



PRODUCT SPECIFICATION

**CARD READER, 80 COLUMN
9504**

230 VAC, 50 Hz OPTION 9505

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DATAPOINT CORPORATION

PRODUCT SPECIFICATION

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230 VAC, 50Hz OPTION

9504
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1.0 GENERAL

The Datapoint 9504 is a medium speed card reader intended for operation with a Version II Datapoint 2200, 1100 or Datapoint 5500.

The 9504 reads standard 80 column punched cards at a maximum continuous speed of 300 cards per minute.

Due to the design of the transport mechanism and inclusion of special electronics, the reader is extremely tolerant of bent cards or errors in punch registration.

The reader includes an internal Datapoint 2200/5500 compatible interface and is program compatible with the 9500 card reader/interface system. The interface contains a 64 character first-in, first-out buffer to reduce program timing constraints.

2.0 SYSTEM CONFIGURATION

The Datapoint 9504 requires only connection to a Datapoint 2200 Version II, 1100 or Datapoint 5500 for operation. There are no minimum memory requirements.

3.0 TECHNICAL DESCRIPTION

3.1 Specifications

Card Rate: 300 cards per minute maximum

Input Power: 102-127 VAC, 60 Hz, single phase
14.5 Ampere (max) starting load for 3 seconds,
5.0 Ampere (max) running load

204-254 VAC, 50 Hz single phase available with option 9505;
7.3 Ampere (max) starting load for 3 seconds,
2.5 Ampere (max) running load

Power Dissipation: 635 watts maximum

Card Capacity: Input hopper - 550 cards
Output stacker - 550 cards

Card Specifications: Cards must meet American National Standard's specification ANSI X3.11 - 1969, Specification for General Purpose Paper Cards for Information Processing. (No color requirements).

Punch Data: Punch data must meet American National Standard ANSI X3.21 - 1967 specifications.

Acceptable Punch Registration: Plus or minus 40% of nominal.

3.2 Operator Controls and Indicators

Operator controls and indicators are located on the front and rear panels of the 9504 (See Figure 4-1).

3.2.1 Rear Panel

AC POWER Switch

This is an AC power circuit breaker which controls primary power for the reader.

SHUTDOWN Switch

This is a two-position switch which controls the drive motor and the vacuum/blower. In MANUAL mode, these motors run continuously when AC power is applied. In the AUTO mode, all motors will turn off when the input hopper is empty (all cards have been read) and may also be turned on and off by program control.

MODE Switch

This is a two-position switch which controls the mode of reader operation. In ON-LINE mode, the reader feeds and reads cards under program control. In OFF-LINE mode, the reader reads cards continuously (program control is lost) until all cards have been read or until an error causes the reader to stop.

ADDRESS Indicator

This indicator is illuminated while the 9504 is addressed by the Datapoint Processor.

OVERRUN Indicator

This indicator is illuminated if the Datapoint Processor does not remove characters from the first-in, first-out buffer sufficiently fast to provide storage locations for new characters read from a card (overrun).

This is not a normal occurrence and usually indicates a program or card reader failure.

LAMP TEST Switch

This is a momentary action test switch which, when pressed, causes all indicators on both the front and rear panels to illuminate so that their operation may be verified.

3.2.2 Front Panel

POWER Indicator

This indicator is illuminated whenever primary AC power is applied to the reader and the AC power switch on the rear panel is set to the ON position.

RESET Switch and Indicator

The RESET switch is a momentary action switch which, when pressed, clears any error conditions and establishes a card reader 'ready' condition if no fault or error conditions are still present. When the 'ready' condition is established, the RESET indicator will light green. The function of this switch/indicator is the same in OFF LINE and ON LINE modes.

STOP Switch and Indicator

The STOP switch is a momentary action switch which, when pressed, terminates card reader operation at the end of a read cycle. The STOP indicator will illuminate red and the RESET indicator will go off when the 'stop' condition is established. The 'stop' condition is also caused by any of the 'check' conditions listed below.

