SERIAL PAPER TAPE READER 950 - 1950

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SECTION 1.

INTRODUCTION

1.1 GENERAL

The Serial Paper Tape Reader is a compact, light-weight module for standard use with the Data I/O System 17 and 19 Universal Programmers and for optional use with other equipment. It consists of a paper tape reader and a driver control interfaced within a single enclosure and connected by cable to the serial port of the System 17 or 19. The reader can be adapted to the Data I/O Models 16, 9 and 7 by a minor modification of the programmer, as well as to other data-communication equipment with RS232C capabilities and proper supply voltages.

This interface allows the operator to load punched data at high speed into programmer memory in any format recognized by the translation software within the programmer. Additionally, the operator can use a single switch to adapt the machine to paper tape of 5-, 7- and 8-level widths.

1.2 SPECIFICATIONS

1.2.1 POWER REQUIREMENTS

+24 Volts DC at 600mA

+5 Volts DC at 200mA

-5 Volts DC at 20mA

1.2.2 PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions. 11.99 cm x 11.18 cm x 10.95 cm (4.7" x 4.4" x 4.3")

Weight. .9 kg (2 lbs.)

Operating Temperature Range. 0°C to 45°C (32°F to 104°F)

Storage Temperature Range. -40°C to 55°C (-40°F to 131°F)

Humidity. to 90% (noncondensing)

Altitude. operational to 50,000 feet

1.3 LIMITED WARRANTY

Data I/O equipment is guaranteed against defects in materials and workmanship. The warranty period on the Paper Tape Reader is one year and begins on receipt of equipment. Data I/O will repair or replace, at Data I/O's option, any equipment found to be defective within the warranty period.

Warranty service will be provided by Data I/O within a reasonable amount of time after notification by the purchaser to Data I/O of equipment malfunction. This service shall not apply to equipment that has been subject to abuse, misuse, negligence or accident as determined by Data I/O, or to which any modifications, alterations, or attachments have been made without written authorization from Data I/O; nor shall it apply to equipment which has been installed or operated in an environment containing excessive dirt, dust, moisture, fumes, humidity, or extremes of temperature.

This warranty policy is in lieu of all other warranties, expressed or implied, unless standard warranty exceptions are granted by Data I/O in writing.

NOTE

For shipment for warranty service, package the unit either in its original shipping container or in a durable carton with appropriate packing material and sealed with strong tape. Improper packing will void the warranty. For information regarding proper return location and procedures, contact your local Data I/O representative.

1.4 SERVICE

After expiration of the warranty period, service and repairs are billed at standard hourly rates, plus expenses, portal-to-portal. Time and one-half rate will apply outside of normal working hours.

Cost of engineering (where applicable) and parts, plus the cost of installation, is billed at standard service-labor rates when implementing approved, customer-requested modifications.

1.5 ORDERING

Orders for parts should contain the following information:

● Description of part(s) and Data I/O part number(s).

● Quantity of each item ordered.

● Equipment serial number and model number.

● Corporate name of customer firm.

- Shipping address of firm, including zip code.

- Full name of person ordering the part(s).

- To whose attention the part(s) are to be shipped.

- Billing information.

- Purchase-order number.

- Method of shipment.

All parts orders may be sent to your local Data I/O representative.

SECTION 2.

INSTALLATION

2.1 INSPECTION

The Serial Paper Tape Reader was carefully pack-
aged to prevent shipping damage. It should, therefore,
arrive free of any defect, electrical or mechanical, without
marks or scratches, and in perfect operating condition.
Carefully inspect the unit for any damage that may have
occurred in transit. If any physical damage is noted, file
a claim with the carrier and notify Data I/O.

Figure 2-1 illustrates the main components of the
Paper Tape Reader with corresponding Data I/O part
numbers. These numbers should be used as reference,
should replacement parts become necessary.

2.2 BAUD RATE

Data transmission from the Serial Paper Tape Reader
is fixed at 2400 Baud. Data I/O programmers are equipped
with an accessible switch for setting the Baud rate. Refer
to the programmer's Instruction Manual for correct
positioning of the Baud rate switch.

2.3 CONNECTIONS

The Serial Paper Tape Reader is connected to the
serial port of the receiving machine through the attached
25-pin connector as shown in Figure 2-1.

For Data I/O programmers or other RS232C serial
equipment that requires a wiring modification, this service
is available through your nearest Data I/O Service Center.

