44689075

CONTROL DATA CORPORATION

CDC® BAND PRINTER E SERIES

MODEL PB 900 LPM
CT207-A

TECHNICAL MANUAL

REVISION RECORD

REVISION	DESCRIPTION
A JAN., 84	Restructured the Hardware Reference/Maintenance Manual Volume II (44689008), and released it as Model I Technical Manual.

PUBLICATION NO.		IDENTIFICATION NO.
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Revision Procedure:

The revision record page is revised for each revision package to reflect the revision sequence: Pre-Release, Release 01, 02, etc; Rev. A, Rev. B, Rev. C, etc. The revision record page also provides a brief description of each change. A manual update revision package will be available for manuals after the Release revision of the manual. Each page revised in an update revision package will have the month and year printed in the lower right hand corner. This same date would appear in the revision column above, just below the revision identification. An instruction Sheet cover is with each revision package, explaining page removal and insertion and reason for the change. The instruction sheets for revision packages are then to be placed at the back of the manuals as a record of the change.

MANUAL TO EQUIPMENT LEVEL CORRELATION

This manual reflects the equipment configurations listed below.

EQUIPMENT TYPE	SERIES	TOP LEVEL ASSEMBLY	COMMENTS
CT207-A	20-21, 24-30	59825300	

PREFACE

This publication contains technical information for the E-Series Band Line Printer Model I & Model II.

The publications listed below are related publications that are directed toward the needs of Field Service Personnel (Customer Engineers). All of these publications are not normally shipped with each printer.

Publication	Publication No.
Band Printer Model 900/1200 LPM Parts Identification Manual	44684699
Band Printer Model 900/1200 LPM Operator's Manual	44689010
Band Printer Model 900/1200 LPM Maintenance Manual	44689012
Key to Symbology	95390100

WARNING: This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A peripheral computing device pursuant to Subpart J of Part 15 of the FCC Rules which are designed to provide resonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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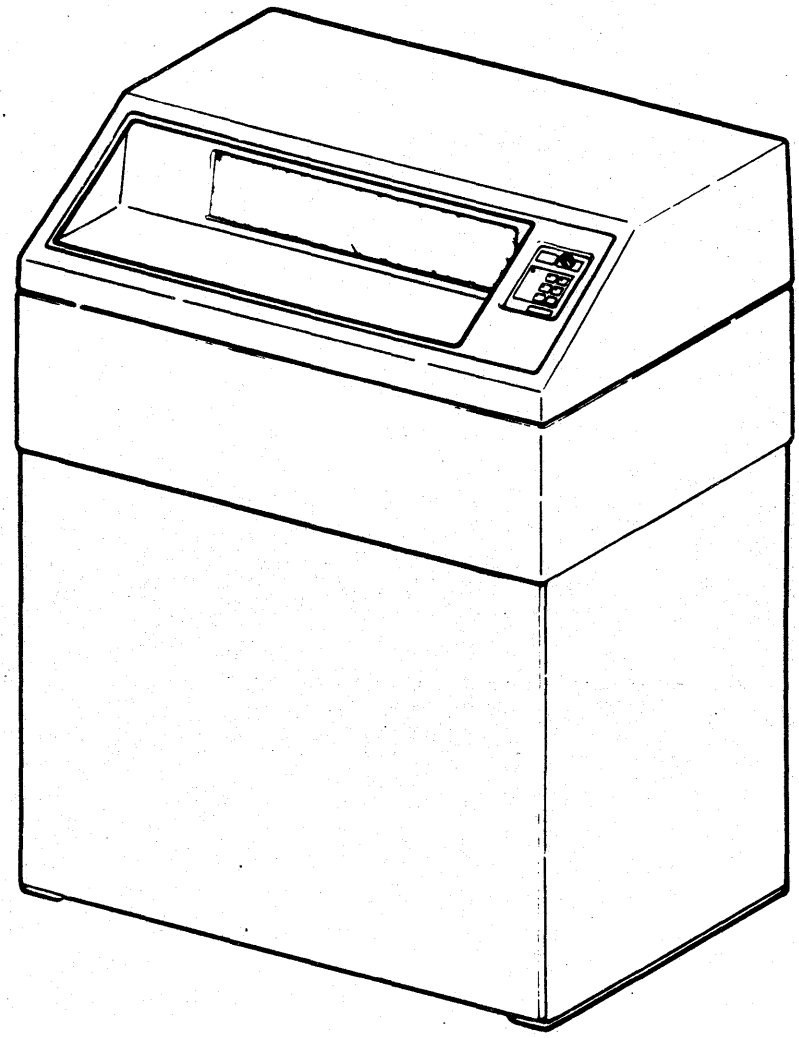


BAND PRINTER - E SERIES MODEL PB 900 LPM

SECTION I
INTRODUCTION

When initially investigating the inner workings of the printer, it will appear to be a complex peripheral device. The intent of this manual is to replace that initial complex appearance with a basic fundamental knowledge of how the printer works. This knowledge is presented in stages. The first stage identifies the major components of the printer, and locates their relative positions within the printer. The second stage separates the printer into its various operating systems. The third stage associates the identified components with their respective system. The last stage explains how each system works.

This manual is divided into various sections. In front of each section is an introduction. The introduction will designate the information to be covered in its section.

This section will introduce the Model I and Model II E-Series Band Line Printers. It will identify the major components of the printers, and show their relative positions. Also it will provide a brief functional description of the printers, followed by a list of signals used within the printers.

Model I is CT207; Model II is CT208.

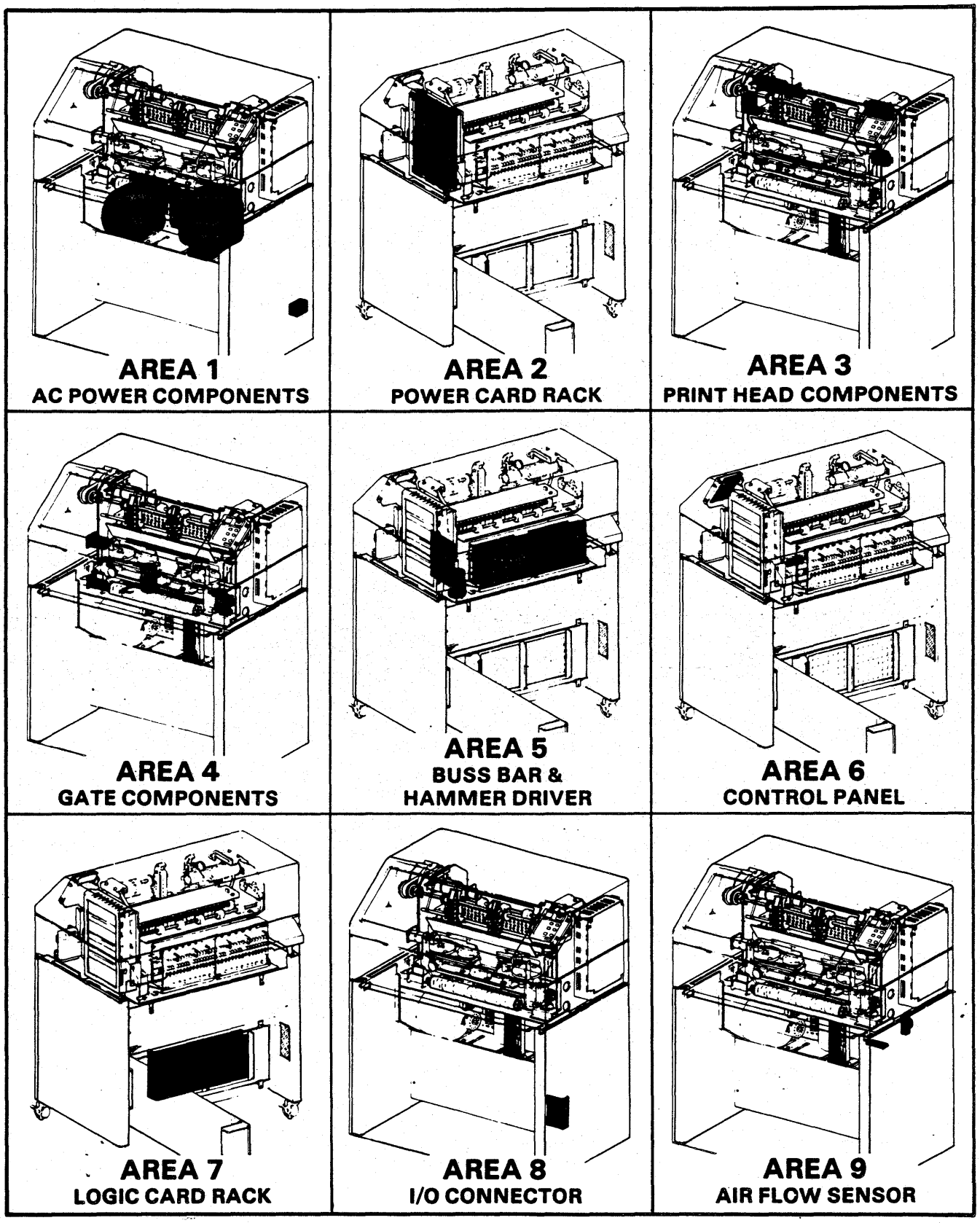


FIGURE 1-1. MACHINE AREA LOCATORS

PRINTER INTRODUCTION

The printer is a back printing, impact, horizontal font, band printer. This description was derived from the actual printing process. The process begins when a print hammer is thrust into the backside of the paper. Its momentum pushes it and the paper forward, where they contact the ribbon. Then the hammer, paper and ribbon impact with a single character of the font. (font is a set of characters of a given size and style) The font is etched on a steel band. It moves horizontally in front of the print hammers, driven by a rotary DC servo motor. A similar servo motor drives two tractors which advance the paper. A print gate, hinged on one side, swings open to allow loading of paper and ribbon. A towel type ribbon supplies the ink for printing. Printing is accomplished one line at a time, and is microprocessor controlled.

The print rates for these printers are shown in Table 1-1.

COMPONENT IDENTIFIER

Each major component is assigned a 4 digit alphanumeric identifier. The first digit corresponds to a numeric machine area location. It designates 1 of 9 different areas of the printer. See Figure 1-1. The next 2 digits are letter symbols for the type of component. In some cases, it is a 2 letter symbol. In the remaining cases, it is a 1 letter symbol followed by the letter O. The following list defines the component symbols.

AO - Assembly
BO - Motor
BB - Buss Bar
BP - Backplane Board
CO - Capacitor
CB - Circuit Breaker
FL - Filter
FO - Fuse
JO - Connector, Jack
KO - Relay
LO - Coil, or Lamp & Sensor Assembly
PO - Connector, Plug
PC - Printed Circuit Assembly
RO - Resistor
SW - Switch
TB - Terminal Block, Board or Strip
XF - Transformer

The last digit sets apart like components in the same area so each one has a unique identity.

TABLE 1-1. PRINT SPEED

NUMBER OF CHARACTERS IN SET	PRINT RATE [1] (LINES PER MINUTE)	
STANDARD PITCH BAND	CT207	CT208
48	1130	1140
64	900	1200
96	660	890
128	500	710

NOTE: [1] ALL PRINT RATES HAVE A TOLERANCE OF ± 3%

COMPONENT IDENTIFICATION & LOCATION

Cabinet (See Figure 1-2)

The cabinet allows quick and easy access to the printer's components. It is divided into two parts, the bonnet and the pedestal. The entire bonnet pivots back, allowing access to components mounted on the front of the print head structure. The upper portion of the bonnet pivots forward, allowing access to components mounted on the rear of the print head structure. The pedestal has a paper tray and a door assembly. The door assembly must be opened to expose the front access panel and the I/O cover. Both of these items, when opened, allow access to the components mounted behind them. The pedestal also has a rear access door and a rear access panel. These items swing open for component access.

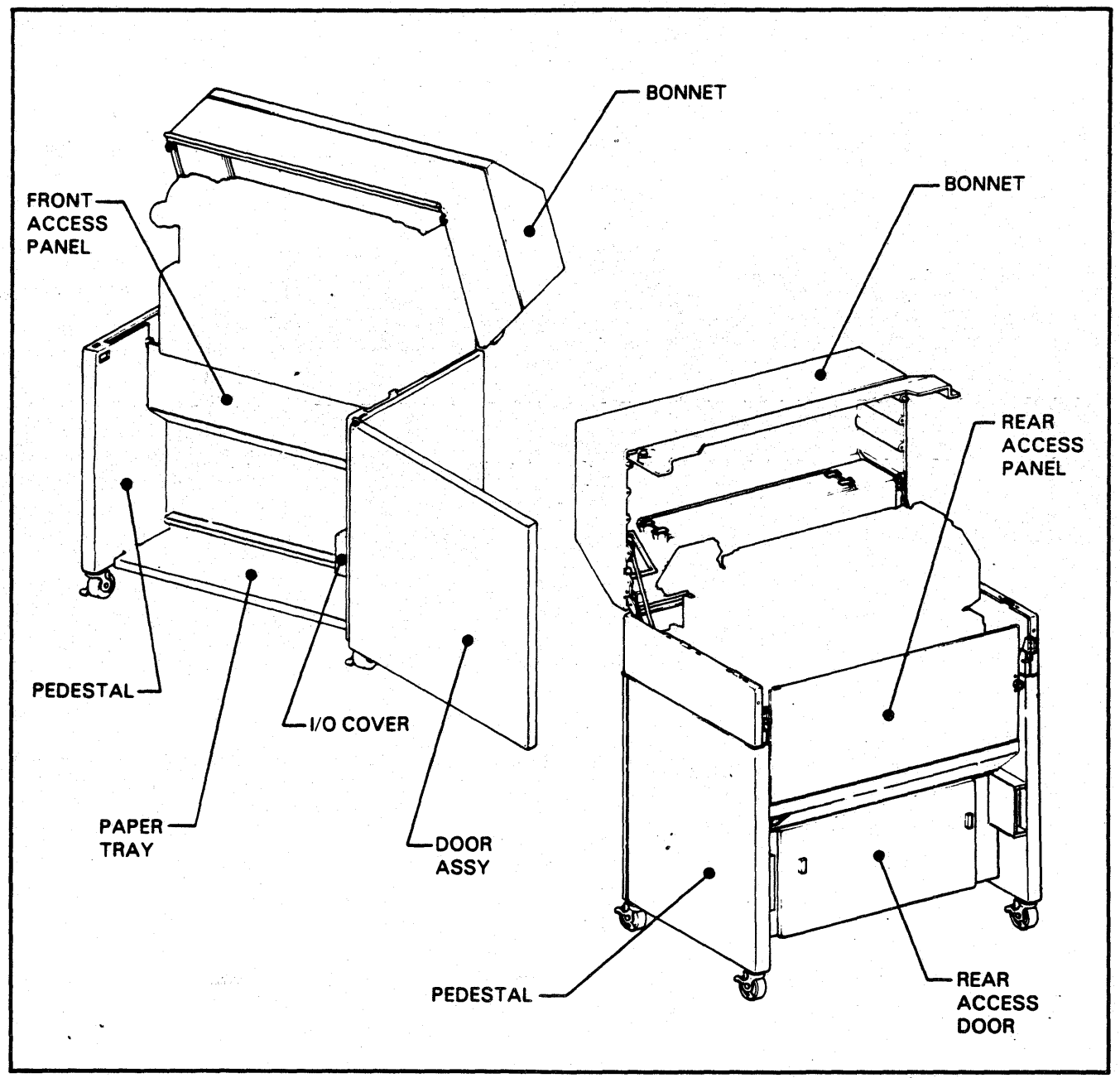


FIGURE 1-2. CABINET

Print Head Structure (See Figure 1-3)

The print head structure is the basic frame of the printer. It provides mounting points for a majority of the printer components. When all the components are mounted to it, the structure is mounted on top of the pedestal.

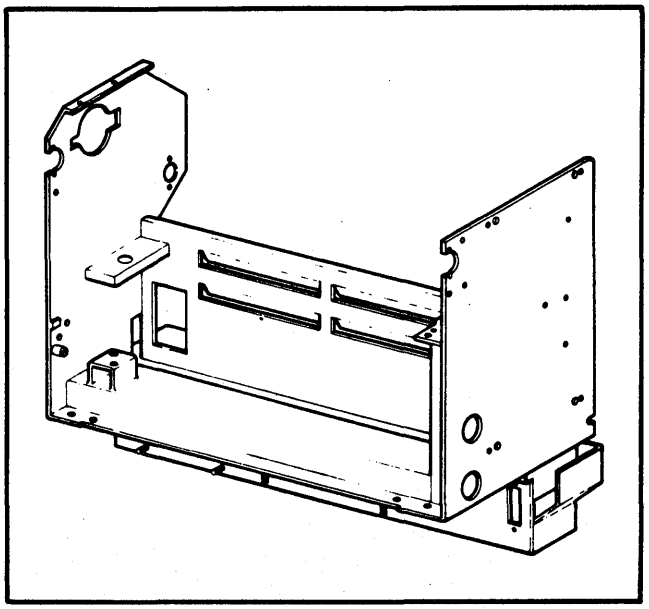


FIGURE 1-3. PRINT HEAD STRUCTURE

Area 1 (See Figure 1-4)

These are the AC power components of Area 1:

1BO1 - Blower
1CB1 - Circuit Breaker
1CO1 - Resonant Capacitor
1CO2 - Blower Capacitor
1FL1 - Line Filter
1PC1 - Solid State Relay Assembly
1TB3 - Transformer Input Terminal Block
1XF1 - Transformer

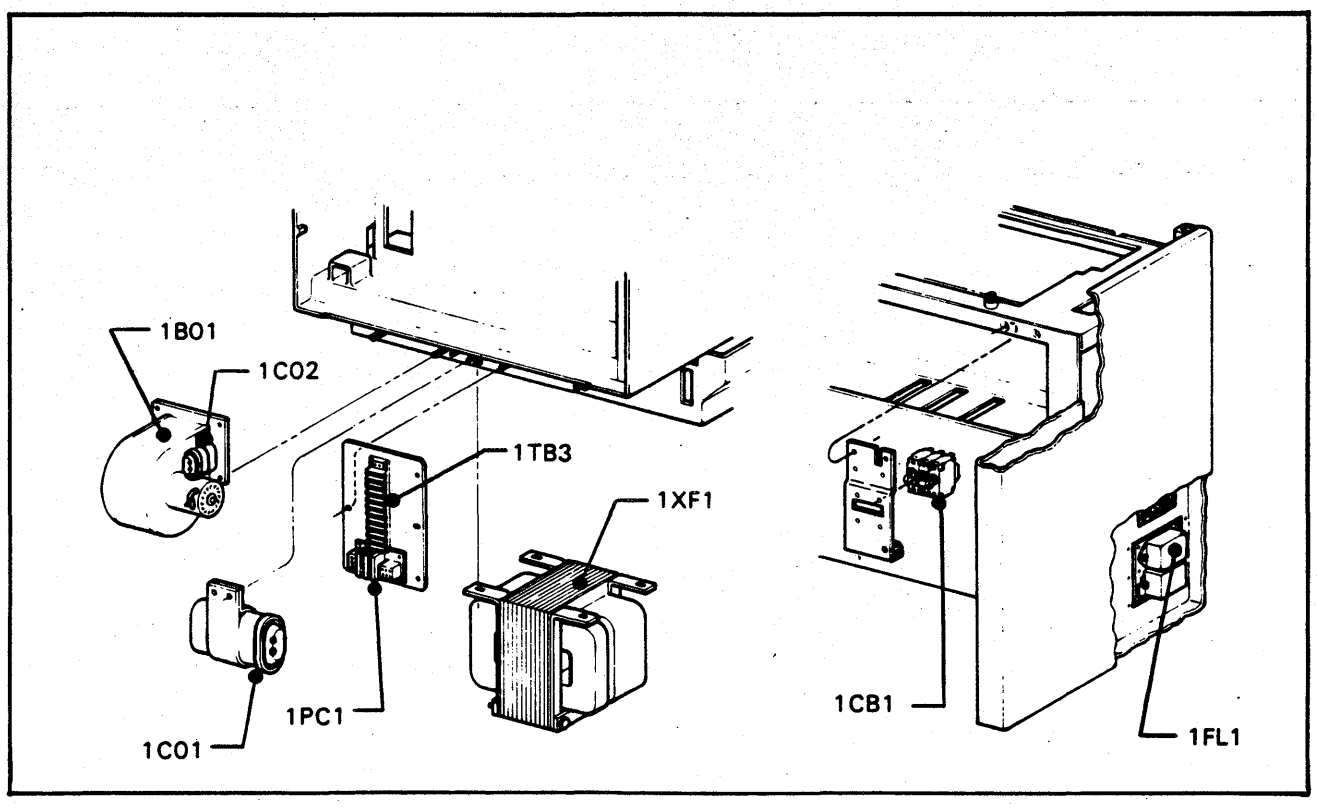


FIGURE 1-4. AREA 1

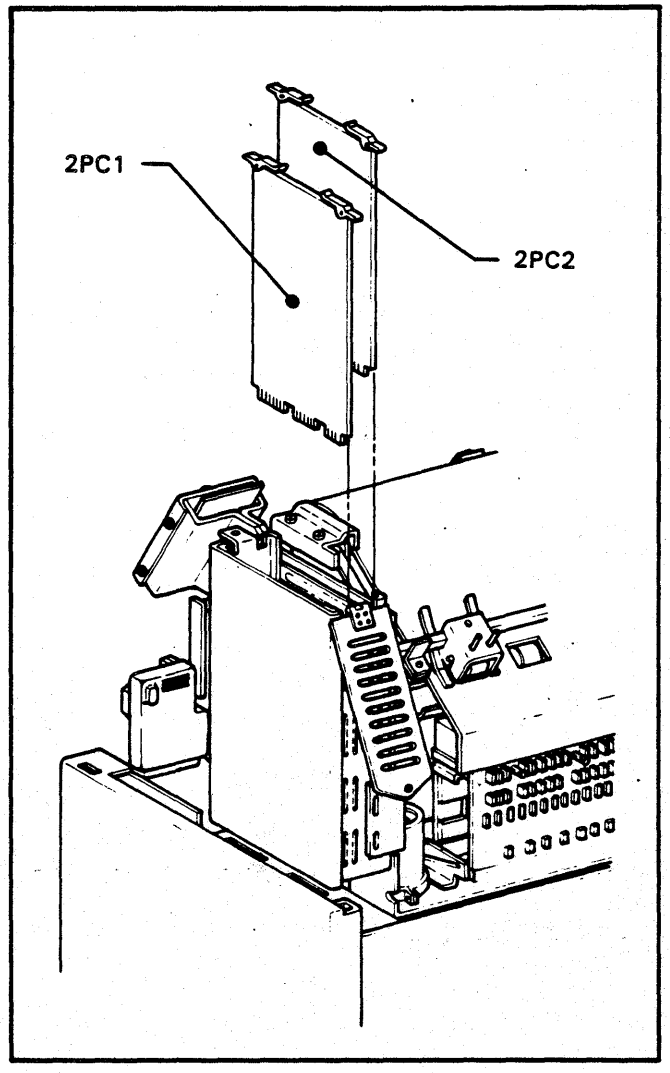


FIGURE 1-5. AREA 2

Area 2 (See Figure 1-5)

These are the Power Card Rack components of Area 2:

2PC1 - Power Supply Assembly
2PC2 - Servo Power Amplifier Assembly

Area 3 (See Figure 1-6)

These are the Print Head Structure components of Area 3:

3BO1 - Vertical Servo Motor
3BO3 - Exit Roller Motor
3CO3 - Exit Roller Motor Capacitor
3LO1 - Vertical Tachometer
3LO2 - Vertical Reader
3LO3 - Vertical Check Strobe Reader
3LO4 - PMV Reader
3LO7 - Paper Clamp Assembly
3SW1 - Gate Switch
3SW2 - 6/8 LPI Switch
3SW4 - Out Of Paper Switch

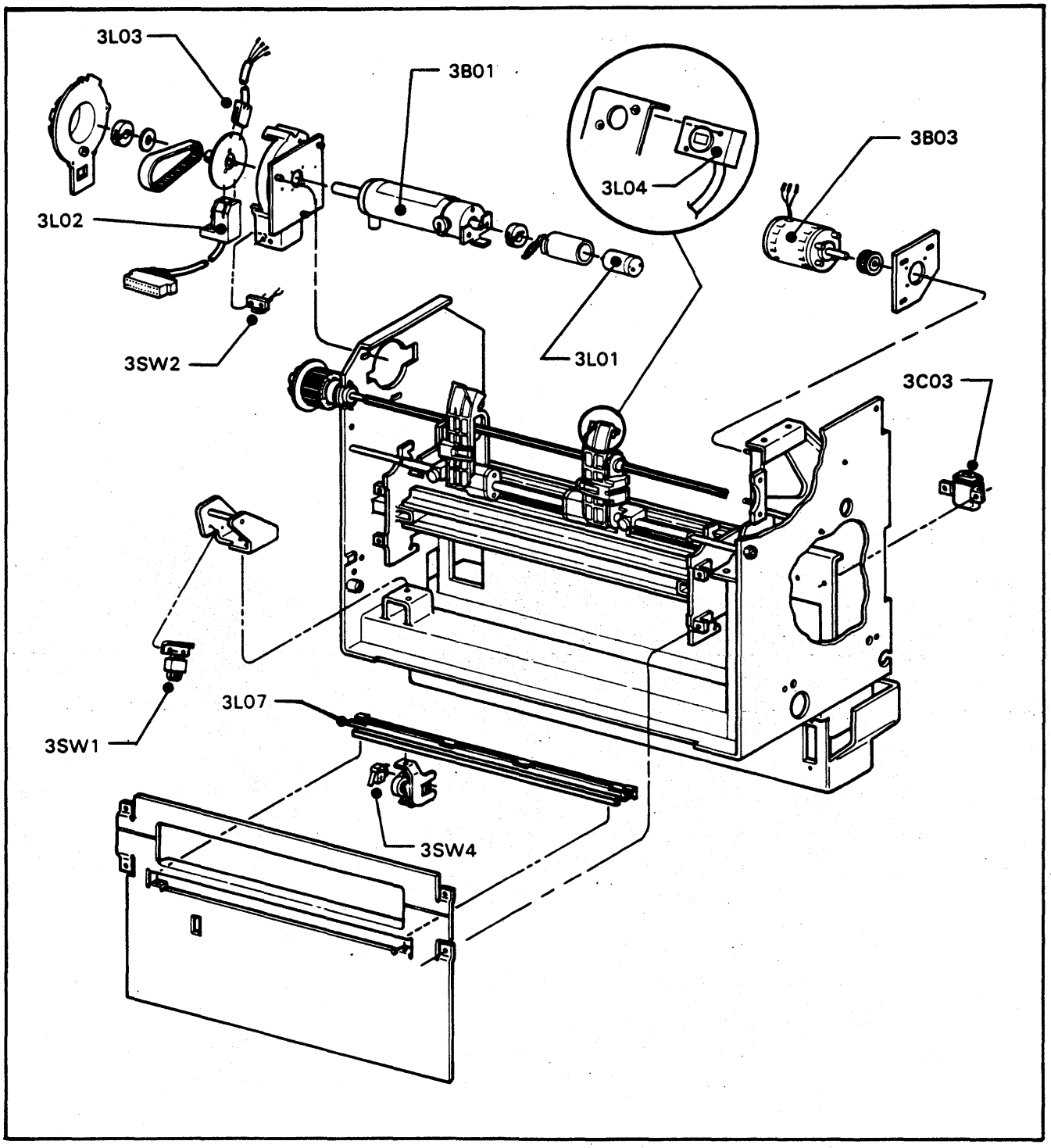


FIGURE 1-6. AREA 3

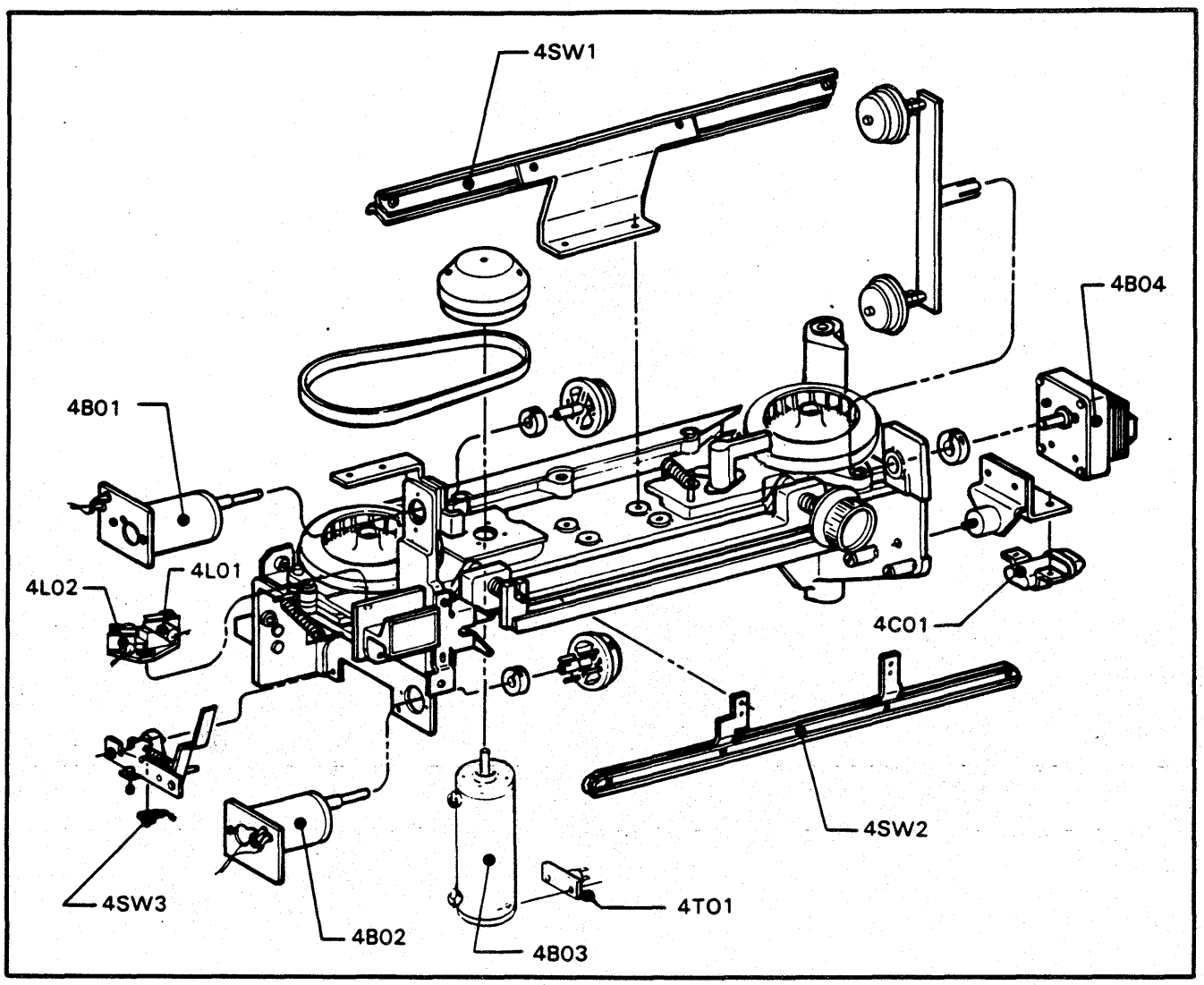


FIGURE 1-7. AREA 4

Area 4 (See Figure 1-7)

These are the Gate components of Area 4:

4BO1 - Upper Ribbon Motor
4BO2 - Lower Ribbon Motor
4BO3 - Band Motor
4BO4 - Ribbon Skew Motor
4CO1 - Ribbon Skew Motor Capacitor
4LO1 - Home Pulse Pickup
4LO2 - Character Pulse Pickup
4SW1 - Upper Ribbon Switch
4SW2 - Lower Ribbon Switch
4SW3 - Ribbon Skew Sense Switch

Area 5 (See Figure 1-8)

These are the Buss Bar and Hammer Driver components of Area 5:

5BBG - 36V Buss Bar Ground
5BBV - 36V Buss Bar Voltage
5CO1 - 9.5V Capacitor
5PC1 - Hammer Driver Assembly
5PC2 - Hammer Driver Assembly
5PC3 - Hammer Driver Assembly
5PC4 - Hammer Driver Assembly
5TB1 - +12 volts
5TB2 - −12 volts
5TB3 - +36 volts
5TB4 - Ground
5TB5 - +5 volts

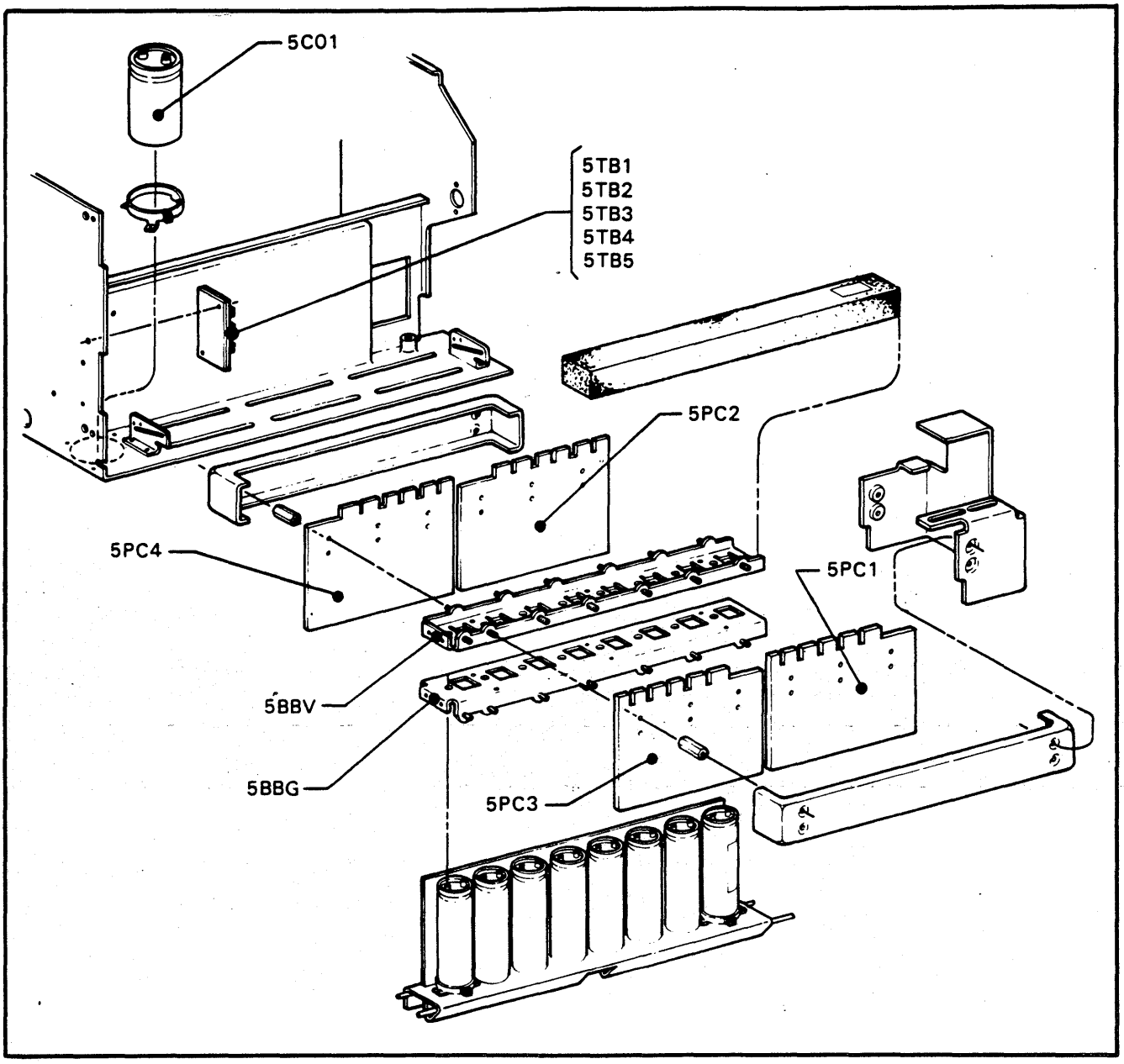


FIGURE 1-8. AREA 5

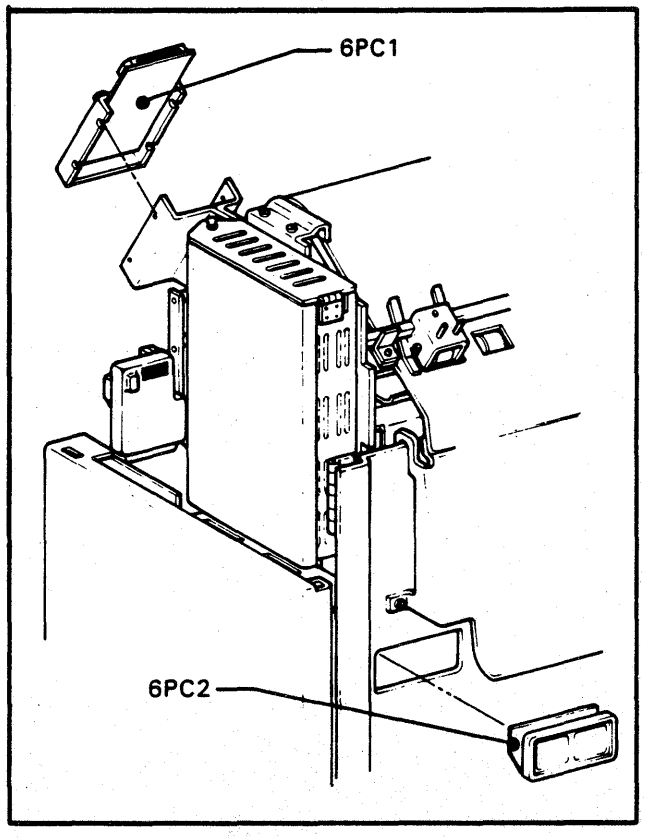


FIGURE 1-9. AREA 6

Area 6 (See Figure 1-9)

These are the Control Panel components of Area 6:

6PC1 - Front Control Panel
6PC2 - Rear Control Panel

Area 7 (See Figure 1-10)

These are the Logic Card Rack components of Area 7:

7BP1 - Backplane Assembly
7FO1 - Paper Clamp Fuse
7PC1 - *Interface Adapter Assembly
7PC2 - Controller Assembly
7PC3 - Print Head Electronics Assembly
*Refer to Interface Adapter Manual

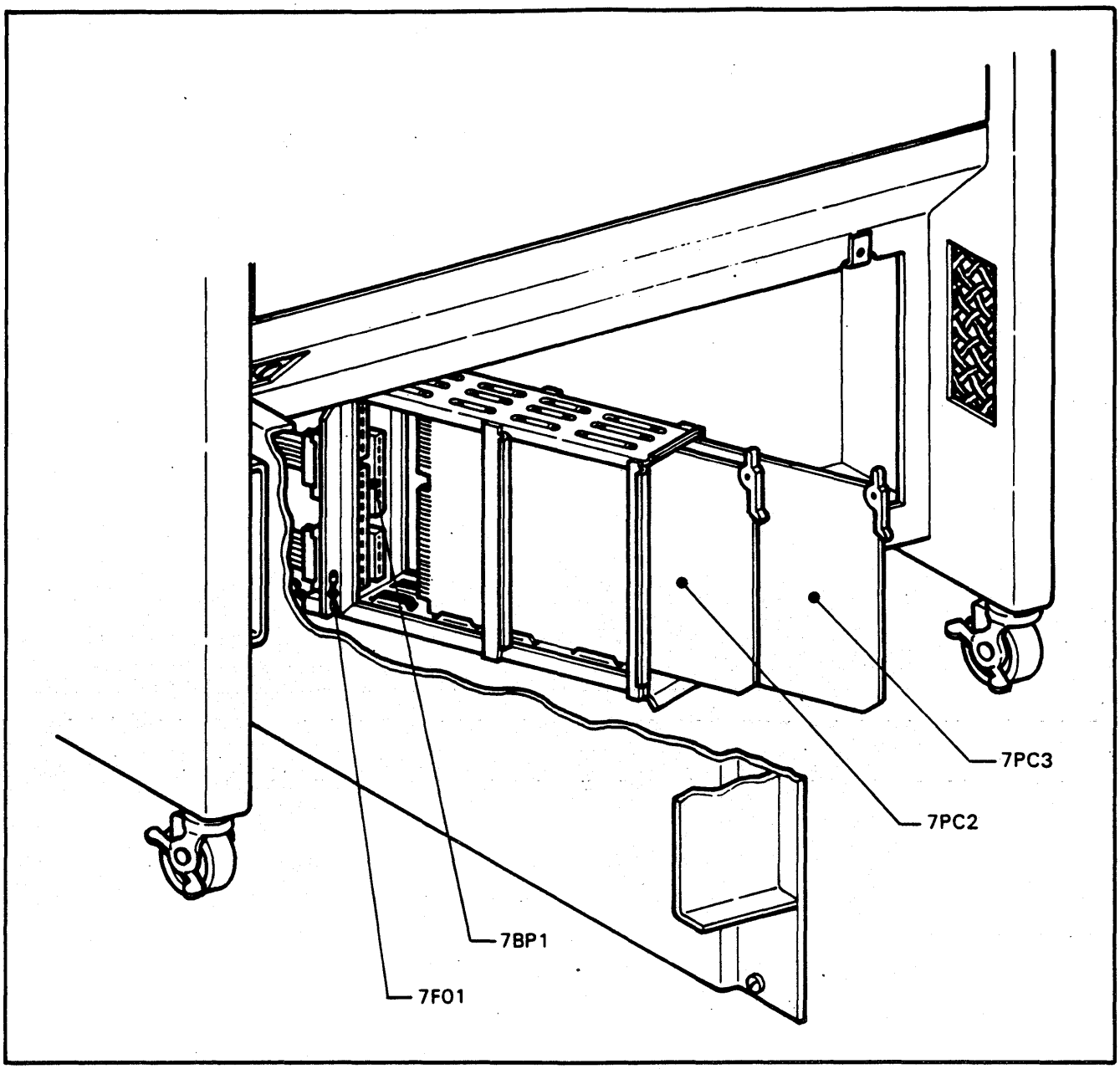


FIGURE 1-10. AREA 7

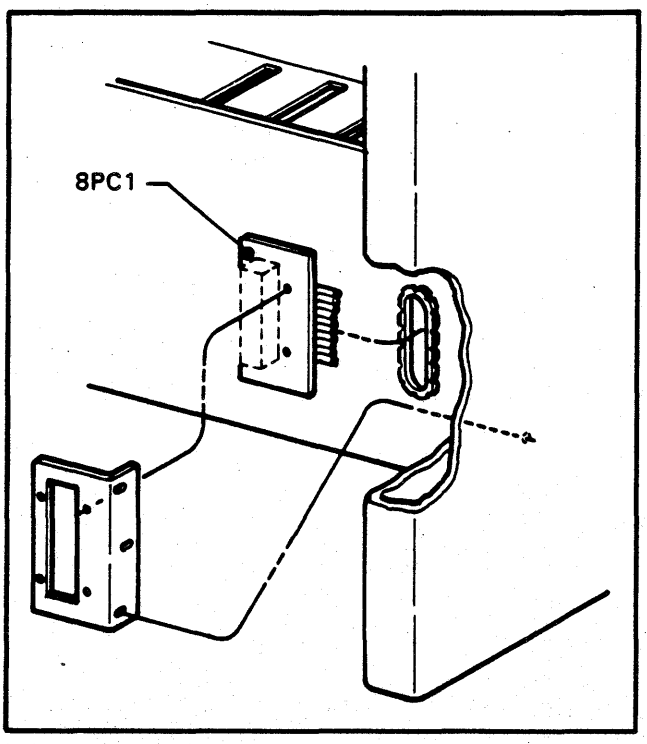


FIGURE 1-11. AREA 8

Area 8 (See Figure 1-11)

This is the I/O Connector component of Area 8:

8PC1 I/O Connector Assembly

Area 9 (See Figure 1-12)

These are the Air Flow Sensor components of Area 9:

9R01 36V Crobar Resistor
9R02 Air Flow Sense Resistor
9R03 Air Flow Sense Thermistor
9TB3 Air Flow Sense Terminal Block

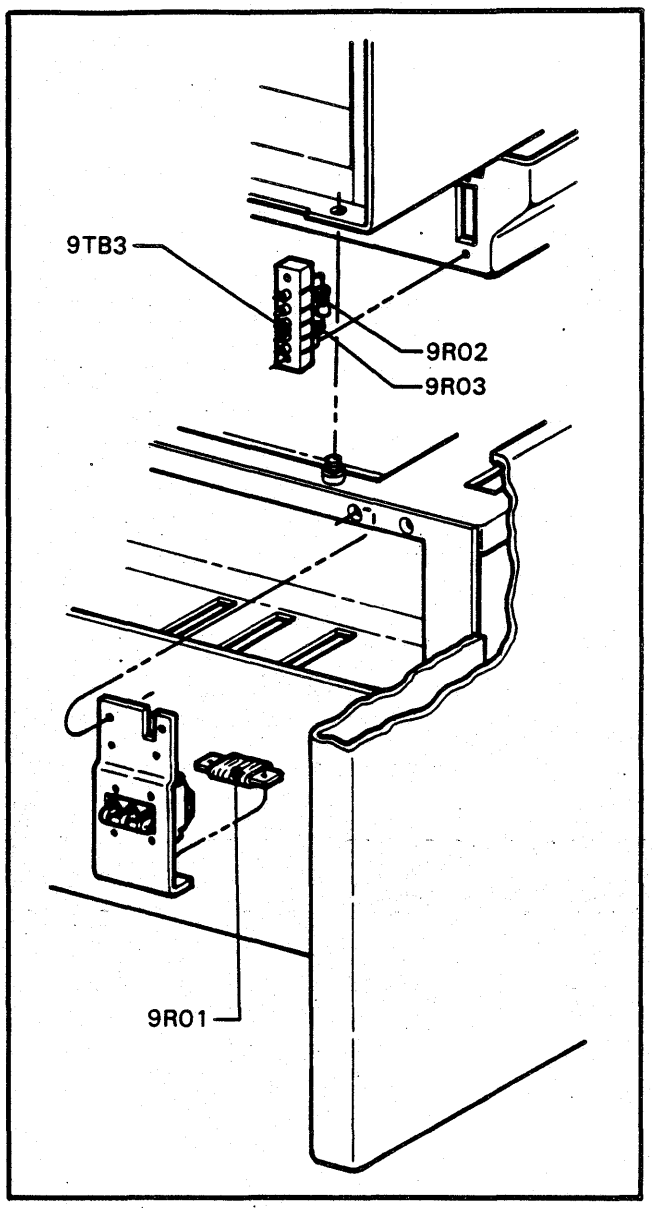


FIGURE 1-12. AREA 9

FUNCTIONAL DESCRIPTION

This description will present a sequence of events which will occur in the printer. The sequence will not point out all of the events in the exact order they occur. However, it will point out main events which give insight to the workings of the printer. Before beginning the sequence, the printer must have the band, paper, and ribbon properly installed, and the gate must be closed.

Part I - Initialization Sequence

1. Set the circuit breaker by raising the handle.
2. This applies AC voltage to the blower, solid state relay assembly and the transformer.
3. This AC voltage will remain until the AC portion of the circuit breaker is tripped.
4. The transformer secondary supplies AC voltage to the power supply assembly.
5. The power supply begins to develop DC voltages.
6. Inhibit signal is generated. It disables all of the systems until the DC voltages are fully up and stable.
7. The microprocessor is started. It configures, starts and tests its ports, RAM and ROM.
8. DC voltages are distributed.
9. The following items are continuously monitored whenever the printer is powered on:

    a. +5VDC - If over or under tolerance, it crobars, causing +36VDC to crobar, which disables the printer.

    b. ±12VDC - A lack of either voltage will cause +36VDC to crobar.

    c. +36VDC - A loss of this voltage on the servo power amplifier will cause +36VDC to crobar.

    d. Air Flow - Insufficient air flow will cause +36VDC to crobar.

    e. Status and Fault lines - So the proper code can be displayed and acted upon.

10. The band motor is started.
11. The vertical motor is activated and a hold voltage is applied.
12. The microprocessor checks the status and fault lines. If no faults exist, the printer enters a ready state.
13. If a fault exists, the printer will remain in a not ready state until the fault is corrected.
14. If a CE Fault exists, the +36VDC will crobar.
15. When the printer is in the ready state, and no printing occurs within 30 seconds, the band motor will time out and stop.

Part II - Print Sequence

16. The print sequence may be entered either ON or OFF line.
17. The sequence begins when the data load starts in the ON LINE mode, or when the Test Mode switch is pressed when in the OFF LINE mode.
18. The band motor is restarted if it has timed out.
19. Data load is completed.
20. The microprocessor keeps track of: the characters on the band; when they align with the hammers; and which characters are to be printed. This is done continuously as the band is passing through the print station.
21. The microprocessor determines if the character that is aligned with a hammer is the character that is to be printed in that location.
22. If the proper character is aligned with the proper hammer, a Compare signal is generated.
23. That hammer is activated to print that character, and printing begins.
24. The upper and lower ribbon motors are started when the first hammer is activated.
25. The solid state relay assembly sends the AC voltage which controls the ribbon skew motor.
26. Printing continues until all characters have been printed on the first line.
27. The vertical motor advances the paper.
28. The vertical motor stops and a hold voltage is applied.

(Continued)

29. Data for the next line is loaded, and the Print Sequence is repeated for the required number of lines.

30. The ribbon motors stop after the last ch of the last line has been printed.

SIGNAL LIST

The following list contains the abbreviations and names of the signals most frequently used within this manual. It is not a complete list of all the signals used in the printer.

SIGNAL LIST

ADO-7	Address 0 to 7
ALE	Address Latch Enable
BAD 1-9	Buffer Address 1 to 9
Band up Ena	Band Up Enable
Band up FF	Band Up Flip-Flop
BCG LD Ena	Band Code Generator Load Enable
BCP	Band Character Pulse
BHP	Band Home Pulse
BM Cur Flt	Band Motor Current Fault
BMC	Band Motor Control
BMC Fdbk	Band Motor Control Feedback
BOF	Bottom of Form
Buf Clk	Buffer Clock
Clk	Clock
CLR BAD	Clear Buffer Address
CLR SR	Clear Shift Register
CMP	Compare
CMP Ena	Compare Enable
*Comp Pitch	Compressed Pitch
*CP En	Compressed Pitch Enable
CS	Chip Select
D Strobe	Data Strobe
DAVFU	Direct Access Vertical Format Unit
EVFU	Electronic Vertical Format Unit
Flt Sense	Fault Sense
Fwd	Forward
*H Adv	Horizontal Advance
*H Dir Rt	Horizontal Direction Right
*H End Stop Flt	Horizontal End Stop Fault
*H Home Ena O/S	Horizontal Home Enable one-shot
*H Home Flt	Horizontal Home Fault
*H Home Rdr	Horizontal Home Reader
H Inh	Horizontal Inhibit
*H Pos Ena	Horizontal Position Enable
*H Pos Fdbk Act	Horizontal Position Feedback Active
*H Pos Rdr	Horizontal Position Reader
*H Stb Lt	Horizontal Strobe Left
*H Stb Rt	Horizontal Strobe Right
H Sw Flt Dis	"H" Switch Fault Disable
*H Tach	Horizontal Tachometer
HD Clk	Hammer Driver Clock
HEP	Hammer Enable Pulse
*HME	Horizontal Motion Error

(Continued)

SIGNAL LIST (Continued)

Hmr Drvr Flt	Hammer Driver Fault
Hmr Flt	Hammer Fault
Hmr on/5v Flt	Hammer on or 5 Volt Fault
High Slew	High Speed Slew
IDB 1-9	Input Data Bits 1 to 9
I/O BAD Clock	Input/Output Buffer Address Clock
I/O Ena Status	Input/Output Enable Status
LWR Rbn Mtr	Lower Ribbon Motor
MC	Master Clear
Motor On	Motor On Signal
OOP	Out of Paper
PMV Clr	Paper Motion Verification Clear
PMV Rdr	Paper Motion Verification Reader
PU	Pull Up
RDI	Rate Damping Inhibit
Rd	Read
RST	Reset
RET	Return
REV	Reverse
Rib Mtr Cur Flt	Ribbon Motor Current Fault
Rib On	Ribbon On
SR→HD	Shift Register to Hammer Driver Pulse
SR STEP	Shift Register Step Pulse
SS Prog	Sub Scan Programming (Band Speed Option)
SSP	Sub Scan Pulse
SS 1,2,3,4	Sub Scan 1,2,3,4
SSR 1,2	Solid State Relays 1,2
TOF	Top Of Form
Trans INH	Translate Inhibit
Upr Rbn Mtr	Upper Ribbon Motor
V Adv	Vertical Advance Signal
V Ck STB	Vertical Check Strobe
V INH	Vertical Inhibit
V STB	Vertical Strobe
VFU Ver	Vertical Format Unit Verify
Wr	Write
(-)5v Inhibit	5 Volt Inhibit
6/8 LPI	6 or 8 Lines Per Inch
48	48 Character Band
64	64 Character Band
96	96 Character Band
128	128 Character Band

*These signals apply to PBS 300/600 LPM printers only.

SECTION II
UNIQUE INTERFACE

THIS SECTION COVERS THE UNIQUE INTERFACE FEATURES. BEFORE CONSULTING THIS SECTION, REFER TO THE BASIC INTERFACE SECTION FOR THE BASIC INTERFACE FEATURES.

This section presents specific information for the 3 basic interface elements: the control panel, the controller assembly and the I/O connector. The information includes adapters, modifications and unique assembly additions. These items customize the basic interface to meet the application requirements of the user's system. The following interface features will be covered in this section:

1. Front Control Panel
2. Rear Control Panel
3. Controller Assembly
4. I/O Connector
5. Backplane Assembly

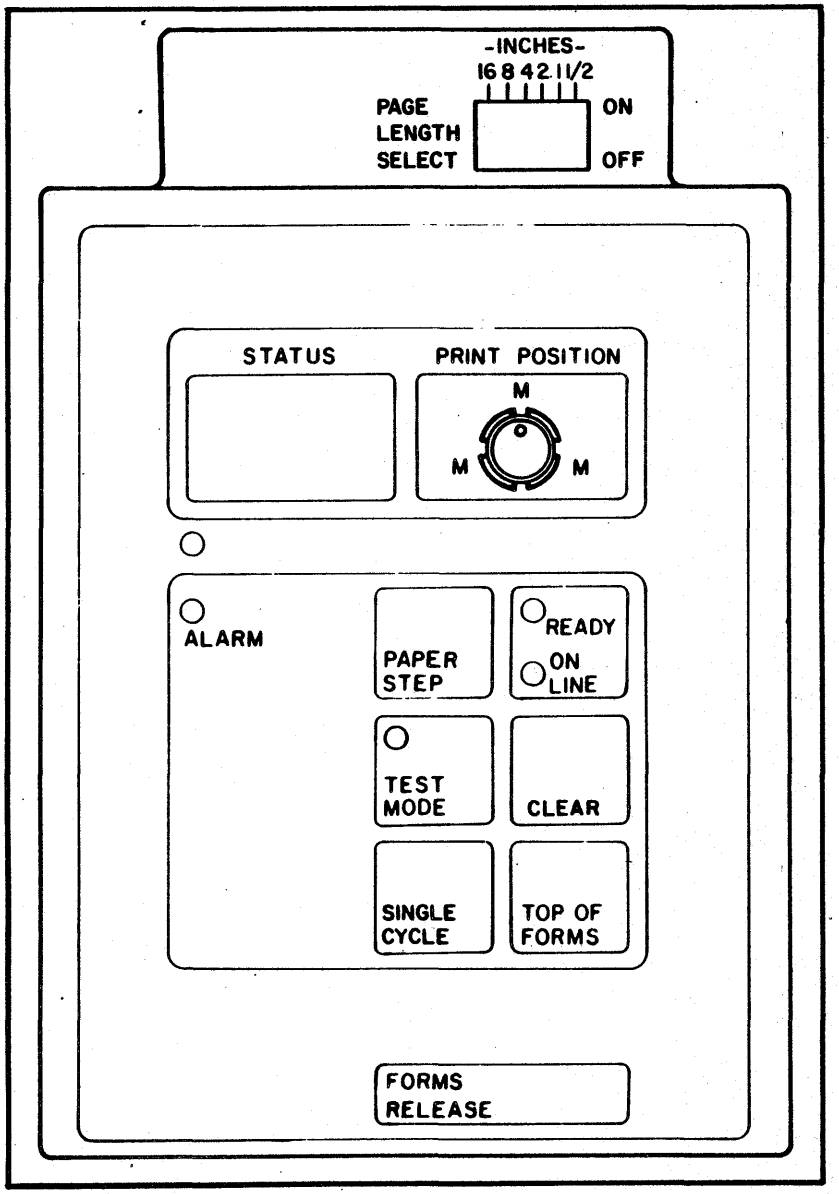


FIGURE 2-1. FRONT CONTROL PANEL

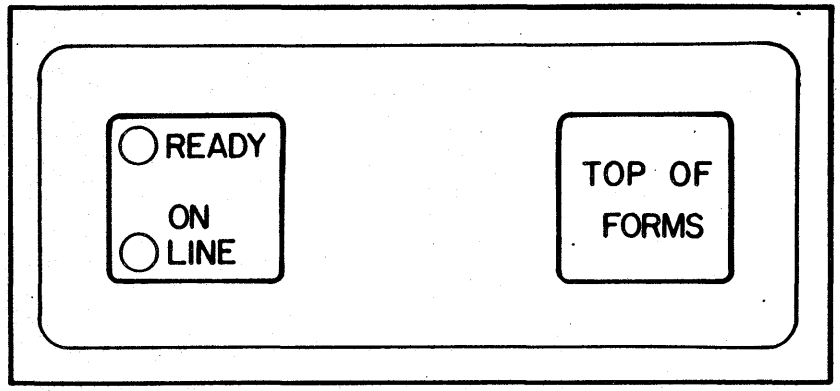


FIGURE 2-2. REAR CONTROL PANEL

NOTE: [1] Access Explainations
- a. Control can be activated with the bonnet open or closed.
- b. Indication can be changed with the bonnet open or closed.
- c. Indication can only be changed with the bonnet open.
- d. Indicator can be heard with the bonnet open or closed.
- e. Indicator can be seen with the bonnet open or closed.
- f. Switch can be activated with the bonnet open or closed.
- g. Switch can only be activated with the bonnet open.

[2] These indicators and switches are used on both the front and rear control panels.

CONTROL PANEL

The following table explains the Front and Rear control panels as shown in Figures 2-1 and 2-2.

TABLE 2-1. CONTROL PANEL FUNCTIONS

CONTROL PANEL CONTROLS AND INDICATORS				
IDENTIFIER	DESCRIPTION	ACCESS [1]	FUNCTION	OPERATION
ALARM	LED INDICATOR	e	On when a fault occurs. Blinks on & off when a CE fault occurs. Off when no faults exist.	Controlled by 7PC2 controller. Certain faults require the reset switch be pressed to clear alarm after fault is corrected.
CLEAR	TOUCH SWITCH	f	Resets controller logic, ends partially completed input cycle, clears the input buffer-data is lost, clears latched faults, puts unit Off Line.	Press
FORMS RELEASE	TOUCH SWITCH	g	Removes power from 3B01 and 3L07. Allows manual movement of paper.	Unit must be Off Line. Press and hold to move paper with the coarse positioning knob.
ON LINE [2]	LED INDICATOR	b,e	When Ready, alternates between On & Off each time the On Line switch is pressed. When on, will go off if a fault occurs.	Unit must be Ready. Press On Line switch to turn indicator On, press again to turn it off.
ON LINE [2]	TOUCH SWITCH	f	Allows the transmission of print data from the data source to the printer.	Unit must be Ready. Press to allow transmission, press again to prohibit transmission.
PAGE LENGTH SELECT	DIP SWITCH NETWORK	g	Enters the page length into the controller logic.	The page length is defined as the sum of all the switch segments placed in the ON position.
PAPER STEP	TOUCH SWITCH	f	When Off Line, moves paper up 1 line. Also, will change test print from 80 to 132 columns.	Press once for each line advance desired. When test printing, press to change column length.
PRINT POSITION	VARIABLE RESISTOR	a	Centers characters on hammer faces by adjusting hammer activation times.	Turn knob CW to move characters to the right. Turn knob CCW to move characters to the left.
READY [2]	LED INDICATOR	e	Indicates the printer is prepared to print. Will go off if anything disturbs this state.	Controlled by 7PC2 controller.
SINGLE CYCLE	TOUCH SWITCH	f	Allows printing of 1 line from the data source when Ready & Off Line, or Not Ready & Off Line due to an out of paper status. If out of paper, allows printing to the bottom of the page.	Press. Unit goes On Line and prints 1 line. Then it will either go Off Line and perform paper motion, or stay On Line and not perform paper motion, depending on the control code.
STATUS	2 NUMERIC DISPLAYS	b,e	Displays status codes.	Controlled by 7PC2 controller.
TEST MODE	LED INDICATOR	b,e	On when Off Line and in the test print mode. Off when out of test print mode.	Unit must be Off Line & Ready. Press Test Mode switch to turn indicator on, press again to turn off.
TEST MODE	TOUCH SWITCH	f	Starts and stops printing in the test mode.	Unit must be Off Line & Ready. Press to start printing, press again to stop.
TOP OF FORMS [2]	TOUCH SWITCH	f	Moves paper to the top of form position.	Unit must be Off Line. Press to move paper to the top of form position.
	LED INDICATOR	b,e	Verifies any touch switch was activated. On when any touch switch is activated.	Press any touch switch to turn indicator on, release switch to turn indicator off.
	AUDIO INDICATOR	b,d	Verifies any touch switch was activated. Emits a momentary audio tone.	Press any touch switch, indicator will beep momentarily.

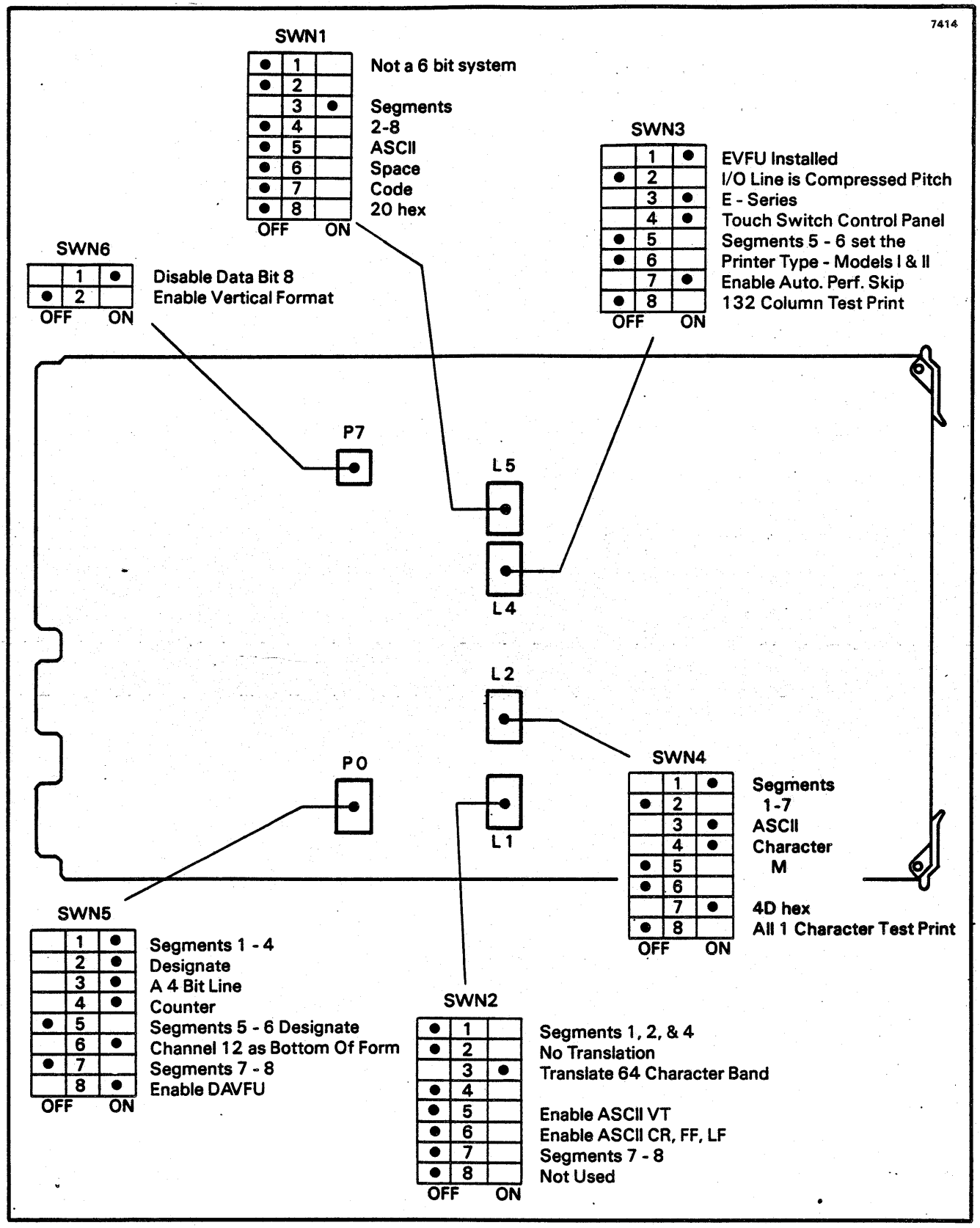


FIGURE 2-3. FACTORY DIP SWITCH SETTINGS FOR: CT207-A

CONTROLLER ASSEMBLY

The controller assembly contains these standard features:

220 ohm terminating resistors on the incoming interface signal lines.

Post Print paper motion.

Page Eject may be performed by control panel or data source command.

ASCII control code VT, if enabled on the controller board, will cause the paper to move to Channel 3. An option allows the selection of Channel 4 as VT.

Paper runaway protection is provided if the data source asks for paper motion to a VFU channel not punched by printing, moving paper 1 line, going Off Line, and generating a fault display.

Paper runaway caused by printer hardware failure is controlled by dropping 36 VDC and generating a fault display.

The factory dip switch settings for the controller are shown in Figure 2-3.

I/O CONNECTOR

The I/O connector for the CT207-A unit is the standard version shown in the Basic Interface Section.

BACKPLANE ASSEMBLY

The Backplane assembly for this printer is the standard version shown in the Basic Interface Section. The factory dip switch settings are shown in Figure 2-4.

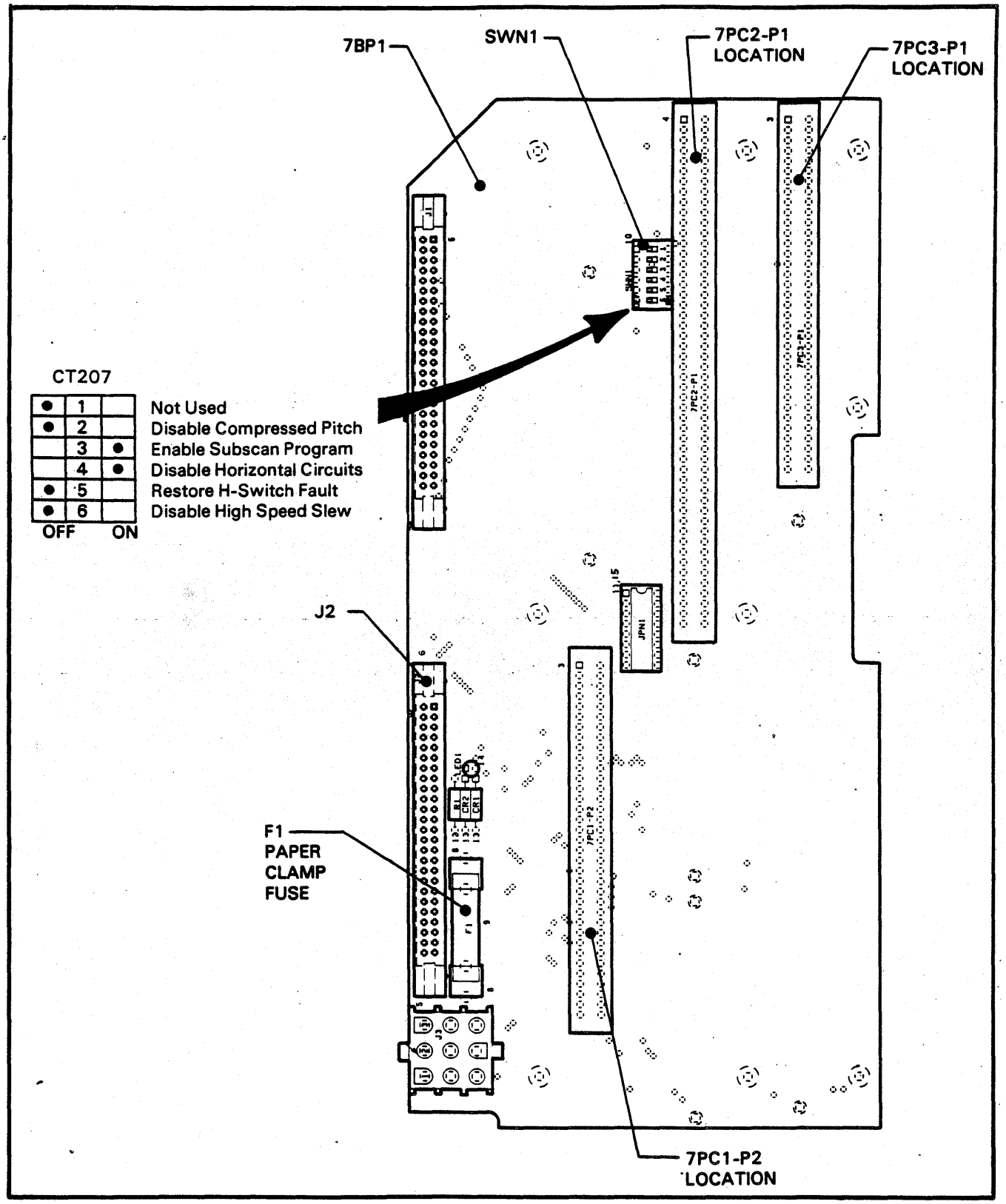


FIGURE 2-4. BACKPLANE FACTORY DIP SWITCH SETTINGS FOR: CT207-A

SECTION III
POWER

This section covers the AC voltage, the DC voltage, and the protective circuits associated with the power used in the printer. The 4 protective circuits are: +5 VDC crobar, +36 VDC crobar, air flow sensor (blower fault), and inhibit.

CIRCUIT BREAKER

The printer is turned on and off by 1CB1, a 3 pole mechanically coupled circuit breaker. Poles 1 and 2 carry the AC and they will trip at 18.7 amperes. Pole 3 carries +36 volts DC and will trip when more than 30 amperes flow between terminals A and C, or 3.43 amperes flow between terminals C and B. See Figure 3-1. If poles 1 or 2 overload, all 3 poles will trip. If pole 3 overloads, only pole 3 trips, poles 1 and 2 will remain on. If pole 3 trips, the breaker must be reset. To reset the breaker, lower the handle, wait for 15 seconds, then raise the handle. No more than 3 resets should be performed in a 5 minute period.

AC (See Figure 3-2)

The AC is routed from the power cord through the line filter and up to the circuit breaker. From the circuit breaker, the AC goes to the input terminal block of a multitap transformer. This terminal block provides: a 120 volt source to run the blower, exit roller and skew motors; and an easy method for selecting the proper input voltage tap of the transformer. When the proper input voltage is applied, the transformer outputs 3 voltages (9.5, 16.5 and 38 VAC), which are directed to 2PC1 power supply assembly. The wiring diagrams contained in the Logic Diagrams-Print Mechanism Section will show the proper configurations for the frequency and input voltage variations.

DC (See Figure 3-3)

The power supply assembly takes the AC from the transformer and developes the DC voltages listed in Table 3-1.

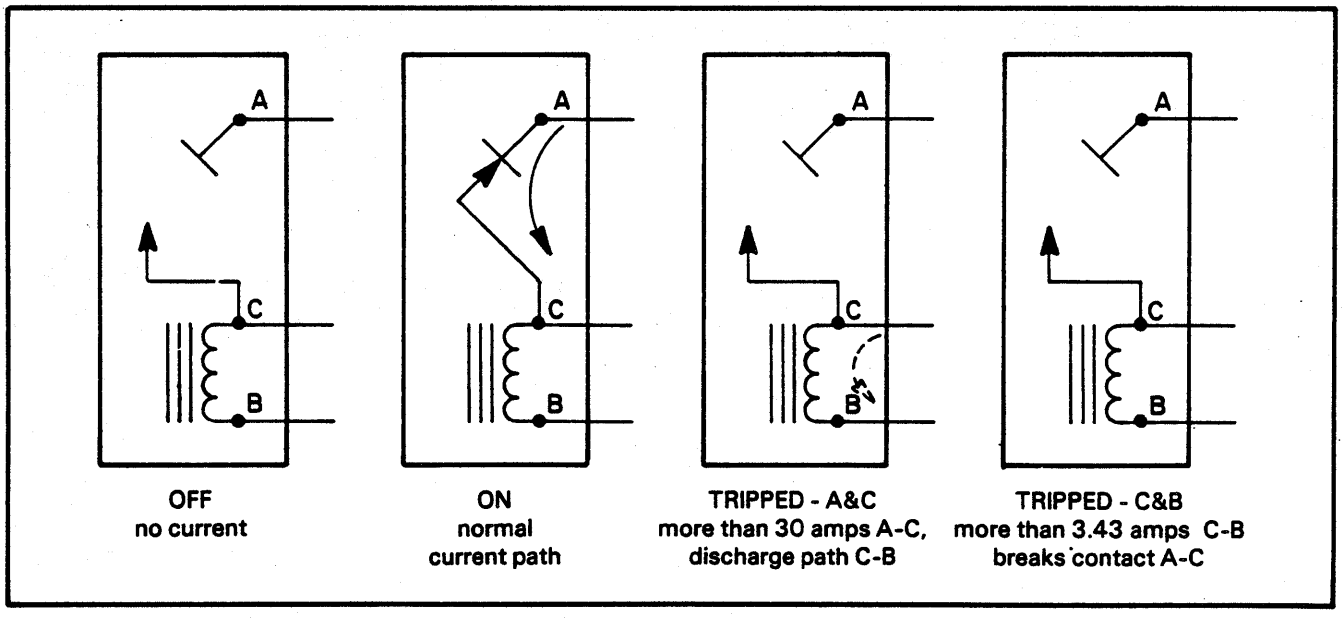


FIGURE 3-1. CIRCUIT BREAKER 1CB1-POLE 3

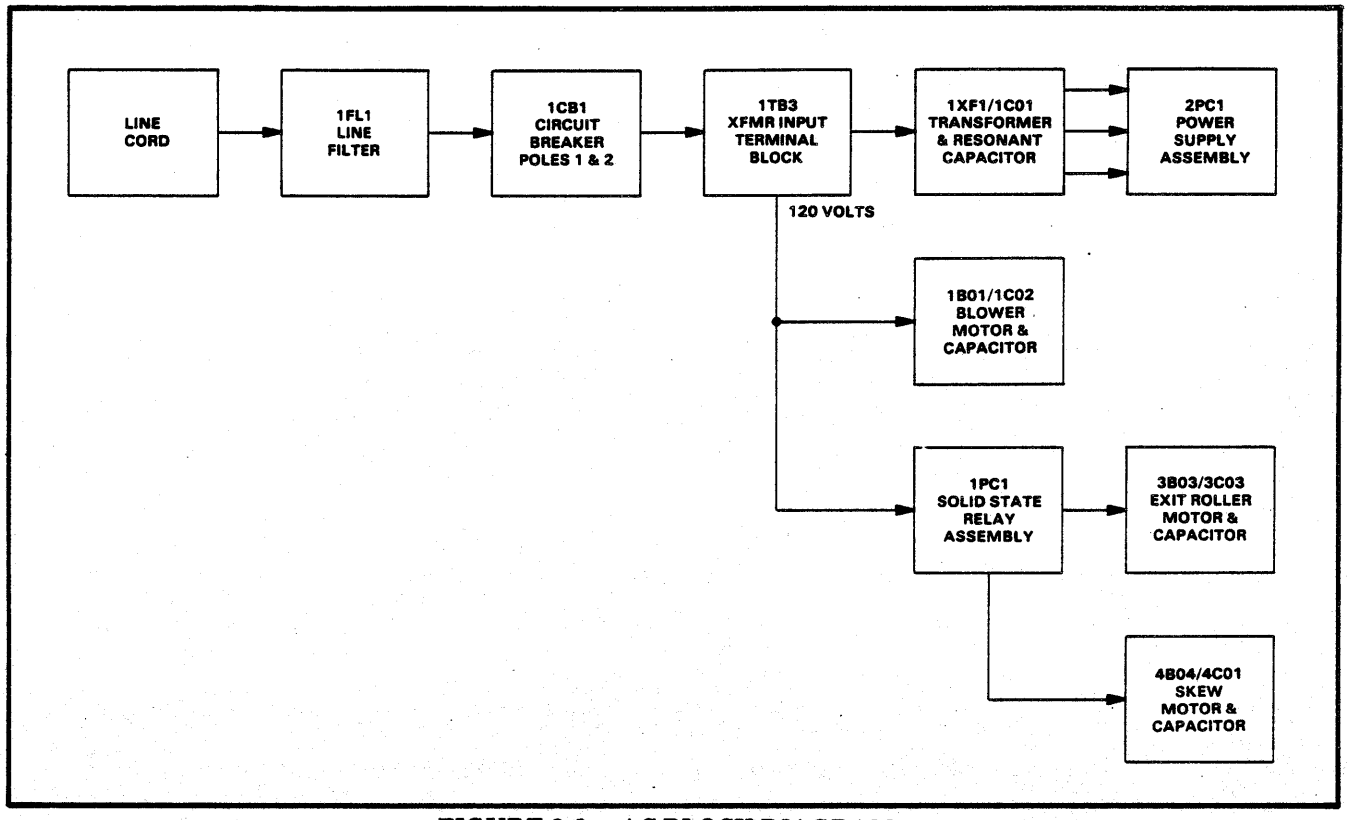


FIGURE 3-2. AC BLOCK DIAGRAM

TABLE 3-1. DC VOLTAGES

VOLTAGE	REGULATION	DISTRIBUTION	FUNCTION
+5VDC	YES	All PC Boards 3L03, 3L04, 4SW3	Supplies voltage to logic circuits
+9.5VDC	NO	5C01, 3L07	Source for +5 VDC. Supplies power for paper clamp
+12VDC	YES	2PC2, 7PC3	Provides reference voltage for operational amplifiers which control servo systems. Supplies power for vertical reader.
-12VDC	YES	2PC2, 7PC3	Provides reference voltage for operational amplifiers which control servo systems. Supplies power for vertical reader.
+36VDC	NO	2PC2,5PCX,7PC3, 3B01,4B01,4B02, 4B03,4SW1,4SW2	Provides drive voltage for actuators, band motor, upper & lower ribbon motors, and vertical motor. Generates +30VDC reference used on 7PC3 for hammer timing circuit. Provides voltage for ribbon reversing switches.

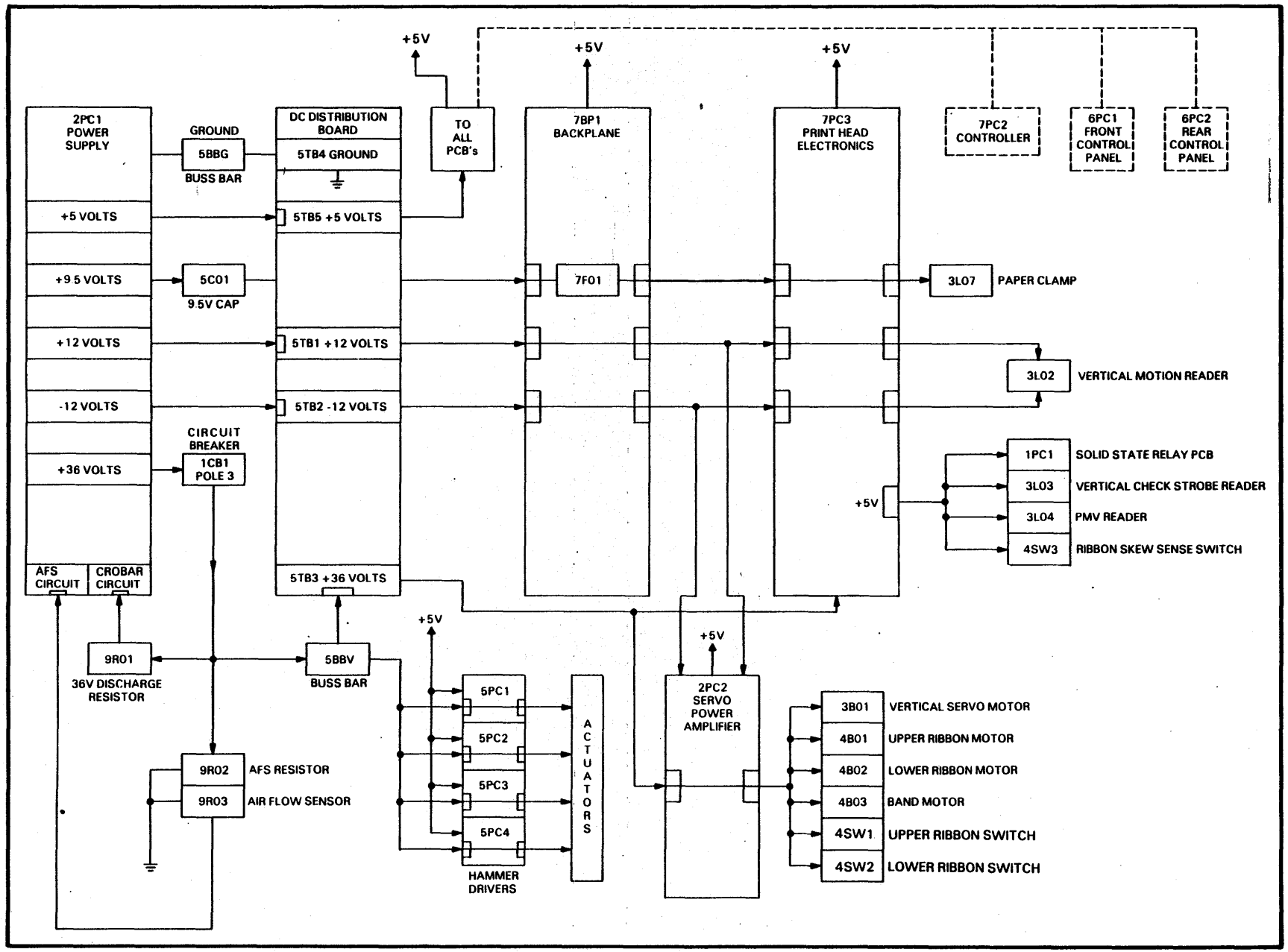


FIGURE 3-3. DC BLOCK DIAGRAM

+5 VDC CROBAR CIRCUIT (See Figure 3-4)

This circuit is located on the 2PC1 power supply board. It provides over voltage protection for the +5VDC supply. If the +5VDC reaches +5.6 volts, Zener diode CR10 will cause Q7 to be forward biased. Q7 will conduct, which will gate SCR1 on, which will shut down the +5 VDC supply. The +5VDC supply may also be shut down by the power down crobar (PDC) signal, which comes from the 7PC3 print head electronics board. PDC will go HI if the +5VDC supply drops below +4.7 VDC.

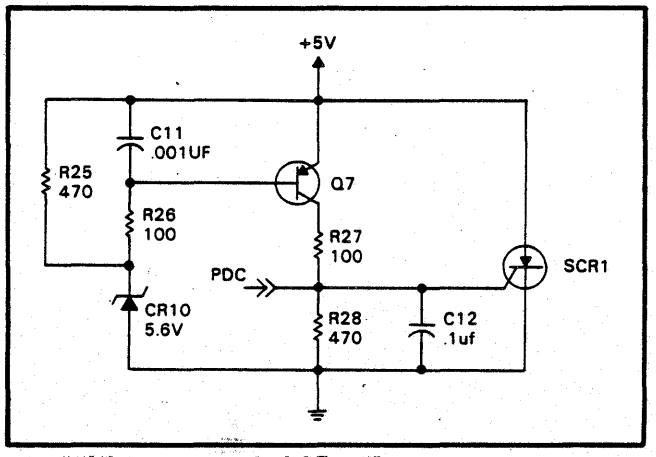


FIGURE 3-4. +5VDC CROBAR CIRCUIT

+36 VDC CROBAR CIRCUIT (See Figure 3-5)

This circuit is located on the 2PC1 power supply board. It removes +36VDC from the printer circuits if a CE fault occurs. It is disabled during power up by Zener diode CR30, which holds Q8 and SCR2 inactive. Due to loading effect of the large capacitor bank on the +36VDC supply, the +5VDC supply will come up much faster than the +36 VDC supply. When the +5 VDC supply comes up, Q5 is forward biased. Q5 will conduct, causing Q9 to conduct. When Q9 conducts, it reverse biases CR29. This holds Q8 and SCR2 inactive. Once +36VDC reaches +28VDC, CR30 provides operating voltage for Q8, but it is held inactive because Q9 is conducting.

When a CE fault occurs, the +36v crobar signal goes HI. This turns off Q5, which turns off Q9. When Q9 turns off, CR30 forward biases CR29. This causes Q8 to conduct, which gates SCR2 on. When SCR2 is gated, it diverts the incoming +36VDC through terminals C and B of 1CB1-pole 3. The current flow through this coil produces a magnetic field which opens the incoming +36VDC on terminal A, but does not disturb 1CB1-poles 1 and 2. When the +36VDC supply is cut off, the current stored in the capacitor bank flows in the opposite direction. It flows through the circuit breaker coil, 9R01, and SCR 2 to ground, which completes the crobar function.

To restore +36VDC, trip the circuit breaker, pause for 15 seconds, then reset the breaker.

There are 2 other ways to cause +36VDC to crobar. The first way is loss of +5VDC, which turns off Q5 and starts the crobar sequence. The second way is caused by the air flow sensor (blower fault), which is covered later on in this section. The following items will cause +36V crobar signal to go HI:

1. Paper Runaway Fault
2. Ribbon Motor Fault
3. 12 Volt Fault
4. Band Motor Fault
5. Hammer Fault
6. H-Switch Fault
7. Fuse Fault (+36V Sense)

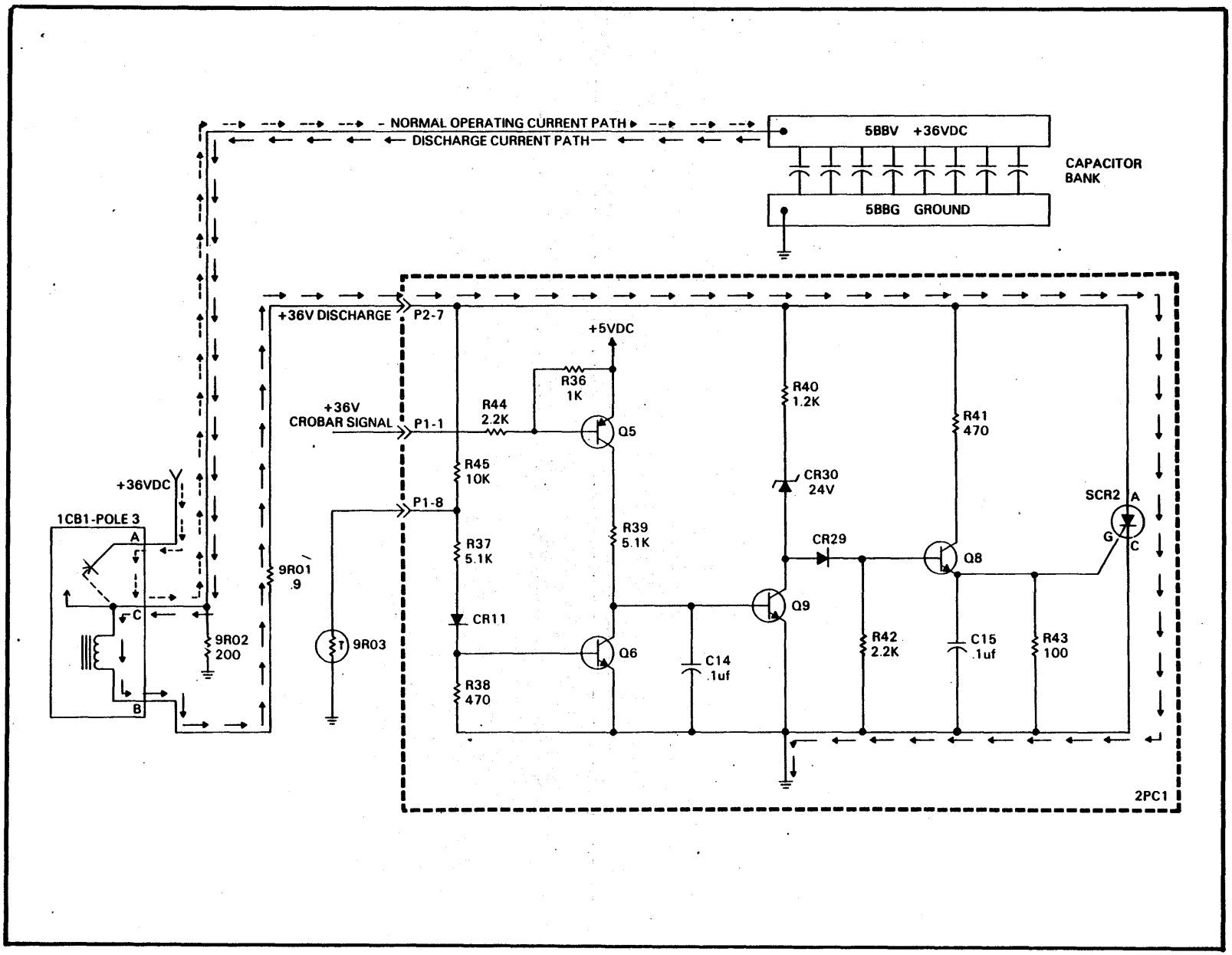


FIGURE 3-5. +36VDC CROBAR CIRCUIT

AIR FLOW SENSOR (BLOWER FAULT)

The printer is cooled by a heavy duty, 115 volt, 50/60 hertz blower motor assembly. This assembly draws air in through the hollow left leg of the pedestal, and distributes it through the print head structure. Located in the print head structure is the air flow sensor. It consists of a thermistor (9R03) mounted inside the ceramic core of resistor 9R02. See Figure 3-6. With proper air flow, 9R02 stays relatively cool, which keeps 9R03 at a low resistive value. Without proper air flow, 9R02 gets extremely hot. This causes 9R03 to greatly increase its resistive value, which causes +36 VDC to crobar. Refer back to Figure 3-5. With proper air flow, a current path is established through 9R03 and R45. Without proper air flow, the path will be through R38, CR11, R37, and R45. When this path is used, Q6 will conduct. When Q6 conducts, it causes Q9 to turn off. With Q9 off, Q8 will conduct, which gates SCR2 on and crobars +36VDC.

