Publication Number 29-290R01

# M46-250
# HIGH SPEED PAPER TAPE READER AND READER PUNCH COMBINATION INTERFACE INSTRUCTION MANUAL

CONSISTS OF:

| | |
|---|---|
| Installation Specification | 02-265A20 |
| Maintenance Specification | 02-265R01A21 |
| Programming Specification | 02-265R01A22 |
| Schematic | 02-265D08 |
| Information Drawing | 02-298D12 |
| Information Drawing | 02-299D12 |

INTERDATA®
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December 1973

# M46-250
# HIGH SPEED PAPER TAPE READER AND READER/PUNCH COMBINATION INSTALLATION SPECIFICATION

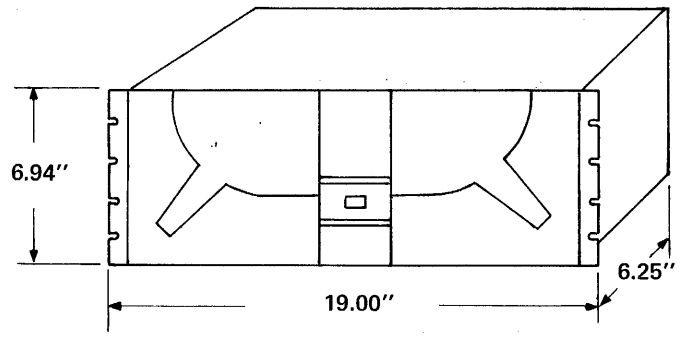
## 1. INTRODUCTION

This specification provides the information necessary to install the High Speed Paper Tape Reader System and the High Speed Paper Tape Reader/Punch Combination System in a standard INTERDATA 66 inch cabinet.

## 2. MECHANICAL ASSEMBLY

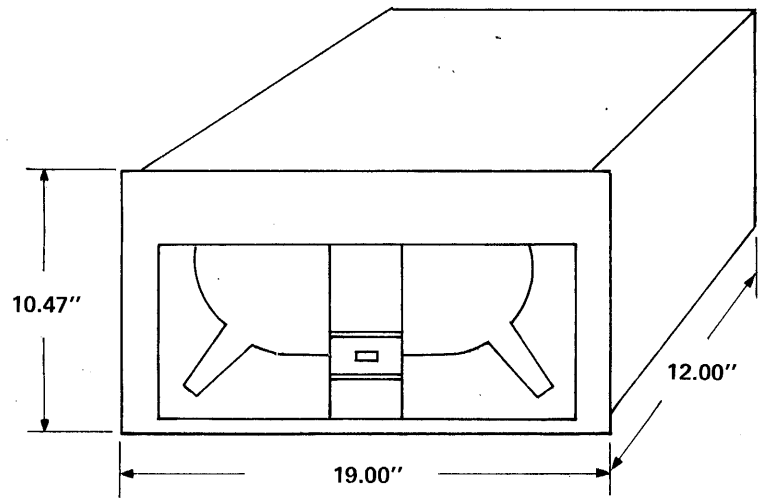
The INTERDATA High Speed Paper Tape Reader System consists of a Paper Tape Reader (27-045), a single seven inch controller (35-439), an interface cable (17-220), and a hardware kit (16-160).

The INTERDATA High Speed Paper Tape Reader/Punch Combination System consists of a Paper Tape Reader/Punch Combination unit (27-046), a single seven inch controller (35-439), an interface cable (17-220), a bracket set (14-363), and a hardware kit (16-160). The physical characteristics of the assembly are shown in Figure 1.




WEIGHT-26.5 LBS.

READER




WEIGHT-60 LBS.

READER/PUNCH

Figure 1. Reader and Reader/Punch Dimensions

A. C. POWER REQUIREMENTS

The INTERDATA High Speed Paper Tape Reader and the High Speed Paper Tape Reader/Punch Combination Systems are normally equipped for 115 VAC, 50/60 Hz operation. For operation with 230 VAC, 50/60 Hz, a minor wiring change is made by removing the cover plate and changing the wiring on the primary of the transformer as follows:

1. Reader Only
   Change the White/Black wire at TB1-6 to TB1-5 for 100 VAC, to TB1-7 for 127 VAC, to TB1-8 for 220 VAC, or to TB1-9 for 240 VAC. The fan must remain tied to TB1-6. In addition, a 1.5 amp fuse must be substituted for the 3 amp fuse at F1 when using 220 or 240 VAC. See Figure 2 and the Vendor Technical Manual for detailed information.

2. Reader/Punch Combination
   Change the Red wire at TB1-6 to TB1-5 for 100 VAC, to TB1-7 for 127 VAC, to TB1-8 for 220 VAC, or to TB1-9 for 240 VAC. The fan must remain tied to TB1-6. In addition, a 2 amp fuse must be substituted for the 4 amp fuse at F1 when using 220 or 240 VAC. See Figure 2 and the Vendor Technical Manual for detailed information.

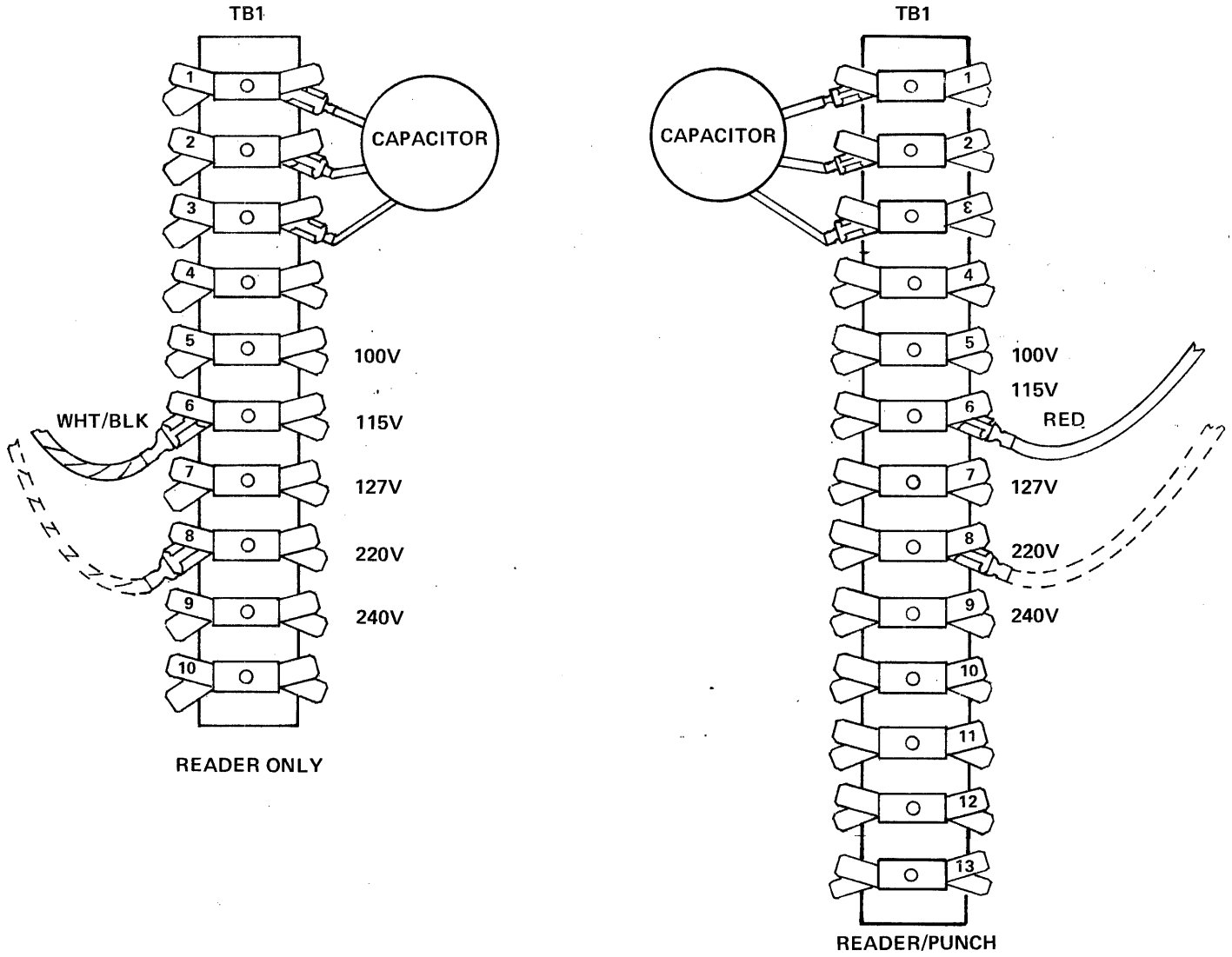



Figure 2. Transformer Wiring Change for Voltages Other Than 115VAC.

4. MOUNTING

4.1 Reader Only

The Reader can be mounted in any standard 19 inch RETMA cabinet or rack. For mounting instructions and procedures, refer to drawing 02-298C12 provided in the Instruction Manual, Publication Number 29-290.

4.2 Reader/Punch Combination

The Reader/Punch Combination unit contains chassis slides which mount to the cabinet. In addition, the front panel secures to the cabinet by means of two mounting studs which snap into sockets. These studs are part of two striker plates which are mounted on each side of the rack by two screws each. To release the sockets from the studs, depress the buttons at the top of the panel. For detailed information, refer to drawing 02-299C12 provided in the Instruction Manual, Publication Number 29-290.

## 5. SYSTEM CONFIGURATION

The High Speed Paper Tape Reader and Punch Controller may be installed in any standard 15 inch I/O slot of an INTERDATA Processor or expansion card file. Remove the RACKO/TACKO Strap between Back Panel Terminals 122 and 222 at the Controller location. The Controller device address is normally wired for X'13' and X'03'. If a set of addresses different from the normal set is desired, the address strapping at the Controller must be altered.

Information for changing the addresses is provided in the Maintenance Specification 02-265A21.

## 6. CABLE CONNECTIONS

Figure 3 shows the proper cable connections between the Controller and the Reader only. Note that J1 (CANNON DB-25P) is not used.

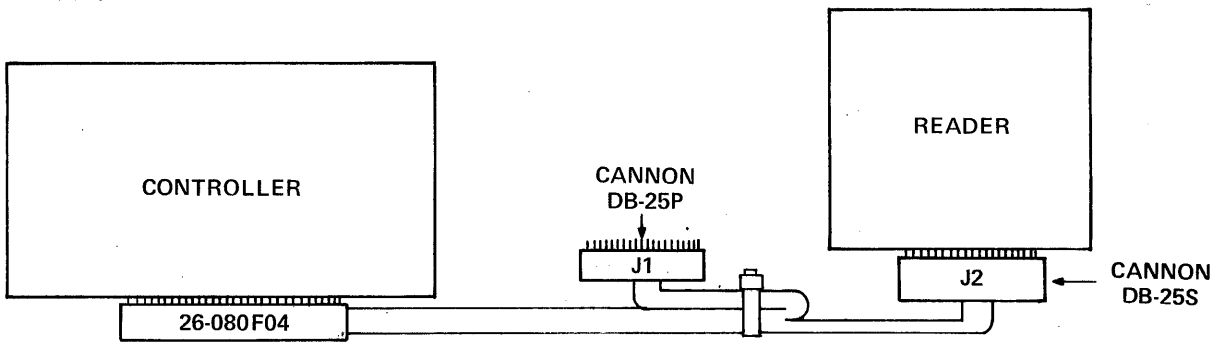



Figure 3. Cable Connection - Controller to Reader

Figure 4 shows the proper cable connections between the controller and the Reader/Punch Combination unit.