For connection of the reader to instruments other
than Data I/O's, refer to the manufacturer's documentation
to insure that the instrument's cabling requirements are
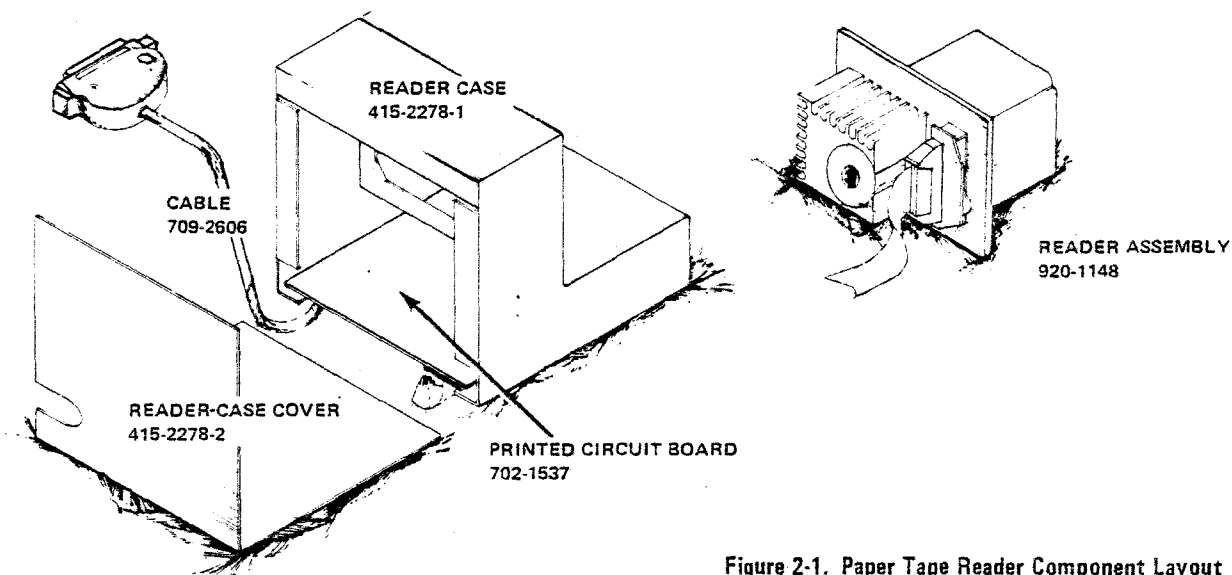compatible with the cable of the reader.

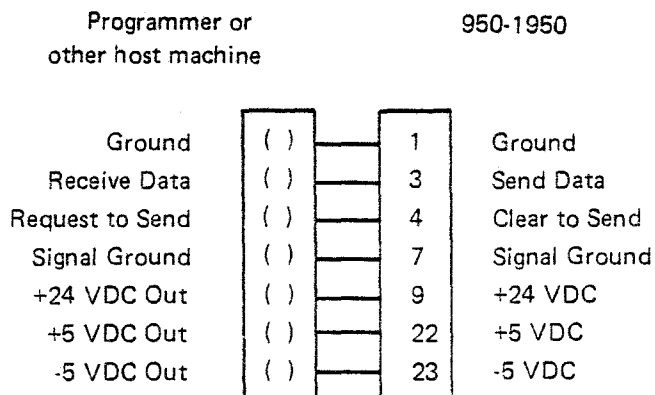Figure 2-1. Paper Tape Reader Component Layout

Programmer or other host machine			950-1950
Ground	( )	1	Ground
Receive Data	( )	3	Send Data
Request to Send	( )	4	Clear to Send
Signal Ground	( )	7	Signal Ground
+24 VDC Out	( )	9	+24 VDC
+5 VDC Out	( )	22	+5 VDC
-5 VDC Out	( )	23	-5 VDC

Figure 2-2. Connections Between Paper Tape Reader and Host Machine

SECTION 3.

OPERATION

3.1 PAPER TAPE INSERTION

Running the Serial Paper Tape Reader is simple. After proper connections have been made and the Baud rate has been set, load tape into the reader according to Figure 3-1 and steps a-d, below.

a. Lift the hinged cover to expose the Read Head and the driver sprocket.

b. Adjust the tape guide for the width of tape in use by turning the tape-guide switch to the appropriate position.

c. Guide the tape leader first under the guide pin and then onto the sprocket.