READ CHECK Indicator

The READ CHECK indicator will light and the stop condition will be established when any of the following conditions are detected by the reader:

- 1) Failure of leading or trailing edge dark check.
- 2) Failure of trailing edge light check.
- 3) Card slippage.
- 4) Control logic failure.
- 5) Any hole greater than 40% mis-punched.

PICK CHECK Indicator

The PICK CHECK indicator is lighted if a card fails to reach the read station after a pick command has been given. This may be caused by excessive leading edge card damage, interlocked webs, cards stapled together or excessive card warpage.

STACK CHECK Indicator

The STACK CHECK indicator is lighted if the previous card read has not reached the output stacker. This may be caused by an obstruction in the card track or incorrectly stacked cards in the output stacker.

HOPPER CHECK Indicator

The HOPPER CHECK indicator is lighted when the input hopper is empty or when the output stacker is full. This may occur during normal operation.

3.3 Operation

3.3.1 Loading the Input Hopper

Load the input hopper with cards to be read as follows:

a) Remove the hopper follower and load the card deck into the hopper area; the first card to be read must be placed at the front with the '9' edge down, column '1' to the left. Continue placing cards into the hopper until it is loosely filled (approximately 550 cards). Replace the follower.

Caution: Do not pack the input hopper so full that the riffle action at the air riffle cap is inhibited.

b) The hopper may be loaded while cards are being read if the operator is careful to keep tension on the front portion of the deck while loading additional cards at the rear. This is accomplished with the input hopper approximately one-half to one-third full. Use just enough pressure to maintain the riffle action.

c) Unloading the input hopper is the reverse of the loading procedure. Normally all cards are processed through the reader; however, if it is necessary to unload the hopper, remove the follower and remove the card deck. If the cards are arranged in a particular order, exercise care in repacking them in their storage container so that the order is maintained.

3.3.2 Unloading the Stacker

To unload the stacker, perform the following steps:

a) Pull the stacker follower down and remove the front or rear portion of the card deck from the stacker area, being careful that deck order is maintained.

b) To unload stacker during operation, pull stacker down and remove portion of deck taking care to allow stacker plate to return to its normal position gradually.

3.4 Programming Requirements

The 9504 must be used with a Version II Datapoint 2200, 1100 or a Datapoint 5500. (In the following text, it is understood that all definitions and requirements apply identically to all machines, but processor will be used as the term of reference).

A 12-bit data field for each column of a card is transferred to the Datapoint Processor in two successive byte transfers. No code conversion is performed by the reader; a full binary image is transferred.

3.4.1 Device Address

The 9504 is addressed by loading the I/O-register with its Input/Output System Bus address and executing an EX ADR instruction. The 9504 is strapped at the factory for address 207 octal, but this may be easily changed in the field.

The 9504 must be addressed for the reader to transmit data or status to the Datapoint Processor or to accept program commands.