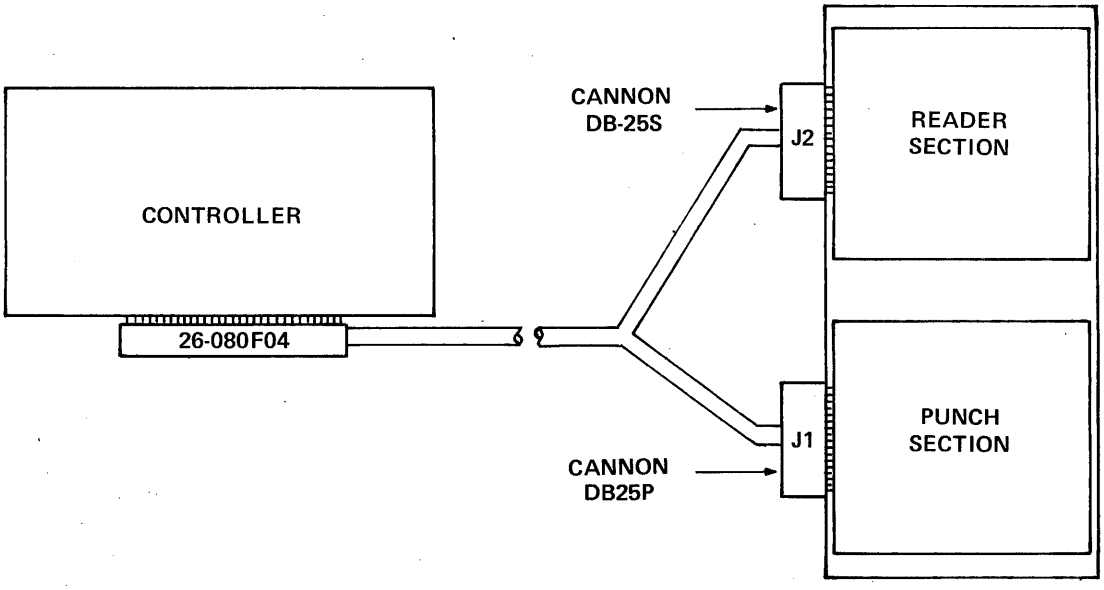



Figure 4. Cable Connection - Controller to Reader/Punch

## 7. VERIFICATION TEST

After installation, run test program 06-137 to determine that the unit is operating correctly.

# M46-250
# HIGH SPEED PAPER TAPE READER AND READER PUNCH COMBINATION INTERFACE MAINTENANCE SPECIFICATION

## 1. INTRODUCTION

The INTERDATA High Speed Paper Tape Reader System consists of a Paper Tape Reader, a single 7 inch controller, and an interface cable. The paper tape reader is rack mounting and equipped with a built-in Power Supply.

The INTERDATA High Speed Paper Tape Reader/Punch Combination System consists of a Paper Tape Reader and a Paper Tape Punch, a single 7 inch controller, and an interface cable. The Reader and Punch are contained in a single unit which mounts on slides and is equipped with a built-in Power Supply.

The following is the relationship between Product Number and Part Number for the various INTERDATA Products.

| PRODUCT NUMBER | PART NUMBER | DESCRIPTION |
|---|---|---|
| M46-240 | 02-298 | High Speed Paper Tape Reader, 60 Hz, 115V |
| M46-241 | 02-300 | High Speed Paper Tape Reader, 50 Hz, 230V |
| M46-242 | 02-299 | High Speed Paper Tape Reader/Punch, 60 Hz, 115V |
| M46-243 | 02-301 | High Speed Paper Tape Reader/Punch, 50 Hz, 230V |
| M46-250 | 02-265 | High Speed Paper Tape Reader/Punch Interface |

## 2. SCOPE

This specification provides the information necessary to maintain the High Speed Paper Tape Reader System and the High Speed Paper Tape Reader/Punch Combination System. It includes a Block Diagram, Functional Schematic Analysis, Device Address Strapping, Timing Information, and a Mnemonics List.

## 3. BLOCK DIAGRAM

The High Speed Paper Tape Reader performs two basic functions:

1. It drives tape in either direction over the read station.
2. It converts the tape information into electrical signals.

These two functions are shown in the block diagram in Figure 1.

The High Speed Paper Tape Reader/Punch Combination performs two basic functions:

1. It controls the operation of the Punch mechanism in response to the input Control signals.
2. It reads tapes.

These two functions are shown in the block diagrams in Figures 1 and 2.

The Interface block diagram is on Sheet 1 of Functional Schematic 02-2651D08. All controls come from the Device Controller.

With the HSPTR/P Interface both the Reader and the Punch use a single device controller. Accordingly it can either read or punch at any given time.