NOTE

The sprocket pulls the tape over the tape guide. Be sure that the tape is inserted so that it travels in the direction shown in Figure 3-1.

d. Hold the paper tape taut, guide it into the tape guide, and close the hinged cover.

3.2 DATA-TRANSFER OPERATIONS

Two operations are possible for data transfers from peripheral devices to Data I/O programmers: data input to RAM is the (Remote) Input operation in the Model 16 and the Systems 17 and 19, and an I/O Load operation in the Models 7 and 9; data comparison between peripherals and RAM is the (Input) Compare operation in the Model 16 and the Systems 17 and 19, and a Verify RAM-Peripheral operation in the Models 7 and 9.

Before transferring data from the Paper Tape Reader into RAM, set any desired operating parameters. For Data I/O programmers, these are covered in either the Data I/O translation formats manuals or the programmer's main instruction manual.

To transfer data from the Paper Tape Reader into RAM, complete the following sequence:

a. Turn the reader's ON/OFF switch ON (the switch will be in its latched center position).

b. Load the data into the programmer (or other instrument) according to the instrument's specifications for inputting data from peripherals. (For Data I/O programmers, refer to the "Operation" or "Operating Procedures" section in the programmer's instruction manual.) The sprocket advances the tape and the data is read at 120 characters per second and sent to RAM.

c. When the entire tape has been read, observe the programmer and the tape reader. For Data I/O equipment, the programmer's COMPLETE light should be ON, and the START or EXECUTE light should be OFF. The tape reader light goes off 1-3 seconds after the tape stops.

To verify the integrity of the data transfer, complete the following sequence:

a. Reinsert the leader of the tape in the Read Head (Figure 3-1).

b. Initiate either the (Input) Compare or the Verify, RAM-Peripheral operation at the programmer.

c. Observe the programmer and the tape reader. On Data I/O programmers, the COMPLETE light should be ON, and the START or EXECUTE light should be OFF.
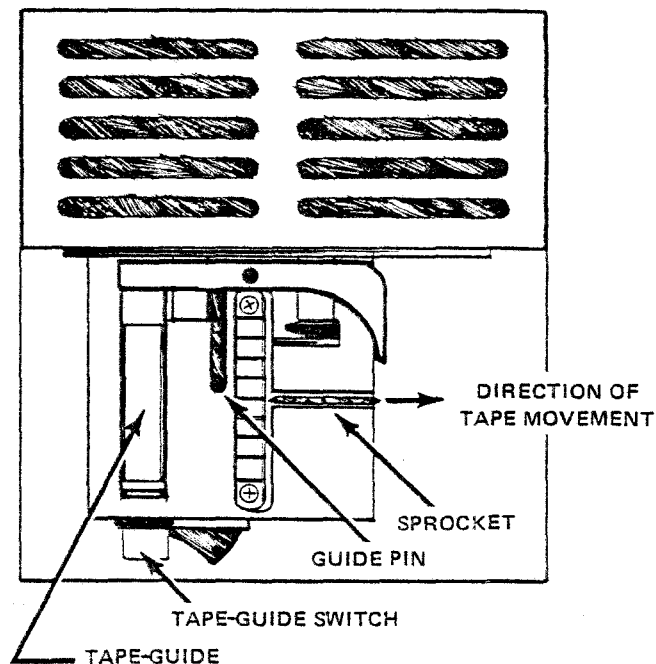

Figure 3-1. Read Head of the Paper Tape Reader

SECTION 4.
MAINTENANCE

The Serial Paper Tape Reader requires very little maintenance. Inspect the Read Head regularly to be sure that it is clean. Any dust or other residue should be wiped off with a damp cloth.

SECTION 5.

CIRCUIT DESCRIPTION

5.1 READER POWER

The power to the reader stepping motor (24 volts) is only applied to the reader during the active period. If the reader commands fail to advance the reader for longer than 10 seconds, the power will automatically be disconnected from the stepping motor, thereby eliminating heat build-up within the reader. As long as the reader is active (reader switch ON and Clear to Send line ON), it will continue to receive power.

5.2 CONTROLLER ELECTRONICS

Figure 5-1 shows the controller of the reader in block-diagram form. The external interface contains a Clear to Send line (CTS) and a Send Data line. The CTS line is an input which arrives via an RS232 amplifier to be presented to a clock memory/gate. A start switch and a Busy Delay are also inputs to the clock memory. The 2400 Hz clock signal is input to the clock memory; the memory, in turn, provides the clock rate for the entire control system.