3.4.2 Status/Data Input

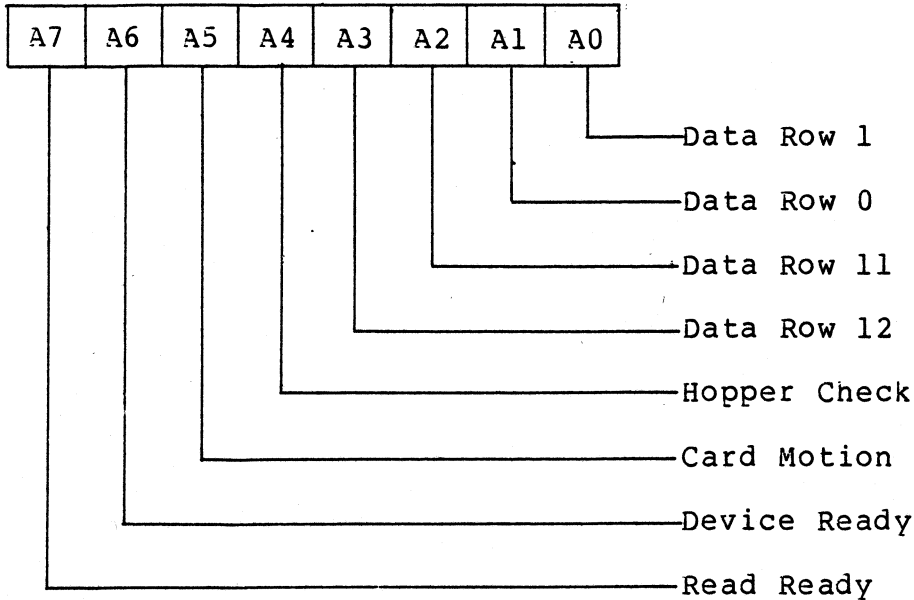
The status byte or data byte is transferred to the I/O-register of the Datapoint Processor by execution of an INPUT instruction while the 9504 is addressed.

The 9504 is in status mode and will place its status byte on the I/O Bus following execution of an EX ADR or EX STATUS instruction. It is in data mode and will place its data byte on the I/O Bus after execution of an EX DATA instruction.

The 9504 has only four status bits; the remaining four bits of the status byte are used to convey four rows of the card column. The remaining eight rows make up the data byte.

The status byte is defined as follows:

STATUS BYTE



A0 - A3 Data Rows 1, 0, 11, 12

The bit is a 1 if a hole is punched in the corresponding row.

A4 Hopper Check

This bit is set to 1 if the input hopper is empty or the output stacker is full.

A5 Card Motion

This bit is set to 1 to indicate that a card is in the process of being read. It comes true before the first column is read by the Reader and stays true until after the last column is read.

A6 Device Ready

When this bit is set true (1) and the Card Motion status bit is false (0), the Reader is capable of reading a card except if the program has turned off the Reader motors by means of an EX COM4 (See 3.4.3). In this case Device Ready is true even though the motors are off and a card cannot be read. However, when the motors are again turned on by means of an EX COM3, Device Ready immediately goes false for a period of approximately 3 seconds until the motors are up to speed again. When Device Ready comes true at the end of this time, the Reader can accept a Feed (EX COM2) command and feed a card.

This bit is set false if:

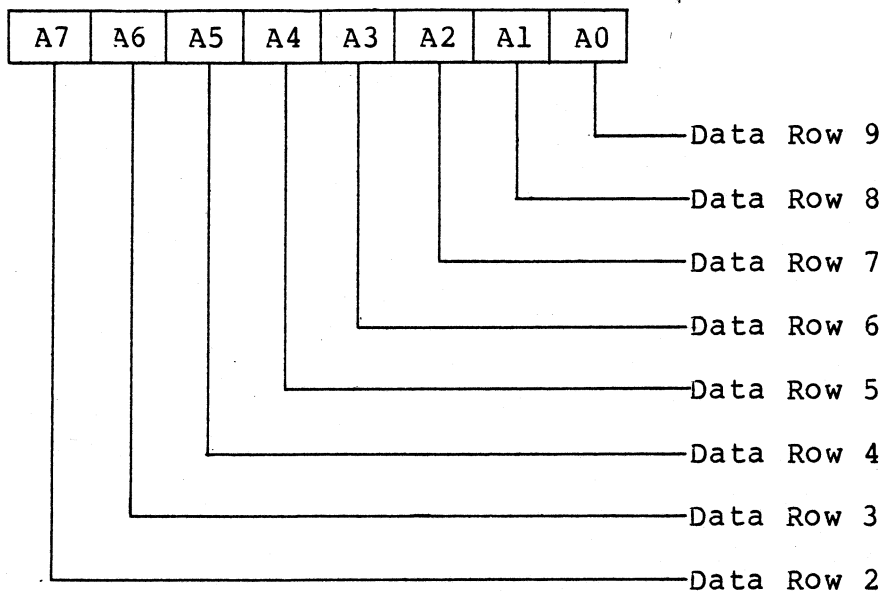
- a) Reader AC power is off,
- b) The Reader is in 'Off-Line' mode, or
- c) The Reader has a 'stop' condition, due either to operator actuation of the STOP switch or presence of a read, pick, stack or hopper check condition. Operator intervention (removing the check condition and pressing the RESET switch) is required to achieve Device Ready once it has been set false for any reason except immediately following a Motor On (EX COM4) command.