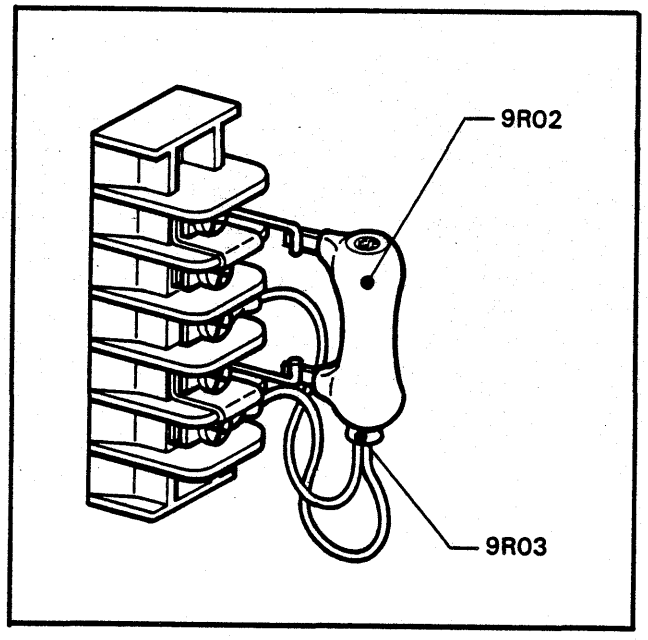


FIGURE 3-6. AIR FLOW SENSOR

INHIBIT CIRCUIT (See Figure 3-7)

This circuit is located on the 7PC3 printhead electronics board, and it provides an active LO signal. This signal prevents any printer operations until the DC voltages are fully up and stable. As +5VDC begins to rise, 2 things happen. A resistor-capacitor network delays the trigger input's effort to go HI on pin 2 of the 555 timer chip, and the LO is removed from the reset pin-4. This combination holds pin 3 HI for 1 second, which holds the relay inactive, which holds the inhibit signal LO. After 1 second, pin 3 goes LO, the relay energizes the contact opens, the inhibit signal goes HI and remains inactive until the printer is powered down.

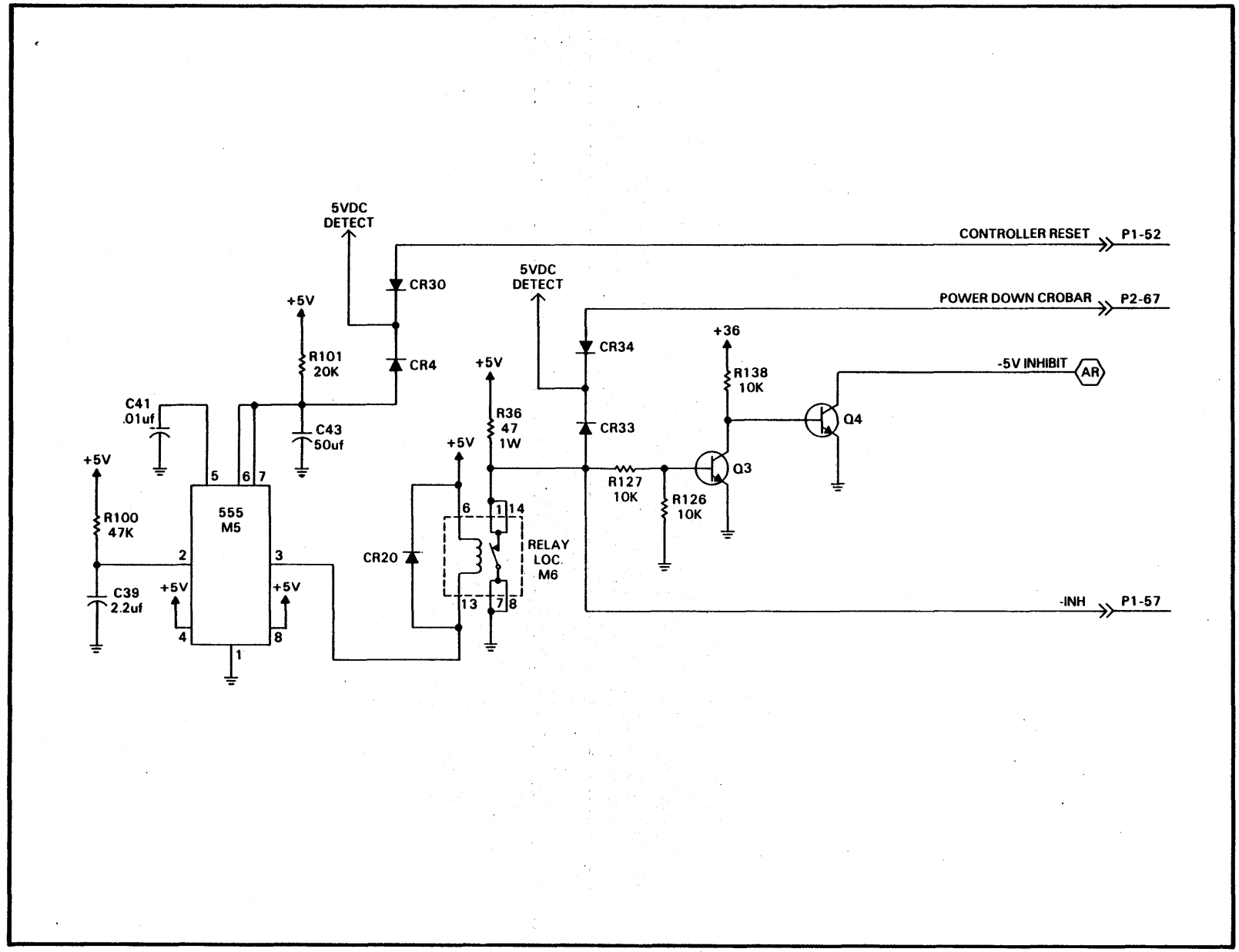


FIGURE 3-7. INHIBIT CIRCUIT

SECTION IV
GATE

The gate is a swing out assembly hinged on the right side (as viewed from the front). It opens for easy access to the band system, print station, and ribbon system. These 3 areas will be covered in this section.

BAND SYSTEM

Components

The components that make up the band system are listed below, along with the functions they perform. See Figure 4-1.

Band - Provides the characters for printing.

Character Pulse Pickup - Provides a signal used to control band speed, Band Motor Control Feedback (BMC FDBK).

Control Electronics - Starts motor, maintains speed, monitors Current, and stops the motor.

Drive Belt - Transfers drive energy from the motor pulley to the drive pulley.

Drive Pulley - Applies the drive energy to the band.

Idler Pulley - Guides the band and applies a tension force on the band

Motor - Provides the drive energy to move the band.

Motor Pulley - Provides a method for transferring the drive energy from the motor.

Tension lever - Applies a force on the idler pulley casting to maintain band tension.

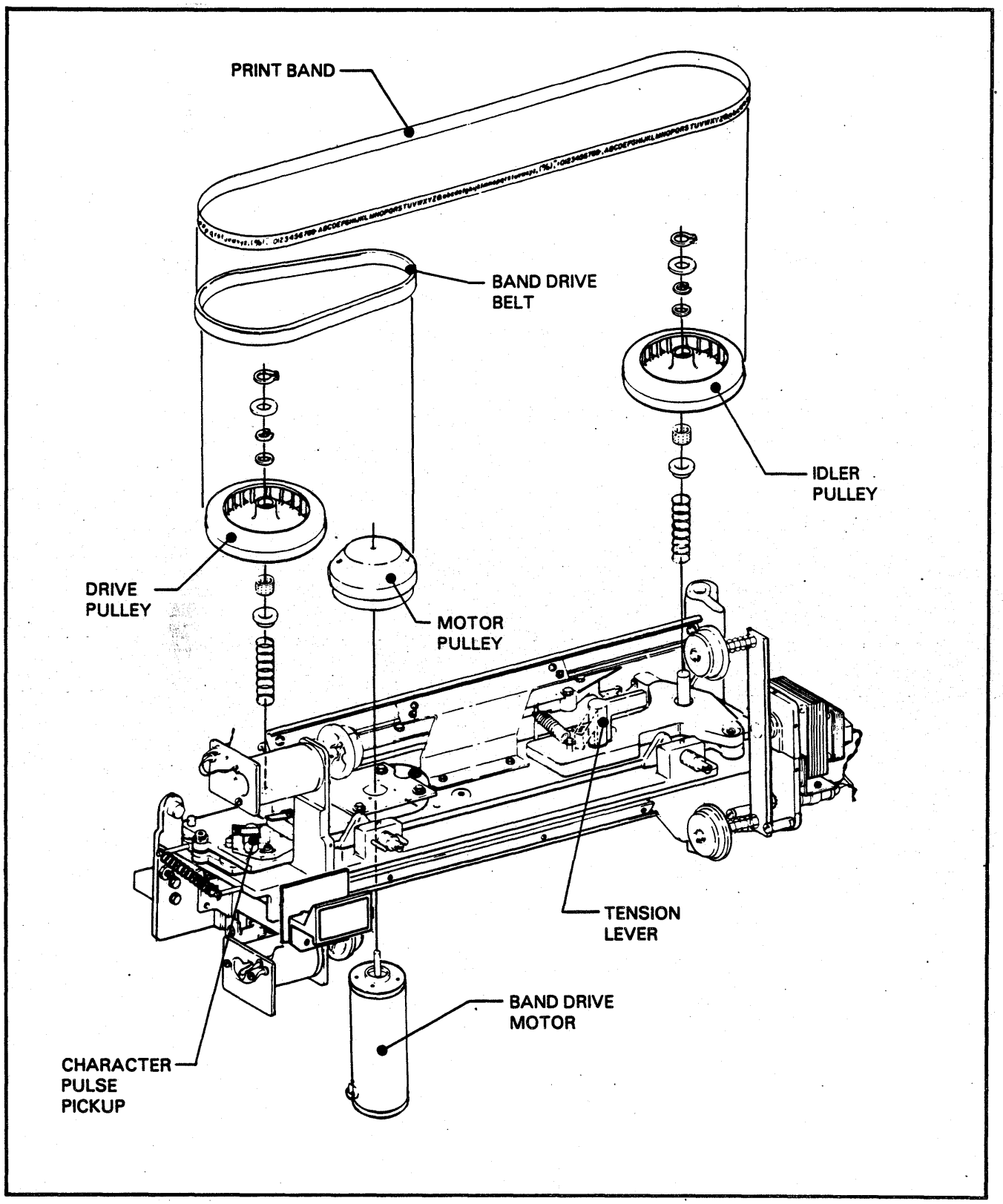


FIGURE 4-1. BAND DRIVE SYSTEM COMPONENTS

Objective (See Figure 4-2)

The objective of the band system is to rotate the band at 246 inches (6250mm) per second. To meet this objective, the system uses a DC servo motor. The motor control electronics use the phase lock loop method. This method compares a motor speed reference signal (BMC FDBK) to a crystal oscillator clock reference signal Band Motor Control Clock (-BMC CLK). Any difference between these 2 signals produces an error voltage signal. This error voltage signal is algebraically summed with a current feedback signal from the motor, and a rate damping signal. The resultant signal is applied to the motor, which either decreases or increases the motor speed. This change is reflected in the BMC FDBK signal, which completes the loop and repeats the cycle.

Control Electronics

The control electronics consist of the following circuits.

Overcurrent Fault: An operational amplifier monitors the drive current flowing through the band motor. Based on that information, it sends a feedback signal to the current chopper circuit. The overcurrent fault circuit has a detector which monitors that current feedback signal for 3.2 amperes. It has a 5 second delay to allow for start up current, which may reach 9 amperes. After the delay, if the current feedback signal exceeds 3.2 amperes, a band motor current fault is generated.

Rate Damping: This circuit provides a signal to the current chopper circuit that is proportional to the rate of change of velocity. The signal is derived by filtering and differentiating the BMC FDBK signal. The rate damping signal stabilizes the servo, controls its acceleration, and protects against an overcurrent condition. It is inhibited for 1.2 seconds during motor start up. This allows maximum acceleration to start the motor and bring it up to speed faster.

Speed Error Detect: This circuit inputs the BMC CLK and the BMC FDBK signals to a frequency (phase) detector. A charge pump converts the output of the frequency detector to fixed amplitude pulses. These pulses are:

a. +2.25 VDC for a frequency low error (band moving below speed)
b. +1.5 VDC for no frequency error (band moving at speed)
c. +0.75 VDC for a frequency high error (band moving above speed)

The appropriate pulse is applied to an active filter, which produces a DC voltage that is proportionate to the phase error. This voltage is sent to the current chopper circuit and is used to accelerate or decelerate the motor.

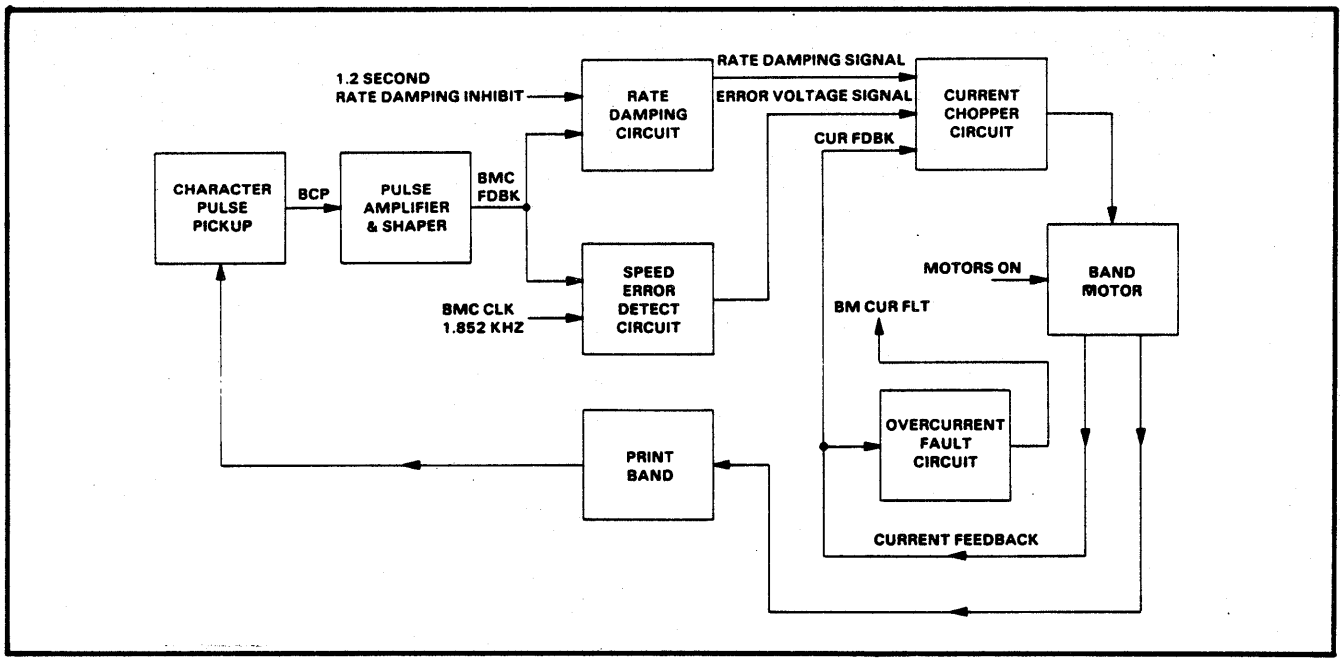


FIGURE 4-2. BAND DRIVE SYSTEM BLOCK DIAGRAM

Current Chopper: This circuit provides drive current to the motor. The drive current is not constant, it is pulsed at a 2 to 5 KHZ rate. The drive transistor turns on, supplies a current pulse, then turns off and allows the motor to coast. This cycle is constantly repeated as long as the motor is activated. The drive current pulse duration and frequency is determined by algebraically summing the error voltage signal, the current feedback signal, and the rate damping signal. The resultant signal is applied to the motor drive transistor.

The error voltage signal comes from the speed error detect circuit, and its purpose is to accelerate or decelerate the motor. The purpose of the current feedback signal is also to accelerate or decelerate the motor. The rate damping signal controls the rate of acceleration, if acceleration is called for by the other two signals.

Miscellaneous

The band system has an automatic time out feature that stops the motor if no data is received for 30±9 seconds. When printing resumes after a time out occurs, the printer will be ready to print within 5.1 seconds after it receives the first character.

PRINT STATION (See Figure 4-3)

The main components of the print station are mounted on the platen adjust casting. The platen adjust casting is mounted on the gate support casting, and is moved toward or away from the print hammers by the paper thickness knob. Mounted on the platen adjust casting is the band system and the platen assembly. The platen assembly consists of a platen, a wear strip, and an upper band guide. The platen is a metal part that provides a solid impact surface for the print hammers. A plastic wear strip is imbedded into the front face of the platen. This strip provides a bearing surface for the band to slide over, and keeps the band from contacting the metal platen. The upper band guide is mounted on top of the platen, and it serves as a locator for the band. The band tends to rise up when rotating around the floating band pulleys, because the pulleys are resting on springs. As the band rises up, it makes contact with the upper band guide. This guide keeps the band in a consistent location, and keeps it aligned to the print hammer faces.

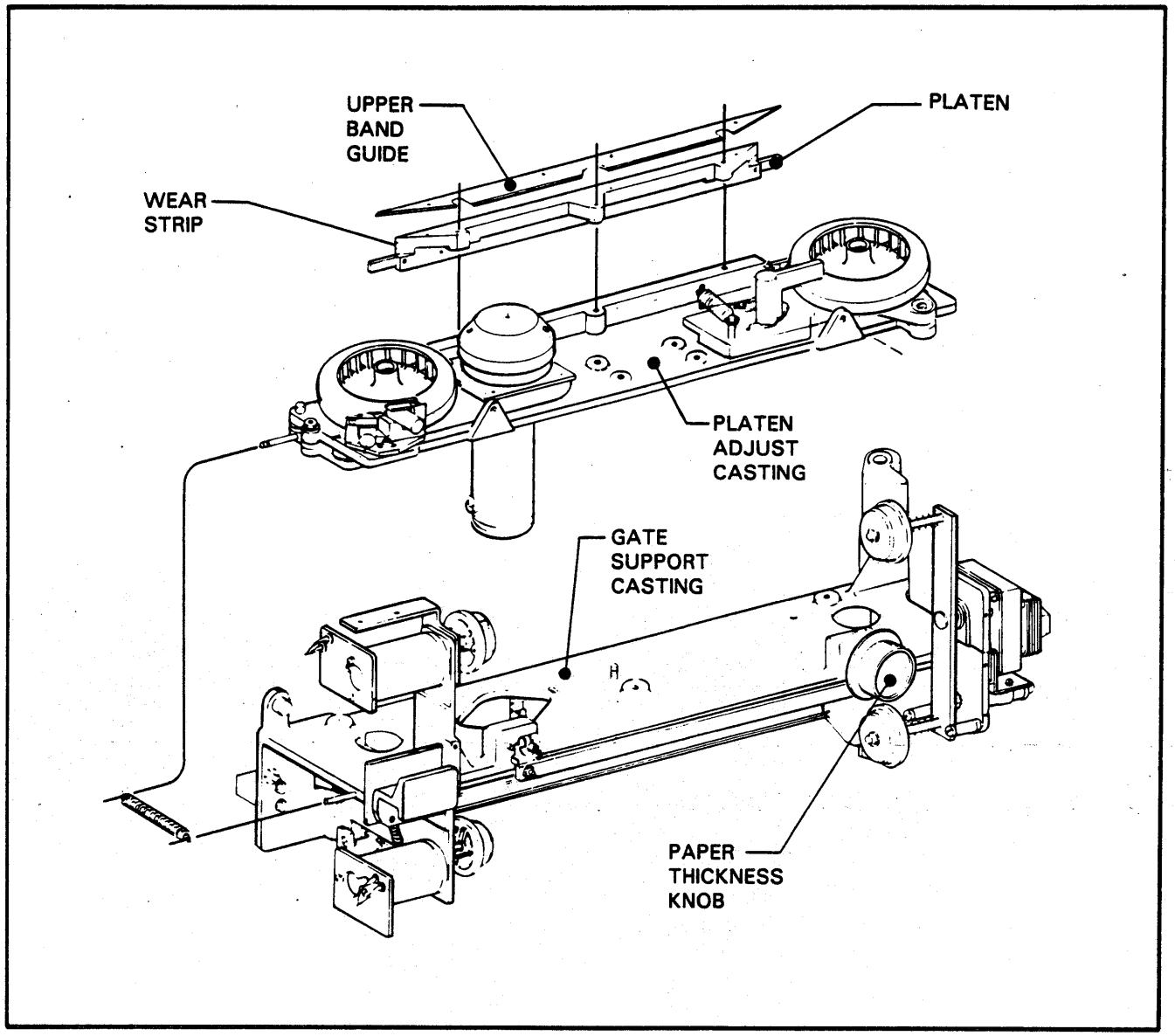


FIGURE 4-3. PRINT STATION COMPONENTS

RIBBON SYSTEM

Components

The components that make up the ribbon system are listed below, along with the functions they perform. See Figure 4-4.

Lower Drive Motor - Pulls the ribbon down when driving, provides drag when the upper motor is driving.

Lower Drive Spool - Transfers drive energy from the motor to the ribbon, actuates the sense arm.

Lower Spool - Supports the lower right end of the ribbon core.

Lower Switch Bar - Guides the ribbon, detects the end of the ribbon.

Sense Pawl Assembly

Sense Arm - Provides mounting points for the sense pawl and sense switch, transfers activating motion from lower drive spool to the sense pawl.

Sense Pawl - Detects the absence or presence of ribbon.

Sense Switch - Hall Effect switch, provides the signal which activates the skew motor.

Skew Arm - Provides ribbon skew by shifting the right side lower and upper spools.

Skew Motor - Provides drive energy to shift the skew arm.

Upper Drive Motor - Pulls the ribbon up when driving, provides drag when the lower motor is driving.

Upper Drive Spool - Transfers drive energy from the motor to the ribbon.

Upper Spool - Supports the upper right end of the ribbon core.

Upper Switch Bar - Guides the ribbon, detects the end of the ribbon.

Objective

The objective of the system is to provide a fresh source of ink to the print station. The ink is contained in a ribbon which is moved down and up across the print station. The ribbon is moved to prevent consecutive lines from printing on the same area. The ribbon is impregnated with a large amount of ink. When a character is printed, some of the ink is transferred from the ribbon to the paper. The area that lost ink recovers it from the surrounding area in a short time. This allows a large number of passes across the print station before the ink fades from the ribbon.

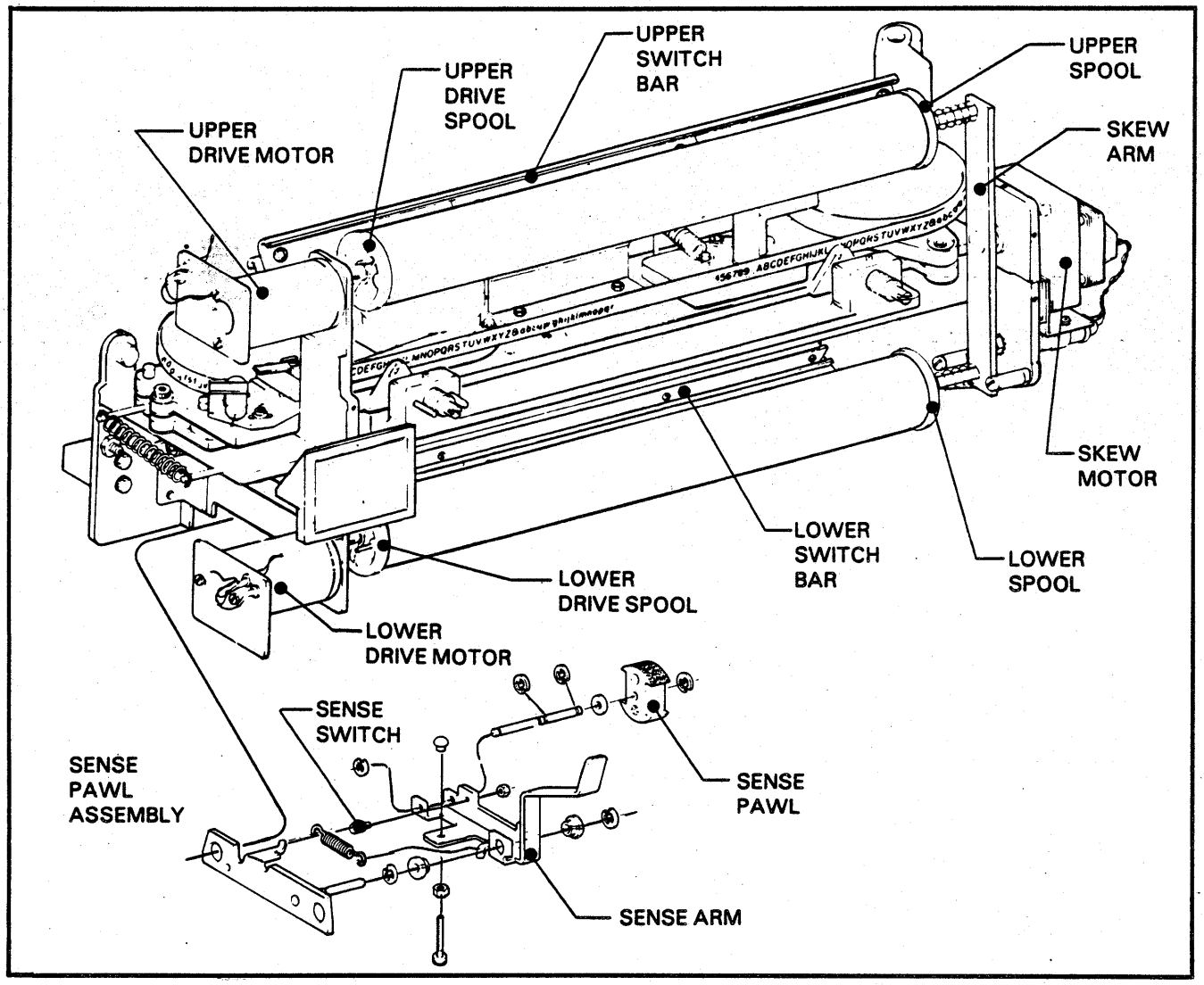


FIGURE 4-4. RIBBON SYSTEM COMPONENTS

Control Electronics (See Figure 4-5)

The control electronics consist of the following circuits:

Drive: Ribbon drive is enabled by the Motors On signal, and controlled by the Ribbon Inhibit signal. If the printer is idle, Motors On is HI. This holds CR10 &11 inactive. When the printer prepares to print, Motors On goes LO. This should forward bias CR10 & 11, but Ribbon Inhibit is LO and keeps them inactive. When the first hammer is activated, Ribbon Inhibit goes HI. This forward biases CR10 & 11, which causes QN1-07 to conduct. QN1-07 causes Q2 to conduct, which apples +36 VDC to relay contact pins 12 & 14. A ground path is provided through pins 11 & 13.

To drive the ribbon upward, +36VDC is applied through pin 12. CR25 is reversed biased, which allows maximum current to flow through 4B01. CR26 is forward biased, which places R93 in parallel with 4B02. The current is divided between them, which slows down 4B02. Because 4B01 is driving at full speed, and 4B02 is dragging at a slightly slower speed, the ribbon is kept taut and is pulled upward.

To drive the ribbon downward, +36VDC is applied through pin 14. CR26 is reversed biased, which allows maximum current to flow through 4B02. CR25 is forward biased, placing R92 in parallel with 4B01. This makes 4B02 the drive motor and 4B01 the drag motor. Since 4B02 is driving, and 4B01 is dragging, the ribbon will be pulled downward.

If no printing occurs within 820 milliseconds after the last line was printed, the ribbon drive is stopped. This is done by a one-shot on 7PC3 print head electronics which makes the Ribbon Inhibit signal LO. This short delay in stopping ribbon drive prevents ribbon smear on the form.

Overcurrent: This circuit monitors the ribbon motor drive current. Voltage comparator IC05 has its input pin 10 set to a predetermined level by R32 & R33. Input pin 11 monitors the voltage across R98. If the motors draw excess current, the voltage across R98 will increase. This will cause the level of pin 11 to increase, which triggers IC05 to output the fault signal. C24 and R105 prevent the fault indication during motor start-up.

Print Inhibit: When the foil strip at either end of the ribbon shorts the switch bar, monostable multivibrator IC15 is triggered. A 140 millisecond pulse (-Print Inhibit) is generated and sent to 7PC3 print head electronics board. From there it is passed on to 7PC2 controller board. The controller will stop printing for 140 milliseconds while the ribbon reverses direction. This prevents printing repeatedly on the same area of the ribbon during reversal.

Reverse: The 2 DC ribbon drive motors are wired in series and both turn in the same direction. This circuit uses a double pole double throw latching relay to determine the direction of travel. The latching function allows it to remember the direction even when the printer is powered off. This ability allows even wear of the ribbon, and provides a starting point for the reversing circuit. In Figure 4-5, the relay is latched with pins 2 & 13 and 7 & 12 making contact. This makes 4B01 the drive motor and 4B02 the drag motor. If 4B01 is driving, 4B02 is giving off ribbon. When the foil strip on the ribbon contacts 4SW2, relay coil B is energized. This causes the contacts to shift position. The new contacts are 2 & 14 and 7 & 11. This applies +36 VDC in the opposite direction, making 4B02 the drive motor, and 4B01 the drag motor.

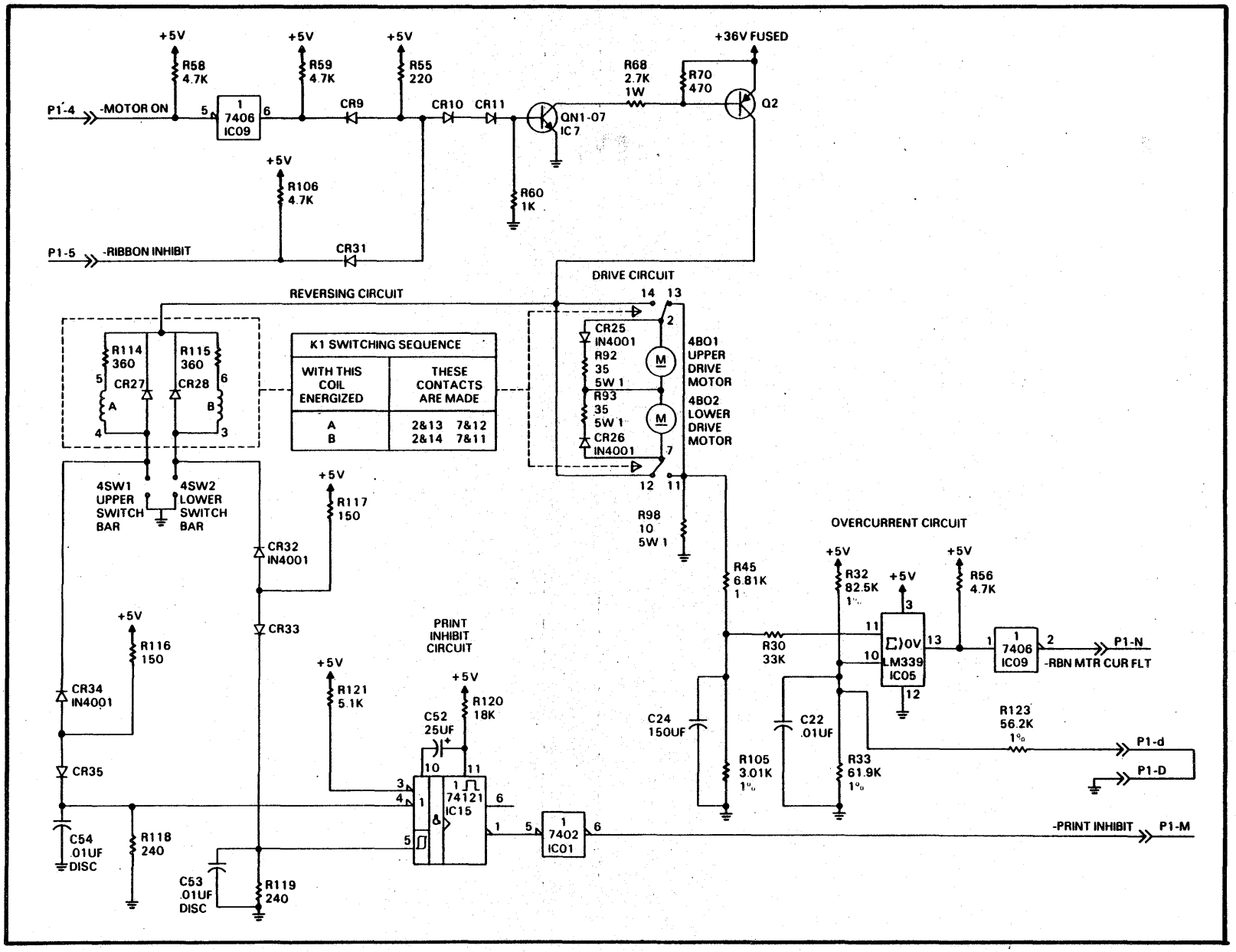


FIGURE 4-5. RIBBON SYSTEM CIRCUITS (2PC2)

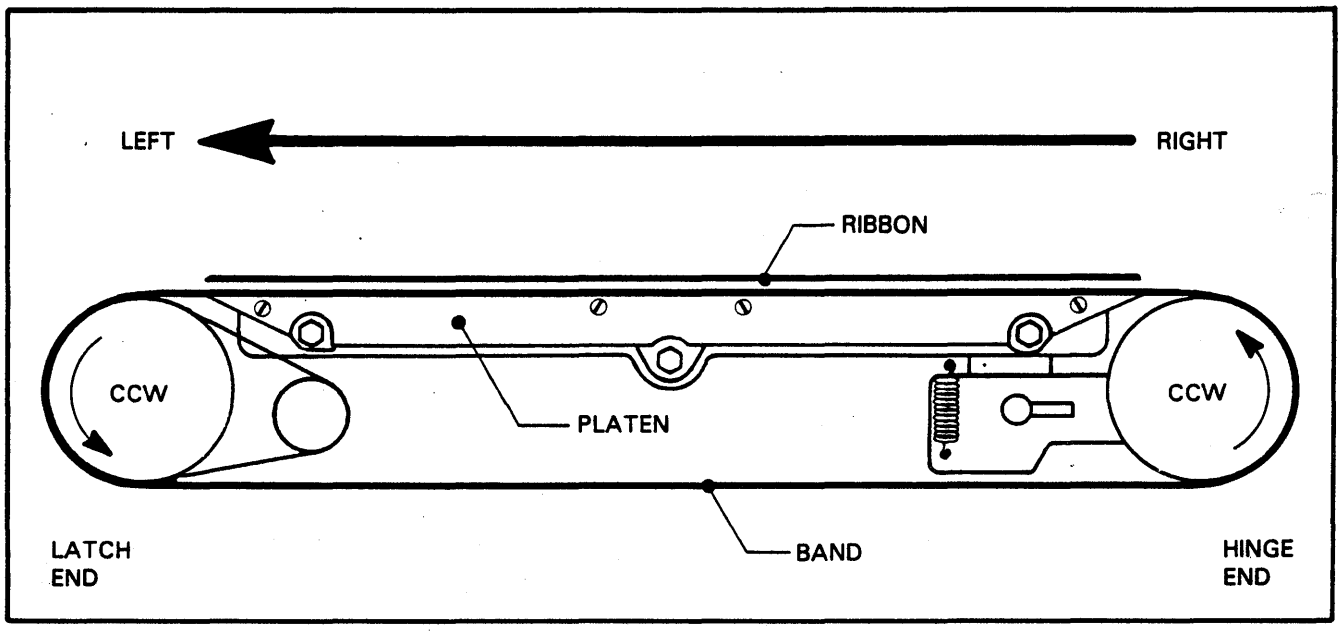


FIGURE 4-6. BAND DIRECTION

Skew: The print band rotates in a CCW direction, and moves from right to left across the platen. See Figure 4-6. When printing occurs, it tends to pull or "Skew" the ribbon to the left. This makes it necessary to provide a system capable of sensing and changing the ribbon skew direction. This system senses when the ribbon has skewed to the left limit, then it skews the ribbon back to the right.

The left limit is the sense pawl. See Figure 4-7. The sense arm is activated by pins on the lower drive spool, which are spaced 90 apart. In its normal upright position, the sense pawl detects the absence of ribbon between it and the lower switch bar. Eventually the pawl moves down, and the ribbon skews above it. When the pawl moves up, it pushes the ribbon against the switch bar. Since the ribbon is moving, it pulls the sense pawl. This causes it to trip, which activates the sense switch.

The signal from the sense switch activates 1 of 2 solid state relays, which apply 120 VAC to the skew motor. The skew motor has 2 windings; one for CW rotation and one for CCW rotation. SSR1 causes CW rotation, which moves the lower spool of the skew arm IN, and the upper spool OUT. SSR2 causes CCW rotation, which moves the lower spool OUT, and the upper spool IN. See Figure 4-8. When the lower motor is taking on ribbon, and the sense pawl is upright, the skew motor rotates CCW. This causes the ribbon to skew to the left. When the ribbon reaches and trips the sense pawl, the skew motor rotates CW. This causes the ribbon to skew to the right. This action repeats constantly until the ribbon reverses direction.

When the direction reverses, the skew motor rotates CW, and the upper motor is taking on ribbon. If the sense pawl is upright, the ribbon skews to the left. When the sense pawl trips, the skew motor rotates CCW. This causes the ribbon to skew back to the right. Whether the lower or upper ribbon motor is driving, these actions repeat constantly, skewing the ribbon from side to side.

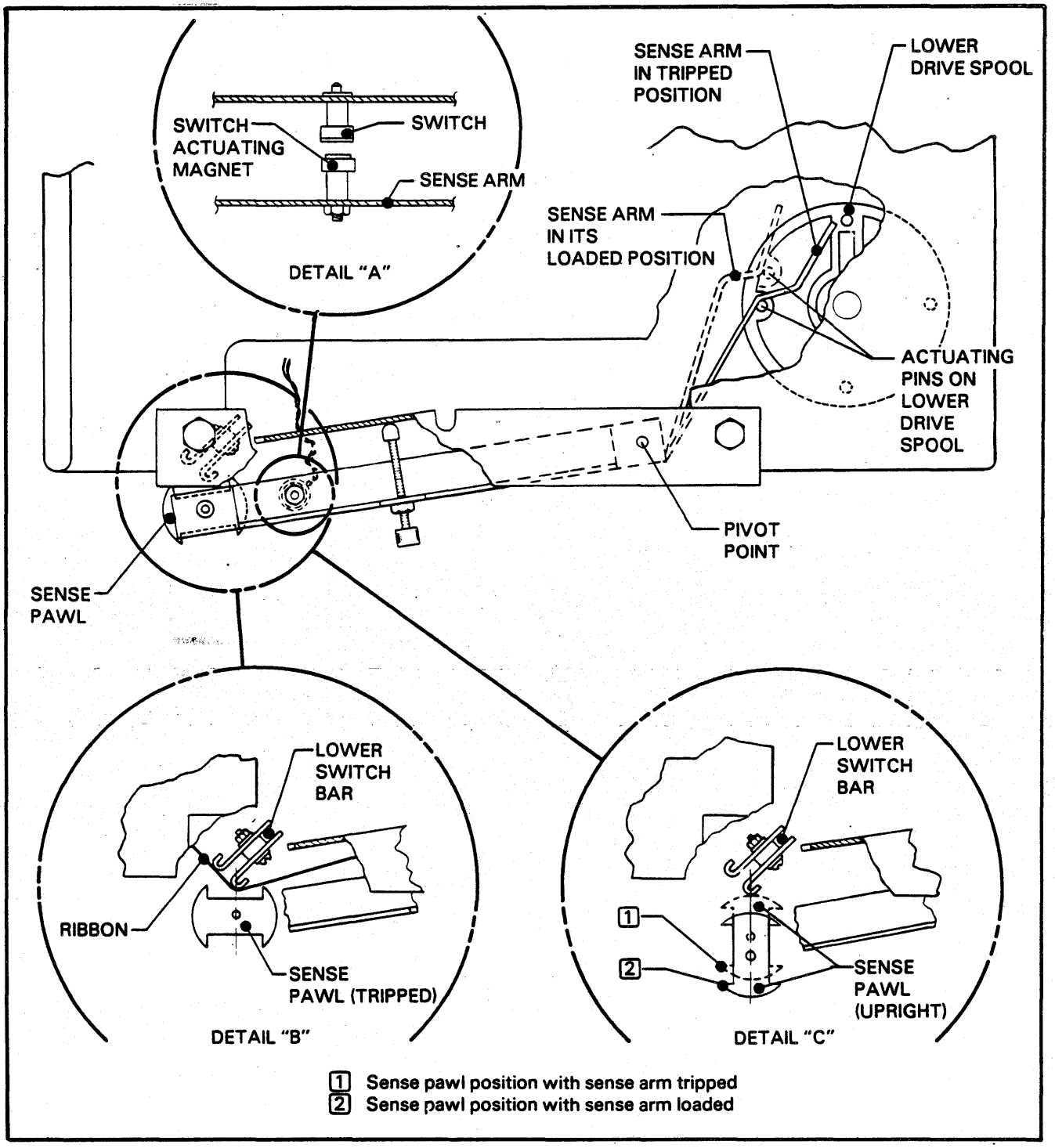


FIGURE 4-7. RIBBON SENSE PAWL ASSEMBLY

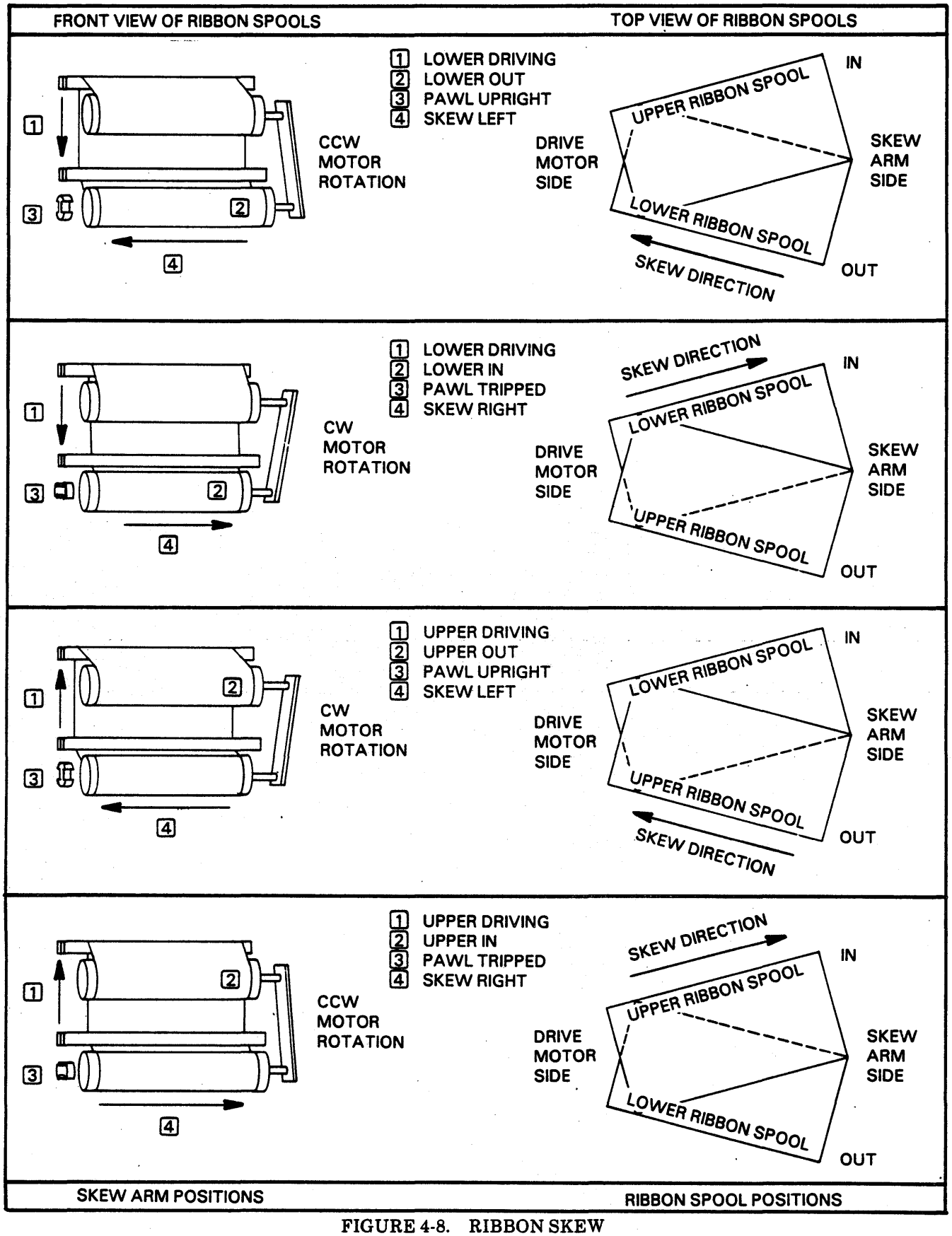


FIGURE 4-8. RIBBON SKEW

SECTION V
PRINT MECHANISM

The print mechanism is responsible for converting electrical signals into mechanical energy for printing. It uses 4 hammer driver boards to provide the electrical signals. These signals drive actuators, hammers, and pushrods into mechanical motion. This section will cover the actuators, hammer driver boards, hammer modules, and pushrod modules.

ACTUATORS (See Figure 5-1)

There are 6 basic parts to an actuator assembly:

Armature - A metal bar that is drawn to a core inside the coil when current is applied. This motion is transferred to the pushrod, which contacts the armature tip.

Backstop - A screw that stops the backward movement of the armature.

Bearing Plates - 2 plates that hold the pivot pin for the armature. These plates prevent lateral movement of the armature.

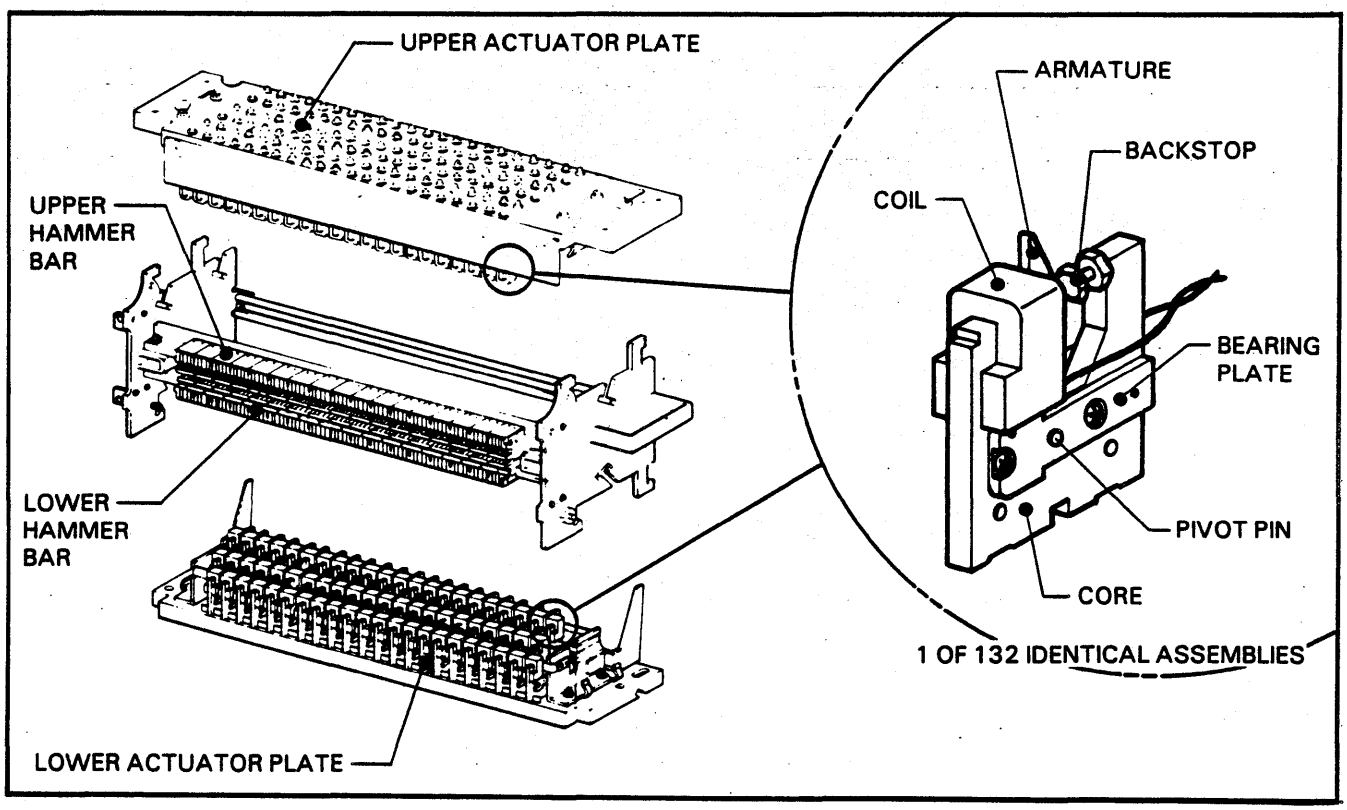


FIGURE 5-1. ACTUATOR AND ACTUATOR PLATES

Coil - A winding around the core that produces a magnetic field when current is applied by the hammer driver board.

Core - A dual purpose part. First, it is the base structure where the remaining parts are mounted. Second, the arm on which the coil is mounted concentrates the magnetic field produced by the coil, so it can attract the armature.

Pivot Pin - Allows backward and forward movement of the armature.

There are 2 actuator plates in the printer, and each one holds 66 actuator assemblies. This provides a total of 132 print positions in the standard printer. The lower plate actuators control printing for the even columns, and the upper plate actuators control printing for the odd columns. Each plate has a residual strip which goes between the armature and the core of each actuator. This strip prevents the armature from permanently sticking to the core.

HAMMER DRIVER BOARD

By inserting the proper programming plug into socket P2, the hammer driver board can be used in 5 different machines. There are 7 different programming plugs; 1 for the PBS 360, 2 for the PBS 720, and 4 for the Model I, II, or III printers. The programming plug provides a connecting path only for the incoming signals that are to be used by that specific board. The remaining signals are not allowed to pass through the plug. The signals that pass through the plug activate two 17 position LSI timers. The LSI timers contain a shift register, a data storage register, a ÷100 counter, and an output buffer. See Figure 5-2. The timer functions are performed in 3 stages.

The first stage loads the shift registers with compare signals. 7PC2 generates a -SR STEP 1 signal to load the signals for the odd columns into 5PC1 and 5PC3. The signal for column 1 is strobed into register B of 5PC3. The signal for column 3 is also strobed into register B, causing the signal for column 1 to shift one location. Then the signal for column 5 is strobed in, which shifts both columns 1 an 3. This process continues until 68 odd column compare signals are loaded. Once the odd columns have been loaded, 7PC2 generates a -SR STEP 2 signal to load the signals for the even columns into 5PC2 and 5PC4. The process is identical to the odd column load, with the signal for column 2 being strobed into register B of 5PC4, etc. The path that the compare signals follow is listed in Table 5-1. Use Figures 5-3 and 5-4 to trace the odd column path. Use Figures 5-5 and 5-6 to trace the even column path.

TABLE 5-1. COMPARE SIGNAL PATH

-SR STEP 1	5PC1	FIG. 5-3	5PC3	FIG. 5-4	REGISTER B		REGISTER A	
-SR STEP 2	5PC2	FIG. 5-5	5PC4	FIG. 5-6				
	in	out	in	out	in	out	in	out
START	→	→	P3-23 →	→	DATA 17 →	17 →	DATA 17 →	17 →
							DATA 16 →	1 →
					DATA 16 →	1 →		
				P3-26 →				
	P3-26 →	→	→	→	DATA 17 →	17 →	DATA 17 →	17 →
							DATA 16 →	1 →
					DATA 16 →	FINISH		

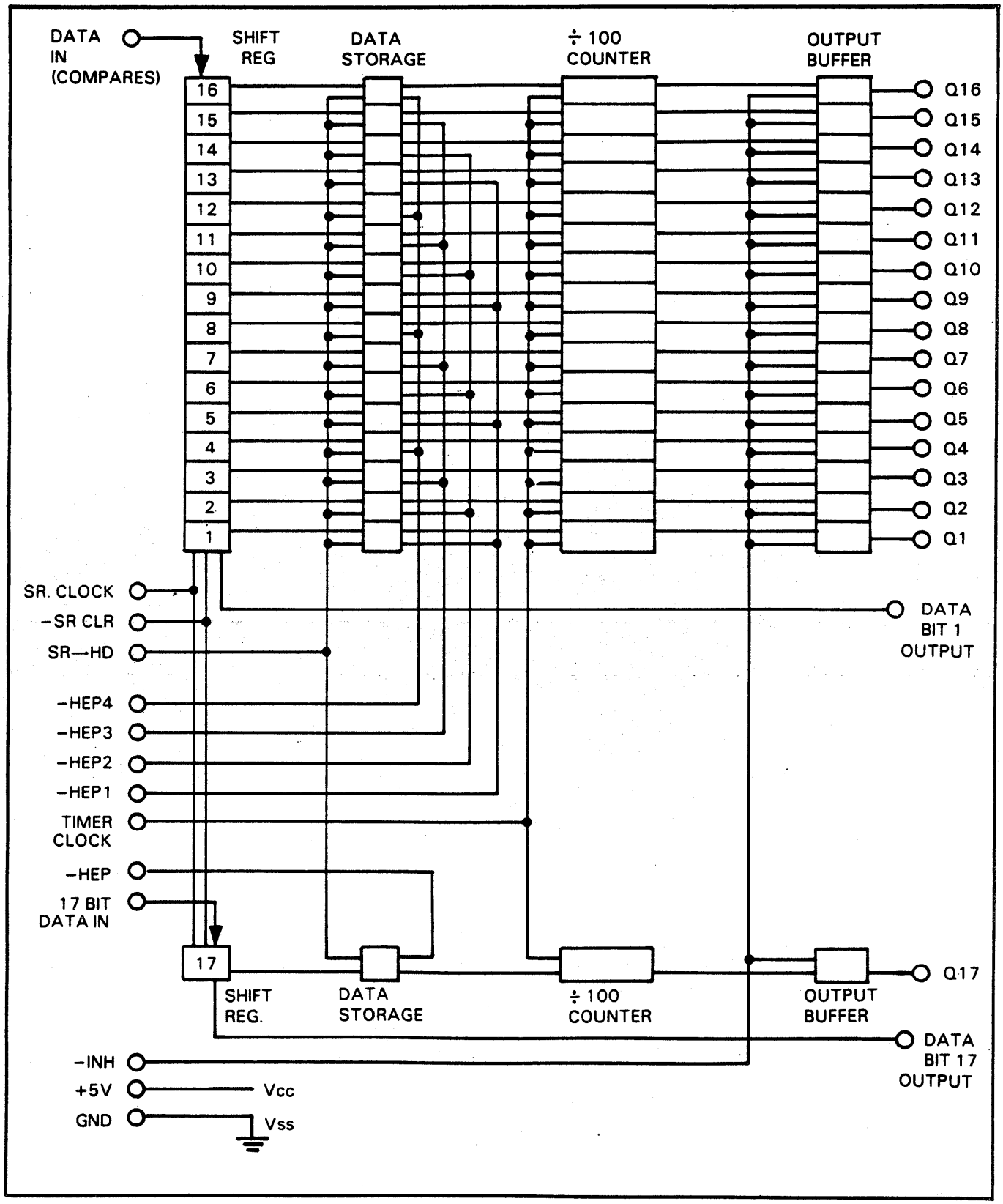


FIGURE 5-2. 17 POSITION HAMMER DRIVER TIMER

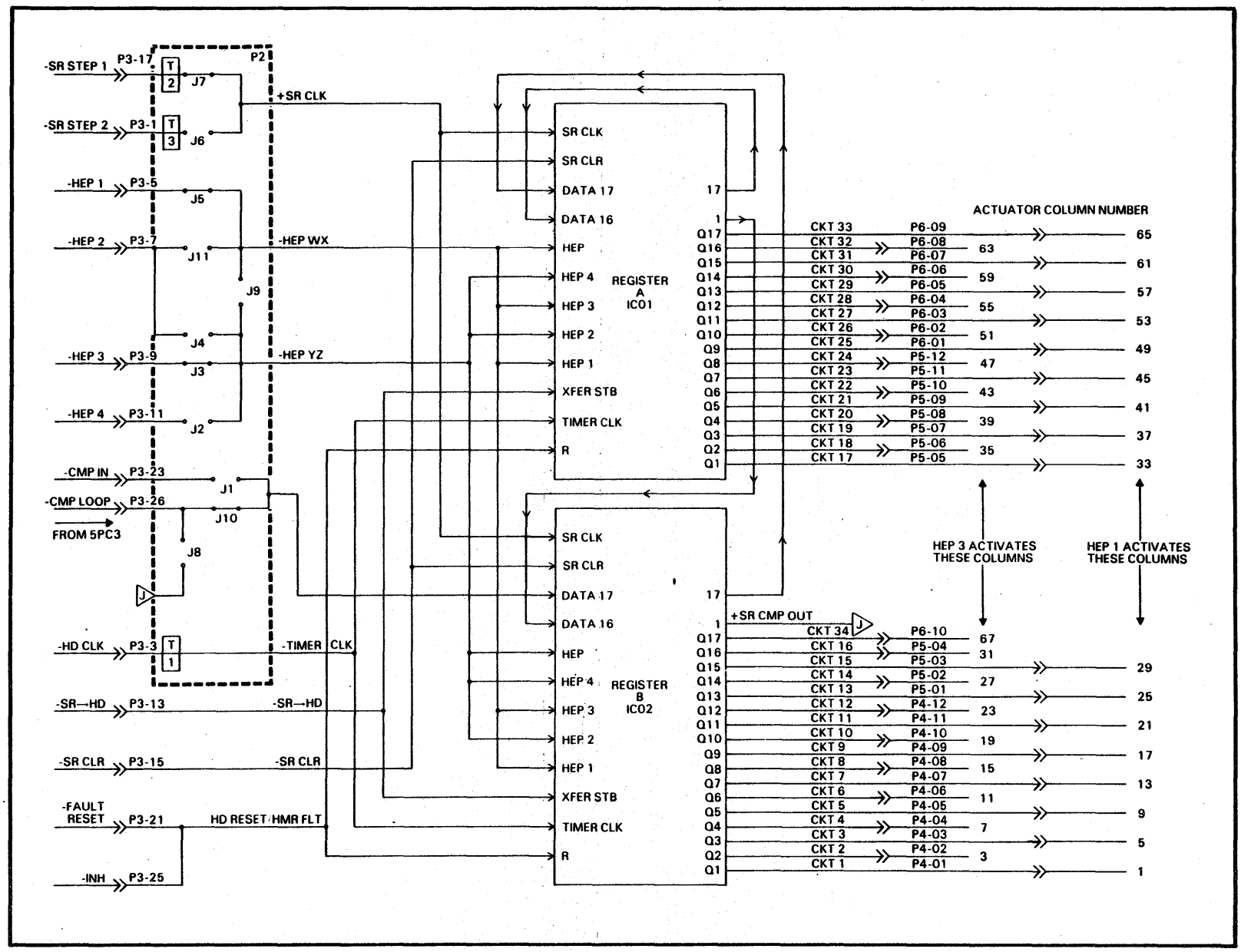


FIGURE 5-3. HAMMER DRIVER 5PC1 (SIMPLIFIED)

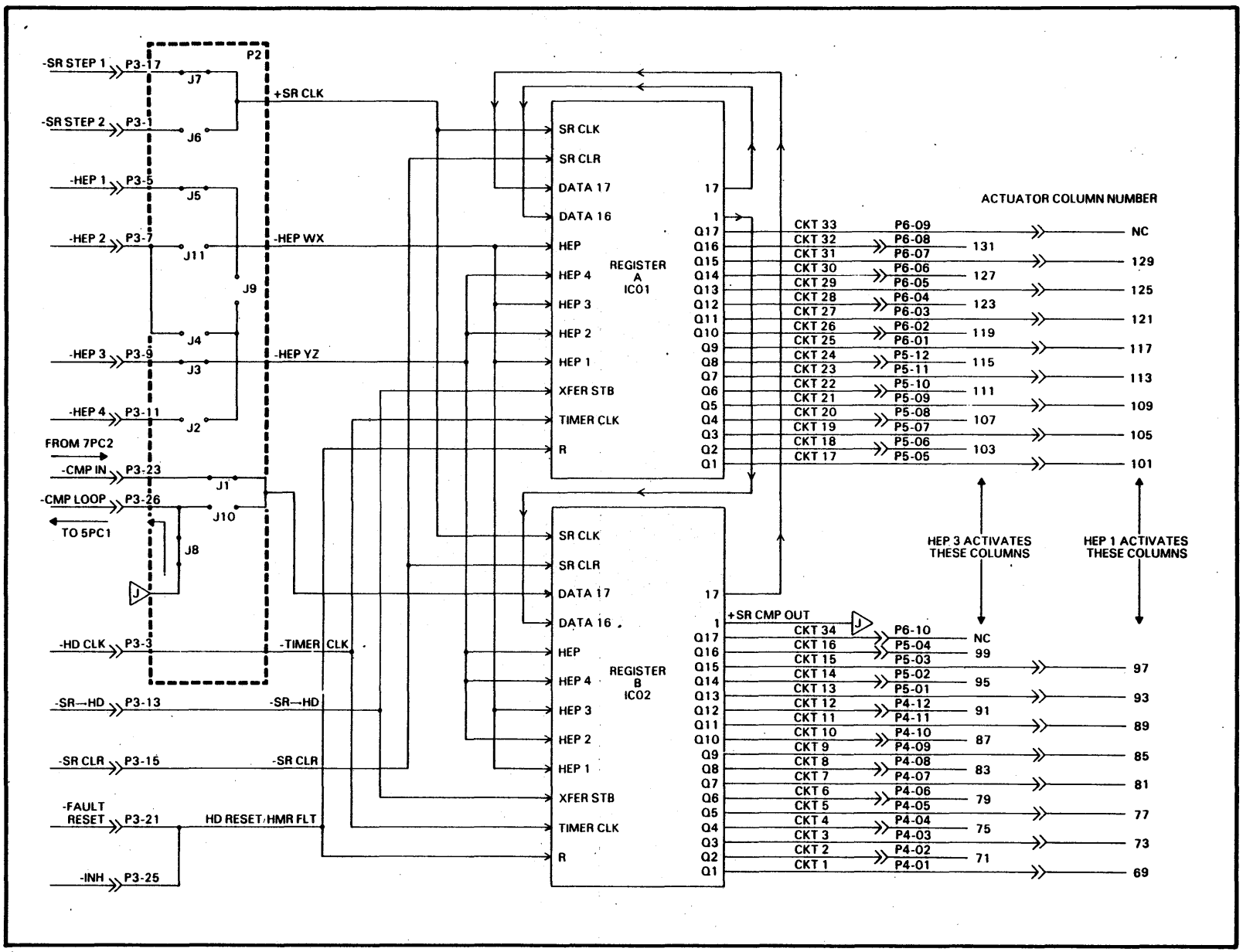


FIGURE 5-4. HAMMER DRIVER 5PC3 (SIMPLIFIED)

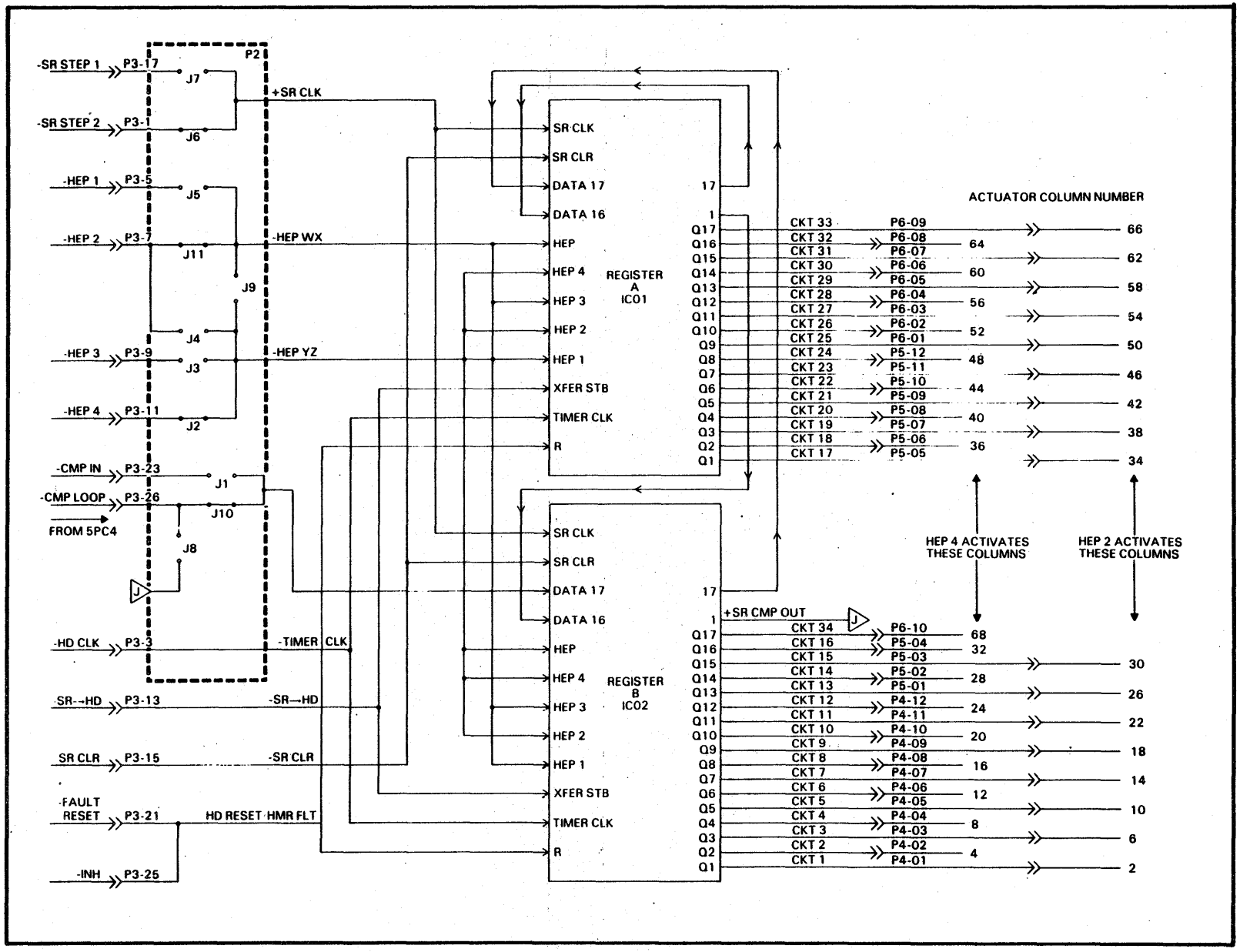


FIGURE 5-5. HAMMER DRIVER 5PC2 (SIMPLIFIED)

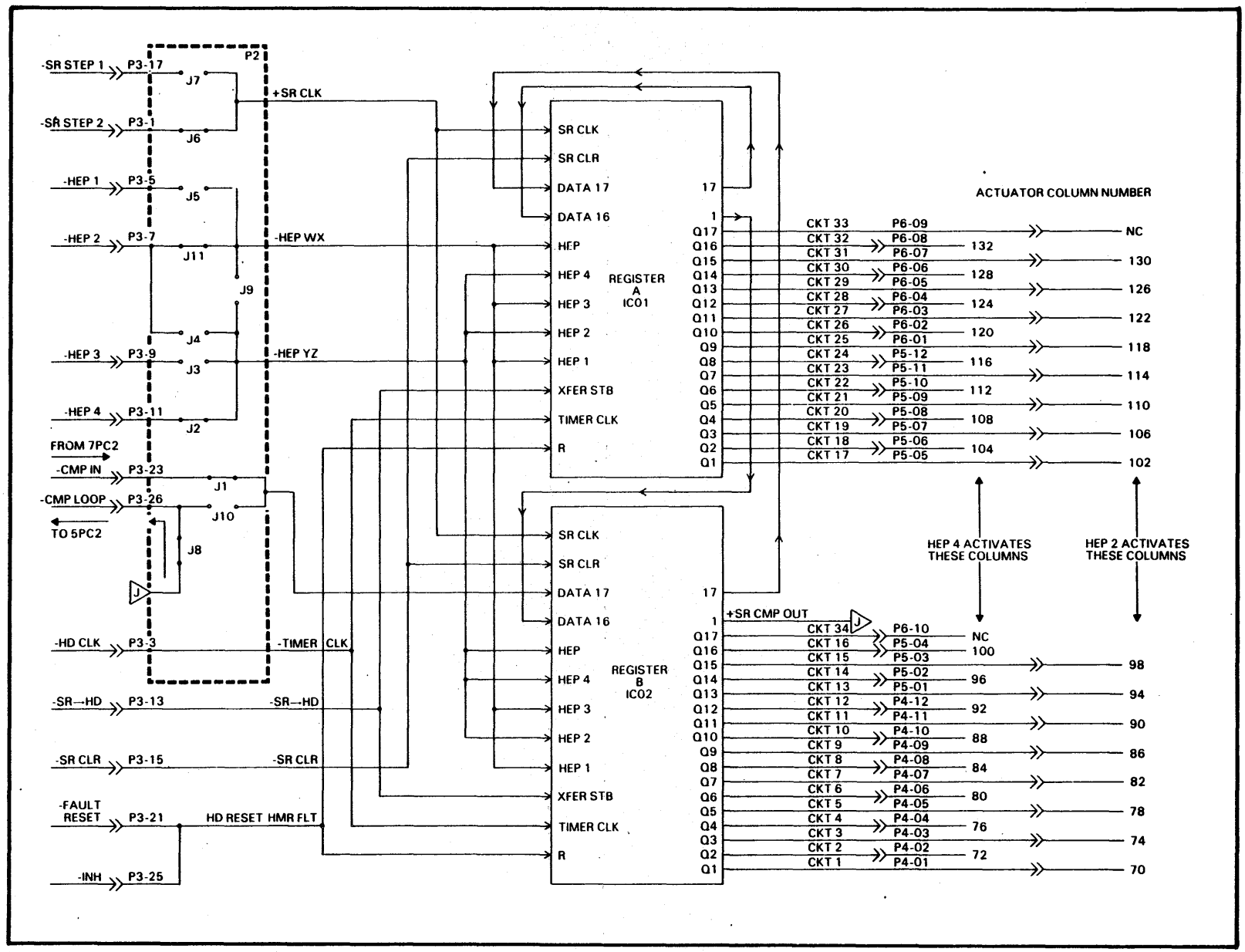


FIGURE5-6. HAMMER DRIVER 5PC4 (SIMPLIFIED)

Stage 2 begins after both the odd and even shift registers are loaded. Stage 2 transfers the data from the shift registers to the data storage register, when 7PC2 generates the -SR → HD signal. This transfer takes place inside the LSI timer. See Figure 5-2. Once the data is transferred, the shift registers are cleared, and the next load is started.In the third stage, 7PC2 generates HEP pulses to release the compare signals in the data storage registers. HEP 1 releases half of the odd column signals from 5PC1 and 5PC3. HEP 2 releases half of the even columns from 5PC2 and 5PC4. HEP 3 releases the remaining half of the odd column signals, and HEP 4 releases the remaining half of the even column signals. When the signals are released, they go to the ÷ 100 counter. This counter allows the signals to be active for 100 timer clock pulses, or 1.1 milliseconds. When the signals are active, they pass through the output buffer, leave the LSI timer, and activate the actuator coil drive transistors. After 100 timer clock pulses, the signals are rendered inactive by the counter.

There is a continuous cycle of signals being loaded, transferred and released. To print 1 line of data, this cycle is repeated once for each character of a set on the band. If a 64 character set band is installed, the cycle will be repeated 64 times for each line printed. If a 96 character set band is installed, the cycle is repeated 96 times for each line printed.

The hammer driver contains 2 fault circuits. See Figure 5-7 The first circuit causes +36 VDC to crobar if a drive transistor develops an emitter-collector short, or an actuator coil develops a break in its windings. This circuit works with a one-shot (O/S) on the 7PC3 print head electronics board. When the -SR → HD signal transfers the compare signals from the shift register to the data storage register, it also sets the O/S. The HEP signals, along with the timer clock pulses, release the compare signals from the data storage register. These compare signals activate the drive transistors. When any of the 34 drive transistors are activated, they light the fault LED, generate a -HMR ON signal, and send it to 7PC3. When the drive transistors turn off, the -HMR ON signal goes inactive and the fault LED is turned off. However, if the O/S times out when a -HRM ON signal is active, a hammer fault occurs. The hammer fault will cause +36 VDC to crobar, and leave the fault LED lit.

The second circuit generates a hammer fault if it detects a loss of +5 VDC from the hammer driver board. See Figure 5-7. As long as +5VDC is present, Q2 is held inactive. If +5VDC is lost, Q2 will conduct, which causes Q3 to conduct. Q3 generates the 5V FAIL signal, and sends it to 7PC3. If the O/S is set, the hammer fault will be generated when it times out. If the O/S is not set, the hammer fault will be generated immediately.

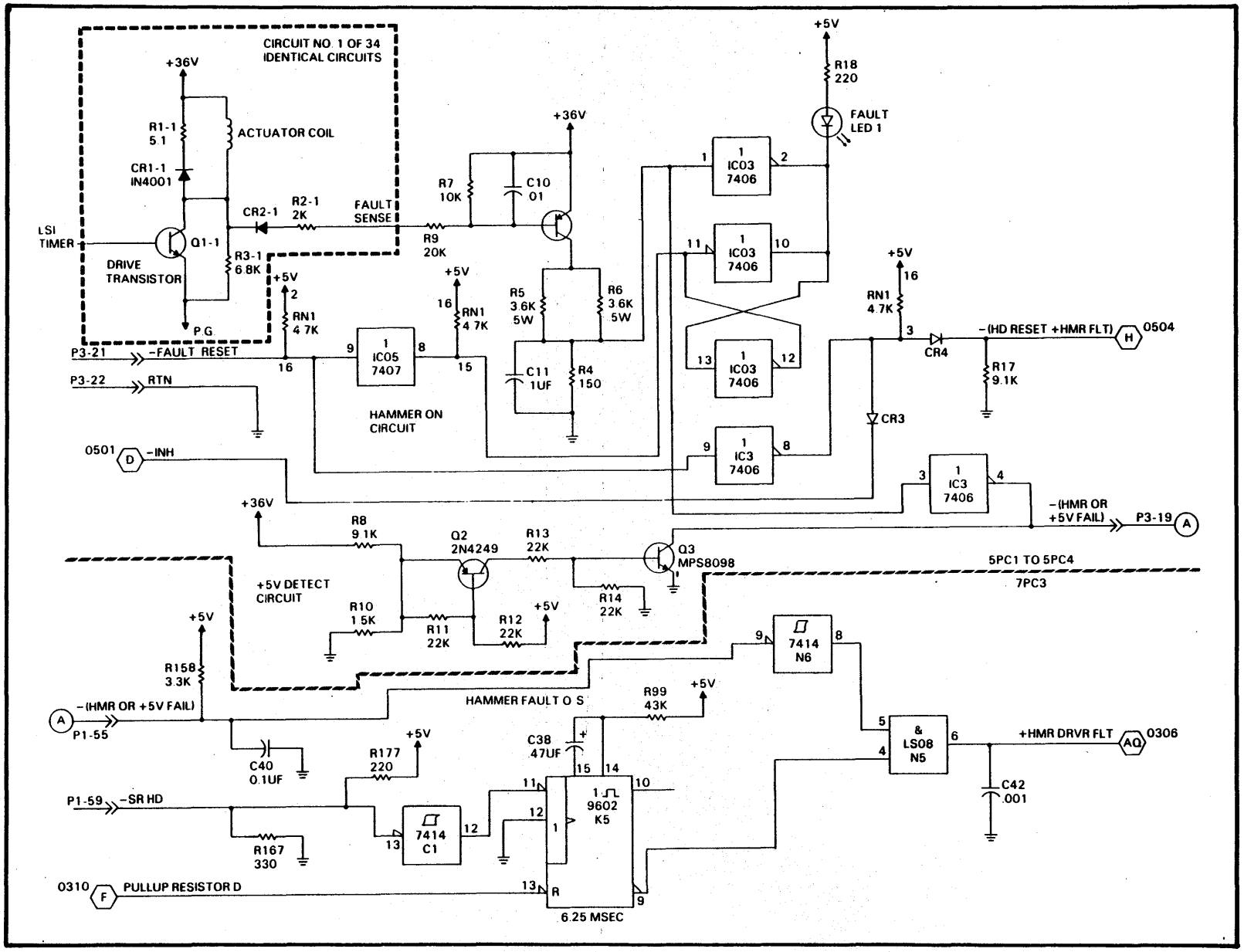


FIGURE 5-7. HAMMER DRIVER FAULT CIRCUITS

HAMMER MODULE (See Figure 5-8)

These are the components of the hammer module assembly and the functions they perform:

Compressor Spring - Applies tension to the forms compressor, used on the lower modules only.

Forms Compressor - Applies pressure on multipart forms to flaten them out prior to printing, used on lower modules only.

Hammer Module - provides mounting points for the assembly parts, mounts the assembly to the printer, and guides the hammers when they are in motion.

Hammer Spring - Applies tension which keeps the hammer in contact with the pushrod when idle, dampens the oscillations when the hammer returns after printing.

Pivot Pin - Allows the hammer to swing out for printing.

Plunger - Transfers the tension force from the spring to the hammer.

Print Hammer - Part that impacts the paper and the ribbon against the character on the band.

Setscrew - Adjust the tension of the forms compressor.

There are 32 full and 2 half full modules in the standard 132 column printer. A full module has 4 hammers, while a half full module only has 2 hammers. The lower hammer bar has 16 full and 1 half full modules mounted on it which print the even columns. Likewise, the upper hammer bar has the same combination which print the odd columns.The hammers are interspaced alternately, 1 from the upper bar, and 1 from the lower bar. When idle, the hammer face is about a tenth of an inch (2.5mm) from the print band. When activated, the armature and pushrod drive the hammer only 8 hundredths of an inch (2.03mm). The inertia of the hammer carries it the remaining distance to the band. This safety factor prevents the hammer from damaging the band if a malfunction would cause the hammer to be held out constantly. After impact the hammer rebounds to its starting position, and its oscillations are dampened by the hammer spring. The spring brings the hammer to a complete stop before it is activated again. See Figure 5-9.

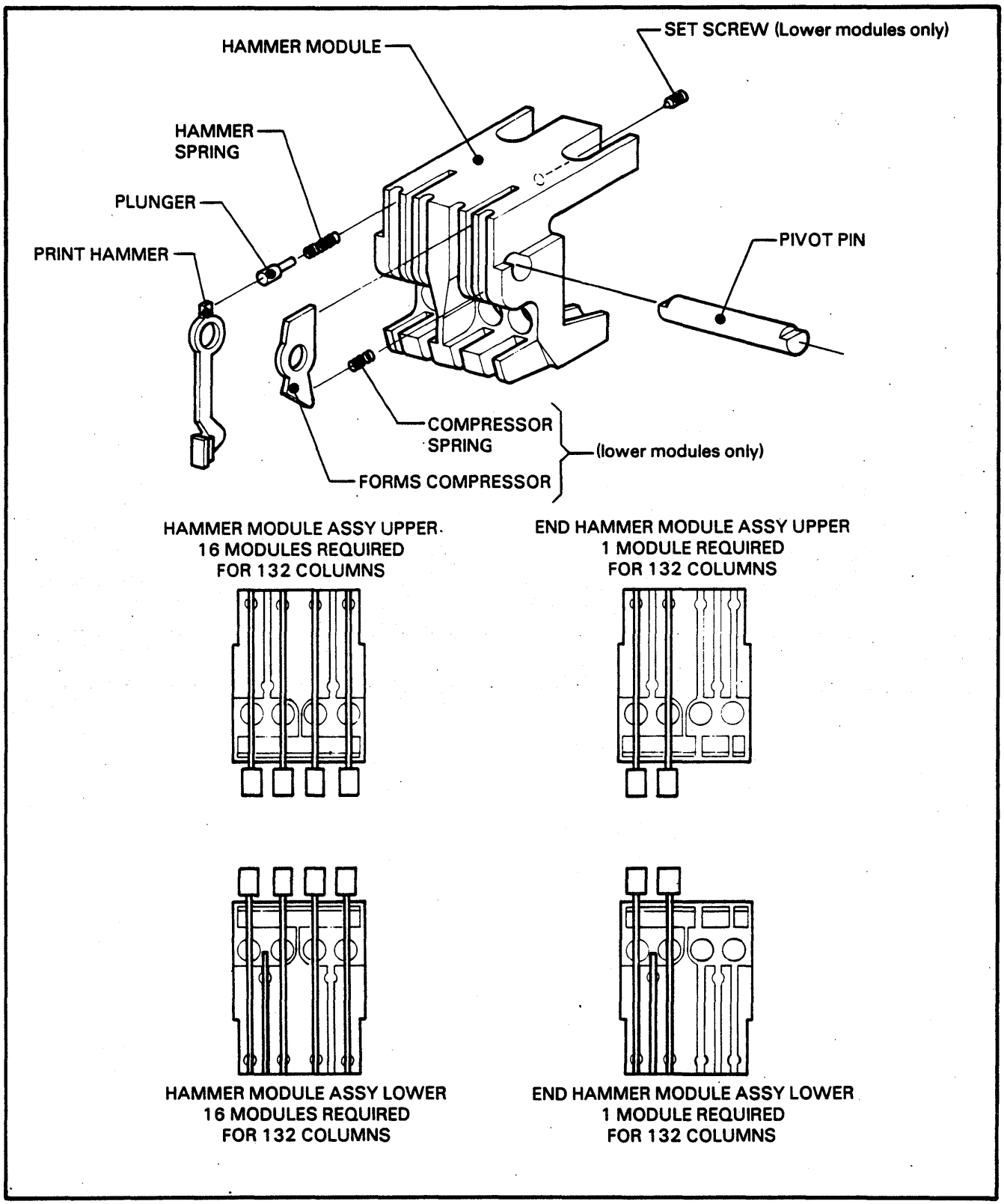


FIGURE 5-8. HAMMER MODULE ASSEMBLIES

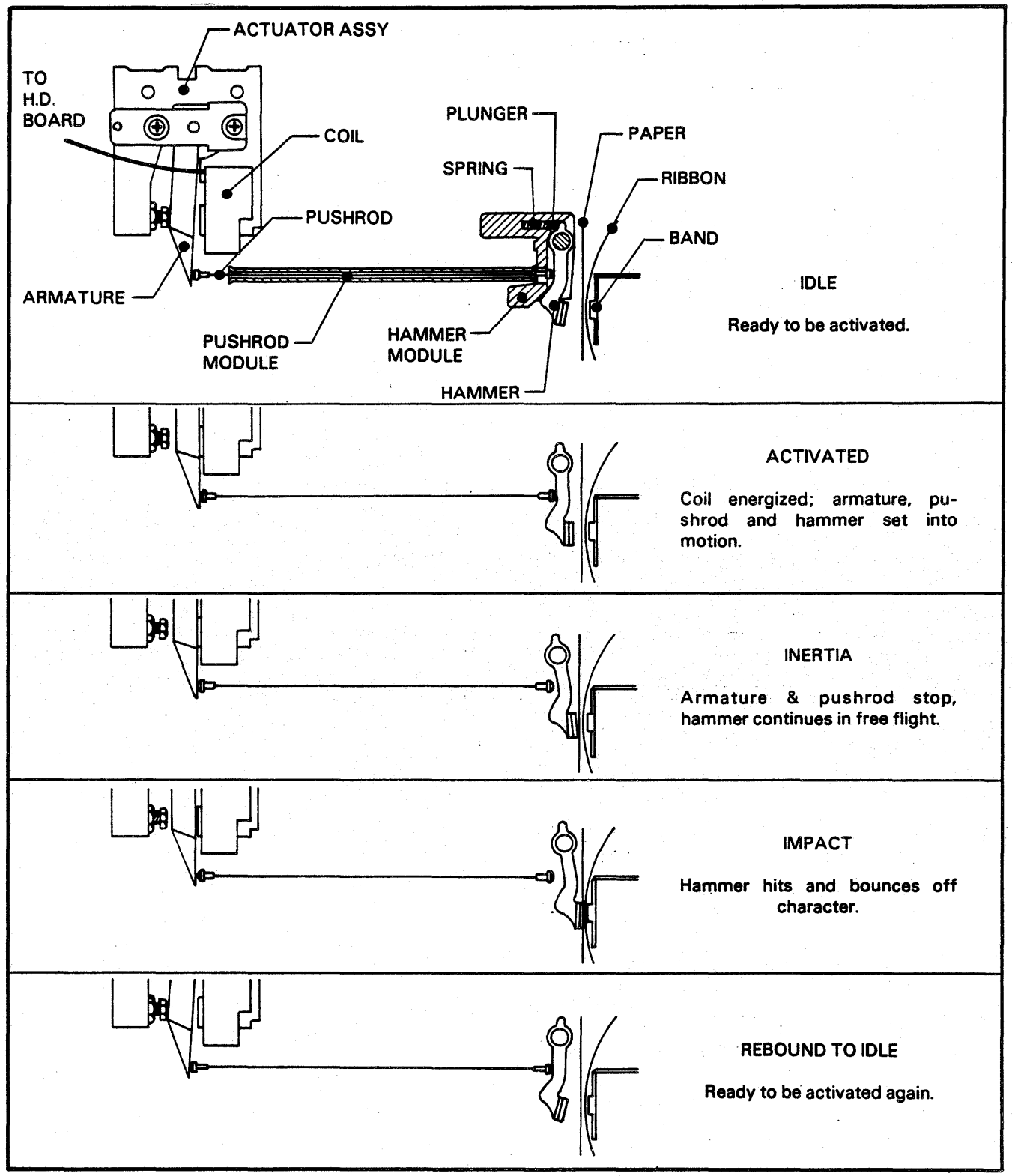


FIGURE 5-9. HAMMER PRINTING CYCLE

PUSHROD MODULE (See Figure 5-10)

There are 22 pushrod modules in the standard 132 column printer, and each one contains 6 pushrods. The lower hammer bar has 11 modules mounted on it, which cover the even columns. The upper hammer bar has 11 modules which cover the odd columns. The pushrods slide back and forth in a plastic pushrod guide. They are kept in place by the pushrod guide retainer. The whole assembly is supported by a metal plate, and fastened to the hammer bar.

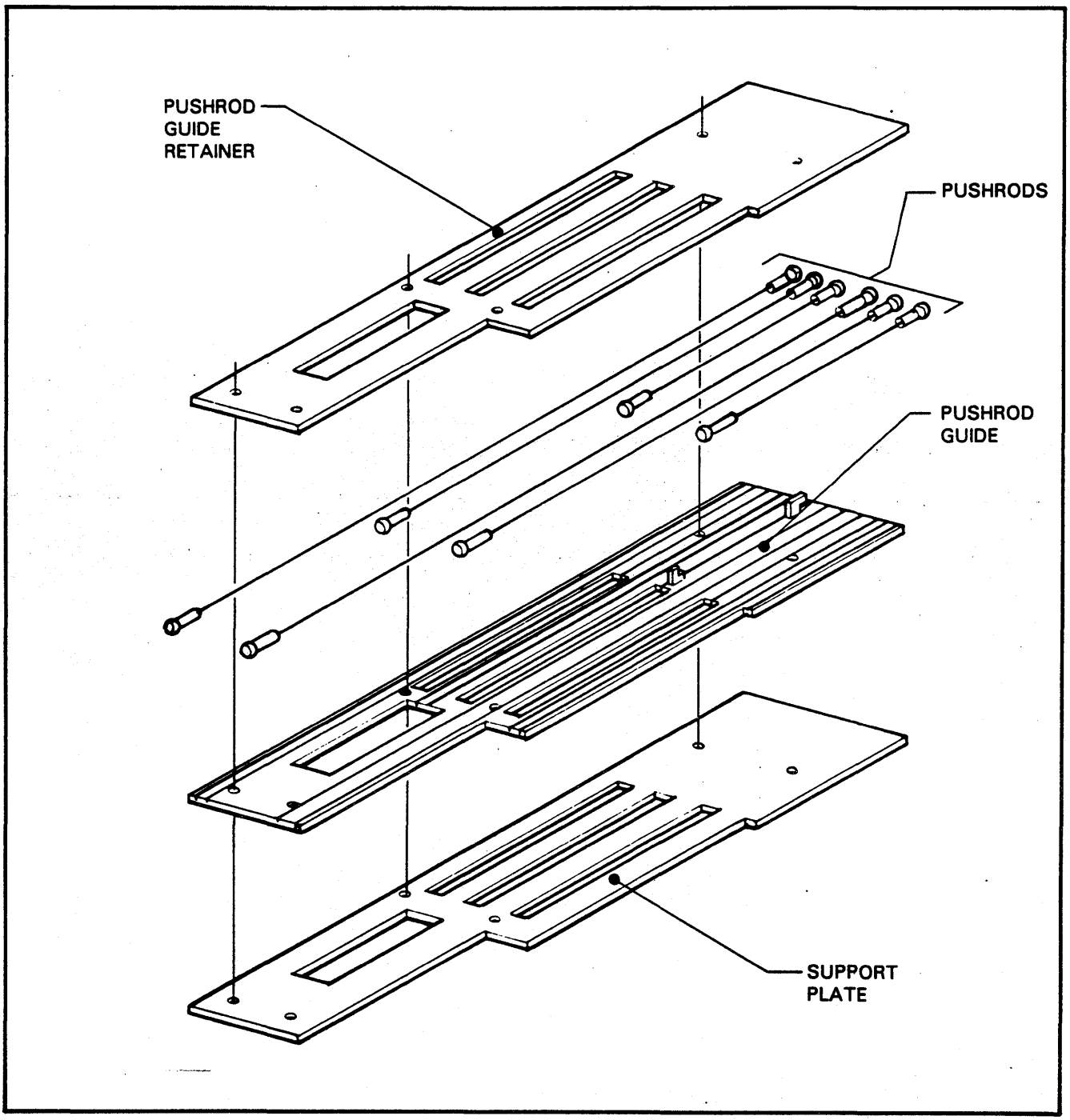


FIGURE 5-10. PUSHROD MODULE

SECTION VI
VERTICAL PAPER MOTION SYSTEM

This section will cover the components and operation of the vertical paper motion system.

> WARNING
>
> THE HIGH SPEED SLEW FUNCTION MENTIONED IN THIS SECTION IS FOR THE MODEL II AND MODEL III UNITS ONLY. ATTEMPTING TO OPERATE THE MODEL I UNIT IN THIS MODE WILL CAUSE SERIOUS DAMAGE TO THE PRINTER, AND VOID ALL WARRANTIES.

VERTICAL PAPER MOTION SYSTEM

Components

The components that make up the vertical motion system are listed below, along with the functions they perform. See Figure 6-1.

6/8 LPI Switch-	This switch indicates whether the reader is up in the 6 LPI position, or down in the 8 LPI position.
Check Strobe Reader-	Provides the signal that is used to check for line spacing errors.
Code Disc-	Provides a method of developing some of the signals used to control the vertical motor.
Code Disc Pulley-	Provides a method for transferring the drive energy from the motor.
Drive Belt-	Transfers drive energy from the code disc pulley to the tractor shaft pulley.
Drive Pins-	Pull the paper up and push it out the back of the printer.
Motor-	Provides the drive energy for moving paper.
Position Reader-	Provides some of the signals used to control the motion of the motor.
Tachometer-	Provides a feedback signal used to control the motor speed.
Tractors-	House the drive pins and guide the paper.
Tractor Drive Shaft-	Transfers the drive energy from the tractor shaft pulley to the tractors.
Tractor Shaft Pulley-	Applies the drive energy from the belt to the shaft.