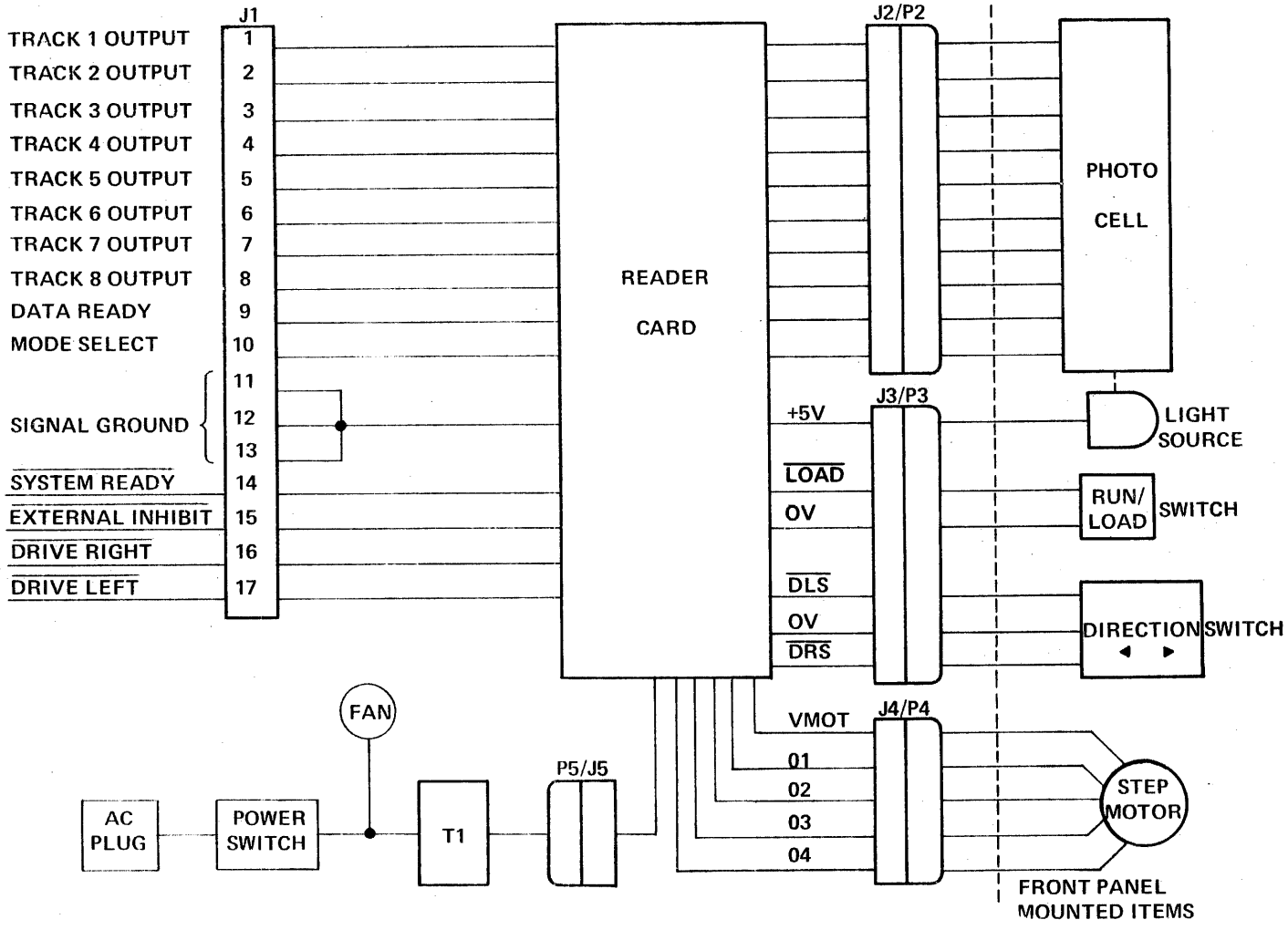



Figure 1. HSPTR Block Diagram

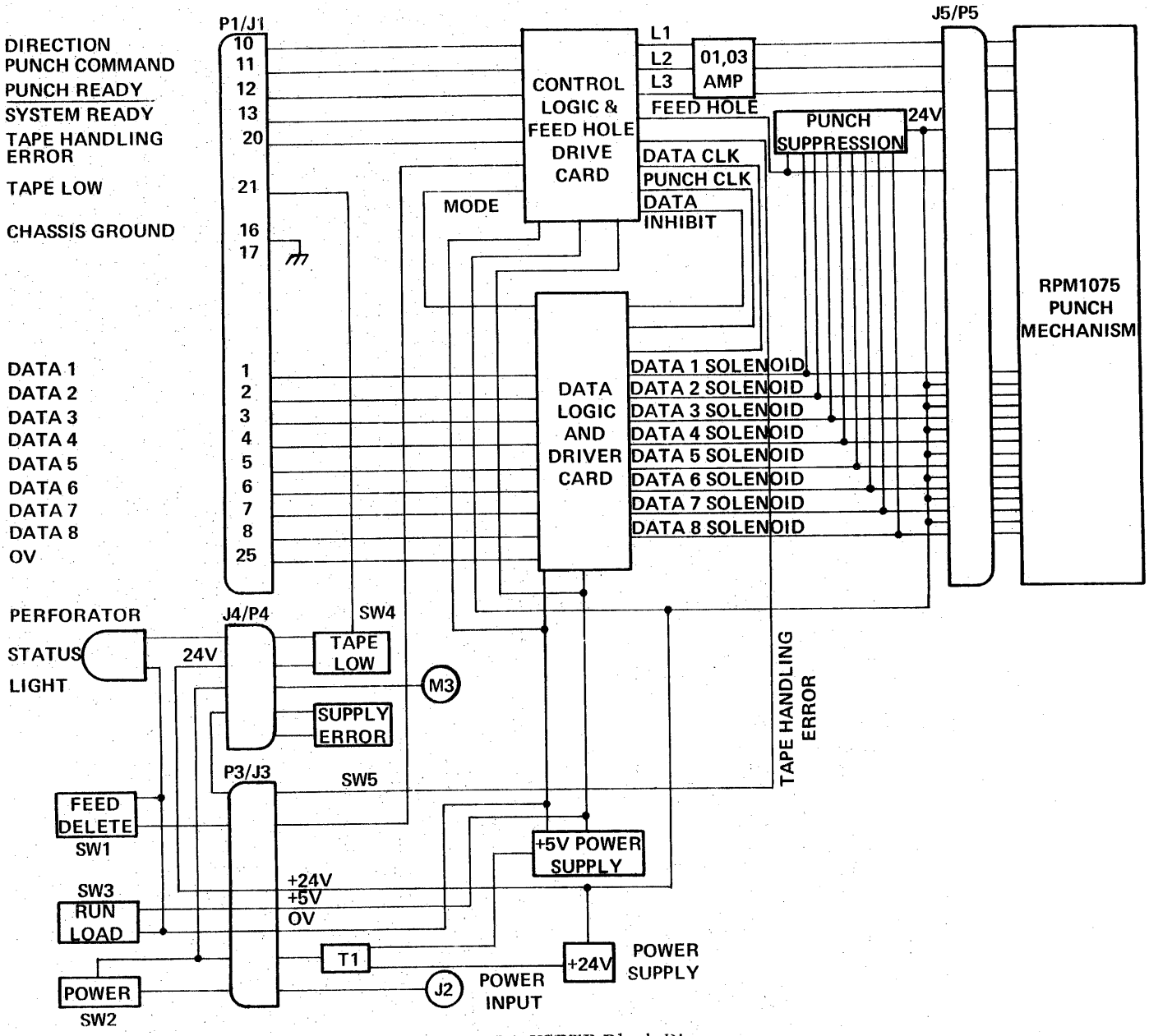



Figure 2. HSPTP Block Diagram

## 4. FUNCTIONAL SCHEMATIC ANALYSIS

### 4.1 Addressing

Prior to receiving any commands, the HSPTR/P Device Controller must receive its address and respond properly. This is done through Micro-Sequences which first send the address (X'13' for Reader/Punch Combination, X'03' for Reader only) on the Data Lines (D080 through D150). The Data Lines go through single to double rail converters and address straps which drive a decoding network. The decoding network is ANDed with the inverted signal from ADRS0 and the output sets the Address flip-flop (AD). After a delay, the SYN0 signal goes low and is tested by the Processor to determine if the HSPTR/P has responded to its address. The AD flip-flop being set enables other Modes of operation (e.g. Writing, Reading, Status Request, etc.) in the HSPTR/P Interface. The AD flip-flop is reset by SCLR0 or when another device is addressed.

### 4.2 Status

The definitions of the Status and Command bits for the HSPTR/P Interface are shown in Table 1. Five Status bits are provided by the HSPTR/P Interface.

The BSY (Busy), EX (Examine), DU (Device Unavailable) and EOM (End of Message-Media) bits occur in the same bit position for all Device Controllers. The HSPTR/P Interface does not use the EOM bit. The EX Status bit is used to indicate that there are other status conditions in the remaining four bits.

TABLE 1. HIGH SPEED PAPER TAPE READER/PUNCH STATUS AND COMMAND BYTE DATA

| BIT NUMBER | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|
| STATUS BYTE | OV | 0 | 0 | NMTN | BSY | EX | 0 | DU |
| COMMAND BYTE | * DISABLE | * ENABLE | STOP | RUN | INCR | SLEW | WRITE | READ |

* DISARM = DISABLE • ENABLE

STATUS

| BIT | READER | PUNCH |
|---|---|---|
| OV | The Overflow bit is set when the Buffer Register is loaded from the Reader before the previous character has been transferred. This condition can only happen in the SLEW Mode. It is reset by:<br>1. Initialization<br>2. The HSPTR/P changing from Read Mode to Write Mode.<br>3. The HSPTR/P changing from Write Mode to Read Mode.<br>4. The Reader changing from STOP to RUN. | The Overflow bit is always reset in the Write Mode. |
| DU | The Device Unavailable bit is set when the power to the Reader is OFF, the power is not stabilized, the RUN/LOAD Switch is in the LOAD position, the drive signal is received and a new feed hole is not sensed within 10 milliseconds, indicating either no tape or torn tape. DU also serves as the out-of-tape signal. It is reset when the above conditions are not true. | The Device Unavailable bit is set when the power to the punch is OFF or internal voltages have not stabilized, or RUN-LOAD Switch is in LOAD, or the chad box is full. It is reset when the above conditions are not true.<br><br>Note that CHAD ERROR is reset by depressing the PERF STATUS Switch. |
| NMTN | The No Motion Bit is set when the Reader has issued a Stop Command and the tape has been stopped on a character. It is reset when the tape starts moving. | The No Motion Bit is always reset in the Write Mode. |
| BSY | The Busy bit is set when the Buffer Register is empty, waiting for an output from the Reader. It is also set if the Reader is in the Load condition or the Reader power is not stabilized. It is reset when the above conditions are not true. | The Busy Bit is set when the tape is advancing and in the punch cycle. It is reset when the punch is ready to accept a punch command. |
| EX | The Examine bit is set whenever OV = 1 or NMTN = 1. It is reset when they are both reset. | The Examine bit is always reset in the Write Mode. |

COMMANDS

| BIT | READER | PUNCH |
|---|---|---|
| DISABLE | This Command inhibits interrupts from the Device Controller from interrupting the Processor. Interrupts are queued. | Same as Reader |
| ENABLE | This Command permits interrupts from the Device Controller to interrupt the Processor. | Same as Reader |
| DISARM | Setting both the DISABLE and the ENABLE bits, DISARM prevents the device from interrupting or queuing the interrupts. | Same as Reader |
| STOP | This Command bit halts the Motion of the tape. The next character to be read is positioned over the sense lights when the tape stops. | Not used. |
| RUN | This Command starts the tape moving if in the SLEW Mode and always leaves the Controller in the Run Mode. | Not used. |
| INCR | In this mode of operation, the tape is advanced one character when the Controller is in the Run Mode and a Read Data instruction is executed. The tape stops after encountering the next character. The tape remains stopped until a Read Data instruction, which starts the tape moving again. | Not used |
| SLEW | In this mode of operation, the tape is advanced continuously until stopped. | Not used |
| WRITE | | Designates the High Speed Paper Tape Punch. |
| READ | Designates the High Speed Paper Tape Reader. | |

4.3 Commands

Any meaningful combination of commands can be simultaneously issued to the Device Controller. The specific command or combination of commands is sent on the Data Lines, followed by the CMD0 signal on the Control Lines. Command enters the Controller as CMD0. This is inverted and ANDed with AD1 to produce CMG0 (Gated Command). This signal is again inverted to gate the bits from the Data Lines to the Command flip-flops.

Because of the dual purpose of the Interface (control of either Read or Write operations), a command to specify a particular operation must be given. If a Read/Run is specified, the WT flip-flop is reset, inhibiting a Write operation from taking place and enabling the status outputs for a Read operation. If a Write operation is specified, the WT flip-flop is set, inhibiting a Read operation from taking place and enabling the status outputs for a Write operation.

Master control over tape movement for the Reader is achieved with the RN flip-flop. When set, the tape moves in a forward direction and the mode is specified by the SL (Slew) flip-flop (continuous run slew if set, one character command increment if reset). When the RN flip-flop is reset, either mode can be established without interferring with the tape movement.

If this Controller is to be used in the interrupt mode, Data Line Bit 9 is set. With D090 active, CMG1 sets the Interrupt Enable flip-flop. Interrupts are generated by the Interface when the reader goes Not Busy (a character is strobed into the Buffer Register from the HSPTR), the Punch goes Not Busy (a character has been output to the HSPTP and the Interface is ready for more data), changes from Write Mode to Read Mode provided the reader is Not Busy, changes from Read Mode to Write Mode provided the Punch is Not Busy, or when the Device Unavailable bit goes true. The interrupt condition is saved in the Attention flip-flop. Enable gates a saved Attention interrupt condition onto the Processor I/O Bus as ATN0. Note that when changing from the Read Mode to the Write Mode, or from the Write Mode to the Read Mode, pending interrupts are cleared, then the busy status of the new device is checked. If the new device is Busy, no interrupt is generated until the device goes Not Busy. If the new device is already Not Busy upon changing Modes, an interrupt will be generated at the time of changing modes.

If the Controller is to be denied interrupt service, Data Line Bit 8 is set. With D080 low, CMG1 resets the Enable flip-flop and sets the Disable flip-flop. Interrupt conditions may still be saved in the Attention flip-flop, but Attention cannot be gated to the I/O Bus. If Data Line Bits 8 and 9 are both set (Disarm), interrupts are neither generated nor queued.

Initialization occurs on power up or when the Initialize Switch on the Processor is depressed. When initialized, interrupts are disarmed. The Disarm, Stop, Increment, and Read Command functions are set and the No-Motion and Examine Status bits are set provided the Reader power is on and the Run/Load Switch is in the Run position.

The active condition on the Initialize Control Line (SCLR0) sets up preferred states by clearing all flip-flops in the Controller. Whenever the Read/Write Mode changes, a partial initialize clears the Overflow, DT, RN, SL, and ATN flip-flops. The operation establishes known control states when changing between the Read and Write Modes, but may be used to clear these flip-flops without changing modes.

### 4.4 Read Operation

In the Slew Mode of operation, the RN and SL flip-flops are set. This condition, ANDed with FWD1, causes DLT0 (Drive Left) to be active driving the tape to the left continuously until a STOP command is received. The DT flip-flop is reset initially due to either initialization or completion of previous Writes or Reads. This causes BSY1 to be inactive, indicating to the Processor that a character has been read from the paper tape and is awaiting transmission.

The Processor requests data by activating Control Line DR0. The HSPTR/P Interface responds to the Processor request through the derivation of DRG0 which activates the SYN0 signal.

The data which has been previously gated into the HSPTR/P Buffer Register is unloaded onto the Data Lines by the enabling actions of DRG0 through four multiplexors. On the trailing edge of DRG0, the DT flip-flop is set and BSY1 becomes active, indicating to the Processor that the last data has just been taken out of Buffer Register and tape is moving forward for the next data. On the leading edge of the next feed hole, DATRDY1 becomes active. It strobes the data into Buffer Register and fires a one-shot to reset the DT flip-flop and causes BSY1 to go inactive. The main signal describing tape movement is DATRDY1. A True signal indicates that data track outputs are in an "on character" condition. This signal is true with the leading edge of a feed hole and remains true until the next drive signal is accepted. In the Slew Mode, DLT0 is a level. Drive signals are generated inside the Reader 50 microseconds after the leading edge of each DATRDY1 provided DLT0 stays active. If the Processor request for data is late with respect to the next character received from the Reader, OV1 becomes active, giving the Processor an indication that data has been overwritten.

In the Incremental Mode, the SL flip-flop is reset. When the HSPTR Interface receives an RD instruction, it first sends out the data in the Buffer Register to the Processor through the Data Lines, then DRG0 sets the DT flip-flop and causes BSY1 to become active. SL0, ANDed with RN1 and DT1, makes DLT0 active which drives the tape to the left until the next character is encountered. On the leading edge of the feed hole, DATRDY1 becomes active and fires a one-shot to reset the DT flip-flop thus making DLT0 inactive and stopping the tape movement. The HSPTR remains in this state until the Processor requests data and DRG0 is activated. Subsequent data requests by the Processor move the tape one character at a time in the manner just described.