A7 Read Ready

This bit is true (1) if one or more valid 12-bit data characters is available in the Reader's first-in, first-out buffer. This bit is cleared to 0 when an INPUT instruction is executed by the Datapoint Processor while the 9504 is addressed and in data mode.

The data byte is defined as follows:

DATA BYTE



Each of these bits is a 1 if a hole is punched in the corresponding row.

3.4.3 Commands

Card Feed - Execution of an EX COM2 causes the Reader to feed a card if status bit 7 (DEVICE READY) is true (1) and a card is not presently in motion (status bit 5 false) except if the program has turned the motors off (See description of Device Ready status bit above).

Motor On - Execution of an EX COM3 turns the Reader motors on and clears the first-in, first-out data buffer. The Device Ready status bit will go false (0) for a period of approximately 3 seconds while the Reader motors come up to speed after execution of EX COM3.

Motor Off - Execution of an EX COM4 turns the Reader motors off. Note that EX COM4 does not set Device Ready false.

3.4.4 Data Buffer Operation

The 9504 incorporates a 64 character first-in, first-out buffer. This buffer allows cards to be read without dedicating the Datapoint Processor to constant interaction with the Reader.

When a card feed command (EX COM2) is issued to the Reader, the twelve bits of each column are loaded into the buffer as they are read in from the card. Characters may be read out of the buffer as they are being written into the buffer by the Reader. If the Datapoint Processor can keep up with the character rate of the reader then the character will fall through the buffer and buffering action will not occur, nor will it be needed. However, if the Datapoint Processor unloads characters at a slower rate than they are being read, then characters will be stored in the buffer for the Datapoint Processor to unload as the speed of its program allows. A character is unloaded from the buffer each time an INPUT instruction is executed while in the data mode. If the entire card is not going to be read, an EX COM3 should be executed after the last desired character is read to clear the buffer. It should be noted that if a card is read but no characters are unloaded from the buffer, then only the first 64 characters will be stored in the buffer and the last 16 will be lost. It is not necessary to unload all of the characters from the buffer before issuing a new feed command, however, any characters left in the buffer will count towards its capacity of 64.