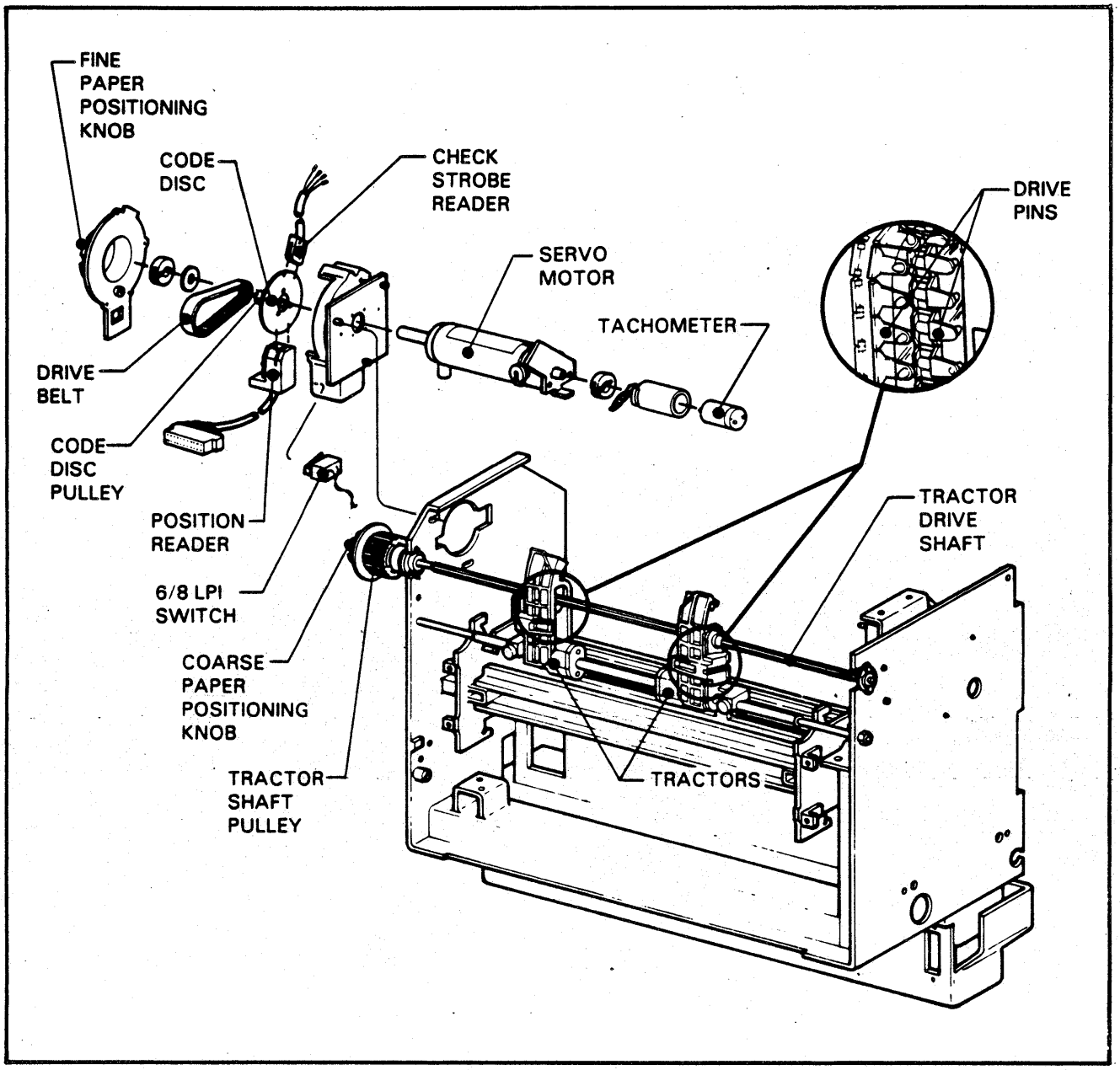


FIGURE 6-1. VERTICAL PAPER MOTION SYSTEM COMPONENTS

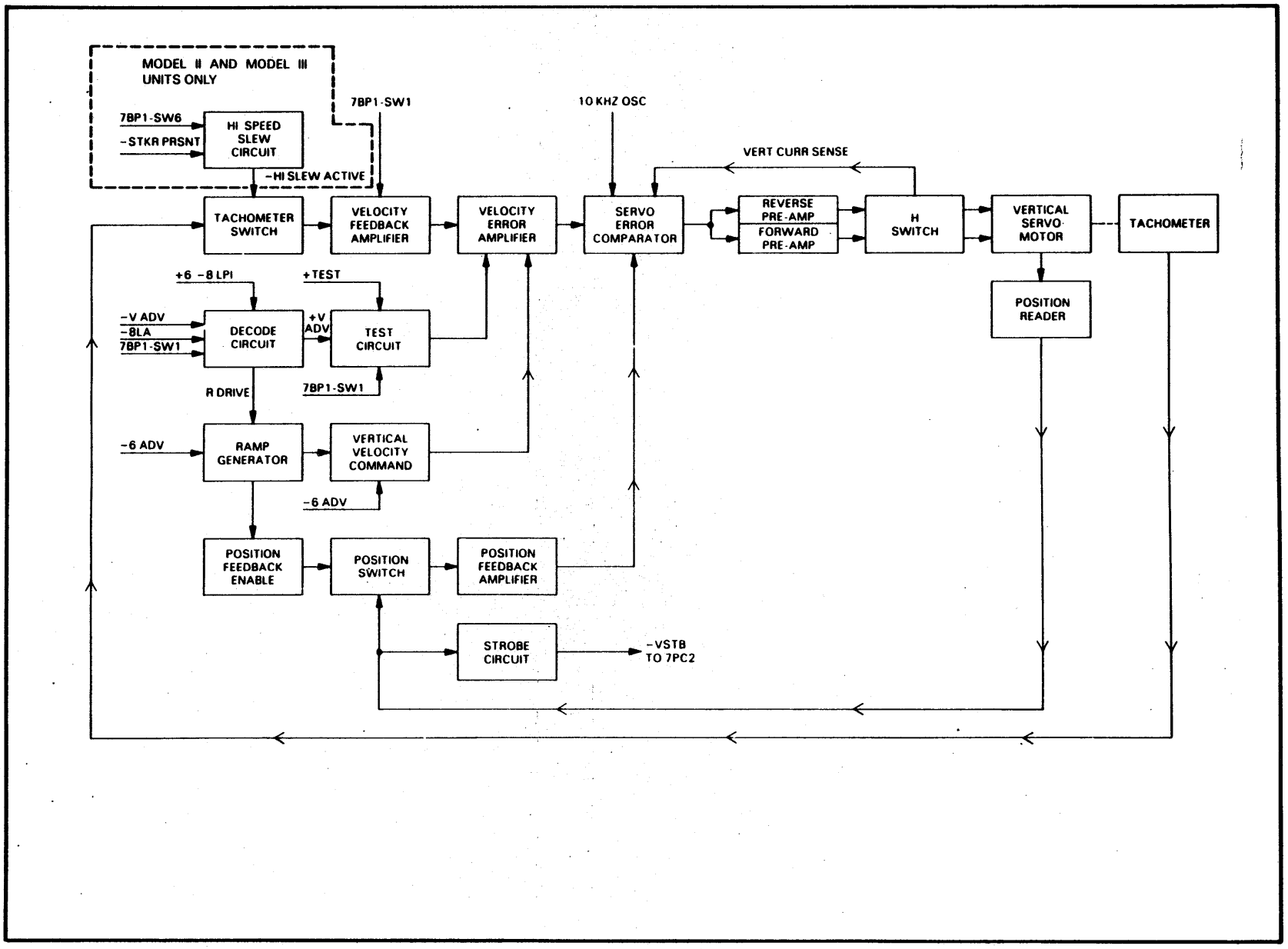


FIGURE 6-2. VERTICAL PAPER MOTION SYSTEM BLOCK DIAGRAM

Objective

The objective of the Model I system is to provide a paper slew velocity of 22 inches (559mm) per second (±10%).

The objective of the Model II & III system is to provide high and low speed paper advance operations when the powered stacker is installed. If a paper motion command of 4 or more lines is received, a paper slew velocity of 55 inches (1397mm) per second (±10%) is selected. If a paper motion command of 1 to 3 lines is received, a paper slew velocity of 22 inches (559mm) per second (±10%) is selected. When the 55 IPS velocity is in operation, the speed will be decreased to 22 IPS 3 lines before the end of the paper advance cycle. For extended Form Feed operation, the slew velocity alternates between 55 and 22 inches per second. The maximum single line advance repetition rate is limited to 2400 lines per minute (±5%) by the controller.

To meet these objectives, paper advance is controlled by a linear drive, closed loop, servo system. The block diagram for this system is shown in Figure 6-2.

Control Electronics

The control electronics on 7PC3 consists of the following circuits:

Decode – This circuit allows the printer to interpret the code disc information, if the new code disc is installed. The old code disc had 1 set of windows for 6 LPI spacing, and another set for 8 LPI spacing. See Figure 6-3 A. The new code disc has just 1 set of windows, and this information is interpreted as either 6 or 8 LPI spacing. See Figure 6-3 B.

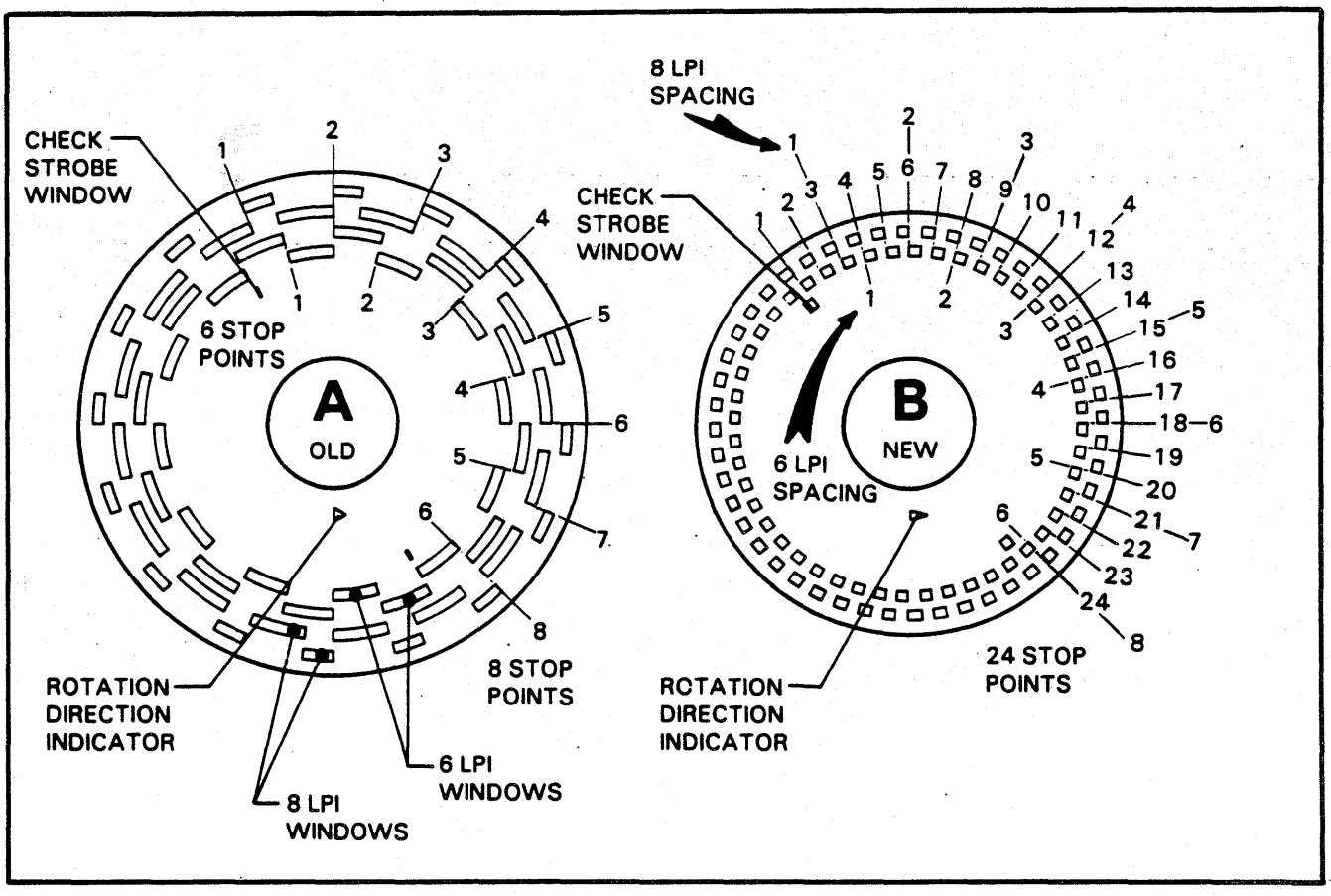


FIGURE 6-3. VERTICAL CODE DISCS

Forward Pre-Amplifier – As its name implies, this circuit amplifies the Forward drive signal before sending it to the H-Switch.

H-Switch – This circuit is on the 2PC2 Servo Amplifier board. It applies current to the servo motor in both the Forward and Reverse directions. See Figure 6-4.

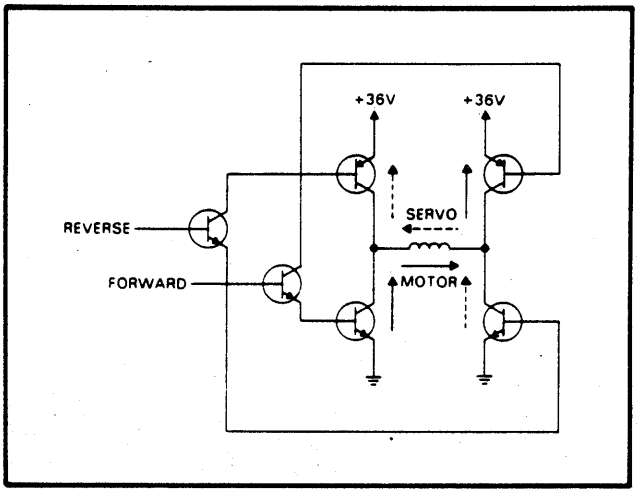


FIGURE 6-4. VERTICAL H-SWITCH

High Speed Slew – MODEL II AND MODEL III UNITS ONLY. This circuit enables the High Speed Slew function only if SW6 on the backplane is ON, and the stacker is properly installed.

Position Feedback Enable – This circuit decides whether the Position Signal is sent to the controller, or sent to the servo motor.

Position Switch – This bilateral switch sends the Position Signal to the servo motor if directed to do so by the Position Feedback Enable circuit.

Ramp Generator – This circuit generates the Ramp signal which is summed with the Velocity Feedback Amplifier signal. The difference between these two signals is sent to the Velocity Error Amplifier circuit.

Reverse Pre-Amplifier – As its name implies, this circuit amplifies the Reverse drive signal before sending it to the H-Switch.

Servo Comparator – This circuit sums the following signals: Velocity Error Amplifier, 10 Kilohertz Oscillator, Vertical Current Sense, and the Position Feedback Amplifier. The result is sent to the Forward and Reverse Pre-Amplifiers.

Strobe – This circuit uses the Position Reader signal to generate the Vertical Strobe signal, which is sent to the controller.

Tachometer Switch – MODEL II AND MODEL III UNITS ONLY. The Hi Slew Active signal determines whether this bilateral switch passes the full Tachometer signal, or a reduced version of it, to the Velocity Feedback amplifier.

Test – This circuit is used to make the electrical adjustments on the 7PC3 board. Its output is sent to the Velocity Error Amplifier when the on-board test switch PB1 is pressed.

Velocity Error Amplifier – This circuit sums the Velocity Feedback Amplifier signal, the Test signal and the Vertical Velocity Command signal, then it sends the result to the Servo Error Comparator.

Vertical Velocity Command – This circuit contains 2 bilateral switches. These switches send a 6 or 8 LPI Ramp signal to the Velocity Error Amplifier, as determined by the -6 ADV signal. If the signal is LO, the 6 LPI Ramp signal is sent. If the signal is HI, the 8 LPI Ramp signal is sent.

ASSOCIATED COMPONENTS (See Figure 6-5)

Direct Access Vertical Format Unit (DAVFU)

The DAVFU consists of a Vertical Format Memory (Buffer) on the 7PC2 controller board. The DAVFU option is activated by a dip switch on this same board. The DAVFU does not require a format tape reader to load the controller's Buffer. The DAVFU option lets the data source load format control information directly into the controller's Buffer over the interface data lines. The vertical format control information is stored in the Buffer until it is called upon by the data source to control paper motion commands.

Electronic Vertical Format Unit (EVFU)

With this option the controller stores format information from a 12 channel paper tape reader in a 180 line (360 byte) Format Tape Buffer (FTB). Parity is assigned during the FTB load cycle, and the parity bit is tested each time the FTB is accessed for information. If a parity test fails during printer operation: the status display will show the code for EVFU PARITY ERROR, the printer will go Not Ready, the contents of the FTB will be lost and must be reloaded. When the printer is powered on in this mode, the format tape will be loaded into the FTB and verified. Further loads are accomplished by a push-button switch on the reader assembly.

Out Of Paper (OOP) Switch

This switch is located 4.50 ± .25 inches (114 ± 6.35 mm) below the print station. A dip switch on the controller board determines how the printer will function upon detection of OOP. If the switch is ON, printing will continue to the bottom of form position. If the switch is OFF, printing will stop immediately.

Page Length Select Switch

A six position dip switch is located at the top of the control panel and is accessible only with the bonnet open. This switch permits page length selection in inches. The individual switches select 16, 8, 4, 2, 1 and 1/2 inch increments. The page length is defined as the sum of the switches placed in the ON position. The controller allows for optional automatic skipping of the last three lines on each page at either 6 or 8 LPI spacing. This option is enabled by a switch located on the controller board. The operator must locate the perforation within this 3 line area. Distorted printing and/or paper handling degradation may occur when printing within 0.5 inch (12.7 mm) of the paper fold.

Paper Clamp System

The paper clamp system consists of an electromagnetic bar and eight spring loaded clamping plates. The electromagnetic bar is located below the hammer modules and protrudes through a cutout in the inner throat plate. The spring loaded clamping plates are mounted on the inside of the outer throat plate. The purpose of the system is to provide a constant hold on the paper whenever the paper is not moving and the gate is closed. The constant hold provides optimum vertical registration during a print operation. When the electromagnetic bar is energized, its magnetic force pulls the spring loaded clamping plates against the bar, and the paper is held firmly between the two. When the electromagnetic bar is de-energized the clamping plates are released, allowing free movement of the paper through the throat area. This system is energized any time the printer is powered on, execpt: during a paper motion operation, whenever the print gate is open, or when the Forms Release Switch is activated.

Paper Motion Verification

Paper Motion Verification (PMV) monitors paper moving through the tractors. The PMV sensor is located in the right tractor. It consists of a light emitting diode and a phototransistor. The LED's output is reflected off the white paper between the feed holes, and is monitored by the phototransistor. Failure to detect paper motion results in an error. Paper motion failure will stop the printer and light the alarm indicator.

Stacker

A PB Powered Stacker is available as an option. The stacker is housed in a separate enclosure and is located at the rear of the printer. It provides power assisted fan fold of the paper as it exits the printer. For further information, refer to the Stacker Manual.

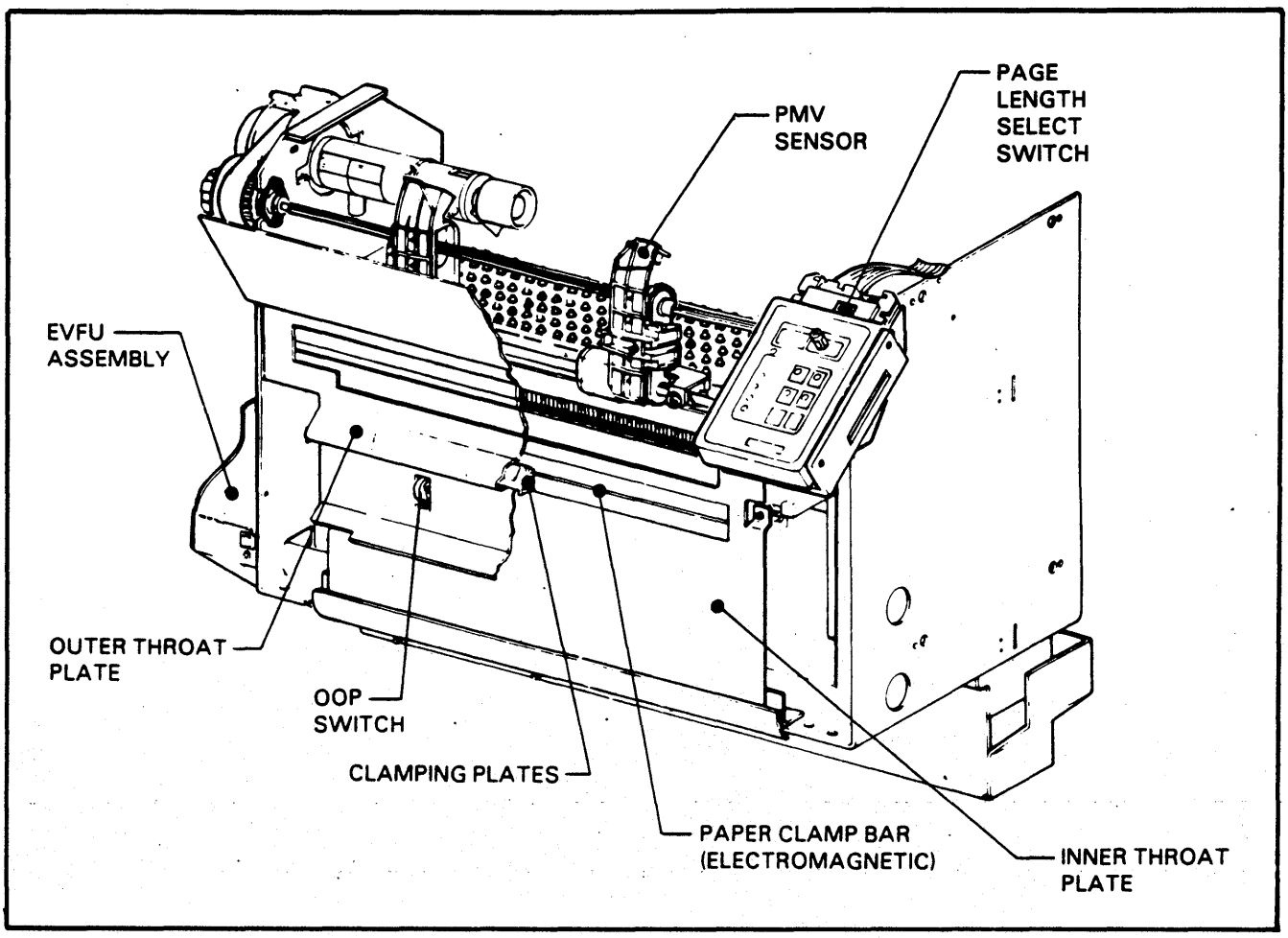


FIGURE 6-5. ASSOCIATED COMPONENTS

SECTION VII
BASIC INTERFACE

The basic interface consists of 3 elements: a control panel, a controller assembly and an I/O connector. This section presents basic information for each of these elements.

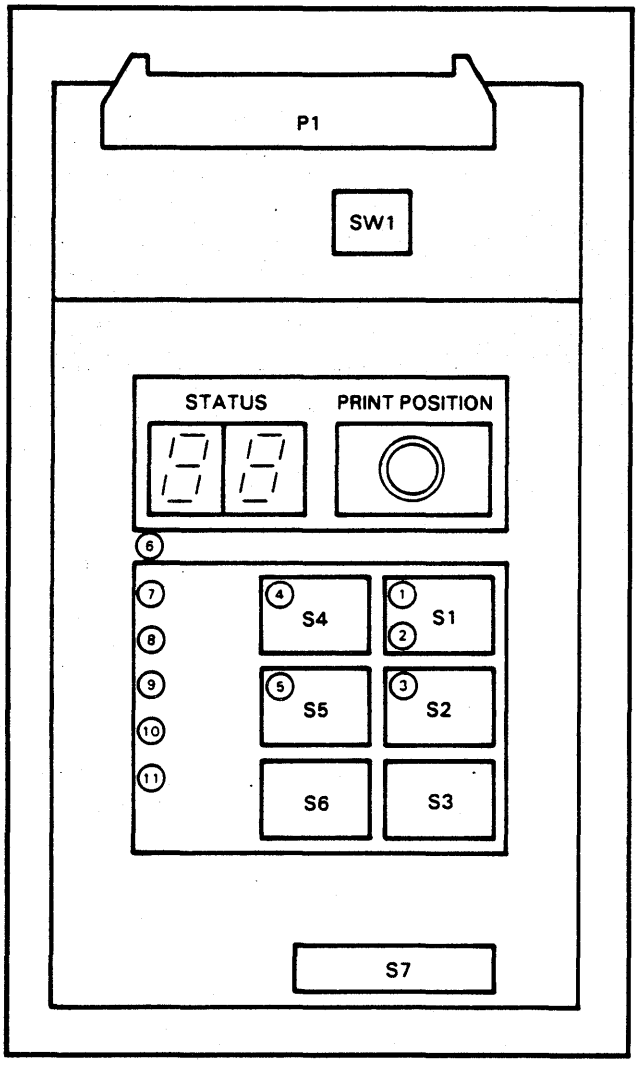


FIGURE 7-1. CONTROL PANEL

CONTROL PANEL (See Figure 7-1)

The basic control panel contains: 2 seven-segment LED displays (STATUS), a potentiometer control (PRINT POSITION), 6 membrane touch-switches (S1-S6), 11 individual LED indicators (1-11), a forms release touch-switch (S7), and a place for an optional switch (SW1). The use of these items may vary with each user configuration .

I/O CONNECTOR (See Figure 7-2)

The basic I/O connector contains: a connector, a connector mounting plate, a printed circuit assembly, and a ribbon cable. The connector size and shape may vary with each user configuration.

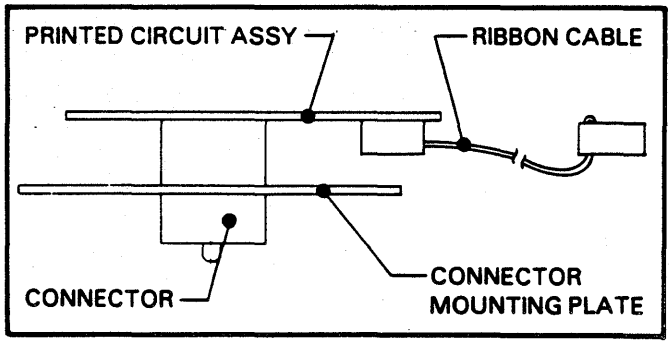


FIGURE 7-2. I/O CONNECTOR

CONTROLLER ASSEMBLY

General testing techniques do not apply to microprocessors without specialized equipment, which makes board replacement the normal mode of repair. Therefore, this section will be limited to general information on the microprocessor. The controller will be broken up into several parts to simplify the information to be presented. The parts to be covered include: Microprocessor, Interface Characteristics, Data Information Types, Data Transfer Sequence, and Dip Switches.

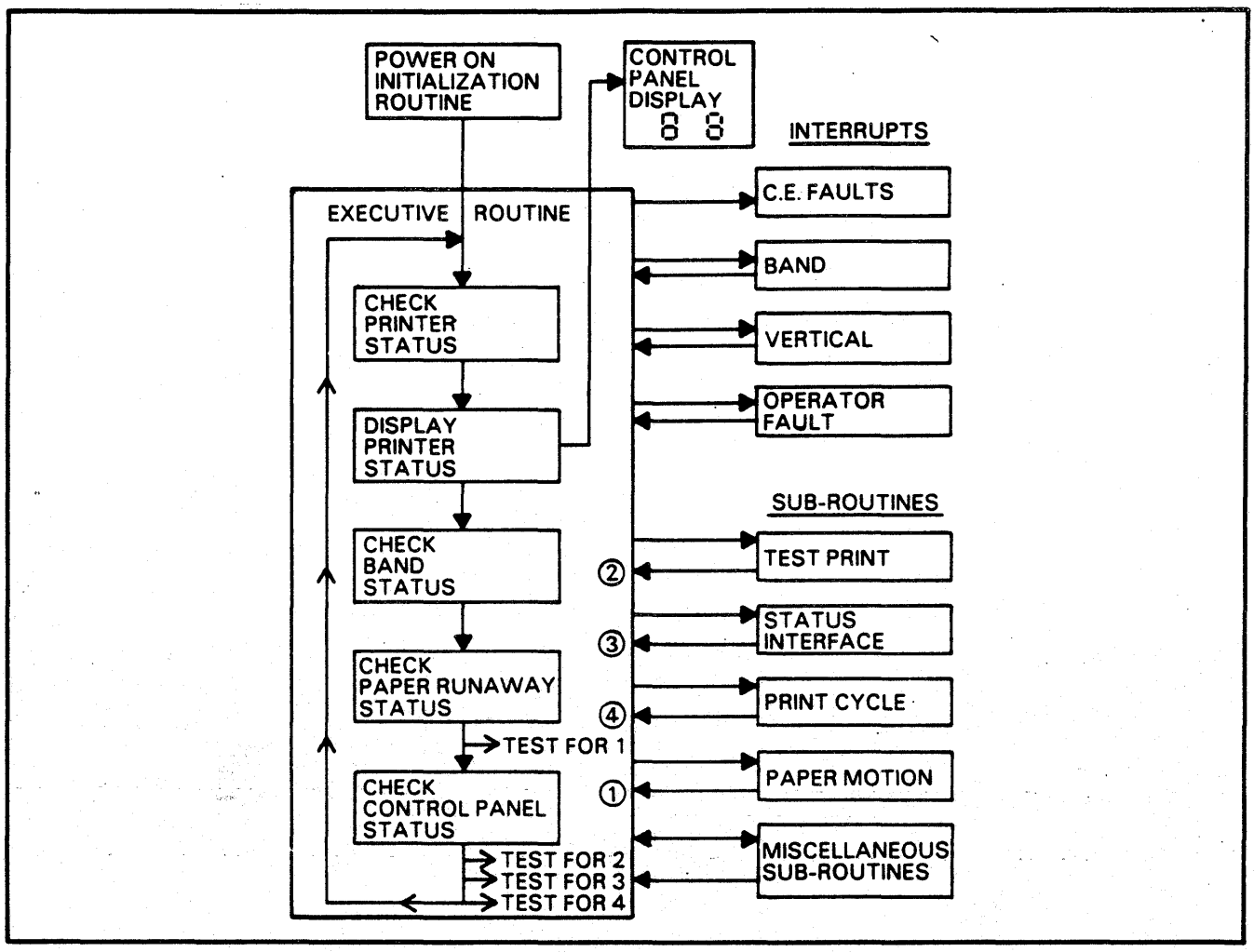


FIGURE 7-3. FIRMWARE BLOCK DIAGRAM

Microprocessor

The main element of the controller assembly is the microprocessor. It sits in chip location G3. It monitors and controls the functions of the printers. It is guided by instructions it receives from the firmware.

The firmware occupies chip locations D1, E1, F1, G1 and H1. These EPROMS contain a program which consists of 2 main routines, various subroutines and 4 interrupt routines. See Figure 7-3. When activated, the microprocessor starts up the Initialization Routine. It uses this main routine to: configure and initialize the 8 I/O Ports, test the RAM and ROM, initialize the stack registers, and enable the interrupts. Then it goes to the Executive Routine. It uses this main routine to continuously loop through these items: check printer status, display printer status, check band status, check paper runaway status, and check control panel status. When a subroutine execution instruction is received, the microprocessor leaves the Executive Routine, executes the subroutine, then returns to loop through the Executive Routine. The microprocessor will also leave the Executive Routine if it receives an interrupt. The interrupts are prioritized, with the CE Fault Interrupt having the highest priority. Then comes the Band Interrupt, followed by the Vertical Interrupt, and the lowest priority belongs to the Operator Fault Interrupt.

The microprocessor uses 8 I/O Ports to execute its instructions. Table 7-1 identifies these ports and the functions they control.

TABLE 7-1. MICROPROCESSOR PORTS

PORT	LOCATION	FUNCTION
1	N3	Band Identification, Control Panel Lamps, I/O Status
2	P3	CE Faults, Control Panel Status Display, I/O Status
3	J3	Forms Release, Page Length Select Switches, PMV, Vertical Check Strobe
4	M3	Band Size, Band Character Locations, Hammer Control, Printer Identification
5	M5	Option Switches, Vertical Status
6	K3	Control Panel Switches, Test Print Select Switches
7	S1	EVFU
8	R1	EVFU, Gate Cover Status, Paper Runaway, Option Switches

Finally, the microprocessor uses 3 clock signals to coordinate the activities of the printer. The main clock is a crystal controled 4 MHZ signal, which is used for the Compare Timing. From that 4 MHZ signal, a 2 MHZ signal is generated. It is used for the Home Pulse Synchronization Timing. From that 2 MHZ signal, a 1 MHZ signal is generated. It is used for the Subscan Timing and the Band Motor Control Clock.

Interface Characteristics

The controller has single ended transmitters and receivers which are capable of communicating on I/O cables up to 50 feet (15.3 meters) in length using the standard signal line terminations. See Figure 7-4.

When the standard signal line terminations are used, the line voltages will be:

Logic "1" = 2.4VDC to 5.0VDC = HI
Logic "0" = 0.0VDC to 0.4VDC = LO

The interface signals are described in Table 7-2.

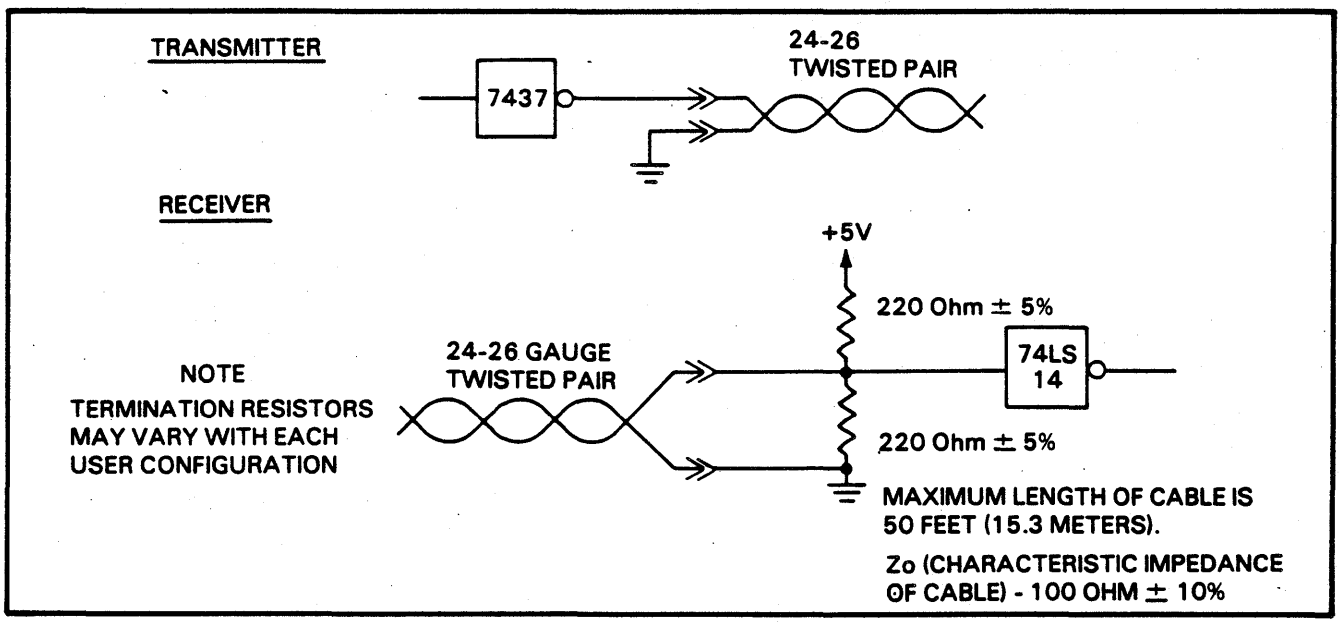


FIGURE 7-4. SINGLE ENDED TRANSMITTERS AND RECEIVERS

TABLE 7-2 I/O SIGNALS

SIGNAL NAME	SIGNAL [1] DIRECTION	ACTIVE STATE	FUNCTION
±BAND IDENTIFICATION 0 ±BAND IDENTIFICATION 1	LP to DS	HI/LO	These 2 signals indicate the type of band currently on the printer. They are valid only when ON LINE is HI. ±BI 1 — ±BI 0 — BAND TYPE LO — LO — 128 Character LO — HI — 96 Character HI — LO — 64 Character HI — HI — 48 Character
+BOTTOM OF FORM	LP to DS	HI	Goes HI when paper moves to the bottom of form position, then goes LO when the paper leaves that position. In EVFU printers, bottom of form is defined by dip switches on 7PC2 Controller board, which select either Channel 2, Channel 8 or Channel 12. In non-EVFU printers, bottom of form is defined as 3 lines before the top of form position.
–BUFFER CLEAR	DS to LP	LO	Resets print line buffer to column 1 if a control code has not been transmitted. Signal must remain LO for a minimum of 2 microseconds.
+COMPRESSED PITCH	LP to DS	HI	FOR PBS UNITS ONLY. Indicates the printer is in the compressed pitch mode. Signal is valid only when ON LINE is HI.
+DATA 1 THRU 8	DS to LP	HI/LO	These lines carry the character and control codes. Data must be stable on these lines for 50 nanoseconds before and after the DATA STROBE signal. The standard printer interface consists of 7 data lines. The 8th line is available if needed. There is a dip switch on 7PC2 Controller board to disable it when it is not used. If the 8th line is to effect a new print code set, special translator ROMS will be required.
+DATA STROBE	DS to LP	HI	Indicates character has been placed on the data lines. When received, the printer samples the data lines, then brings the DEMAND signal LO while storing the character.
+DEMAND	LP to DS	HI	Used to synchronize data transfer. When ON LINE is HI, DEMAND will go HI to request a character. DEMAND remains HI until a DATA STROBE is received, then it goes LO. When DEMAND goes LO, DATA STROBE may go LO. Another DEMAND will not be generated until DATA STROBE has gone LO.
–EVFU INSTALLED –EVFU VERIFY	LP to DS DS to LP	LO	Allows the data source to determine if the EVFU option is installed. This is accomplished by connecting a dip switch from the 7PC2 controller board across these 2 lines. If EVFU is installed, the switch must be ON. If EVFU is not installed, the switch must be OFF.

SIGNAL NAME	SIGNAL [1] DIRECTION	ACTIVE STATE	FUNCTION
-INTERFACE VERIFY -INTERFACE VERIFY	LP to DS DS to LP	LO	Allows the data source to verify the I/O connector is attached. This is accomplished by connecting the indicated pins together on the printer I/O connector.
+ON LINE	LP to DS	HI	Indicates the printer is available to receive data. When HI, the printer is READY, and the ON LINE switch has been activated.
+PAPER MOVING	LP to DS	HI	Indicates when paper is moving in the printer. Goes HI when the vertical advance signal goes LO, then goes LO when the vertical advance signal goes HI.
+READY	LP to DS	HI	Indicates no faults exist and the printer is ready to placed ON LINE.
+TOP OF FORM	LP to DS	HI	AVAILABLE ONLY FOR EVFU UNITS. Goes HI when the paper moves to the top of form position, then goes LO when the paper leaves that position. Top of form is defined by channel 1 in the format tape buffer.
+VERTICAL FORMAT	DS to LP	HI	Indicates the code on the data lines is a paper motion command.
+5V	LP to IO	HI	A +5V supply line available for I/O testers. Current is limited to approximately 300 milliamperes.
-96 CHARACTER -96 CHARACTER VERIFY	DS to LP LP to DS	LO	Tells the data source when a 96 character band is installed. This is automatically controlled by the printer. These lines are connected to the normally open contacts of a relay. If a 96 character band is installed and detected, the relay energizes and closes the contacts. This completes the verify loop to the data source.

[1] DS = Data Source
IO = I/O Connector
LP = Line Printer

Figure 7-5 shows how these signals apply to the standard I/O connector. The standard connector uses single ended transmitters and receivers, which are located on the controller board. This connector is commonly refered to as a short line driver. Figure 7-5 is followed by the logic diagrams for the short line driver, and Figure 7-6 shows an illustration of the connector.

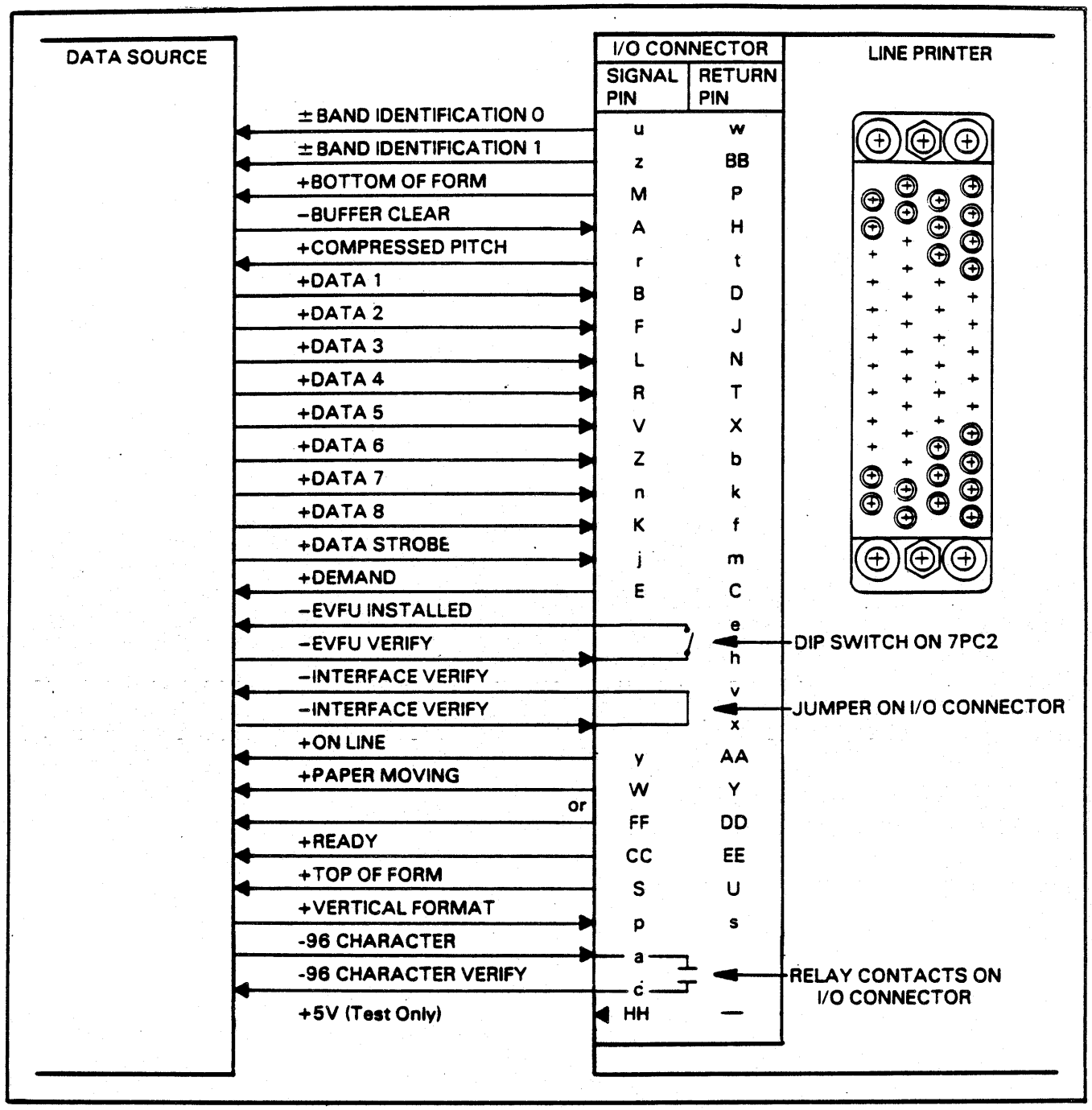
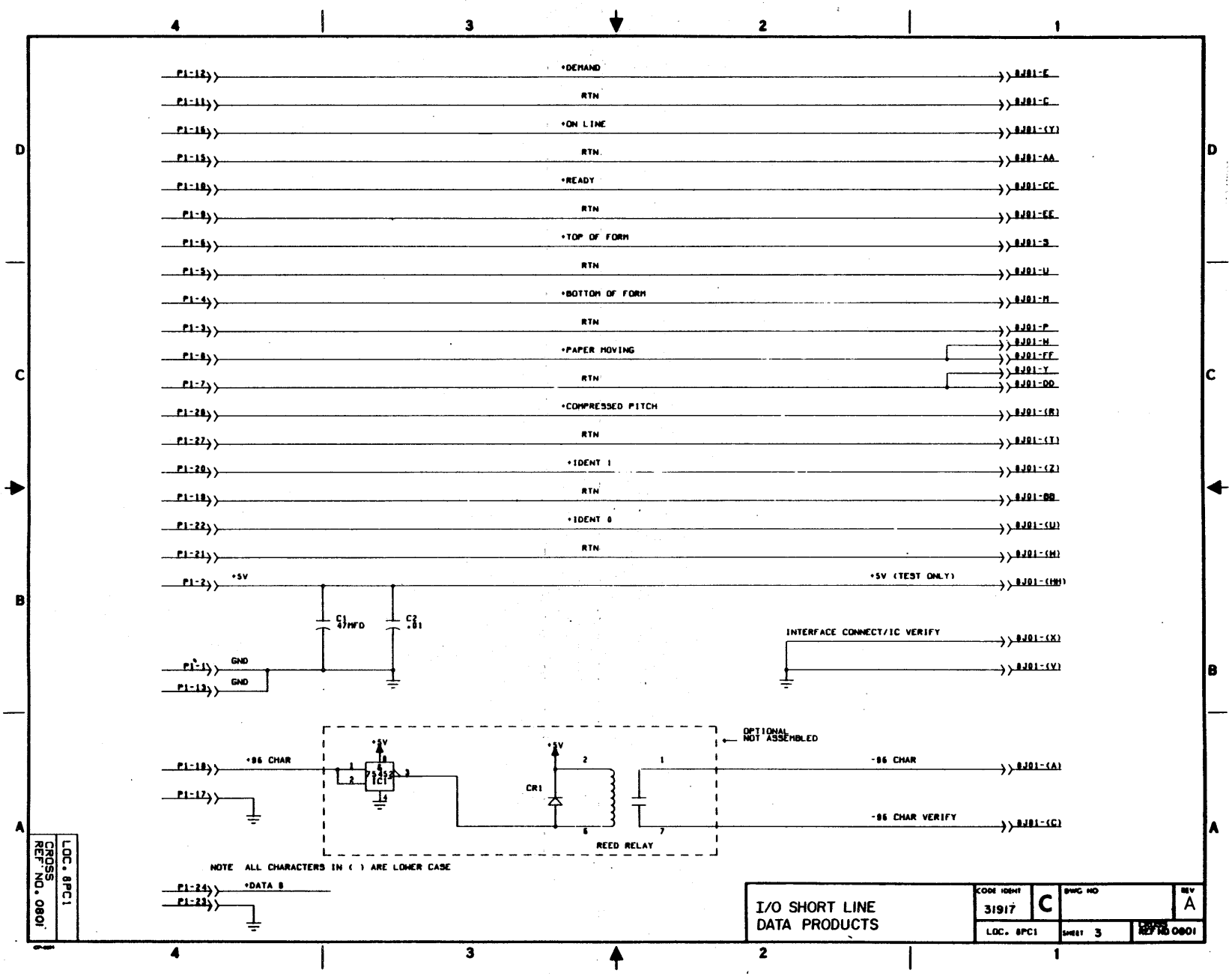


FIGURE 7-5. I/O SIGNALS AND PIN ASSIGNMENTS - SHORT LINE DRIVER


P1-12 *DEMAND 8J01-E
P1-11 RTN 8J01-C
P1-16 *ON LINE 8J01-(Y)
P1-15 RTN 8J01-AA
P1-10 *READY 8J01-CC
P1-9 RTN 8J01-EE
P1-6 *TOP OF FORM 8J01-S
P1-5 RTN 8J01-U
P1-4 *BOTTOM OF FORM 8J01-M
P1-3 RTN 8J01-P
P1-8 *PAPER MOVING 8J01-H 8J01-FF
P1-7 RTN 8J01-Y 8J01-DD
P1-26 *COMPRESSED PITCH 8J01-(R)
P1-27 RTN 8J01-(T)
P1-20 *IDENT 1 8J01-(Z)
P1-18 RTN 8J01-BB
P1-22 *IDENT 0 8J01-(U)
P1-21 RTN 8J01-(H)
P1-2 *5V 8J01-(HH)
*5V (TEST ONLY)
C1 47MFD
C2 .01
P1-1 GND
P1-13 GND
INTERFACE CONNECT/IC VERIFY 8J01-(X) 8J01-(V)
OPTIONAL NOT ASSEMBLED
P1-18 *86 CHAR
P1-17
IC1
CR1
-86 CHAR 8J01-(A)
-86 CHAR VERIFY 8J01-(C)
REED RELAY
NOTE ALL CHARACTERS IN ( ) ARE LOWER CASE
P1-24 *DATA 8
P1-23
CROSS REF. NO. 0801
LOC. 8PC1
I/O SHORT LINE DATA PRODUCTS
CODE IDENT 31917
C
DWG NO
REV A
LOC. 8PC1
SHEET 3
DRAWING REF NO 0801

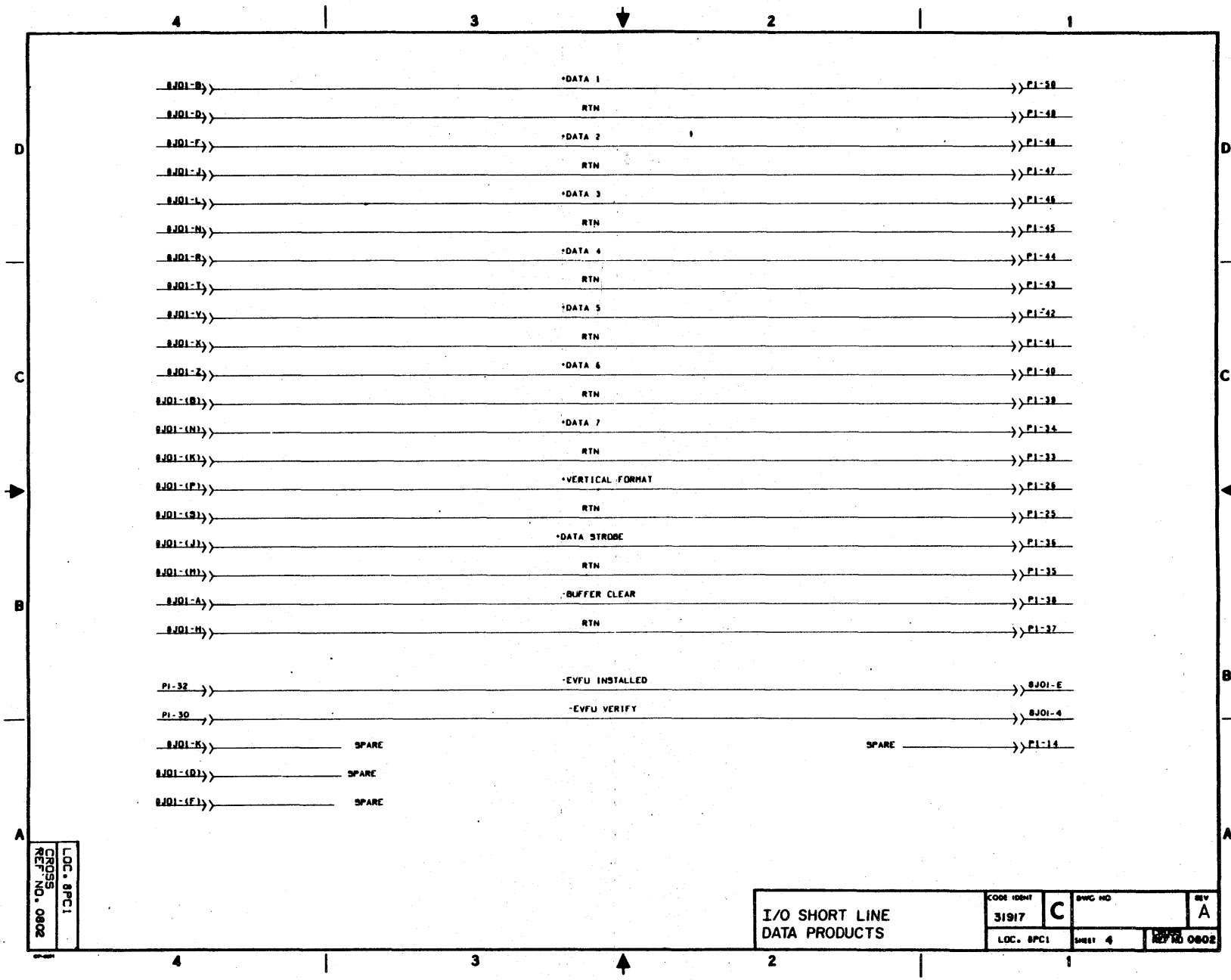

4
3
2
1
D
C
B
A
8J01-B
*DATA 1
P1-50
8J01-D
RTN
P1-49
8J01-F
*DATA 2
P1-48
8J01-J
RTN
P1-47
8J01-L
*DATA 3
P1-46
8J01-N
RTN
P1-45
8J01-R
*DATA 4
P1-44
8J01-T
RTN
P1-43
8J01-V
*DATA 5
P1-42
8J01-X
RTN
P1-41
8J01-Z
*DATA 6
P1-40
8J01-(B)
RTN
P1-39
8J01-(N)
*DATA 7
P1-34
8J01-(K)
RTN
P1-33
8J01-(P)
*VERTICAL FORMAT
P1-26
8J01-(S)
RTN
P1-25
8J01-(J)
*DATA STROBE
P1-36
8J01-(M)
RTN
P1-35
8J01-A
-BUFFER CLEAR
P1-38
8J01-H
RTN
P1-37
P1-32
-EVFU INSTALLED
8J01-E
P1-30
-EVFU VERIFY
8J01-4
8J01-K
SPARE
SPARE
P1-14
8J01-(D)
SPARE
8J01-(F)
SPARE
LOC. 8PC1
CROSS REF NO. 0802
I/O SHORT LINE
DATA PRODUCTS
CODE IDENT
31917
C
DWG NO
REV
A
LOC. 8PC1
SHEET 4
REFNO 0802

TABLE 7-3. ASCII CHARACTER AND CODE SET

BIT POSITIONS				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1									
0	0	0	0				SP	0	@	P		p
0	0	0	1				!	1	A	Q	a	q
0	0	1	0				"	2	B	R	b	r
0	0	1	1				#	3	C	S	c	s
0	1	0	0				$	4	D	T	d	t
0	1	0	1				%	5	E	U	e	u
0	1	1	0				&	6	F	V	f	v
0	1	1	1				'	7	G	W	g	w
1	0	0	0				(	8	H	X	h	x
1	0	0	1				)	9	I	Y	i	y
1	0	1	0	[5]	LF		*	:	J	Z	j	z
1	0	1	1	[5]	VT		+	;	K	[	k	{
1	1	0	0	[5]	FF		,	<	L	\	l	!
1	1	0	1	[5]	CR		-	=	M	]	m	}
1	1	1	0				.	>	N	^	n	~
1	1	1	1				/	?	O	_	o	SPEC. CHAR.

[3] — [64] — [96] — [4]

NOTES:

[1] THE ABOVE CODE SET IS VALID IF THE VERTICAL FORMAT LINE IS LO.

[2] THE ABOVE CODE SET IS USED WHEN THE BAND CODE TRANSLATER ROM's ARE DISABLED (SWN2-1 THRU 4 IN OFF POSITION).

[3] ALL UNDEFINED CODES IN THE FIRST TWO CHART COLUMNS WILL BE TREATED AS A SPACE CODE WHEN ASCII CONTROL CODES ARE USED. WHEN ASCII CONTROL CODES ARE NOT USED, CHARACTER CODES FOR 128 CHARACTER SET BANDS CAN BE ASSIGNED.

[4] ALL CODES IN LAST TWO COLUMNS WILL BE TREATED AS SPACE CODES WHEN A 64 CHARACTER BAND IS INSTALLED.

[5] THESE CODES ARE SWITCH SELECTABLE OPTIONS ON THE PRINTER CONTROLLER BOARD.

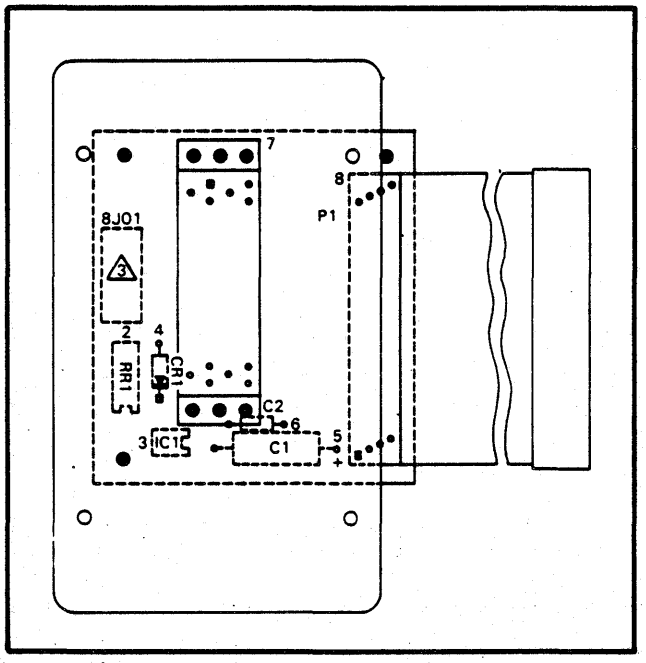


FIGURE 7-6. I/O CABLE ASSEMBLY (SHORT LINE DRIVER)

Data Information Types

There are 4 types of information that can be transmitted to the printer on the data lines: Character Codes, Control Codes, DAVFU Codes and Paper Motion Command Codes. If the Vertical Format line is LO, the data transmitted will be either character codes or 1 of 4 control codes. Table 7-3 shows the standard character codes and the 4 control codes.

The 4 control codes are:

Carriage Return (CR) Causes no paper advance after the contents of the print line buffer has been printed.

Form Feed (FF) Causes the paper to advance to the next top of form position after the contents of the print line buffer has been printed.

Line Feed (LF) Causes the paper to advance 1 line after the contents of the print line buffer has been printed.

Vertical Tab (VT) Causes the paper to advance to the Channel 3 position after the contents of the print line buffer has been printed. This code is only valid for DAVFU and EVFU units. A dip switch selectable option allows an advance to Channel 4 instead of Channel 3.

When the Vertical Format line is LO, and the data is not a control code, the first code received will be stored for printing in column 1. The second code received will be stored for printing in column 2, and so on. This process will continue until the print line buffer is filled with 132 codes. All excess codes are not stored or printed, but the printer will continue to accept them. Printing will occur if a control code, or a paper motion command code is received.

A control code, or a paper motion command code may be transmitted after any amount of character codes have been transmitted. If a control code is used, the Vertical Format line must be LO. If a paper motion command is used, the vertical Format line must be HI. When the Vertical Format line is HI, there are two types of paper motion commands that may be transmitted. The first type is an advance to channel "n" command, and the second type is an advance "n" lines command. Data bit 5 is the key bit that determines which type of command will be transmitted. If it is LO, the command will be to advance to Channel "n". If it is HI, the command will be to advance "n" lines. Table 7-4 shows the paper motion commands and their respective codes.

TABLE 7-4. PAPER MOTION COMMANDS

VERT. FMT.	DATA 8765	BITS 4321	PAPER MOTION COMMAND
1	xxx0	0000	Advance to Channel 1
1	xxx0	0001	Advance to Channel 2
1	xxx0	0010	Advance to Channel 3
1	xxx0	0011	Advance to Channel 4
1	xxx0	0100	Advance to Channel 5
1	xxx0	0101	Advance to Channel 6
1	xxx0	0110	Advance to Channel 7
1	xxx0	0111	Advance to Channel 8
1	xxx0	1000	Advance to Channel 9
1	xxx0	1001	Advance to Channel 10
1	xxx0	1010	Advance to Channel 11
1	xxx0	1011	Advance to Channel 12
1	xxx0	1100	Illegal Command
1	xxx0	1101	Illegal Command
1	xxx0	1110	Illegal Command
1	xxx0	1111	Illegal Command

VERT. FMT.	DATA 8765	BITS 4321	PAPER MOTION COMMAND
1	xxx1	0000	Advance No Lines
1	xxx1	0001	Advance 1 Line
1	xxx1	0010	Advance 2 Lines
1	xxx1	0011	Advance 3 Lines
1	xxx1	0100	Advance 4 Lines
1	xxx1	0101	Advance 5 Lines
1	xxx1	0110	Advance 6 Lines
1	xxx1	0111	Advance 7 Lines
1	xxx1	1000	Advance 8 Lines
1	xxx1	1001	Advance 9 Lines
1	xxx1	1010	Advance 10 Lines
1	xxx1	1011	Advance 11 Lines
1	xxx1	1100	Advance 12 Lines
1	xxx1	1101	Advance 13 Lines
1	xxx1	1110	Advance 14 Lines
1	xxx1	1111	Advance 15 Lines

NOTE: 0 = Logic 0 - LO
1 = Logic 1 - HI
x = May be Either 0 or 1

The Direct Access Vertical Format Unit (DAVFU) mode is selected by dip switches on the controller board. This mode allows the printer to receive the format information from the data source. When in this mode, the printer will display the code for EVFU Not Loaded, but may be placed On Line. The printer will accept character codes, LF, FF and CR control codes without error, because paper motion control will be taken over by an internal line counter. However, if a VFU channel command is transmitted to the printer when DAVFU is not loaded, the printer will go Not Ready and display the code for Invalid Format Code. The sequence for the data source to load DAVFU information is:

1. Make the Vertical Format signal line HI.
2. Transmit Start DAVFU Load command.
3. Transmit an odd tape data byte for Channels 1 thru 6.
4. Transmit an even tape data byte for Channels 7 thru 12.
5. Repeat steps 3 and 4 as required to describe each equivalent format tape line.
6. Make the Vertical Format signal line HI.
7. Transmit End DAVFU Load command. See Figure 7-7.

The following statements qualify the load sequence:

1A. The relationship between the DAVFU data to be loaded and the existing paper position is determined by the order of the data load.

1B. The DAVFU data loaded will not be moved to the top of form position after the data load.

1C. Therefore, it is recommended that:

a. The paper's top of form position be aligned to the first line of print position before the load begins.
b. Channel 1 (top of form) be the first DAVFU data line loaded.

2A. The printer must be On Line and have no data in the print line buffer.

2B. If data is present when the Start DAVFU Load command is transmitted, it will be transferred to the format tape buffer, and will be interpreted as DAVFU data.

3A. A pair of tape data bytes, one odd and one even, must be transmitted for each format tape line.

3B. If an odd number of tape data bytes are transmitted, a fault will occur and:

a. DAVFU will not be loaded.

b. Any previous format tape buffer contents will be lost.

c. When the printer is returned On Line, it will display the code for EVFU Not Loaded.

4A. The maximum memory size is 508 bytes, or 254 format tape lines.

4B. If this limit is exceeded, a fault will occur, and items 3Ba thru 3Bc will apply.

5. If Start DAVFU Load is followed by End DAVFU Load, the printer will continue to display the code for EVFU Not Loaded. However, it will be able to perform line advance commands. If a channel advance command is attempted, the printer will display the code for an Invalid Format Code error.

6. If a DAVFU Load was transferred, but no channel 1 (top of form) was indicated, the following conditions will exist:

a. If the Top of Form switch is activated, or a FF control code is transmitted, the paper will advance 1 line, and the code for Selected VFU Channel Not Punched will be displayed.

b. If the Single Cycle switch function is attempted, the controller will have no reference point for determining the bottom of form position. This may result in printing past the bottom of the page.

7. Parity is assigned during a format tape buffer load cycle. Parity is checked each time the format tape buffer is accessed for information. If a parity error is detected, the printer will go Not Ready, and will display the code for EVFU Parity Error. The contents of the format tape buffer will be lost, and must be reloaded.

8. The End DAVFU Load command indicates the printer's format tape buffer has been loaded. When received, the printer responds by requesting the next transfer. This is accomplished by transmitting the Demand signal within 15 to 60 milliseconds after End DAVFU Load is received.

NOTE:

1. 0 = Logic 0 - LO
   1 = Logic 1 - HI
   X = May be Either 0 or 1

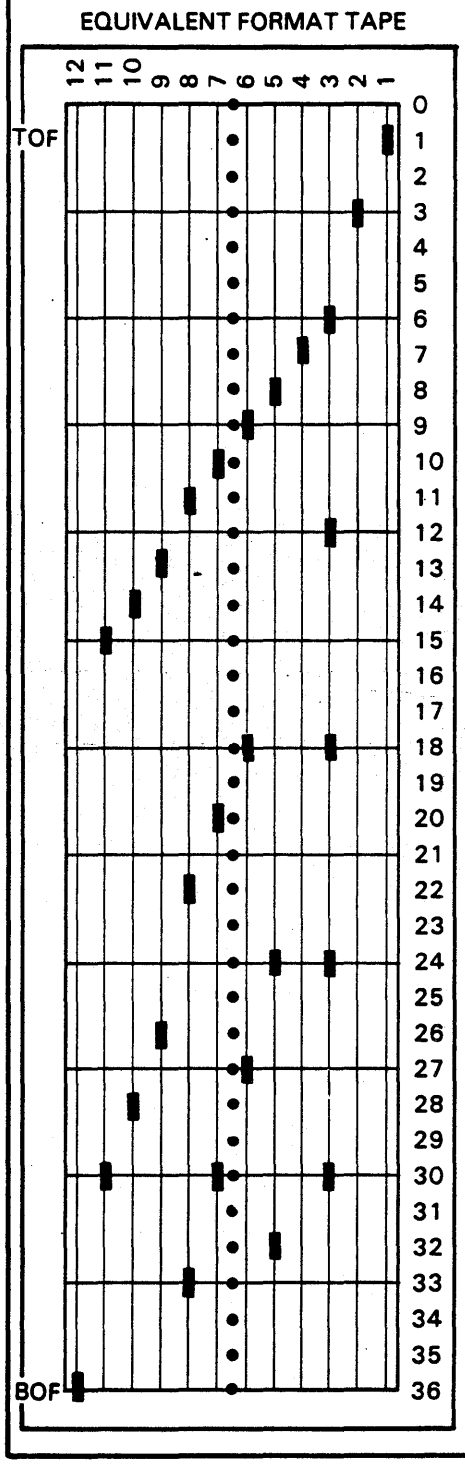
2. This example is for a 6 inch form, printed at 6 lines per inch, with a total of 36 lines. (6 inch form X6 lines per inch = 36 total lines)

LOAD SEQUENCE

1. Make Vertical Format signal HI
2. Transmit START DAVFU LOAD command
3. Transmit an odd tape data byte for channels 1 thru 6
4. Transmit an even tape data byte for channels 7 thru 12
5. Repeat steps 3 and 4 as required to describe equivalent format tape
6. Make VERTICAL FORMAT signal HI
7. Transmit END DAVFU LOAD command

(Continued)

FIGURE 7-7. DAVFU LOAD EXAMPLE



VERTICAL FORMAT		(DB8)	(DB7)	(DB6) FMT. CHNL. 12	(DB5) FMT. CHNL. 11	(DB4) FMT. CHNL. 10	(DB3) FMT. CHNL. 9	(DB2) FMT. CHNL. 8	(DB1) FMT. CHNL. 7		(DB8)	(DB7)	(DB6) FMT. CHNL. 6	(DB5) FMT. CHNL. 5	(DB4) FMT. CHNL. 4	(DB3) FMT. CHNL. 3	(DB2) FMT. CHNL. 2	(DB1) FMT. CHNL. 1
1	[1]									[2]	0	1	1	0	1	1	1	0
X	[4]	X	X	0	0	0	0	0	0	[3]	X	X	0	0	0	0	0	1
X		X	X	0	0	0	0	0	0	[5]	X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	1	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	1	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	1	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	1	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	1	0	0	0	0	0
X		X	X	0	0	0	0	0	1		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	1	0		X	X	0	0	0	1	0	0
X		X	X	0	0	0	1	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	1	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	1	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	1	0	0	1	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	1		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	1	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	1	0	1	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	1	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	1	0		X	X	0	0	0	0	0	0
X		X	X	0	0	1	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	1	0	0	0	1		X	X	0	0	0	1	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	1	0	0	0	0
X		X	X	0	0	0	0	1	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	0	0	0	0	0	0		X	X	0	0	0	0	0	0
X		X	X	1	0	0	0	0	0	[5]	X	X	0	0	0	0	0	0
1	[6]									[7]	0	1	1	0	1	1	1	1

FIGURE 7-7. DAVFU LOAD EXAMPLE (Continued)

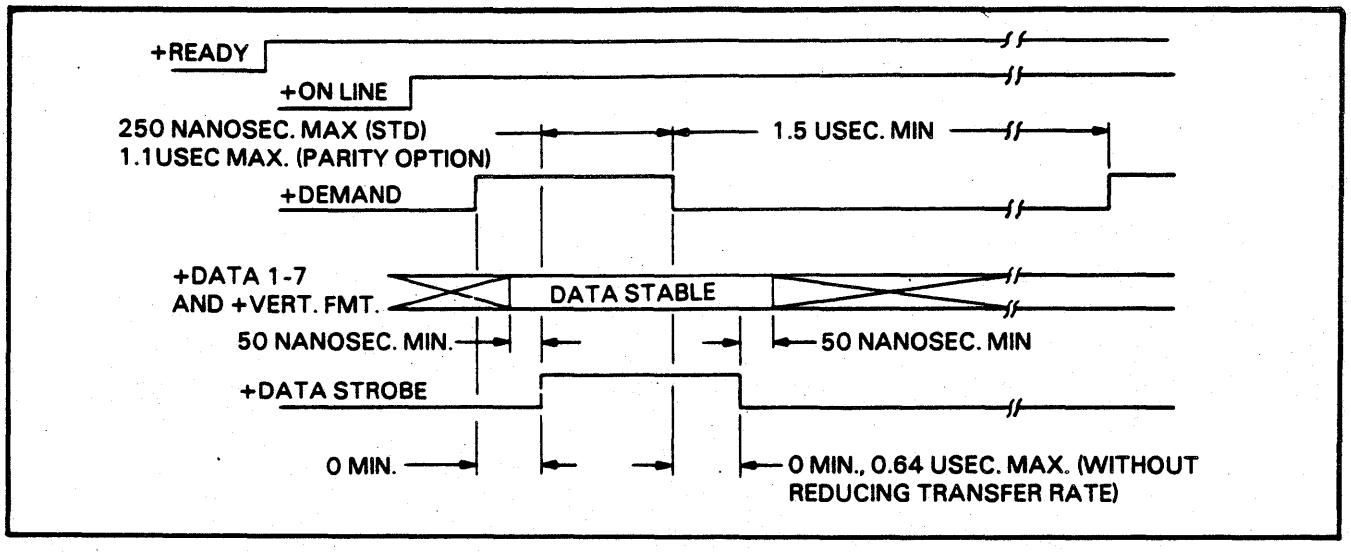


FIGURE 7-8. I/O TIMING

Data Transfer sequence

1. Printer brings READY HI.
2. Printer brings ON LINE HI.
3. Printer brings DEMAND HI.
4. Data Source places DATA on the lines.
5. Data Source brings DATA STROBE HI.
6. Printer samples DATA.
7. Printer brings DEMAND LO.
8. Data Source brings DATA STROBE LO.
9. Printer repeats sequence by bringing DEMAND HI.

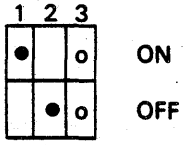
NOTE

DATA SOURCE MUST HOLD THE DATA LINES STABLE FOR 50 NANOSECONDS BEFORE AND 50 NANOSECONDS AFTER TRANSMITTING DATA STROBE. SEE FIGURE 7-8.

DIP SWITCHES

There are 6 dip switches which configure the controller board. See Figure 7-9. Setting these switches properly is important to the operation of the printer. If they are the rocker type, push down the ON side to turn the switch ON, and push down the OFF side to turn the switch OFF. If they are the slide type, slide the tab to the ON position to turn the switch ON, and slide it back to turn the switch OFF. The following information is provided to aid you in properly setting the dip switches. It will explain the settings and functions of each switch segment.

The example below shows switch segment 1 in the ON position, segment 2 in the OFF position, and segment 3 indicates the switch may be ON or OFF.



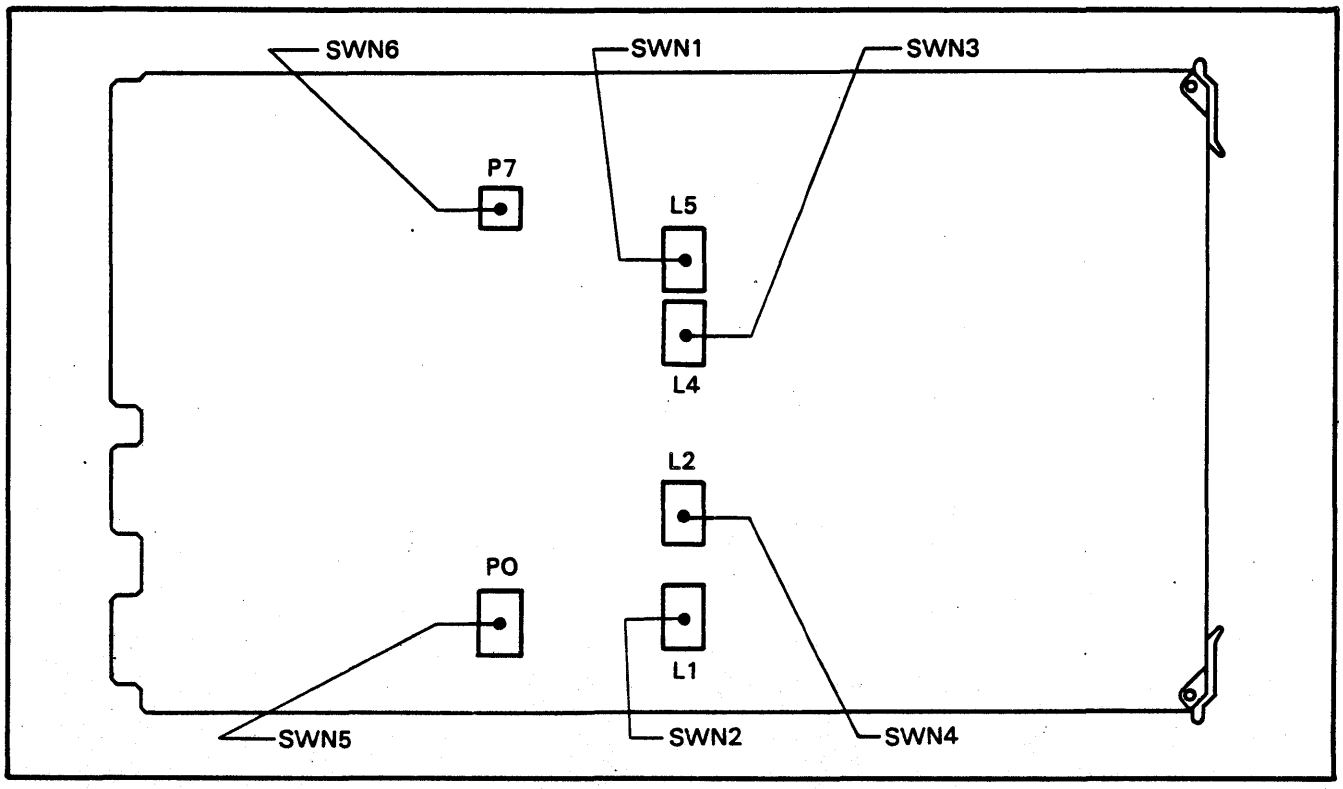


FIGURE 7-9. DIP SWITCH LOCATIONS

SWN1 - Segment 1

When ON, generates data bit 7 by inverting data bit 6. When OFF, data bit 7 is used in the normal manner.

SWN1 - Segments 2-8

Set the space code. ON represents Logic 1, OFF represents Logic 0. The ASCII space code is 20 hex, and would be set like this:

	0	1	0	0	0	0	0	
1	2	3	4	5	6	7	8	Segments
o		●						ON = Logic 1
o	●		●	●	●	●	●	OFF = Logic 0

SWN2 - Segments 1-4

Enable the translation ROM set as indicated below.

1	2	3	4	5	6	7	8	
●				o	o	o	o	ON
	●	●	●	o	o	o	o	OFF

Enables ROMS for all 128 character set bands.

1	2	3	4	5	6	7	8	
	●			o	o	o	o	ON
●		●	●	o	o	o	o	OFF

Enables ROMS for Non-ASCII 96 character set bands.

1	2	3	4	5	6	7	8	
		●		o	o	o	o	ON
●	●		●	o	o	o	o	OFF

Enables ROMS for Non-ASCII 64 character set bands.

1	2	3	4	5	6	7	8	
			●	o	o	o	o	ON
●	●	●		o	o	o	o	OFF

Enables ROMS for all 48-character set bands.

SWN2 - Segment 5

If segment 6 is ON, this segment has no effect. If 6 is OFF, and 5 is ON, Vertical Tab will be disabled. If 6 is OFF and 5 is OFF, Vertical Tab is enabled.

SWN2 - Segment 6

When ON, disables the ASCII control codes. When OFF, the LF FF & CR control codes are enabled, and VT is dependent on the setting of segment 5.

SWN2 - Segments 7-8

Not Used.

SWN3 - Segment 1

When ON, indicates to the data source that the EVFU is installed. When OFF, indicates EVFU is not installed.

SWN3 - Segment 2

When ON, changes the Compressed Pitch signal line to Parity Error Clear. When OFF, the Compressed Pitch line remains unchanged.

SWN3 - Segment 3

When ON, indicates the printer is an E-series model. When OFF, indicates the printer is a non-E-series model.

SWN3 - Segment 4

When ON, indicates the printer has a membrane control panel. When OFF, indicates the printer has a mechanical control panel.

SWN3 - Segment 5-6

Set the printer type as indicated below.

1	2	3	4	5	6	7	8	
o	o	o	o	●	●	o	o	ON
o	o	o	o			o	o	OFF

PBS 360

1	2	3	4	5	6	7	8	
o	o	o	o	●		o	o	ON
o	o	o	o		●	o	o	OFF

PBS 720

1	2	3	4	5	6	7	8	
o	o	o	o			o	o	ON
o	o	o	o	●	●	o	o	OFF

Models I & II

SWN3 - Segment 7

When ON, enables the automatic perforation skip. Its function depends on the printer configuration as follows:

NON-EVFU UNITS	Paper is moved 3 lines past the bottom of form position.
EVFU UNITS	When bottom of form is sensed, paper is moved to top of form.
DAVFU UNITS	When not loaded, paper is moved 3 lines past the bottom of form position. When loaded, but no channel 1 was included, the function is ignored. When loaded with Channel 1, paper is moved to top of form when bottom of form is sensed.

When OFF, automatic perforation skip is disabled.

SWN3 - Segment 8

Determines which line length the test mode function will initially print. When ON, 80 columns will be printed every time the Test Mode switch is activated to start printing. When OFF, 132 columns will be printed. Activating the paper step switch when printing in the test mode will switch from 80 to 132 columns and vice versa.

CAUTION

SWN4 ALLOWS SELECTION OF THE CODES TO BE PRINTED. DO NOT SELECT CODES THAT CAUSE PRINTING ON THE BLANK POSITIONS OF THE BAND. IF UNAVOIDABLE, DO NOT PRINT ON. SINGLE PART PAPER FOR ANY LENGTH OF TIME.

SWN4 - Segments 1-8

Configure the test mode functions. Segment 8 decides which function will be printed, and segments 1-7 select an option of that function. These are the functions available:

CE FUNCTIONS - SEGMENT 8 ON, 1-4 NOT USED, 5-7 SELECT OPTION.

No Printing Option

1	2	3	4	5	6	7	8	
o	o	o	o	●	●		●	ON
o	o	o	o			●		OFF

The printer will act as if it were in the all one character function, but the hammers will not be activated. The out of paper, paper tear, line space error, stacker ready, and sync error faults will not be flagged or cause the printer to stop.

Horizontal Motion Only Option (PBS units only)

1	2	3	4	5	6	7	8	
o	o	o	o	●		●	●	ON
o	o	o	o		●			OFF

The printer's horizontal motion system will cycle with no printing and no paper motion.

Vertical Motion Only Option

1	2	3	4	5	6	7	8	
o	o	o	o		●	●	●	ON
o	o	o	o	●				OFF

The printer's vertical motion system will perform one line advances at a maximum rate with no other printer activity.

Sliding Band Order Option

1	2	3	4	5	6	7	8	
o	o	o	o	●	●	●	●	ON
o	o	o	o					OFF

The printer will print continuous lines of band order groups. Band order groups are all the characters of a character set printed in the order they appear on the band. Groups may be 48, 64, 96 or 128 characters long. Each successive line will be displaced by 1 character position from the previous line.

All One Character Function - Segment 8 OFF, 1-7 select a character code option.

The character code option range for a:
- 48 character set band is 20 to 4F hex
- 64 character set band is 20 to 5F hex
- 96 character set band is 20 to 7F hex
- 128 character set band is 0 to 7F hex

If a character code is selected which is not within the range of the band installed, the printer will perform a print operation but will not activate the hammers. The following examples show the switch settings for various character code options.

NOTE

THE SEGMENT ORDER IS REVERSED FOR THE NEXT 4 EXAMPLES ONLY.

	0	1	0	1	0	1	1	2B hex (+)
8	7	6	5	4	3	2	1	Segments
		●		●		●	●	ON = Logic 1
●	●		●		●			OFF = Logic 0

	0	1	1	1	1	0	0	3C hex (<)
8	7	6	5	4	3	2	1	Segments
		●	●	●	●			ON = Logic 1
●	●					●	●	OFF = Logic 0

	1	0	0	1	1	0	1	4D hex (M)
8	7	6	5	4	3	2	1	Segments
	●			●	●		●	ON = Logic 1
●		●	●			●		OFF = Logic 0

	1	0	1	1	1	1	0	5E hex (Λ)
8	7	6	5	4	3	2	1	Segments
	●		●	●	●	●		ON = Logic 1
●		●					●	OFF = Logic 0

SWN5 - Segments 1-4

Configure the line spacing format as indicated below.

Not Used.

1	2	3	4	5	6	7	8	
				o	o	o	o	ON
●	●	●	●	o	o	o	o	OFF

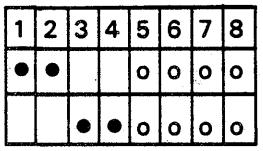
6 bit line counter with Channel 9 TOF.

1	2	3	4	5	6	7	8	
●		●		o	o	o	o	ON
	●		●	o	o	o	o	OFF

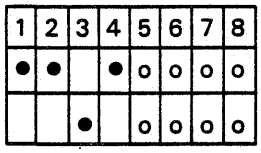
7 Bit Line Counter.

1	2	3	4	5	6	7	8	
●		●	●	o	o	o	o	ON
	●			o	o	o	o	OFF

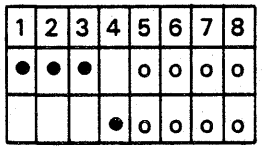
Vertical Tab = Channel 4.



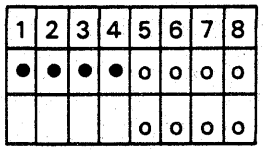
Carriage Return = Line Feed, and
Vertical Tab = Channel 4.



6 Bit Line Counter.



4 Bit Line Counter.



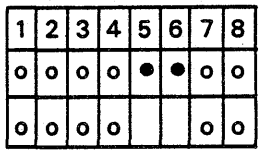
VT = Channel 4.
Normally Vertical Tab is Channel 3.
This option changes it to Channel 4.

CR = LF.
When the data source transmits a Carriage Return control code, the printer performs a Line Feed if this option is selected.

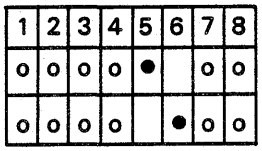
SWN5 - Segments 5-6

Determine which format channel will be designated bottom of form.

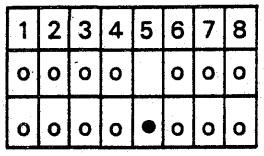
Channel 2



Channel 8



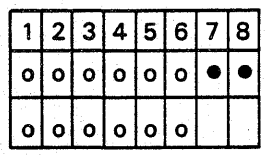
Channel 12



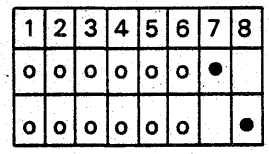
SWN5 - Segments 7-8

Determine which format mode is used.

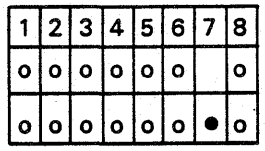
Disables EVFU and DAVFU.



Enables EVFU.



Enables DAVFU.



SWN6 - Segment 1

When ON, disables data bit 8. When OFF, data bit 8 is enabled.

SWN6 - Segment 2

When ON, disables the Vertical Format signal. When OFF, Vertical Format is enabled.

BACKPLANE (See Figure 7-10)

The backplane is an important part of the interface. It provides interconnections between the control panel, I/O connector, controller and the interface adapter, if applicable. In addition, the backplane contains a fuse for the paper clamp circuit, and a dip switch. The following information explains the function of each dip switch segment.

SWN1 - Segment 1

Not Used.

SWN1 - Segment 2

When ON, enables the compressed pitch function for the PBS units only. When OFF, the function is disabled.

SWN1 - Segment 3

Affects the band speed by changing the reference clock signal. This segment must be ON for Model I units, and OFF for Model II & III units.

SWN1 - Segment 4

When ON, prevents horizontal circuitry from functioning. When OFF, circuitry is functional.

SWN1 - Segment 5

When ON, desensitizes the H-switch fault circuit. When OFF, the circuit functions in the normal manner.

SWN1 - Segment 6

When ON, enables high speed slew circuit. When OFF, circuit is disabled.

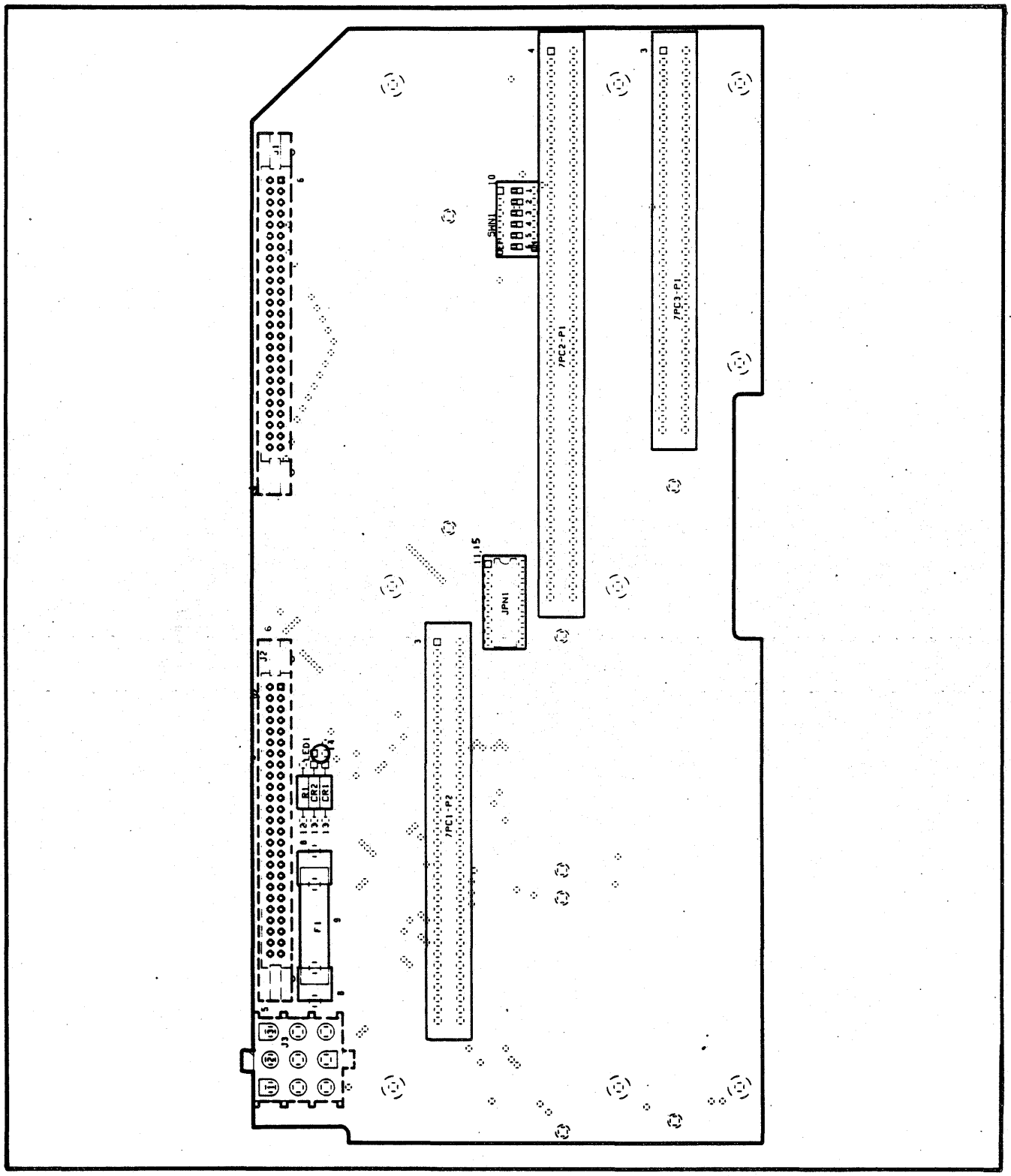


FIGURE 7-10. BACKPLANE

SECTION VIII
PRINT CYCLE ELECTRONICS

This section covers character and home pulse generation, home to character pulse synchronization, subscan pulse generation, and subscan compensation.