### 4.5 Write Operation

Prior to a Write Operation, a Write Command is issued by the Processor. The Processor transfers data from the Data Lines to the HSPTR/P Interface by activating the DA0 control line. DA0 is inverted in the HSPTR/P Interface and used to derive DAG0. Approximately 200 nanoseconds after DAG0 goes high, SYN1 goes high. SYN1 inverted indicates to the Processor that the HSPTR/P Interface received the information. At this time, BSY1 is inactive due to either initialization or completion of a previous Write or Read operation by the HSPTR/P Interface. DAG0 is inverted and Strobes the information into the Buffer Register. On the trailing edge of DAG0, a one shot is fired and sends the PUNCH Command to the Punch. The PUNCH Command moves tape and initiates punching at up to 75 characters/second. The PRDY1 is inactive during the advance and punch cycle which makes BSY1 active, indicating to the Processor that the Punch is not ready for another Punch Command. At the end of the Punch cycle, PRDY1 becomes active, makes BSY1 inactive, and the HSPTR/P Interface is now ready to receive another byte of data from the Processor.

## 5. DEVICE ADDRESS STRAPPING

The preferred address for the High Speed Paper Tape Reader Controller is X'03' and for the High Speed Paper Tape Reader/Punch Combination Controller is X'13'. The wire-wrap stakes for strapping are located on the Controller. The Schematic 02-265D08 shows the address X'13' for Reader and Punch Combination. For Reader only (X'03'), connect G to 3 (H and 3 are disconnected).

## 6. BI-DIRECTIONAL READ OPERATION

With minor changes, the HSPTR/P Interface can perform bi-directional Read operations. Table 2 shows the Status and Command Bytes for bi-directional read operation:

TABLE 2. STATUS AND COMMAND BYTES FOR BI-DIRECTIONAL READ OPERATION

| BIT NUMBER | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|
| STATUS NUMBER | OV | 0 | 0 | NMTN | BSY | EX | 0 | DU |
| COMMAND BYTE | * DISABLE | * ENABLE | STOP | RUN | INCR | SLEW | REV | FWD |

* DISARM = DISABLE . ENABLE

The FORWARD Read Command drives tape in the forward direction (from right to left) and the REVERSE Read Command drives tape in the reverse direction (from left to right). Note that REV and WRITE occupy the same Data Line (Bit 14) (See Table 1); thus, in bi-directional Read operation, the Write Command cannot be executed.

The following are the necessary changes for bi-directional Read operation:

1. HSPTR/P Interface

   a. Remove the diode D7. (Near IC 21, the anode is connected to Pin 4 of IC 21)
   b. Cut the wire between Pin 11 of IC 12 and the feed hole which is also connected to Pin 4 of IC 4.
   c. Ground Pin 4 of IC 4. (See Figure 3 for details.)

2. Reader Head

   a. Insert a piece of tape known to have been punched with all holes having normal registration.
   b. With power ON, the motor should be energized. Use an Allen wrench to loosen the two set screws which hold the motor to the heat sink.
   c. Rotate the motor so that the holes in the tape appear concentric with the fiberglass read heads and the light columns. (See Figure 3 for details.)

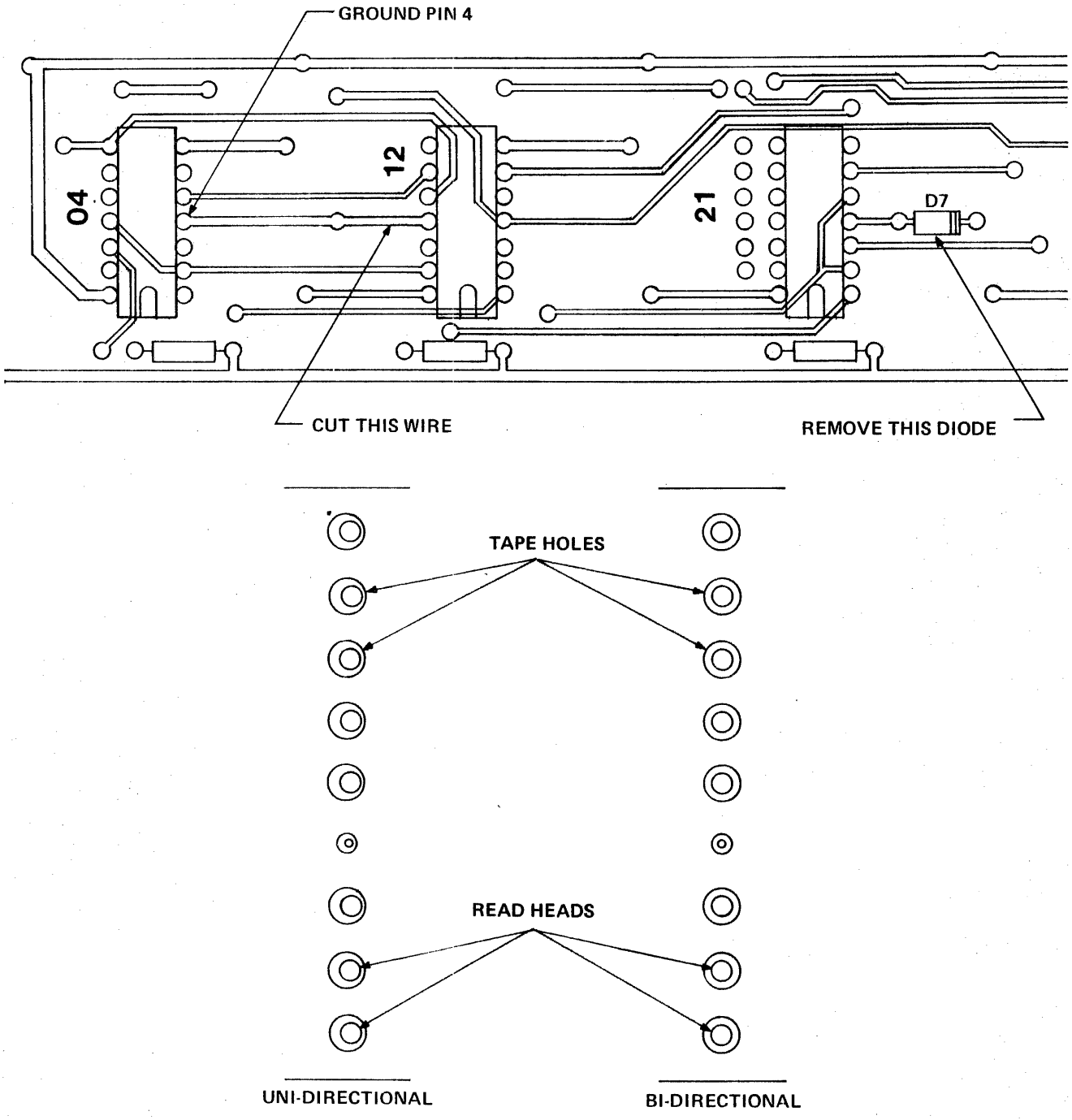



Figure 3. Modifications for Bi-Directional Read

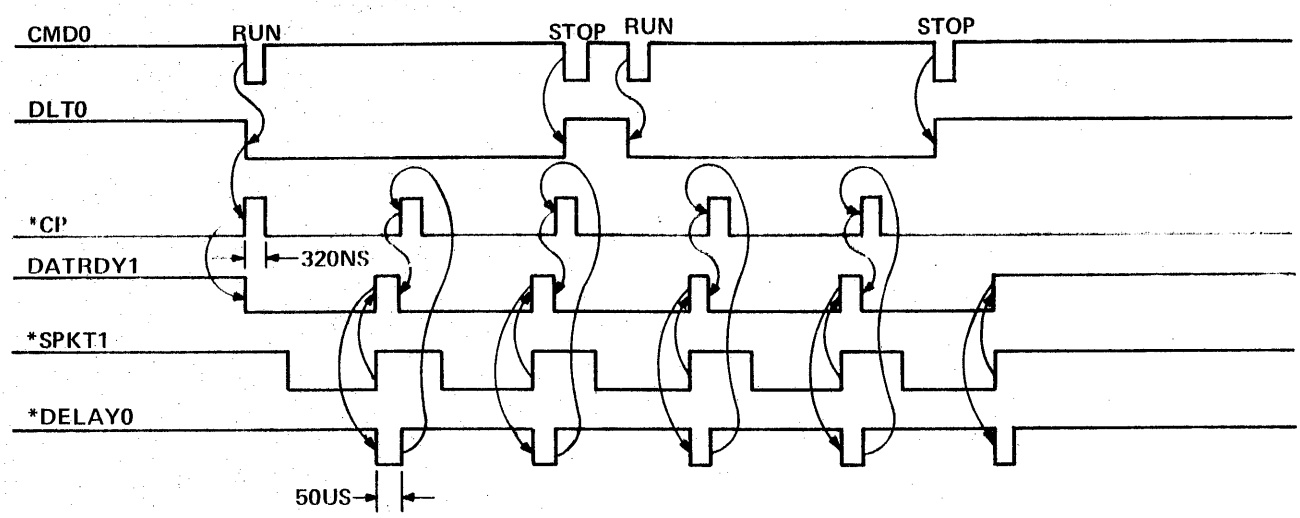
7. MAINTENANCE

The High Speed Paper Tape Reader/Punch Controller requires no periodic maintenance. The Reader and Punch requires periodic maintenance such as cleaning and lubrication. For a procedure and maintenance requirements, refer to the Vendor Technical Manuals, Publication Numbers 29-333 (Reader), and 29-334 (Combination).

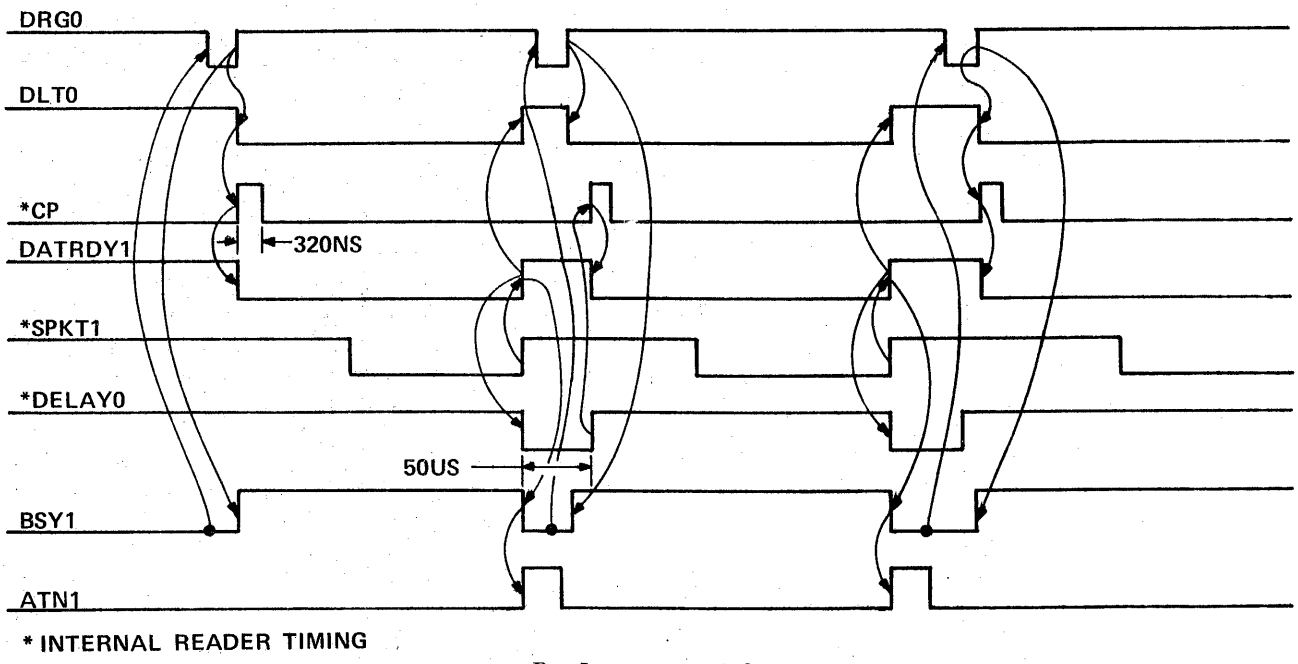
Performance tests of the system can be made on the system by using the test program 06-137. This test program will assist in troubleshooting the Controller.