The following example routine illustrates this procedure:

```

START  LA      0207      ADDRESS READER
      EX      ADR
      EX      COM3      TURN ON MOTOR AND CLEAR BUFFER
      INPUT
      ND      0120      INPUT STATUS OF READER
      CP      0100      LEAVE READY AND HOPPER CHECK BITS
      JFZ     EXIT1     TEST FOR READY=1, HOPPER CHECK=0
      EX      COM2      DEVICE NOT READY OR HOPPER CHECK
      EX      COM2      FEED A CARD
CARMO  INPUT
      ND      0160      INPUT STATUS OF READER
      ND      0160      LEAVE CARD MOTION, READY, & HOPPER
      CP      0140      CHECK
      JTZ     CHAR      THE CARD HAS ENTERED THE READ STATION
      CP      0140      START LOOKING FOR CHARACTERS
      CP      0140      A TIME-OUT ROUTINE MAY BE INSERTED
      CP      0140      HERE TO TEST FOR MISSED FEEDS,
      CP      0140      PREVENTING PROGRAM HANGING IF A FEED
      CP      0140      SHOULD BE MISSED
CHAR   JMP     CARMO
      EX     STATUS    SELECT STATUS
      INPUT
      ND     0240      INPUT STATUS OF READER
      JTZ   DONE      LEAVE READ READY AND CARD MOTION BITS
      CP     0240      IF BOTH ARE ZERO THEN ALL CHARACTERS
      CP     0240      HAVE BEEN READ AND THE CARD HAS
      CP     0240      PASSED THE READ STATION-ANOTHER FEED
      CP     0240      COMMAND MAY BE ISSUED
      ND     0200      CHECK FOR READ READY
      JTZ   CHAR      NO CHARACTER
      ND     017      STRIP OFF DATA PART (DATA ROWS
      CP     017      12/11/0/1)
      CP     017      THIS PART OF THE DATA WORD CAN NOW BE
      CP     017      STORED AS DESIRED
      EX     DATA     SELECT DATA
      INPUT
      CP     017      READ IN DATA ROWS 2/3/4/5/6/7/8/9
      CP     017      THIS PART OF THE DATA WORD CAN NOW BE
      CP     017      STORED AS DESIRED
      JMP   CHAR      GO BACK TO CHAR TO LOOK FOR THE NEXT
      CP     017      CHARACTER
EXIT1  DC     0        TAKE APPROPRIATE ACTION
DONE   DC     0        TAKE APPROPRIATE ACTION

```

4.0 PHYSICAL DESCRIPTION

Size:

Height: 11 inches
Width: 19.3 inches
Depth: 14 inches

Weight: 60 pounds

See Figure 4-1 for location of operator controls and power and I/O Bus connectors.

5.0 ENVIRONMENTAL REQUIREMENTS

Operating:

Dry Bulb Temperature: 50 to 100 degrees F
(10 to 38 degrees C)

Relative Humidity: 30% to 90% non-condensing

Wet Bulb Temperature: 80 degrees F maximum
(27 degrees C)

Heat Dissipation: 2165 BTU/HR

Altitude: 1000 feet below to 6000 feet above sea level

Storage:

Dry Bulb Temperature: -25 to +135 degrees F
(-32 to 57 degrees C)

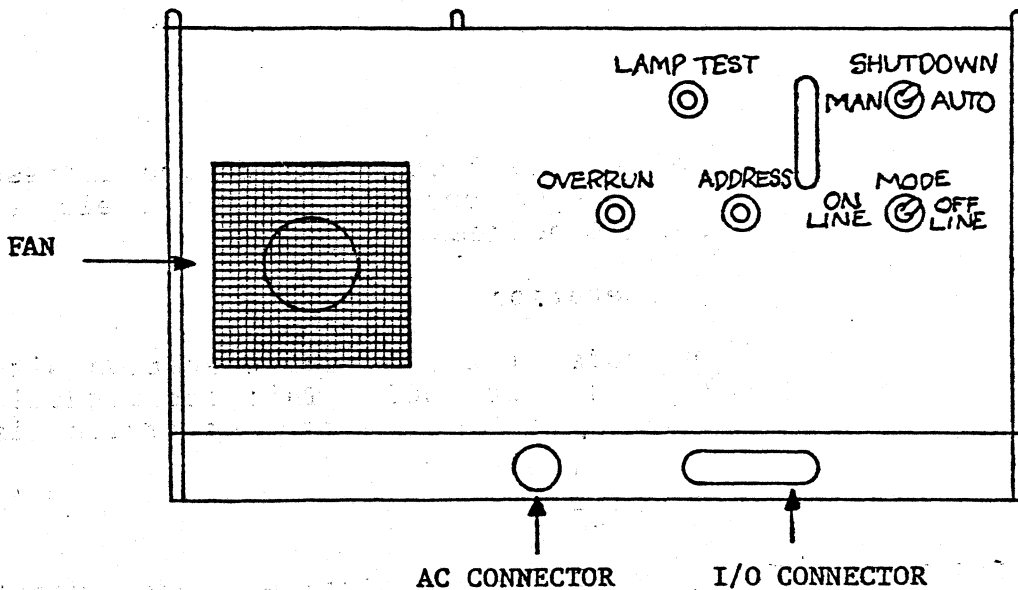
Relative Humidity: 5% to 95% non-condensing