CHARACTER AND HOME PULSE GENERATION

The print band is moving at a rate of 246 inches (6250mm) per second. At this speed there is approxi-

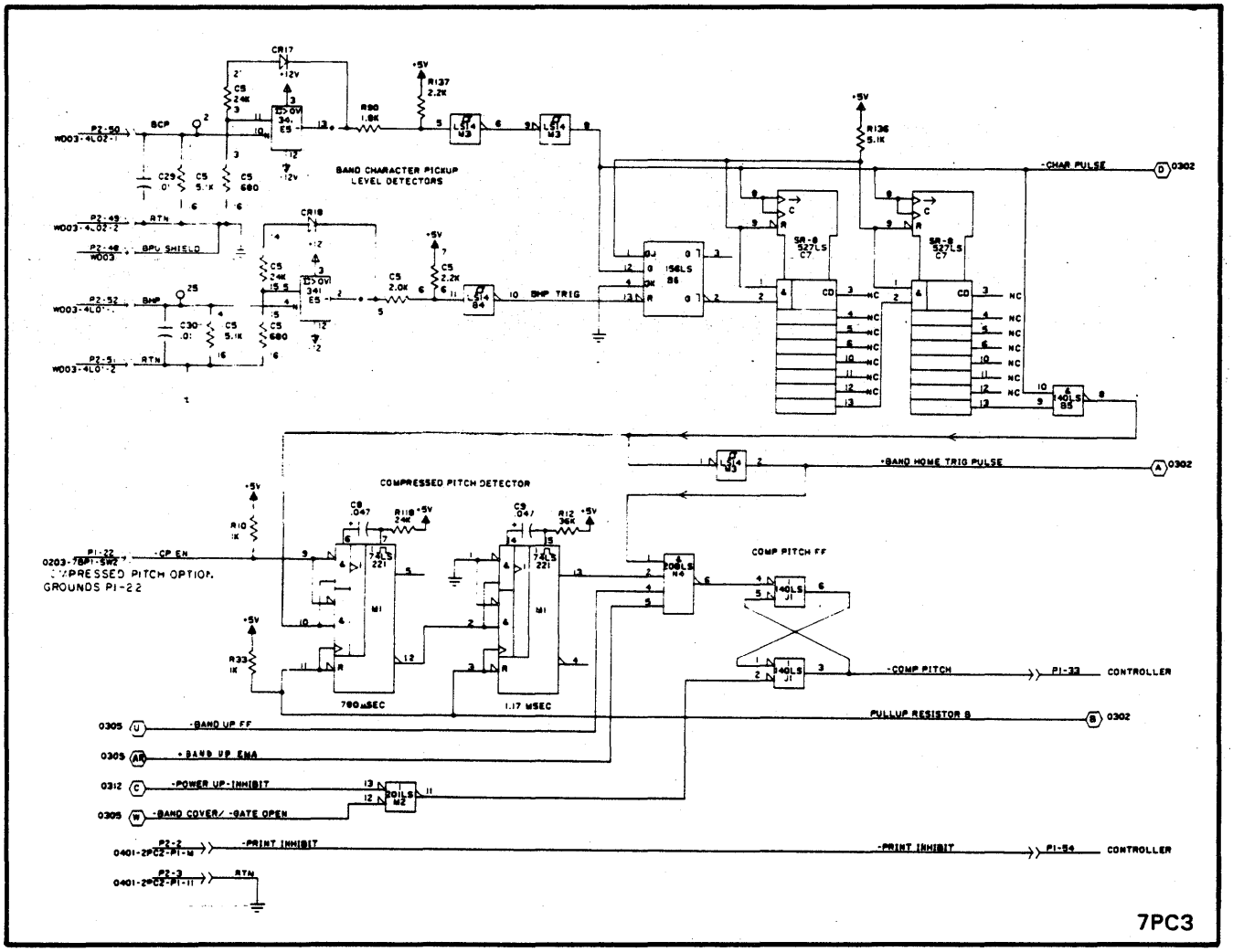


FIGURE 8-1. CHARACTER PULSE AND HOME PULSE

mately 540 microseconds between characters. The time for a complete font scan varies with the size of the font: 48 character =26 milliseconds; 64 character = 34.5 milliseconds; 96 character = 52 milliseconds; 128 character = 69 milliseconds. There will be one complete font scan for each line of print. Two pulses are generated by the band when it is in motion, the Character pulse (BCP) and the Home pulse (BHP). One Character pulse is generated for each band character, 384 per band revolution. There is one Home Pulse generated for each character font. The number of Home pulses per band revolution will vary with the size of the character font: 48 Character = 8 Home pulses; 64 character = 6 Home pulses; 96 character = 4 Home pulses; 128 Character = 3 Home pulses. The Home pulse is used to synchronize the controller Band Code Counter to the band. Also the controller counts the number of Character pulses between each Home pulse to automatically determine the size of the character font.

Circuit Description (See Figure 8-1)

Each band contains two sets of raised lines. The upper set is the Home pulse lines. The lower set is the Character pulse lines. As these lines pass the pickups mounted on the latch end of the gate, the pickups generate sine wave signals. The signals must have a negative swing of -.5 volts minimum to -2.0 volts maximum. When the Character pulse swings negative approximately -.3 volts on pin 10 of voltage comparator E5, it switches. The comparator switches back when the character pulse input at pin 10 crosses 0 volts. This produces a logic level pulse at D. The negative trailing edge of this pulse becomes -CHAR PULSE. The Home pulse detection circuitry functions in an identical manner to the Character pulse.

SUBSCAN COMPENSATION

The signal generating the subscan is the band character pulse which is input at point H2 pin 10 in Figure 8-2. The analog compensation network (E4/F5) electrically adjusts the start of the subscans corresponding to the voltage level of the +36 volt supply and the position of the Print Position Control. By adjusting the start of the subscans, the activating time of the hammers is also adjusted accordingly. Thus, if the +36 volts is low or the Print Position Control is adjusted for single part paper, the hammers are activated early. Correspondingly, if the +36 volts is high or the Print Position Control is adjusted for multiple part paper, the hammers are activated later. The analog compensation network automatically adjusts for these conditions or any combination of these conditions.

Circuit Description (See Figure 8-2)

The 7 microseconds positive going Character Trigger pulse triggers O/S H2 pin 10. The time-out of this phase delay circuit is dependent upon the setting of the Print Position Control on the control panel. The output pulse of O/S H2 pin 5 resets the integrator E4 to 0 volts. The comparator F5 is then set, and will not reset until the integrator E4 voltage rises to the level which is present at pin 6 of F5. The voltage at F5 pin 6 is in direct proportion to the magnitude of the +36V supply, therefore, the switching point of comparator F5 is delayed as the +36V supply varies. F5 then triggers O/S H2 pin 1 which starts Subscan Timing.

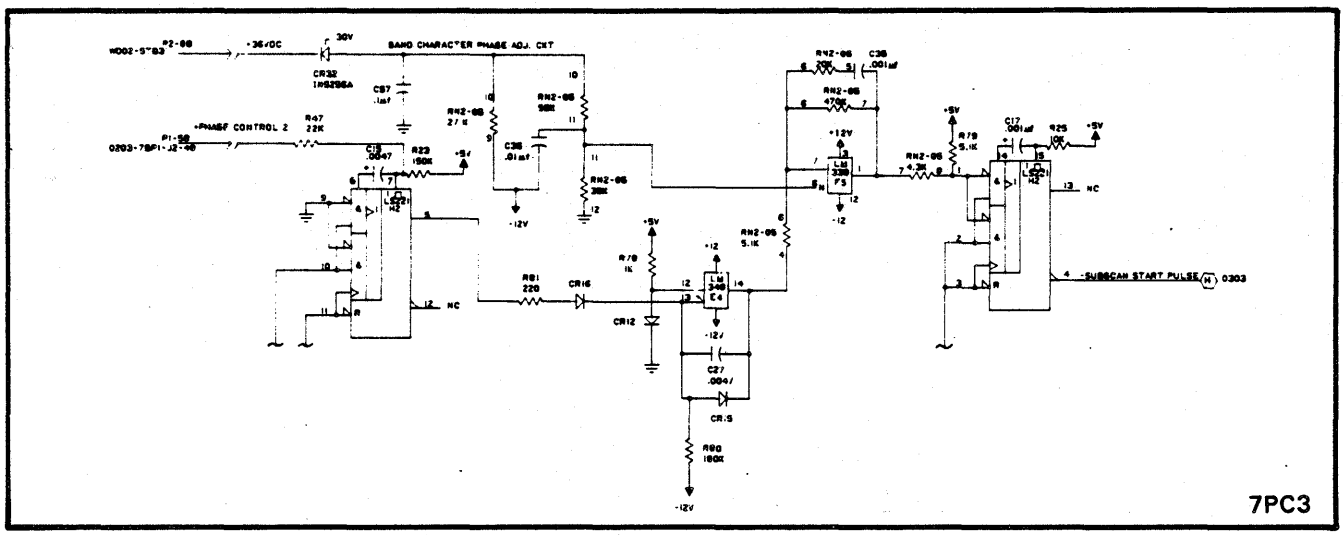


FIGURE 8-2. SUBSCAN COMPENSATION (PHASING) CIRCUITY

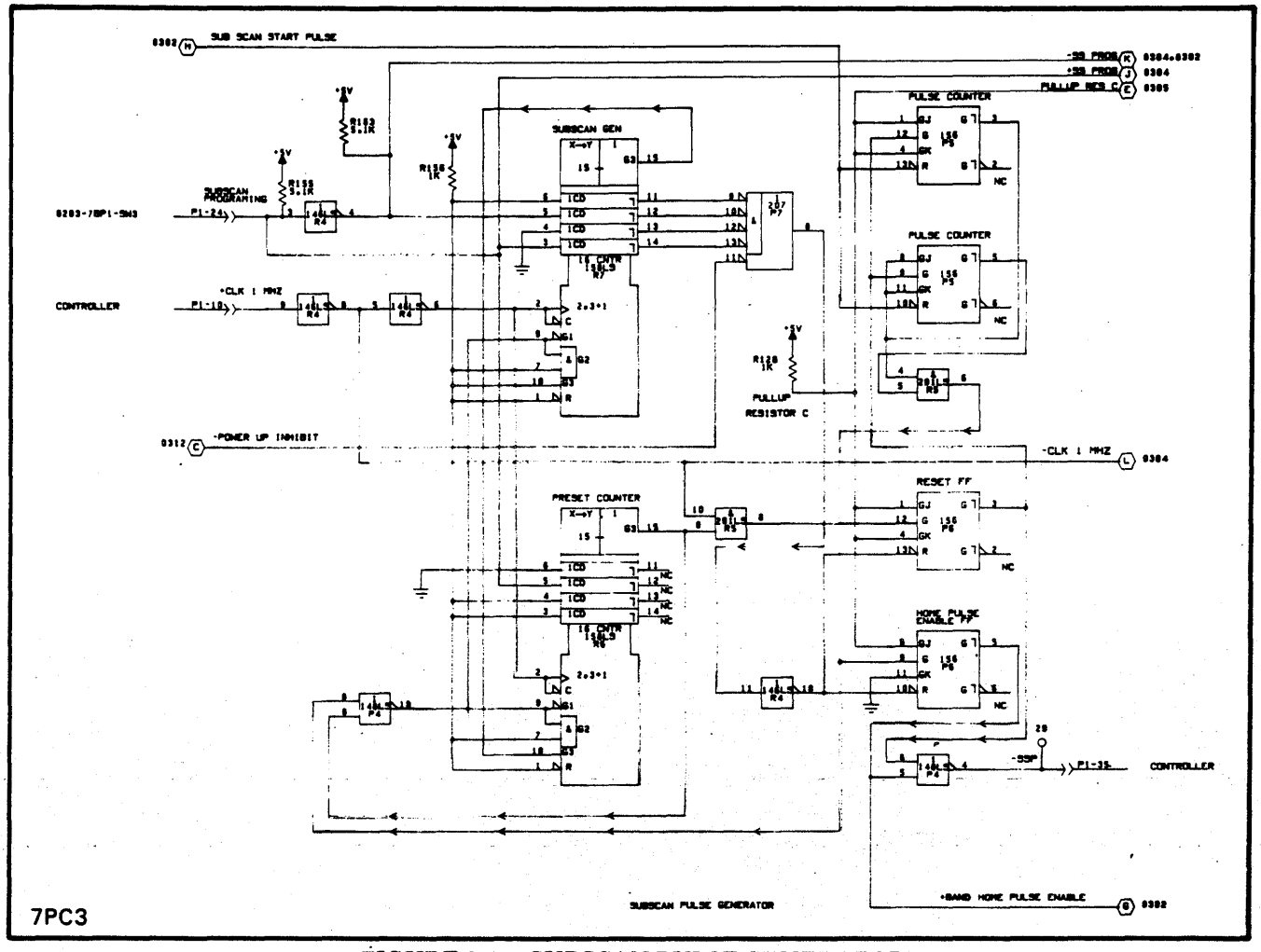


FIGURE 8-3. SUBSCAN PULSE GENERATOR

SUBSCAN PULSE GENERATOR

The Subscan Pulse Generator splits the time between each Character pulse (Subscan Start Pulse) into 4 subscans. During each subscan every third print band character is aligned with every fourth hammer position. The subscan pulses correspond to the print time for each hammer position.

Circuit Description (See Figure 8-3)

The subscan generator is running continuously anytime the print band is moving. This description of the circuit operation starts just before the generation of the Subscan Start Pulse. At this time flip-flops P5-3 and P5-5 are set, and flip-flops P6-3 and P6-5 are reset. The 2 counter chips R6 and R7 are held in the load condition by R5 pin 6, and each Clock pulse is strobing the count of 121 decimal into the counter. Upon receipt of the -Subscan Start Pulse, flip-flops P5-3 and P5-5 are reset. This action sets flip-flop P6-5 which generates the fourth Subscan Pulse and the Home Pulse Enable signal. At the same time these 2 pulses are generated the Load input is removed from the counter, and it begins counting. The counter is clocked by a 1MHZ clock pulse. This pulse increments the counter by 1 count every microsecond. When the counter reaches the count of 128 decimal, its 4 least significant bits are LO. This condition causes a HI output from P7-8, which resets flip-flop P6-5. This terminates the fourth-Subscan Pulse and the Home Enable Pulse 7 microseconds after their origination. The counter continues to be incremented every microsecond until it reaches the count of 255 decimal. At this time, gate R5-8 is enabled. On the trailing edge of the clock pulse, flip-flop P6-3 sets, and the counter is reloaded to the count of 121 decimal. The setting of flip-flop P6-3 generates the first -Subscan Pulse for the Character pulse. The leading edge of the next clock pulse increments the counter. At the count of 128 decimal, the 4 least significant bits are again all

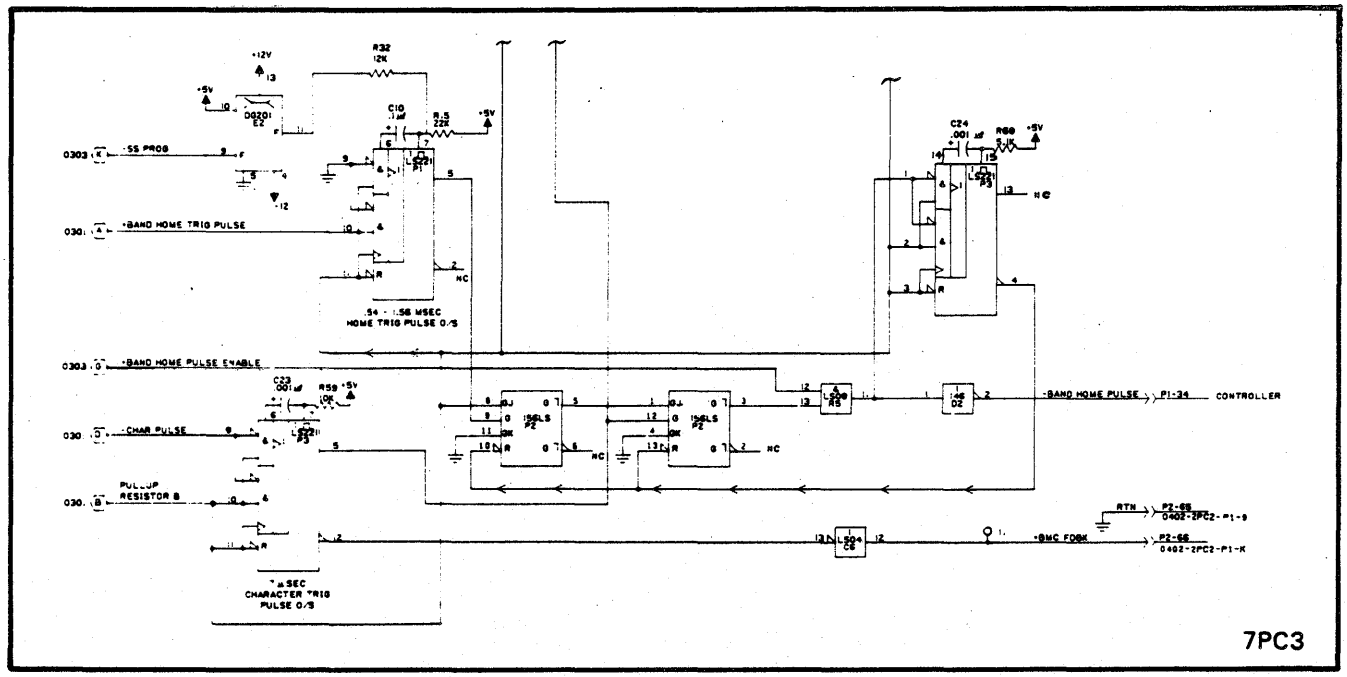


FIGURE 8-4. HOME TO CHARACTER PULSE SYNCHRONIZATION

LO, causing flip-flop P6-3 to reset. As the flip-flop P5-3 is set, the counter continues to be incremented every microsecond until it reaches the count of 255 decimal. At this time, gate R5-8 is again enabled. When the clock pulse drops, flip-flop P6-3 is again set and the counter is reloaded to 121 decimal. Flip flop P6-3 generates the second -Subscan Pulse. The counter starts counting again. At the count of 128 decimal. flip-flop P6-3 is reset, terminating the second -Subscan Pulse, resetting flip-flop P5-3, and setting flip-flop P5-5. The counter continues to be incremented every microsecond until it reaches the count of 255 decimal. At this time, gate R5-8 is again enabled. On the trailing edge of the clock, flip-flop P6-3 is again set, and the counter is reloaded to the count of 121 decimal. Flip-flop P6-3 generates the third -Subscan Pulse. The counter resumes counting at the next clock pulse. When the counter reaches the count of 128 decimal, flip-flop P6-3 resets, terminating the third -Subscan Pulse and setting flip-flop P5-3. At this time both flip-flop P5-3 and P5-5 set, enabling gate R5-6. Ths holds a constant Load signal on the counter, disabling it until the next -Subscan Start Pulse. The fourth -Subscan Pulse is not generated until the receipt of the next -Subscan Start Pulse. When it is received, flip-flops P5-3 and P5-5 are reset. This action sets flip-flop P6-5 which generates the fourth -Subscan Pulse and the Home Pulse Enable signal. At this time, the Load signal is removed from the counter and it begins counting again.

HOME TO CHARACTER PULSE SYNCHRONIZATION

This circuit electrically compensates for any mechanical misalignment between the Character Pulse Pickup and the Home Pulse Pickup. The adjustment of the Home Pulse Synchronization O/S P1-5, allows the Band Home Pulse to be centered on any one of 5 Character Pulses.

Circuit Description (Figure 8-4 and 8-5)

The circuit operation is initiated when the Band Home Trigger Pulse (BHTP) is generated. The BHTP triggers O/S P1-5. The pulse width of this O/S is controlled by bilateral switch E2. This switch sets the pulse width at 1.56 milliseconds for Model I units, and .54 milliseconds for all other units. On the trailing edge of the O/S pulse, Flip-Flop P2-5 is set. The Character Pulse aligned with the Band Home Pulse has already triggered the 7 microseconds O/S P3-5. The trailing edge of this O/S pulse sets flip-flop P2-3. When the Band Home Pulse Enable signal is generated during the fourth subscan for this Character Pulse, gate R5-11 is enabled, the Band Home Pulse drops, and the reset O/S P3-13 is triggered. This 4 microseconds pulse resets both flip-flops P2-5 and P2-3 terminating the synchronization operation. Bilateral switch E2 changes the Band Home Pulse time-out depending on variances of band speed between printers.

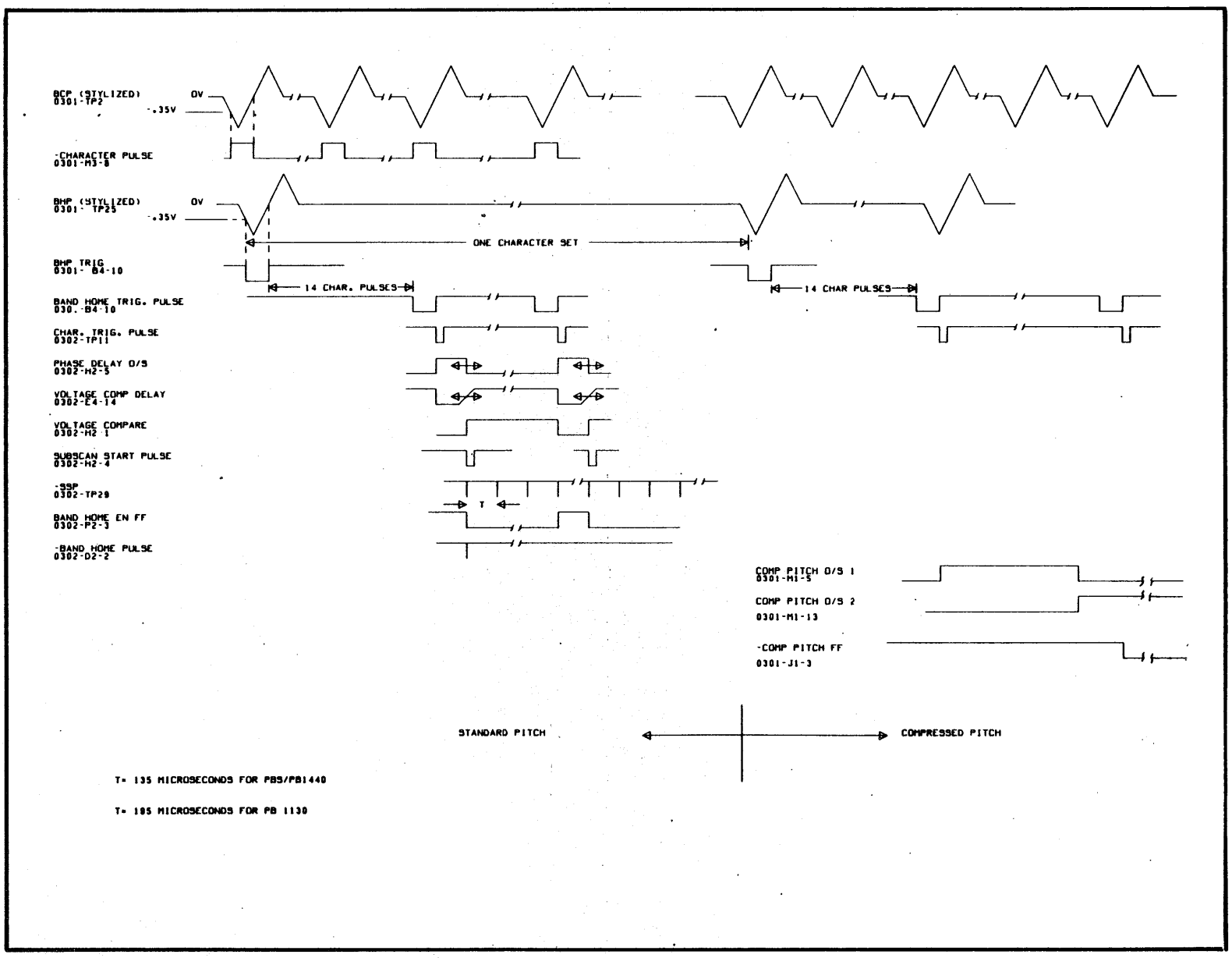


FIGURE 8-5. BAND POSITION PULSE GENERATION

SECTION IX
OPTIONS

This section will cover the various options that can be installed on the basic printer. These options customize the printer to meet the needs of the user. The options covered in this section are:

136 Columns
Electronic Vertical Format Unit (EVFU)
Interface

a. "D" Type Connector
b. Long Line Driver
c. Parity

Line Counter
Rear Control Panel
Stacker

NOTE

PARTS OF THIS SECTION ARE IN THE SIGNAL INDEX AND MODULAR LOGIC FORMAT. IF NOT FAMILIAR WITH THIS FORMAT, REFER TO SECTION X FOR AN EXPLANATION.

136 COLUMNS

This option expands the column capacity when the following components are added:

4	actuators
4	hammers
4	hammer springs
4	plungers
1	pushrod module, lower
1	pushrod module, upper

See Figure 9-1.

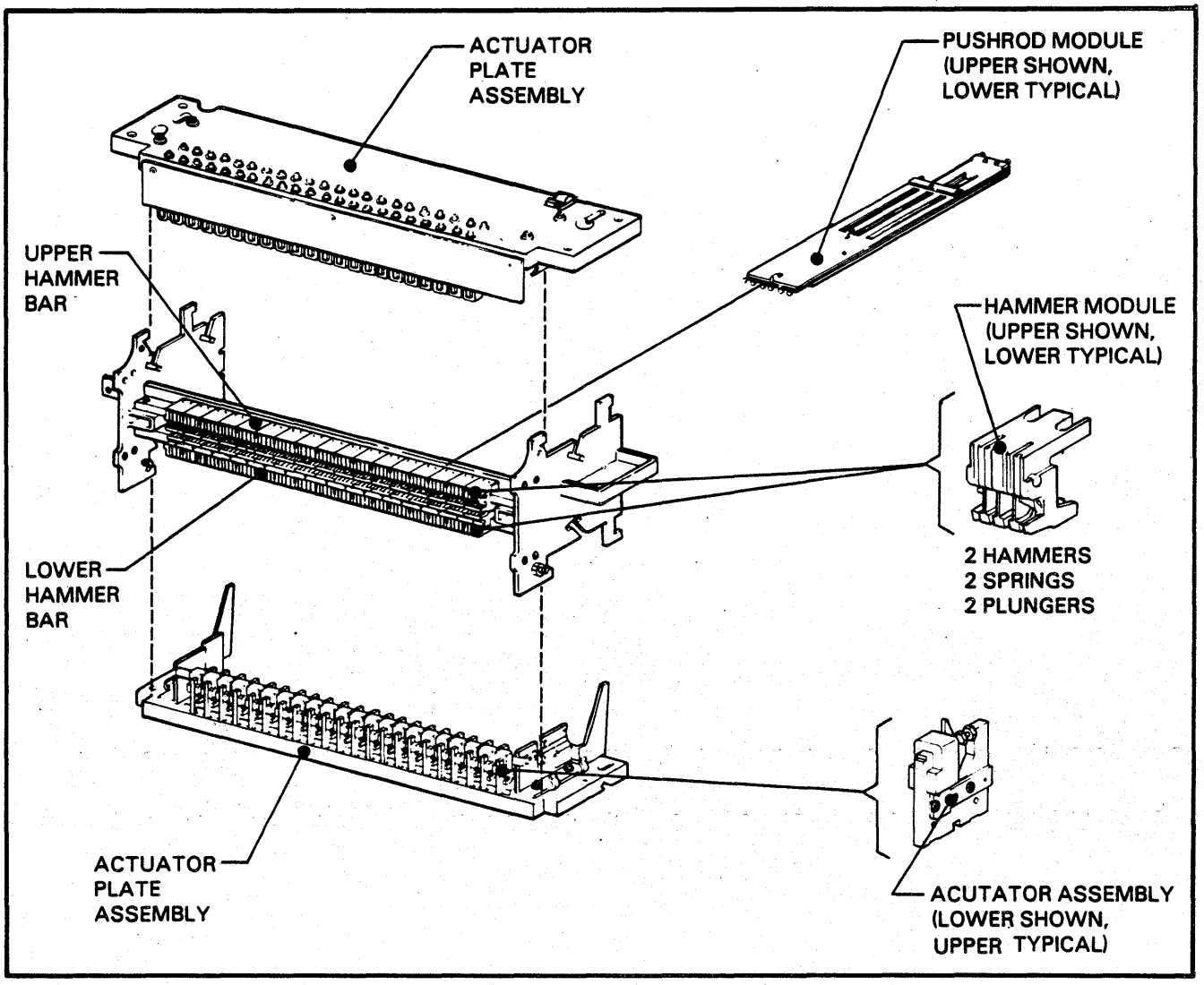


FIGURE 9-1. 136 COLUMN OPTION

ELECTRONIC VERTICAL FORMAT UNIT (EVFU) (See Figure 9-2)

The EVFU may be installed as an option to the standard paper motion system. The EVFU consists of a format tape reader and a vertical format memory.The format tape reader assembly is mounted on the left side of the printhead structure. It consists of an optical tape reader and format tape drive mechanism. The Vertical Format Memory (Buffer) is located on the 7PC2 controller board. The EVFU option is activated by a dip switch on this same board. The primary function of the tape reader is to read format control tape information into the format memory where it is stored until it is called upon by the data source to control paper motion commands. The format reader has 12 channels and the format memory size is 180 lines or 360 bytes.When the printer is powered ON, the format tape is automatically loaded into the vertical format memory and verified. Further loads required due to the changing of format tapes may be done manually by pressing the Load switch on the reader assembly.During the tape load cycle, the controller checks the format tape reader for faults such as No Tape In Reader, Tape Reader Jam, No Top Of Form (Channel 1) On Tape, Tape Too Long and Unable to Read/Verify Tape. If one of these faults exist during the tape load cycle, the 2 - digit code for that fault will appear on the status display.

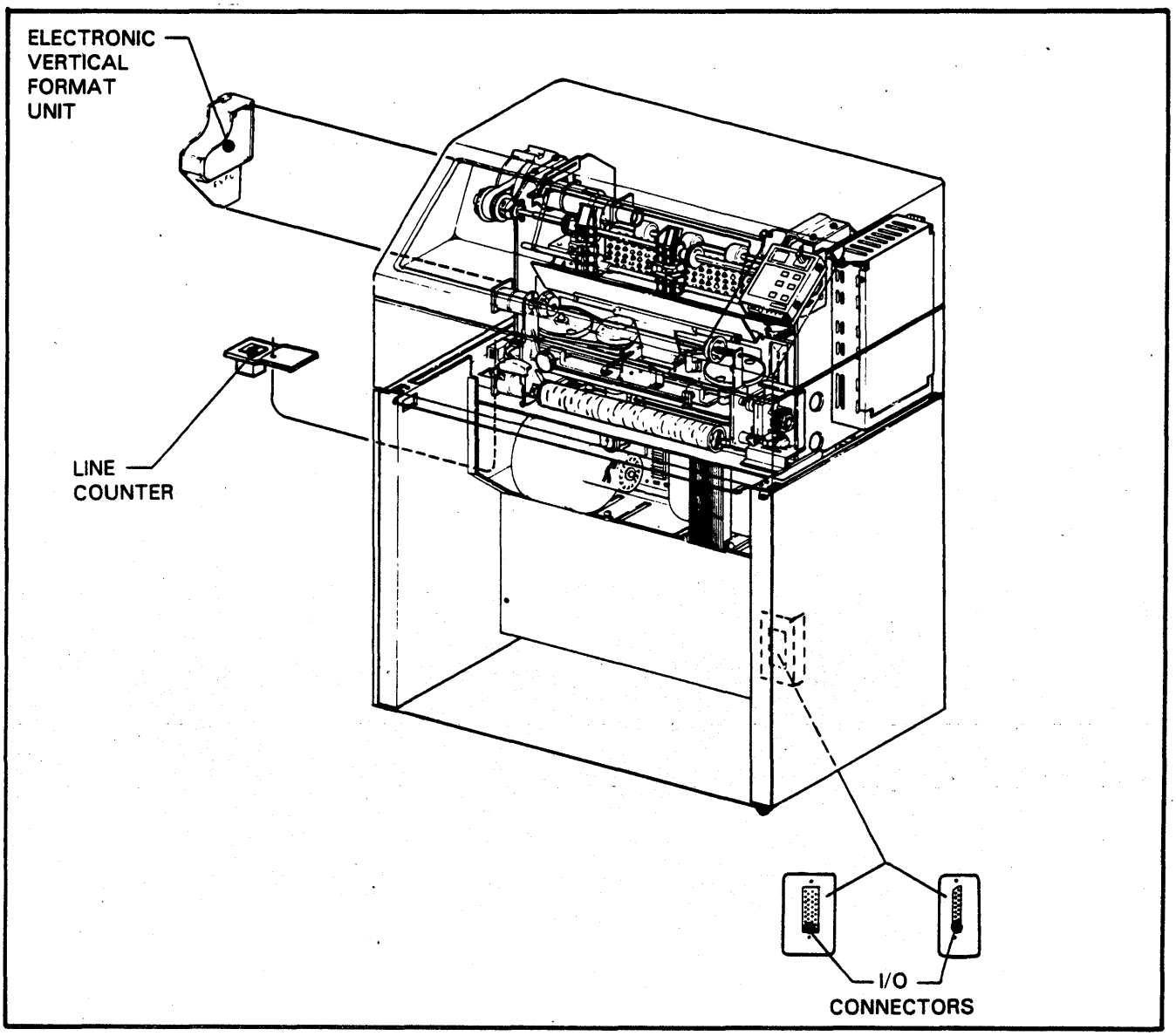


FIGURE 9-2. OPTIONAL COMPONENTS

CROSS REF NO: 3100
MODULE LOC: 3A01 EVFU
SCHEMATIC NO: 44687972

PART NO: 44687942
REV: A

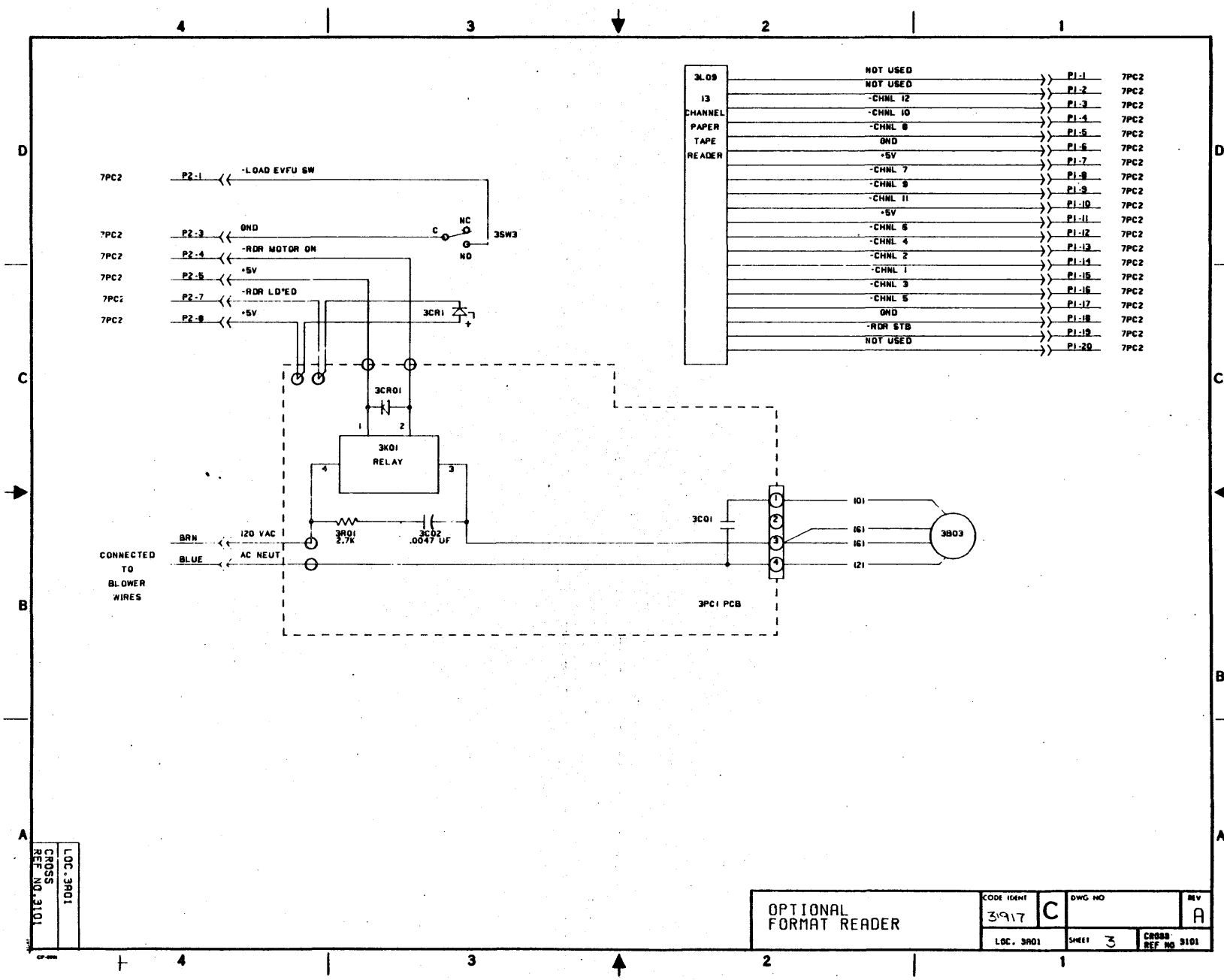
LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF. NO.
0100/7PC2	GND	3101/P2-3
0100/7PC2	LOAD EVFU SW(-)	3101/P2-1
0100/7PC2	RDR LD'ED	3101/P2-7
0100/7PC2	RDR MOTOR ON(-)	3101/P2-4
0100/7PC2	5V(+)	3101/P2-5
0100/7PC2	5V(+)	3101/P2-8

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
3101/P1-15	CHNL 1	0100/7PC2
3101/P1-14	CHNL 2	0100/7PC2
3101/P1-16	CHNL 3	0100/7PC2
3101/P1-13	CHNL 4	0100/7PC2
3101/P1-17	CHNL 5	0100/7PC2
3101/P1-12	CHNL 6	0100/7PC2
3101/P1-8	CHNL 7	0100/7PC2
3101/P1-5	CHNL 8	0100/7PC2
3101/P1-9	CHNL 9	0100/7PC2
3101/P1-4	CHNL 10	0100/7PC2
3101/P1-10	CHNL 11	0100/7PC2
3101/P1-3	CHNL 12	0100/7PC2
3101/P1-6	GND	0100/7PC2
3101/P1-18	GND	0100/7PC2
3101/P1-1	NOT USED	0100/7PC2
3101/P1-2	NOT USED	0100/7PC2
3101/P1-20	NOT USED	0100/7PC2
3101/P1-19	RDR STB(-)	0100/7PC2
3101/P1-7	5V(+)	0100/7PC2
3101/P1-11	5V(+)	0100/7PC2


3L09
13 CHANNEL PAPER TAPE READER
NOT USED
NOT USED
-CHNL 12
-CHNL 10
-CHNL 8
GND
+5V
-CHNL 7
-CHNL 9
-CHNL 11
+5V
-CHNL 6
-CHNL 4
-CHNL 2
-CHNL 1
-CHNL 3
-CHNL 5
GND
-RDR STB
NOT USED
P1-1 7PC2
P1-2 7PC2
P1-3 7PC2
P1-4 7PC2
P1-5 7PC2
P1-6 7PC2
P1-7 7PC2
P1-8 7PC2
P1-9 7PC2
P1-10 7PC2
P1-11 7PC2
P1-12 7PC2
P1-13 7PC2
P1-14 7PC2
P1-15 7PC2
P1-16 7PC2
P1-17 7PC2
P1-18 7PC2
P1-19 7PC2
P1-20 7PC2
7PC2 P2-1 -LOAD EVFU SW
7PC2 P2-3 GND
7PC2 P2-4 -RDR MOTOR ON
7PC2 P2-5 +5V
7PC2 P2-7 -RDR LD*ED
7PC2 P2-8 +5V
C NC NO 3SW3
3CR1
3CR01
3K01 RELAY
3R01 2.7K
3C02 .0047 UF
3C01
BRN 120 VAC
BLUE AC NEUT
CONNECTED TO BLOWER WIRES
101
161
161
121
3B03
3PC1 PCB
CROSS REF NO. 3101
LOC. 3R01
OPTIONAL FORMAT READER
CODE IDENT 3917
C
DWG NO
REV A
LOC. 3R01
SHEET 3
CROSS REF NO 3101

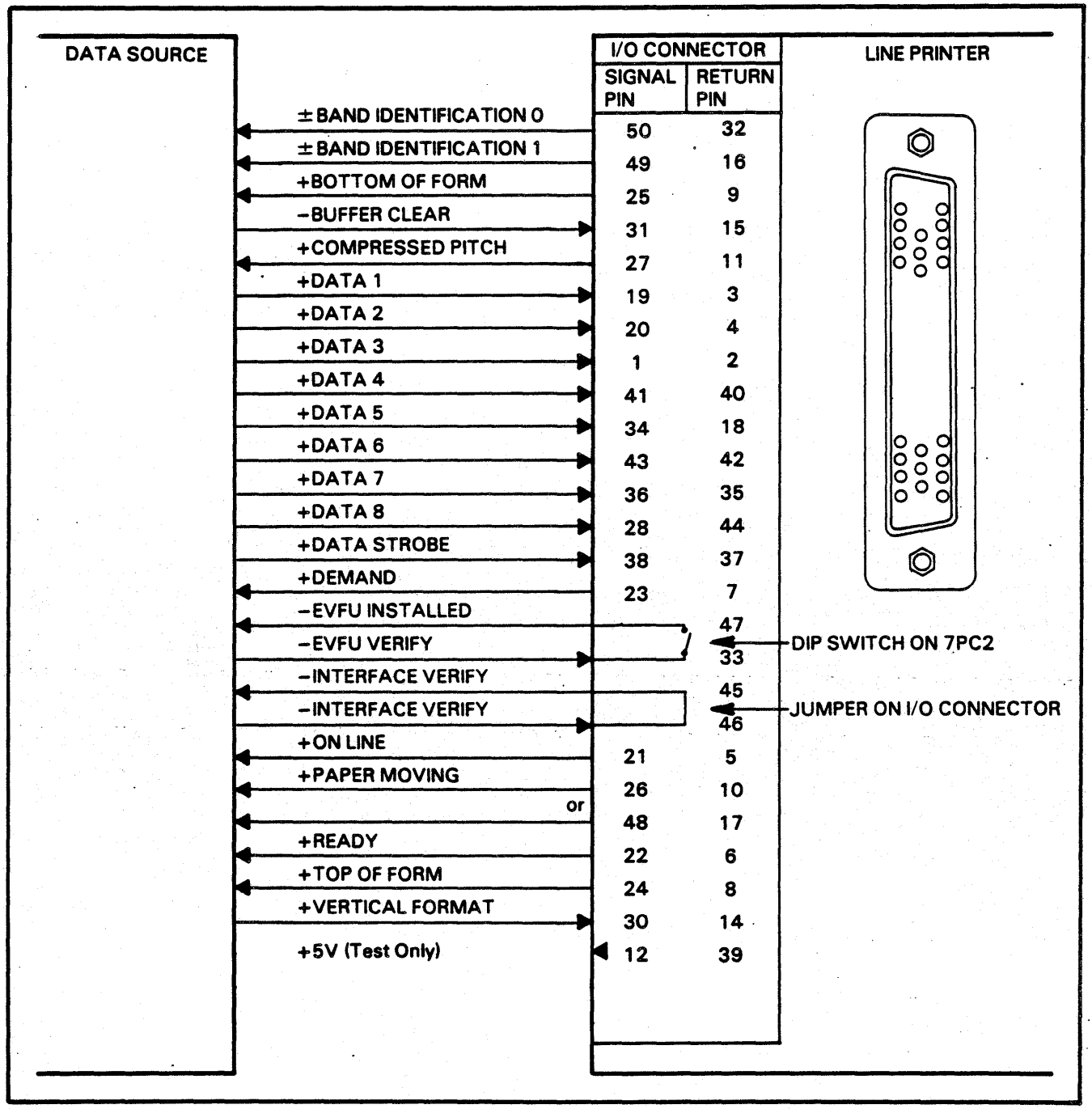


FIGURE 9-3. I/O SIGNALS AND PIN ASSIGNMENTS - "D" TYPE CONNECTOR (SHORT LINE DRIVER)

INTERFACE

"D" Type Connector

This connector is an AMP 50 pin D-type, part number 205740-2. The connector is shown in Figure 9-3, along with the interface signals and their pin assignments.

CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688431

PART NO: 44688972
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0100/7PC2	BOTTOM OF FORMS(+)	0801/P1-4
0100/7PC2	RTN	0801/P1-3
0100/7PC2	CP(+)/P E CLR(+)	0801/P1-28
0100/7PC2	RTN	0801/P1-27
0100/7PC2	DEMAND (+)	0801/P1-12
0100/7PC2	RTN	0801/P1-11
0100/7PC2	EVFU INSTALLED (-)	0802/P1-32
0100/7PC2	EVFU VERIFY (-)	0802/P1-30
0100/7PC2	IDENT 0 (+)	0801/P1-22
0100/7PC2	RTN	0801/P1-21
0100/7PC2	IDENT 1 (+)	0801/P1-20
0100/7PC2	RTN	0801/P1-19
0100/7PC2	ON LINE (+)	0801/P1-16
0100/7PC2	RTN	0801/P1-15
0100/7PC2	PAPER MOVING (+)	0801/P1-8
0100/7PC2	RTN	0801/P1-7
0100/7PC2	READY (+)	0801/P1-10
0100/7PC2	RTN	0801/P1-9
0100/7PC2	TOP OF FORMS (+)	0801/P1-6
0100/7PC2	RTN	0801/P1-5

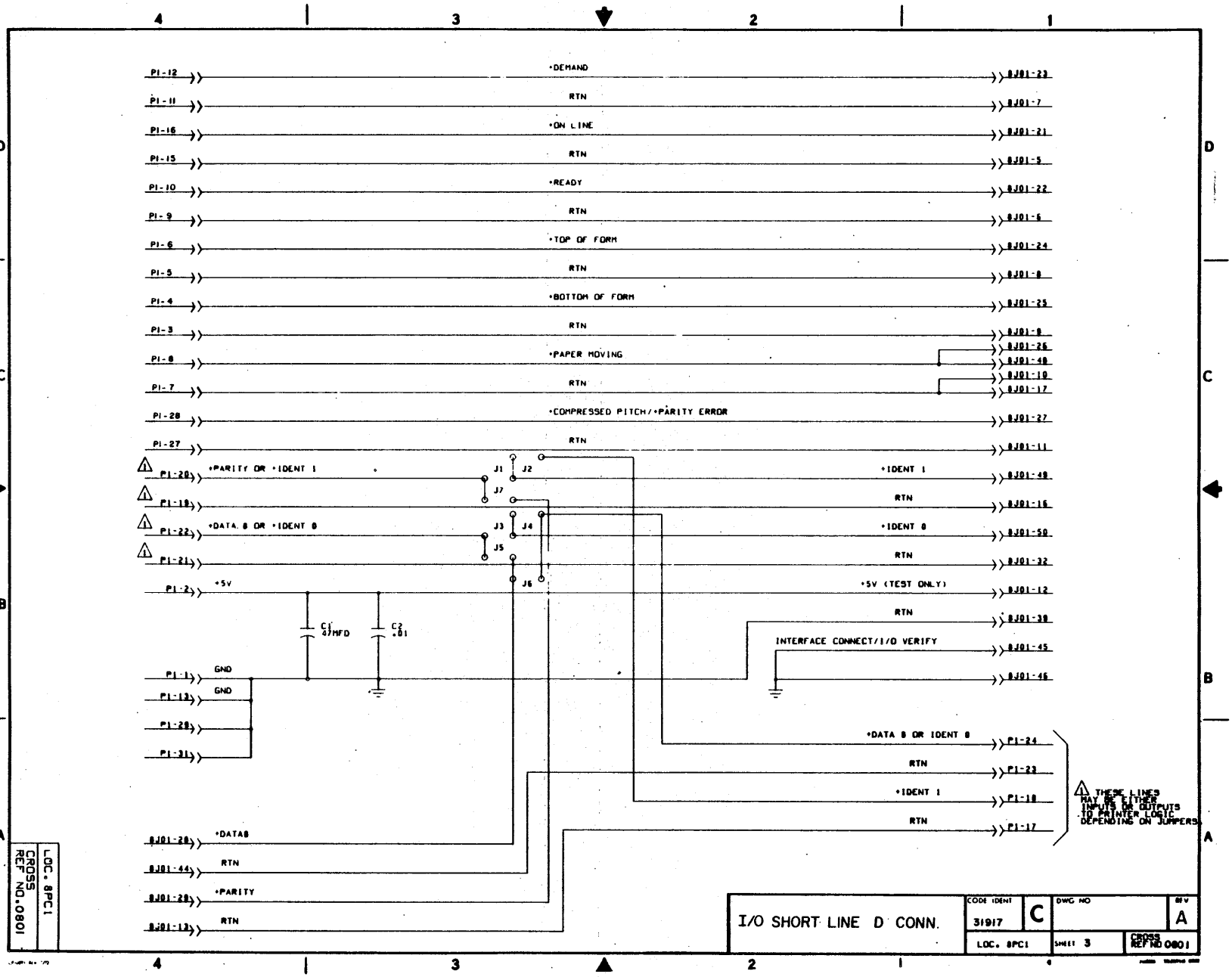
CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688431

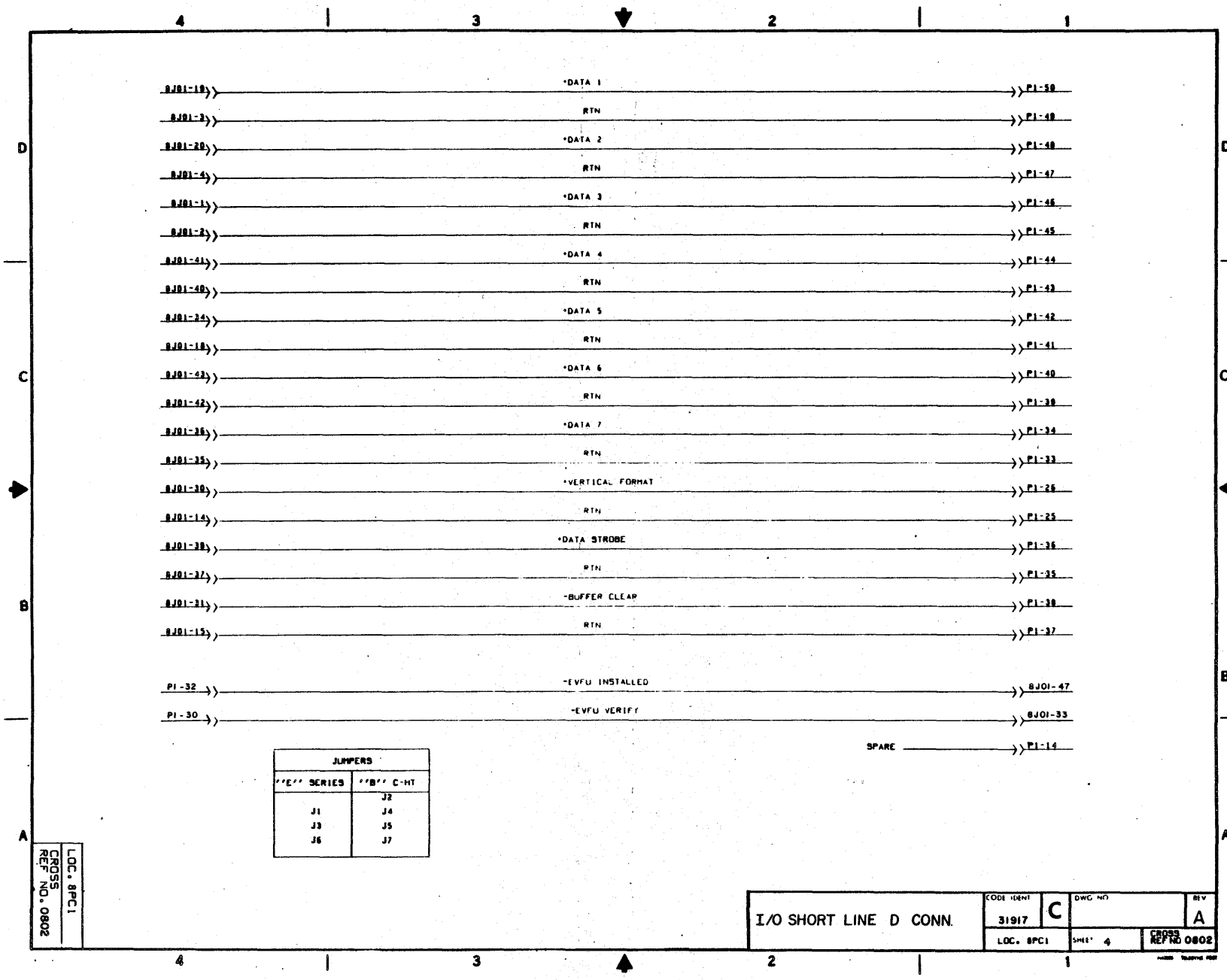
PART NO: 44688972
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0802/P1-38	BUFFER CLEAR (-)	0100/7PC2
0802/P1-37	RTN	0100/7PC2
0802/P1-50	DATA 1 (+)	0100/7PC2
0802/P1-49	RTN	0100/7PC2
0802/P1-48	DATA 2(+)	0100/7PC2
0802/P1-47	RTN	0100/7PC2
0802/P1-46	DATA 3(+)	0100/7PC2
0802/P1-45	RTN	0100/7PC2
0802/P1-44	DATA 4(+)	0100/7PC2
0802/P1-43	RTN	0100/7PC2
0802/P1-42	DATA 5 (+)	0100/7PC2
0802/P1-41	RTN	0100/7PC2
0802/P1-40	DATA 6(+)	0100/7PC2
0802/P1-39	RTN	0100/7PC2
0802/P1-34	DATA 7 (+)	0100/7PC2
0802/P1-33	RTN	0100/7PC2
0802/P1-36	DATA STROBE (+)	0100/7PC1
0802/P1-35	RTN	0100/7PC2
0801/P1-24	IDENT 0	0100/7PC2
0801/P1-23	RTN	0100/7PC2
0801/P1-18	IDENT 1	0100/7PC2
0801/P1-17	RTN	0100/7PC2
0802/P1-26	VERTICAL FORMAT (+)	0100/7PC2
0802/P1-25	RTN	0100/7PC2
0802/P1-14	SPARE	0100/7PC2


P1-12 *DEMAND 8J01-23
P1-11 RTN 8J01-7
P1-16 *ON LINE 8J01-21
P1-15 RTN 8J01-5
P1-10 *READY 8J01-22
P1-9 RTN 8J01-6
P1-6 *TOP OF FORM 8J01-24
P1-5 RTN 8J01-8
P1-4 *BOTTOM OF FORM 8J01-25
P1-3 RTN 8J01-9
P1-8 *PAPER MOVING 8J01-26 8J01-48
P1-7 RTN 8J01-10 8J01-17
P1-28 *COMPRESSED PITCH/*PARITY ERROR 8J01-27
P1-27 RTN 8J01-11
P1-20 *PARITY OR *IDENT 1 J1 J2 *IDENT 1 8J01-49
P1-19 J7 RTN 8J01-16
P1-22 *DATA 8 OR *IDENT 8 J3 J4 *IDENT 8 8J01-50
P1-21 J5 RTN 8J01-32
P1-2 +5V J6 +5V (TEST ONLY) 8J01-12
C1 47MFD C2 .01 RTN 8J01-38
INTERFACE CONNECT/I/O VERIFY 8J01-45
P1-1 GND 8J01-46
P1-13 GND
P1-26
P1-31
*DATA 8 OR IDENT 8 P1-24
RTN P1-23
*IDENT 1 P1-18
RTN P1-17
THESE LINES MAY BE EITHER INPUTS OR OUTPUTS TO PRINTER LOGIC DEPENDING ON JUMPERS.
8J01-28 *DATA8
8J01-44 RTN
8J01-29 *PARITY
8J01-13 RTN
CROSS REF NO. 0801
LOC. 8PC1
I/O SHORT LINE D CONN.
CODE IDENT 31917
C
DWG NO
REV A
LOC. 8PC1
SHEET 3
CROSS REF NO 0801


4
3
2
1
D
C
B
A
8J01-19
*DATA 1
P1-50
8J01-3
RTN
P1-49
8J01-20
*DATA 2
P1-48
8J01-4
RTN
P1-47
8J01-1
*DATA 3
P1-46
8J01-2
RTN
P1-45
8J01-41
*DATA 4
P1-44
8J01-40
RTN
P1-43
8J01-24
*DATA 5
P1-42
8J01-18
RTN
P1-41
8J01-43
*DATA 6
P1-40
8J01-42
RTN
P1-39
8J01-26
*DATA 7
P1-34
8J01-25
RTN
P1-33
8J01-30
*VERTICAL FORMAT
P1-26
8J01-14
RTN
P1-25
8J01-38
*DATA STROBE
P1-36
8J01-37
RTN
P1-35
8J01-31
-BUFFER CLEAR
P1-38
8J01-15
RTN
P1-37
P1-32
-EVFU INSTALLED
8J01-47
P1-30
-EVFU VERIFY
8J01-33
SPARE
P1-14
JUMPERS
"E" SERIES
"B" C-HT
J2
J1
J4
J3
J5
J6
J7
LOC. 8PC1
CROSS REF NO. 0802
I/O SHORT LINE D CONN.
CODE IDENT
31917
C
DWG NO
REV
A
LOC. 8PC1
SHEET 4
CROSS REF NO 0802

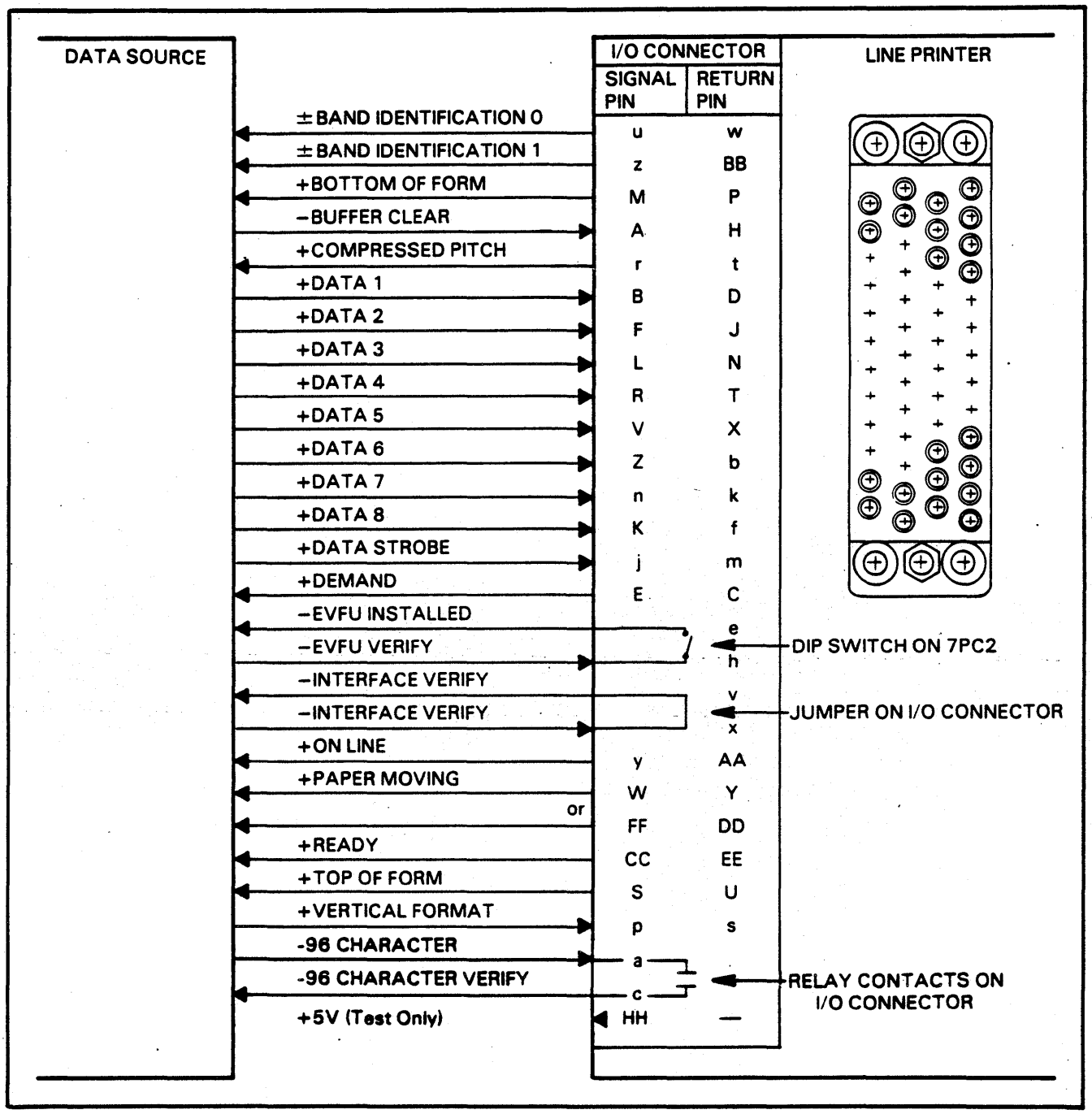


FIGURE 9-4. I/O SIGNALS AND PIN ASSIGNMENTS - LONG LINE DRIVER

Long Line Driver

This connector allows the use of an I/O cable up to 500 feet (152 meters) long. The connector is shown in Figure 9-4, along with the interface signals and their pin assignments. Typical transmitter and receiver circuits are shown in Figure 9-5.

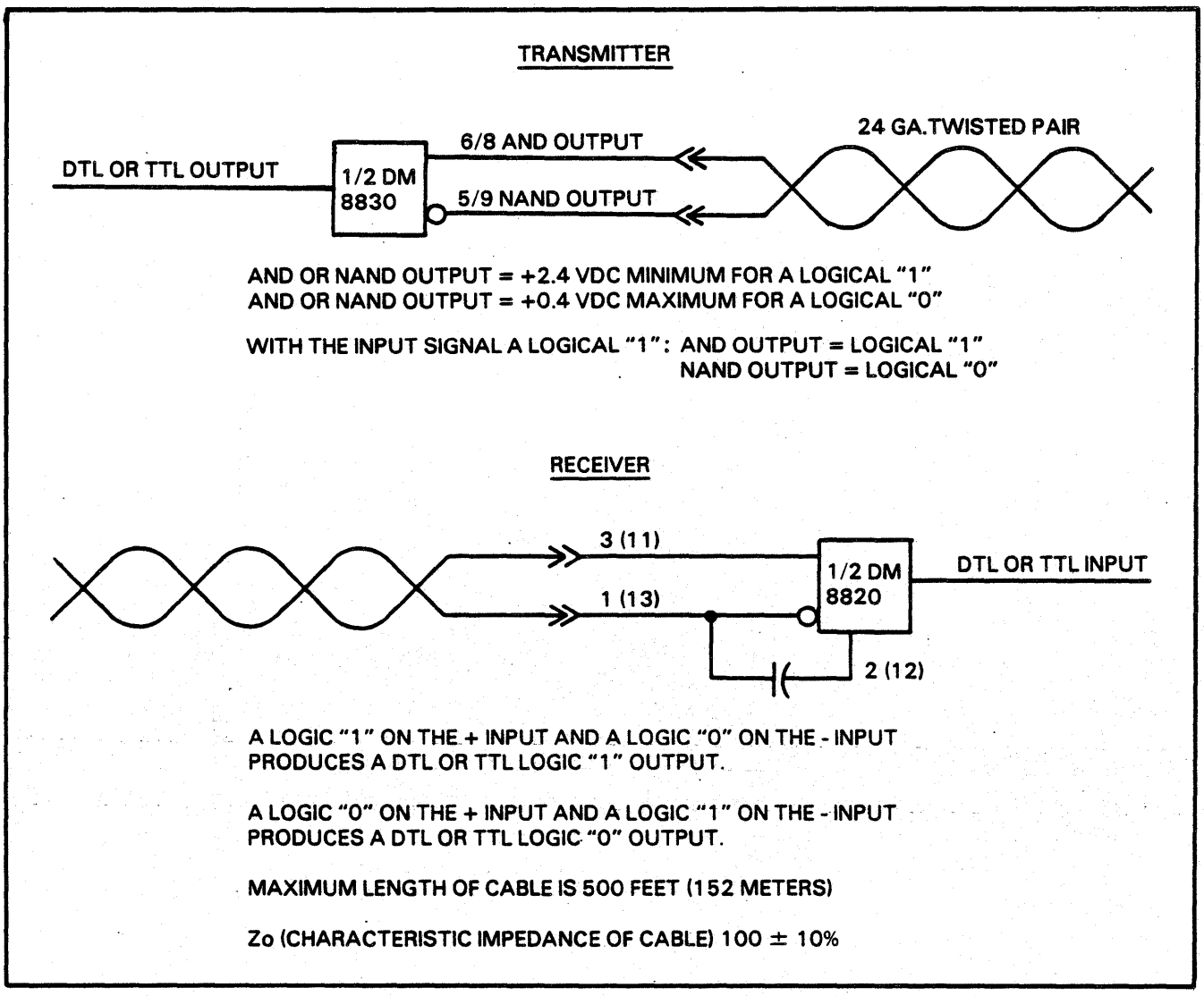


Figure 9-5. DIFFERENTIAL TRANSMITTERS AND RECEIVERS (LONG LINE DRIVER)

CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688429

PART NO: 44688970
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF. NO.
0100/?PC2	BOTTOM OF FORM (+)	0802/P1-4
0100/?PC2	RTN	0802/P1-3
0100/?PC2	CP (+)	0803/P1-28
0100/?PC2	RTN	0803/P1-27
0100/?PC2	DEMAND (+)	0802/P1-12
0100/?PC2	RTN	0802/P1-11
0100/?PC2	EVFU INSTALLED (-)	0803/P1-32
0100/?PC2	EVFU VERIFY (-)	0803/P1-30
0100/?PC2	IDENT 0 (+)	0803/P1-22
0100/?PC2	RTN	0803/P1-21
0100/?PC2	IDENT 1 (+)	0803/P1-20
0100/?PC2	RTN	0803/P1-19
0100/?PC2	ON LINE (+)	0802/P1-16
0100/?PC2	RTN	0802/P1-15
0100/?PC2	PAPER MOVING (+)	0803/P1-8
0100/?PC2	RTN	0803/P1-7
0100/?PC2	READY (+)	0802/P1-10
0100/?PC2	RTN	0802/P1-9
0100/?PC2	TOP OF FORM (+)	0802/P1-6
0100/?PC2	RTN	0803/P1-5
0100/?PC2	96 CHAR (+)	0803/P1-18
0100/?PC2	RTN	0803/P1-17

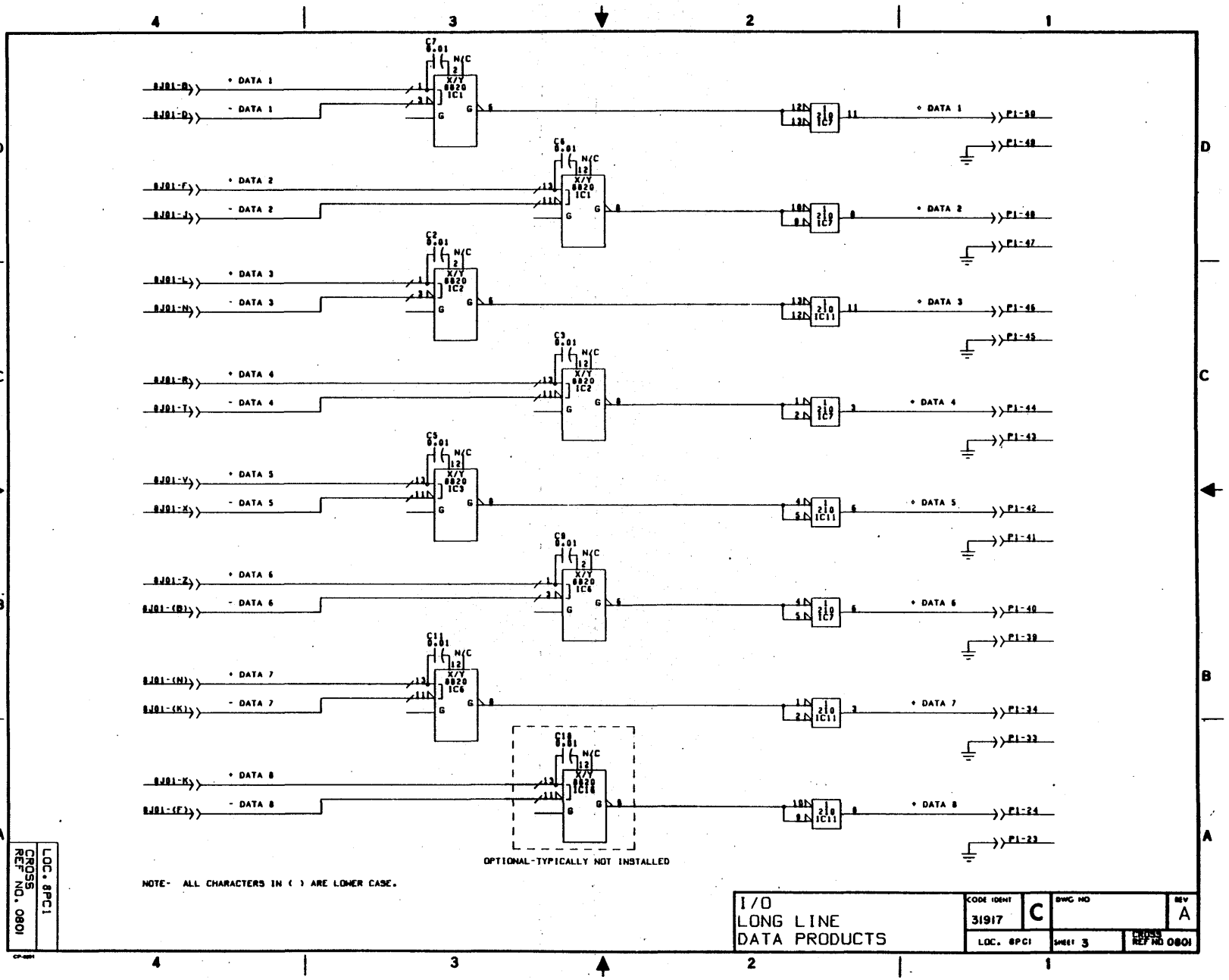
CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688429

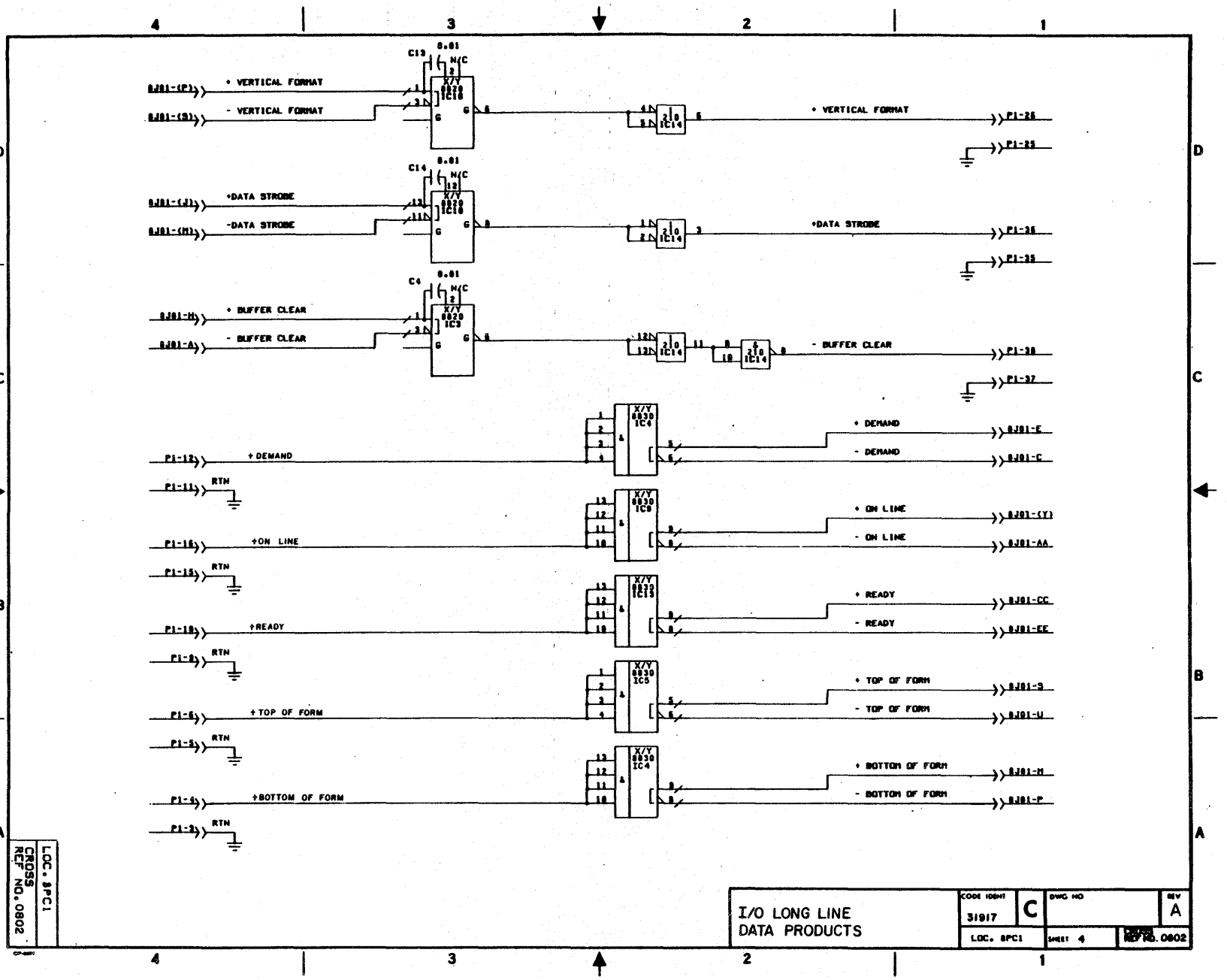
PART NO: 44688970
REV: A

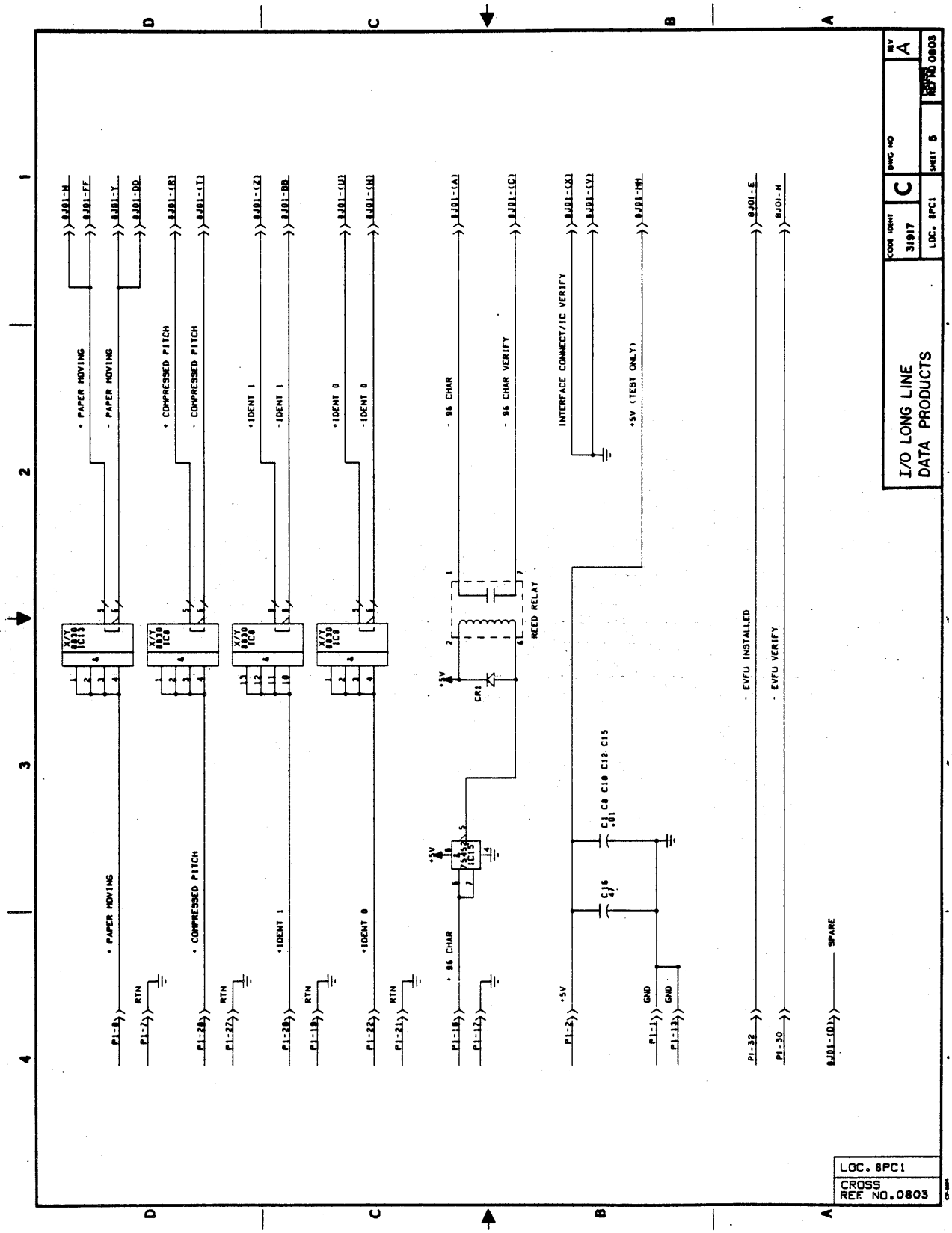
LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0802/P1-38	BUFFER CLEAR (-)	0100/?PC2
0802/P1-37	RTN	0100/?PC2
0801/P1-50	DATA 1 (+)	0100/?PC2
0801/P1-49	RTN	0100/?PC2
0801/P1-48	DATA 2 (+)	0100/?PC2
0801/P1-47	RTN	0100/?PC2
0801/P1-46	DATA 3 (+)	0100/?PC2
0801/P1-45	RTN	0100/?PC2
0801/P1-44	DATA 4 (+)	0100/?PC2
0801/P1-43	RTN	0100/?PC2
0801/P1-42	DATA 5 (+)	0100/?PC2
0801/P1-41	RTN	0100/?PC2
0801/P1-40	DATA 6 (+)	0100/?PC2
0801/P1-39	RTN	0100/?PC2
0801/P1-34	DATA 7 (+)	0100/?PC2
0801/P1-33	RTN	0100/?PC2
0801/P1-24	DATA 8 (+)	0100/?PC2
0801/P1-23	RTN	0100/?PC2
0802/P1-36	DATA STROBE (+)	0100/?PC2
0802/P1-35	RTN	0100/?PC2
0802/P1-26	VERTICAL FORMAT (+)	0100/?PC2
0802/P1-25	RTN	0100/?PC2


4
3
2
1
D
C
B
A
J01-B
J01-D
J01-F
J01-J
J01-L
J01-N
J01-R
J01-T
J01-V
J01-X
J01-Z
J01-(B1)
J01-(N1)
J01-(K1)
J01-K
J01-(F1)
+ DATA 1
- DATA 1
+ DATA 2
- DATA 2
+ DATA 3
- DATA 3
+ DATA 4
- DATA 4
+ DATA 5
- DATA 5
+ DATA 6
- DATA 6
+ DATA 7
- DATA 7
+ DATA 8
- DATA 8
C7 0.01
C6 0.01
C2 0.01
C3 0.01
C5 0.01
C8 0.01
C11 0.01
C10 0.01
N/C
X/Y 8820
IC1
IC2
IC3
IC6
IC11
IC10
IC7
P1-50
P1-49
P1-48
P1-47
P1-46
P1-45
P1-44
P1-43
P1-42
P1-41
P1-40
P1-39
P1-34
P1-33
P1-24
P1-23
OPTIONAL-TYPICALLY NOT INSTALLED
NOTE- ALL CHARACTERS IN ( ) ARE LOWER CASE.
CROSS REF NO. 0801
LOC. 8PC1
I/O
LONG LINE
DATA PRODUCTS
CODE IDENT 31917
C
DWG NO
REV A
LOC. 8PC1
SHEET 3
CROSS REF NO 0801


+ VERTICAL FORMAT
- VERTICAL FORMAT
+DATA STROBE
-DATA STROBE
+ BUFFER CLEAR
- BUFFER CLEAR
+ DEMAND
- DEMAND
+ ON LINE
- ON LINE
+ READY
- READY
+ TOP OF FORM
- TOP OF FORM
+ BOTTOM OF FORM
- BOTTOM OF FORM
RTN
I/O LONG LINE
DATA PRODUCTS
CROSS REF NO. 0802
LOC. 8PC1
31917
SHEET 4


I/O LONG LINE
DATA PRODUCTS
LOC. 8PC1
CROSS REF NO.0803
+ PAPER MOVING
- PAPER MOVING
+ COMPRESSED PITCH
- COMPRESSED PITCH
+IDENT 1
-IDENT 1
+IDENT 0
-IDENT 0
+ 96 CHAR
- 96 CHAR VERIFY
REED RELAY
INTERFACE CONNECT/IC VERIFY
+5V (TEST ONLY)
- EVFU INSTALLED
- EVFU VERIFY
SPARE
RTN
GND

PARITY OPTION

Description

This option is available with a special single ended I/O connector board. See Figure 9-6. The board comes with the standard 50 pin MRAC SPS-J Winchester connector, or the compatible 50 pin 200277-2 AMP connector. Figure 9-7 shows the connector pin assignments for the interface signals.

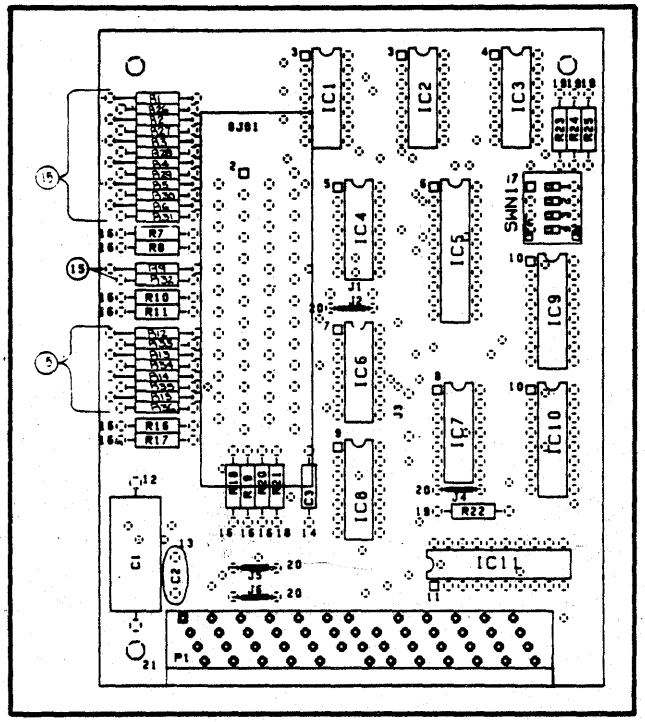


FIGURE 9-6. I/O CONNECTOR ASSEMBLY (SHORT LINE DRIVER WITH PARITY)

With this option, the character codes, control codes and format control codes will be carried on the 7 Data Lines, a Parity Line and the Vertical Format (Paper Instruction) line. All the incoming data will be checked for odd or even (jumper selectable) parity. Any deviation from the selected parity will cause the parity error output signal to be generated.

The parity error check circuit may be disabled by a dip switch located on the I/O connector board.

Status

The Parity Error status can be operated in one of two modes.

Mode 1

Parity Error Status can stay active once it is detected (about 500 nanoseconds after Data Strobe) until cleared by any of the following methods:

a. The system issues a Buffer Clear Signal.
b. The operator pushes the Clear Switch on the Control Panel.
c. The current input cycle with the error gets terminated with a valid line termination code. The Parity Error Status will be dropped before the next demand is raised to request a new line of data.

Mode 2

Parity Error Status follows each byte of input data separately, about 150 nanoseconds after the data lines change.

Upon detection of a Parity Error, the printer automatically substitutes a Blank Code (20 hex) for every code with bad parity.

Associated Signals

Parity Input - This is the signal line to the printer that will make the correct parity sum (odd or even) for each character on the data lines.

Parity Error - This signal line is from the printer. It will be HI (logic 1) when a Parity Error is detected. It shares the same line with Compressed Pitch, so a dip switch on the controller board is used to select one or the other.

Inverted Buffer Clear Signal - This signal may be received by the printer as either active HI or active LO, by setting a dip switch on the I/O connector board.

Inverted Data Strobe Signal - This signal may be received by the printer as either active HI or active LO, by setting a dip switch on the I/O connector board.

Remove VF from parity test - The Vertical Format (Paper Instruction) signal can be included or not included in the parity test depending on the setting of a dip switch on the I/O connector board.

Channel 9 Status - If the printer is selected for this option, VFU Channel 9 will be available as a status signal on the same pins that are designated for TOF Pin S will be + Channel 9. and Pin U will be Channe 9 Return. When this mode is selected, Top of Form (Channel 1) will be disabled and the 6 Bit Line Count er option will be enabled.

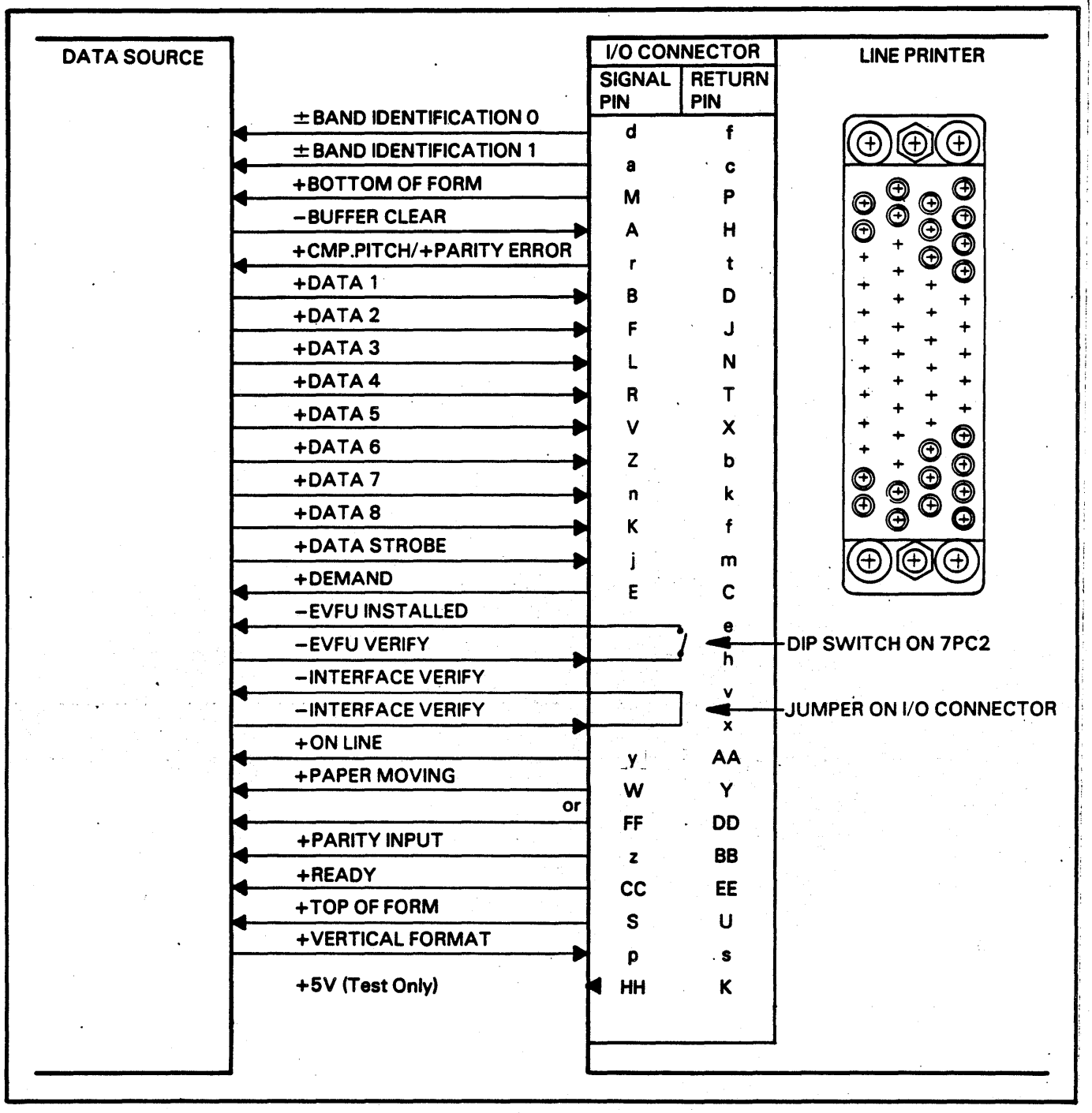


FIGURE 9-7. I/O SIGNALS AND PIN ASSIGNMENTS - SHORT LINE DRIVER WITH PARITY

CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688432

PART NO: 44688973
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0100/7PC2	BOTTOM OF FORMS(+)	0802/P1-4
0100/7PC2	RTN	0802/P1-3
0100/7PC2	CP(+)/P.E.CLR(+)	0801/P1-28
0100/7PC2	RTN	0801/P1-27
0100/7PC2	DEMAND(+)	0801/P1-12
0100/7PC2	RTN	0801/P1-11
0100/7PC2	EVFU INSTALLED(-)	0802/P1-32
0100/7PC2	EVFU VERIFY(-)	0802/P2-30
0100/7PC2	IDENT 0 (+)	0802/P1-22
0100/7PC2	RTN	0802/P1-21
0100/7PC2	IDENT 1 (+)	0802/P1-20
0100/7PC2	RTN	0802/P1-19
0100/7PC2	ON LINE(+)	0802/P1-16
0100/7PC2	RTN	0802/P1-15
0100/7PC2	PAPER MOVING(+)	0802/P1-8
0100/7PC2	RTN	0802/P1-7
0100/7PC2	READY(+)	0802/P1-10
0100/7PC2	RTN	0802/P1-9
0100/7PC2	TOP OF FORMS(+)	0802/P1-6
0100/7PC2	RTN	0802/P1-5
NC	SPARE	0801/P1-14
NC	SPARE	0801/P1-18
NC	SPARE	0801/P1-24

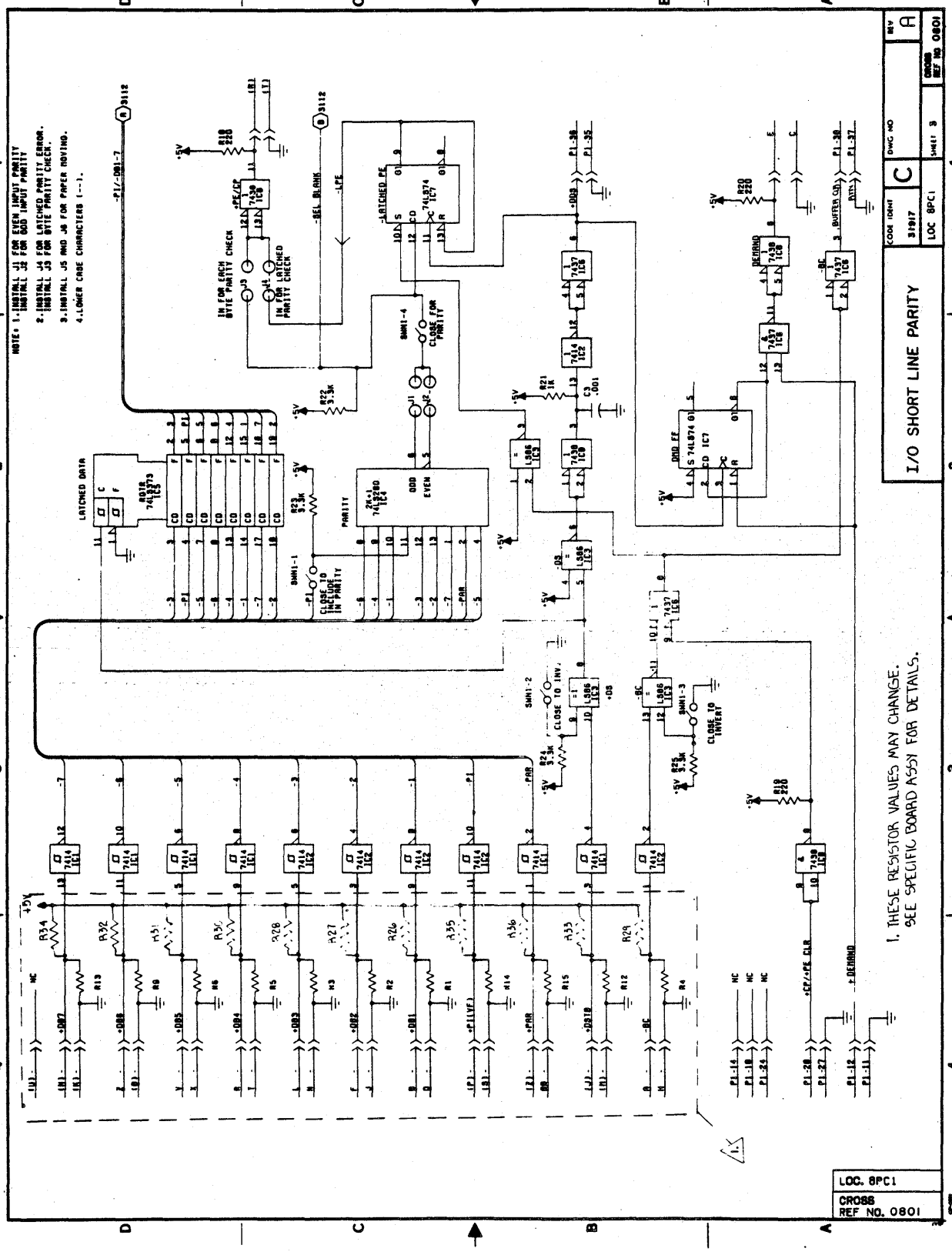
CROSS REF NO: 0800
MODULE LOC: 8PC1
SCHEMATIC NO: 44688432

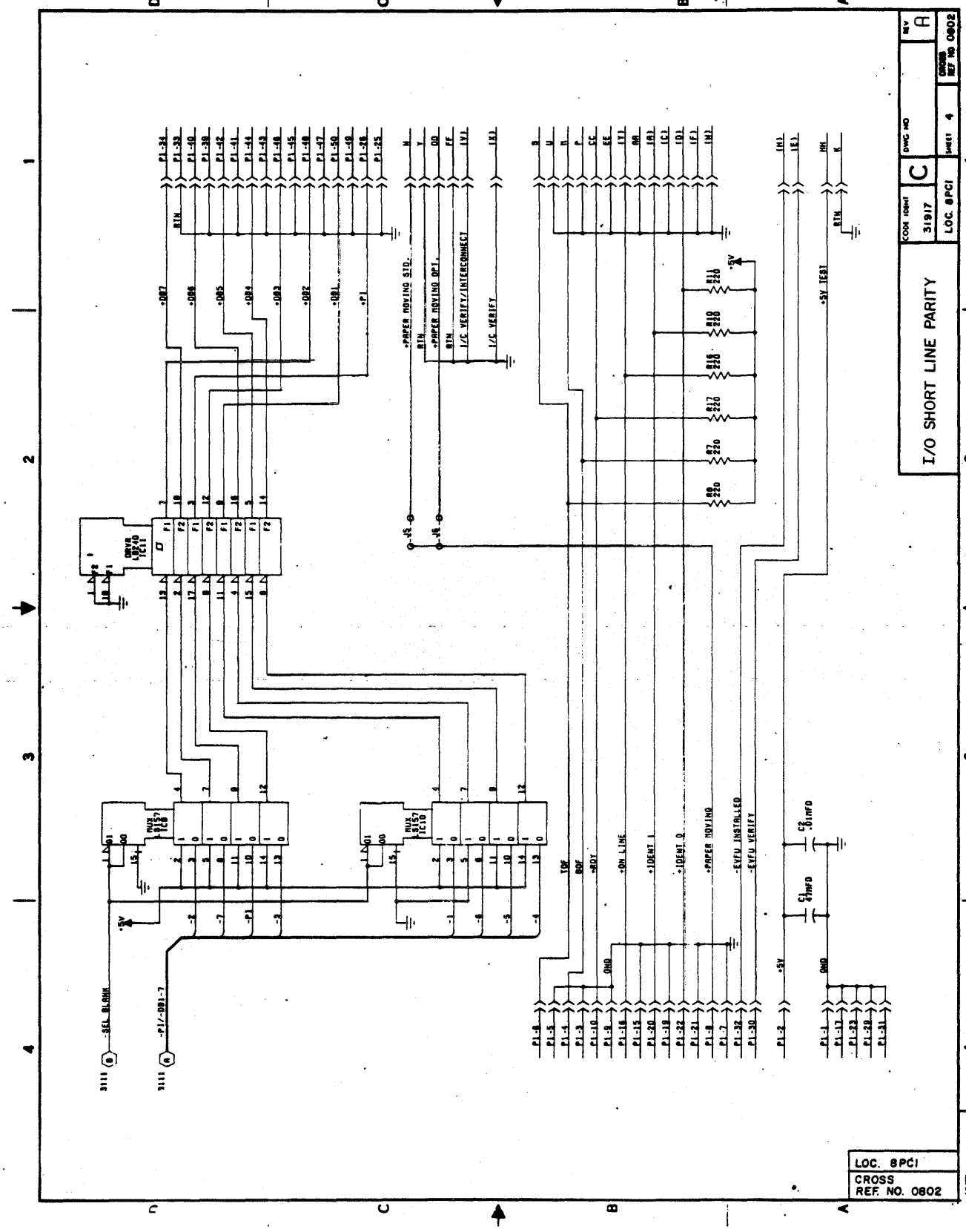
PART NO: 44688973
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0801/P1-38	BUFFER CLEAR(-)	0100/7PC2
0801/P1-37	RTN	0100/7PC2
0802/P1-50	DATA 1(+)	0100/7PC2
0802/P1-49	RTN	0100/7PC2
0802/P1-48	DATA 2(+)	0100/7PC2
0802/P1-47	RTN	0100/7PC2
0802/P1-46	DATA 3(+)	0100/7PC2
0802/P1-45	RTN	0100/7PC2
0802/P1-44	DATA 4(+)	0100/7PC2
0802/P1-43	RTN	0100/7PC2
0802/P1-42	DATA 5(+)	0100/7PC2
0802/P1-41	RTN	0100/7PC2
0802/P1-40	DATA 6(+)	0100/7PC2
0802/P1-39	RTN	0100/7PC2
0802/P1-34	DATA 7(+)	0100/7PC2
0802/P1-33	RTN	0100/7PC2
0801/P1-36	DDS+/DATA STROBE(+)	0100/7PC2
0801/P1-35	RTN	0100/7PC2
0802/P1-26	PI(+)	0100/7PC2
0802/P1-25	RTN	0100/7PC2


I/O SHORT LINE PARITY
LOC. 8PC1
CROSS REF NO. 0801
1. THESE RESISTOR VALUES MAY CHANGE. SEE SPECIFIC BOARD ASSY FOR DETAILS.