8. TIMING

The timing diagrams for the Read and Write operations of the Controller are shown in Figures 4 and 5.




A. Slew Mode




B. Increment Mode

Figure 4. Read Mode Timing Diagram

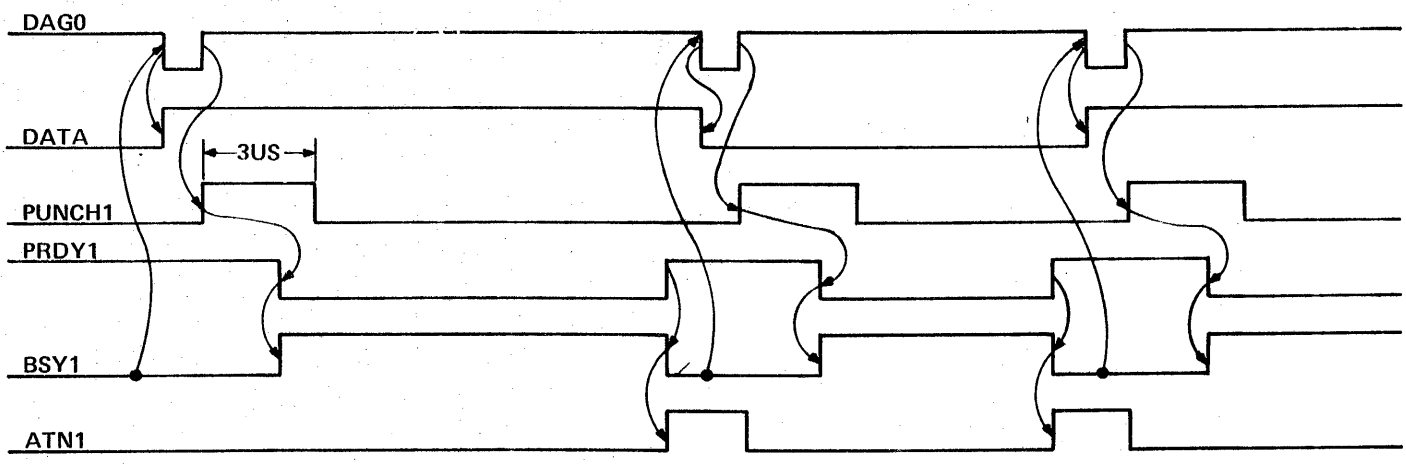



Figure 5. Write Mode Timing Diagram

## 9. MNEMONICS

The following list provides a brief description of each mnemonic found in the HSPTR/P Device Controller. The meaning and the 02-265D08 source of each signal are also provided.

| MNEMONIC | MEANING | LOCATION |
|---|---|---|
| AD1 | Address Flip-Flop | 2G7 |
| ADRS0 | Address | 2F1 |
| ATN0 | Attention | 2A1 |
| BSY1 | Busy | 3F9 |
| CMD0 | Command | 2D1 |
| CMDRST0 | Command Reset | 3N9 |
| CMDRST0A | Command Reset | 3N9 |
| DA0 | Data Available | 2D1 |
| DAG0 | Gated Data Available | 2D9 |
| DATRDY1 | Reader Data Ready | 3A6 |
| DATA11-DATA81 | Punch Data | 3G4-3G1 |
| DAT081-DAT151 | Read Data | 3D4-3D1 |
| D080-D150 | Data Lines | 2N1-2G1 |
| DISARM0 | Disarm | 2B9 |
| DLT0 | Drive Left | 3N3 |
| DR0 | Data Request | 2E1 |
| DRG0 | Gated Data Request | 2E9 |
| DRT0 | Drive Right | 3N3 |
| DT1 | Device Transmit Flip-flop | 3J5 |
| DU1 | Device Unavailable | 3F7 |
| EX1 | Examine | 3M6 |
| FWD1 | Forward | 3M2 |
| HW0 | Halfword | 2G9 |
| NMTN1 | No Motion | 3M6 |
| OV0 | Overflow | 3J6 |
| PATN0 | Pulsed Attention | 2B9 |
| PRDY1 | Punch Ready | 3A8 |
| PSYSRDY0 | Punch System Ready | 3A7 |
| PUNCH1 | Punch | 3D7 |
| RACK0 | Received Acknowledge | 2B1 |
| REV1 | Reverse | 3N2 |
| RN1 | Run Flip-Flop | 3K4 |
| RN0 | Run Flip-Flop | 3K4 |
| SATN0 | Set Attention | 3J8 |
| SCLR0 | System Clear-Initialize | 2E1 |
| SL0 | Slew Mode | 3K4 |
| SR0 | Status Request | 2E1 |
| SREQ0 | Selch Request | 2H9 |
| SYN0 | System Sync. | 2F9 |
| SYSRDY0 | Reader System Ready | 3A5 |
| TACK0 | Transmit Acknowledge | 2A5 |
| TERM0 | Terminate | 2H9 |
| TPHE1 | Tape Handling Error | 3A8 |
| TR11-TR81 | Reader Data Lines | 3A1-3A4 |
| WT1 | Write Flip-Flop | 3M1 |
| XFER0 | Transfer | 2C1 |

# M46-250
# PAPER TAPE READER/PUNCH
# PROGRAMMING SPECIFICATION

## 1. INTRODUCTION

This specification provides information on the operation and programming of the M46-250 combination Paper Tape Reader/Punch interface, which supports the M46-240 Paper Tape Reader or the M46-242 Paper Tape Reader/Punch. Note that with this interface, the PTR/P cannot read and punch tapes simultaneously.

Table 1 lists the general characteristics of the Reader and Punch.

TABLE 1. READER AND PUNCH CHARACTERISTICS

| CHARACTERISTICS | READER | PUNCH |
|---|---|---|
| Type | Photo-electric | Electro-mechanical |
| Tape Width | Fixed width of 1 inch | Fixed width of 1 inch |
| Speed | Maximum of 300 characters-per-second | Maximum of 75 characters-per-second |
| Tape handling | Oiled or unoiled paper, paper-mylar, mylar, and aluminum mylar | Same as the Reader |
| Stop time | Capable of stopping on a character | Punches character and stops |
| Read/Load Switch | Allows loading or changing of tapes | Same as the Reader |
| Power Switch | Applies AC power to Reader motor | Applies AC power to Punch motor |

## 2. CONFIGURATION

The M46-242 Paper Tape Reader/Punch, and the M46-240 Paper Tape Reader only, with the M46-250 interface, require any basic new series Processor configuration. No particular Processor options are necessary. The device is normally used on the Multiplexor Bus.

## 3. OPERATING PROCEDURES

### 3.1 Punch Front Panel

The Punch front panel contains three control switches. They are:

1. Power. This rocker switch turns power on or off to the Punch. It lights in the ON position.

2. Feed. This momentary rocker switch causes the unit to feed tape through the punch mechanism. Sprocket holes are punched, but data is inhibited. Note that operation of this switch in conjunction with external input on the punch line is not allowed and can cause erratic punching.

3. Run/Load. This lever, when in the Run position, allows operation of the Punch mechanism. When in the Load position, it dis-engages the pinch roller from the capstan on the Punch mechanism.

### 3.2 Reader Control Switches

The reader mechanism contains three control switches. They are:

1. Power. This switch turns power on or off to the reader.

2. Run/Load. This switch, which is activated by the tape access door, allows the Reader to operate when the door is closed and inhibits Reader operation when the door is open.

3. Direction Control. This momentary rocker switch enables the user to manually back up or advance the paper tape.

## 4. DATA FORMAT

### 4.1 Reader

The High Speed Paper Tape Reader is a byte buffered device capable or reading up to eight channels on a paper tape.

### 4.2 Punch

The High Speed Paper Tape Punch is a byte buffered device capable of punching up to eight channels in a paper tape.

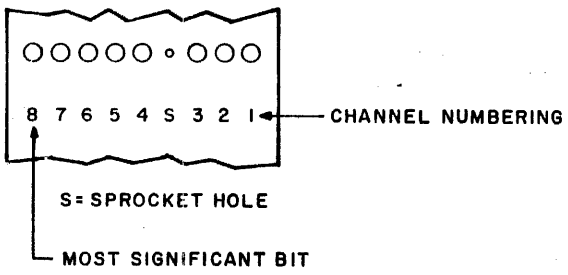



Figure 1. Channel Designations

## 5. PROGRAMMING INSTRUCTIONS

### 5.1 Status and Command Bytes

The status and command bytes for the High Speed Paper Tape Reader/Punch Interface are shown in Table 2.

## 6. PROGRAMMING SEQUENCES

### 6.1 Punch

The Interface is given an output command to place the device in the Write Mode with interrupts disarmed. A Sense Status instruction is issued followed by a test for Busy. When Busy goes low, a Write Data instruction may be given.

### 6.2 Read

The Interface is given an output command to place the device in the Read, Run, INCR Mode with interrupts disarmed. A Sense Status instruction is issued followed by a test for Busy. When Busy goes low, a Read Data instruction may be given.

## 7. INTERRUPTS

When enabled, interrupts are generated by the Interface when:

1. The Reader goes Not Busy. (A character is strobed into the Buffer Register from the HSPTR.)
2. The Punch goes Not Busy. (A character has been output to the HSPTP and the Interface is ready for more data.)
*3. Change from Read Mode to Write Mode provided the Punch is Not Busy.
*4. Change from Write Mode to Read Mode provided the Reader is Not Busy.
5. Device Unavailable (DU bit goes from 0 to 1).

Pending Interrupts are cleared by:

1. Initialization.
2. Disarm command.
3. Acknowledge interrupt instruction.
*4. Changing from Read Mode to Write Mode.
*5. Changing from Write Mode to Read Mode.

When disabled, interrupts are queued.

When disarmed, interrupts are not generated or queued.

NOTE

To maintain programming compatibility with the 02-031 High Speed Paper Tape Reader/Punch a test for Busy=0 must be performed before changing modes.