Data signals generated at the Read Head are sent through buffer amplifiers to the shift register.

Three lines from the control PROM control the Clear, Load and Shift functions of the shift register, whose output is presented through an RS232 amplifier to the Send Data line.

The input to the reader motor is controlled by a stepping counter, whose output is transmitted through driver networks. The active timer, a long-period retriggerable delay network, activates the drivers if the clock memory/gate output is active. In this case the timer

is in its retriggerable state, thereby applying +24V to the reader motor.

A counter-and-PROM combination functions as the entire control-system intelligence. The clock output is sent to the counter, which then counts in binary to input an address to the PROM. The PROM's output is tested by a Chip Select line (the clock complement) and then input to the shift register for the Shift, Load and Clear functions, to a Busy Test line for the clock memory/gate, and to an Advance line for incrementing the counter. The counter then advances the reader one osition, after which a feed-back line from the PROM back to the counter presets the counter to zero.

5.3 TIMING

Refer to the timing diagram, Figure 5-2.

The PROM output first transmits a pulse to the shift register to clear it. The next pulse loads data from the reader into the shift register, thereby creating the start bit in the serial data stream. The eight clock pulses shift the data through the register and onto the RS232 Send Data line.

The next clock pulse tests the Busy Delay during the stop-bit period, halting the clock until the Busy Delay has expired. This time period is also used for speed-interlock control, which determines if the Clear To Send line has been dropped or if the reader switch itself has been turned off.