Altitude: 1000 feet below to 12000 feet above sea level

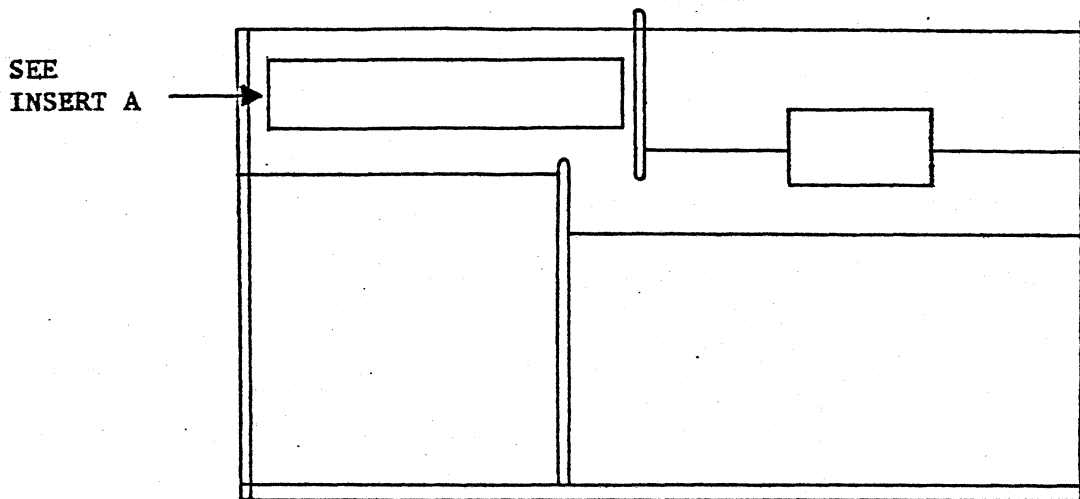
6.0 INTERFACE REQUIREMENTS

The only connections required for operation of the 9504 are primary power (115 VAC or 230 VAC as appropriate) and the I/O System Bus. These are available at the rear of the Reader.

REAR VIEW



FRONT VIEW



INSERT A

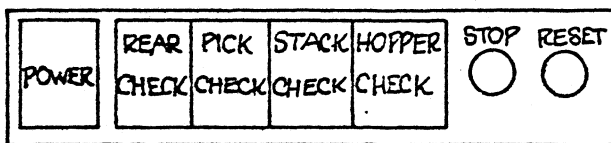


FIGURE 4-1 - 9504 PHYSICAL LAYOUT

7.0 OPTIONS

7.1 Device Address

The 9504 is strapped at the factory for device address 207 octal. This may be easily changed in the field to configure any other valid I/O address.

7.2 Datapoint 5500/2200 Operation

A single strap configures the 9504 for operation with either the Datapoint 2200, 1100 or 5500. This strap should be set to match the machine with which operation is intended.

7.3 230 VAC, 50Hz Option 9505

230 VAC, 50Hz operation may be obtained under model code option 9504/9505. Complete model codes for the Reader are:

9504: 115 VAC, 60Hz

9504/9505: 230VAC, 50Hz

8.0 SHIPPING LIST*

The following items are shipped with each 9504:

<u>QUANTITY</u>	<u>ITEM</u>
(1)	9010 Cable, Processor External Device, 8 feet
(1)	Diagnostic Routines
(1)	9504 Card Reader
(1)	9504 Product Specification
(1)	Card Weight
(1)	Power Cable

*Note: This shipping list is for reference only and is superceded by the current Datapoint Shipping List in use at time of shipment.