## 8. INITIALIZATION

Initialization occurs on power up or when the Initialize Switch on the Processor is depressed, provided the Reader power is on and the RUN/LOAD Switch is in the RUN position.

When initialized, the following occurs:

1. Interrupts of all kinds are disarmed.
2. The NMTN and EX status bits are set.
3. The Disarm, Stop, INCR and Read command functions are set.
4. The BSY status bit is set or reset depending on the state of the Reader.

* When changing from Read Mode to Write Mode, or from Write Mode to Read Mode, pending interrupts are cleared, then the Busy status of the new device is checked. If the new device is Busy, no interrupt is generated until the device goes Not Busy. If the new device is already Not Busy upon changing mode, an interrupt is generated at the time of changing mode. The programmer can ignore the last interrupt and change mode directly.

TABLE 2. HSPTR/P INTERFACE STATUS AND COMMAND

| BIT NUMBER | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|
| STATUS BYTE | OV | | | NMTN | BSY | EX | | DU |
| COMMAND BYTE | DISABLE | ENABLE | STOP | RUN | INCR | SLEW | WRITE | READ |

DISARM = DISABLE • ENABLE

STATUS

| BIT | READER | PUNCH |
|---|---|---|
| OV | The Overflow bit is set when the Buffer Register is loaded from the Reader before the previous character has been transferred. This condition can only happen in the SLEW mode. It is reset by:<br>1. Initialization.<br>2. The HSPTR/P changes from Read Mode to Write Mode.<br>3. The HSPTR/P changes from Write Mode to Read Mode.<br>4. The Reader changes from STOP to RUN. | The Overflow bit is always reset in the Write Mode. |
| DU | The Device Unavailable bit is set when the power to the Reader is off or the power is not stabilized, or the Reader lever is in the LOAD position, or if the drive signal is received and new feed hole is not sensed within 10ms. It indicates either no tape or torn tape and serves as the Out-Of-Tape signal. It is reset when the above conditions are not true. | The Device Unavailable bit is set when the power to the punch is off or internal voltages have not stabilized, or RUN-LOAD Switch is in LOAD or the chad box is full. It is reset when the above conditions are not true.<br>Note that CHAD ERROR is reset by depressing the PERF STATUS Switch. |
| NMTN | The No Motion Bit is set when the Reader has issued a Stop Command and the tape has been stopped on the character. It is reset when tape starts moving. | The No Motion bit is always reset in the Write Mode. |
| BSY | The Busy bit is set when the Buffer Register is empty, waiting for an output from the Reader or the Reader is in Load Condition or the Reader power is not stabilized. It is reset when the above conditions are not true. | The Busy bit is set when the tape is advancing and in the Punch cycle. It is reset when the Punch is ready to accept a punch command. |
| EX | The Examine bit is set whenever OV=1 or NMTN=1. It is reset when they are both reset. | The Examine bit is always reset in the Write Mode. |

COMMANDS

| BIT | READER | PUNCH |
|---|---|---|
| DISABLE | This command inhibits interrupts from the Device Controller from interrupting the Processor. Interrupts are queued. | Same as Reader. |
| ENABLE | This command permits interrupts from the Device Controller to interrupt the Processor. | Same as Reader. |
| DISARM | This command prevents the device from interrupting or queuing the interrupts. | Same as Reader. |
| STOP | This command bit halts the motion of the tape. The next character to be read is positioned over the sense light when the tape stops. | Not used. |
| RUN | This command leaves the controller in the Run Mode, and if in the Slew Mode, starts the tape moving. | Not used. |
| INCR | In this mode of operation, the tape is advanced one character when the controller is in the Run Mode and a Read Data instruction is executed. The tape stops after encountering the next character. The tape remains stopped until a Read Data Instruction, which starts the tape moving again. | Not used. |
| SLEW | In this mode of operation, the tape is advanced continuously until stopped. | Not used. |
| WRITE | | Designates the High Speed Paper Tape Punch. |
| READ | Designates the High Speed Paper Tape Reader. | |

INSTRUCTIONS

Output command (OC or OCR) - This instruction is used to send a Command Byte to the reader/punch from the Processor.

Sense Status (SS or SSR) - This instruction enables the Status Byte of the Interface to be examined.

Write Data (WD or WDR) - This instruction is used to output a data byte to the punch.

Read Data (RD or RDR) - This instruction is used to input a data byte from the Reader when in the Read mode.

Acknowledge Interrupt (AI or AIR) - This instruction enables the user to examine the Device Address and Status Byte when the Interface generates an interrupt.

Read Block (RB or RBR) and Write Block (WB or WBR) instructions can be used with the reader/punch. Halfword I/O instructions (RH, RHR, WH, WHR) are not used with the Reader/Punch.

## 9. DEVICE NUMBER

The High Speed Paper Tape Reader/Punch, using Device Controller 35-439, is normally assigned address X'03' if using a Reader only. If using both a Reader and a Punch, address X'13' is normally assigned. These device numbers are easily changed by a minor modification to the Device Controller. Refer to the HSPTR/P Interface Instruction Manual, Publication Number 29-290, for details.

## 10. SAMPLE PROGRAMS

Appendix 1 is a sample program for Models 4, 5, 70, and 80 using the High Speed Paper Tape Reader in the Incremental Mode, using a programmed status loop.

Appendix 2 is a sample program for Models 4, 5, 70 and 80 using the High Speed Paper Tape Reader in the Slew Mode using interrupt control.

Appendix 3 is a sample program for Models 4, 5, 70 and 80 using the High Speed Paper Tape Punch, using a programmed status loop.

Appendix 4 is a sample program for Models 4, 5, 70 and 80 using the High Speed Paper Tape Reader/Punch, using a programmed status loop.

Appendix 5 is a sample program for Models 4, 5, 70 and 80 using the High Speed Paper Tape Reader/Punch under interrupt control.

APPENDIX 1
SAMPLE PROGRAM
READER-INCREMENTAL MODE

```
*
* SAMPLE PROGRAM FOR HSPTR (INCREMENTAL MODE)
* USING STATUS LOOPS
*
INPUT     LHI     DEV,3          SELECT DEVICE NUMBER

          OC      DEV,READ       ISSUE OUTPUT COMMAND

SENSE     SSR     DEV,STATUS     GET STATUS OF READER
          BTC     5,TROBLE       DU OR EX=1; ERROR

          BTC     8,SENSE        BSY=1; WAIT

          RDR     DEV,TEMP       READ ONE CHAR. FROM TAPE
          B       PROCES         PROCESS THIS CHARACTER

*
TROBLE    LPSW    STOP           TROUBLE CORRECTED; RETURN

STOP      DC      X'8000',A(INPUT)  TO INPUT ROUTINE

*
DEV       EQU     1              DEVICE NUMBER 03
STATUS    EQU     2              HOLDS STATUS BITS
TEMP      EQU     3              TEMPORARY STORAGE
*
READ      DC      X'D9D9'        OUTPUT COMMAND IS X'D9'
*
PROCES    EQU     *
          END
```

APPENDIX 2
SAMPLE PROGRAM
READER-SLEW MODE-INTERRUPT CONTROL

```
*
* SAMPLE PROGRAM FOR HSPTR (SLEW MODE) USING INTERRUPT CONTROL
* READ TAPE UNTIL X'FF' CHARACTER IS ENCOUNTERED OR BUFFER IS FULL
*
INPUT     LHI     DEV,3                  SELECT DEVICE NUMBER
          OC      DEV,DISARM             ISSUE OUTPUT COMMAND
          LHI     CHECK,X'4000'          SET NEW PSW
          STH     CHECK,X'44'
          LHI     CHECK,INT              SET EXT INT ADRS
          STH     CHECK,X'46'
          XHR     INDEX,INDEX            ZERO INDEX REG
          LHI     5,1                    SET INCREMENT VALUE
          LHI     6,4096                 SET BXLE LIMIT
          LPSW    ENABLE                 ENABLE EXT INTS
ENABLE    DC      X'4000',ENABLE+4
          OC      DEV,READ               ISSUE OUTPUT COMMAND
TROBLE    LPSW    WAIT                   TROUBLE THEN WAIT
WAIT      DC      X'C000',INPUT
INT       AIR     ADR,STATUS             ACKNOWLEDGE INT
          BTC     1,TROBLE               DU=1 WAIT
          CLHR    ADR,DEV                DID READER INT
          BNE     TROBLE                 NO, WAIT
          RDR     DEV,CHECK              READ CHAR. FROM TAPE
          CLHI    CHECK,X'FF'            IS IT DELIMITING CHAR.
          BE      STOP                   YES, STOP TAPE MOTION
          STH     CHECK,BUFFER(INDEX)    STORE CHAR. IN BUFFER
          BXLE    INDEX,TROBLE           WAIT FOR INT
STOP      OC      DEV,DONE               OUTPUT COMMAND X'E0'
          LPSW    HALT
HALT      DC      X'8000',INPUT          HALT
DEV       EQU     1                      DEVICE NUMBER 03
STATUS    EQU     2                      HOLDS STATUS BITS
CHECK     EQU     3                      REG USED TO CHECK FOR DELI
INDEX     EQU     4                      INDEX VALUE
ADR       EQU     7                      HOLDS INT DEV ADRS
DISARM    DC      X'C2C2'                OUTPUT COMMAND DISARM-WRITE
READ      DC      X'5555'                OUTPUT COMMAND ENABLE-RUN, READ
DONE      DC      X'E0E0'                OUTPUT COMMAND DISARM-STOP
BUFFER    DS      4096                   BUFFER SIZE
          END
```

APPENDIX 3
SAMPLE PROGRAM
PUNCH

```
*
* SAMPLE PROGRAM FOR THE HIGH SPEED PAPER TAPE PUNCH USING STATUS LOOPS
*
START     LHI     DEV,X'13'              SET DEVICE NUMBER
          LHI     3,1                    SET LOW LIMIT AND
          LHI     4,4096                 HIGH LIMITS OF THE
OUTPUT    XHR     COUNT,COUNT            BUFFER AREA
          OC      DEV,WRITE              WRITE MODE
SENSE     SSR     DEV,STATUS             CHECK STATUS
          BTC     1,TROBLE               DU=1; STOP
          BTC     8,SENSE                BUSY=1 WAIT
          WD      DEV,BUFFER,(COUNT)     OUTPUT CHARACTER
          BXLE    COUNT,SENSE            DO UNTIL DONE
TROBLE    LPSW    STOP                   TROUBLE CORRECTED; RETURN
STOP      DC      X'8000',A(START)       TO OUTPUT ROUTINE
BUFFER    DS      4096
*
DEV       EQU     0                      DEV. NUM. X'13'
STATUS    EQU     1                      HOLDS STATUS OF THE PUNCH
COUNT     EQU     2                      HOLDS LOW LIMIT OF BUFFER
RETURN    EQU     5                      RETURN TO MAIN PROC.
WRITE     DC      X'C2C2'                OUTPUT COM. X'C2'
          END
```