If (1) the Busy Delay has not expired, or (2) the Clear To Send line has not been dropped, or (3) the reader switch has been turned off, the clock will stop until all conditions again become true. When all functions are true, the clock is again initiated and the next cycle continues.
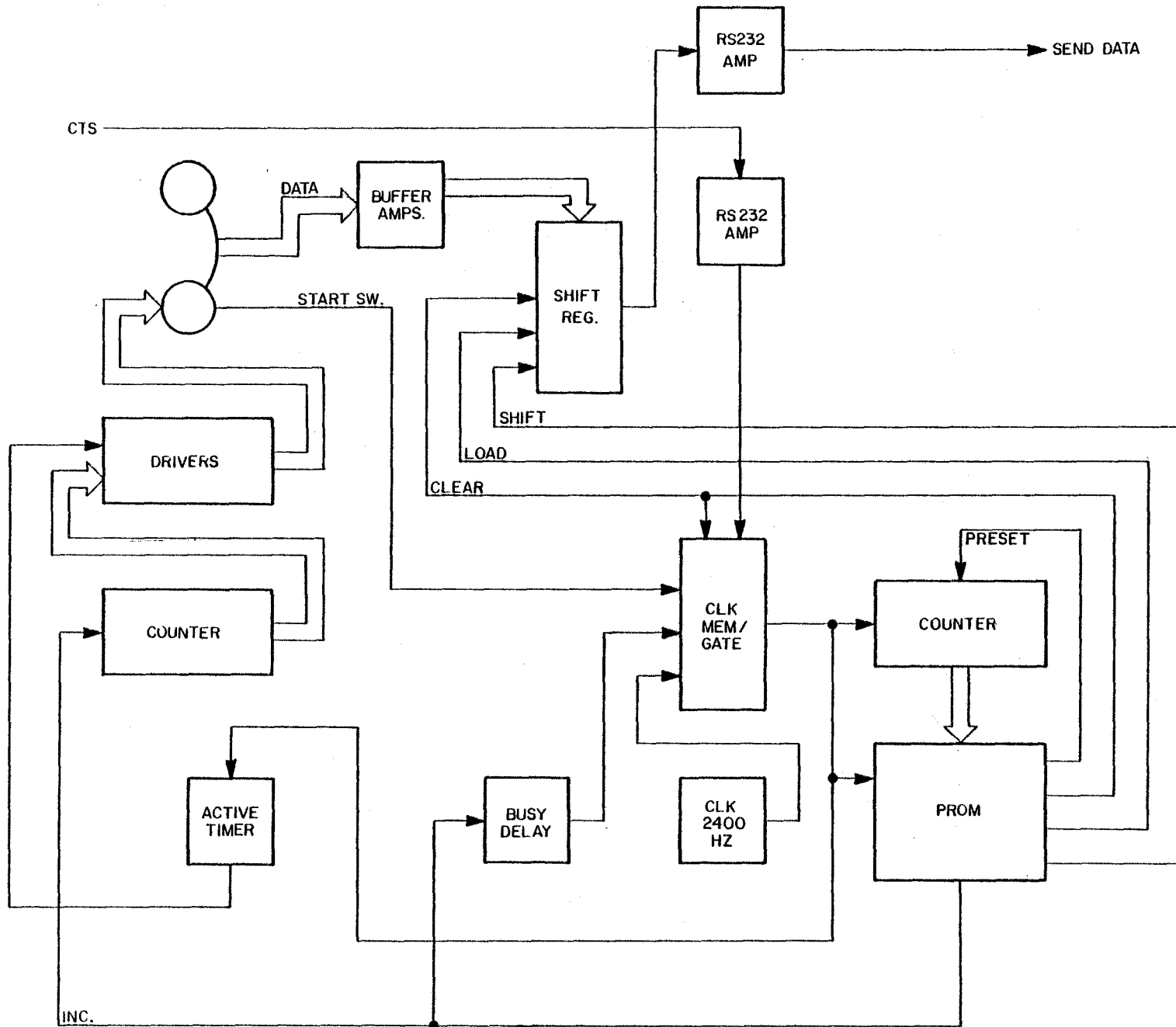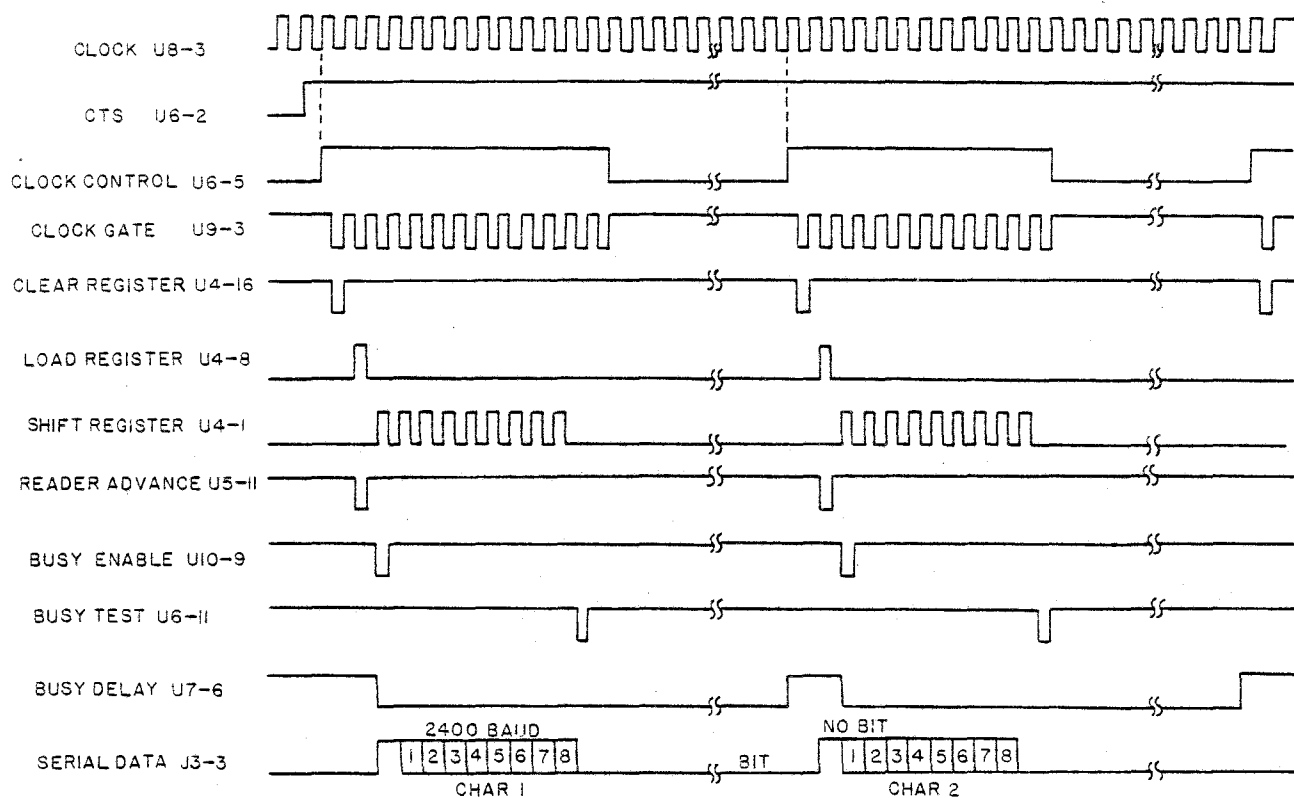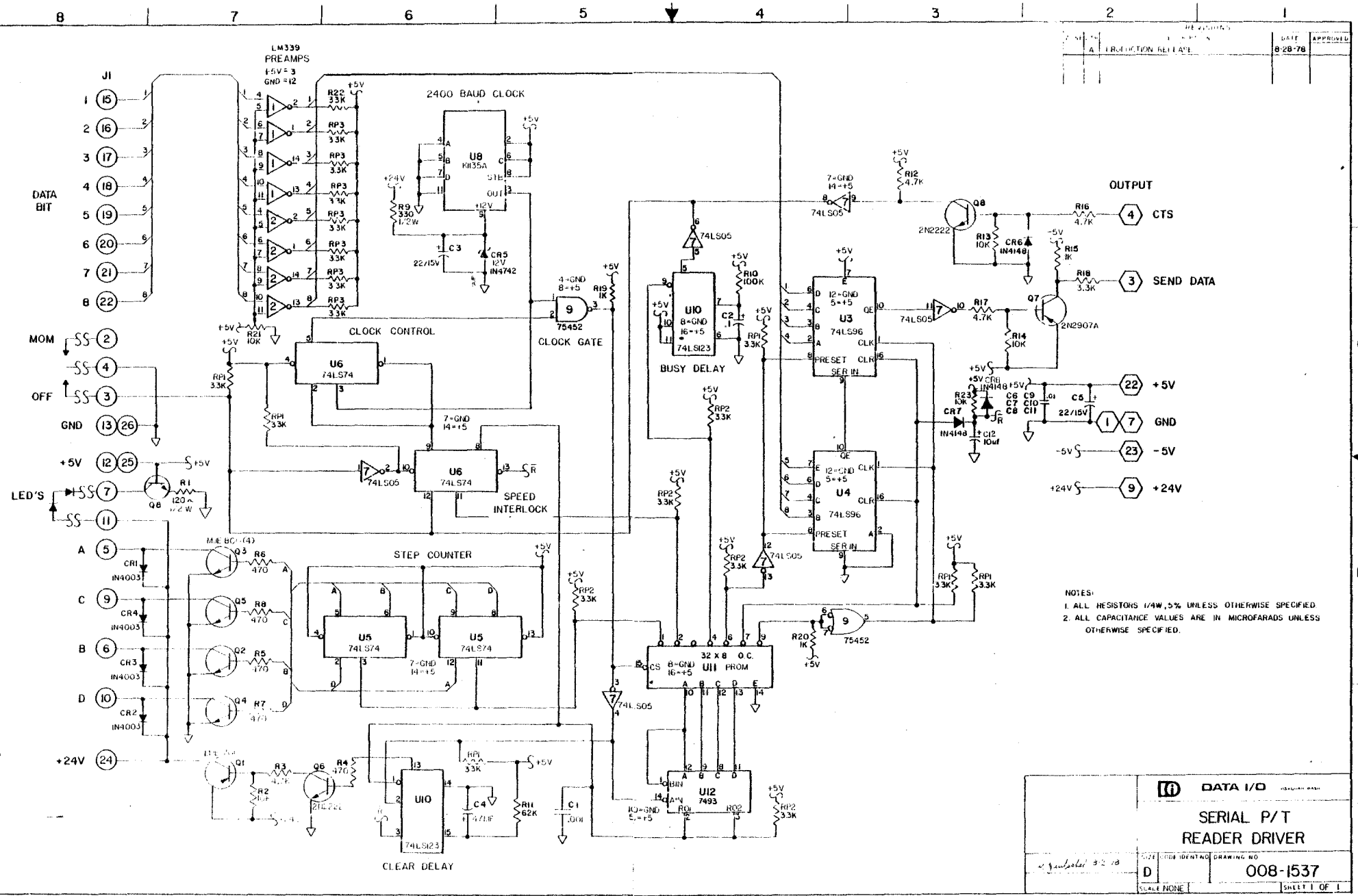
Figure 5-1. Block Diagram, Controller

Figure 5-2. Timing Diagram, Controller

NOTE: WAVEFORMS NOT TO SCALE

SERIAL P/T
READER DRIVER

DATA I/O

008-1537

NOTES:
1. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS UNLESS
   OTHERWISE SPECIFIED.

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