I/O SHORT LINE PARITY
CODE IDENT 31917
C
LOC. 8PCI
DWG NO
SHEET 4
REV A
CROSS REF NO 0802
LOC. 8PCI
CROSS
REF. NO. 0802

LINE COUNTER

This option consists of a mechanical line count display and a cable. See Figure 9-8. The cable connects the display to the 7PC3 print head electronics board. A counter on the 7PC3 board is clocked by the vertical advance signal. For every 100 lines printed, the counter increments the mechanical display by 1 digit. Power off of the printer resets the internal 100 counter to 0.

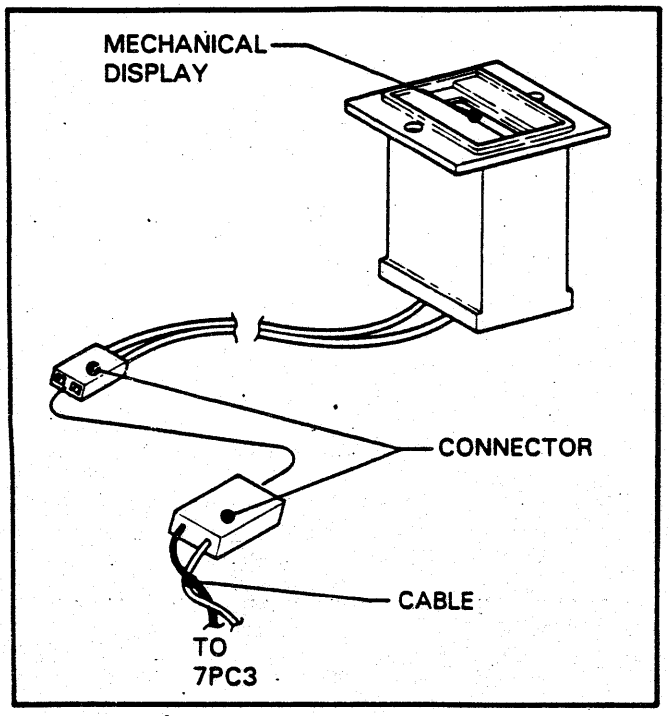


FIGURE 9-8. LINE COUNTER

REAR CONTROL PANEL

This control panel has the capability of 3 touch switches and 6 led indicators. See Figure 9-9. Refer to Section II for user configuration.

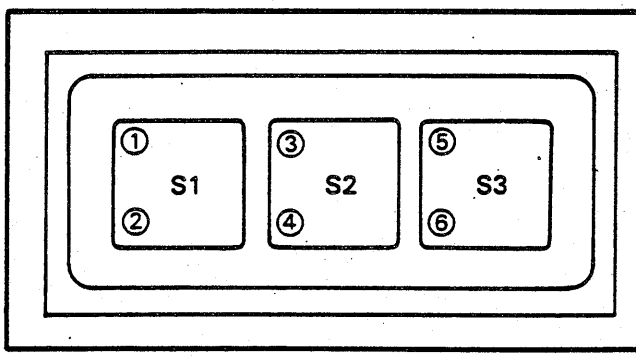


FIGURE 9-9. REAR CONTROL PANEL

STACKER

A powered stacker is available for use with the printers. See Figure 9-10. For further informatio refer to the stacker manual.

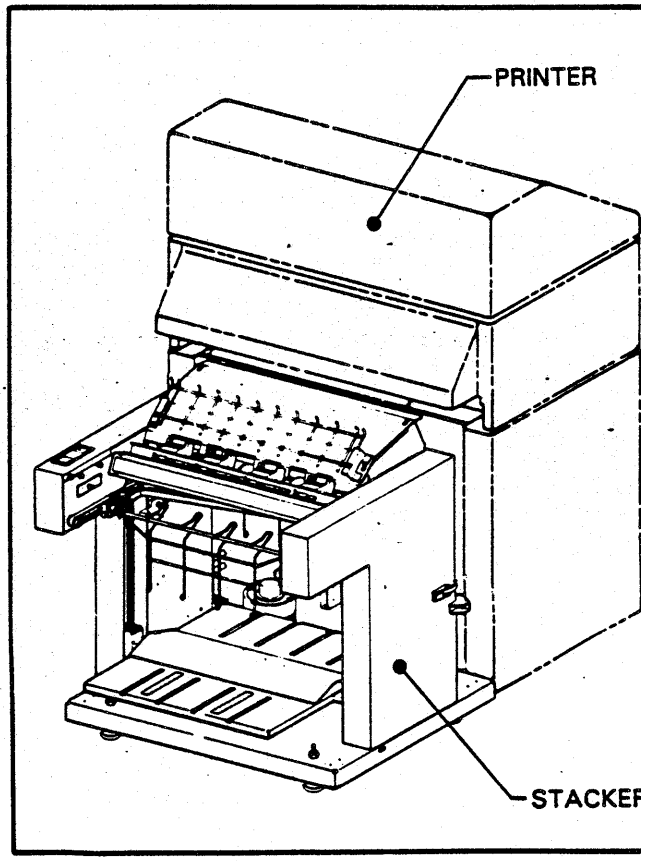


FIGURE 9-10. STACKER

SECTION X
LOGIC DIAGRAMS - PRINT MECHANISM

This section and the following section contain the logic diagrams for the printer. The logic diagrams are divided into 2 groups, the print mechanism and the controller. The print mechanism group (this section) covers: 2PC1 power supply, 2PC2 servo amplifier, 5PCx hammer drivers, and 7PC3 print head electronics. The controller group (the following section) covers: 6PC1 front control panel, 6PC2 rear control panel, 7BP1 backplane assembly, 7PC1 interface adapter, and 7PC2 controller. Both of these groups are presented in a signal index and modular logic format, which will be introduced and explained in this section.

SIGNAL INDEX AND MODULAR LOGIC INTRODUCTION

The logic for each printed circuit board is shown in a set of schematic diagrams. Each schematic set is called a logic module. In front of each logic module is a list of signals entering and leaving that particular printed circuit board. This list is called the signal index. These 2 elements make up the signal index and modular logic format. Most of the printed circuit boards will have a signal index and logic module. However, there are exceptions to this rule. One exception is the 7BP1 backplane assembly. It does not have a signal index because the signals are listed in the logic module. Another exception is the 7PC1 interface adapter. It does not have a logic module because the assembly is supplied and documented by the customer.

Figures 10-1 and 10-2 show examples of the signal index headings. Figure 10-3 shows the title block of the logic module. The following information will explain these Figures.

Figure 10-1

Ⓐ CROSS REF NO: This number designates which logic module is described by the signal index. The module numbers, locations and names are listed in Table 10-1.

Ⓑ PART NUMBER: This is the 8 digit part number of the signal index.

Ⓒ MODULE LOC: This code identifies the printed circuit board which the signal index is describing.

Ⓓ REV: This letter indicates the current revision level of the signal index.

Ⓔ SCHEMATIC NO: This is the 8 digit drawing number of the schematic diagrams for the logic module being described. It should match the number in block E of Figure 10-3.

Ⓕ MODULE INPUTS: This title indicates the signals listed below it are signals entering the board. Normally they enter on the left side of the schematic diagram.

Ⓖ SOURCE: This column indicates where each signal comes from. Signals coming from components will be shown like this: 1TB3, 3LO1, 4SW2. Signals coming from other boards will be shown like this: 0100-7PC2, 0200-2PC1, 0300-7PC3.

Ⓗ SIGNAL NAME: Self explanatory.

Ⓘ MODULE CROSS REF NO: This column indicates where the signal is found in the logic module. It will appear in this form: 0401-P1-(B). 0401 is the number that will match block G of Figure 10-3. P1 is the connector on the printed circuit board, and (B) is the pin number of that connector.

Figure 10-2

Ⓐ CROSS REF NO: This number designates which logic module is described by the signal index. The module numbers, locations and names are listed in Table 10-1.

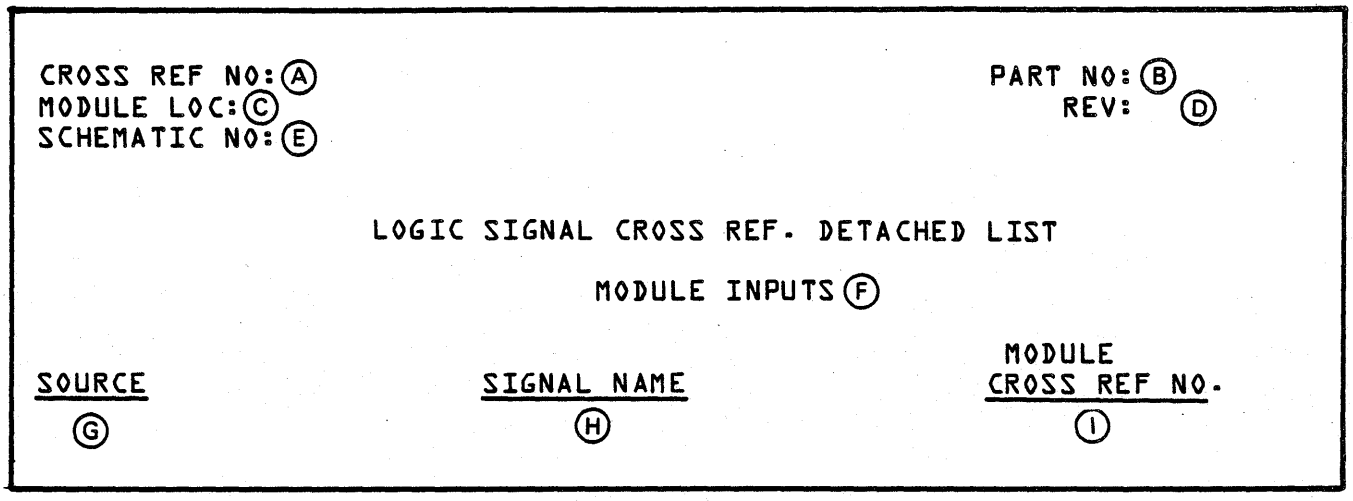


FIGURE 10-1. SIGNAL INDEX HEADING – INPUT

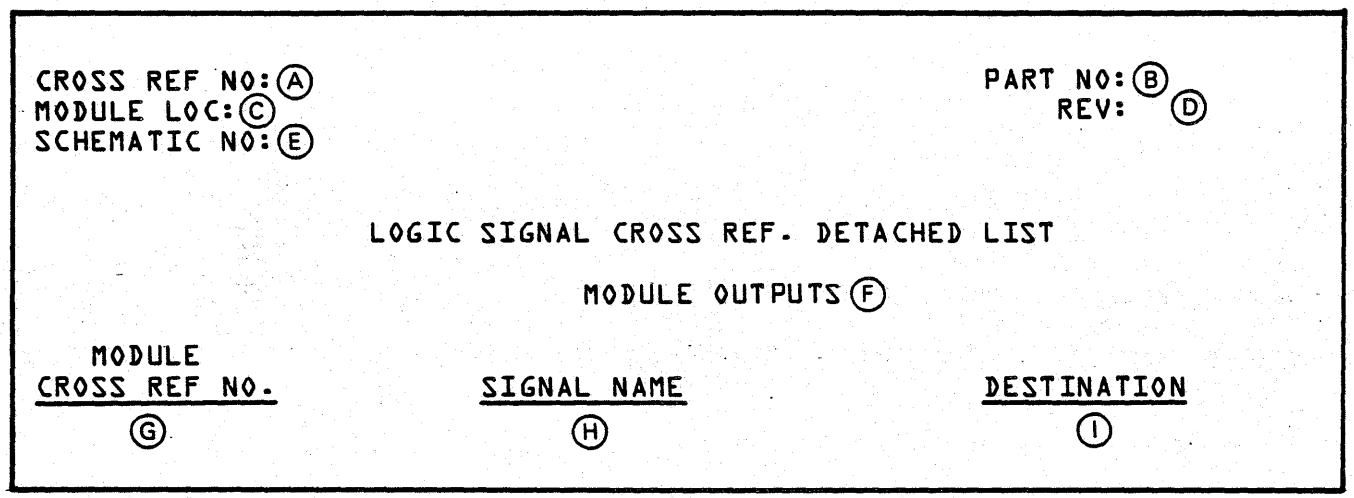


FIGURE 10-2. SIGNAL INDEX HEADING – OUTPUT

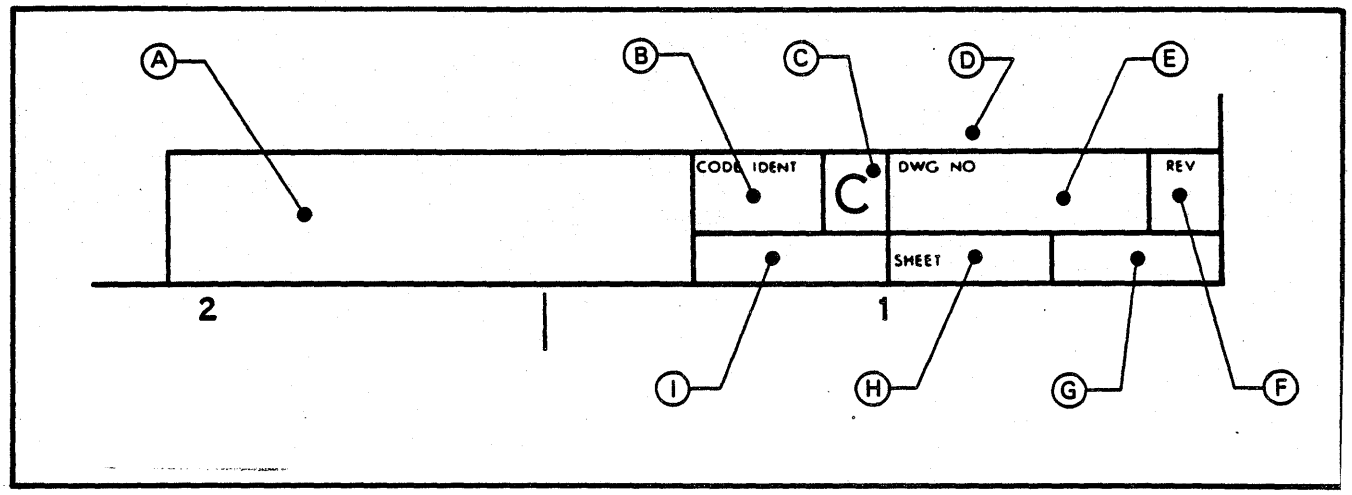


FIGURE 10-3. LOGIC MODULE TITLE BLOCK

Ⓑ PART NUMBER: This is the 8 digit part number of the signal index.

Ⓒ MODULE LOC: This code identifies the printed circuit board which the signal index is describing.

Ⓓ REV: This letter indicates the current revision level of the signal index.

Ⓔ SCHEMATIC NO: This is the 8 digit drawing number of the schematic diagrams for the logic module being described. It should match the number in block E of Figure 10-3.

Ⓕ MODULE OUTPUTS: This title indicates the signals listed below it are signals leaving the board. Normally they leave on the right side of the schematic diagram.

Ⓖ MODULE CROSS REF NO: This column indicates where the signal is found in the logic module. It will appear in this form: 0401-P1-(B). 0401 is the number that will match block G of Figure 10-3. P1 is the connector on the printed circuit board, and (B) is the pin number of that connector.

Ⓗ SIGNAL NAME: Self explanatory.

Ⓘ DESTINATION: This column indicates where the signals are going. Signals going to components will be shown like this: 1TB3, 3LO1, 4SW2. Signals going to other boards will be shown like this: 0100-7PC2, 0200-2PC1, 0300-7PC3.

Figure 10-3

Ⓐ This is the title block of the schematic sheet and normally describes what is in the drawing.

Ⓑ This code identification block is for use by the manufacturing facility only.

Ⓒ This block indicates the size of the original drawing.

Ⓓ Some drawings show this 8 digit part number for the printed circuit board WITHOUT COMPONENTS.

NOTE

DO NOT USE THIS NUMBER TO ORDER A REPLACEMENT FUNCTIONAL BOARD. REFER TO THE PARTS MANUAL FOR THE COMPLETED BOARD ASSEMBLY PART NUMBER.

Ⓔ This is the 8 digit part number assigned to the drawing set. See note above.

Ⓕ This block indicates the current revision level of the drawing.

Ⓖ This block is the reference find number for signals designated by I of Figure 10-1 and G of Figure 10-2.

Ⓗ This block indicates the individual sheets' numbered location within the complete set.

Ⓘ This block shows the module location. It should match C of Figures 10-1 and 10-2.

SIGNAL TRACE EXAMPLE

Using the signal index and modular logic format, the out of paper signal will be traced from its originating point to its final destination. This is a simple example that involves only 2 boards. Some signals are more complex and go to several boards. However, this same procedure is used for complex signals by repeating the steps for each board the signal goes to. Table 10-2 explains the abbreviations used in the procedure.

TABLE 10-1. CROSS REF. NO. CODES

CROSS REF. NO.	MODULE LOC.	NAME
0100	7PC2	Controller
0200	2PC1	Power Supply
0300	7PC3	Print Head Electronics
0400	2PC2	Servo Power Amplifer
0500	5PCx	Hammer Driver
0600	6PC1	Control Panel (Front)
0700	7BP1	Backplane
0800	8PC1	I/O Connector
0900	7PC1	Interface Adapter
3100	3AO1	EVFU
6100	6PC2	Control Panel (Rear)

TABLE 10-2. ABBREVIATION DEFINITIONS

ABBR	DEFINITION	SEE FIGURE
CRN	Cross Reference Number	
	SI-CRN 0000, MI	10-1 Ⓐ
	SI-CRN 0000, MO	10-2 Ⓐ
	LM-CRN 0000	10-3 Ⓖ
D	Destination	10-2 Ⓘ
LM	Logic Module	10-3
MCRN	Module Cross Reference Number	
	MI	10-1 Ⓘ
	MO	10-2 Ⓖ
MI	Module Inputs	10-1 Ⓕ
MO	Module Outputs	10-2 Ⓕ
OOP	Out of Paper Signal	
S	Source	10-1 Ⓖ
SI	Signal Index	
	MI	10-1
	MO	10-2
SN	Signal Name	
	MI	10-1 Ⓗ
	MO	10-2 Ⓗ

Procedure for tracing OOP path:

1. Go to SI – CRN 0300, MI.
2. Scan SN for OOP.
3. Note S is 3SW4 (originating point).
4. Move across the line to MCRN.
5. It is 0308 – P2 – 6.
6. Go to LM – CRN 0308.
7. Scan left side of drawing for P2 – 6.
8. Follow OOP's path through the logic.
9. It's output pin is P1 – 49.
10. Go to SI – CRN 0300, MO.
11. Scan SN for OOP.
12. Verify MCRN is 0308 – P1 – 49.
13. Move across the line to D.
14. It is 0100 – 7PC2
15. Go to SI – CRN 0100, MI.
16. Scan SN for OOP.
17. Verify S is 0300 – 7PC3.
18. Move across the line to MCRN.
19. It is 0114 – P1 – 72.
20. Go to LM – CRN 0114.
21. Scan left side of drawing for P1 – 72.
22. Follow OOP's path through the logic.
23. Its final destination is PORT – P5.

GENERAL NOTES

1. 1PC1 is documented in the 120 VAC distribution wiring diagram.

2. Each logic symbol in the schematic diagram reflects the function being performed,(A) component type,(B) and board location of the device (C). See Figure 10-4.

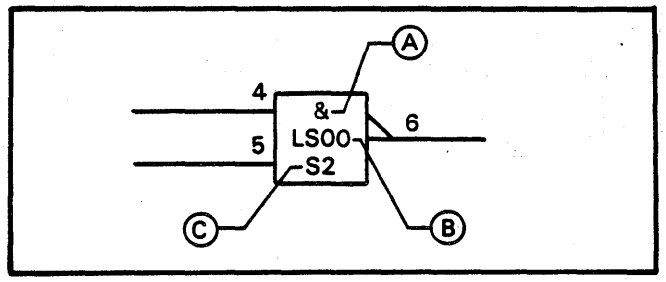


Figure 10-4. LOGIC SYMBOL

3. Information of device operation is available in the key to logic symbols, manual number 59390100.

4. All standard devices have the following DC power connections which are not shown as part of the logic symbols:

14 PIN DEVICE	FUNCTION	16 PIN DEVICE
Pin 7	Logic Ground	Pin 8
Pin 14	+5VDC	Pin 16

5. Digital Logic Levels:

INPUT	MINIMUM	MAXIMUM
HI	+2.0 VDC	+5.5 VDC
LO	+0.0 VDC	+0.8 VDC

OUTPUT	MINIMUM	MAXIMUM
HI	+2.4 VDC	+5.5 VDC
LO	+0.0 VDC	+0.4 VDC

6 DC Filtering:

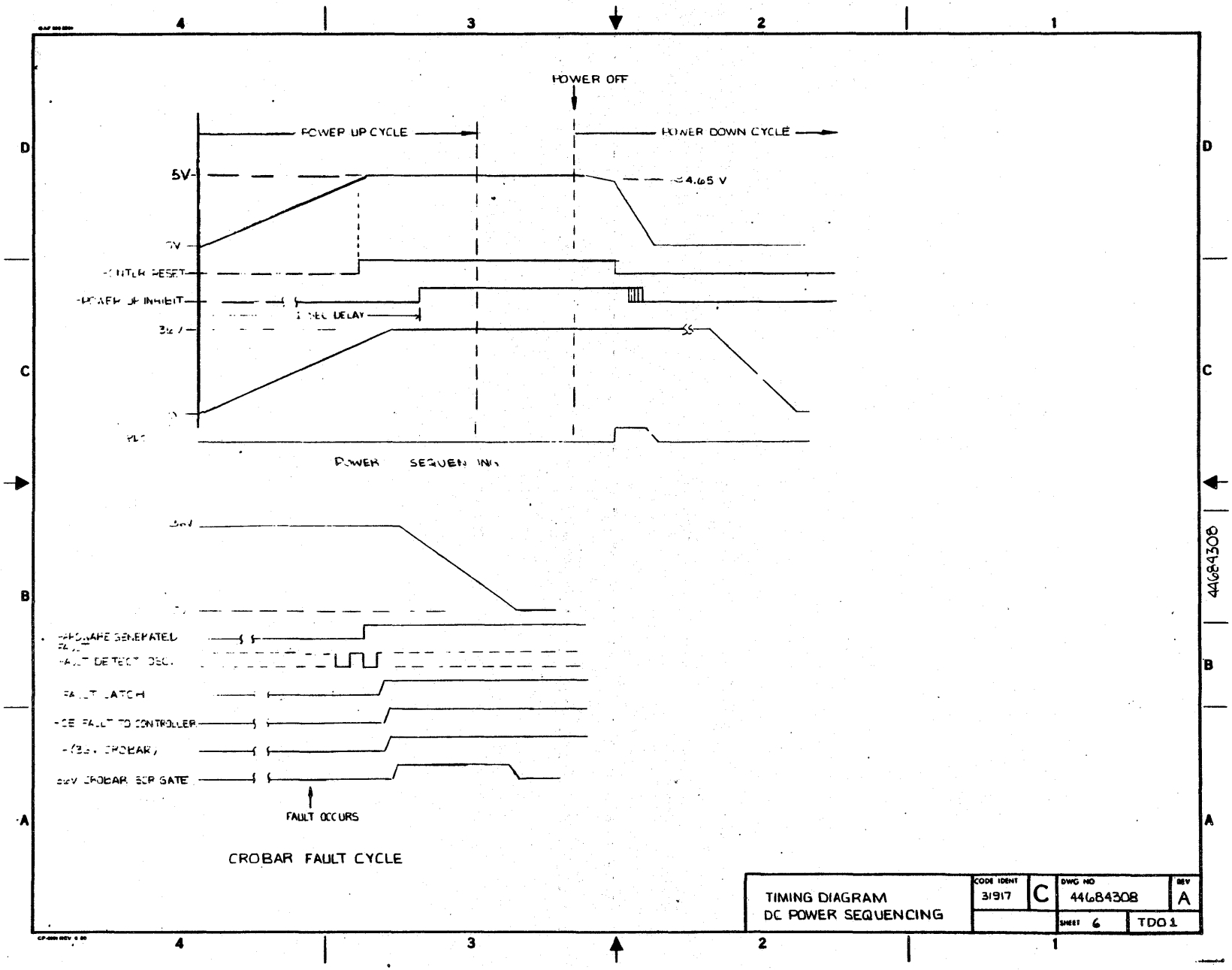
   a. Filter capacitors are generally located near the input power connections.
   b. High frequency decoupling capacitors are located between devices, approximately 1 capacitor for every 3 devices.

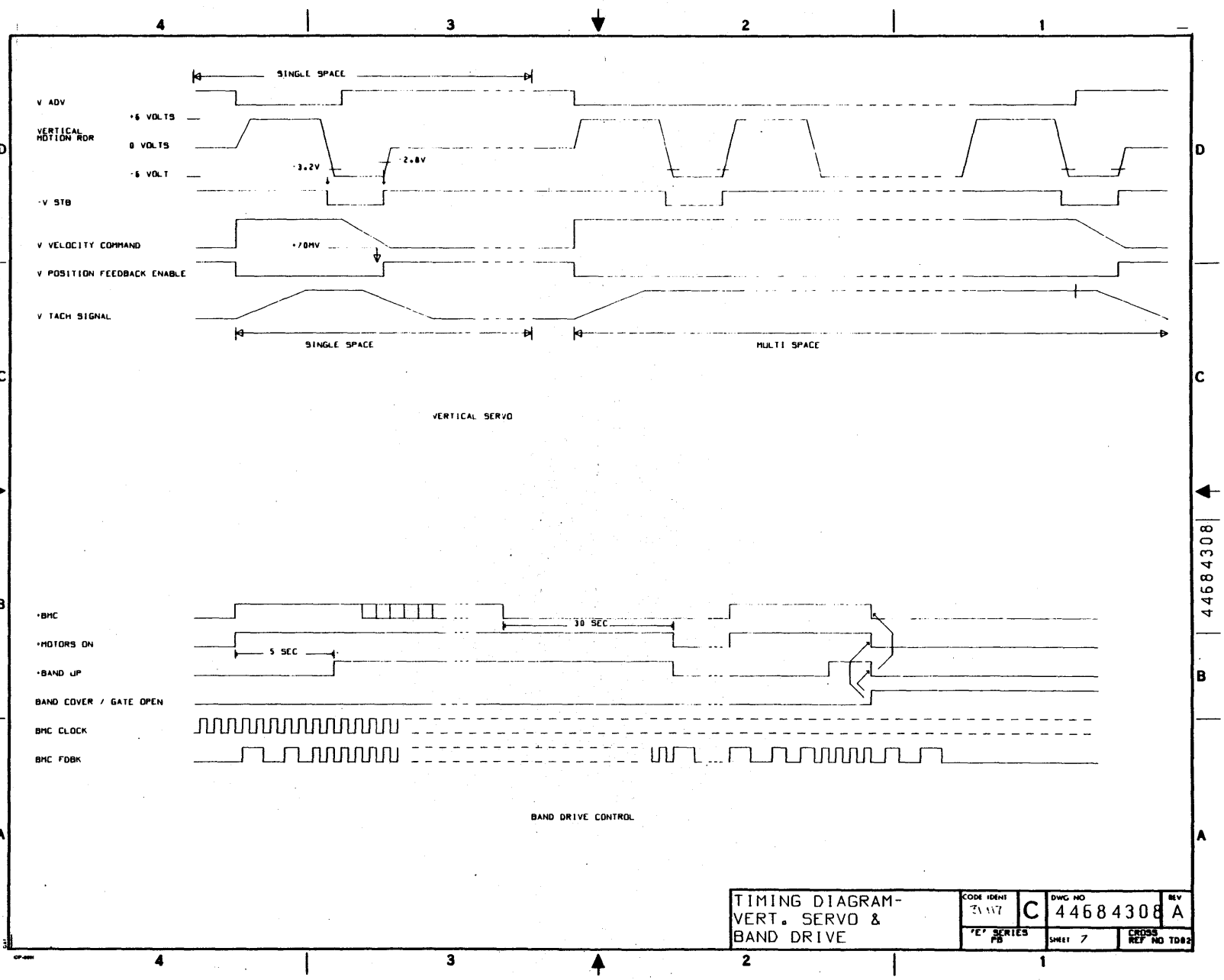
7. Square pads on the printed circuit board indicate:

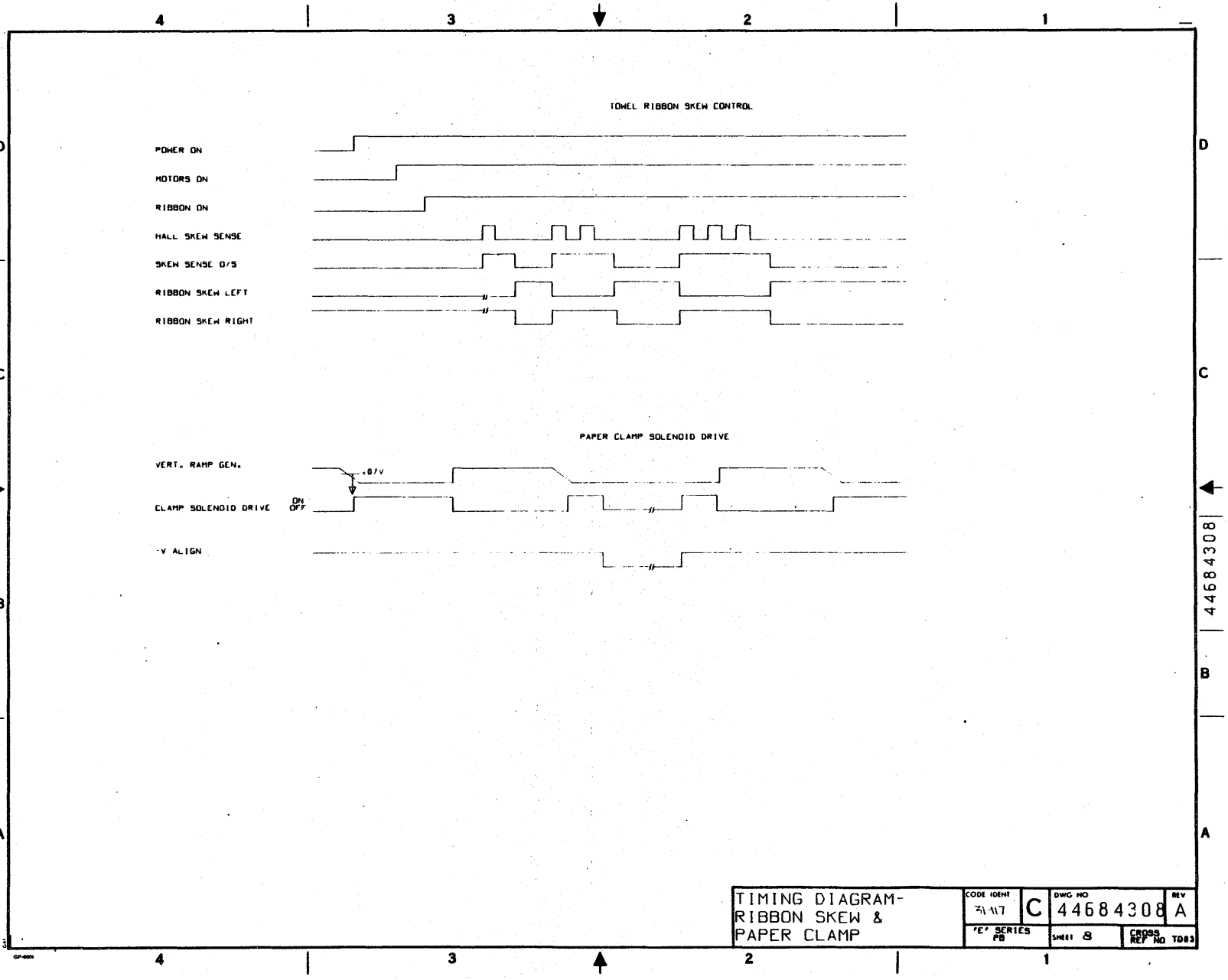
   a. Pin 1 of an IC device.
   b. Pin 1 of connectors.
   c. Cathode of a diode.
   d. Positive terminal of electrolytic capacitors.

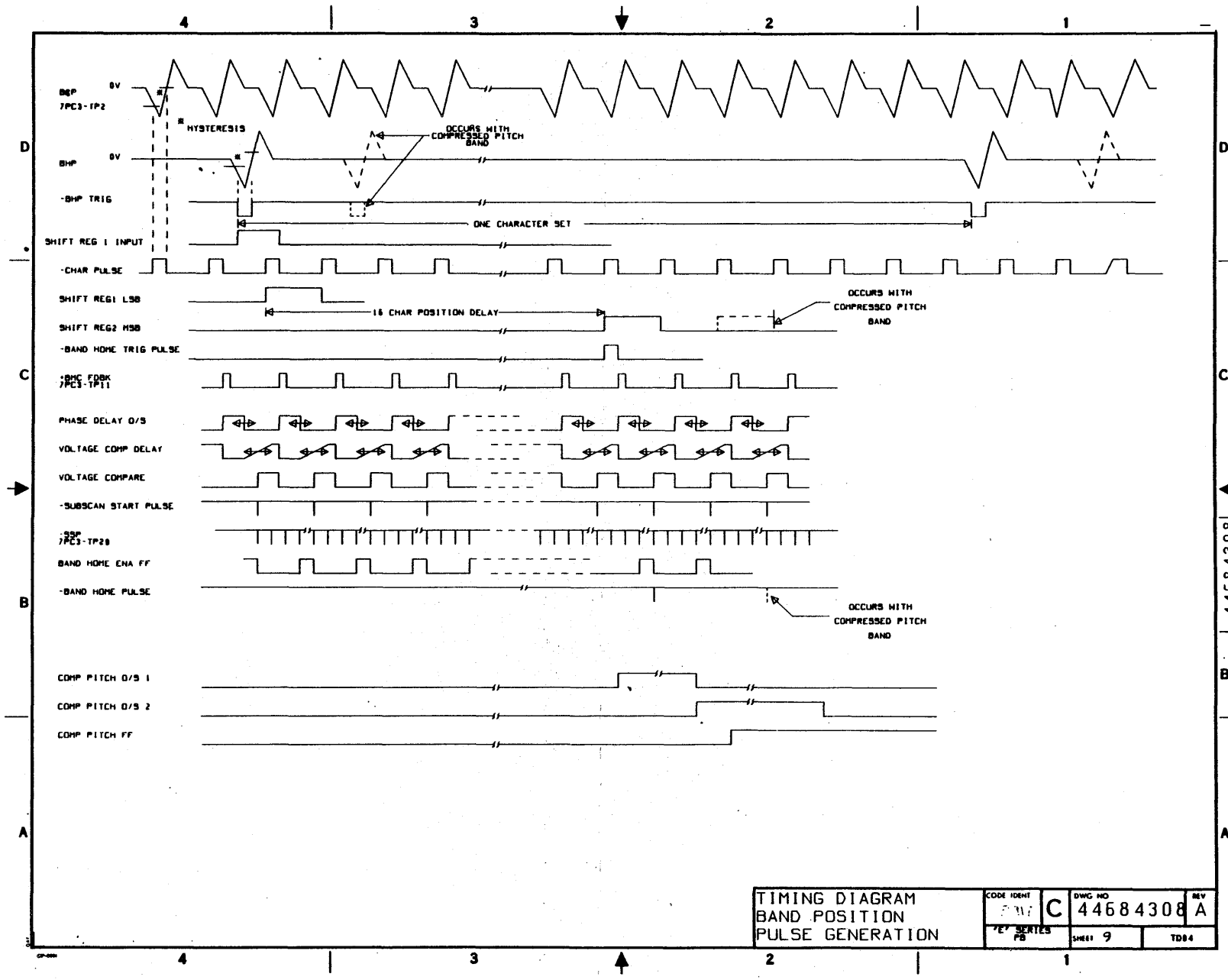
8. Signals are connected by way of the backplane, or interconnections described in the wiring diagrams.

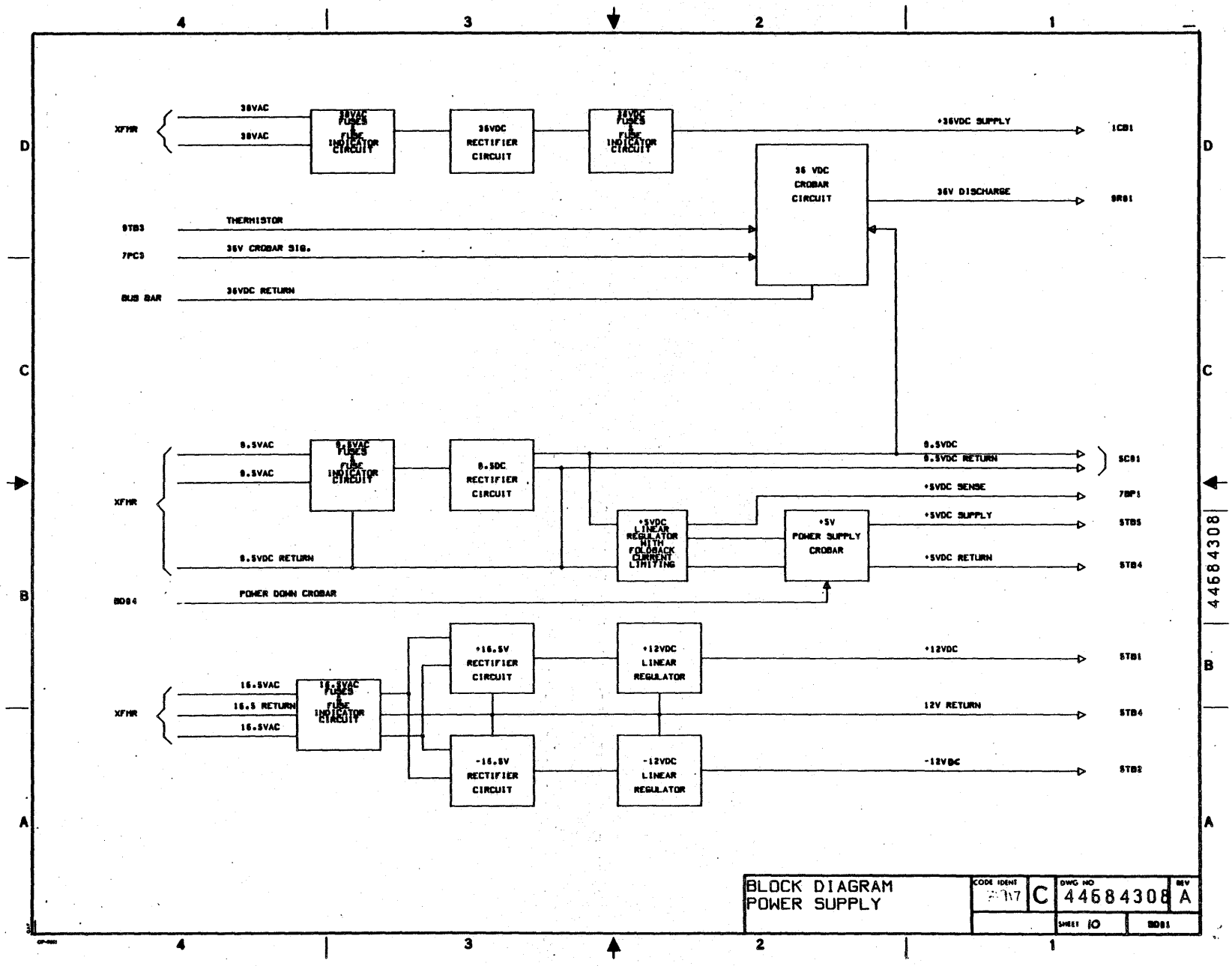
9. Signals shown in the timing diagrams have been simplified for illustration and are not true images of the actual signals they represent.

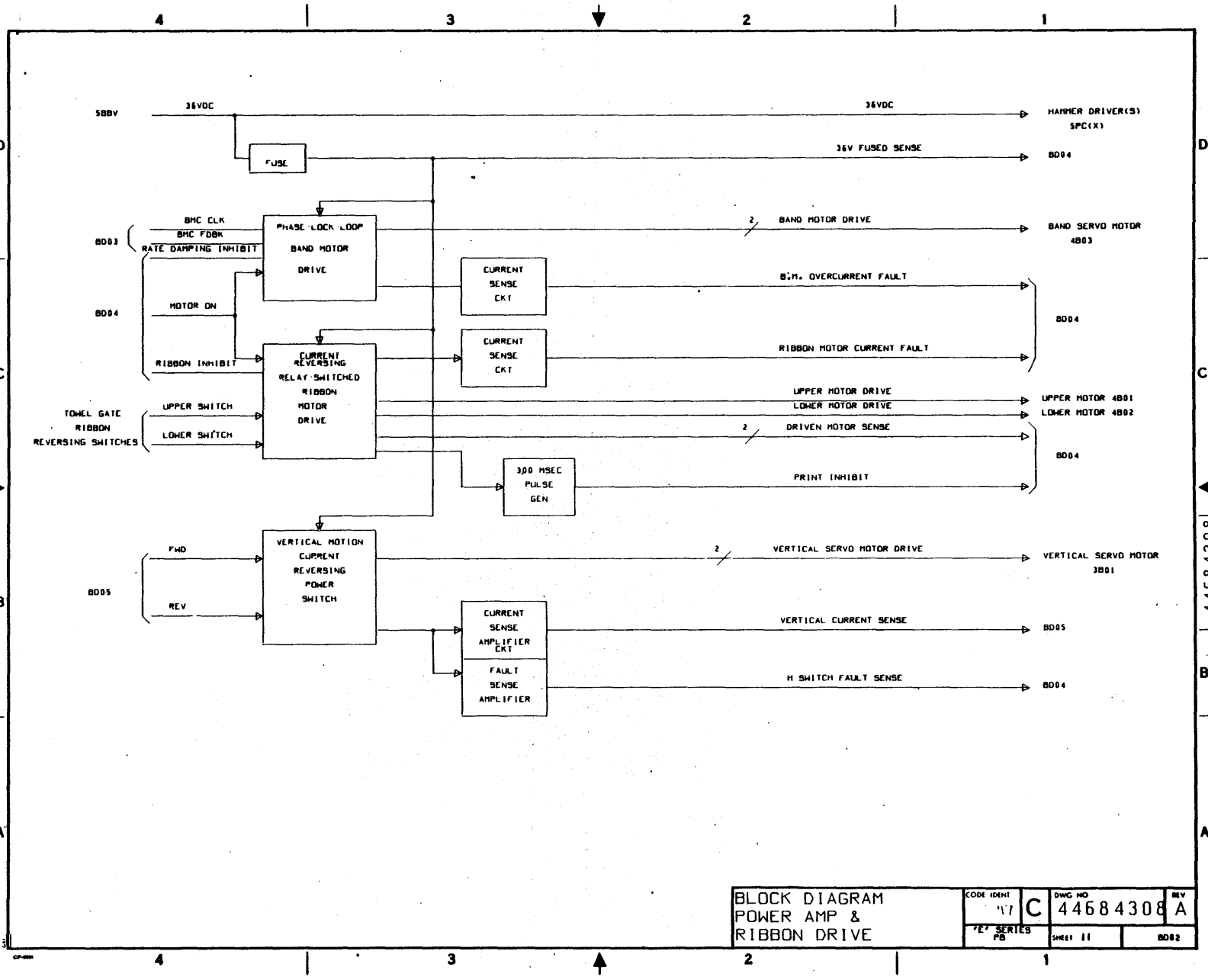

POWER OFF
POWER UP CYCLE
POWER DOWN CYCLE
5V
≤4.65 V
7V
COUNTER RESET
CROWBAR INHIBIT
1 SEC DELAY
POWER SEQUENCING
FAULT DETECT DEC.
FAULT LATCH
FAULT TO CONTROLLER
CROWBAR SCR GATE
FAULT OCCURS
CROBAR FAULT CYCLE
TIMING DIAGRAM
DC POWER SEQUENCING
CODE IDENT 31917
C
DWG NO 44684308
REV A
SHEET 6
TDO 1
44684308


SINGLE SPACE
V ADV
+6 VOLTS
VERTICAL MOTION RDR
0 VOLTS
-6 VOLT
-3.2V
-2.8V
-V STB
V VELOCITY COMMAND
+70MV
V POSITION FEEDBACK ENABLE
V TACH SIGNAL
SINGLE SPACE
MULTI SPACE
VERTICAL SERVO
+BMC
30 SEC
+MOTORS ON
5 SEC
+BAND UP
BAND COVER / GATE OPEN
BMC CLOCK
BMC FDBK
BAND DRIVE CONTROL
TIMING DIAGRAM-
VERT. SERVO &
BAND DRIVE
CODE IDENT
C
DWG NO
44684308
REV
A
'E' SERIES
PB
SHEET 7
CROSS REF NO TD82
44684308


TOWEL RIBBON SKEW CONTROL
POWER ON
MOTORS ON
RIBBON ON
HALL SKEW SENSE
SKEW SENSE O/S
RIBBON SKEW LEFT
RIBBON SKEW RIGHT
PAPER CLAMP SOLENOID DRIVE
VERT. RAMP GEN.
-0.7V
CLAMP SOLENOID DRIVE
ON
OFF
-V ALIGN
TIMING DIAGRAM-
RIBBON SKEW &
PAPER CLAMP
CODE IDENT
31417
C
DWG NO
44684308
REV
A
'E' SERIES
PB
SHEET 8
CROSS
REF NO TD83
44684308

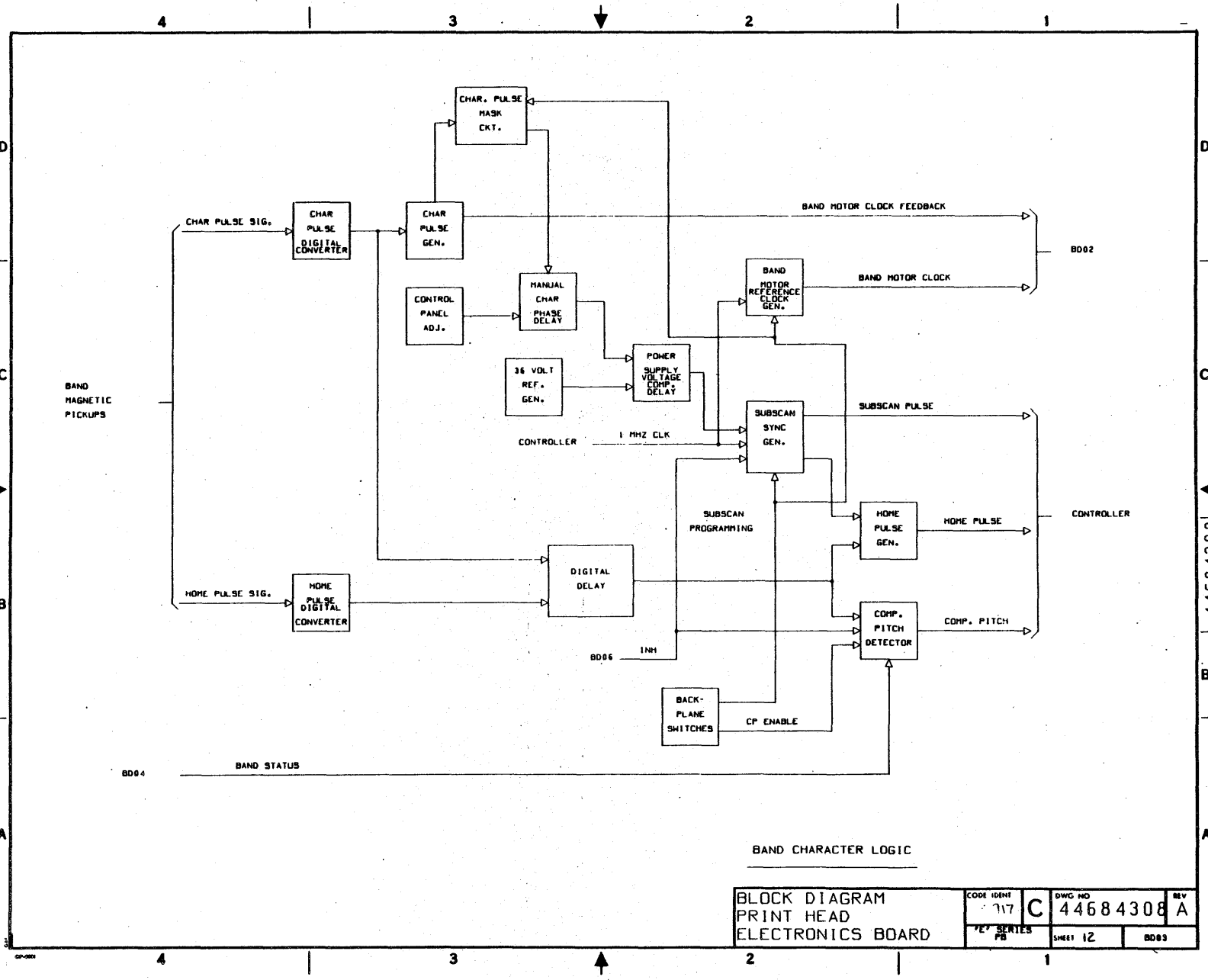

BEP
7PC3-TP2
0V
HYSTERESIS
OCCURS WITH COMPRESSED PITCH BAND
BHP
0V
-BHP TRIG
ONE CHARACTER SET
SHIFT REG 1 INPUT
-CHAR PULSE
SHIFT REG1 LSB
16 CHAR POSITION DELAY
OCCURS WITH COMPRESSED PITCH BAND
SHIFT REG2 MSB
-BAND HOME TRIG PULSE
-BHC FDBK
7PC3-TP11
PHASE DELAY O/S
VOLTAGE COMP DELAY
VOLTAGE COMPARE
-SUBSCAN START PULSE
-SSP
7PC3-TP28
BAND HOME ENA FF
-BAND HOME PULSE
OCCURS WITH COMPRESSED PITCH BAND
COMP PITCH O/S 1
COMP PITCH O/S 2
COMP PITCH FF
TIMING DIAGRAM
BAND POSITION
PULSE GENERATION
CODE IDENT
C
DWG NO
44684308
REV
A
"E" SERIES PB
SHEET 9
TD84
44684308


XFMR
38VAC
38VAC
38VAC FUSES & FUSE INDICATOR CIRCUIT
36VDC RECTIFIER CIRCUIT
36VDC FUSES & FUSE INDICATOR CIRCUIT
+36VDC SUPPLY
1CB1
36 VDC CROBAR CIRCUIT
36V DISCHARGE
9R81
9TB3
THERMISTOR
7PC3
36V CROBAR SIG.
BUS BAR
36VDC RETURN
XFMR
8.5VAC
8.5VAC
8.5VAC FUSES & FUSE INDICATOR CIRCUIT
8.5DC RECTIFIER CIRCUIT
8.5VDC
8.5VDC RETURN
5C81
+5VDC SENSE
7BP1
+5VDC LINEAR REGULATOR WITH FOLDBACK CURRENT LIMITING
+5V POWER SUPPLY CROBAR
+5VDC SUPPLY
5TB5
+5VDC RETURN
5TB4
8.5VDC RETURN
8D84
POWER DOWN CROBAR
XFMR
16.5VAC
16.5 RETURN
16.5VAC
16.5VAC FUSES & FUSE INDICATOR CIRCUIT
+16.5V RECTIFIER CIRCUIT
+12VDC LINEAR REGULATOR
+12VDC
5TB1
12V RETURN
5TB4
-16.5V RECTIFIER CIRCUIT
-12VDC LINEAR REGULATOR
-12VDC
5TB2
BLOCK DIAGRAM
POWER SUPPLY
CODE IDENT
C
DWG NO
44684308
REV
A
SHEET 10
SD81

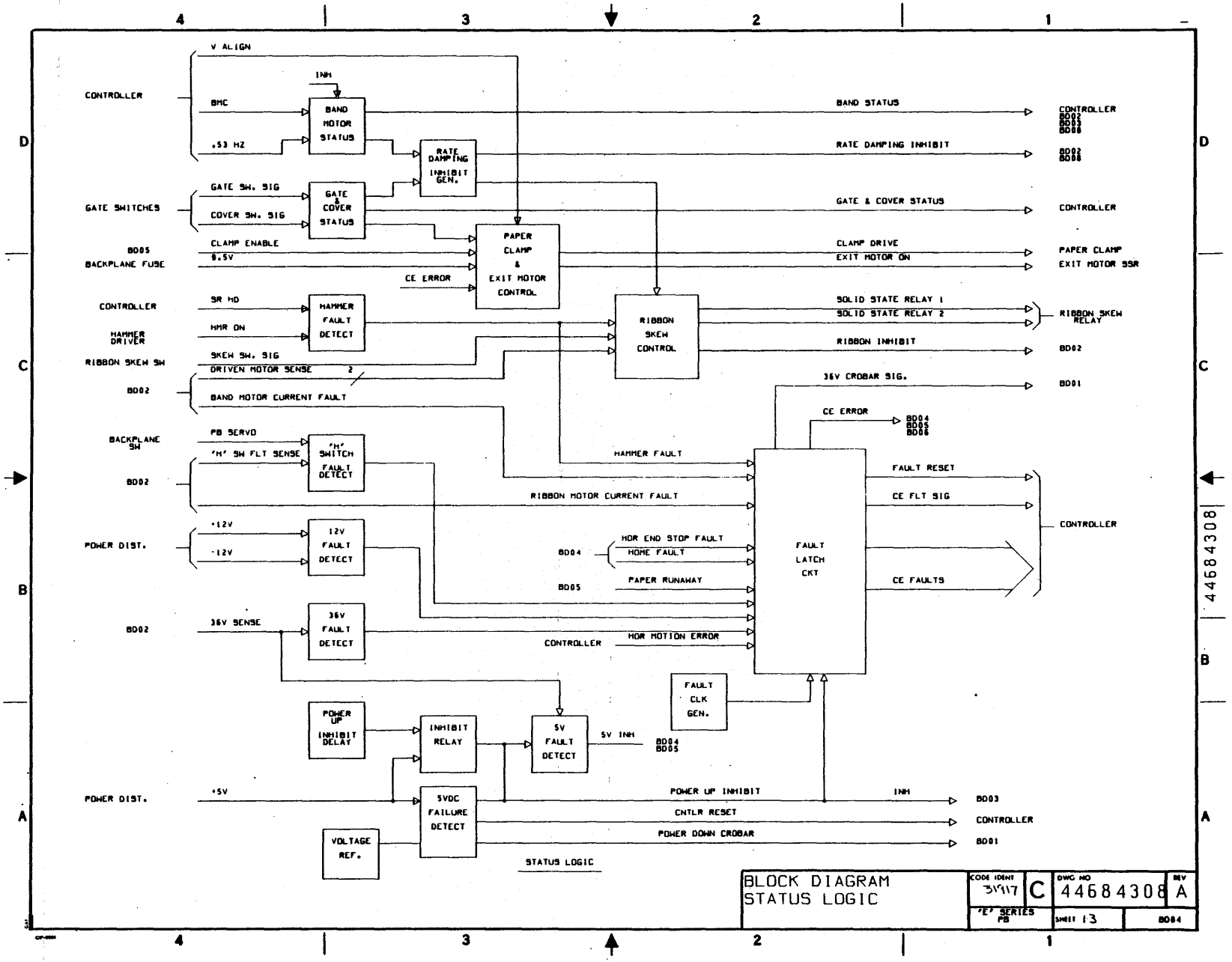


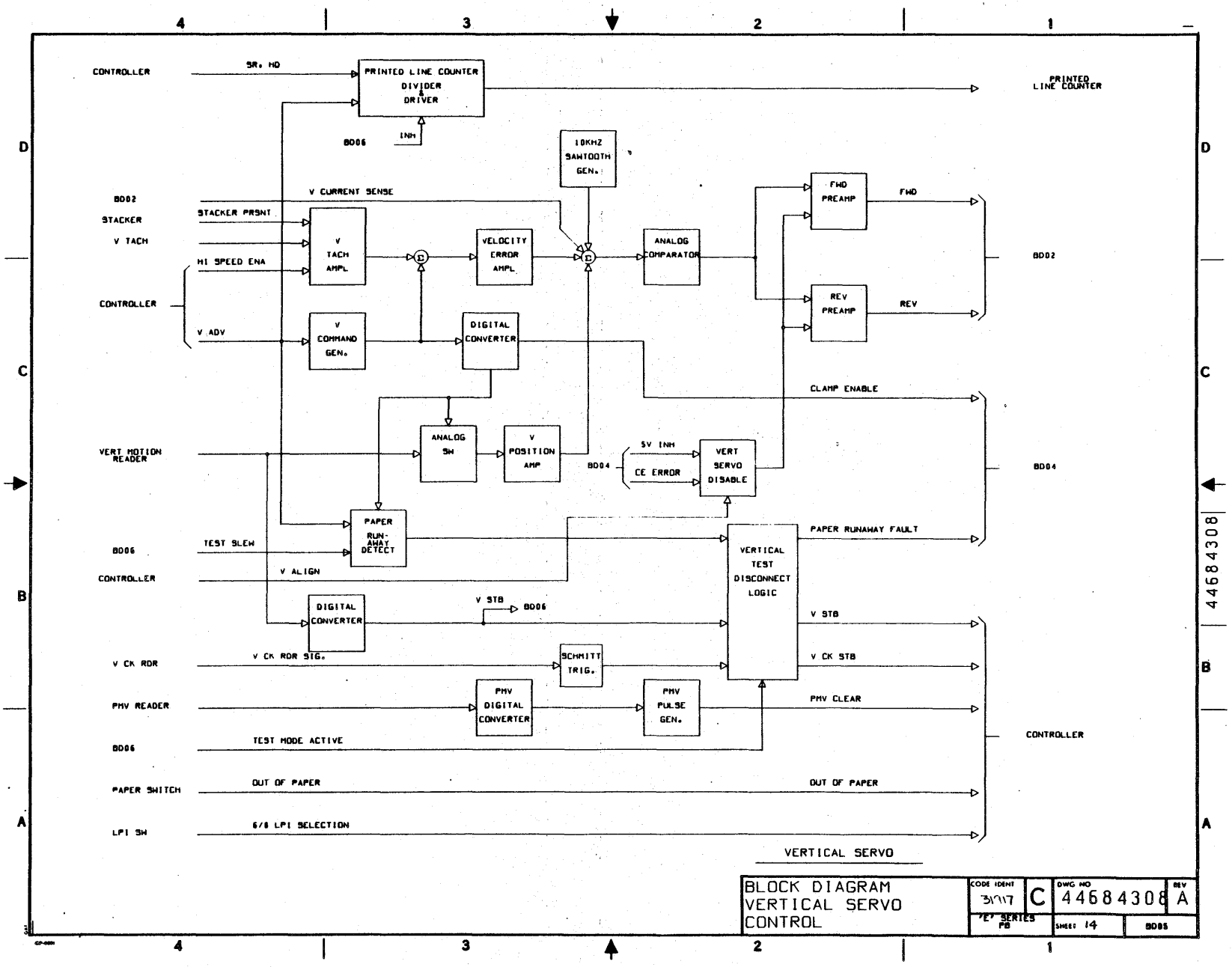
BLOCK DIAGRAM POWER AMP & RIBBON DRIVE	CODE IDENT 17	C	DWG NO 44684308	REV A
	'E' SERIES PB		SHEET 11	BD82

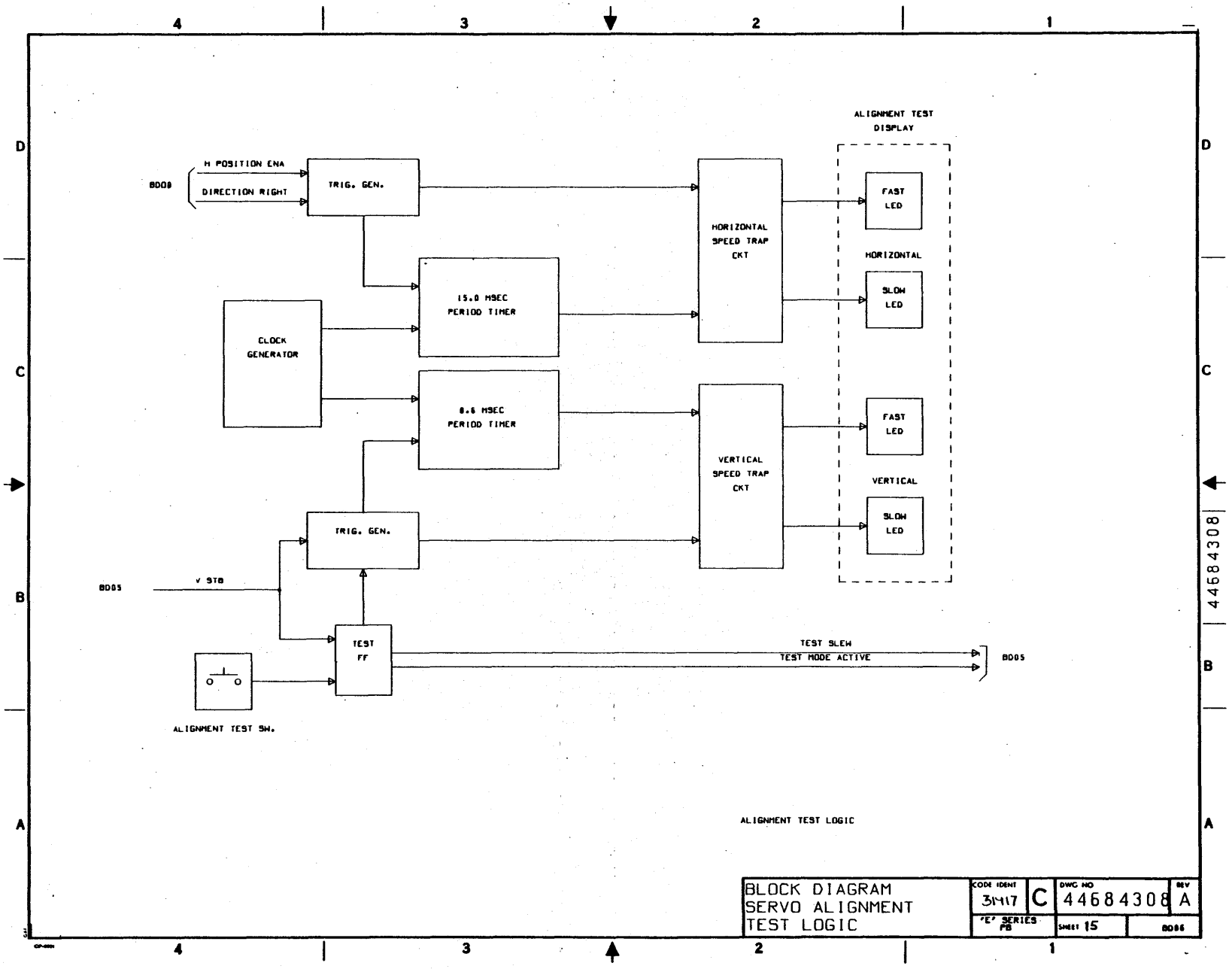
44684308

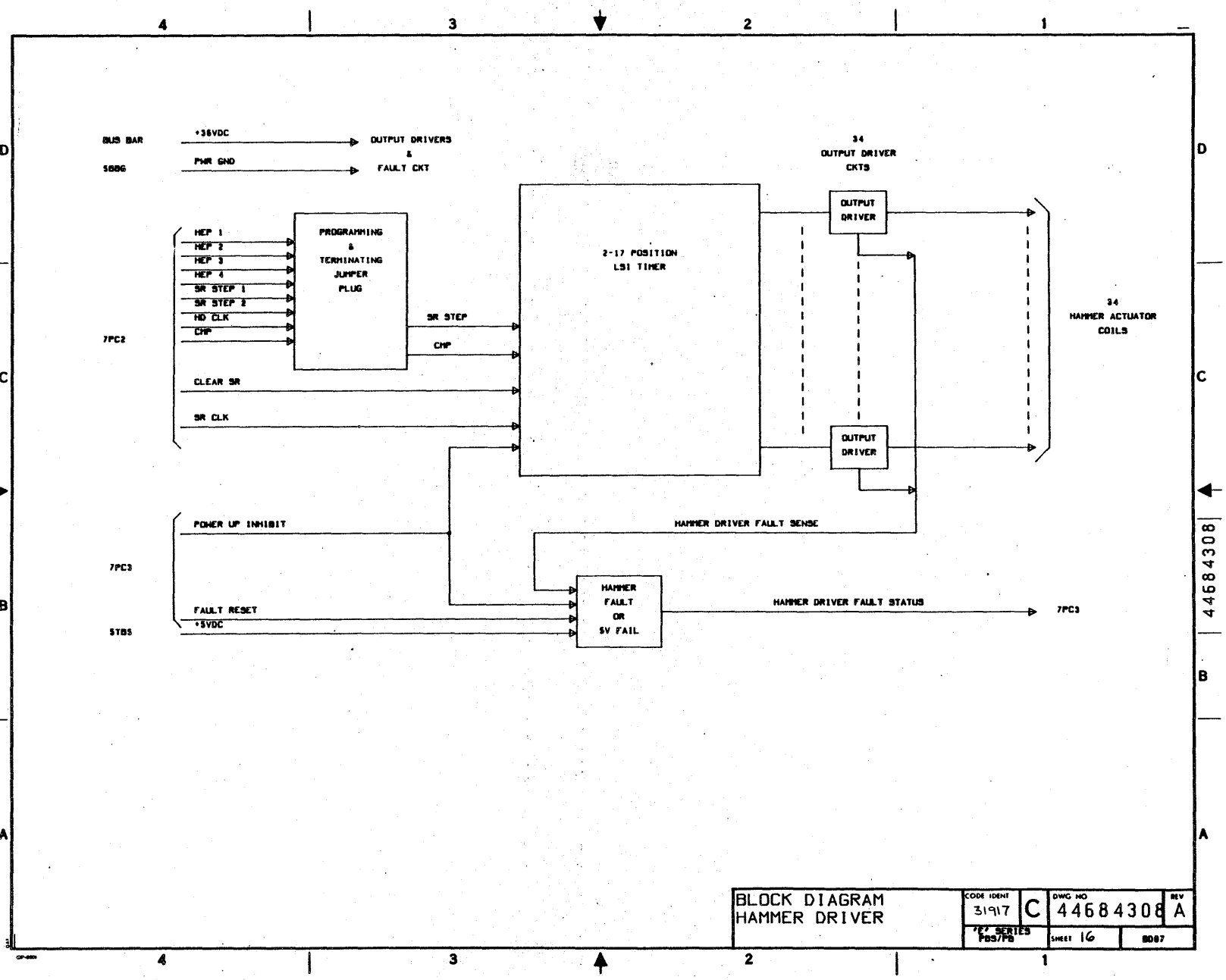

CHAR. PULSE MASK CKT.
CHAR PULSE SIG.
CHAR PULSE DIGITAL CONVERTER
CHAR PULSE GEN.
BAND MOTOR CLOCK FEEDBACK
BD02
BAND MOTOR REFERENCE CLOCK GEN.
BAND MOTOR CLOCK
CONTROL PANEL ADJ.
MANUAL CHAR PHASE DELAY
36 VOLT REF. GEN.
POWER SUPPLY VOLTAGE COMP. DELAY
BAND MAGNETIC PICKUPS
SUBSCAN SYNC GEN.
SUBSCAN PULSE
CONTROLLER
1 MHZ CLK
SUBSCAN PROGRAMMING
HOME PULSE GEN.
HOME PULSE
CONTROLLER
DIGITAL DELAY
HOME PULSE SIG.
HOME PULSE DIGITAL CONVERTER
COMP. PITCH DETECTOR
COMP. PITCH
BD06
INH
BACK-PLANE SWITCHES
CP ENABLE
BD04
BAND STATUS
BAND CHARACTER LOGIC
BLOCK DIAGRAM
PRINT HEAD
ELECTRONICS BOARD
CODE IDENT 717
C
DWG NO 44684308
REV A
"E" SERIES PB
SHEET 12
BD03

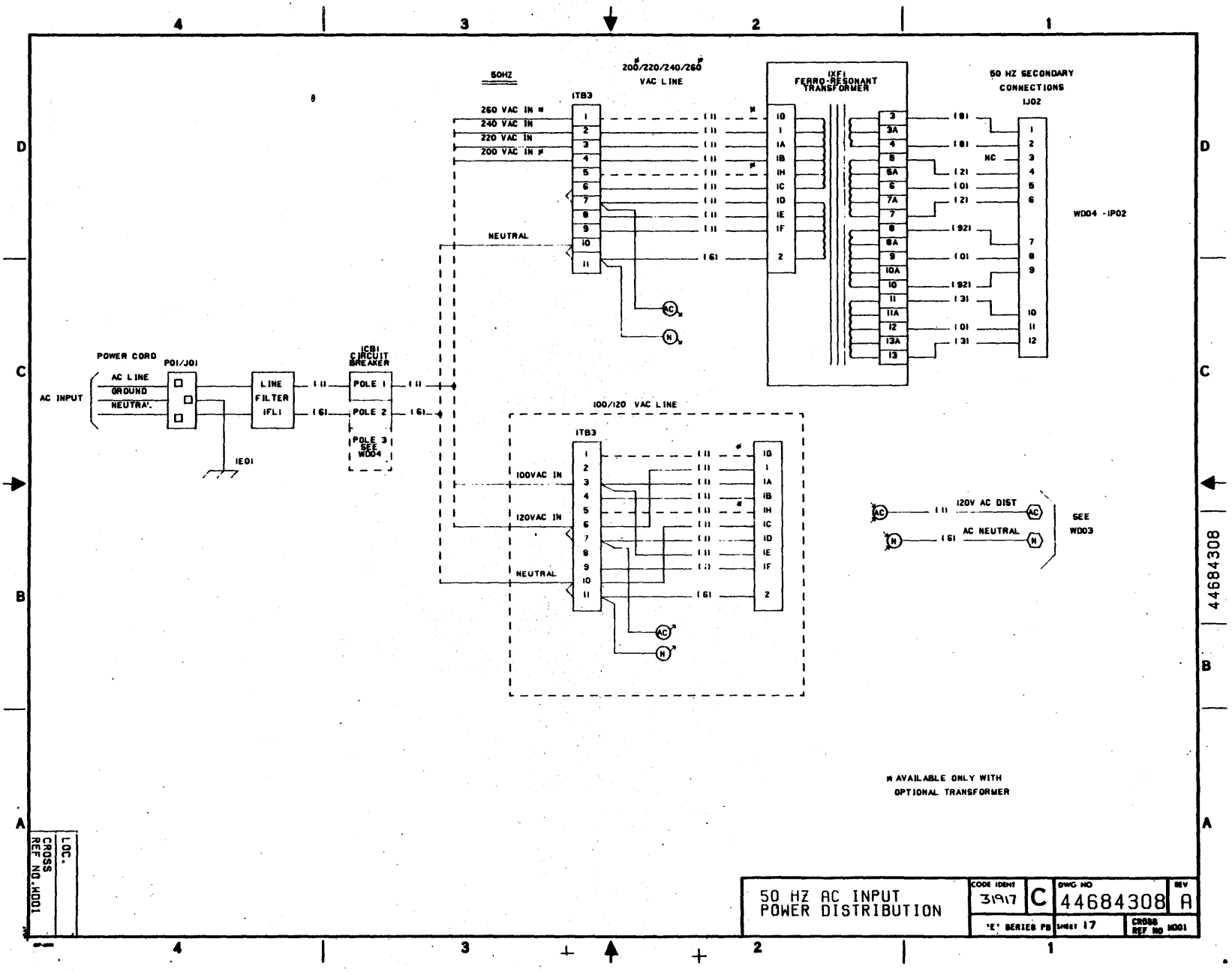
44684308

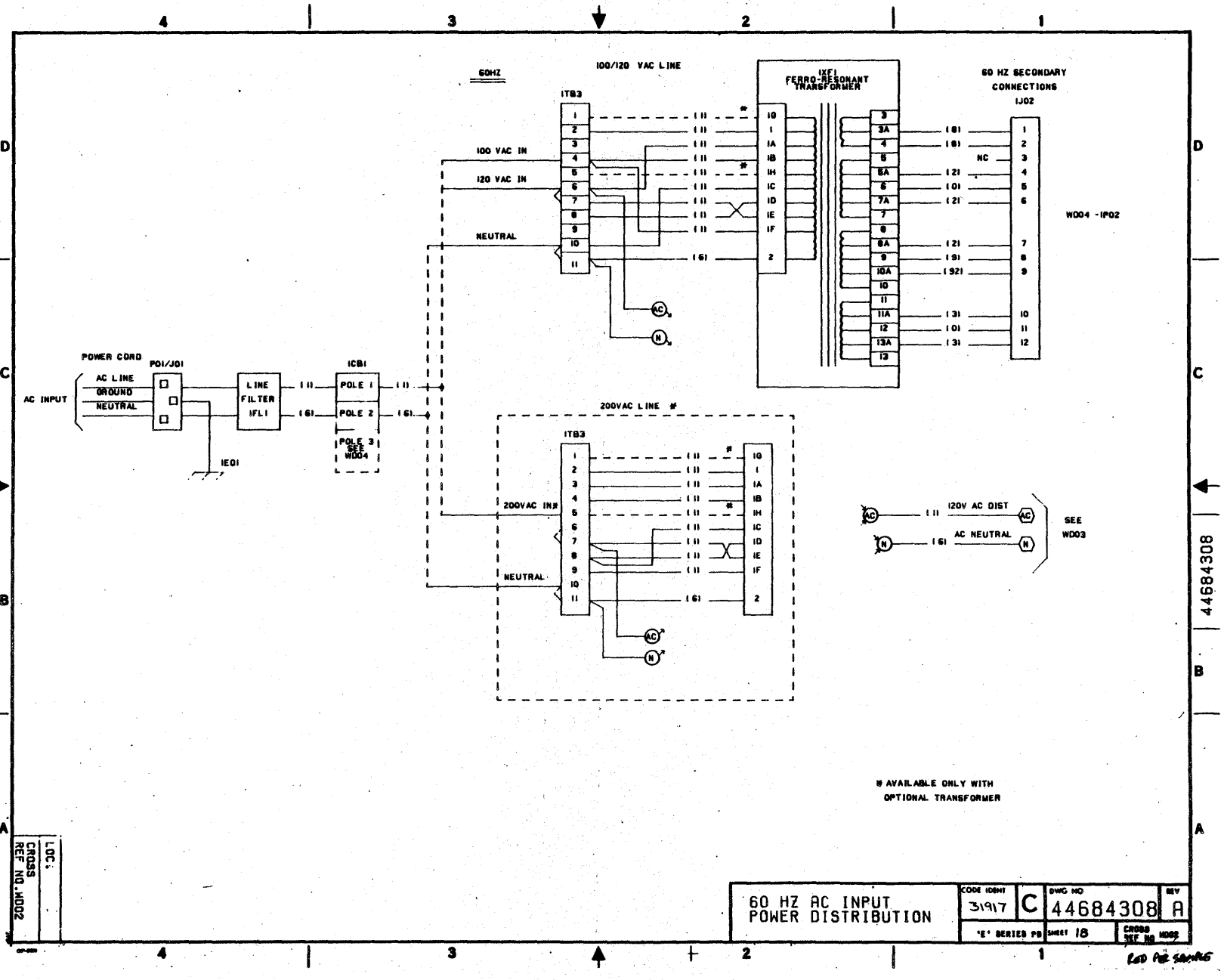

V ALIGN
INH
CONTROLLER
BMC
.53 HZ
BAND MOTOR STATUS
RATE DAMPING INHIBIT GEN.
BAND STATUS
CONTROLLER BD02 BD03 BD08
RATE DAMPING INHIBIT
BD02 BD08
GATE SWITCHES
GATE SW. SIG
COVER SW. SIG
GATE & COVER STATUS
GATE & COVER STATUS
CONTROLLER
BD05 BACKPLANE FUSE
CLAMP ENABLE
+5V
CE ERROR
PAPER CLAMP & EXIT MOTOR CONTROL
CLAMP DRIVE
EXIT MOTOR ON
PAPER CLAMP
EXIT MOTOR SSR
CONTROLLER
HAMMER DRIVER
SR HD
HMR ON
HAMMER FAULT DETECT
RIBBON SKEW CONTROL
SOLID STATE RELAY 1
SOLID STATE RELAY 2
RIBBON SKEW RELAY
RIBBON INHIBIT
BD02
RIBBON SKEW SW
SKEW SW. SIG
DRIVEN MOTOR SENSE 2
BD02
BAND MOTOR CURRENT FAULT
36V CROBAR SIG.
BD01
CE ERROR
BD04 BD05 BD06
BACKPLANE SW
FB SERVO
'H' SW FLT SENSE
'H' SWITCH FAULT DETECT
HAMMER FAULT
FAULT RESET
BD02
RIBBON MOTOR CURRENT FAULT
CE FLT SIG
POWER DIST.
+12V
-12V
12V FAULT DETECT
HOR END STOP FAULT
BD04
HOME FAULT
FAULT LATCH CKT
CONTROLLER
BD05
PAPER RUNAWAY
CE FAULTS
BD02
36V SENSE
36V FAULT DETECT
CONTROLLER
HOR MOTION ERROR
FAULT CLK GEN.
POWER UP INHIBIT DELAY
INHIBIT RELAY
5V FAULT DETECT
5V INH
BD04 BD05
POWER DIST.
+5V
5VDC FAILURE DETECT
POWER UP INHIBIT
INH
BD03
CNTLR RESET
CONTROLLER
POWER DOWN CROBAR
BD01
VOLTAGE REF.
STATUS LOGIC
BLOCK DIAGRAM
STATUS LOGIC
CODE IDENT 31917
C
DWG NO 44684308
REV A
'E' SERIES PB
SHEET 13
BD84

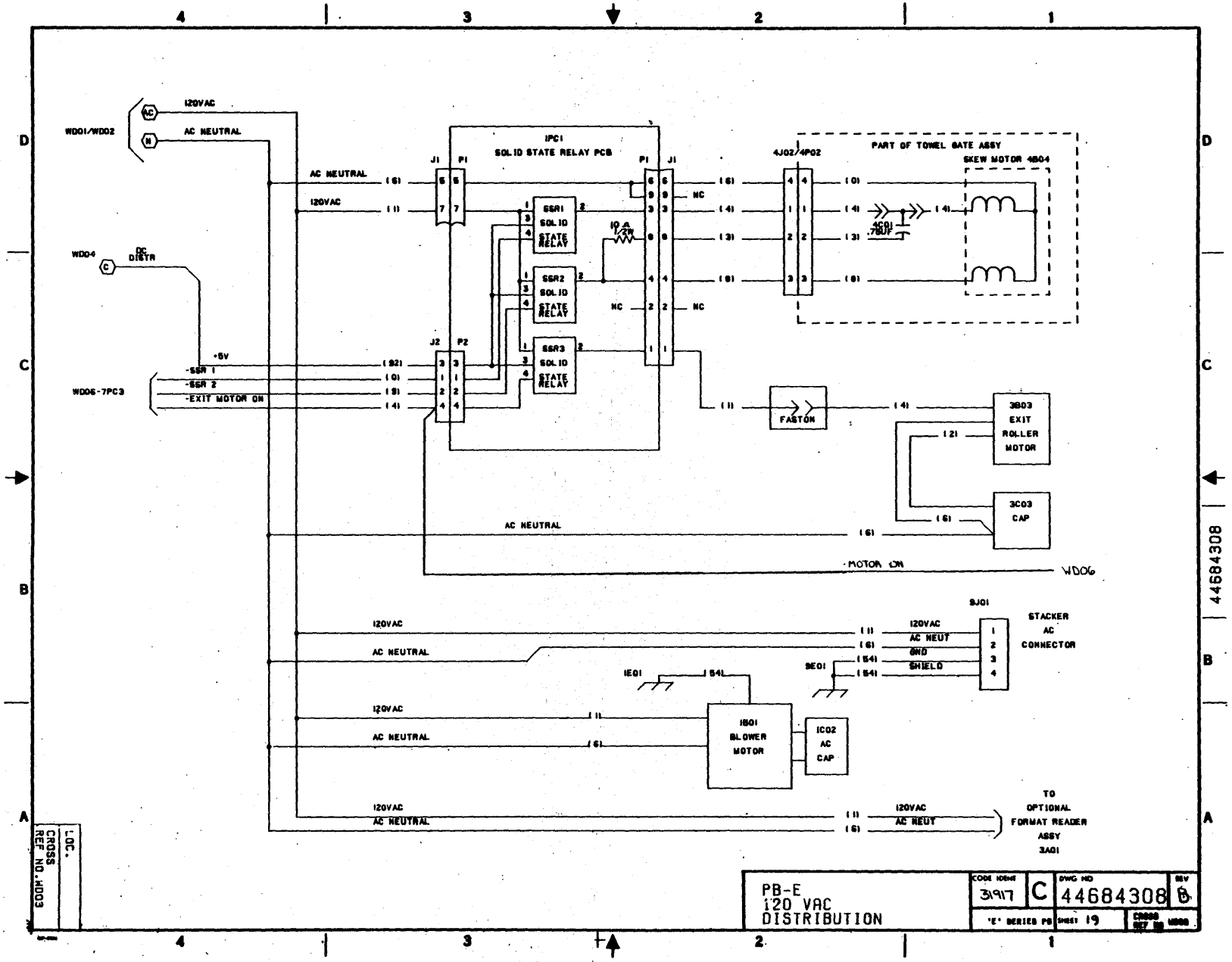

CONTROLLER
SR. HD
PRINTED LINE COUNTER DIVIDER & DRIVER
PRINTED LINE COUNTER
INH
BD06
10KHZ SAWTOOTH GEN.
V CURRENT SENSE
BD02
STACKER
STACKER PRSNT
V TACH
HI SPEED ENA
V TACH AMPL
VELOCITY ERROR AMPL
ANALOG COMPARATOR
FWD PREAMP
FWD
REV PREAMP
REV
BD02
CONTROLLER
V ADV
V COMMAND GEN.
DIGITAL CONVERTER
CLAMP ENABLE
VERT MOTION READER
ANALOG SW
V POSITION AMP
BD04
SV INH
CE ERROR
VERT SERVO DISABLE
BD04
PAPER RUN-AWAY DETECT
TEST SLEW
BD06
CONTROLLER
V ALIGN
PAPER RUNAWAY FAULT
VERTICAL TEST DISCONNECT LOGIC
DIGITAL CONVERTER
V STB
BD06
V STB
V CK RDR
V CK RDR SIG.
SCHMITT TRIG.
V CK STB
PMV READER
PMV DIGITAL CONVERTER
PMV PULSE GEN.
PMV CLEAR
BD06
TEST MODE ACTIVE
CONTROLLER
PAPER SWITCH
OUT OF PAPER
OUT OF PAPER
LPI SW
6/8 LPI SELECTION
VERTICAL SERVO
BLOCK DIAGRAM
VERTICAL SERVO
CONTROL
CODE IDENT
31717
C
DWG NO
44684308
REV
A
"E" SERIES PB
SHEET 14
BD85

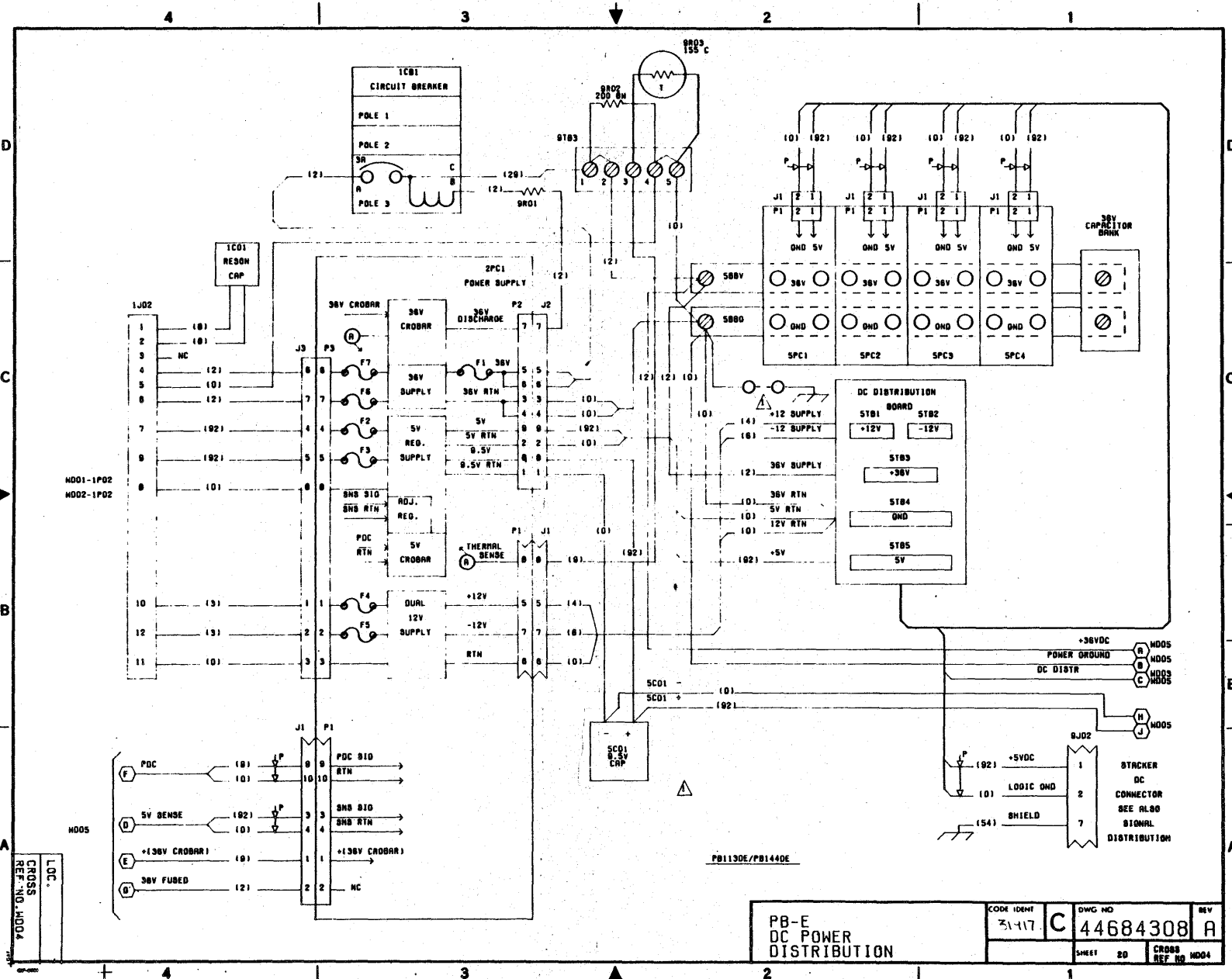

ALIGNMENT TEST
DISPLAY
H POSITION ENA
DIRECTION RIGHT
BD08
TRIG. GEN.
HORIZONTAL
SPEED TRAP
CKT
FAST
LED
HORIZONTAL
SLOW
LED
15.0 MSEC
PERIOD TIMER
CLOCK
GENERATOR
8.6 MSEC
PERIOD TIMER
VERTICAL
SPEED TRAP
CKT
FAST
LED
VERTICAL
SLOW
LED
TRIG. GEN.
BD05
V STB
TEST
FF
TEST SLEW
TEST MODE ACTIVE
BD05
ALIGNMENT TEST SW.
ALIGNMENT TEST LOGIC
BLOCK DIAGRAM
SERVO ALIGNMENT
TEST LOGIC
CODE IDENT
31417
C
DWG NO
44684308
REV
A
"E" SERIES
PB
SHEET 15
BD86
44684308