APPENDIX 4
SAMPLE PROGRAM
READER/PUNCH COMBINATION

```
*
* SAMPLE PROGRAM USING THE HSPTR/HSPTP IN MODE SWITCHING
* USING STATUS LOOPS
START     LHI     DEVICE,X'13'        SET DEVICE NUMBER
          LHI     3,100               SET HIGH LIMIT AND
          LHI     2,1                 LOW LIMITS OF THE
INPUT     XHR     1,1                 BUFFER AREA
          OC      DEVICE,READ         READ MODE
INPI      SSR     DEVICE              STATUS
          BTC     1,TROBLE            DU=1 STOP
          BTC     8,INPI              BUSY=1 WAIT
          RD      DEVICE,BUFFER(1)    INPUT CHAR.
          BXLE    1,INPI
*
*
OUTPUT    XHR     1,1                 CLEAR LOW LIMITS
          OC      DEVICE,WRITE        WRITE MODE
OUTI      SSR     DEVICE,STATUS
          BTC     1,TROBLE            DU=1 STOP
          BTC     8,OUTI              BUSY=1 WAIT
          WD      DEVICE,BUFFER(1)    OUTPUT CHAR.
          BXLE    1,OUTI
          B       INPUT
TROBLE    LPSW    STOP                TROUBLE CORRECTED; RETURN
STOP      DC      X'8000',A(START)    TO INPUT ROUTINE
READ      DC      X'D9D9'
WRITE     DC      X'C2C2'
DEVICE    EQU     4
STATUS    EQU     5
BUFFER    DS      100
          END
```

APPENDIX 5
SAMPLE PROGRAM
READER/PUNCH COMBINATION

```
*
* SAMPLE PROGRAM USING THE HSPTR/HSPTP UNDER INTERRUPT CONTROL
*
START    LHI     DEVICE,X'13'        SET DEVICE NUMBER
         OC      DEVICE,DISARM       DISARM DEVICE
         LHI     1,X'4000'           SET NEW PSW
         STH     1,X'44'
         LPSW    ENABLE              ENABLE EXT, INT
ENABLE   DC      X'4000',BEGIN       AT PROCESSOR
*
*
RDINT    AIR     5,6                 ACK INT
         BTC     1,WAIT              DU=1 WAIT
         CLH     5,DEVICE            DID READER INT
         BNE     WAIT                NO WAIT
         RD      DEVICE,BUFFER(1)    INPUT CHAR.
         BXLE    1,WAIT
         LHI     1,WRTINT            SET EXT INT
         STH     1,X'46'             ADDRESS
         LHI     3,100               SET HIGH LIMIT
         LHI     2,1                 AND LOW LIMIT
         XHR     1,1                 OF BUFFER AREA
         OC      DEVICE,WRITE        WRITE MODE
*
*        B       WAIT
WRIINT   AIR     5,6                 ACK INT
         BTC     1,WAIT              DU=1 WAIT
         CLH     5,DEVICE            DID PUNCH INT
         BNE     WAIT                NO WAIT
         WD      DEVICE,BUFFER(1)    OUTPUT CHAR.
         BXLE    1,WAIT
BEGIN    LHI     1,RDINT             SET EXT INT
         STH     1,X'46'             ADDRESS
         LHI     3,100               SET HIGH LIMIT
         LHI     2,1                 AND LOW LIMIT
         XHR     1,1                 OF BUFFER AREA
         OC      DEVICE,READ         READ MODE
*
*
WAIT     LPSW    WAIT+4
         DC      X'C000',START
*
*
READ     DC      X'5959'
WRITE    DC      X'4242'
DISARM   DC      X'C2C2'
DEVICE   EQU     4
BUFFER   DS      100
         END
```

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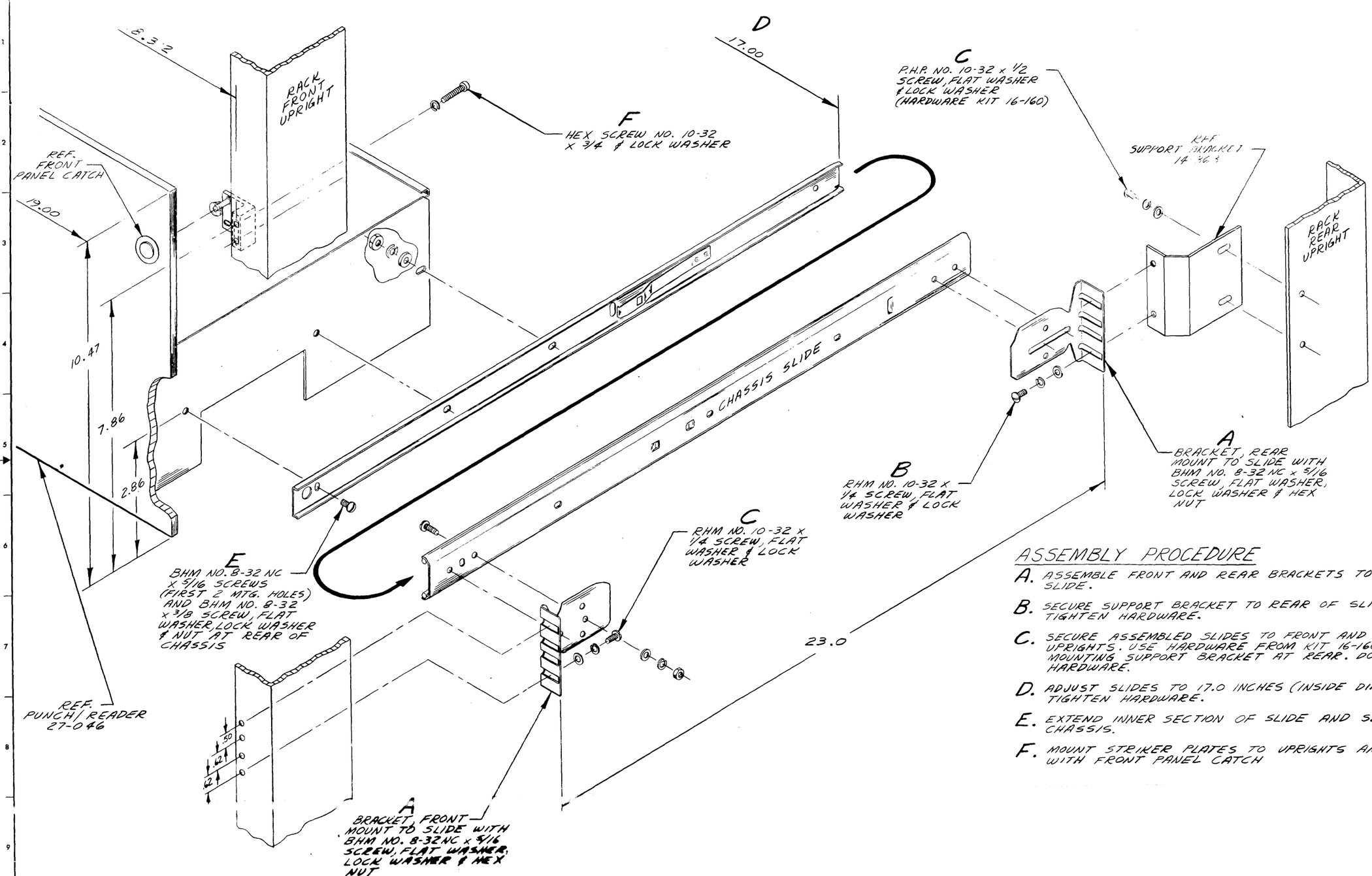



## ASSEMBLY PROCEDURE

A. ASSEMBLE FRONT AND REAR BRACKETS TO CHASSIS SLIDE.

B. SECURE SUPPORT BRACKET TO REAR OF SLIDE. DO NOT TIGHTEN HARDWARE.

C. SECURE ASSEMBLED SLIDES TO FRONT AND REAR UPRIGHTS. USE HARDWARE FROM KIT 16-160 FOR MOUNTING SUPPORT BRACKET AT REAR. DO NOT TIGHTEN HARDWARE.

D. ADJUST SLIDES TO 17.0 INCHES (INSIDE DIMENSION) AND TIGHTEN HARDWARE.

E. EXTEND INNER SECTION OF SLIDE AND SECURE TO CHASSIS.

F. MOUNT STRIKER PLATES TO UPRIGHTS AND ALIGN WITH FRONT PANEL CATCH

NOTES
1. UNLESS OTHERWISE SPECIFIED MOUNTING HARDWARE IS SUPPLIED WITH P/R UNIT.

2. ASSEMBLY PROCEDURE IS FOR MOUNTING UNIT IN INTERDATA STANDARD RACK.

NAME: D. BARKER / P. MATTER
TITLE / DATE: DRAFT 3-15-73; CHK. 3-15-73; STAND. 4-18-73

TITLE INFORMATION
PUNCH/READER RACK INSTALLATION
TASK NO. 03017
SHEET OF 1 1

NG 44-231 16042

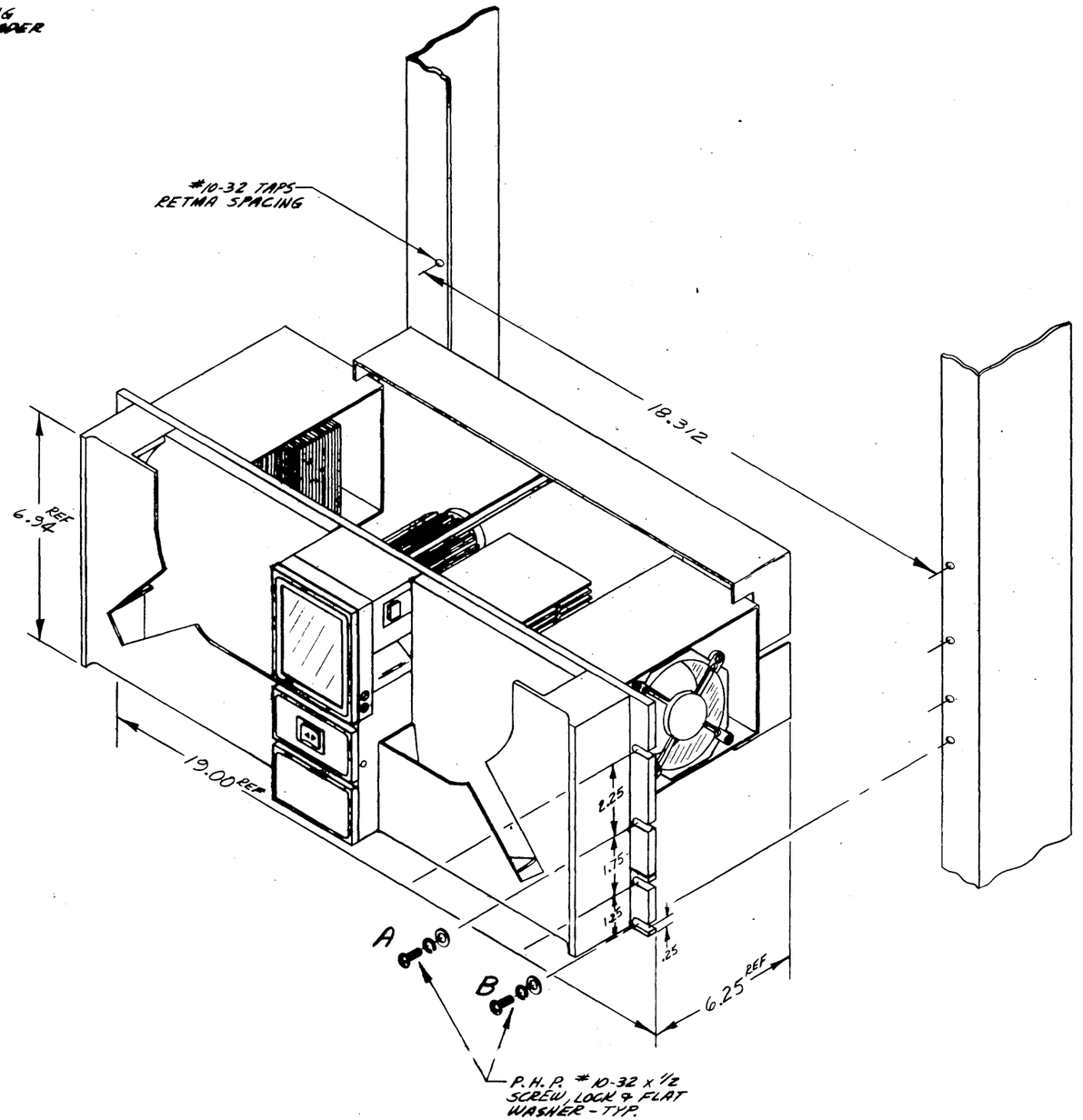
INTERDATA®

# ASSEMBLY PROCEDURE

NOTE: ALL MOUNTING HARDWARE IS PART OF HARDWARE KIT 16-160

A. SECURE READER TO RACK WITH #10 HARDWARE.

B. SECURE FANFOLD BIN MOUNTING FLANGE DIRECTLY BELOW READER PANEL WITH #10 HARDWARE.




NOTES

| NAME | TITLE | DATE |
|---|---|---|
| D. BARKER | DRAFT | 3-12-73 |
| H. MATTER | CHK | 3-12-73 |
| G. WELLY | ENGR | 4-18-73 |
| | DIR ENG | |

TITLE INFORMATION READER RACK INSTALLATION

TASK NO. 03017

DWG NO. 02-298 D12

SHEET OF 1 - 1

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NOTES 1. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE .0022 UF.

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| W. MATTER | DRAFT | 10OCT72 | |
| | CHK | | |
| | ENGR | | |
| | DIR ENG | | TASK NO 03017 ACCT NO 02 265 008 SHEET 04 3-4 |

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| COMPONENT | REFERENCE DESIGNATION |
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| RESISTOR | R1 THRU R46 |
| CAPACITOR | C1 THRU C59 |

NOTES

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| | CHK | | PUNCH INTERFACE |
| | ENGR | | TASK NO. 01017 |
| | DIR ENG | | DWG NO. 02-265 C08 |
| | | | SHEET 4 OF 4 |

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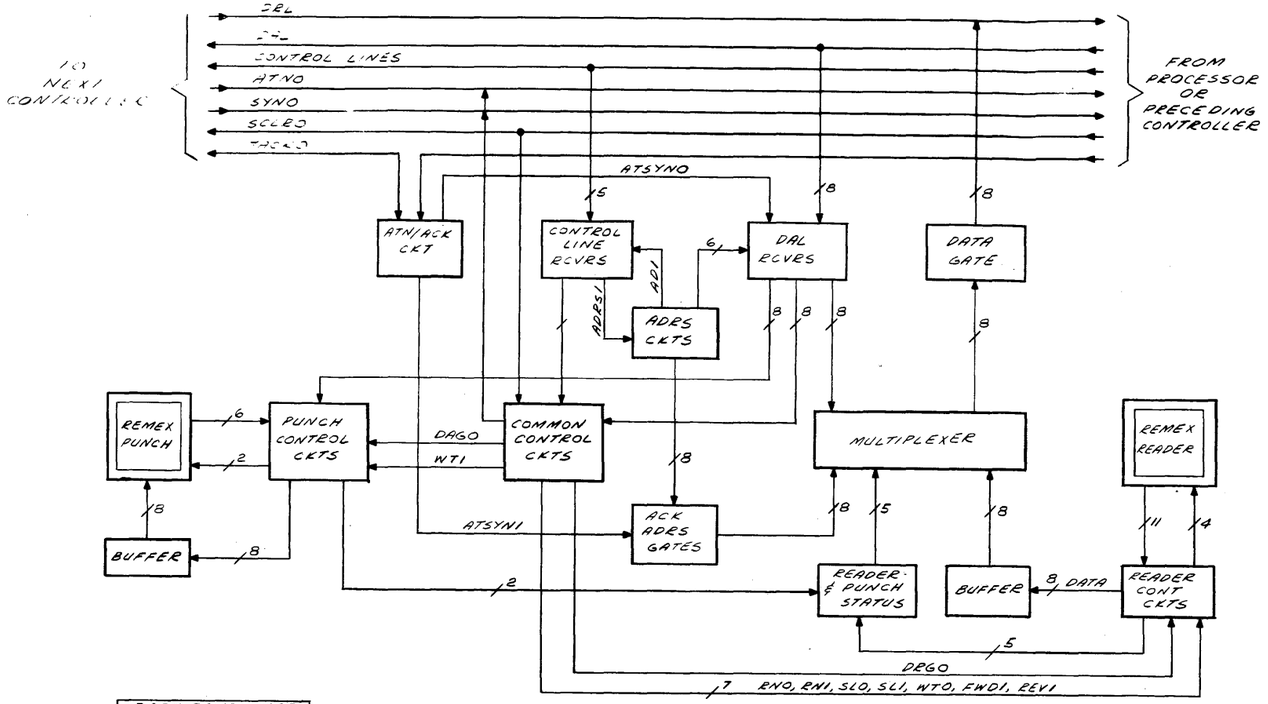


| BACK PANEL MAP | | |
|---|---|---|
| TERM NO | ROW 1 | ROW 2 |
| 41 | GND | GND |
| 40 | P5 | GND |
| 39 | | |
| 38 | | |
| 37 | | |
| 36 | | |
| 35 | | |
| 34 | | |
| 33 | | |
| 32 | | |
| 31 | | |
| 30 | | |
| 29 | | |
| 28 | | |
| 27 | | |
| 26 | SCLRO | HWO |
| 25 | PATNO | SREQO |
| 24 | XFERO | TERMO |
| 23 | SYNO | ATNO |
| 22 | BACKO | TACKO |
| 21 | CLOTO | DAO |
| 20 | DRO | CMDO |
| 19 | SRO | ADRSO |
| 18 | D140 | D150 |
| 17 | D120 | D130 |
| 16 | D100 | D110 |
| 15 | D080 | D090 |
| 14 | | |
| 13 | | |
| 12 | | |
| 11 | | |
| 10 | | |
| 09 | | |
| 08 | | |
| 07 | | |
| 06 | | |
| 05 | | |
| 04 | | |
| 03 | | |
| 02 | | |
| 01 | P5 | GND |
| 00 | GND | GND |

CONN A
35-439

| | | | |
|---|---|---|---|
| 100 | PUNCH1 | P | (PUNCH 1 DATA INPUT) |
| 200 | | | |
| 101 | DATA11 | P | (DATA 1 INPUT) |
| 201 | | | |
| 102 | DATA21 | P | (DATA 2 INPUT) |
| 202 | | | |
| 103 | DATA31 | P | (DATA 3 INPUT) |
| 203 | | | |
| 104 | DATA41 | P | (DATA 4 INPUT) |
| 204 | | | |
| 105 | DATA51 | P | (DATA 5 INPUT) |
| 205 | | | |
| 106 | DATA61 | P | (DATA 6 INPUT) |
| 206 | | | |
| 107 | DATA71 | P | (DATA 7 INPUT) |
| 207 | | | |
| 108 | DATA81 | P | (DATA 8 INPUT) |
| 208 | | | |
| 120 | PRDY1 | P | |
| 220 | | | |
| 124 | SIGNAL GND | | |
| 117 | TPHE1 | | (TAPE HAND. ERR. OUTPUT) |
| 122 | TPLOW1 | | (TAPE LOW OUTPUT) |
| 123 | DIRECTION | | (DIRECTION INPUT) |
| 221 | PSYSRDY0 | | (SYSTEM READY OUTPUT) |
| 224 | CHASSIS GND | | |
| 109 | TR11 | P | (DATA 1 OUTPUT) |
| 209 | | | |
| 110 | TR21 | P | (DATA 2 OUTPUT) |
| 210 | | | |
| 111 | TR31 | P | (DATA 3 OUTPUT) |
| 211 | | | |
| 112 | TR41 | P | (DATA 4 OUTPUT) |
| 212 | | | |
| 113 | TR51 | P | (DATA 5 OUTPUT) |
| 213 | | | |
| 114 | TR61 | P | (DATA 6 OUTPUT) |
| 214 | | | |
| 115 | TR71 | P | (DATA 7 OUTPUT) |
| 215 | | | |
| 116 | TR81 | P | (DATA 8 OUTPUT) |
| 216 | | | |
| 119 | DATRDY1 | P | (DATA READY OUTPUT) |
| 219 | | | |
| 118 | DLTO | P | ($\overline{\text{DRIVE LEFT}}$ INPUT) |
| 218 | GND | | (SIGNAL GND) |
| 121 | SYSRDY0 | | (SYSTEM RDY OUTPUT) |
| 222 | MODE SELECT | | |
| 217 | DRTO | | ($\overline{\text{DRIVE RIGHT}}$ INPUT) |
| 223 | EXTINBO | | ($\overline{\text{EXT INHIBIT}}$ INPUT) |

| | |
|---|---|
| P1 | J1-11 |
| P1 | J1-1 |
| P1 | J1-2 |
| P1 | J1-3 |
| P1 | J1-4 |
| P1 | J1-5 |
| P1 | J1-6 |
| P1 | J1-7 |
| P1 | J1-8 |
| P1 | J1-12 |
| | J1-25 |
| | J1-20 |
| | J1-21 |
| | J1-10 |
| | J1-13 |
| | J1-16,17 |
| P1 | J2-1 |
| P1 | J2-2 |
| P1 | J2-3 |
| P1 | J2-4 |
| P1 | J2-5 |
| P1 | J2-6 |
| P1 | J2-7 |
| P1 | J2-8 |
| P1 | J2-9 |
| P1 | J2-17 |
| | J2-11,12,13 |
| | J2-14 |
| | J2-10 |
| | J2-16 |
| | J2-15 |

CABLE 17-220

REVISIONS

NOTES

| NAME | TITLE | DATE |
|---|---|---|
| M. MATTER | DRAFT | 28 NOV 72 |
| | CHK | 28 NOV 72 |
| | ENGR | 2-2-73 |
| | SYS TEST | 2-6-73 |
| 115 | DIR ENG | |

TITLE FUNCT. SCHEMATIC PAPER TAPE READER / PUNCH INTERFACE

CAGE NO 03017 DWG NO 02-265 REV 008 SHEET 1 OF 4

BRUNING 44231 16042

INTERDATA®

REVISIONS

1. STATUS ADDRESS 13 HEX 211 NOT FOR READER & PUNCH COMBINATION.
STATUS ADDRESS 13 (HEX 213) FOR READER ONLY.

H. MATTEI

FUNCT. SCHEMATIC
300 CPS PAPER TAPE READER-PUNCH INTERFACE

03017
16-265

002 2 4