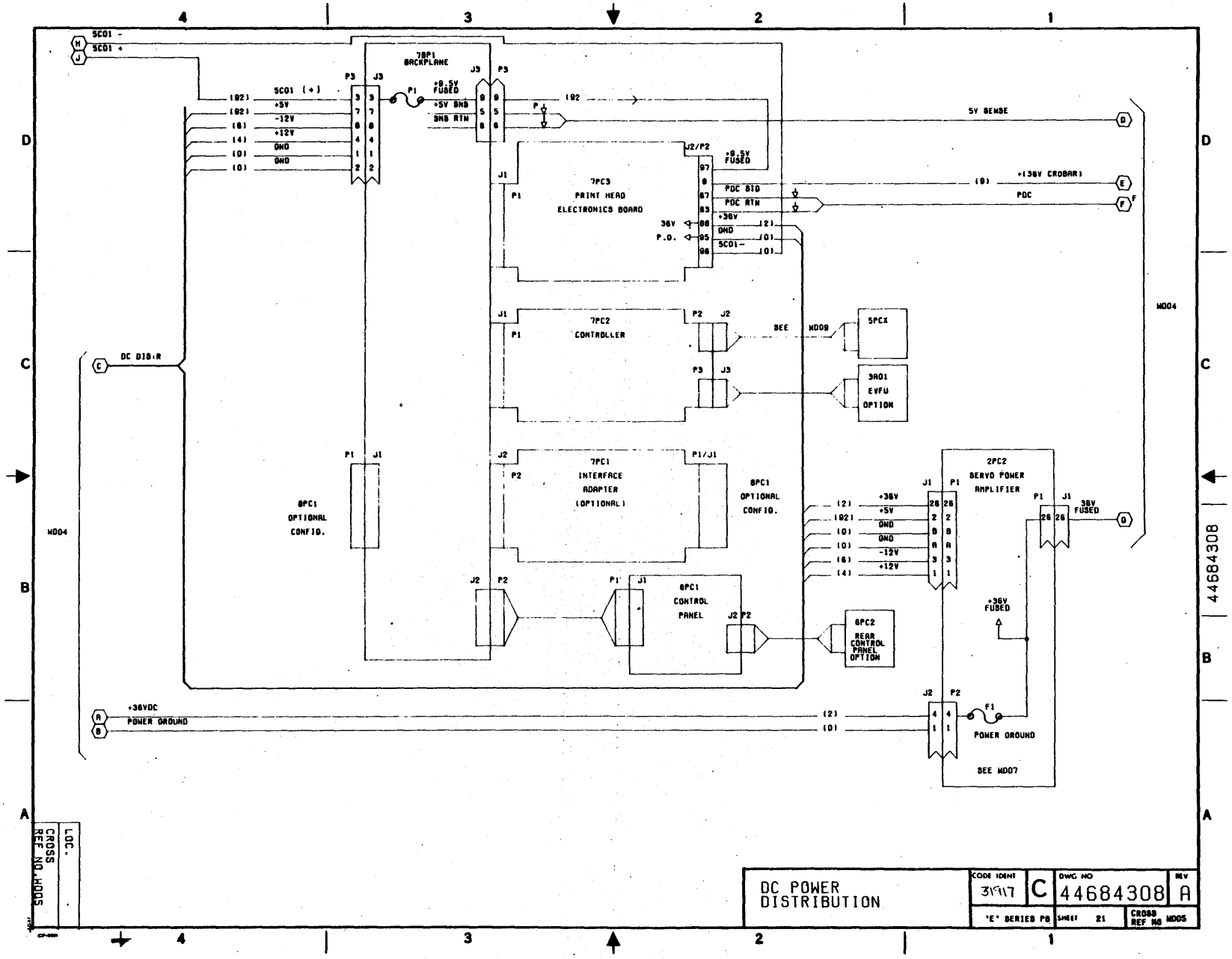

BUS BAR
5606
+36VDC
PWR GND
OUTPUT DRIVERS
&
FAULT CKT
34
OUTPUT DRIVER
CKTS
HEP 1
HEP 2
HEP 3
HEP 4
SR STEP 1
SR STEP 2
HD CLK
CMP
7PC2
PROGRAMMING
&
TERMINATING
JUMPER
PLUG
SR STEP
CMP
2-17 POSITION
LSI TIMER
OUTPUT
DRIVER
OUTPUT
DRIVER
34
HAMMER ACTUATOR
COILS
CLEAR SR
SR CLK
POWER UP INHIBIT
HAMMER DRIVER FAULT SENSE
7PC3
FAULT RESET
+5VDC
5TB5
HAMMER
FAULT
OR
5V FAIL
HAMMER DRIVER FAULT STATUS
7PC3
BLOCK DIAGRAM
HAMMER DRIVER
CODE IDENT
31917
C
DWG NO
44684308
REV
A
SHEET 16
8087
4684308

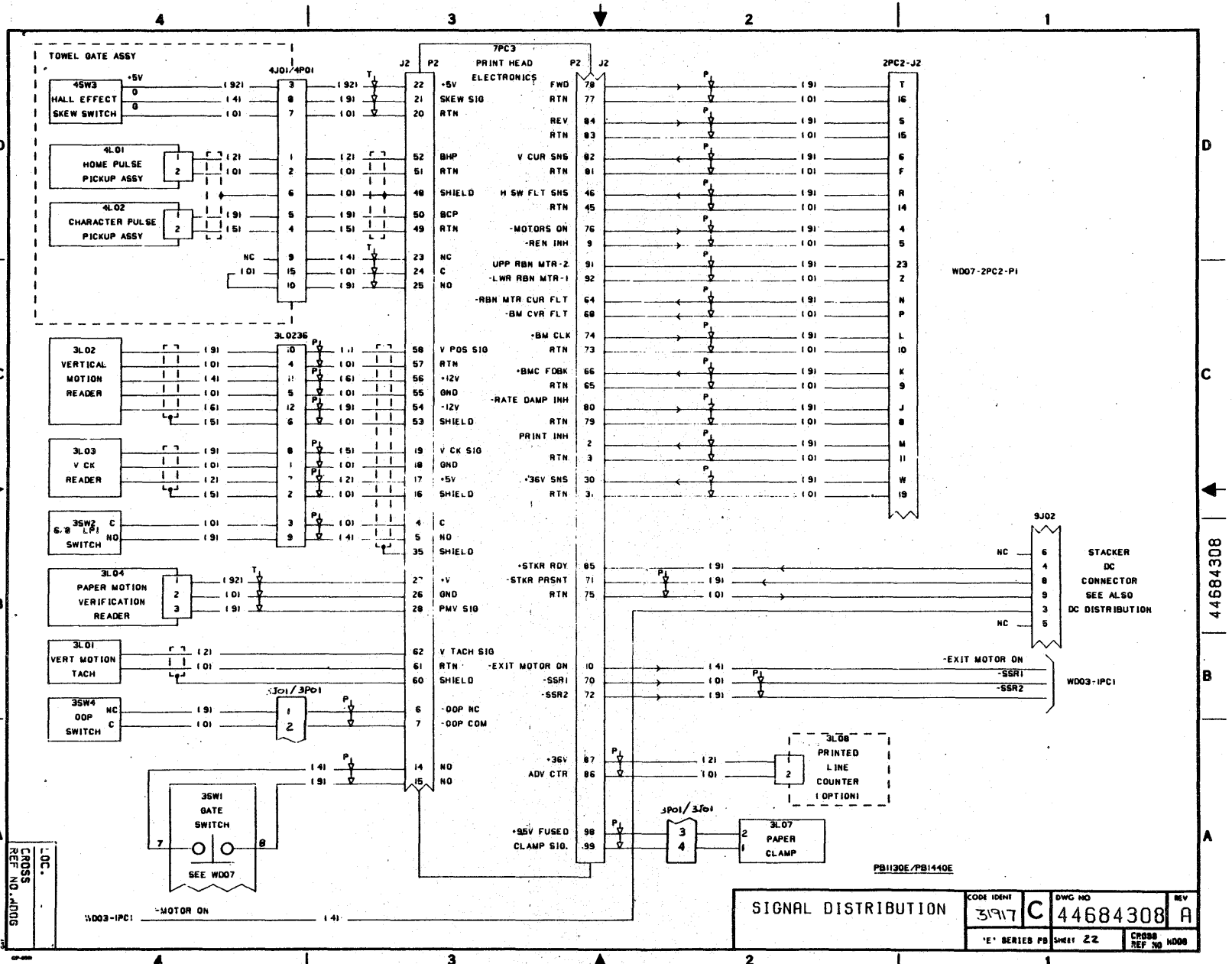

50HZ
200/220/240/260 VAC LINE
ITB3
260 VAC IN #
240 VAC IN
220 VAC IN
200 VAC IN #
NEUTRAL
1XF1
FERRO-RESONANT TRANSFORMER
50 HZ SECONDARY CONNECTIONS
1J02
NC
WD04 -1P02
POWER CORD
AC INPUT
AC LINE
GROUND
NEUTRAL
P01/J01
LINE FILTER 1FL1
1CB1 CIRCUIT BREAKER
POLE 1
POLE 2
POLE 3 SEE WD04
1E01
100/120 VAC LINE
100VAC IN
120VAC IN
120V AC DIST
AC NEUTRAL
SEE WD03
AVAILABLE ONLY WITH OPTIONAL TRANSFORMER
CROSS REF NO. WD01
LOC.
50 HZ AC INPUT POWER DISTRIBUTION
CODE IDENT 31917
C
DWG NO 44684308
REV A
'E' SERIES PB
SHEET 17
CROSS REF NO WD01
44684308

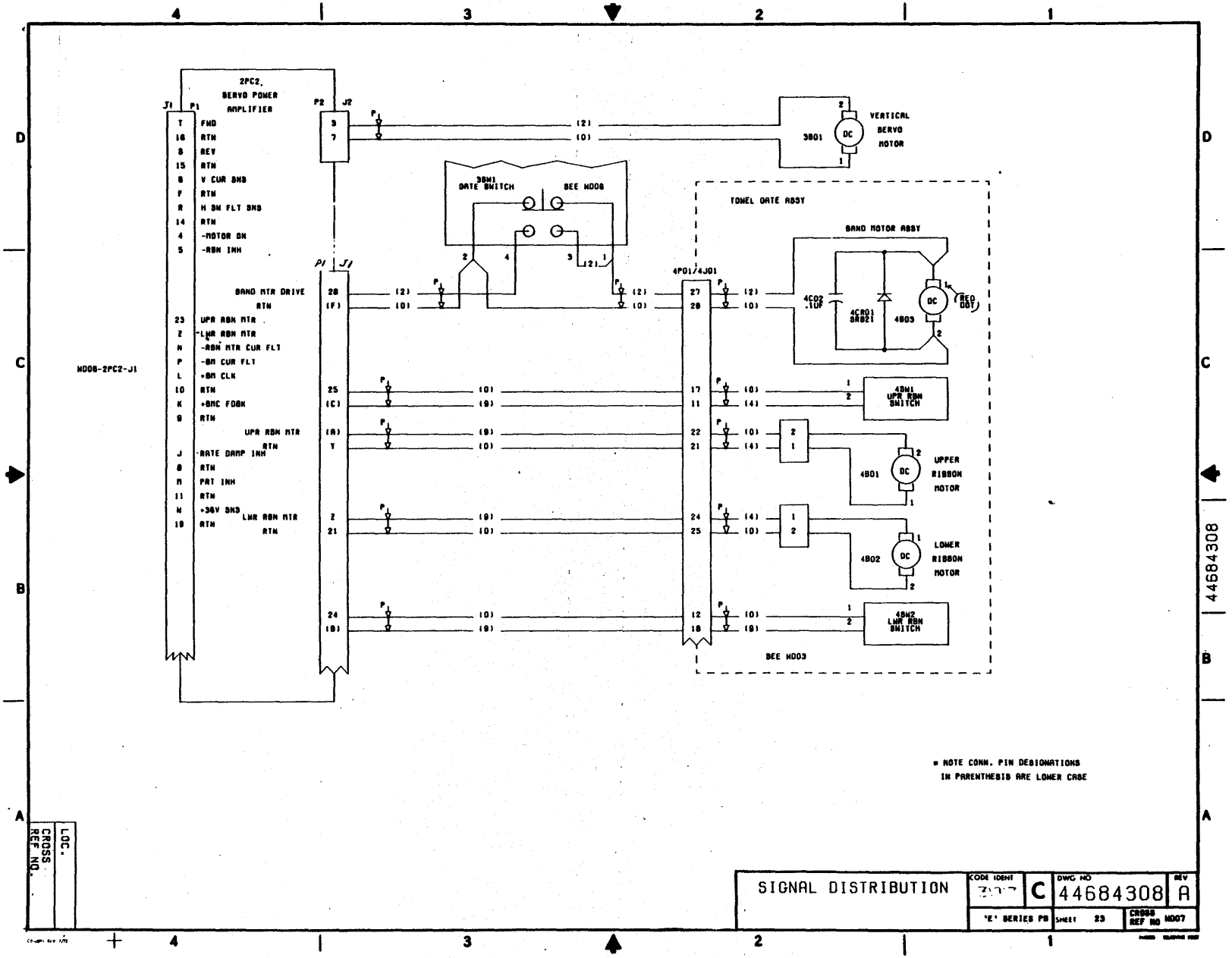

60HZ
100/120 VAC LINE
1XF1
FERRO-RESONANT
TRANSFORMER
60 HZ SECONDARY
CONNECTIONS
1J02
1TB3
100 VAC IN
120 VAC IN
NEUTRAL
NC
WD04 -1P02
POWER CORD
AC INPUT
AC LINE
GROUND
NEUTRAL
P01/J01
LINE
FILTER
1FL1
1CB1
POLE 1
POLE 2
POLE 3
SEE
WD04
1E01
200VAC LINE #
200VAC IN#
120V AC DIST
AC NEUTRAL
SEE
WD03
AVAILABLE ONLY WITH
OPTIONAL TRANSFORMER
60 HZ AC INPUT
POWER DISTRIBUTION
CODE IDENT
31917
C
DWG NO
44684308
REV
A
'E' SERIES PB
SHEET 18
CROSS
REF NO. WD02
LOC:
CROSS
REF NO. WD02
44684308

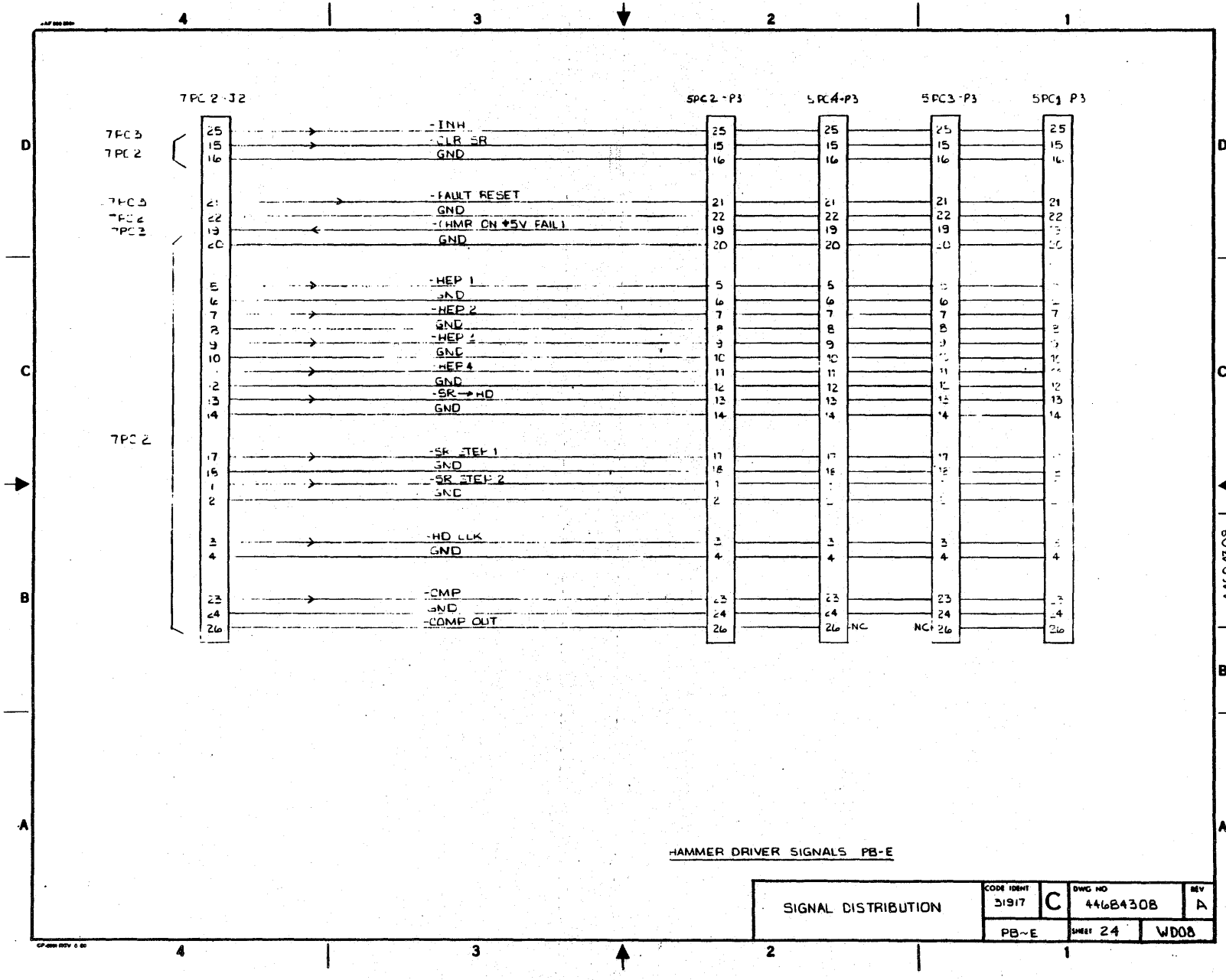

120VAC
AC NEUTRAL
WD01/WD02
AC
N
1PC1
SOLID STATE RELAY PCB
J1
P1
P1
J1
AC NEUTRAL
120VAC
SSR1
SSR2
SSR3
SOLID STATE RELAY
10 A 2W
NC
4J02/4P02
PART OF TOWEL GATE ASSY
SKEW MOTOR 4B04
4C01 .75UF
WD04
DC DISTR
C
+5V
-SSR 1
-SSR 2
-EXIT MOTOR ON
WD06-7PC3
J2
P2
FASTON
3B03 EXIT ROLLER MOTOR
3C03 CAP
AC NEUTRAL
MOTOR ON
WD06
120VAC
AC NEUTRAL
5J01
STACKER AC CONNECTOR
AC NEUT
GND
SHIELD
1E01
1B01 BLOWER MOTOR
1C02 AC CAP
120VAC
AC NEUTRAL
TO OPTIONAL FORMAT READER ASSY 3A01
LOC.
CROSS REF NO. WD03
PB-E
120 VAC
DISTRIBUTION
CODE IDENT
3917
C
DWG NO
4468308
REV
B
'E' SERIES PB
SHEET 19
4468308


1CB1
CIRCUIT BREAKER
POLE 1
POLE 2
POLE 3
9R03
155 Ω
9R02
200 Ω 5W
9R01
9TB3
1C01
RESON CAP
2PC1
POWER SUPPLY
1J02
36V CROBAR
36V DISCHARGE
36V SUPPLY
5V REG. SUPPLY
ADJ. REG.
5V CROBAR
DUAL 12V SUPPLY
THERMAL SENSE
SNS SIG
SNS RTN
PDC RTN
F1
F2
F3
F4
F5
F6
F7
+12V
-12V
RTN
5V RTN
9.5V
9.5V RTN
588V
588Ω
5PC1
5PC2
5PC3
5PC4
36V CAPACITOR BANK
DC DISTRIBUTION BOARD
STB1 +12V
STB2 -12V
STB3 +36V
STB4 GND
STB5 5V
+12 SUPPLY
-12 SUPPLY
36V SUPPLY
36V RTN
5V RTN
12V RTN
+5V
+36VDC
POWER GROUND
DC DISTR
5C01 9.5V CAP
9J02
+5VDC
LOGIC GND
SHIELD
STACKER DC CONNECTOR SEE AL80 SIGNAL DISTRIBUTION
PDC
5V SENSE
+36V CROBAR
36V FUSED
PDC SIG
SNS SIG
W005
W001-1P02
W002-1P02
PB1130E/PB1440E
PB-E
DC POWER
DISTRIBUTION
CODE IDENT 31417
C
DWG NO 44684308
REV A
SHEET 20
CROSS REF NO W004
CROSS REF NO-W004
LOC.


7BP1 BACKPLANE
7PC3 PRINT HEAD ELECTRONICS BOARD
7PC2 CONTROLLER
7PC1 INTERFACE ADAPTER (OPTIONAL)
8PC1 OPTIONAL CONFIG.
8PC1 CONTROL PANEL
8PC2 REAR CONTROL PANEL OPTION
2PC2 SERVO POWER AMPLIFIER
5PCX
3A01 EVFU OPTION
DC DISTR
+36VDC
POWER GROUND
+36V FUSED
+0.5V FUSED
+5V SNS
SNS RTN
5V SENSE
+36V CROWBAR
PDC BIO
PDC RTN
36V P.O.
SEE WD08
SEE WD07
WD04
DC POWER DISTRIBUTION
CODE IDENT 31917
DWG NO 44684308
REV A
'E' SERIES PB
SHEET 21
CROSS REF NO WD05


TOWEL GATE ASSY
4SW3 HALL EFFECT SKEW SWITCH
4L01 HOME PULSE PICKUP ASSY
4L02 CHARACTER PULSE PICKUP ASSY
4J01/4P01
3L0236
3L02 VERTICAL MOTION READER
3L03 V CK READER
3SW2 6.8 LPI SWITCH
3L04 PAPER MOTION VERIFICATION READER
3L01 VERT MOTION TACH
3SW4 OOP SWITCH
3J01/3P01
3SW1 GATE SWITCH
SEE WD07
7PC3
PRINT HEAD ELECTRONICS
J2 P2
P2 J2
2PC2-J2
WD07-2PC2-P1
9J02
STACKER DC CONNECTOR SEE ALSO DC DISTRIBUTION
-EXIT MOTOR ON
-SSR1
-SSR2
WD03-1PC1
3L08 PRINTED LINE COUNTER (OPTION)
3P01/3J01
3L07 PAPER CLAMP
PB1130E/PB1440E
WD03-1PC1 -MOTOR ON
LOC.
CROSS REF NO. WDOG
SIGNAL DISTRIBUTION
CODE IDENT 31917
C
DWG NO 44684308
REV A
'E' SERIES PB
SHEET 22
CROSS REF NO WD08


2PC2,
SERVO POWER
AMPLIFIER
J1 P1
T FWD
18 RTN
8 REV
15 RTN
6 V CUR SNS
F RTN
R H SW FLT SNS
14 RTN
4 -MOTOR SW
5 -RBN INH
BAND MTR DRIVE
RTN
23 UPR RBN MTR
Z LWR RBN MTR
N -RBN MTR CUR FLT
P -BM CUR FLT
L +BM CLK
10 RTN
K +BMC FDBK
9 RTN
UPR RBN MTR
RTN
J RATE DAMP INH
8 RTN
M PRT INH
11 RTN
W +36V SNS
19 RTN
LWR RBN MTR
RTN
P2 J2
3
7
3801
VERTICAL
SERVO
MOTOR
3BH1
DATE SWITCH
SEE WD06
TOWEL DATE ASSY
BAND MOTOR ASSY
P1 J1
28
(F)
25
(C)
(A)
Y
2
21
24
(B)
4P01/4J01
27
28
17
11
22
21
24
25
12
18
4C02
.1UF
4CR01
SR021
4B03
RED
DOT
4BH1
UPR RBN
SWITCH
4B01
UPPER
RIBBON
MOTOR
4B02
LOWER
RIBBON
MOTOR
4BH2
LWR RBN
SWITCH
SEE WD03
WD06-2PC2-J1
* NOTE CONN. PIN DESIGNATIONS
IN PARENTHESIS ARE LOWER CASE
LOC.
CROSS
REF NO.
SIGNAL DISTRIBUTION
CODE IDENT
C
DWG NO
44684308
REV
A
'E' SERIES PB
SHEET 23
CROSS
REF NO WD07


7PC2-J2
5PC2-P3
5PC4-P3
5PC3-P3
5PC1 P3
7PC3
7PC2
7PC2
-INH
-CLR SR
GND
-FAULT RESET
GND
-(HMR ON +5V FAIL)
GND
-HEP 1
GND
-HEP 2
GND
-HEP 3
GND
-HEP 4
GND
-SR→HD
GND
-SR STEP 1
GND
-SR STEP 2
GND
-HD CLK
GND
-CMP
GND
-COMP OUT
NC
NC
HAMMER DRIVER SIGNALS PB-E
SIGNAL DISTRIBUTION
CODE IDENT 31917
C
DWG NO 44684308
REV A
PB-E
SHEET 24
WD08
44684308

HAMMER DRIVER CRT #	ACTUATOR COLUMN			
	LOC. 5PC2	LOC. 5PC4	LOC. 5PC3	LOC. 5PC1
1	2	70	69	1
2	4	72	71	3
3	6	74	73	5
4	8	76	75	7
5	10	78	77	9
6	12	80	79	11
7	14	82	81	13
8	16	84	83	15
9	18	86	85	17
10	20	88	87	19
11	22	90	89	21
12	24	92	91	23
13	26	94	93	25
14	28	96	95	27
15	30	98	97	29
16	32	100	99	31
17	34	102	101	33
18	36	104	103	35
19	38	106	105	37
20	40	108	107	39
21	42	110	109	41
22	44	112	111	43
23	46	114	113	45
24	48	116	115	47
25	50	118	117	49
26	52	120	119	51
27	54	122	121	53
28	56	124	123	55
29	58	126	125	57
30	60	128	127	59
31	62	130	129	61
32	64	132	131	63
33	66	134	133	65
34	68	136	135	67

HAMMER DRIVER INTERCONNECTION

EACH H.D PCB ASS'Y (5PC(x)) MUST HAVE A UNIQUE TERMINATOR / JUMPER ASS'Y INSTALLED IN 5PC(x)-J1 FOR PROPER HAMMER ADDRESSING. THE TABLE BELOW DESCRIBES THE FUNCTIONS OF EACH TERMINATOR/JUMPER ASS'Y

THE TABLE AT THE LEFT ILLUSTRATES THE RELATIONSHIP OF HAMMER DRIVER CIRCUITS AND PRINTER COLUMNS

JUMPER/ TERMINATOR	SIGNAL	LOCATION			
		5PC2-J1	5PC4-J1	5PC3-J1	5PC1-J1
J1	CMP		X	X	
J2	-HEP4	X	X		
J3	-HEP3			X	X
J4	-HEP2				
J5	-HEP1			X	X
J6	-SR STEP2	X	X		
J7	-SR STEP1			X	X
J8	-CMP OUT		X	X	
J9	-HEP				
J10	-ER CMP	X			X
J11	-HEP2	X	X		
TERM 1	-HD CLK				X
TERM 2	-SR STEP1				X
TERM 3	-SR STEP2				X

SIGNAL DISTRIBUTION	CODE IDENT 31917	C	DWG NO 4468430B	REV
	PB-E		SHEET 25	WD09

4468430B

CROSS REF NO: 0200
MODULE LOC: 2PC1
SCHEMATIC NO: 44687963

PART NO: 44687943
REV: A

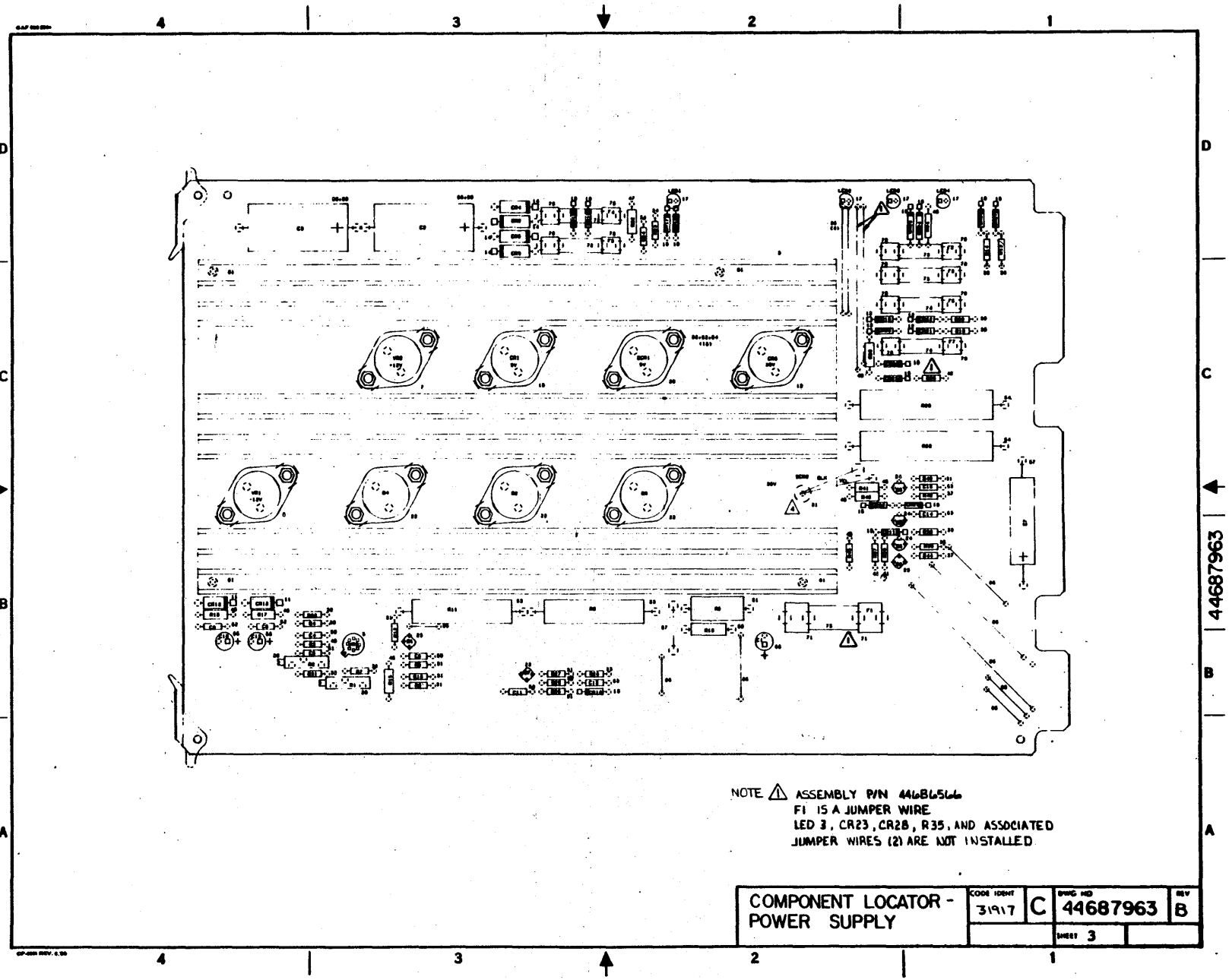
LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0700-7BP1	5V SENSE(+)	0201-P1-03
1J02	9.5 VAC	0201-P3-04
1J02	9.5 VAC	0201-P3-05
1J02	9.5V GND	0201-P3-08
1J02	16.5 VAC	0201-P3-01
1J02	16.5V GND	0201-P3-03
1J02	16.5 VAC	0201-P3-02
0300-7PC3	36V CROBAR(+)	0201-P1-01
9R01	36V DISCHARGE(+)	0201-P2-07
1J02	38 VAC	0201-P3-06
1J02	38 VAC	0201-P3-07
0300-7PC3	PDC SIG	0201-P1-09
0300-7PC3	RTN	0201-P1-10
9TB3	THERMISTOR(+)	0201-P1-08
0400-2PC2	36V(+)	0201-P1-02
5BBG	36V GND	0201-P2-04
5BBG	36V GND	0201-P2-03
0700-7BP1	5V SENSE RTN (+)	0201-P1-04

MODULE OUTPUTS

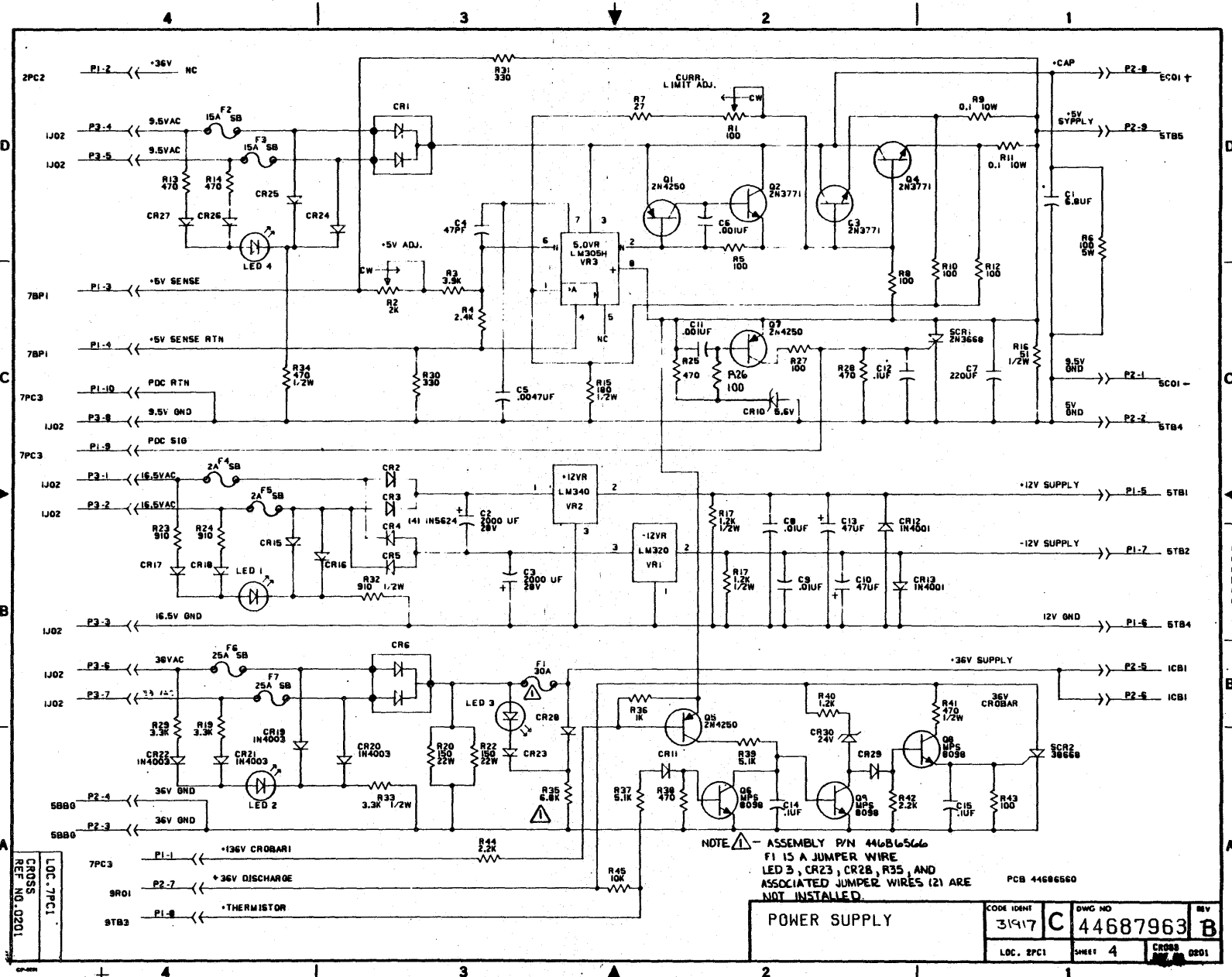
MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0201-P2-9	5V SUPPLY(+)	5TB5
0201-P1-5	12V(+)	5TB1
0201-P1-7	12V(-)	5TB2
0201-P2-5,P2-6	36V SUPPLY(+)	1CB1
0201-P2-8	CAP(+)	5C01
0201-P2-1	9.5V GND	5C01
0201-P2-2	5V GND	5TB4
0201-P1-6	12V GND	5TB4



NOTE ⚠ ASSEMBLY P/N 44686566
F1 IS A JUMPER WIRE.
LED 3, CR23, CR28, R35, AND ASSOCIATED
JUMPER WIRES (2) ARE NOT INSTALLED.

COMPONENT LOCATOR - POWER SUPPLY	CODE IDENT 31917	C	DWG NO 44687963	REV B
			SHEET 3	

44687963


POWER SUPPLY
44687963
B
31917
C
LOC. 2PC1
SHEET 4
NOTE ⚠ - ASSEMBLY P/N 44686560
F1 IS A JUMPER WIRE
LED 3, CR23, CR28, R35, AND
ASSOCIATED JUMPER WIRES (2) ARE
NOT INSTALLED.
PCB 44686560
+36V SUPPLY
+12V SUPPLY
-12V SUPPLY
+5V SUPPLY
+CAP
9.5V GND
5V GND
12V GND
36V GND
+5V SENSE
+5V SENSE RTN
PDC RTN
PDC SIG
+5V ADJ.
CURR. LIMIT ADJ.
+36V DISCHARGE
+THERMISTOR
36V CROBAR
5.0VR LM305H VR3
+12VR LM340 VR2
-12VR LM320 VR1
SCR1 2N3668
SCR2 38668
LED 1
LED 2
LED 3
LED 4
CROSS REF NO. 0201
LOC. 7PC1

44687963

CROSS REF NO: 0400
MODULE LOC: 2PC2
SCHEMATIC NO: 44687964

PART NO: 44687944
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

	SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
	5TB5	+5V	0401-P1-2
	5TB1	+12V	0404-P1-1
	5TB2	-12V	0404-P1-3
	5BBV	+36V	0403-P2-4
	NC	+36V FUSED	0403-P2-5
	0300-7PC3	BMC CLOCK (+)	0402-P1-L
	0300-7PC3	RTN	0402-P1-10
	0300-7PC3	BMC FEED BACK (+)	0402-P1-K
	0300-7PC3	RTN	0402-P1-9
	0300-7PC3	FWD	0403-P1-T
	0300-7PC3	RTN	0403-P1-16
	5TB4	GND	0404-P1-A
	5TB4	GND	0401-P1-B
	NC	GND	0404-P1-C
1	0300-7PC3	LEFT	0403-P1-U
	0300-7PC3	RTN	0403-P1-17
	4SW2	LOWER BAR RTN	0401-P1-24
	4SW2	LOWER SHORTING BAR	0401-P1-(B)
	0300-7PC3	MOTOR ON (-)	0401-P1-4
	5BBG	36V GND	0403-P2-1
	0300-7PC3	RATE DAMPING INH(-)	0402-P1-J
	0300-7PC3	RTN	0402-P1-8
	0300-7PC3	REV	0403-P1-S
	0300-7PC3	RTN	0403-P1-15
	0300-7PC3	RIBBON INHIBIT (-)	0401-P1-5
1	0300-7PC3	RIGHT	0403-P1-V
	0300-7PC3	RTN	0403-P1-18
	4SW1	UPPER BAR RTN	0401-P1-25
	4SW1	UPPER SHORTING BAR	0401-P1-(C)

NOTE:
1 SIGNAL USED ON PBS SERVO PWR AMP BDS; NOT USED ON PB BDS

CROSS REF NO: 0400
MODULE LOC: 2PC2
SCHEMATIC NO: 44687964

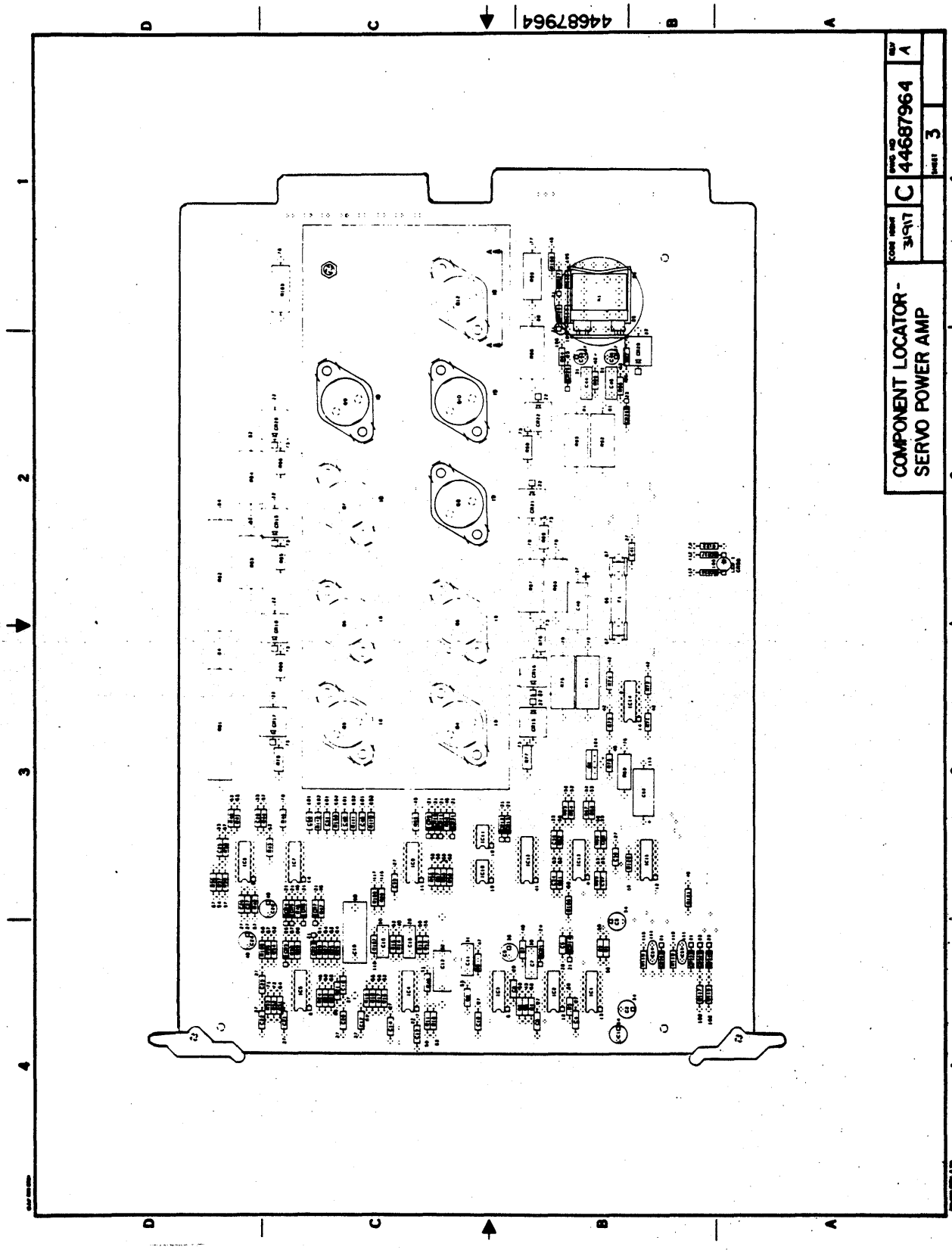
PART NO: 44687944
REV: A

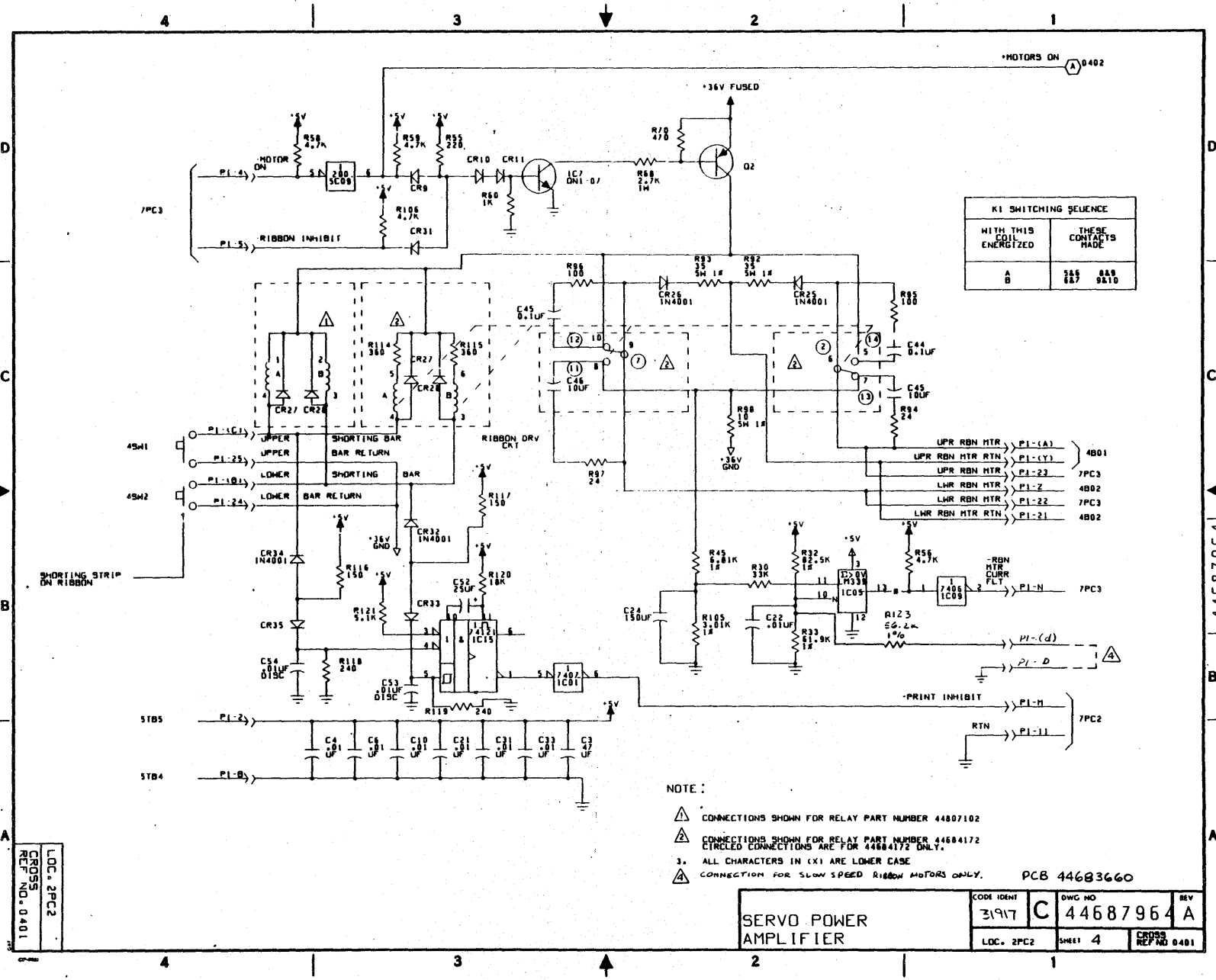
LOGIC SIGNAL CROSS REF. DETACHED LIST

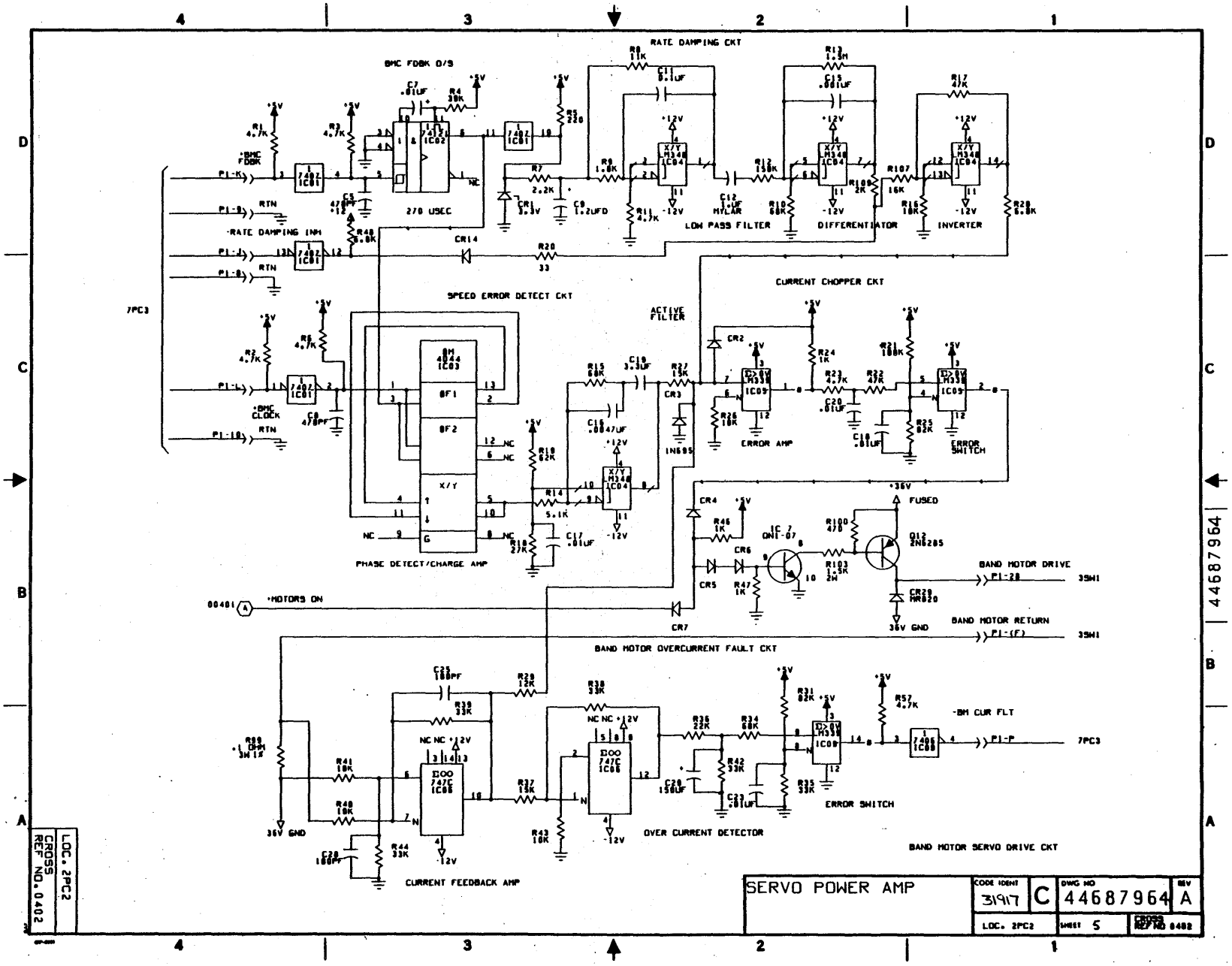
MODULE OUTPUTS

	MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
	0403-P1-26	36V(+)	0300-2PC1
	0402-P1-19	RTN	0300-7PC3
	0403-P1-W	36V SENSE (+)	0300-7PC3
	0402-P1-28	BAND MTR DRIVE	3SW1
	0402-P1-(F)	BAND MTR RTN	3SW1
	0402-P1-P	BM CUR FLT (-)	0300-7PC3
1	0403-P2-2	COIL LEFT	PRINTER LOGIC
1	0403-P2-6	COIL RIGHT	PRINTER LOGIC
1	0404-P1-7	H CUR SENSE	0300-7PC3
	0404-P1-H	RTN	0300-7PC3
	0404-P1-R	H SW FAULT SENSE	0300-7PC3
	0404-P1-14	RTN	0300-7PC3
	0401-P1-Z	LWR RBN MTR	4B02
	0401-P1-22	LWR RBN MTR	0300-7PC3
	0401-P1-21	RTN	4B02
	0401-P1-M	PRINT INHIBIT (-)	0100-7PC2
	0401-P1-11	RTN	0200-7PC2
	0401-P1-N	RBN MTR CUR FLT(-)	0300-7PC3
	0401-P1-(A)	UPPER RBN MTR	4B01
	0401-P1-(Y)	RTN	4B01
	0401-P1-23	UPPER RBN MTR	0300-7PC3
	0404-P1-6	V CUR SENSE	0300-7PC3
	0404-P1-F	RTN	0300-7PC3
	0403-P2-3	VERT SERVO MOTOR FWD	3B01
	0403-P2-7	VERT SERVO MOTOR REV	3B01

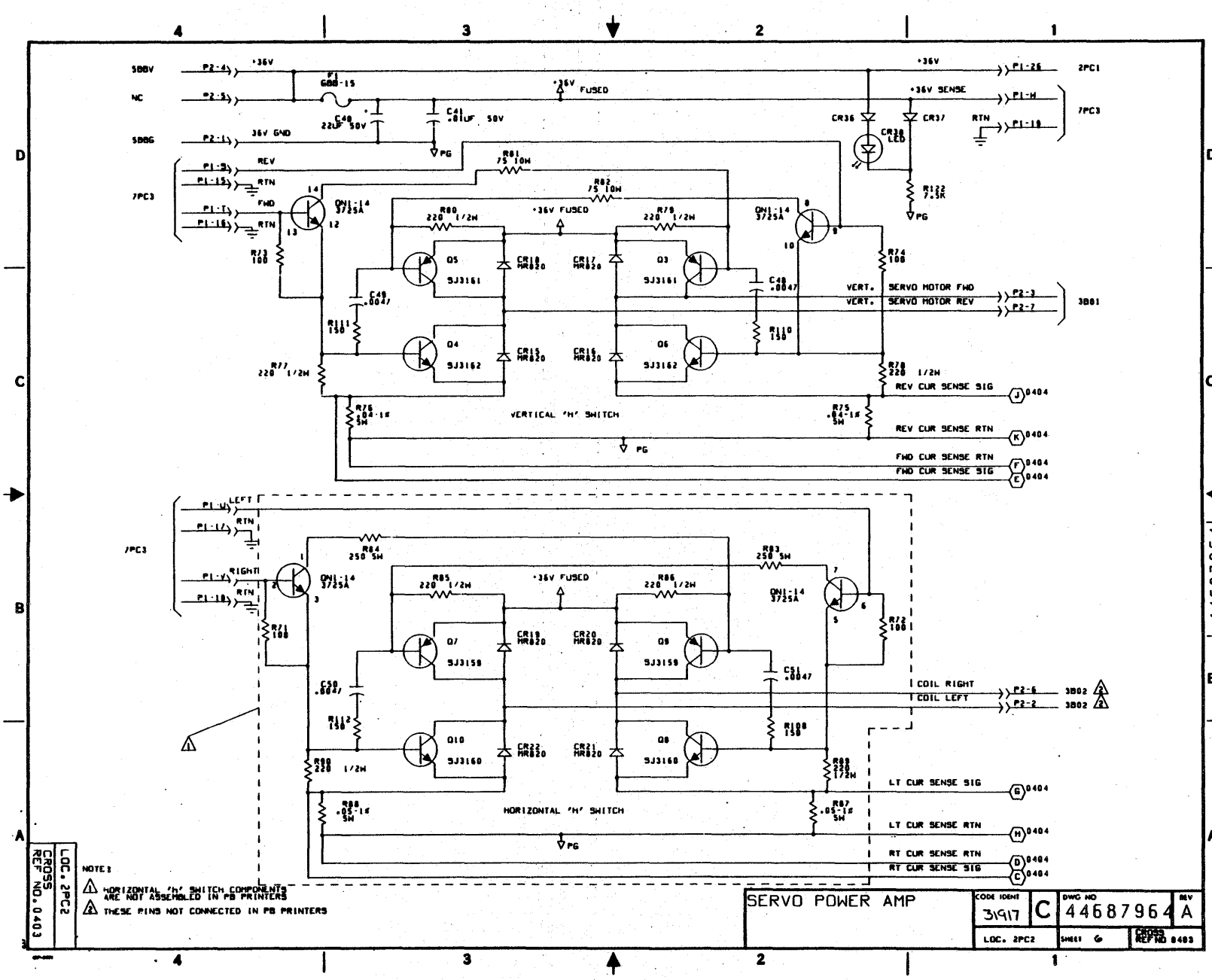
NOTE:
1 SIGNAL USED ON PBS SERVO PWR AMP BDS; NOT USED ON PB BDS

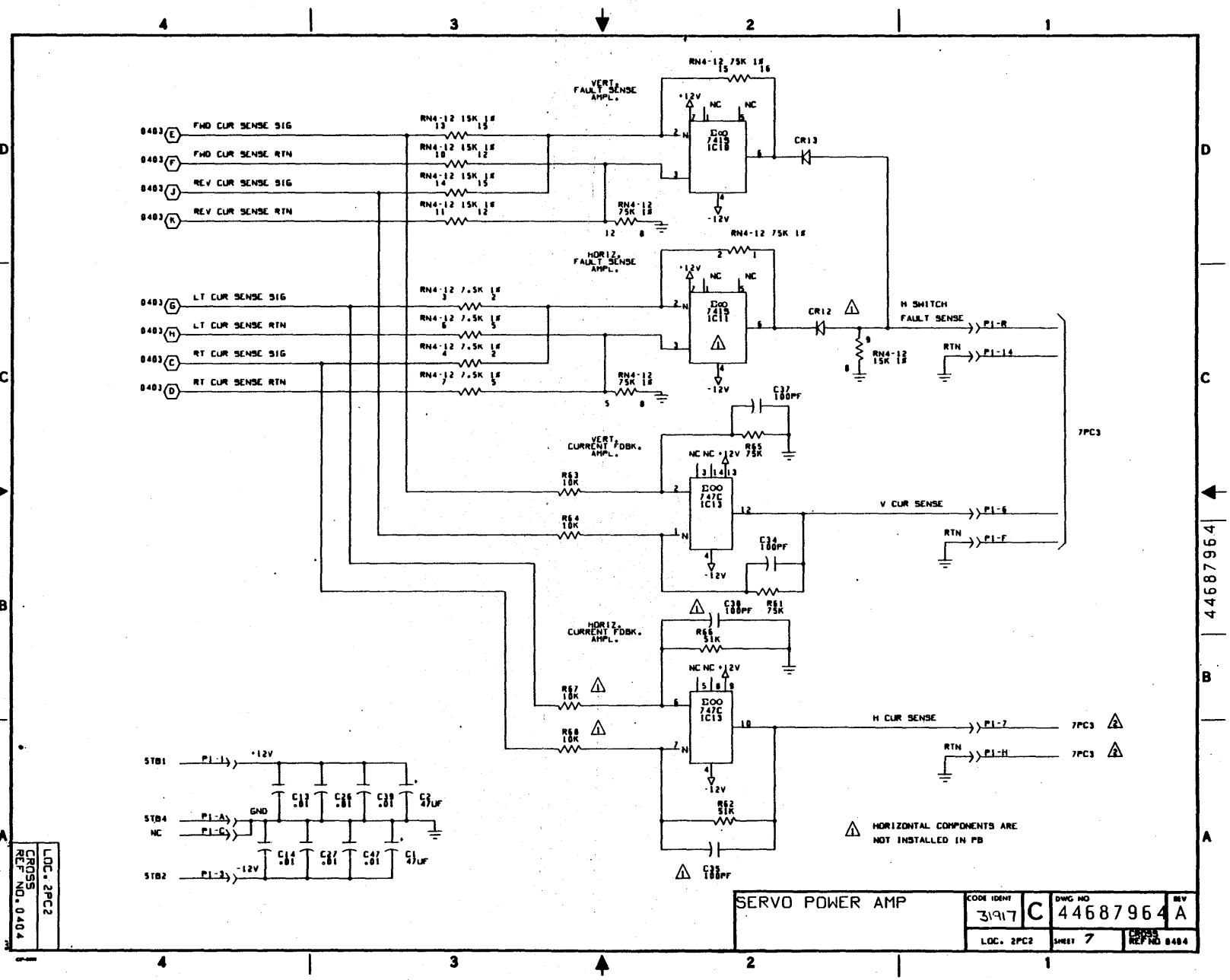

44687964
COMPONENT LOCATOR -
SERVO POWER AMP
C
44687964
A
3


*MOTORS ON
0402
*36V FUSED
*5V
MOTOR ON
RIBBON INHIBIT
/PC3
P1-4
P1-5
R58 4.7K
R59 4.7K
R55 220
R106 4.7K
CR9
CR31
CR10
CR11
IC7 DN1-07
R60 1K
R70 470
R68 2.7K 1W
Q2
K1 SWITCHING SEQUENCE
WITH THIS COIL ENERGIZED
THESE CONTACTS MADE
A
B
5&6 8&7
8&9 9&10
R86 100
R93 35 5W 1%
R92 35 5W 1%
CR26 IN4001
CR25 IN4001
R85 100
C45 0.1UF
C46 10UF
C44 0.1UF
C45 10UF
R98 10 5W 1%
R94 24
R97 24
*36V GND
R114 360
R115 360
CR27
CR28
CR27 CR28
4SW1
4SW2
P1-(C)
P1-25
P1-(B)
P1-24
UPPER SHORTING BAR
UPPER BAR RETURN
LOWER SHORTING BAR
LOWER BAR RETURN
RIBBON DRV CKT
SHORTING STRIP ON RIBBON
R117 150
CR32 IN4001
R116 150
CR34 IN4001
R120 10K
C52 25UF
CR33
R121 5.1K
CR35
C54 .01UF DISC
R118 240
C53 .01UF DISC
R119 240
IC15
IC01
STB5
STB4
P1-2
P1-8
C4 .01 UF
C6 .01 UF
C10 .01 UF
C21 .01 UF
C31 .01 UF
C33 .01 UF
C3 .47 UF
UPR RBN MTR P1-(A)
UPR RBN MTR RTN P1-(Y)
UPR RBN MTR P1-23
LWR RBN MTR P1-Z
LWR RBN MTR P1-22
LWR RBN MTR RTN P1-21
4B01
7PC3
4B02
7PC3
4B02
R45 6.81K 1%
R30 33K
R32 82.5K 1%
R56 4.7K
LM339 IC05
7406 IC09
-RBN MTR CURR FLT
P1-N
7PC3
C24 150UF
R105 3.01K 1%
C22 .01UF
R33 61.9K 1%
R123 56.2K 1%
P1-(d)
P1-D
-PRINT INHIBIT
P1-M
RTN
P1-11
7PC2
NOTE:
1. CONNECTIONS SHOWN FOR RELAY PART NUMBER 44807102
2. CONNECTIONS SHOWN FOR RELAY PART NUMBER 44684172 CIRCLED CONNECTIONS ARE FOR 44684172 ONLY.
3. ALL CHARACTERS IN (X) ARE LOWER CASE
4. CONNECTION FOR SLOW SPEED RIBBON MOTORS ONLY.
PCB 44683660
SERVO POWER AMPLIFIER
CODE IDENT 31917
C
DWG NO 44687964
REV A
LOC. 2PC2
SHEET 4
CROSS REF NO 0401
CROSS REF NO. 0401
LOC. 2PC2


RATE DAMPING CKT
BMC FDBK O/S
270 USEC
LOW PASS FILTER
DIFFERENTIATOR
INVERTER
-RATE DAMPING INH
SPEED ERROR DETECT CKT
CURRENT CHOPPER CKT
ACTIVE FILTER
PHASE DETECT/CHARGE AMP
ERROR AMP
ERROR SWITCH
FUSED
BAND MOTOR DRIVE
BAND MOTOR RETURN
+MOTORS ON
BAND MOTOR OVERCURRENT FAULT CKT
-BM CUR FLT
CURRENT FEEDBACK AMP
OVER CURRENT DETECTOR
BAND MOTOR SERVO DRIVE CKT
SERVO POWER AMP
CODE IDENT 31917
DWG NO 44687964
REV A
SHEET 5
LOC. 2PC2
CROSS REF NO. 0402

44687964


SERVO POWER AMP
CODE IDENT 31917
C
DWG NO 44687964
REV A
LOC. 2PC2
SHEET 6
CROSS REF NO. 0403
VERTICAL 'H' SWITCH
HORIZONTAL 'H' SWITCH
VERT. SERVO MOTOR FWD
VERT. SERVO MOTOR REV
REV CUR SENSE SIG
REV CUR SENSE RTN
FWD CUR SENSE RTN
FWD CUR SENSE SIG
COIL RIGHT
COIL LEFT
LT CUR SENSE SIG
LT CUR SENSE RTN
RT CUR SENSE RTN
RT CUR SENSE SIG
+36V FUSED
+36V SENSE
36V GND
NOTE:
1. 'HORIZONTAL 'H' SWITCH COMPONENTS ARE NOT ASSEMBLED IN PB PRINTERS
2. THESE PINS NOT CONNECTED IN PB PRINTERS


FWD CUR SENSE SIG
FWD CUR SENSE RTN
REV CUR SENSE SIG
REV CUR SENSE RTN
LT CUR SENSE SIG
LT CUR SENSE RTN
RT CUR SENSE SIG
RT CUR SENSE RTN
VERT. FAULT SENSE AMPL.
HORIZ. FAULT SENSE AMPL.
VERT. CURRENT FDBK. AMPL.
HORIZ. CURRENT FDBK. AMPL.
CR13
CR12
H SWITCH FAULT SENSE
V CUR SENSE
H CUR SENSE
RTN
7PC3
HORIZONTAL COMPONENTS ARE NOT INSTALLED IN PB
SERVO POWER AMP
CODE IDENT 31917
DWG NO 44687964
REV A
LOC. 2PC2
SHEET 7
CROSS REF NO 0404

44687964

CROSS REF NO: 0500
MODULE LOC: 5PCx
SCHEMATIC NO: 44687966

PART NO: 44687946
REV: A

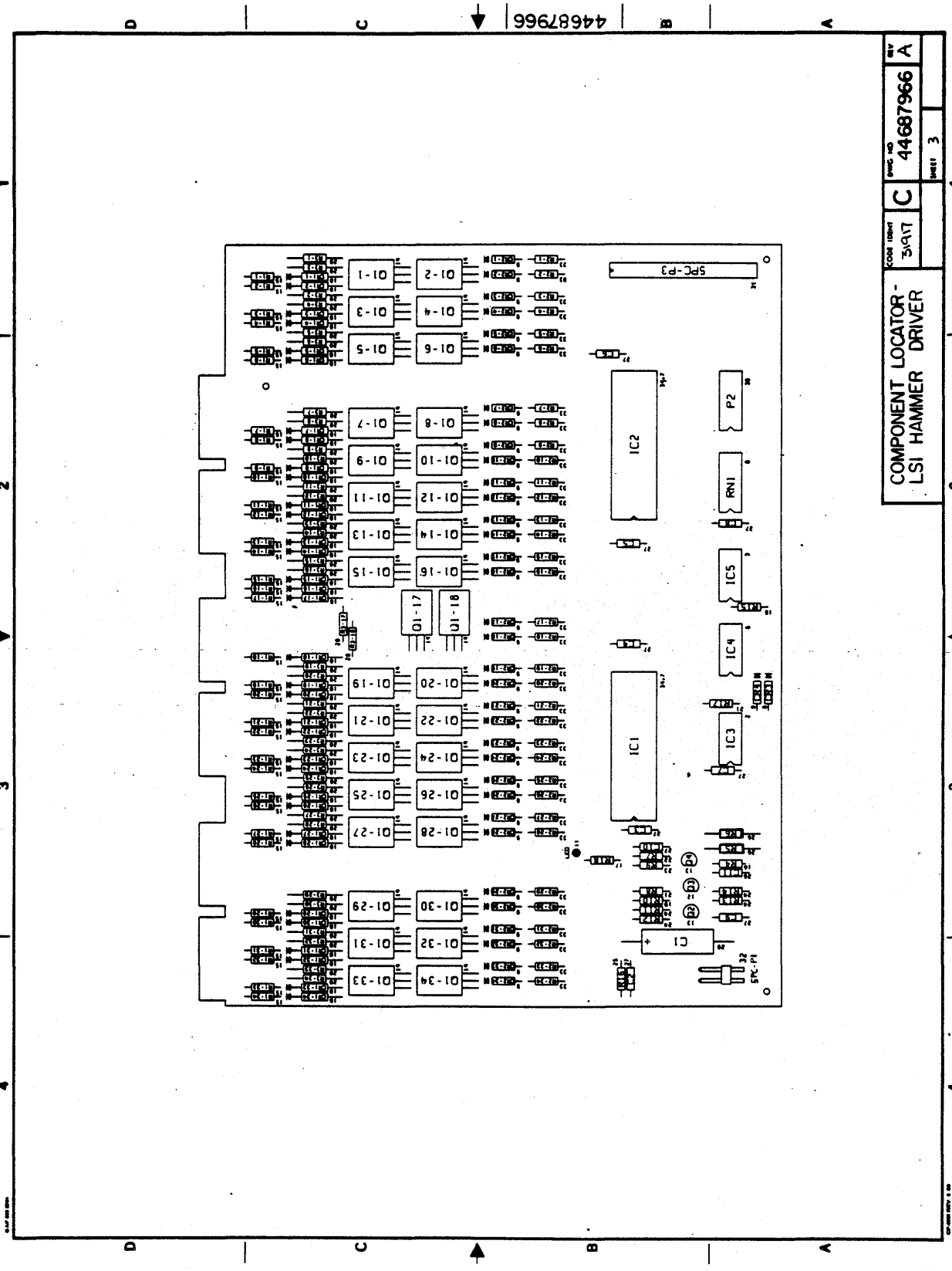
LOGIC SIGNAL CROSS REF. DETACHED LIST

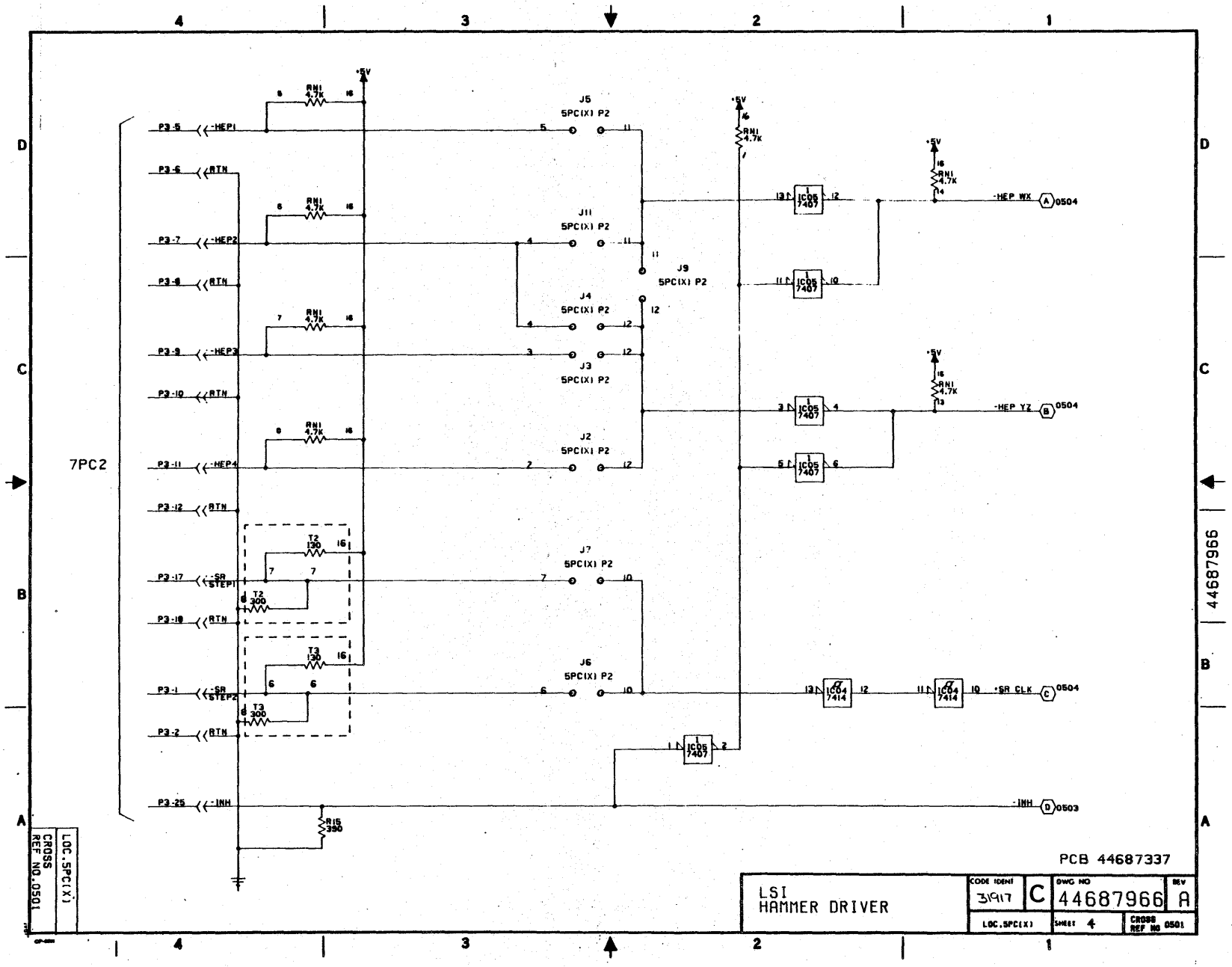
MODULE INPUTS

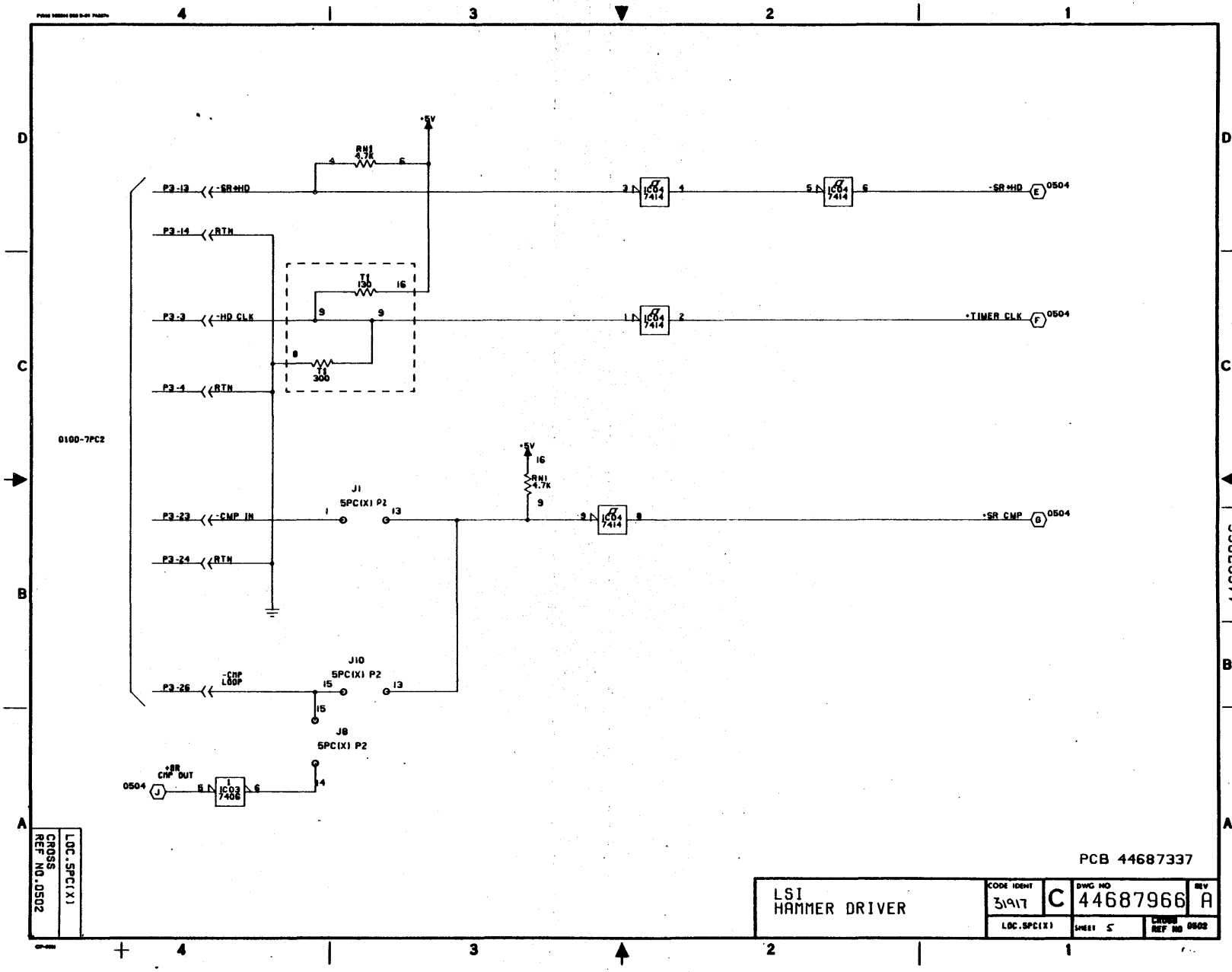
SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0100-7PC2	CMP IN(-)	0502-P3-23
0100-7PC2	RTN	0502-P3-24
0500-5PC3	CMP LOOP(-) to 5PC1	0502-P3-26
0500-5PC4	CMP LOOP(-) to 5PC2	0502-P3-26
0100-7PC2	FAULT RESET(-)	0503-P3-21
0100-7PC2	RTN	0503-P3-22
0100-7PC2	HD CLK(-)	0502-P3-3
0100-7PC2	RTN	0503-P3-4
0100-7PC2	HEP 1(-)	0501-P3-5
0100-7PC2	RTN	0501-P3-6
0100-7PC2	HEP 2(-)	0501-P3-7
0100-7PC2	RTN	0501-P3-8
0100-7PC2	HEP 3(-)	0501-P3-9
0100-7PC2	RTN	0501-P3-10
0100-7PC2	HEP 4(-)	0501-P3-11
0100-7PC2	RTN	0501-P3-12
0100-7PC2	INH(-)	0501-P3-25
0100-7PC2	SR CLR(-)	0504-P3-15
0100-7PC2	RTN	0504-P3-16
0100-7PC2	SR HD(-)	0502-P3-13
0100-7PC2	RTN	0502-P3-14
0100-7PC2	SR STEP 1(-)	0501-P3-17
0100-7PC2	RTN	0501-P3-18
0100-7PC2	SR STEP 2(-)	0501-P3-1
0100-7PC2	RTN	0501-P3-2
5TB5	5VDC (+)	0503-P1-1
5TB4	GND	0503-P1-2

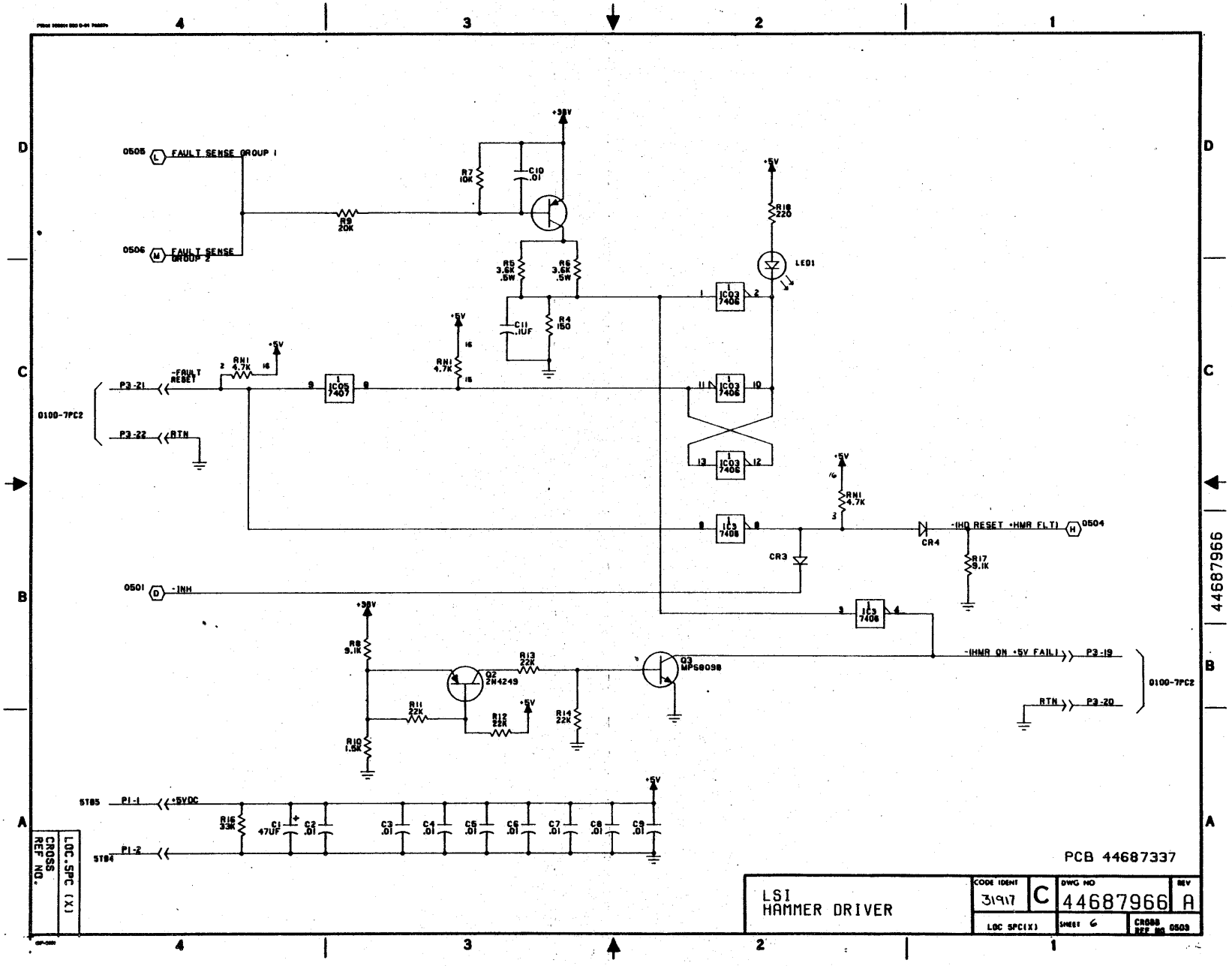
MODULE OUTPUTS

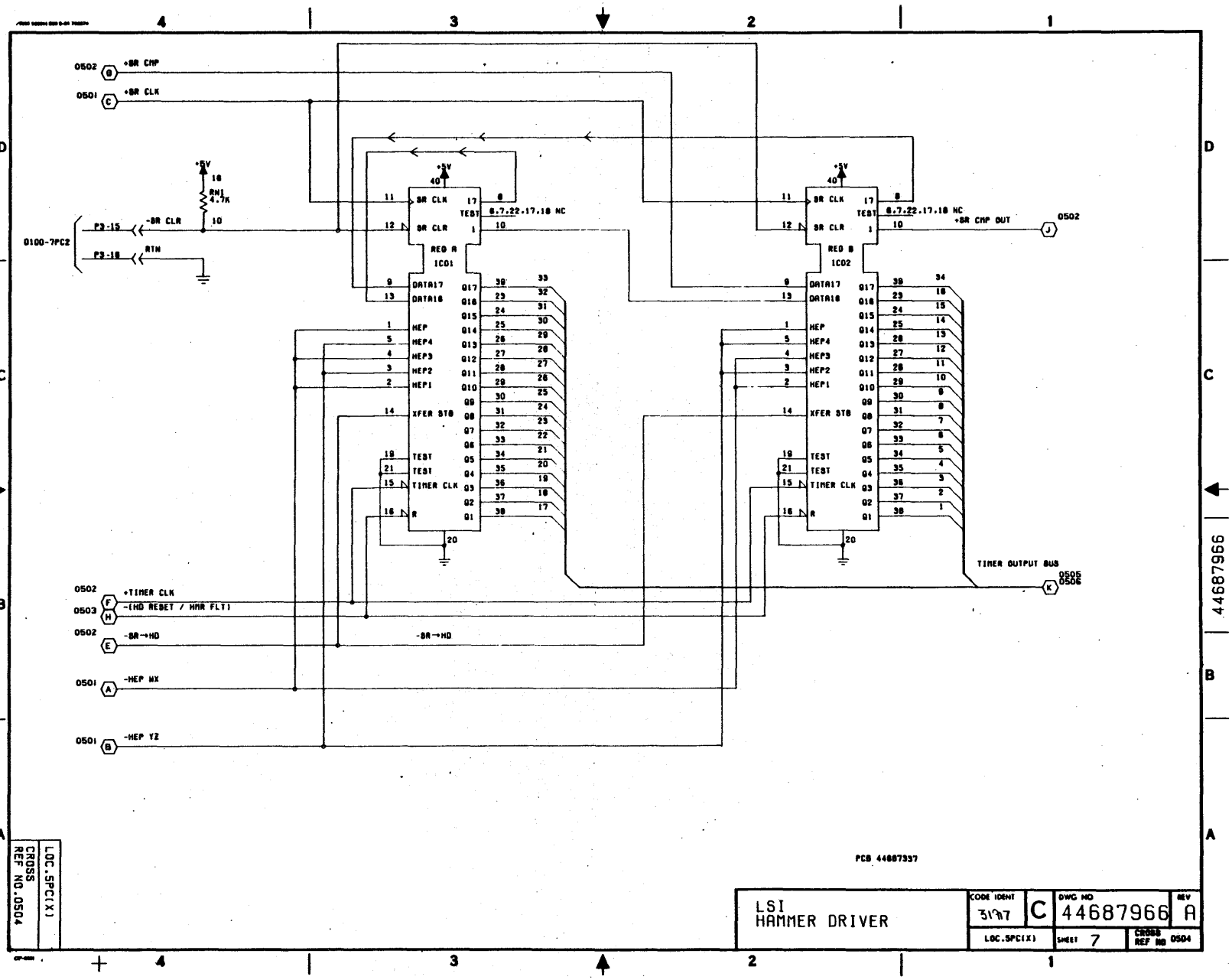
MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0502-P3-26	CMP LOOP(-) from 5PC3	0500-5PC1
0502-P3-26	CMP LOOP(-) from 5PC4	0500-5PC2
0503-P3-19	HMR ON +5V FAIL (-)	0100-7PC2
0503-P3-20	RTN	0100-7PC2
0505-P4-B01	REFER TO "PRINTER	
0505-P4-A01	ELECTRONICS DIAGRAMS"	

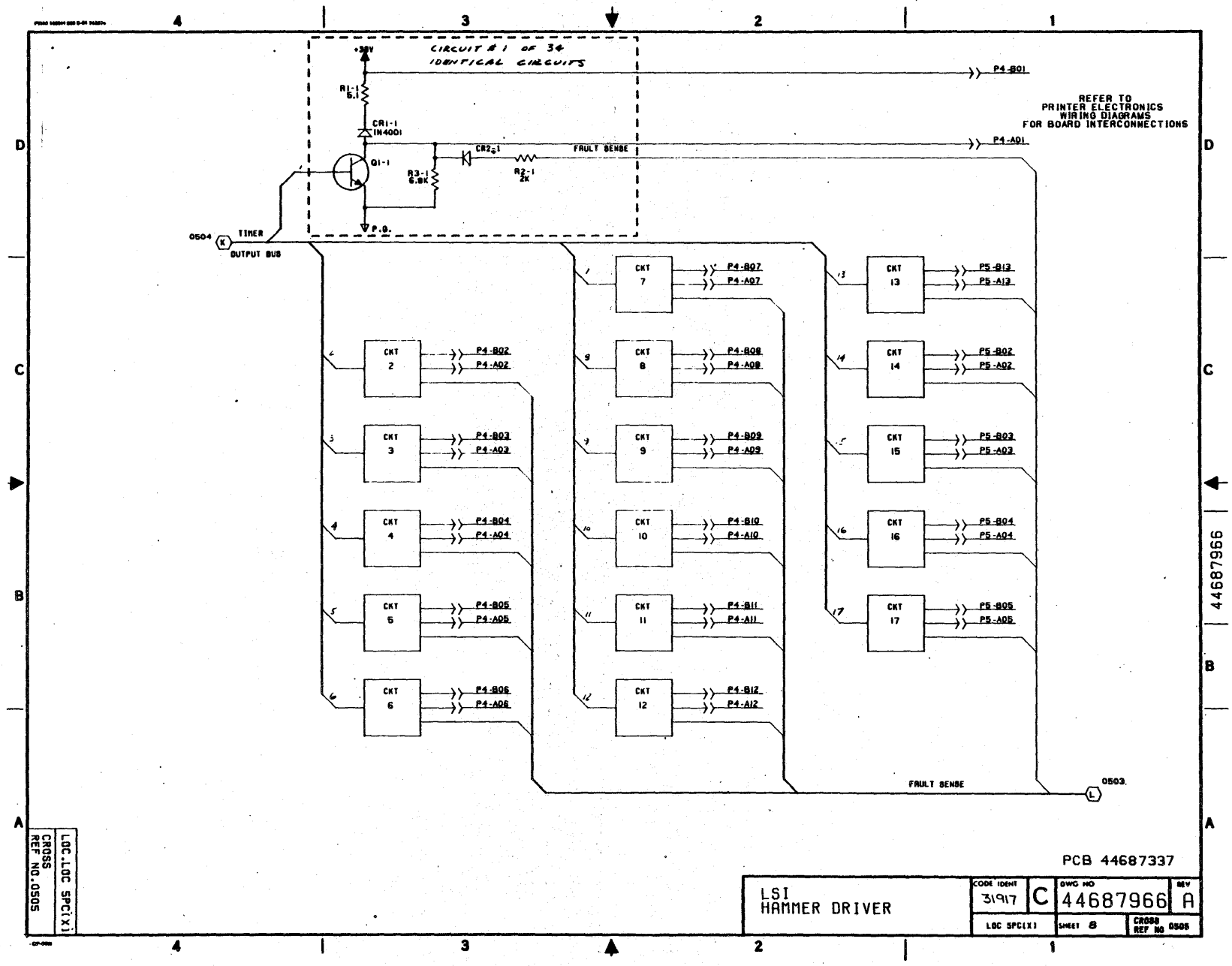

44687966
COMPONENT LOCATOR - LSI HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
SHEET 3
SPC-P3
SPC-P1
P2
RN1
IC1
IC2
IC3
IC4
IC5
C1
Q1-1
Q1-2
Q1-3
Q1-4
Q1-5
Q1-6
Q1-7
Q1-8
Q1-9
Q1-10
Q1-11
Q1-12
Q1-13
Q1-14
Q1-15
Q1-16
Q1-17
Q1-18
Q1-19
Q1-20
Q1-21
Q1-22
Q1-23
Q1-24
Q1-25
Q1-26
Q1-27
Q1-28
Q1-29
Q1-30
Q1-31
Q1-32
Q1-33
Q1-34

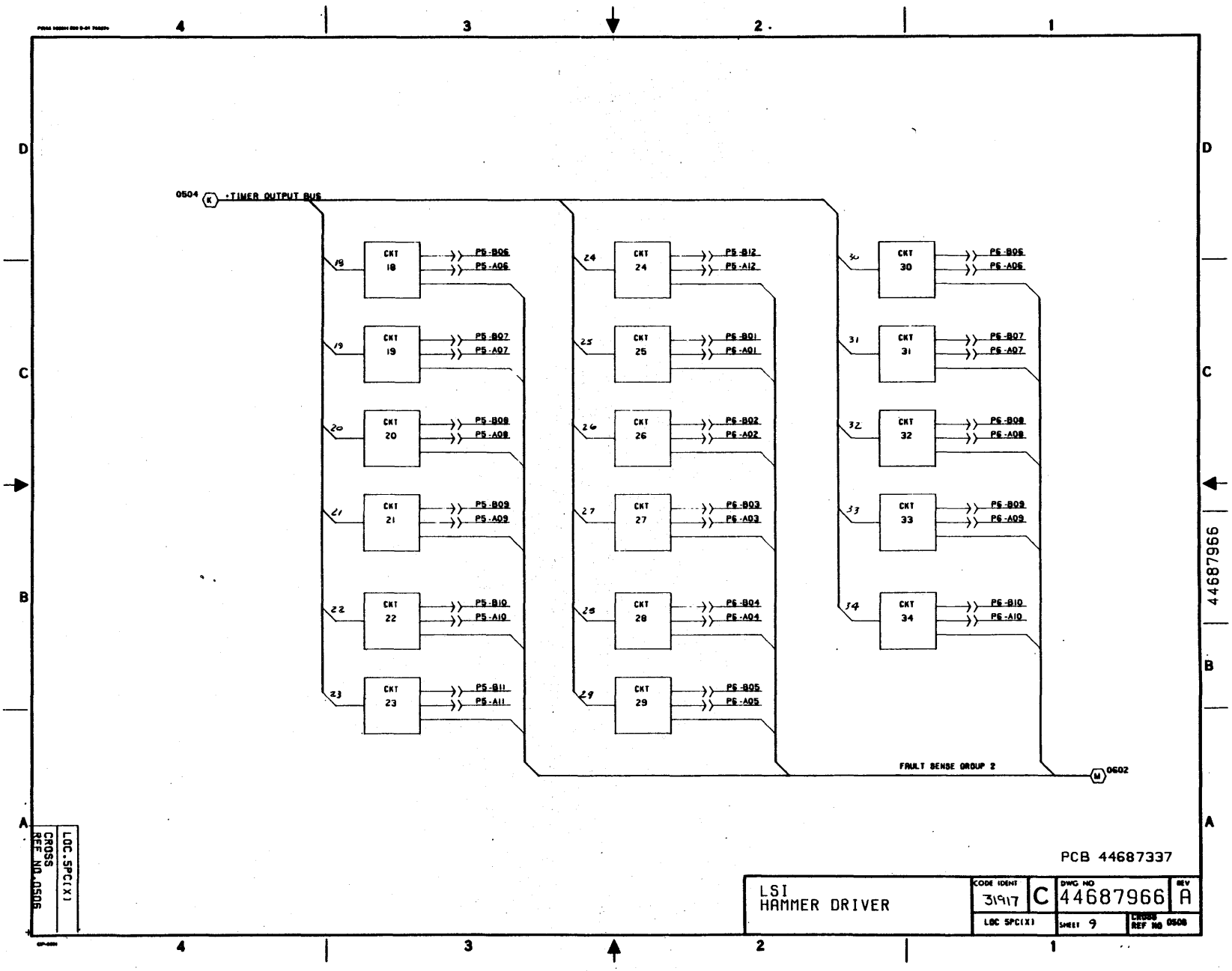

7PC2
P3-5 -HEP1
P3-6 RTN
P3-7 -HEP2
P3-8 RTN
P3-9 -HEP3
P3-10 RTN
P3-11 -HEP4
P3-12 RTN
P3-17 -SR STEP1
P3-18 RTN
P3-1 -SR STEP2
P3-2 RTN
P3-25 -INH
+5V
RNI 4.7K
T2 130
T2 300
T3 130
T3 300
R15 350
J5 5PC(X) P2
J11 5PC(X) P2
J9 5PC(X) P2
J4 5PC(X) P2
J3 5PC(X) P2
J2 5PC(X) P2
J7 5PC(X) P2
J6 5PC(X) P2
IC05 7407
IC04 7414
-HEP WX A 0504
-HEP YZ B 0504
•SR CLK C 0504
-INH D 0503
CROSS REF NO. 0501
LOC. 5PC(X)
PCB 44687337
LSI
HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
LOC, 5PC(X)
SHEET 4
CROSS REF NO 0501
44687966


+5V
RN1 4.7K
P3-13
-SR+HD
IC04 7414
0504
P3-14
RTN
T1 130
16
P3-3
-HD CLK
9
T1 300
8
+TIMER CLK
P3-4
0100-7PC2
RN1 4.7k
J1
5PC(X) P2
P3-23
-CMP IN
13
+SR CMP
P3-24
J10
P3-26
-CMP LOOP
15
J8
+SR CMP OUT
IC03 7406
14
PCB 44687337
LSI
HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
LOC.SPC(X)
SHEET 5
CROSS REF NO.0502
LOC.SPC(X)


0505 FAULT SENSE GROUP 1
0506 FAULT SENSE GROUP 2
+38V
+5V
R7 10K
C10 .01
R9 20K
R5 3.6K .5W
R6 3.6K .5W
R18 220
LED1
C11 .1UF
R4 150
RN1 4.7K
-FAULT RESET
P3-21
P3-22
RTN
0100-7PC2
IC05 7407
IC02 7406
IC03 7408
-IHR RESET +HMR FLT
0504
CR4
CR3
R17 9.1K
0501
-INH
R8 9.1K
R13 22K
Q2 2N4249
Q3 MPS8098
R11 22K
R12 226
R14 22K
R10 1.5K
-HMR ON +5V FAIL
P3-19
P3-20
ST85
ST84
P1-1
P1-2
+5VDC
R16 33K
C1 47UF
C2 .01
C3 .01
C4 .01
C5 .01
C6 .01
C7 .01
C8 .01
C9 .01
CROSS REF NO.
LOC.SPC (X)
PCB 44687337
LSI
HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
LOC SPC(X)
SHEET 6
CROSS REF NO 0503


0502 +BR CMP
0501 +BR CLK
+5V
RN1 4.7K
0100-7PC2
P3-15 -BR CLR
P3-18 RTN
REG A IC01
REG B IC02
BR CLK
BR CLR
TEST
8,7,22,17,18 NC
DATA17
DATA16
HEP
HEP4
HEP3
HEP2
HEP1
XFER STB
TEST
TIMER CLK
R
+BR CMP OUT
TIMER OUTPUT BUS
0505
0506
0502 +TIMER CLK
0503 -(HD RESET / HAR FLT)
0502 -BR→HD
-BR→HD
0501 -HEP MX
0501 -HEP YZ
PCB 44687937
LSI
HAMMER DRIVER
CODE IDENT 31997
C
DWG NO 44687966
REV A
LOC.5PC(X)
SHEET 7
CROSS REF NO 0504
CROSS REF NO.0504
LOC.5PC(X)


CIRCUIT # 1 OF 34
IDENTICAL CIRCUITS
+30V
R1-1
5.1
CR1-1
IN4001
Q1-1
R3-1
6.8K
CR2-1
R2-1
2K
FAULT BENBE
P.O.
P4-B01
P4-A01
REFER TO
PRINTER ELECTRONICS
WIRING DIAGRAMS
FOR BOARD INTERCONNECTIONS
0504
TIMER
OUTPUT BUS
CKT 7
P4-B07
P4-A07
CKT 13
P5-B13
P5-A13
CKT 2
P4-B02
P4-A02
CKT 8
P4-B08
P4-A08
CKT 14
P5-B02
P5-A02
CKT 3
P4-B03
P4-A03
CKT 9
P4-B09
P4-A09
CKT 15
P5-B03
P5-A03
CKT 4
P4-B04
P4-A04
CKT 10
P4-B10
P4-A10
CKT 16
P5-B04
P5-A04
CKT 5
P4-B05
P4-A05
CKT 11
P4-B11
P4-A11
CKT 17
P5-B05
P5-A05
CKT 6
P4-B06
P4-A06
CKT 12
P4-B12
P4-A12
FAULT BENBE
0503
PCB 44687337
LSI
HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
LOC SPC(X)
SHEET 8
CROSS REF NO 0505
CROSS REF NO.0505
LOC.LOC SPC(X)
44687966


0504 K •TIMER OUTPUT BUS
18 CKT 18 P5-B06 P5-A06
19 CKT 19 P5-B07 P5-A07
20 CKT 20 P5-B08 P5-A08
21 CKT 21 P5-B09 P5-A09
22 CKT 22 P5-B10 P5-A10
23 CKT 23 P5-B11 P5-A11
24 CKT 24 P5-B12 P5-A12
25 CKT 25 P6-B01 P6-A01
26 CKT 26 P6-B02 P6-A02
27 CKT 27 P6-B03 P6-A03
28 CKT 28 P6-B04 P6-A04
29 CKT 29 P6-B05 P6-A05
30 CKT 30 P6-B06 P6-A06
31 CKT 31 P6-B07 P6-A07
32 CKT 32 P6-B08 P6-A08
33 CKT 33 P6-B09 P6-A09
34 CKT 34 P6-B10 P6-A10
FAULT SENSE GROUP 2
M 0502
LOC.SPC(X)
CROSS REF NO. 0505
PCB 44687337
LSI HAMMER DRIVER
CODE IDENT 31917
C
DWG NO 44687966
REV A
LOC SPC(X)
SHEET 9
CROSS REF NO 0508
44687966

CROSS REF NO: 0300
MODULE LOC: 7PC3
SCHEMATIC NO: 44687970

PART NO: 44687941
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
5TB1	12V+	0306-P1-5
5TB1	12V+	0306-P1-6
0100-7PC2	0.53 HZ CLK+	0305-P1-9
0400-2PC2	36 VDC+	0302-P2-88
0400-2PC2	36V SENSE+	0306-P2-30
0400-2PC2	RTN	0306-P2-31
3SW2	6/-8LPI+	0308-P2-4
NC	BAND CVR SW NC	0305-P2-23
5C01	9.5V FUSED+	0314-P2-97
4J01	BAND CVR SW C	0305-P2-24
4J01	BAND CVR SW NO	0305-P2-25
4L02	BCP	0301-P2-50
4L02	RTN	0301-P2-49
4L02	SHIELD	0301-P2-48
4L01	BHP	0301-P2-52
4L01	RTN	0301-P2-51
0400-2PC2	BM CURRENT FLT-	0306-P2-68
0100-7PC2	BMC-	0305-P1-23
0100-7PC2	CLK 1 MHZ+	0303-P1-10
0700-7BP1	CP EN-	0301-P1-22
3SW1	GATE SW C	0305-P2-14
3SW1	GATE SW NO	0305-P2-15
5TB4	GND	0315-P1-1
5TB4	GND	0315-P1-2
5TB4	GND	0315-P1-69
5TB4	GND	0315-P1-70
0100-7PC2	H ADV-	0311-P1-17
0400-2PC2	H CUR SENSE	0309-P2-12
0400-2PC2	RTN	0309-P2-11
0100-7PC2	H DIR RT-	0310-P1-16
3L06	H HOME RDR	0309-P2-44
3L06	RTN	0309-P2-43
0700-7BP1	H INH-	0310-P1-26
3L06	H POS RDR	0309-P2-42
3L06	RTN	0309-P2-41
3L06	SHIELD	0309-P2-39
0400-2PC2	H SW FLT SENSE	0306-P2-46
0400-2PC2	RTN	0306-P2-45
3L05	H TACH SIGNAL	0309-P2-34
3L05	RTN	0309-P2-33
3L05	SHIELD	0309-P2-32

CROSS REF NO: 0300
MODULE LOC: 7PC3
SCHEMATIC NO: 44687970

PART NO: 44687941
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS (Cont)

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
4SW3	HALL EFFECT GATE SW-	0313-P2-22
4SW3	RTN	0313-P2-20
0700-7BP1	HI SLEW SW -	0308-P1-48
0100-7PC2	HME+	0306-P1-27
0100-7PC2	HMR ON/5V FAIL-	0313-P1-55
0400-2PC2	LWR RBN MTR	0313-P2-92
3SW4	OOP-	0308-P2-6
0700-7BP1	PB SERVO	0306-P1-28
0600-6PC1	PHASE CONTROL 2(+)	0302-P1-58
3L04	PMV RDR	0308-P2-28
5TB4	POWER GROUND	0314-P2-95
5C01	POWER GROUND	0314-P2-96
0400-2PC2	PRINT INHIBIT-	0314-P2-2
0400-2PC2	RTN	0314-P2-3
0400-2PC2	RIB MOT CUR FLT-	0306-P2-64
0100-7PC2	SR HD-	0313-P1-59
STACKER	STKR PRSNT-	0308-P2-71
STACKER	STKR RDY+	0314-P2-85
0700-7BP1	SUBSCAN PROGRAM	0303-P1-24
0400-2PC2	UPR RBN MTR	0313-P2-91
0100-7PC2	V ADV-	0308-P1-14
0100-7PC2	V ALIGN-	0307-P1-12
3L02	V CK RDR-	0308-P2-19
0400-2PC2	VERT CUR SENSE	0307-P2-82
0400-2PC2	RTN	0307-P2-81
3L02	VERT MOTION RDR	0307-P2-58
3L02	RTN	0307-P2-57
3L02	SHIELD	0307-P2-53
3L01	VERT TACH SIGNAL	0307-P2-62
3L01	RTN	0307-P2-60
3L01	SHIELD	0307-P2-61
5TB2	12V-	0306-P1-7
5TB2	12V-	0306-P1-8
NC	UNUSED	0314-P1-61
NC	UNUSED	0314-P1-62
NC	NC	0314-P1-53
5TB5	+5V	0315-P1-3
5TB5	+5V	0315-P1-4
5TB5	+5V	0315-P1-67
5TB5	+5V	0315-P1-68

CROSS REF NO: 0300
MODULE LOC: 7PC3
SCHEMATIC NO: 44687970

PART NO: 44687941
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

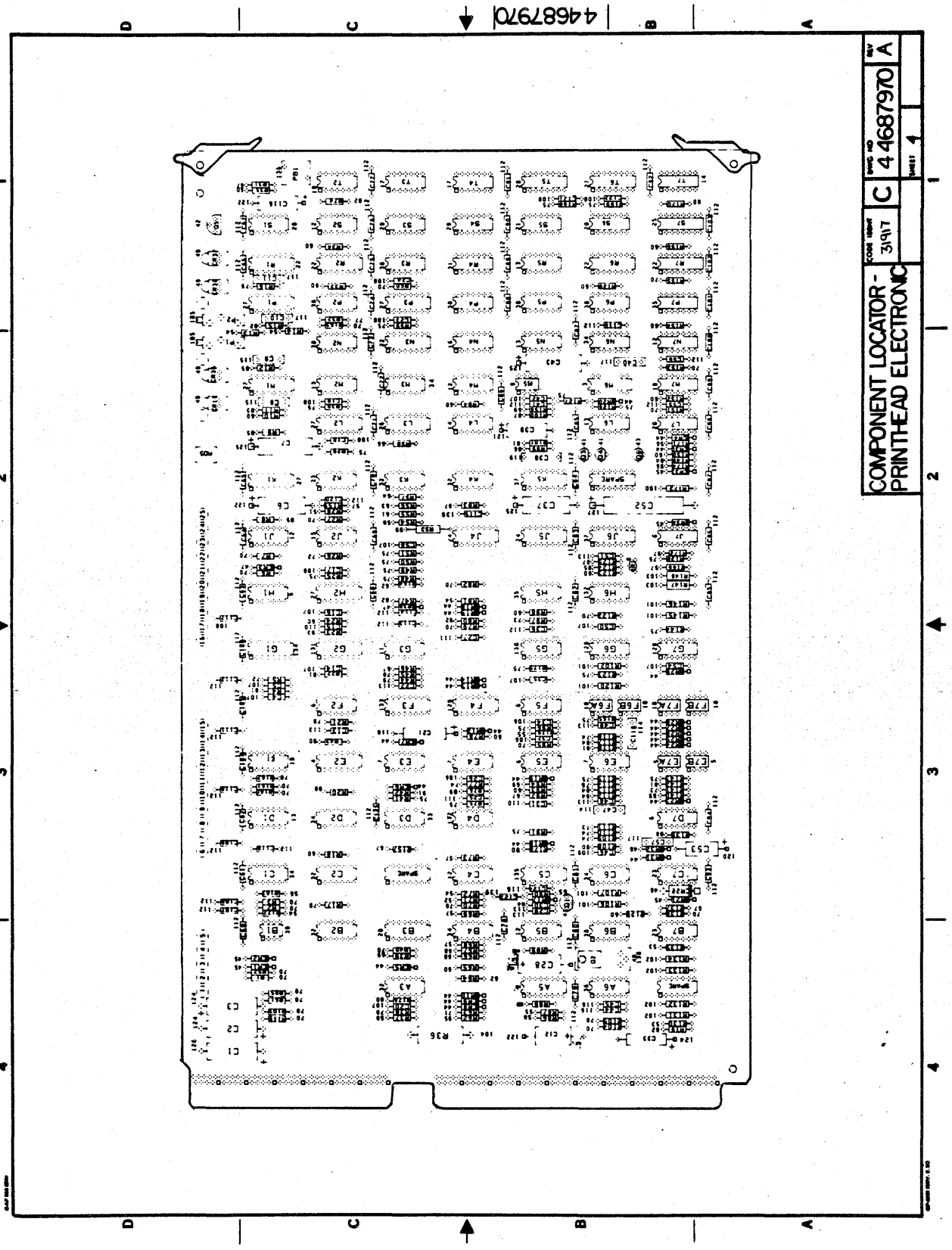
MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0309-P2-38	12V-	3L06
0309-P2-40	12V+	3L06
0306-P1-38	12V- FLT	0100-7PC2
0306-P2-8	36V+ CROBAR	0400-2PC2
0313-P2-87	36V+	3L08
0308-P1-42	6/-8 LPI+	0100-7PC2
0308-P1-42	6/-8 LPI+	0900-7PC1
0314-P2-98	9.5V FUSED+	3L07
0305-P1-31	BAND CRV/GATE OPEN+	0100-7PC2
0305-P2-34	BAND HOME PULSE-	0100-7PC2
0306-P1-40	BAND MOT FLT-	0100-7PC2
0305-P1-25	BAND UP+	0100-2PC2
0304-P2-74	BMC CLK+	0400-2PC2
0304-P2-73	RTN	0400-2PC1
0302-P2-66	BMC FDBK+	0400-2PC2
0302-P2-65	RTN	0400-2PC2
0306-P1-32	CE FLT+	0100-7PC2
0314-P2-99	CLAMP SOLENOID RTN	3L07
0314-P2-100	CLAMP SOLENOID RTN	3L07
0315-P1-52	CNTRLR RESET	0100-7PC2
0301-P1-33	COMP PITCH-	0100-7PC2
0307-P2-10	EXIT MTR ON-	1PC1
0306-P1-56	FAULT RESET-	0100-7PC2
0306-P1-37	FUSE FLT-	0100-7Pc2
0307-P2-78	FWD	0400-2PC2
0307-P2-77	RTN	0400-2PC2
0305-P1-47	GATE CVR STATUS-	0100-7PC2
0309-P2-37	GND	3L06
0308-P2-7	GND	3SW4
0308-P2-5	GND	3SW4
0308-P2-75	GND	STACKER
0306-P1-45	H END STOP FLT-	0100-7PC2
0306-P1-44	H HOME FLT-	0100-7PC2
0311-P1-18	H POS FDBK ACT+	0100-7PC2
0310-P1-21	H STB LT-	0100-7PC2
0310-P1-19	H STB RT-	0100-7PC2
0306-P1-41	H SW FLT-	0100-7PC2
0306-P1-39	HME FLT-	0100-7PC2
0306-P1-46	HMR FLT-	0100-7PC2
0315-P1-57	INH-	0100-7PC2

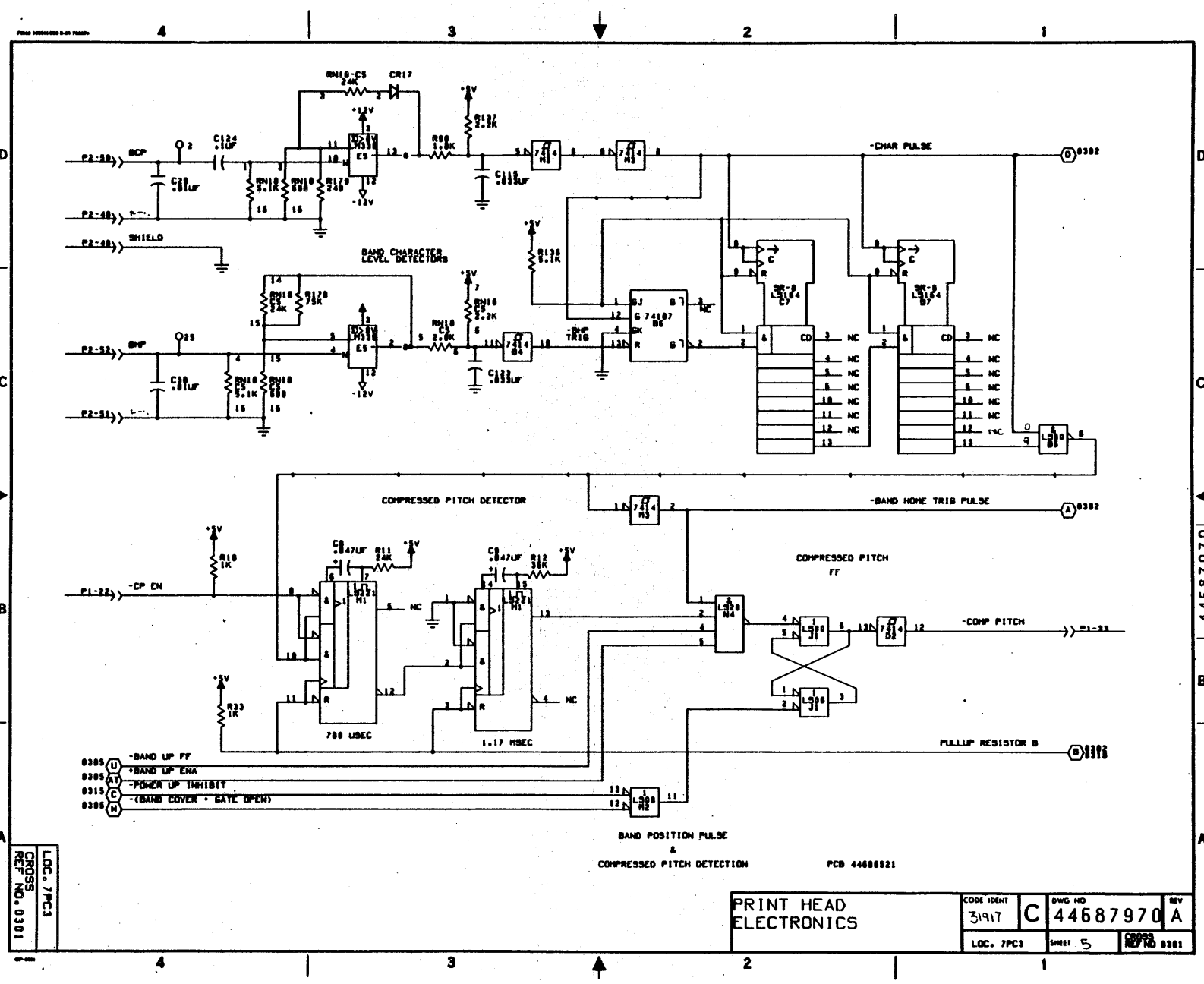
CROSS REF NO: 0300
MODULE LOC: 7PC3
SCHEMATIC NO: 44687970

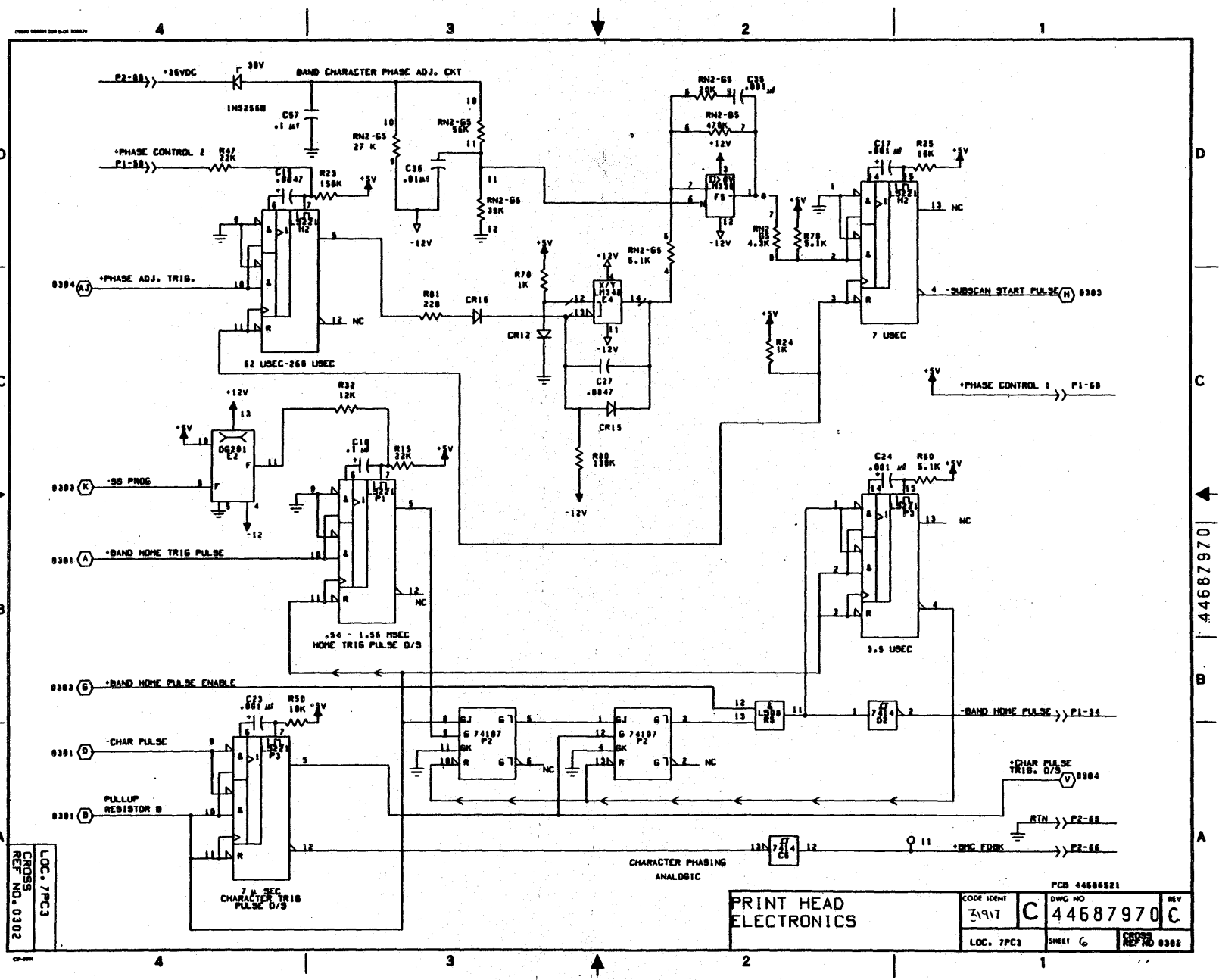
PART NO: 44687941
REV: A

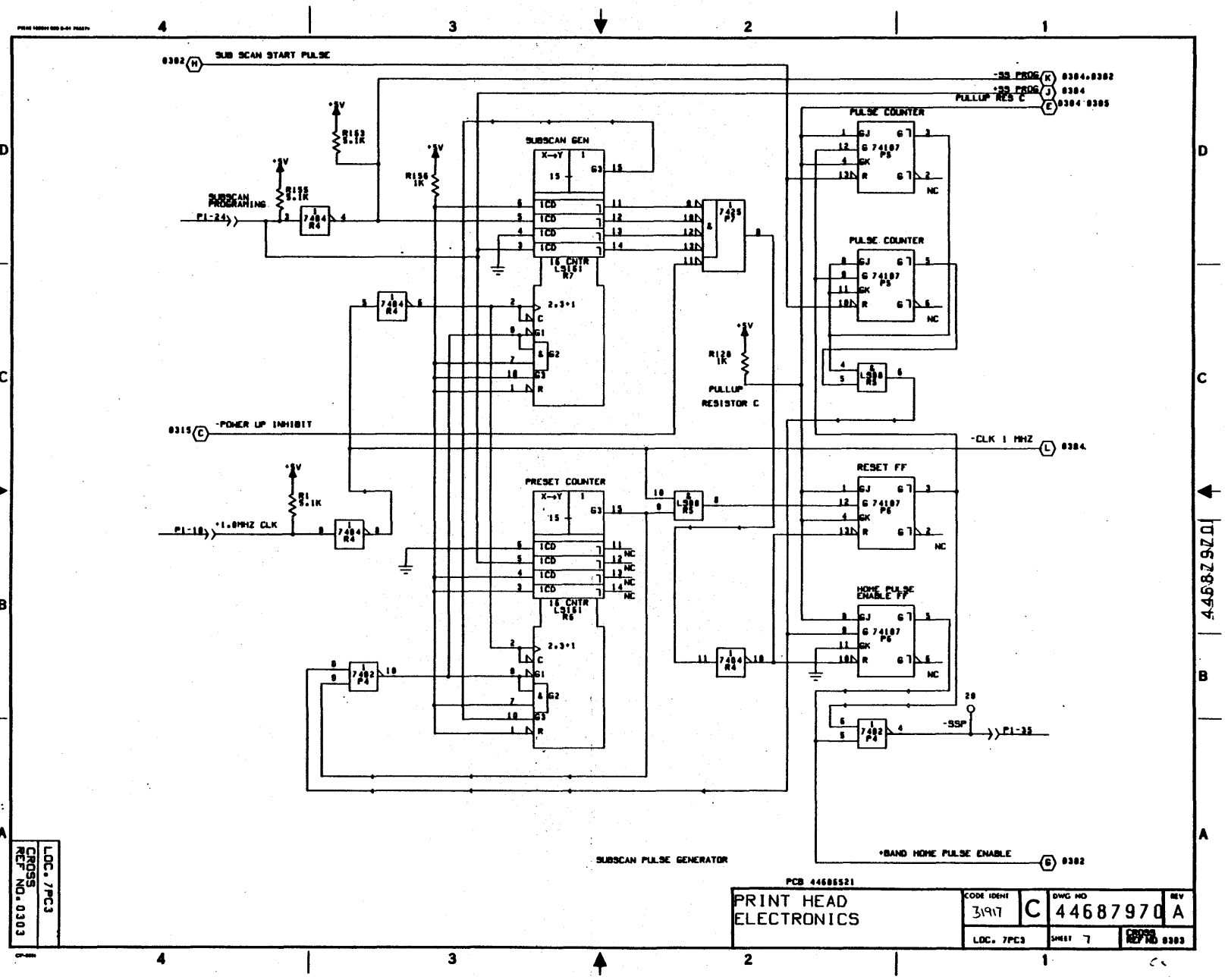
MODULE OUTPUTS (Cont)

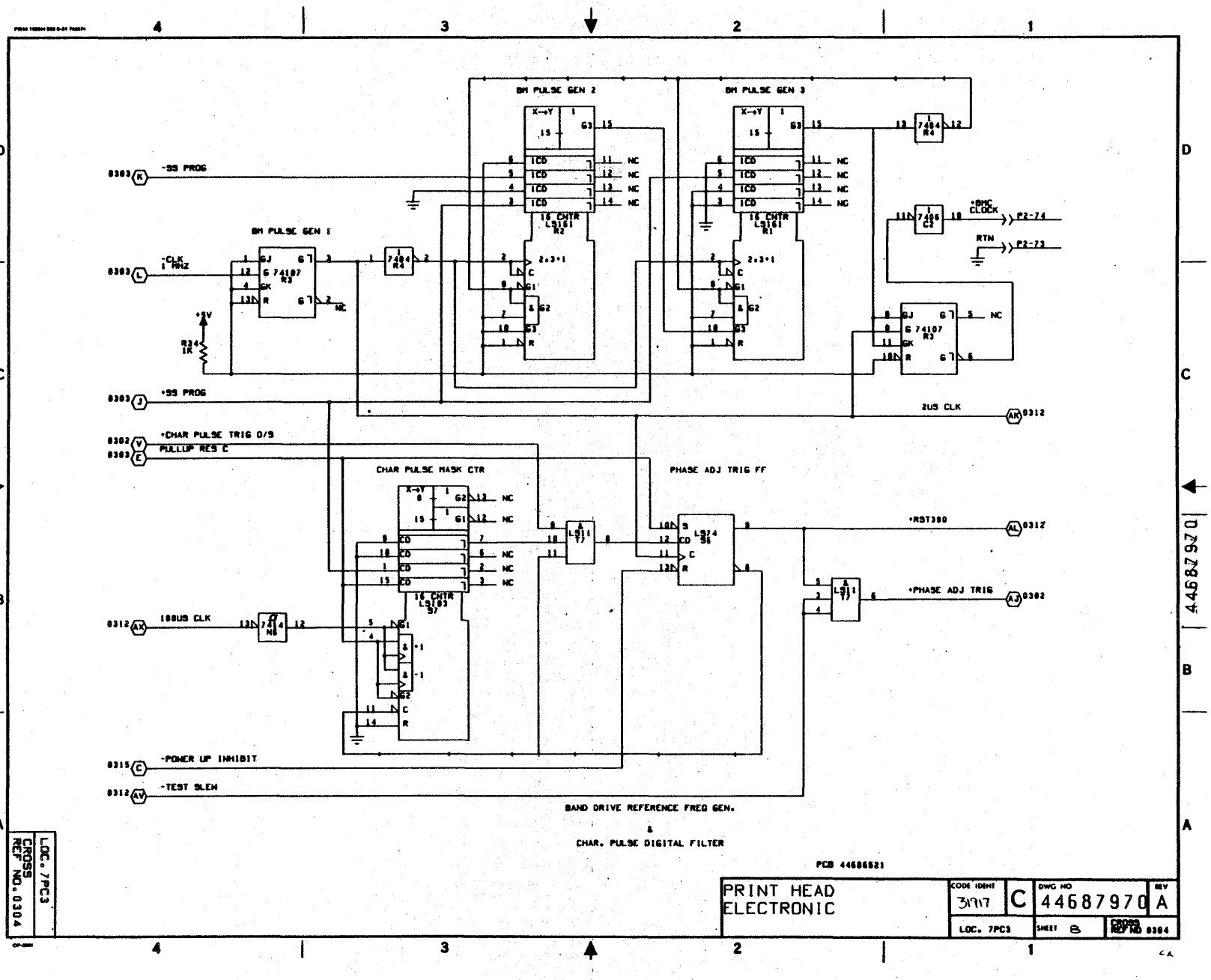
MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0309-P2-94	LEFT	0400-2PC2
0313-P2-86	LINE CNTR	3L08
0305-P2-76	MOTOR ON-	0400-2PC2
0314-P2-29	NC	NC
0308-P1-49	OOP-	0100-7PC2
0306-P1-36	PAPER RUNAWAY FLT-	0100-7PC2
0302-P1-60	PHASE CONTROL 1+	0600-6PC1
0308-P1-11	PMV CLR-	0100-7PC2
0308-P2-27	PMVR V+	3L04
0308-P2-26	RTN	3L04
0314-P1-54	PRINT INHIBIT-	0100-7PC2
0315-P2-67	PWR DWN CROBAR	0200-2PC1
NC	RIBBON FOLD-	0314-P1-51
0315-P2-63	RTN	0200-2PC2
0305-P2-80	RATE DAMPING INH-	0400-2PC2
0305-P2-79	RTN	0400-2PC2
0307-P2-84	REV	0400-2PC2
0307-P2-83	RTN	0400-2PC2
0306-P1-43	RIB MOT FLT-	0100-7PC2
0313-P2-09	RIBBON INH-	0400-2PC2
0309-P2-90	RIGHT	0400-2PC2
0309-P2-89	RTN	0400-2PC2
0314-P2-69	SPARE	
0314-P2-47	SPARE	
0303-P1-35	SSP-	0100-7PC2
0313-P2-70	SSR 1-	1PC1
0313-P2-72	SSR 2-	1PC1
0314-P1-50	STKR RDY+	0100-7PC2
0307-P2-59	TEST LINE	NC
0309-P2-36	TEST LINE	NC
0314-P2-69	UNUSED	NC
0314-P2-47	UNUSED	NC
0308-P1-15	V CK STB-	0100-7PC2
0308-P2-18	RTN	3L03
0308-P2-16	SHIELD	3L03
0308-P1-13	V STB-	0100-7PC2
0309-P2-93	RTN	2PC2

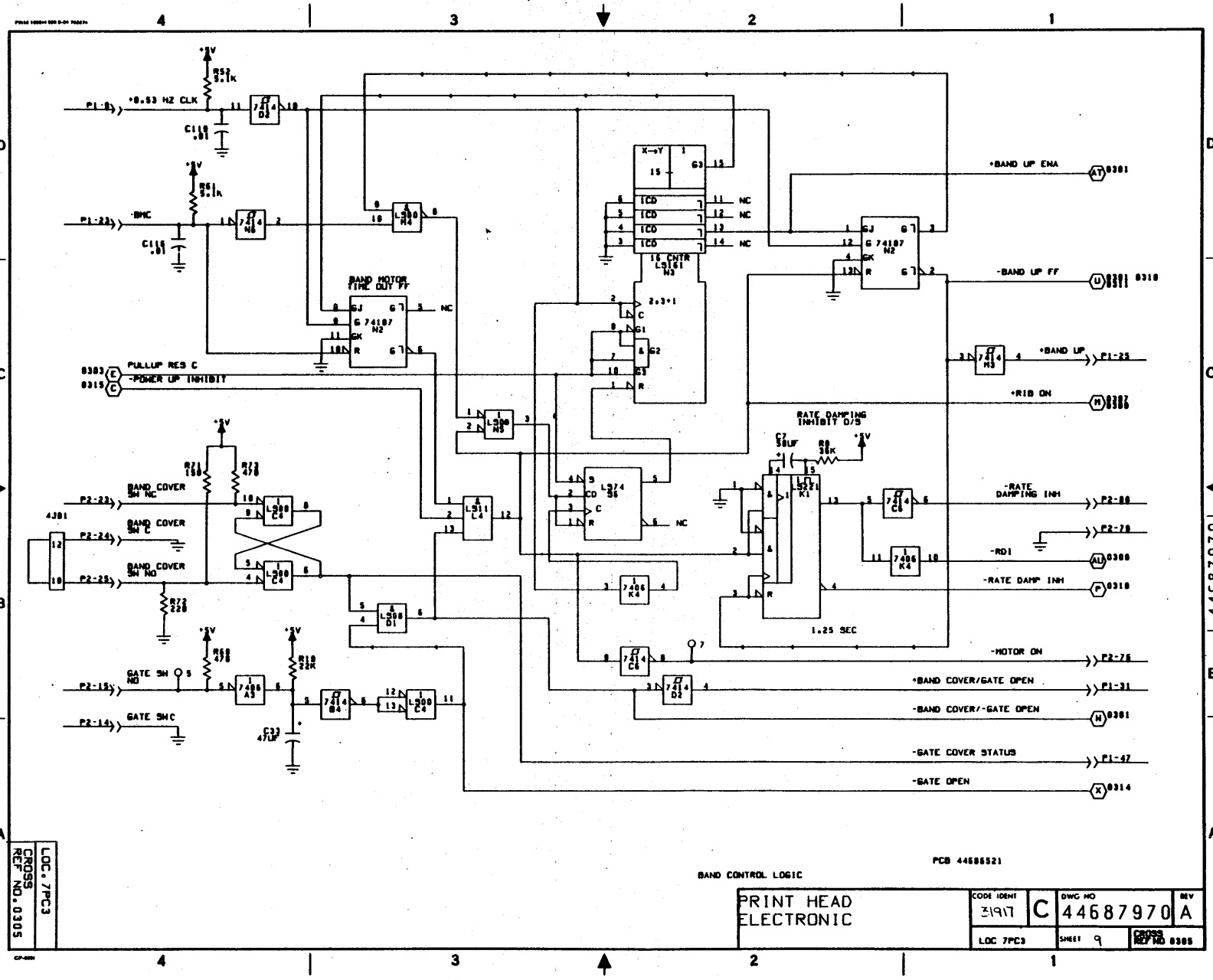

4468797D
COMPONENT LOCATOR -
PRINTHEAD ELECTRONIC
31917
C
4468797D
A
SHEET 1

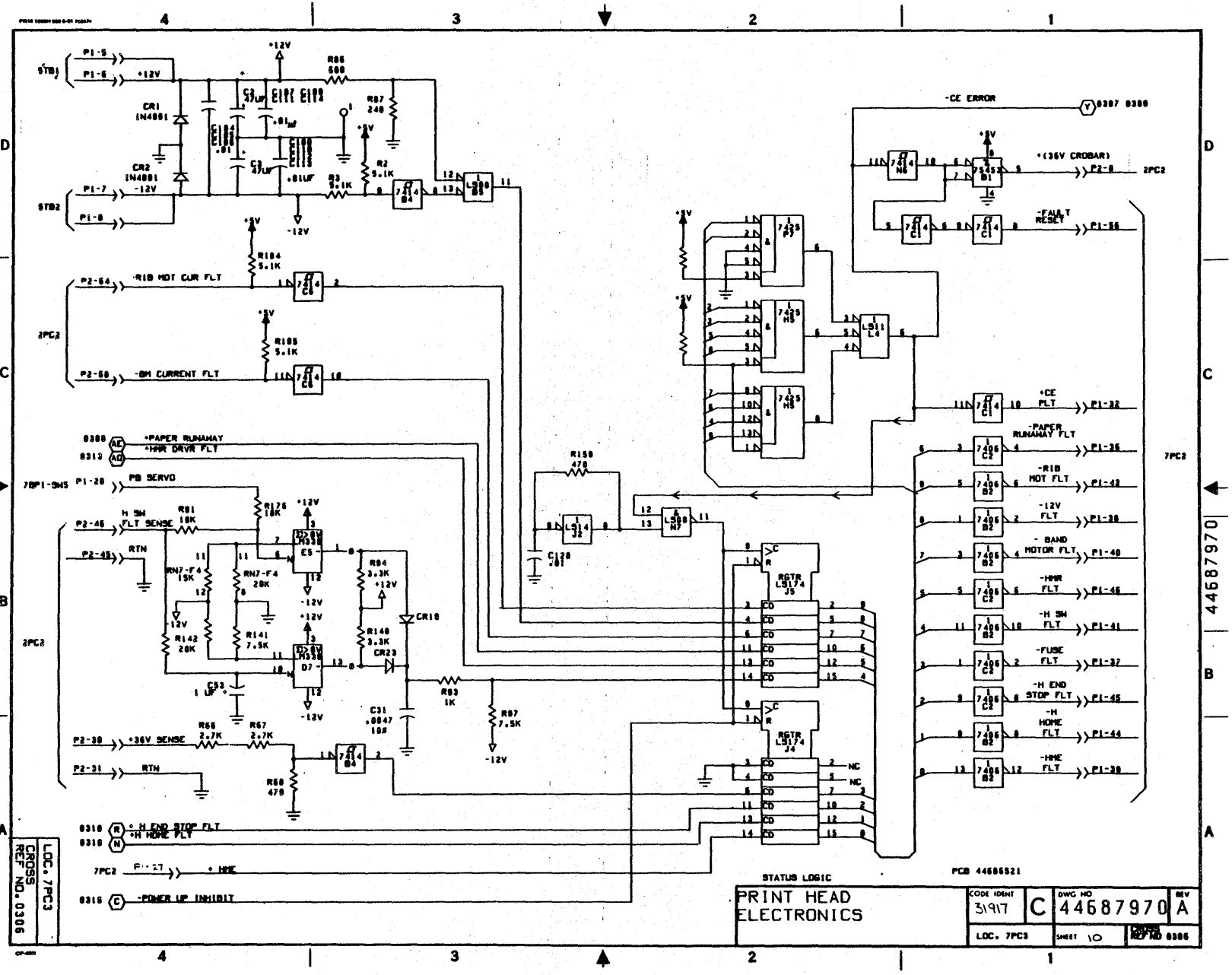

BAND CHARACTER LEVEL DETECTORS
COMPRESSED PITCH DETECTOR
COMPRESSED PITCH FF
-CHAR PULSE
-BAND HOME TRIG PULSE
-COMP PITCH
PULLUP RESISTOR B
BAND POSITION PULSE & COMPRESSED PITCH DETECTION
PCB 44686821
PRINT HEAD ELECTRONICS
CODE IDENT 31917
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 5
CROSS REF NO 0301

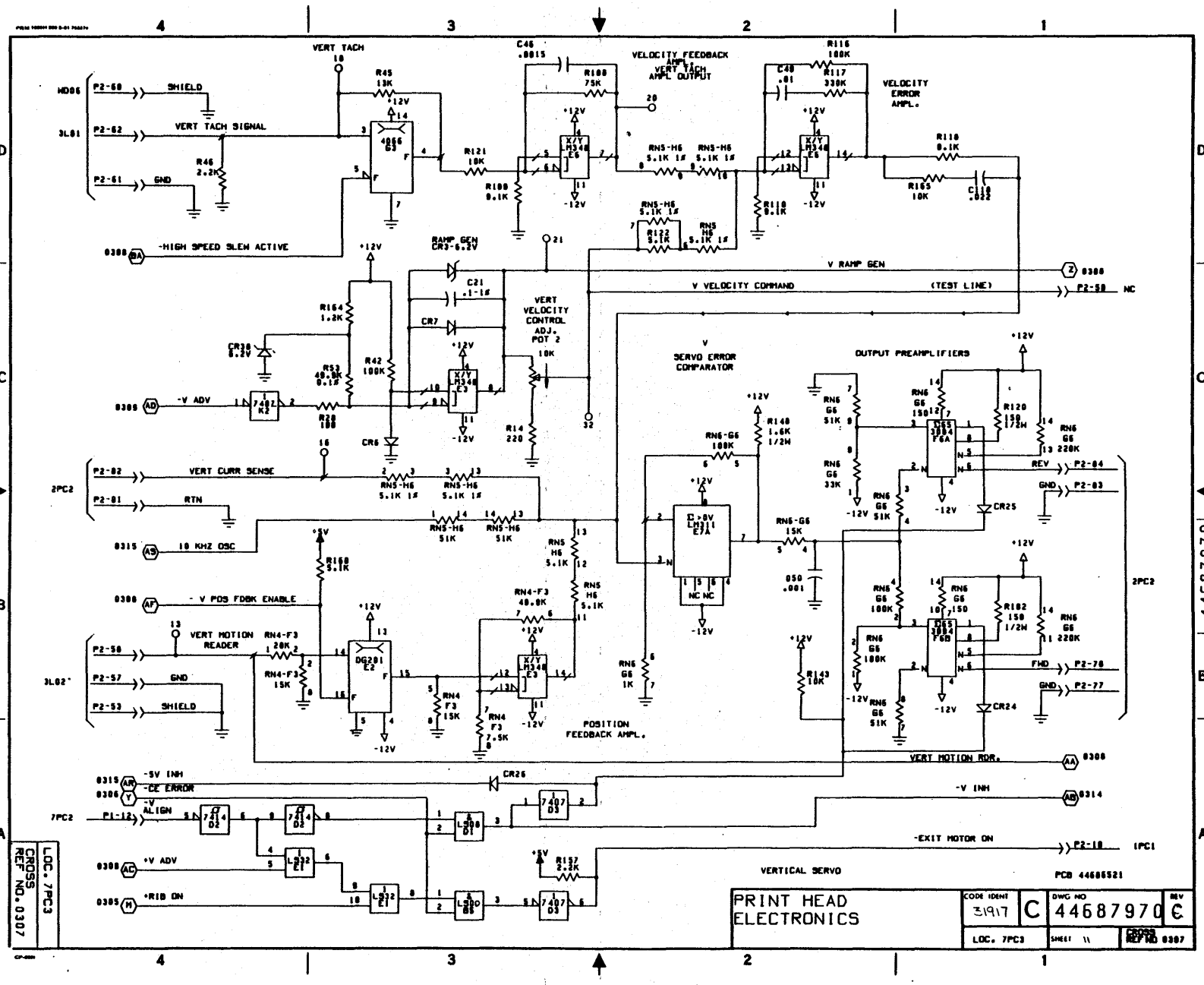

BAND CHARACTER PHASE ADJ. CKT
*36VDC
P2-68
IN5256B
*PHASE CONTROL 2
P1-58
*PHASE ADJ. TRIG.
62 USEC-260 USEC
7 USEC
-SUBSCAN START PULSE
*PHASE CONTROL 1
P1-60
-SS PROG
*BAND HOME TRIG PULSE
.54 - 1.56 MSEC
HOME TRIG PULSE D/S
3.5 USEC
*BAND HOME PULSE ENABLE
-BAND HOME PULSE
P1-34
-CHAR PULSE
PULLUP
RESISTOR B
*CHAR PULSE
TRIG. D/S
RTN
P2-65
*BMC FDBK
P2-66
CHARACTER PHASING
ANALOGIC
CHARACTER TRIG
PULSE D/S
PRINT HEAD
ELECTRONICS
PCB 44686521
CODE IDENT
31917
DWG NO
44687970
REV
C
LOC. 7PC3
SHEET 6
CROSS REF NO. 0302

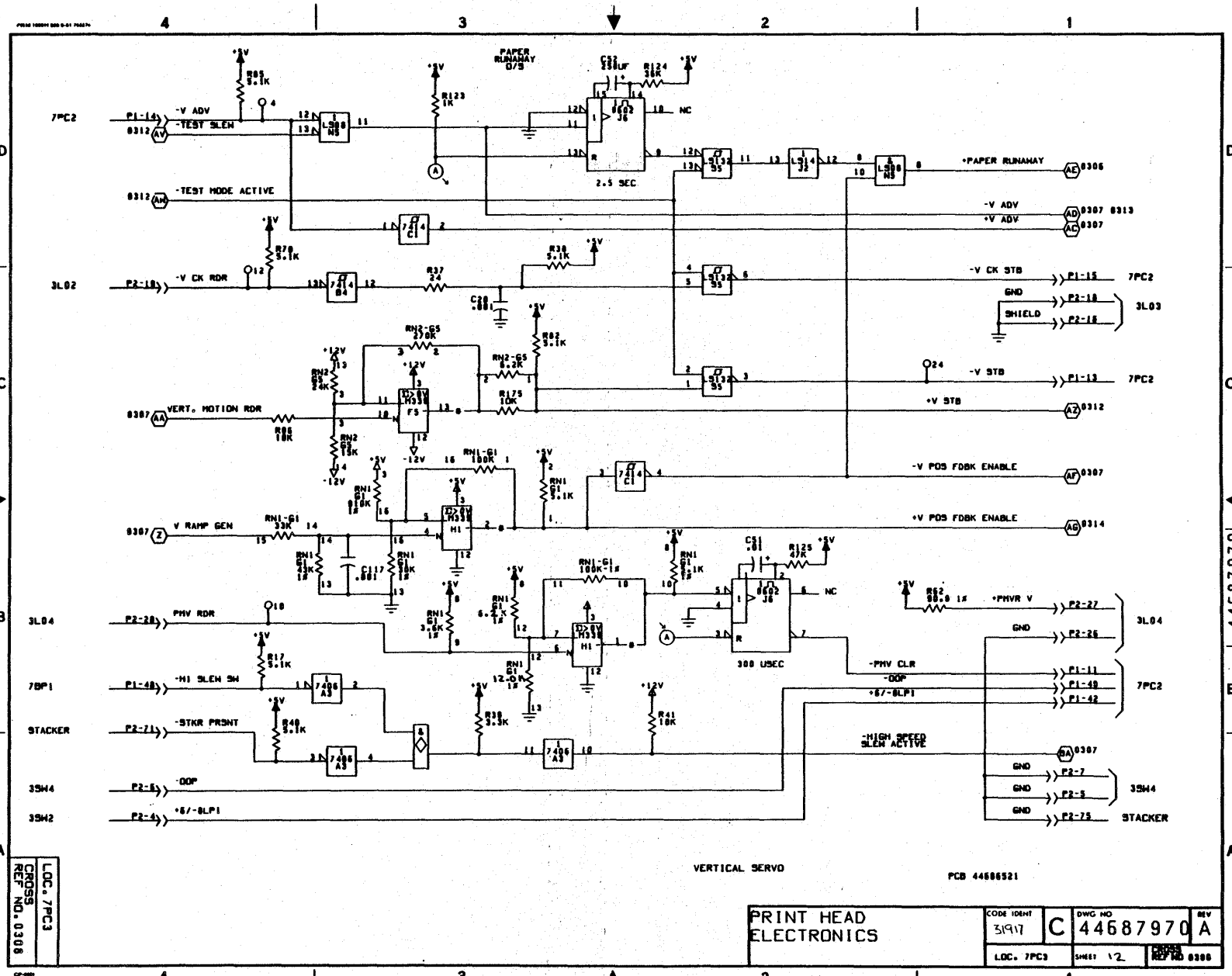

SUB SCAN START PULSE
-35 PROG
+35 PROG
PULLUP RES C
PULSE COUNTER
SUBSCAN GEN
SUBSCAN PROGRAMING
P1-24
PULSE COUNTER
PULLUP RESISTOR C
-POWER UP INHIBIT
-CLK 1 MHZ
RESET FF
PRESET COUNTER
P1-18
+1.0MHZ CLK
HOME PULSE ENABLE FF
-SSP
P1-35
+BAND HOME PULSE ENABLE
SUBSCAN PULSE GENERATOR
PRINT HEAD ELECTRONICS
PCB 44685521
CODE IDENT 31917
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 7
CROSS REF NO. 0303

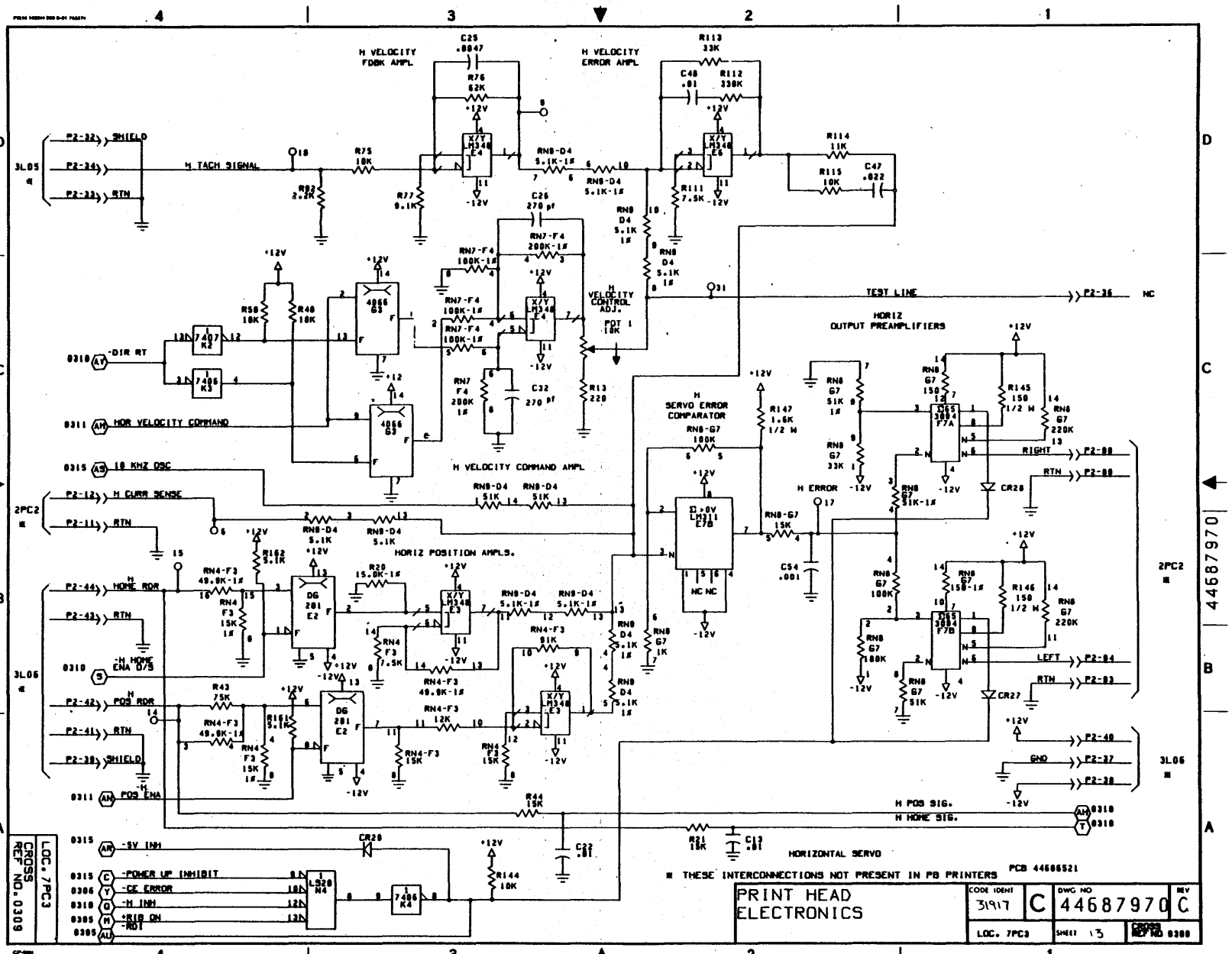

BM PULSE GEN 2
BM PULSE GEN 3
BM PULSE GEN 1
-SS PROG
-CLK 1 MHZ
+5V
R34 1K
+SS PROG
+CHAR PULSE TRIG 0/9
PULLUP RES C
CHAR PULSE MASK CTR
PHASE ADJ TRIG FF
100US CLK
2US CLK
+RST380
+PHASE ADJ TRIG
+BMC CLOCK
RTN
P2-74
P2-73
-POWER UP INHIBIT
-TEST SLEW
BAND DRIVE REFERENCE FREQ GEN.
&
CHAR. PULSE DIGITAL FILTER
PCB 44686521
PRINT HEAD ELECTRONIC
CODE IDENT 31917
C
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 8
CROSS REF NO. 0304
LOC. 7PC3
CROSS REF NO. 0304

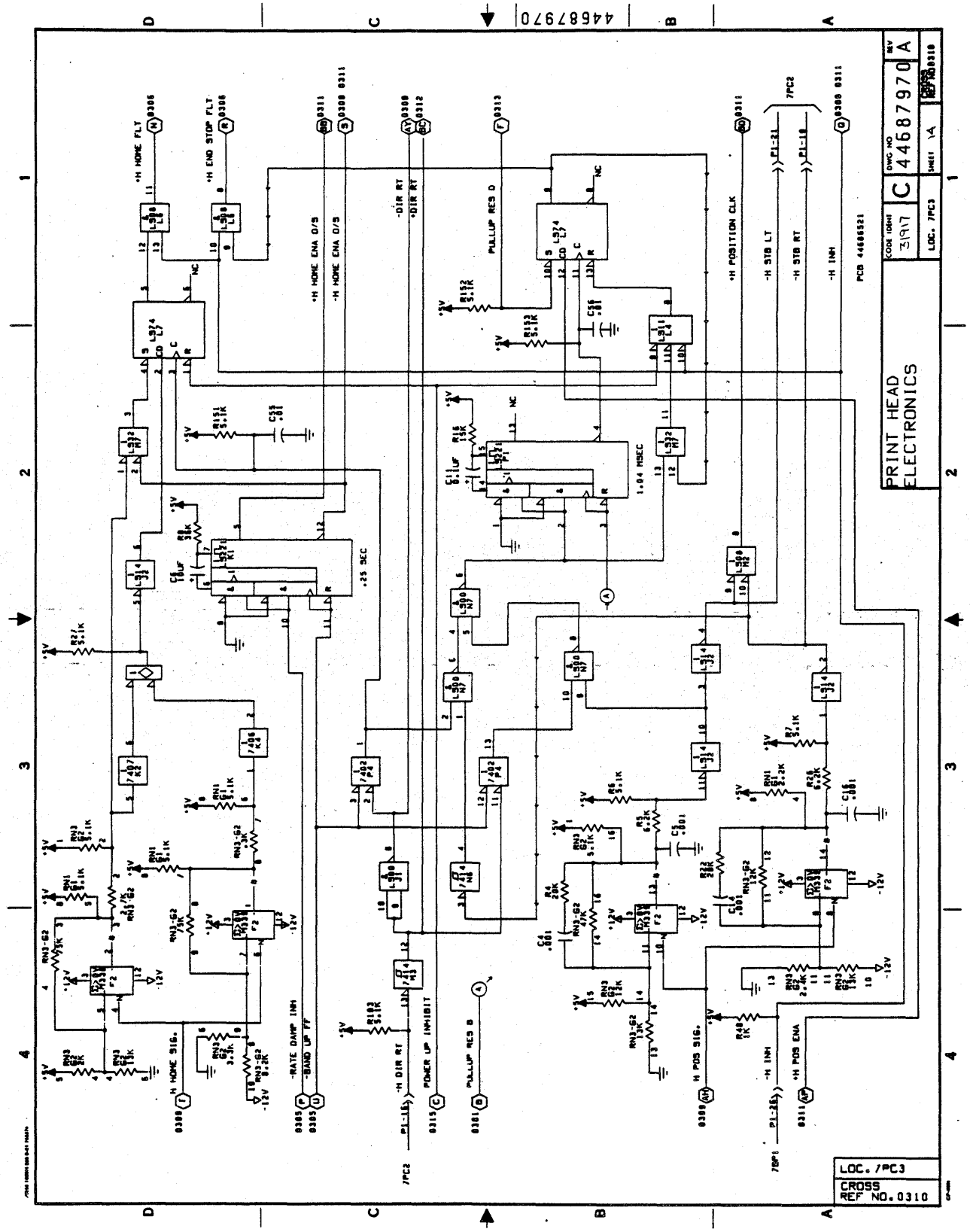

+8.53 HZ CLK
-BMC
PULLUP RES C
-POWER UP INHIBIT
BAND MOTOR TIME OUT FF
15 CNTR LS161 N3
+BAND UP ENA
-BAND UP FF
+BAND UP
+RIB ON
RATE DAMPING INHIBIT O/S
BAND COVER SW NC
BAND COVER SW C
BAND COVER SW NO
4J81
GATE SW NO
GATE SW C
-RATE DAMPING INH
-RDI
-RATE DAMP INH
1.25 SEC
-MOTOR ON
+BAND COVER/GATE OPEN
-BAND COVER/-GATE OPEN
-GATE COVER STATUS
-GATE OPEN
PCB 44686521
BAND CONTROL LOGIC
PRINT HEAD ELECTRONIC
CODE IDENT 31917
DWG NO 44687970
REV A
LOC 7PC3
SHEET 9
CROSS REF NO 0305
CROSS REF NO.0305
LOC.7PC3

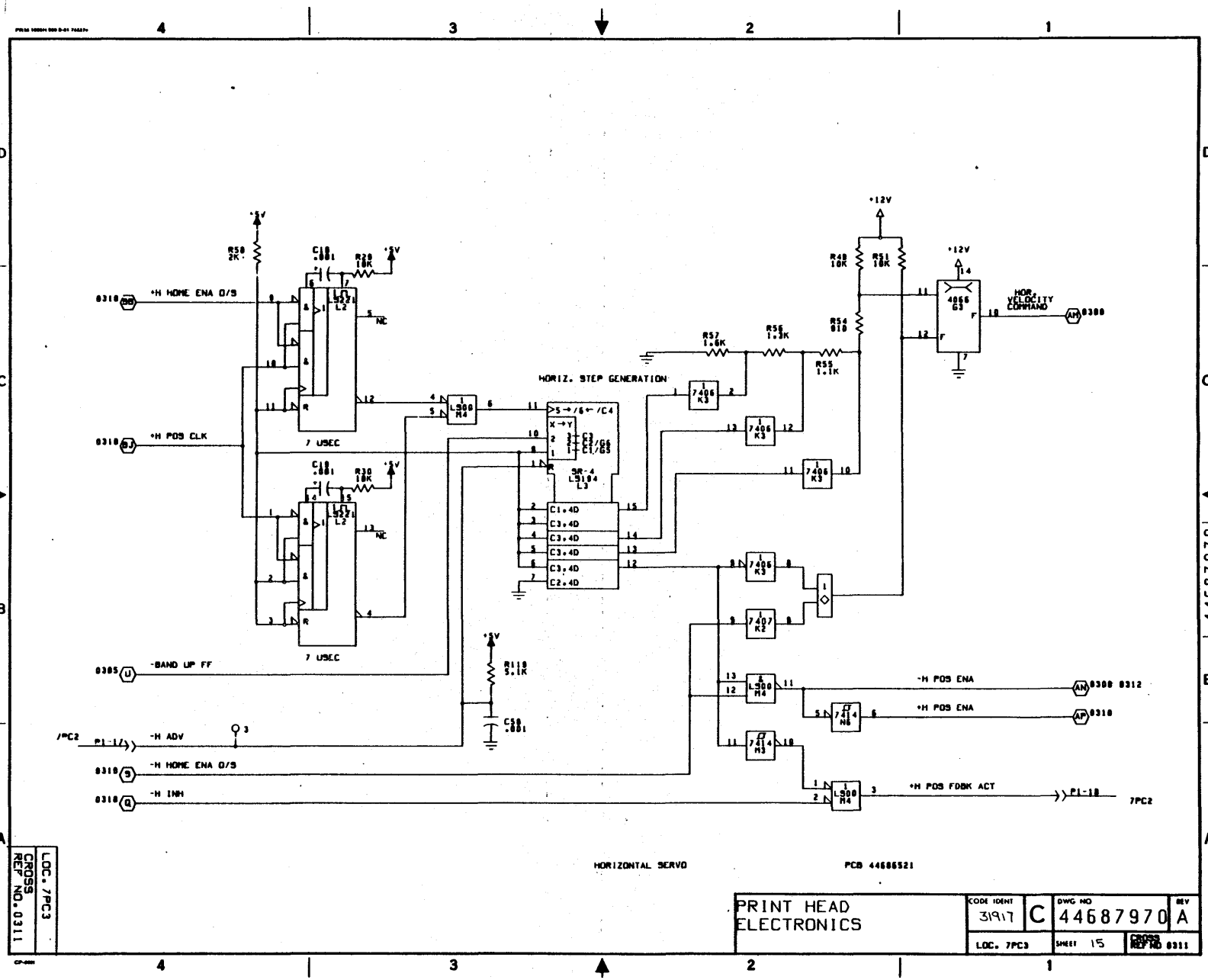

PRINT HEAD ELECTRONICS
STATUS LOGIC
PCB 44686521
CODE IDENT 31917
C
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 10
CROSS REF NO. 0306
LOC. 7PC3
-CE ERROR
+(36V CROBAR)
-FAULT RESET
+CE FLT
-PAPER RUNAWAY FLT
-RIB MOT FLT
-12V FLT
- BAND MOTOR FLT
-HMR FLT
-H SH FLT
-FUSE FLT
-H END STOP FLT
-H HOME FLT
-HME FLT
-RIB MOT CUR FLT
-BM CURRENT FLT
+PAPER RUNAWAY
+HMR DRVR FLT
PB SERVO
H SH FLT SENSE
+36V SENSE
+H END STOP FLT
+H HOME FLT
+ HME
-POWER UP INHIBIT

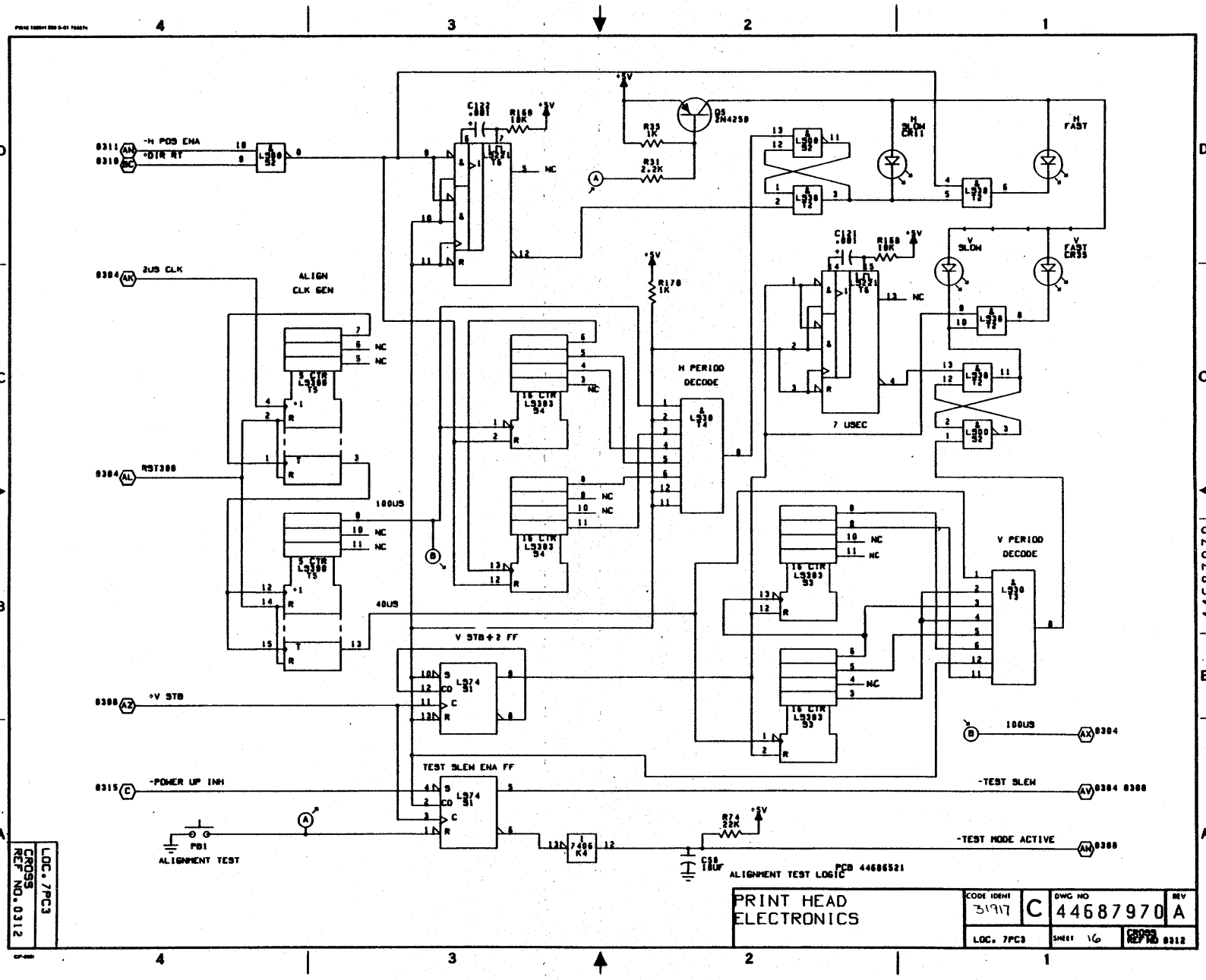

VERT TACH
VELOCITY FEEDBACK AMPL.
VERT TACH AMPL OUTPUT
VELOCITY ERROR AMPL.
HD06
P2-60
SHIELD
3L01
P2-62
VERT TACH SIGNAL
P2-61
GND
-HIGH SPEED SLEW ACTIVE
RAMP GEN CR3-6.2V
V RAMP GEN
V VELOCITY COMMAND
(TEST LINE)
P2-58
NC
VERT VELOCITY CONTROL ADJ. POT 2
V SERVO ERROR COMPARATOR
OUTPUT PREAMPLIFIERS
-V ADV
VERT CURR SENSE
RTN
2PC2
10 KHZ OSC
- V POS FDBK ENABLE
VERT MOTION READER
P2-56
P2-57
GND
P2-53
SHIELD
3L02
POSITION FEEDBACK AMPL.
REV
P2-84
GND
P2-83
FWD
P2-78
GND
P2-77
VERT MOTION RDR.
-5V INH
-CE ERROR
-V ALIGN
7PC2
P1-12
+V ADV
*RIB ON
-V INH
-EXIT MOTOR ON
P2-18
1PC1
VERTICAL SERVO
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
C
DWG NO 44687970
REV C
LOC. 7PC3
SHEET 11
CROSS REF NO. 0307
LOC. 7PC3
CROSS REF NO. 0307

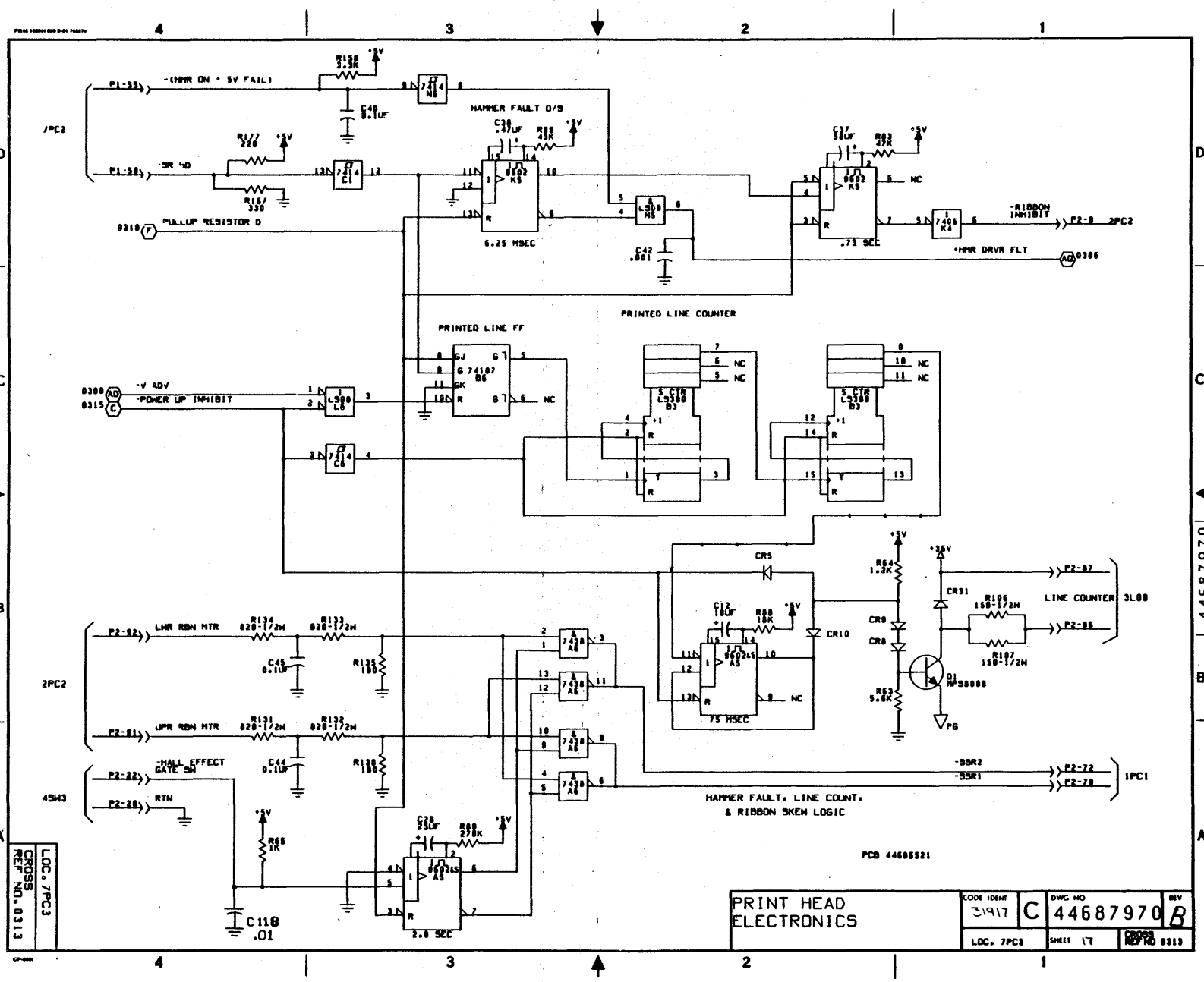

PAPER RUNAWAY 0/9
2.5 SEC
300 USEC
-V ADV
-TEST SLEW
-TEST MODE ACTIVE
-V CK RDR
VERT. MOTION RDR
V RAMP GEN
PHV RDR
-HI SLEW SW
-STKR PRSNT
-OOP
+5/-8LP1
*PAPER RUNAWAY
-V CK STB
-V STB
+V STB
-V POS FDBK ENABLE
+V POS FDBK ENABLE
-PHV CLR
-HIGH SPEED SLEW ACTIVE
*PHVR V
GND
SHIELD
VERTICAL SERVO
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 12
CROSS REF NO. 0308

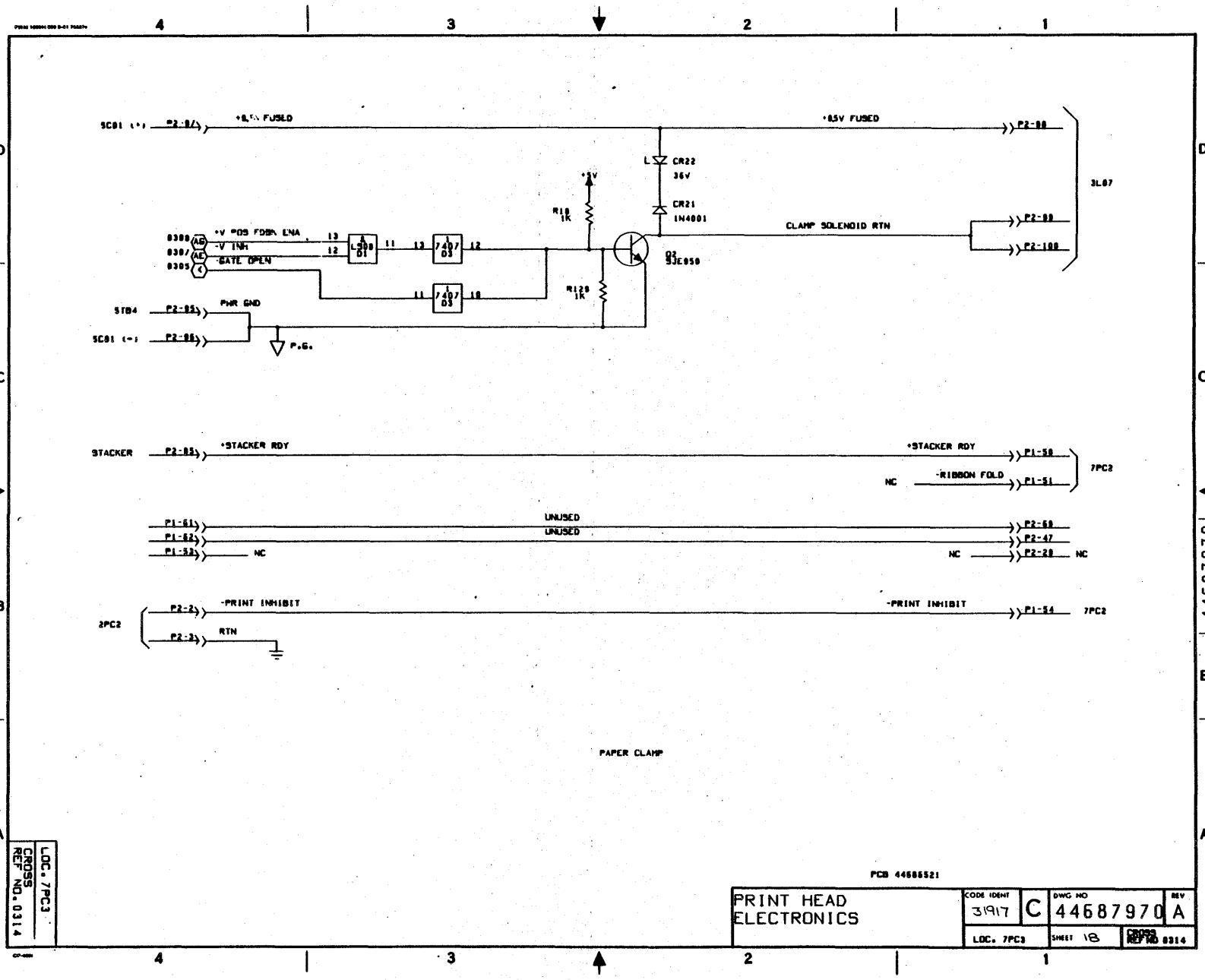

H VELOCITY FDBK AMPL
H VELOCITY ERROR AMPL
H TACH SIGNAL
H VELOCITY CONTROL ADJ.
H VELOCITY COMMAND AMPL
TEST LINE
HORIZ OUTPUT PREAMPLIFIERS
H SERVO ERROR COMPARATOR
H ERROR
HORIZ POSITION AMPLS.
RIGHT
LEFT
-DIR RT
HOR VELOCITY COMMAND
10 KHZ OSC
H CURR SENSE
H HOME RDR
-H HOME ENA D/S
H POS RDR
POS ENA
-5V INH
-POWER UP INHIBIT
-CE ERROR
-H INH
+RIB ON
-ROT
H POS SIG.
H HOME SIG.
HORIZONTAL SERVO
* THESE INTERCONNECTIONS NOT PRESENT IN PB PRINTERS
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
DWG NO 44687970
REV C
LOC. 7PC3
SHEET 13
CROSS REF NO. 0309

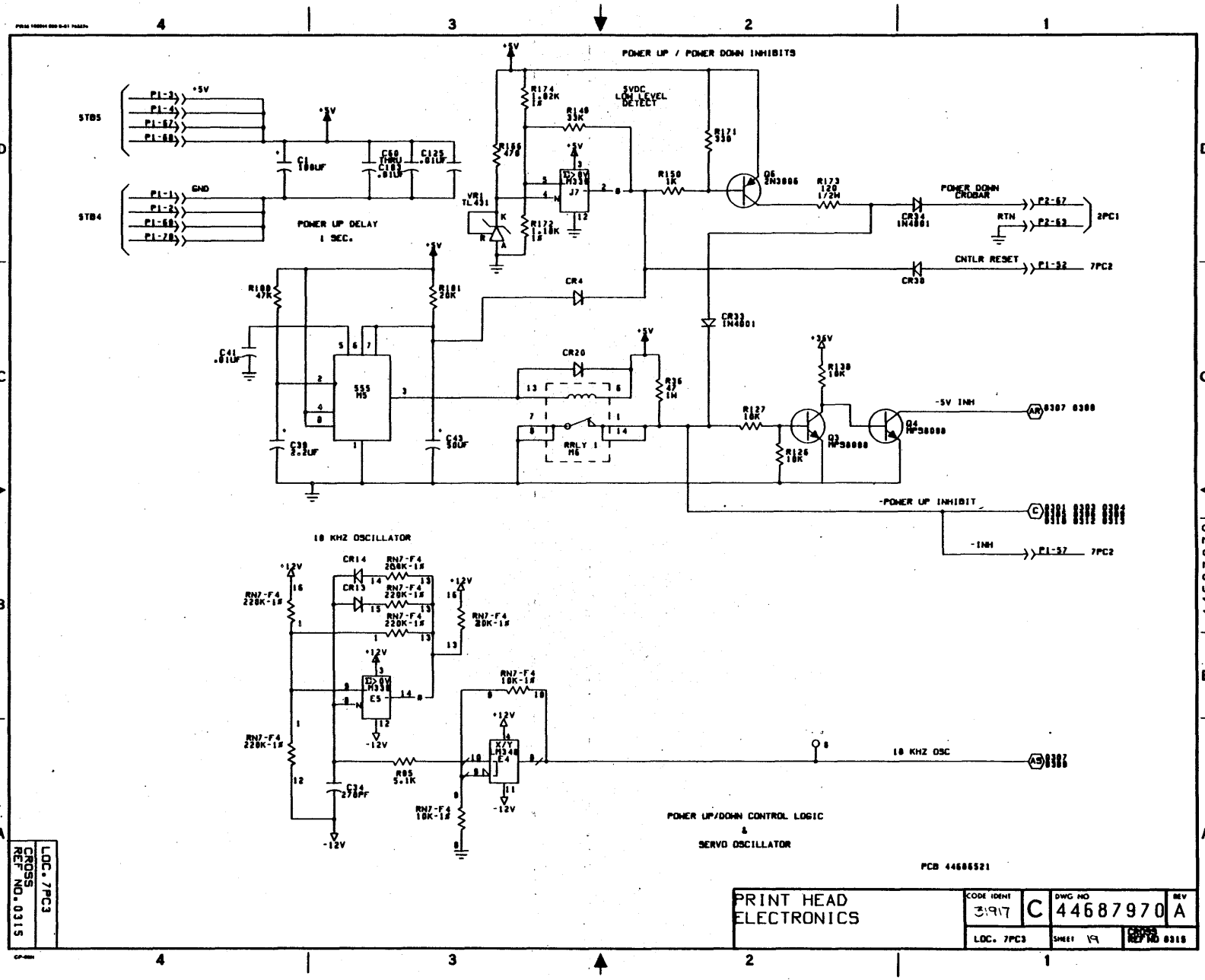

PRINT HEAD ELECTRONICS
CODE IDENT 31917
DWG NO C 44687970
REV A
SHEET 1A
LOC. 7PC3
44687970
LOC. /PC3
CROSS REF NO. 0310
+H HOME FLT
+H END STOP FLT
+H HOME ENA O/S
-H HOME ENA O/S
-DIR RT
+DIR RT
PULLUP RES D
+H POSITION CLK
-H STB LT
-H STB RT
-H INH
PCB 44686521
1.04 MSEC
.25 SEC
-RATE DAMP INH
-BAND LP FF
+H DIR RT
POWER UP INHIBIT
PULLUP RES B
H HOME SIG.
H POS SIG.
-H INH
+H POS ENA

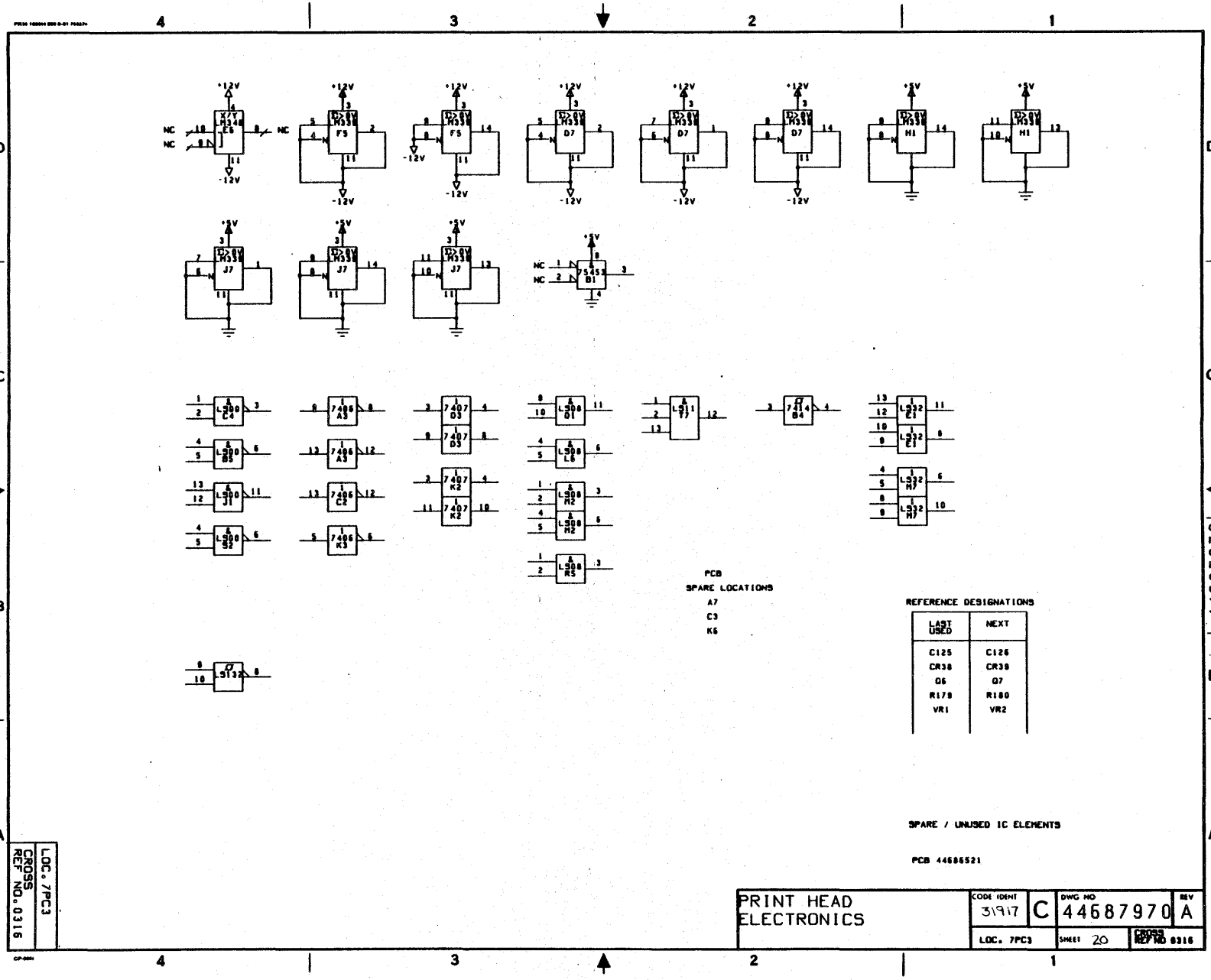

+H HOME ENA O/S
+H POS CLK
-BAND UP FF
-H ADV
-H HOME ENA O/S
-H INH
7 USEC
7 USEC
HORIZ. STEP GENERATION
+H POS ENA
+H POS ENA
+H POS FDBK ACT
HOR VELOCITY COMMAND
HORIZONTAL SERVO
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
C
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 15
CROSS REF NO 0311
CROSS REF NO. 0311
LOC. 7PC3


-H POS ENA
+DIR RT
2US CLK
ALIGN CLK GEN
RST388
100US
40US
+V STB
-POWER UP INH
ALIGNMENT TEST
PB1
H PERIOD DECODE
V PERIOD DECODE
7 USEC
V STB÷2 FF
TEST SLEW ENA FF
-TEST SLEW
-TEST MODE ACTIVE
H SLOW CRT1
H FAST
V SLOW
V FAST CR35
ALIGNMENT TEST LOGIC
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
C
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 16
CROSS REF NO. 0312


HAMMER FAULT D/S
PRINTED LINE FF
PRINTED LINE COUNTER
HAMMER FAULT, LINE COUNT, & RIBBON SKEW LOGIC
PRINT HEAD ELECTRONICS
PCB 44686521
44687970


+8.5V FUSED
+8.5V FUSED
CR22
36V
CR21
1N4001
+5V
R18
1k
CLAMP SOLENOID RTN
3L07
+V POS FDBK ENA
-V INH
GATE OPEN
Q2
2SC950
R129
1K
PWR GND
P.G.
STACKER
+STACKER RDY
+STACKER RDY
7PC2
-RIBBON FOLD
NC
UNUSED
UNUSED
NC
NC
NC
-PRINT INHIBIT
-PRINT INHIBIT
7PC2
2PC2
RTN
PAPER CLAMP
PCB 44686521
PRINT HEAD
ELECTRONICS
CODE IDENT
31917
C
DWG NO
44687970
REV
A
LOC. 7PC3
SHEET 18
CROSS REF NO. 0314
LOC. 7PC3
CROSS REF NO. 0314


POWER UP / POWER DOWN INHIBITS
5VDC LOW LEVEL DETECT
POWER UP DELAY 1 SEC.
POWER DOWN CROWBAR
CNTLR RESET
-5V INH
-POWER UP INHIBIT
-INH
10 KHZ OSCILLATOR
10 KHZ OSC
POWER UP/DOWN CONTROL LOGIC & SERVO OSCILLATOR
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 19
CROSS REF NO. 0315


PCB
SPARE LOCATIONS
A7
C3
K6
REFERENCE DESIGNATIONS
LAST USED
NEXT
C125
C126
CR38
CR39
Q6
Q7
R179
R180
VR1
VR2
SPARE / UNUSED IC ELEMENTS
PCB 44686521
PRINT HEAD ELECTRONICS
CODE IDENT 31917
C
DWG NO 44687970
REV A
LOC. 7PC3
SHEET 20
CROSS REF NO. 0316
44687970

SECTION XI
LOGIC DIAGRAMS –CONTROLLER

Included in this section are the logic diagrams for 6PC1 front control panel, 6PC2 rear control panel, 7BP1 backplane assembly, and 7PC2 controller assembly. Also included are the signal indexes for 6PC1, 6PC2 and 7PC2. If not familiar with the modular logic and signal index feature used in this section, refer to the Logic Diagrams-Print Mechanism Section for an explanation.

CROSS REF NO: 0600
MODULE LOC: 6PC1
SCHEMATIC NO: 44687967

PART NO: 44687947
REV: A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
7BP1	+5 VDC	0603-P1-13
7BP1	+5 VDC	0603-P1-14
0700-7BP1	5 LED P/S(+)	0603-P1-37
0700-7BP1	5 LED P/S (+)	0603-P1-38
0700-7BP1	ALARM(-)	0601-P1-28
0100-7PC2, or 7PC1	DISPLAY 01(+)	0603-P1-23
0100-7PC2, or 7PC1	DISPLAY 02(+)	0603-P1-22
0100-7PC2, or 7PC1	DISPLAY 04(+)	0603-P1-19
0100-7PC2, or 7PC1	DISPLAY 08(+)	0603-P1-20
0100-7PC2, or 7PC1	DISPLAY 10(+)	0603-P1-21
0100-7PC2, or 7PC1	DISPLAY 20(+)	0603-P1-16
0100-7PC2, or 7PC1	DISPLAY 40(+)	0603-P1-17
0100-7PC2, or 7PC1	DISPLAY 80(+)	0603-P1-18
0100-7PC2	LED 01(-)	0603-P1-40
0100-7PC2	(LED 02 & LED 03)(-)	0603-P1-44
0100-7PC2	LED 04(-)	0603-P1-10
0100-7PC2	LED 05(-)	0603-P1-04
0100-7PC2	LED 07(-)	0603-P1-43
0100-7PC2	LED 08(-)	0603-P1-09
0100-7PC2	LED 09(-)	0603-P1-08
0100-7PC2	LED 10(-)	0603-P1-06
0100-7PC2	LED 11(-)	0603-P1-05
0300-7PC3	PHASE CONTROL 1	0603-P1-47

CROSS REF NO: 0600
MODULE LOC: 6PC1
SCHEMATIC NO: 44687967

PART NO: 44687947
REV: A

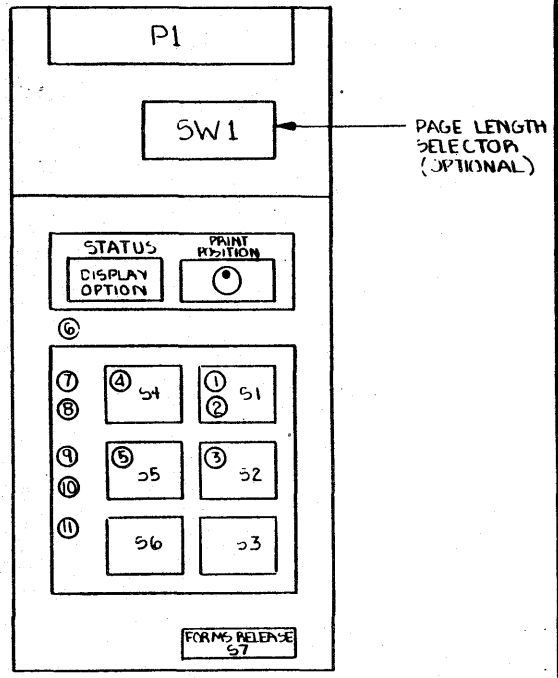
LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0603-P1-48	PHASE CONTROL 2	0300-7PC3
0603-P1-36	PL0(-)	0100-7PC2
0603-P1-35	PL1(-)	0100-7PC2
0603-P1-34	PL2(-)	0100-7PC2
0603-P1-33	PL3(-)	0100-7PC2
0603-P1-32	PL4(-)	0100-7PC2
0603-P1-31	PL5(-)	0100-7PC2
0602-P1-45	S1(-)	0100-7PC2
0602-P1-41	S2(-)	0100-7PC2
0602-P1-07	S3(-)	0100-7PC2
0602-P1-03	S4(-)	0100-7PC2
0602-P1-30	S5(-)	0100-7PC2
0602-P1-29	S6(-)	0100-7PC2
0602-P1-42	S7(-) Forms Release	0100-7PC2

JUMPERS J1 J8 ARE USED TO ENABLE KEY POSITIONS ON THE MEMBRANE SWITCH PANEL AND ROUTE SWITCH SIGNALS TO THE APPROPRIATE CONNECTOR PIN.

JMPR	MEMBRANE SWITCH	OUTPUT SIGNAL	OUTPUT CONNECTION	FUNCTION
J1	S2	S1	GPC1 P1 45	REFER TO CONTROLLER LOGIC SET FOR SWITCH APPLICABILITY AND FUNCTION NAME.
J2	S2	S2	GPC1 P1 41	
J3	S3	S3	GPC1 P1 7	
J4	S4	S4	GPC1 P1 3	
J5	S5	S5	GPC1 P1 29	
J6	S6	S6	GPC1 P1 25	
J7	S7	S2	GPC1 P1 41	
J8	S8	S3	GPC1 P1 7	



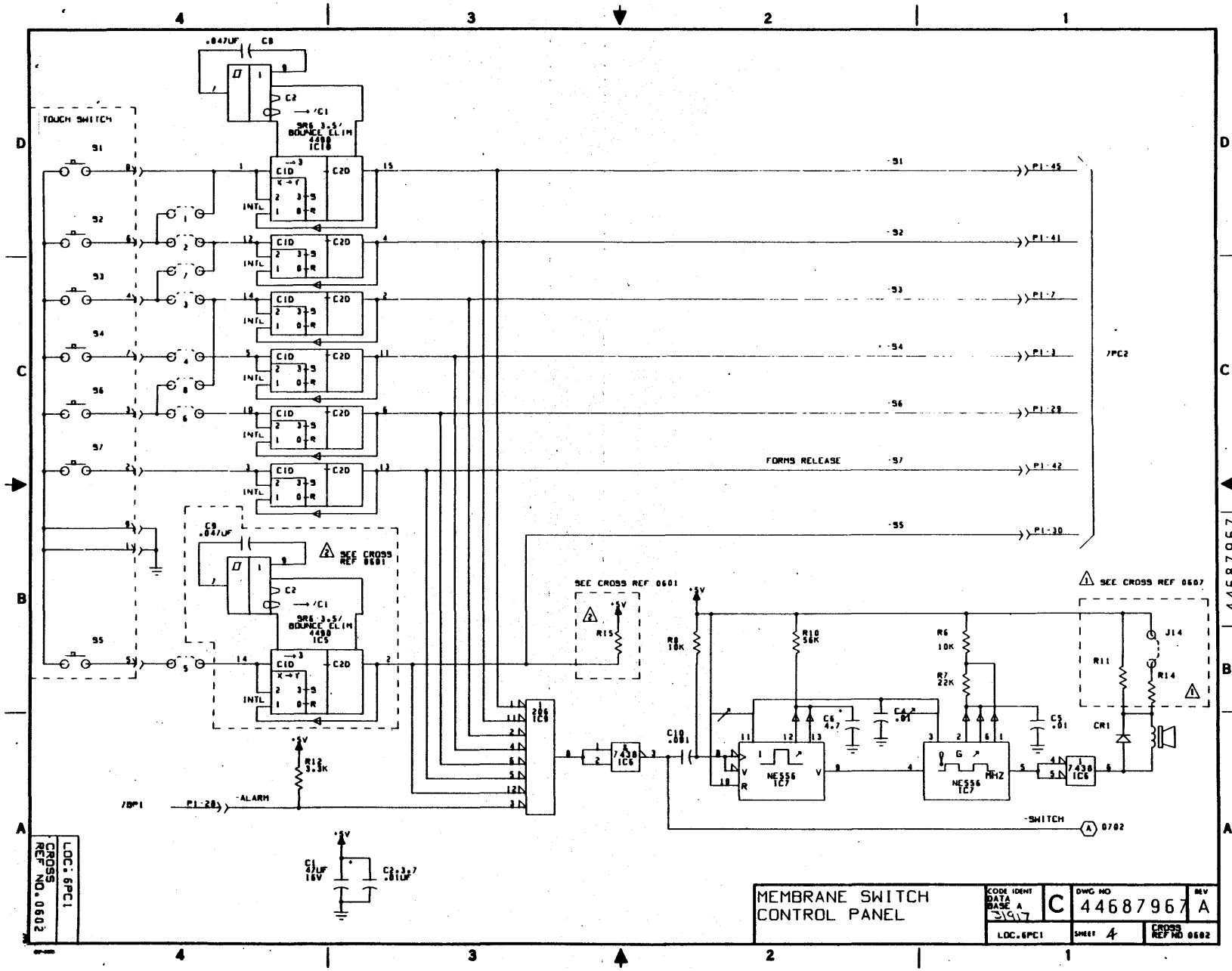
1. ALARM LEVEL VOLUME SELECTION

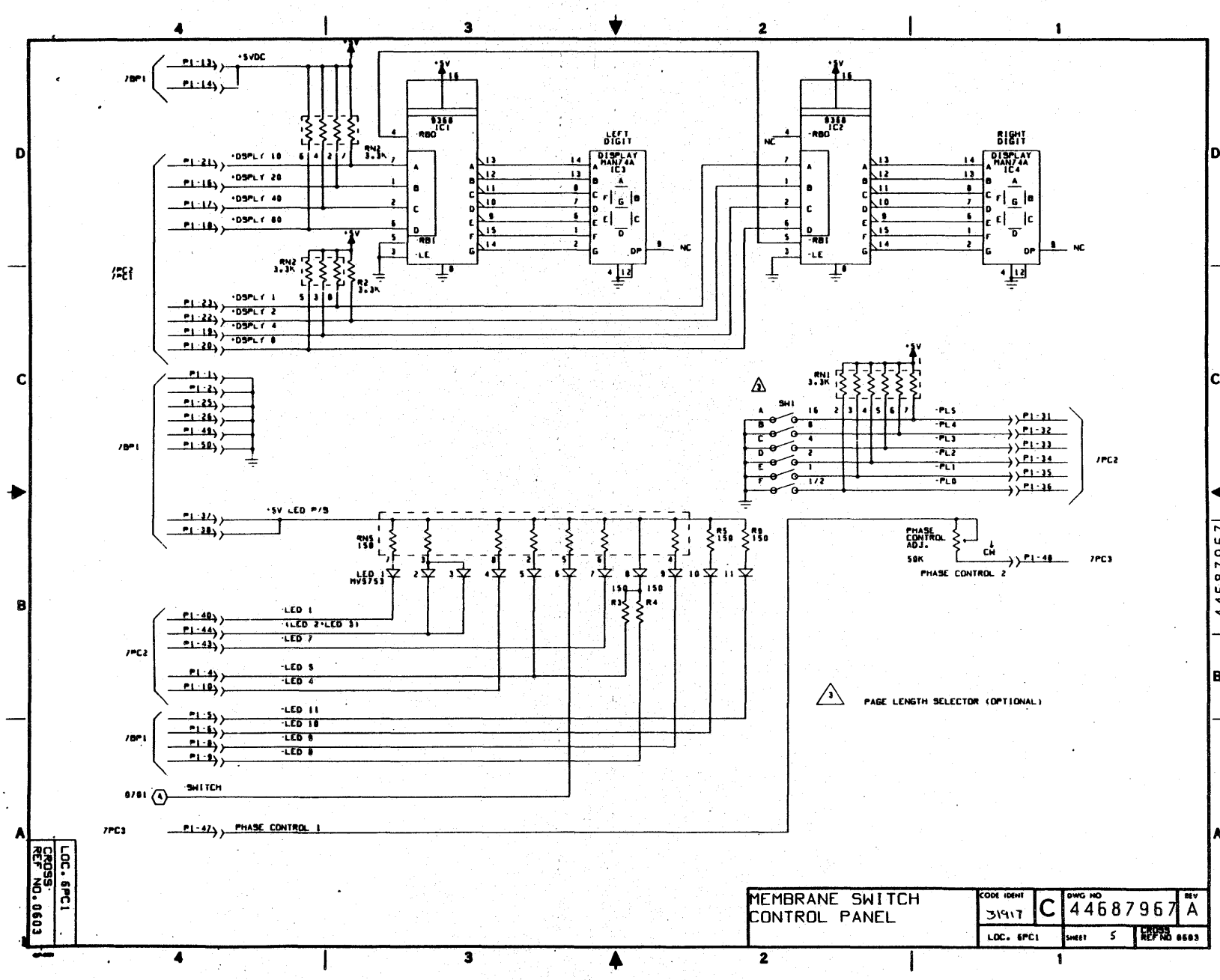
MAXIMUM	REDUCED
R11 100 OHM	R11 200 OHM
R14 REMOVED	R14 200 OHM
J14 REMOVED	J14 INSTALLED

2. RESISTOR R15 IS INSTALLED WHEN IC5 AND IC9 ARE NOT INSTALLED.

MEMBRANE SWITCH CONTROL PANEL	CODE IDENT 31917	C	DWG NO 44687967	REV A
	6PC1		SHEET 3	0601

44687967


TOUCH SWITCH
S1
S2
S3
S4
S6
S7
S5
.047UF C8
C9 .047UF
SR6 3.5/ BOUNCE ELIM 4490 IC10
SR6 3.5/ BOUNCE ELIM 4490 IC5
C1D
C2D
INTL
/C1
C2
FORMS RELEASE
-S1
-S2
-S3
-S4
-S6
-S7
-S5
P1-45
P1-41
P1-7
P1-3
P1-29
P1-42
P1-30
/PC2
SEE CROSS REF 0601
SEE CROSS REF 0607
R15
R8 10K
R10 56K
R6 10K
R7 22K
R11
R14
J14
CR1
C5 .01
C6 4.7
C7 .01
C10 .001
R12 3.3K
/BP1
P1-28
-ALARM
-SWITCH
0702
NE556 IC7
MHZ
7438 IC6
205 IC9
C1 47UF 16V
C2:3,7 .01UF
LOC: 6PC1
CROSS REF NO. 0602
MEMBRANE SWITCH CONTROL PANEL
CODE IDENT DATA BASE A
C
DWG NO 44687967
REV A
SHEET 4
CROSS REF NO 0602


MEMBRANE SWITCH
CONTROL PANEL
CODE IDENT 31917
C
DWG NO 44687967
REV A
LOC. 6PC1
SHEET 5
CROSS REF NO 0603
44687967
11-6
PAGE LENGTH SELECTOR (OPTIONAL)
PHASE CONTROL 2
PHASE CONTROL 1
SWITCH
LEFT DIGIT
RIGHT DIGIT
DISPLAY MAN74A
8368
+5VDC
+5V LED P/S

CROSS REF NO: 6100
MODULE LOC: 6PC2
SCHEMATIC NO: 44688422

PART NO: 44688968
REV: A

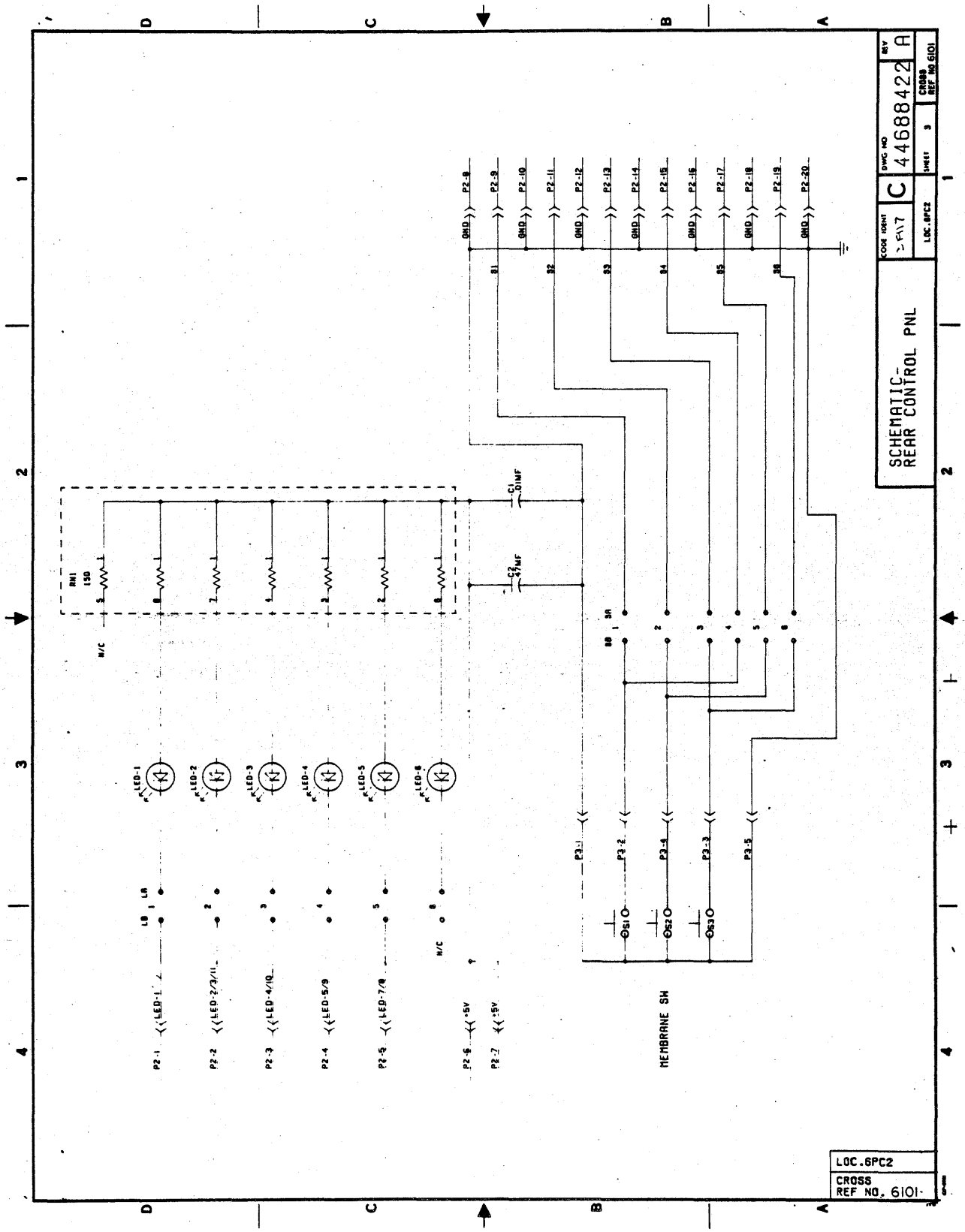
LOGIC SIGNAL CROSS REF. DETACHED LIST

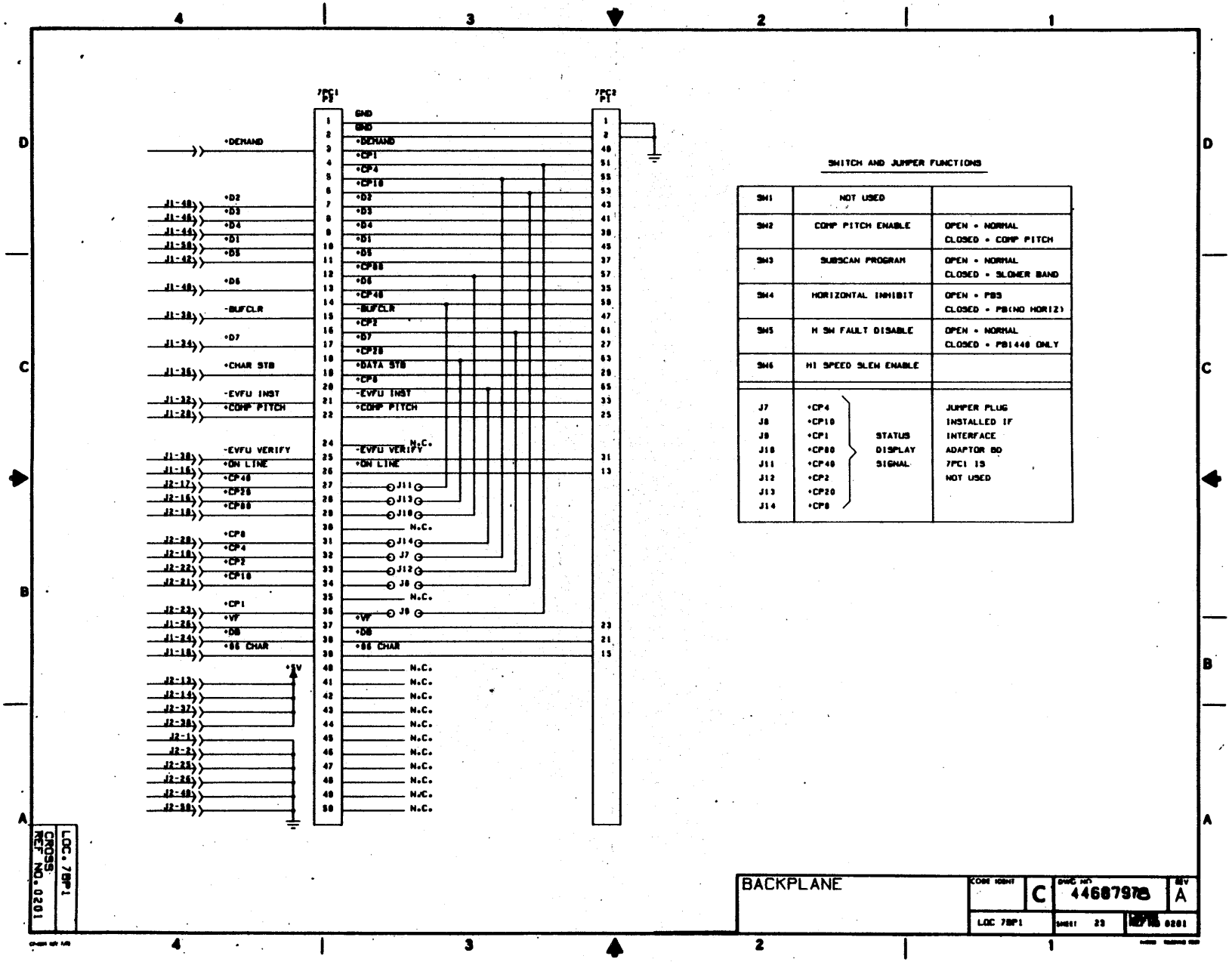
MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0600/6PC1	LED-1(-) READY	6101/P2-1
0600/6PC1	LED-2/3/11(-) ON LINE	6101/P2-2
0600/6PC1	LED-4/10(-) Not Used	6101/P2-3
0600/6PC1	LED-5/9(-) Not Used	6101/P2-4
0600/6PC1	LED-7/8(-) Not Used	6101/P2-5
0600/6PC1	+5 VDC	6101/P2-6
0600/6PC1	+5 VDC	6101/P2-7

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
6101/P2-9	S1 ON LINE	0600/6PC1
6101/P2-10	RTN	0600/6PC1
6101/P2-11	S2 Not Used	0600/6PC1
6101/P2-12	RTN	0600/6PC1
6101/P2-13	S3 TOP OF FORM	0600/6PC1
6101/P2-14	RTN	0600/6PC1
6101/P2-15	S4 Not Used	0600/6PC1
6101/P2-16	RTN	0600/6PC1
6101/P2-17	S5 Not Used	0600/6PC1
6101/P2-18	RTN	0600/6PC1
6101/P2-19	S6 Not Used	0600/6PC1
6101/P2-20	RTN	0600/6PC1
6101/P2-8	GND	0600/6PC1

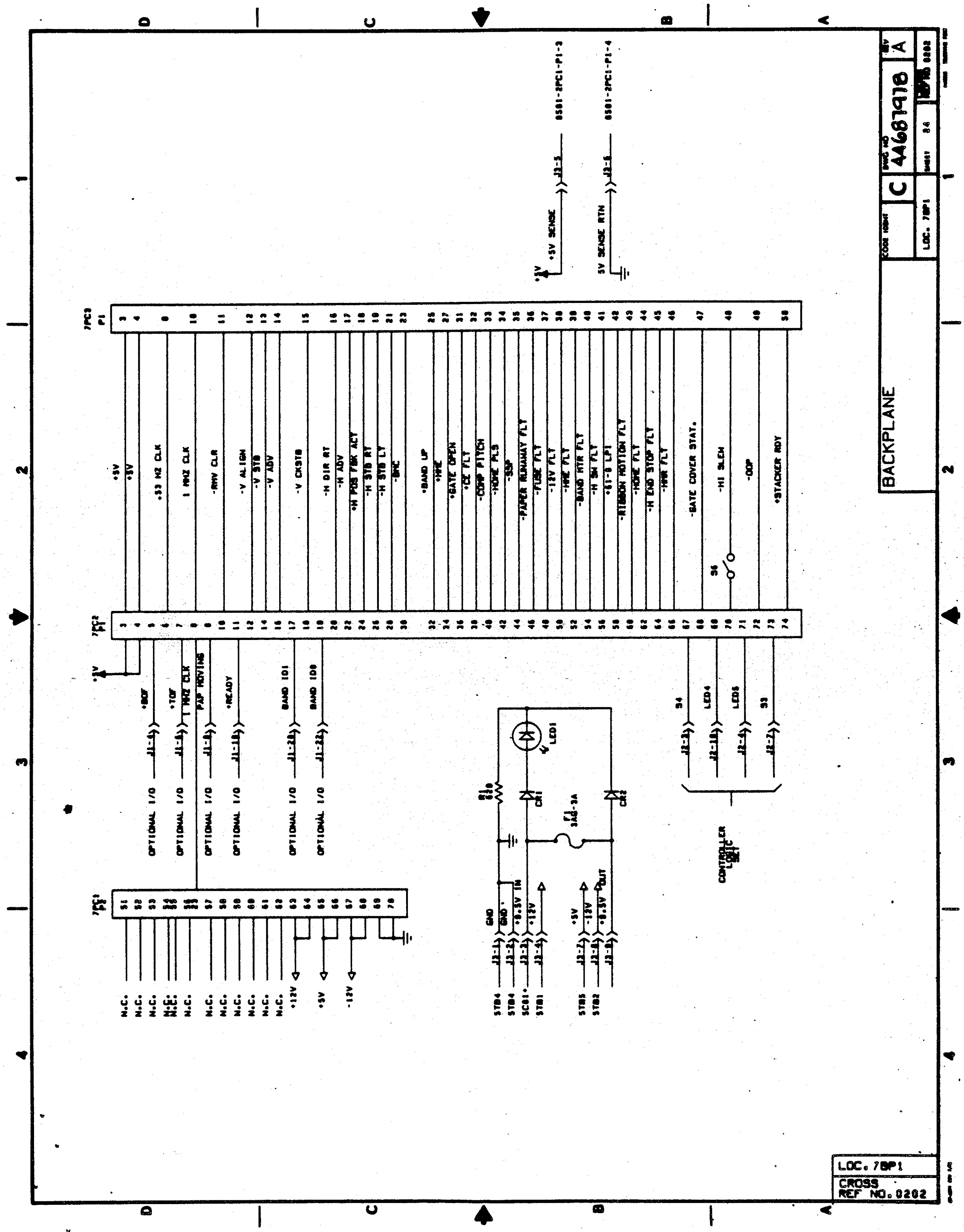

SCHEMATIC-
REAR CONTROL PNL
C
44688422
A
LOC.6PC2
CROSS
REF NO. 6101
MEMBRANE SW
RN1
150
C1
.01MF
C2
47MF
LED-1
LED-2
LED-3
LED-4
LED-5
LED-6
LED-7/8
LED-1/7
LED-2/3/11
LED-4/10
LED-5/9
P2-1
P2-2
P2-3
P2-4
P2-5
P2-6
P2-7
P2-8
P2-9
P2-10
P2-11
P2-12
P2-13
P2-14
P2-15
P2-16
P2-17
P2-18
P2-19
P2-20
P3-1
P3-2
P3-4
P3-3
P3-5
+5V
GND
N/C

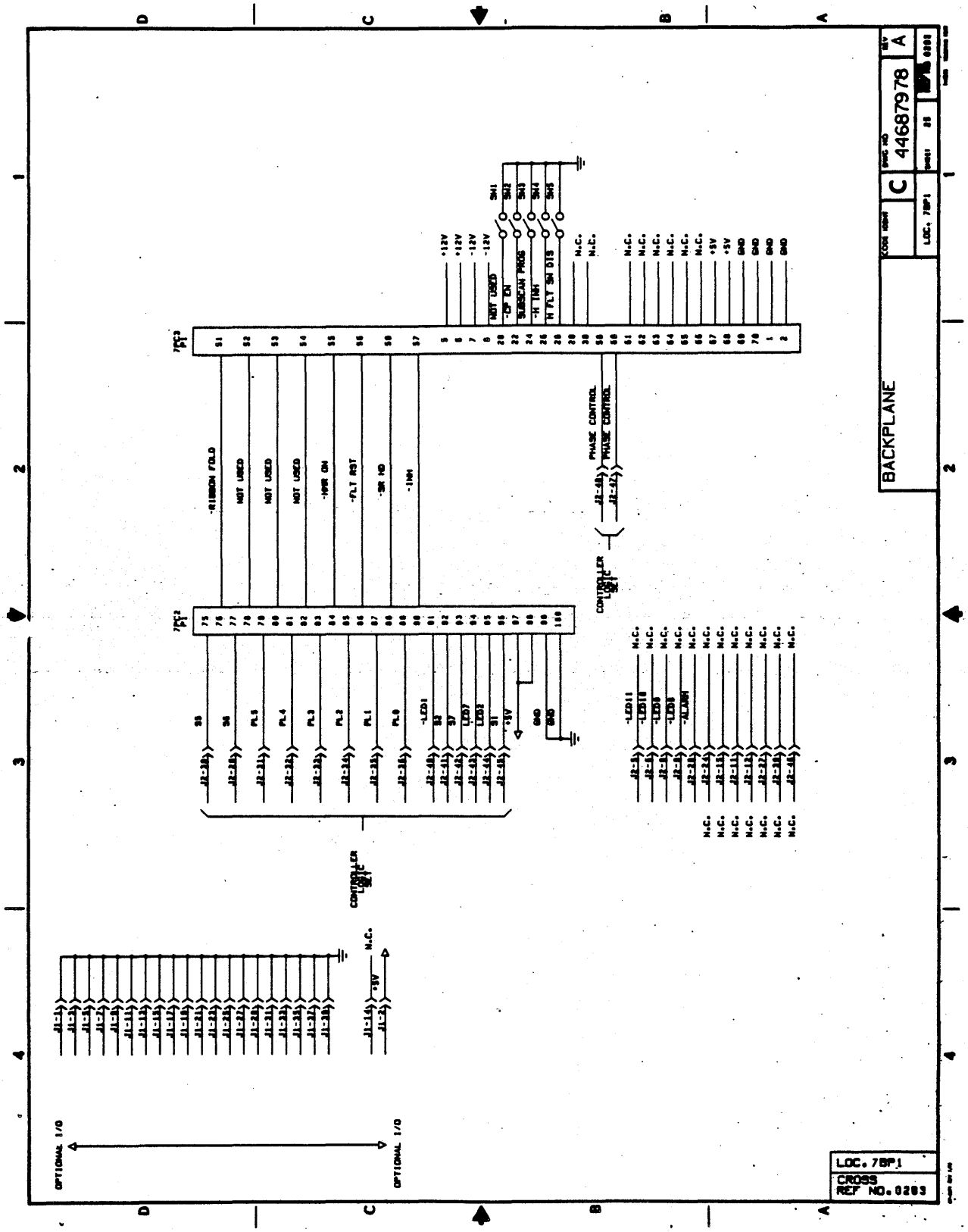


SWITCH AND JUMPER FUNCTIONS

SW1	NOT USED	
SW2	COMP PITCH ENABLE	OPEN = NORMAL CLOSED = COMP PITCH
SW3	SUBSCAN PROGRAM	OPEN = NORMAL CLOSED = SLOWER BAND
SW4	HORIZONTAL INHIBIT	OPEN = PB3 CLOSED = PB(NO HORIZ)
SW5	H SW FAULT DISABLE	OPEN = NORMAL CLOSED = PB1440 ONLY
SW6	HI SPEED SLEW ENABLE	
J7	*CP4	JUMPER PLUG
J8	*CP10	INSTALLED IF
J9	*CP1	INTERFACE
J10	*CP80	ADAPTOR BD
J11	*CP40	7PC1 IS
J12	*CP2	NOT USED
J13	*CP20	
J14	*CP8	

STATUS DISPLAY SIGNAL


BACKPLANE
LOC. 7BP1
CROSS
REF NO. 0202
C
4468791B
A
OPTIONAL I/O
CONTROLLER LOGIC
+5V SENSE
5V SENSE RTN


BACKPLANE
44687978
C
A
LOC. 7BP1
CROSS REF NO. 0283
OPTIONAL I/O
OPTIONAL I/O
CONTROLLER LOGIC
CONTROLLER LOGIC
PHASE CONTROL
PHASE CONTROL
-RIBBON FOLD
NOT USED
NOT USED
NOT USED
-PWR ON
-FLT RST
-SR HD
-INH
+12V
+12V
-12V
-12V
NOT USED
-DP EN
SUBSCAN PROG
-H INH
H FLT SN DIS
N.C.
+5V
+5V
GND
GND
GND
GND
N.C.

CROSS REF NO: 0100
MODULE LOC.: 7PC2
SCHEMATIC NO: 44688186

PART NO. 44688967
REV. A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0300/7PC3	12V FLT(-)	0111/P1-50
0300/7PC3	6LPI(+)/8LPI(-)	0112/P1-58
0300/7PC3	BAND MOTOR FLT(-)	0111/P1-54
0300/7PC3	BAND UP(+)	0114/P1-32
0800/8PC1	BUFFER CLEAR(-)	0106/P1-47
0300/7PC3	CE FAULT(+)	0107/P1-38
0600/6PC1	CLR SW(-)	0115/P1-92
0300/7PC3	COMP PITCH(-)	0114/P1-40
0300/7PC3	CONTROLLER RESET(-)	0107/P1-78
0800/8PC1	DATA 1(+)	0101/P1-45
0800/8PC1	DATA 2(+)	0101/01-43
0800/8PC1	DATA 3(+)	0101/P1-41
0800/8PC1	DATA 4(+)	0101/P1-39
0800/8PC1	DATA 5(+)	0101/P1-37
0800/8PC1	DATA 6(+)	0101/P1-35
0800/8PC1	DATA 7(+)	0101/P1-27
0800/8PC1	DATA 8(+)	0101/P1-21
0800/8PC1	DATA STROBE(+)	0106/P1-29
0300/7PC3	FLT RESET(-)	0119/P1-86
0600/6PC1	FORMS RELEASE(-)	0112/P1-93
0300/7PC3	FUSE FLT(-)	0111/P1-48
0300/7PC3	GATE COVER STATUS(-)	0117/P1-68
0300/7PC3	GATE OPEN/BAND COVER(+)	0114/P1-36
0500/5PCX	GND	0119/P2-20
3100/3A01	GND	0115/P3-26
0300/7PC3	H END STOP FLT(-)	0111/P1-64
0300/7PC3	H POS FDBK ACT(+)	0114/P1-24
0300/7PC3	H STB LT(-)	0114/P1-28
0300/7PC3	H STB RT(-)	0114/P1-26
0300/7PC3	H SW FLT(-)	0111/P1-56
0300/7PC3	HME FLT(-)	0111/P1-52
0300/7PC3	HMR FLT(-)	0111/P1-66
0500/5PCX	HMR ON/5V FAIL(-)	0119/P2-19
0300/7PC3	HOME FLT(-)	0111/P1-62
0300/7PC3	HOME PULSE(-)	0120/P1-42
0300/7PC3	INH(-)	0107/P1-90
3100/3A01	LOAD EVFU SW(-)	0115/P3-25
0900/7PC1	ON/OFF LINE SW(-)	0115/P1-96
0300/7PC3	OOP(-)	0114/P1-72
0300/7PC3	PAP RUNAWAY FAULT(-)	0117/P1-46

CROSS REF NO: 0100
MODULE LOC.: 7PC2
SCHEMATIC NO: 44688186

PART NO. 44688967
REV. A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE INPUTS (Cont)

SOURCE	SIGNAL NAME	MODULE CROSS REF NO.
0600/6PC1	PAPER STEP SW(-)	0115/P1-67
0600/6PC1	PL-0(-)	0112/P1-89
0600/6PC1	PL-1(-)	0112/P1-87
0600/6PC1	PL-2(-)	0112/P1-85
0600/6PC1	PL-3(-)	0112/P1-83
0600/6PC1	PL-4(-)	0112/P1-81
0600/6PC1	PL-5(-)	0112/P1-79
0300/7PC3	PMV CLR(-)	0112/P1-10
0300-7PC3	PRINT INHIBIT (-)	0117/P1-82
3100/3A01	RDR STB(-)	0116/P3-19
3100/3A01	RDR1(-)	0116/P3-15
3100/3A01	RDR2(-)	0116/P3-14
3100/3A01	RDR3(-)	0116/P3-16
3100/3A01	RDR4(-)	0116/P3-13
3100/3A01	RDR5(-)	0116/P3-17
3100/3A01	RDR6(-)	0116/P3-12
3100/3A01	RDR7(-)	0116/P3-8
3100/3A01	RDR8 (-)	0116/P3-5
3100/3A01	RDR9(-)	0116/P3-9
3100/3A01	RDR10(-)	0116/P3-4
3100/3A01	RDR11(-)	0116/P3-10
3100/3A01	RDR12(-)	0116/P3-3
0300/7PC3	RIB MOT FLT(-)	0111/P1-60
0300/7PC3	RIBBON FOLD(-)	0112/P1-76
0600/6PC1	SINGLE CYCLE(-)	0115/P1-77
0300/7PC3	SSP(-)	0120/P1-44
0300/7PC3	STACKER RDY(+)	0111/P1-74
0600/6PC1	TEST MODE SW(-)	0115/P1-75
0600/6PC1	TOF SW(-)	0115/P1-73
0300/7PC3	V CK STB(-)	0112/P1-18
0300/7PC3	V STB(-)	0114/P1-14
0800/8PC1	VERTICAL FORMAT(+)	0101/P1-23

CROSS REF NO: 0100
MODULE LOC.: 7PC2
SCHEMATIC NO: 44688186

PART NO. 44688967
REV. A

LOGIC SIGNAL CROSS REF. DETACHED LIST

MODULE OUTPUTS

MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0121-P2-26	N/C	N/C
0121-P1-78	N/C	N/C
0121-P1-80	N/C	N/C
0117/P3-1	N/C	N/C
0117/P3-2	N/C	N/C
0117/P3-20	N/C	N/C
0108/P1-6	0.53 HZ CLOCK(+)	0300/7PC3
0113/P1-15	96 CHAR(+)	0800/8PC1
0110/P1-94	ALARM LAMP(-)	0900/7PC1
0114/P1-30	BMC (-)	0300/7PC3
0117/P1-5	BOTTOM OF FORM(+)	0800/8PC1
0108/P1-8	CLK 1 MHZ(+)	0300/7PC3
0113/P2-15	CLR SR(-)	0500/5PCX
0118/P2-23	CMP(-)	0500/5PCX
0111/P1-51	CP1(+)	0600/6PC1
0111/P1-61	CP2(+)	0600/6PC1
0111/P1-55	CP4(+)	0600/6PC1
0111/P1-65	CP8(+)	0600/6PC1
0111/P1-53	CP10(+)	0600/6PC1
0111/P1-63	CP20(+)	0600/6PC1
0111/P1-59	CP40(+)	0600/6PC1
0111/P1-57	CP80(+)	0600/6PC1
0110/P1-25	CP(+)/PE CLR(+)	0800/8PC1
0105/P1-49	DEMAND(+)	0800/8PC1
0104/P1-33	EVFU INSTALLED(-)	0800/8PC1
0104/P1-31	EVFU VERIFY(-)	0800/8PC1
0119/P2-21	FLT RST(-)	0500/5PCX
0119/P2-22	GND	0500/5PCX
0119/P2-2	GND	0500/5PCX
0119/P2-14	GND	0500/5PCX
0120/P2-4	GND	0500/5PCX
0114/P1-22	H ADV(-)	0300/7PC3
0114/P1-20	H DIR RT(-)	0300/7PC3
0120/P2-3	HD CLK(-)	0500/5PCX
0212/P2-5	HEP 1(-)	0500/5PCX
0121/P2-7	HEP 2(-)	0500/5PCX
0121/P2-9	HEP 3(-)	0500/5PCX
0121/P2-11	HEP 4(-)	0500/5PCX
0110/P1-70	HI SLEW(-)	0300/7PC3

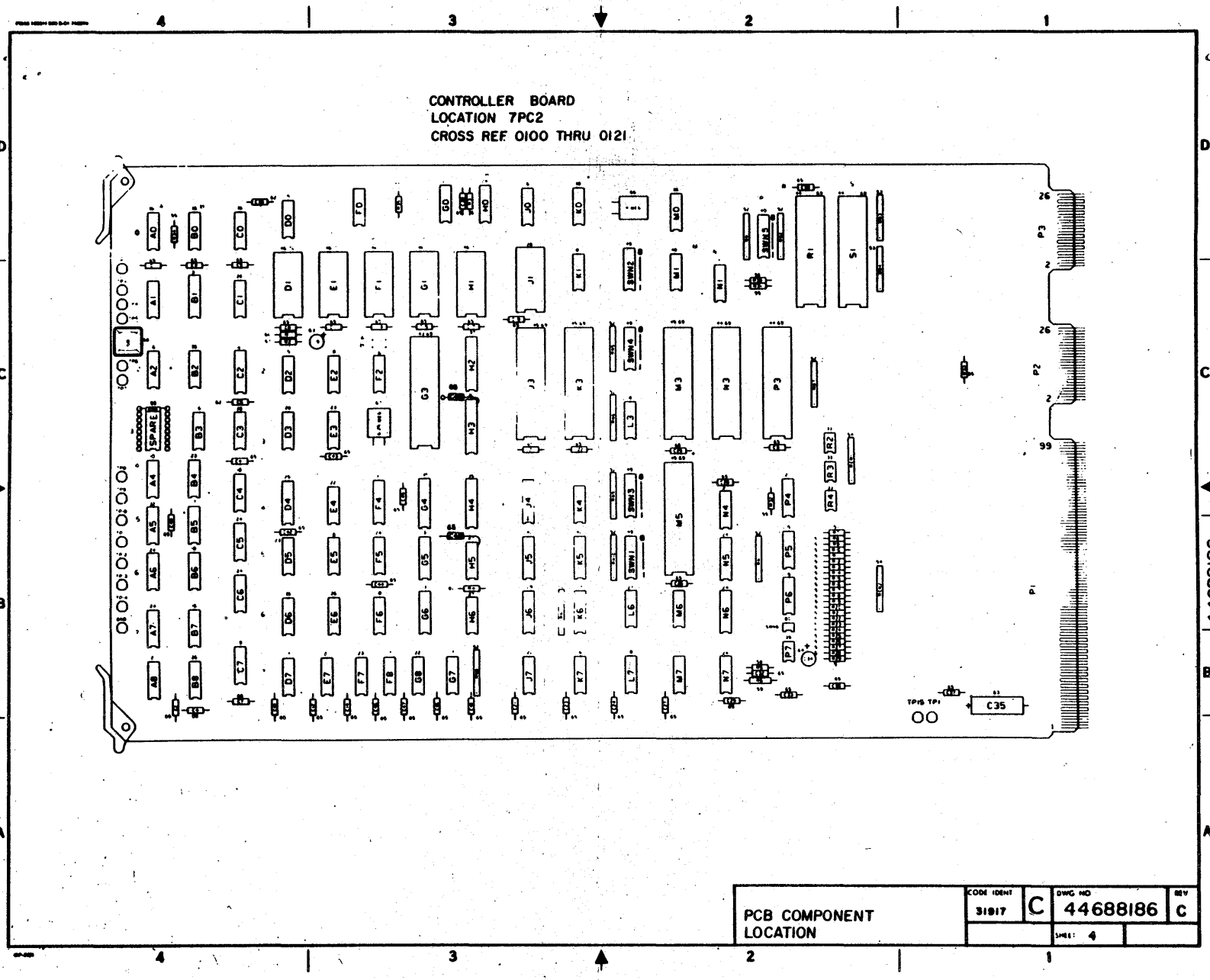
CROSS REF NO: 0100
MODULE LOC.: 7PC2
SCHEMATIC NO: 44688186

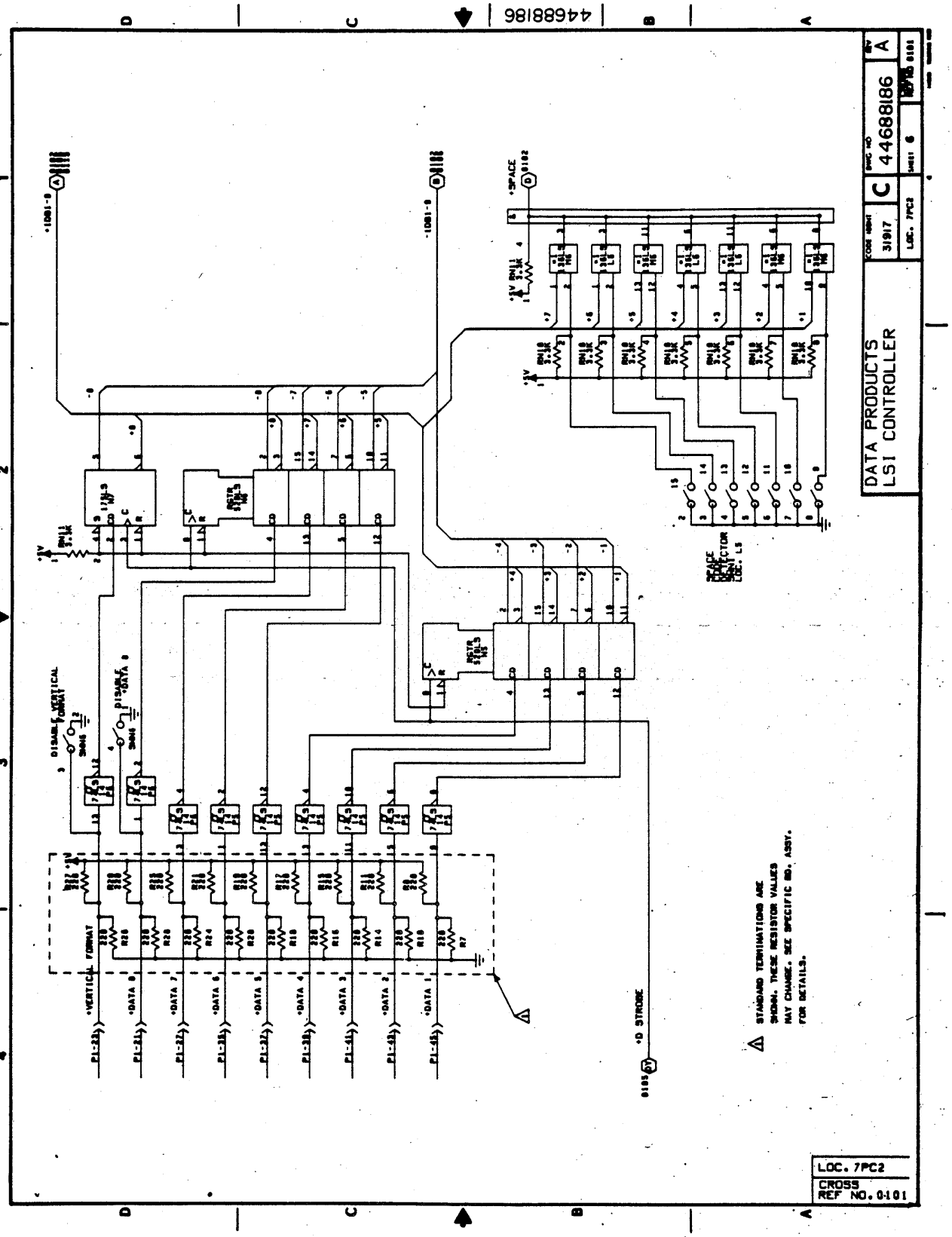
PART NO. 44688967
REV. A

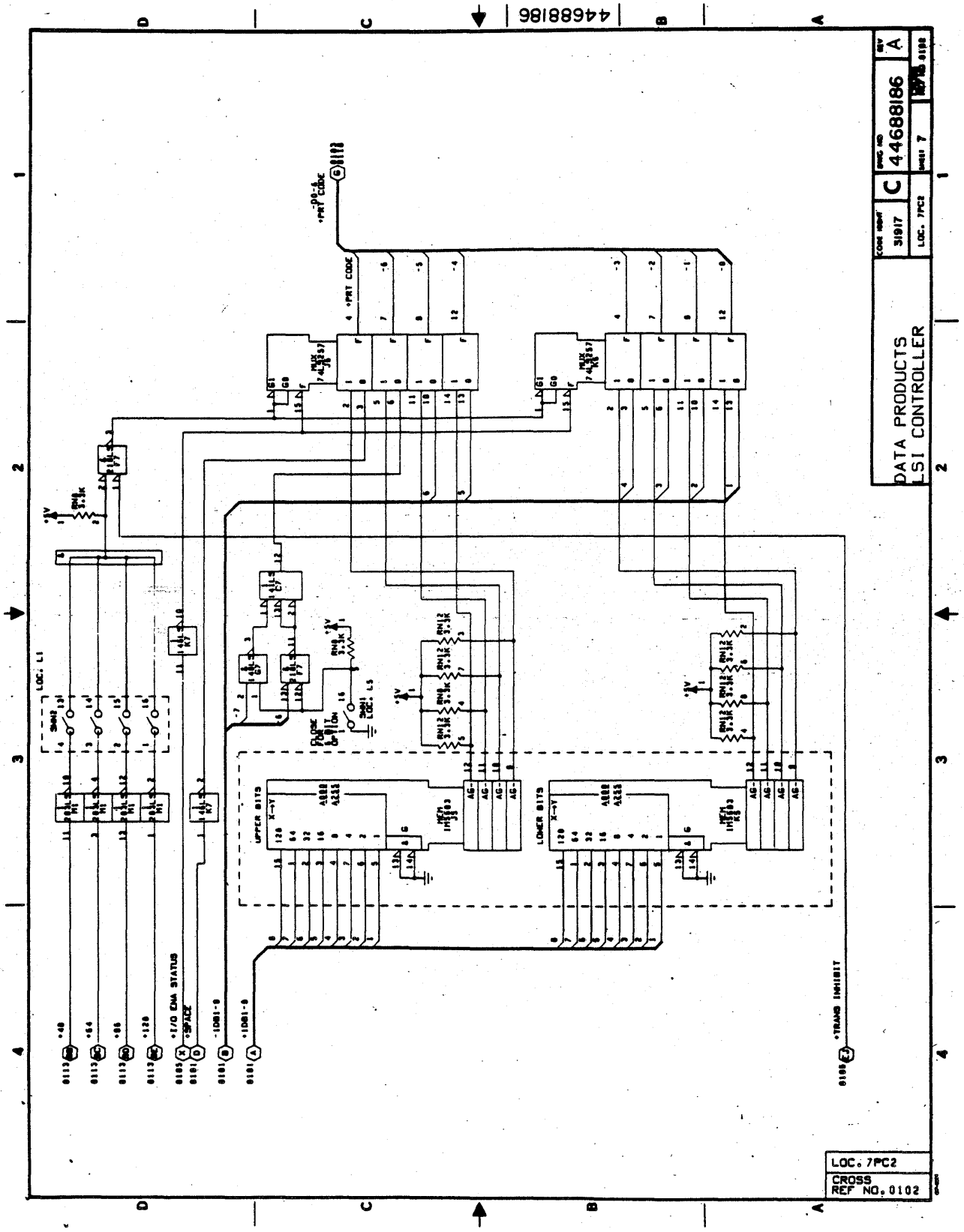
LOGIC SIGNAL CROSS REF. DETACHED LIST

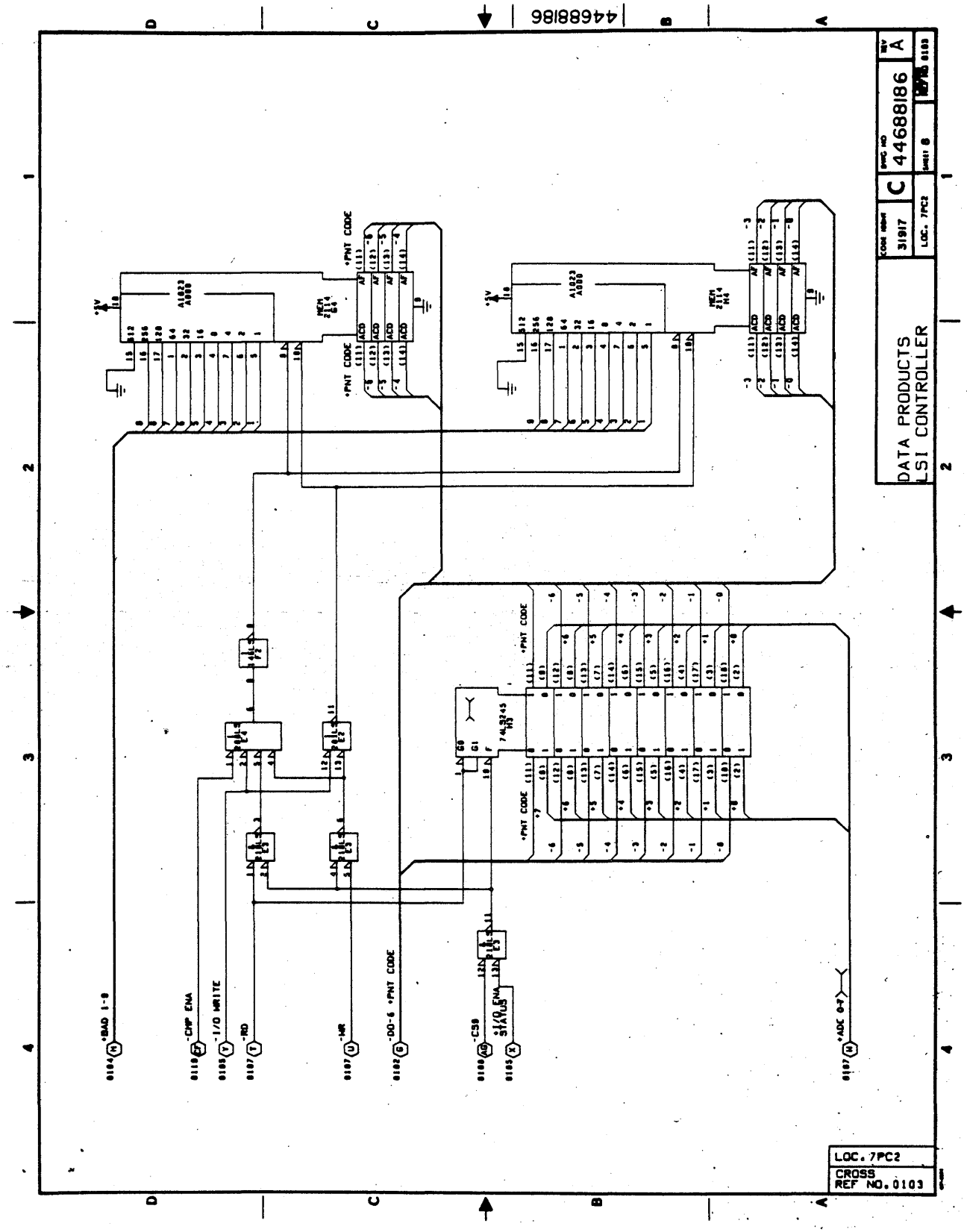
MODULE OUTPUTS (Cont)

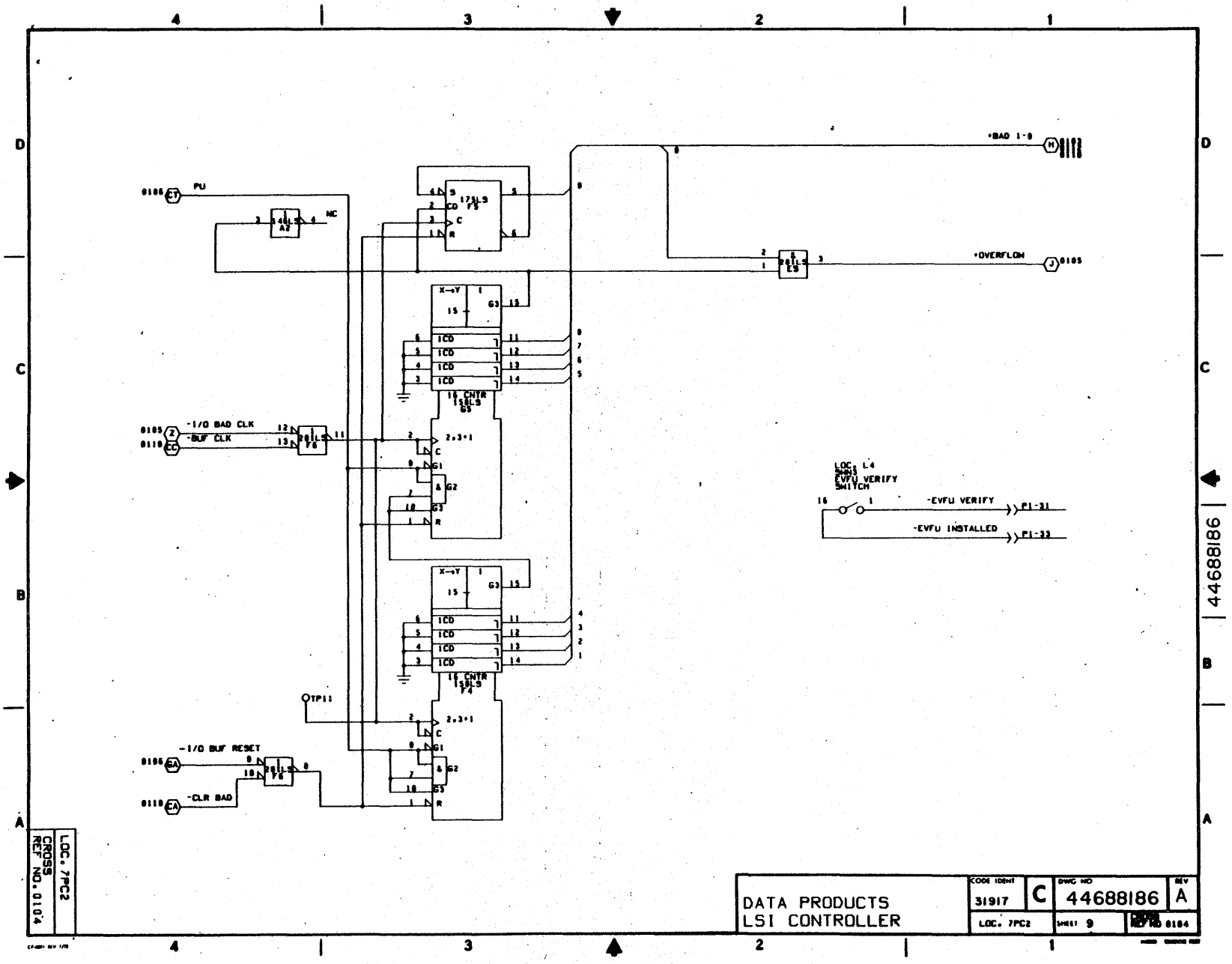
MODULE CROSS REF NO.	SIGNAL NAME	DESTINATION
0114/P1-34	HME(+)	0300/7PC3
0119/P1-84	HMR ON/5V FAIL(-)	0300/7PC3
0110/P1-19	IDENT 0(+)	0800/8PC1
0110/P1-17	IDENT 1(+)	0800/8PC1
0107/P2-25	INH(-)	0500/5PCX
0110/P1-13	ON LINE (+)	0800/8PC1
0110/P1-95	ON LINE LAMP(-)	0900/7PC1
0110/P1-9	PAPER MOVING(+)	0800/8PC1
0117/P3-21	RDR LD ED(-)	3100/3A01
0117/P3-23	RDR MOT ON(-)	3100/3A01
0110/P1-91	READY LAMP(-)	0900/7PC1
0110/P1-11	READY(+)	0800/8PC1
0113/P2-16	RTN	0500/5PCX
0118/P2-24	RTN	0500/5PCX
0119/P1-88	SR HD(-)	0300/7PC3
0119/P2-13	SR HD(-)	0500/5PCX
0119/P2-17	SR STEP 1(-)	0500/5PCX
0119/P2-1	SR STEP 2(-)	0500/5PCX
0110/P1-71	TEST MODE LAMP(-)	0600/6PC1
0110/P1-69	TOF LAMP(-)	0900/7PC1
0110/P1-7	TOP OF FORM(+)	0800/8PC1
0114/P1-16	V ADV(-)	0300/7PC3
0114/P1-12	V ALIGN(-)	0300/7PC3
0117/P3-7	5V (+)	3101
0117/P3-11	5V (+)	3101
0117/P3-24	5V (+)	3101
0117/P3-22	5V (+)	3101
0117/P3-6	GND	3101
0117/P3-18	GND	3101
0119/P2-18	GND	0500,5PCX
0121/P2-12	GND	0500,5PCX
0121/P2-10	GND	0500,5PCX
0121/P2-8	GND	0500,5PCX
0121/P2-6	GND	0500,5PCX

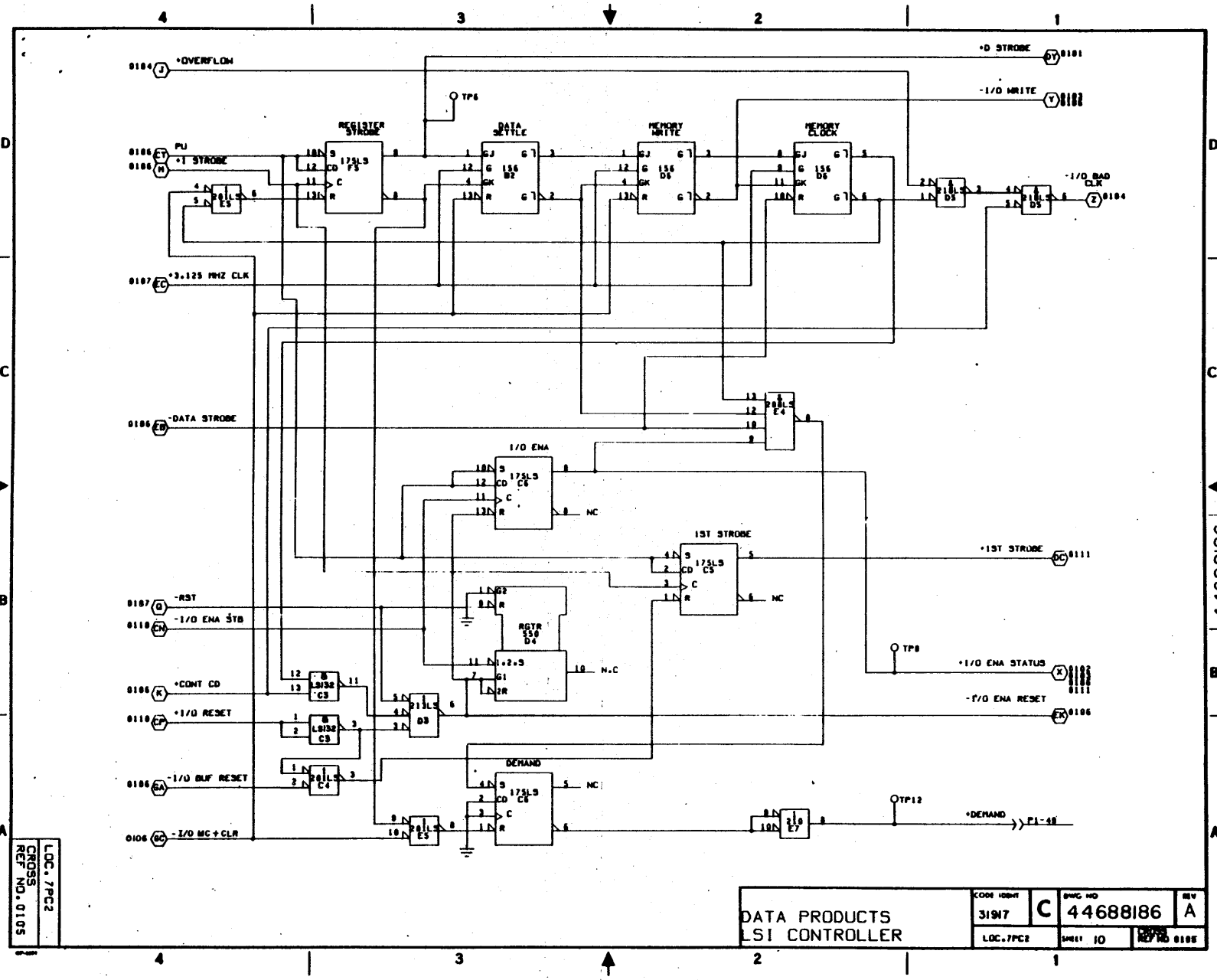

CONTROLLER BOARD
LOCATION 7PC2
CROSS REF 0100 THRU 0121
SPARE
C35
PCB COMPONENT
LOCATION
CODE IDENT
31917
C
DWG NO
44688186
REV
C
SHEET 4
44688186

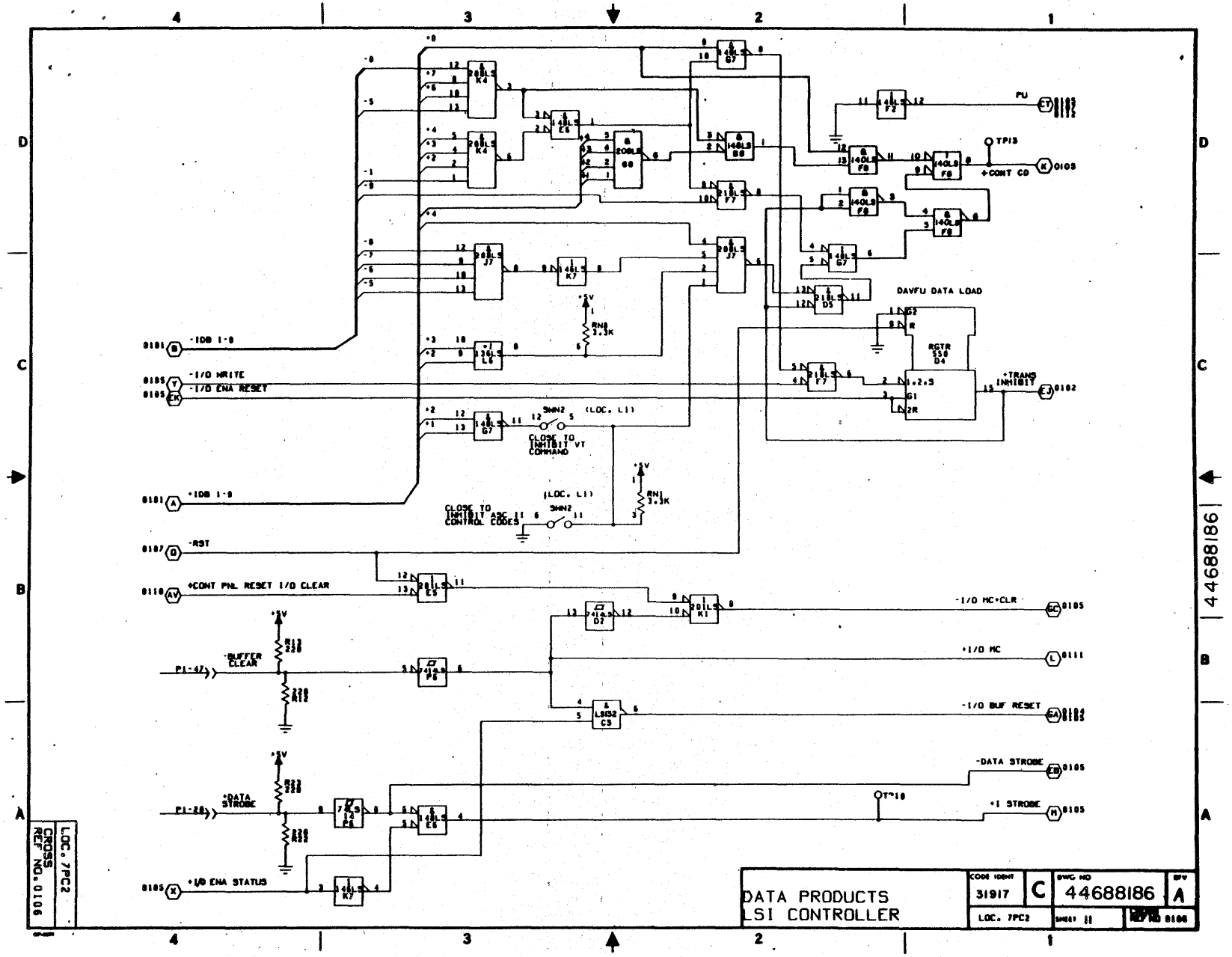

44688186
DATA PRODUCTS
LS1 CONTROLLER
31917
C
44688186
A
LOC. 7PC2
CROSS REF NO. 0101
STANDARD TERMINATIONS ARE SHOWN. THESE RESISTOR VALUES MAY CHANGE. SEE SPECIFIC NO. ASSY. FOR DETAILS.
*VERTICAL FORMAT
*DATA 8
*DATA 7
*DATA 6
*DATA 5
*DATA 4
*DATA 3
*DATA 2
*DATA 1
*D STROBE
*SPACE

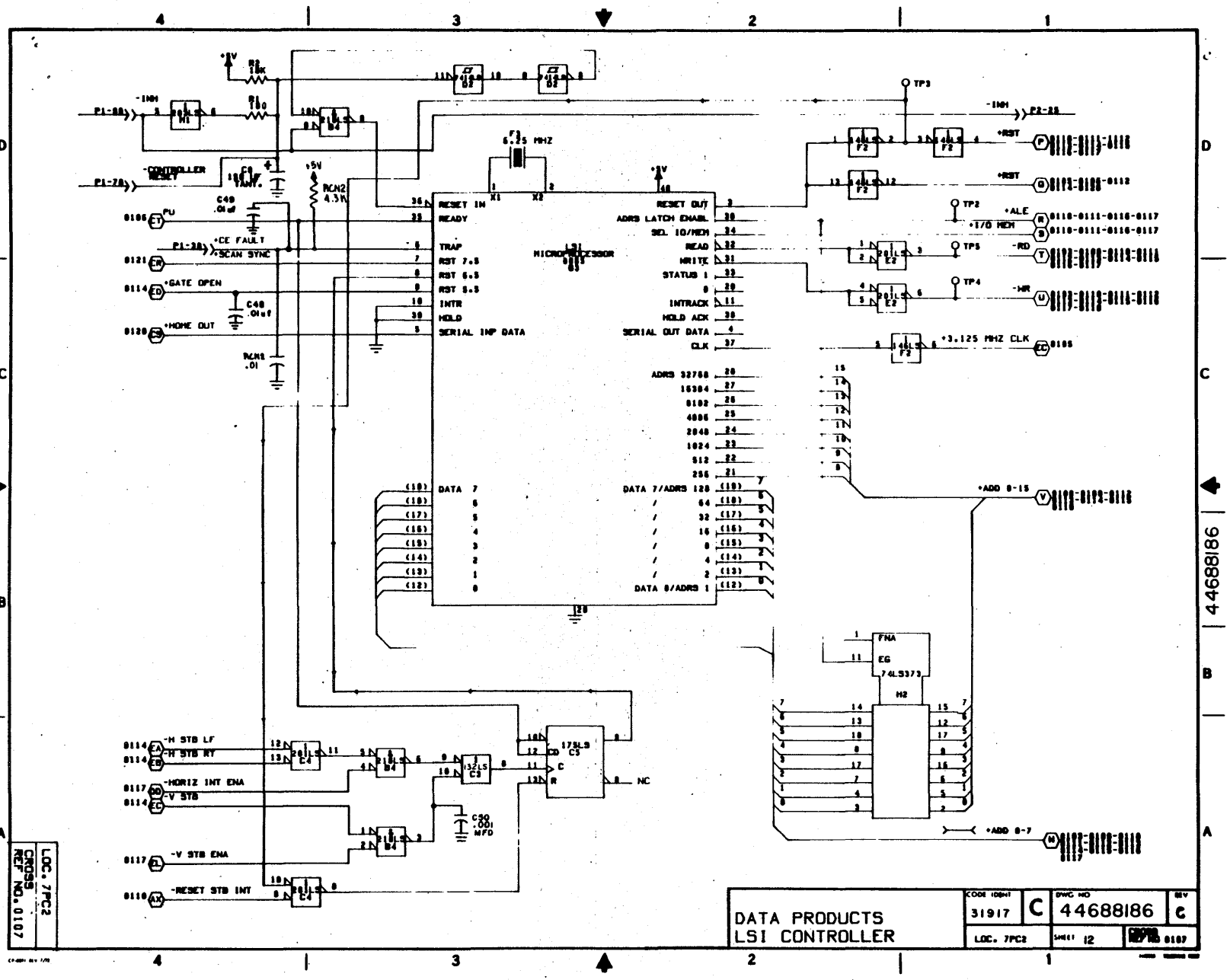

44688186
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 7
LOC. 7PC2
LOC. 7PC2
CROSS REF NO. 0102

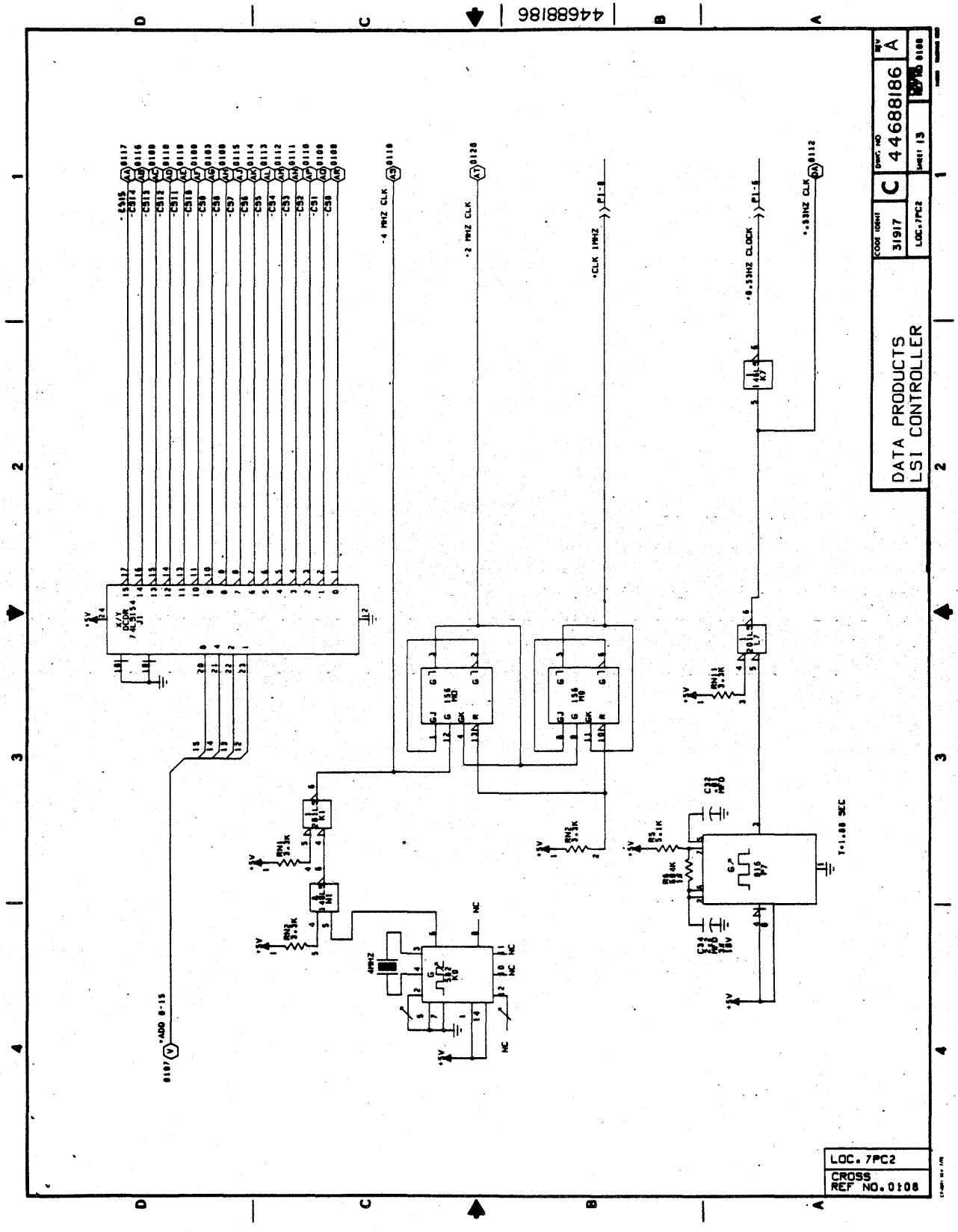

44688186
DATA PRODUCTS
LSI CONTROLLER
LOC. 7PC2
CROSS
REF NO. 0103
*BAD 1-8
-CMP ENA
-I/O WRITE
-RD
-WR
-DO-6 *PNT CODE
-CS0
STATUS ENA
*ADC 0-7
*PNT CODE

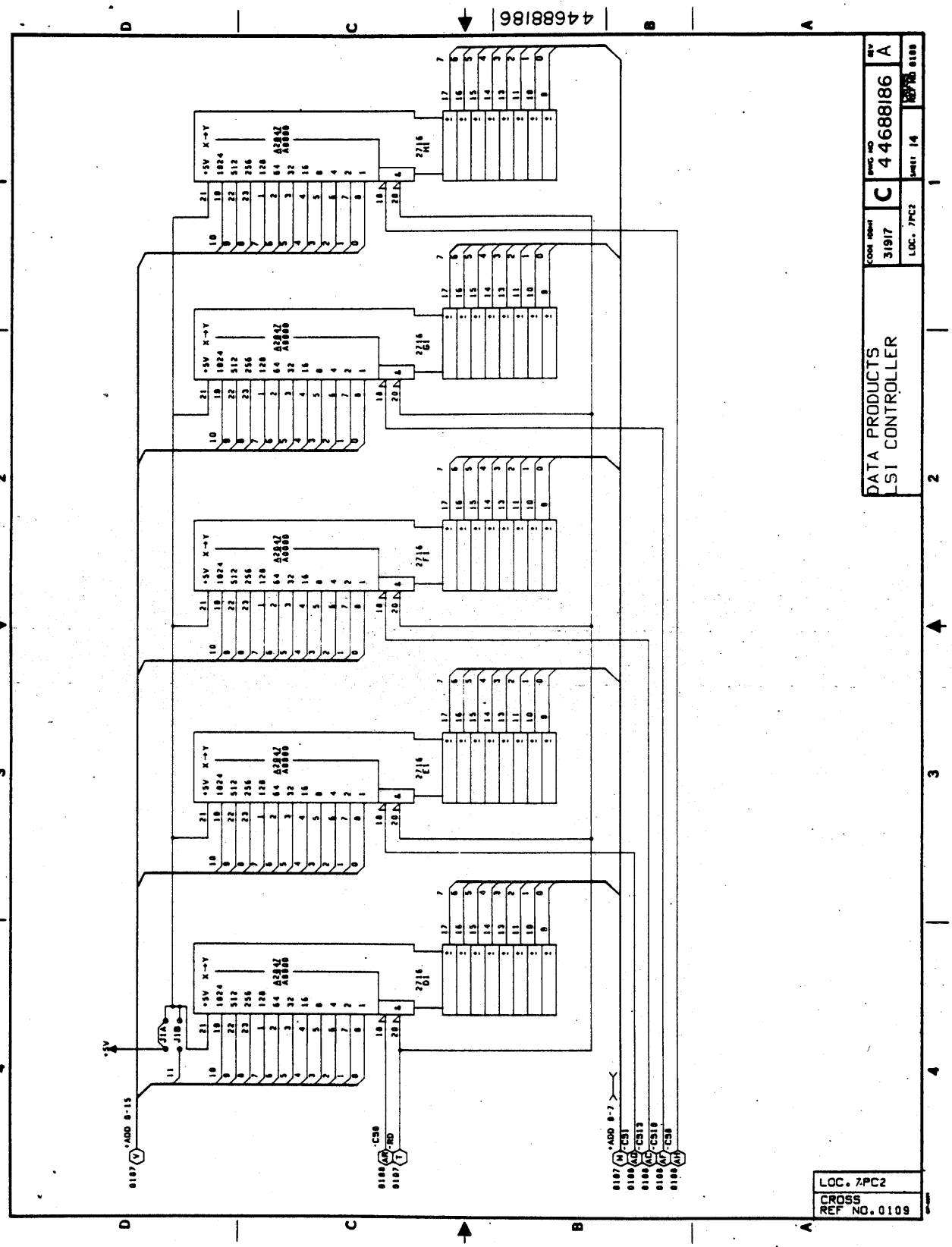

*BAD 1-8
*OVERFLOW
PU
NC
-I/O BAD CLK
-BUF CLK
-I/O BUF RESET
-CLR BAD
TP11
LOC. L4
EVFU VERIFY SWITCH
-EVFU VERIFY
-EVFU INSTALLED
P1-31
P1-33
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 9
CROSS REF NO. 0104
LOC. 7PC2

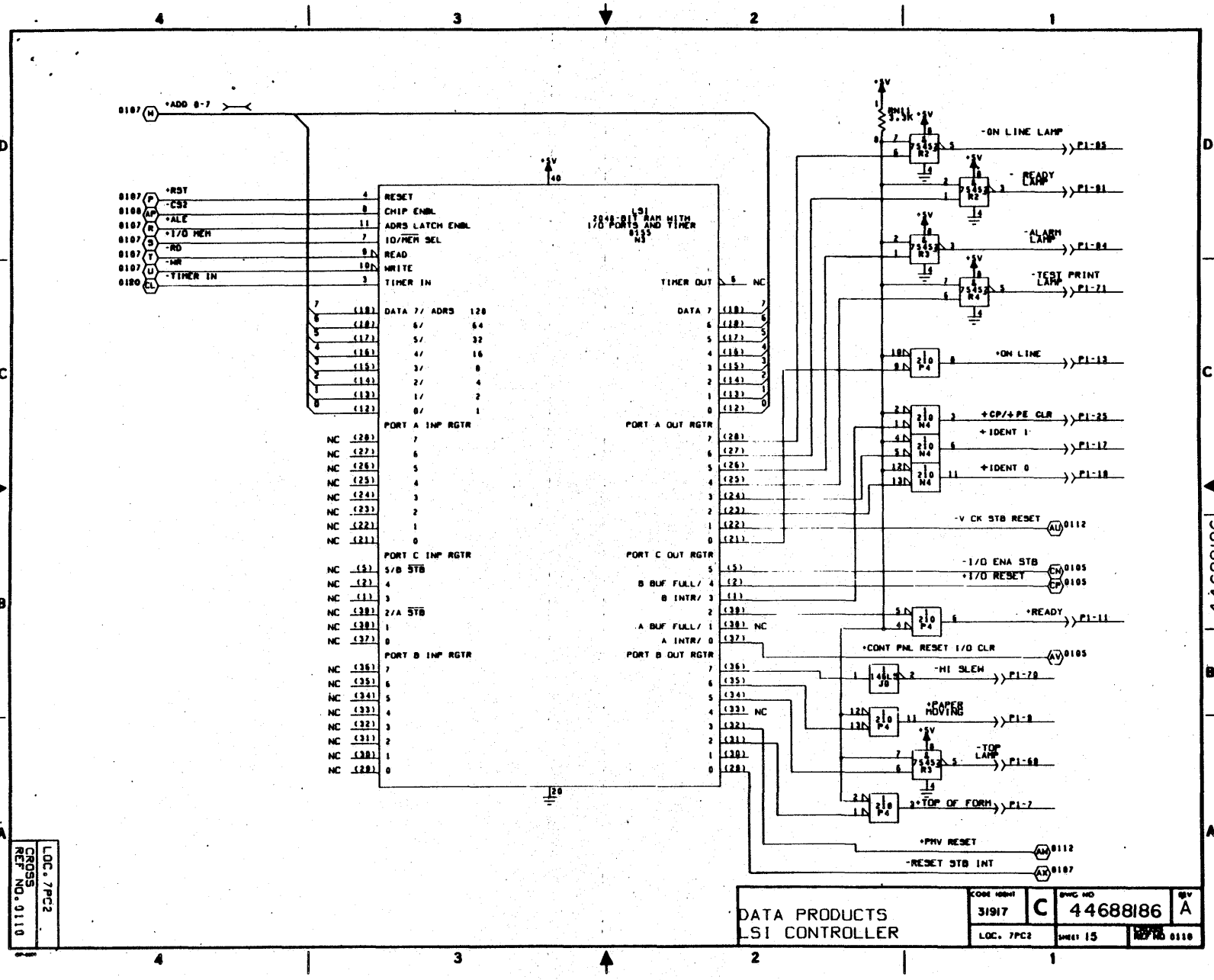

*OVERFLOW
TP6
REGISTER STROBE
DATA SETTLE
MEMORY WRITE
MEMORY CLOCK
*D STROBE
-I/O WRITE
PU
*I STROBE
-I/O BAD CLK
*3.125 MHZ CLK
-DATA STROBE
I/O ENA
1ST STROBE
*1ST STROBE
-RST
-I/O ENA STB
RGTR
TP8
*I/O ENA STATUS
*CONT CD
*I/O RESET
-I/O ENA RESET
DEMAND
-I/O BUF RESET
TP12
*DEMAND
-I/O MC+CLR
DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
A
LOC.7PC2
SHEET 10
CROSS REF NO. 0105


DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 11
44688186
-I/O WRITE
-I/O ENA RESET
-RST
+CONT PNL RESET I/O CLEAR
+I/O ENA STATUS
-I/O MC+CLR
+I/O MC
-I/O BUF RESET
-DATA STROBE
+I STROBE
+CONT CD
DAVFU DATA LOAD
+TRANS INHIBIT
CLOSE TO INHIBIT VT COMMAND
CLOSE TO INHIBIT ASC CONTROL CODES
BUFFER CLEAR
CROSS REF NO. 0106
LOC. 7PC2

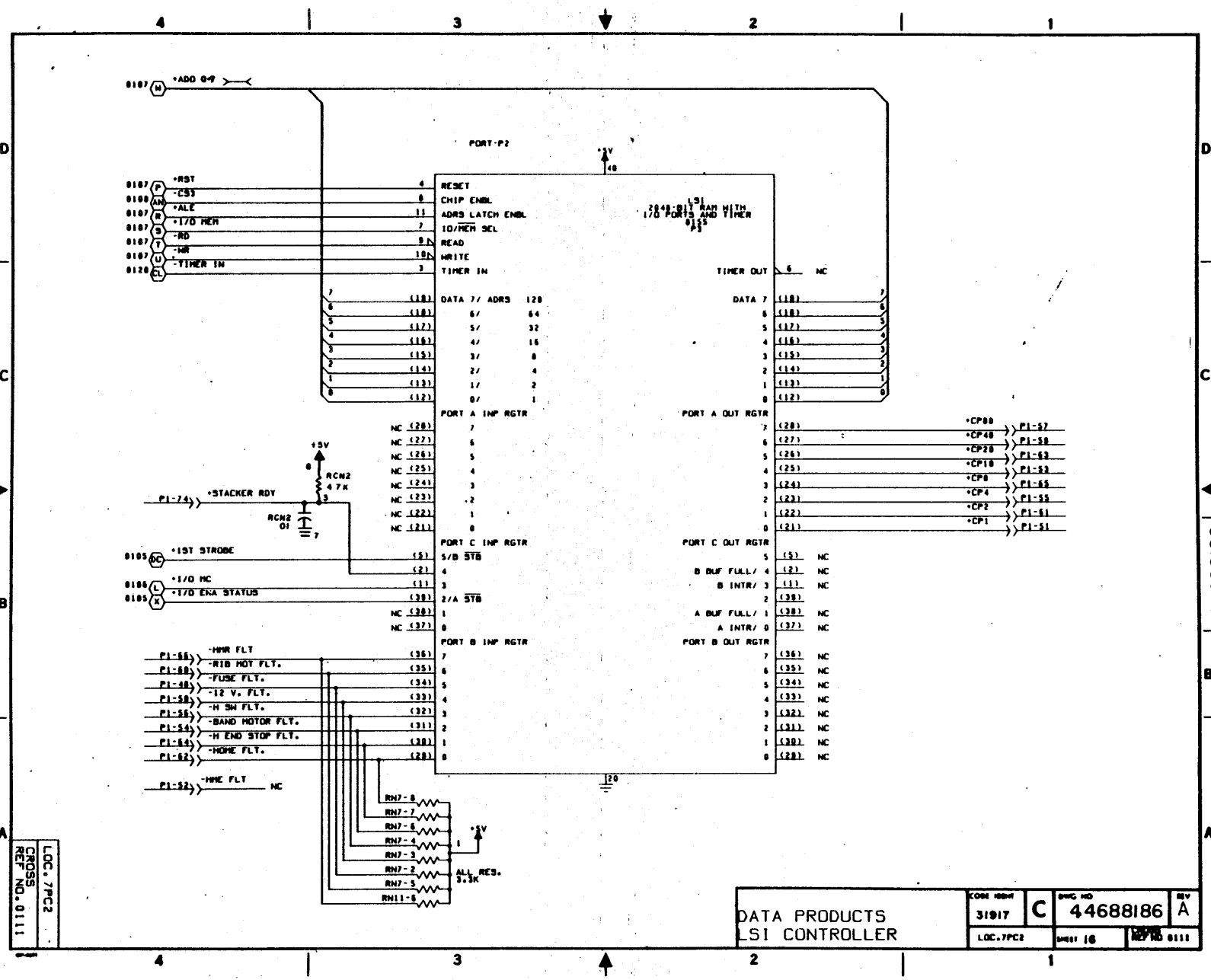

DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
C
LOC. 7PC2
SHEET 12
44688186
RESET IN
READY
TRAP
RST 7.5
RST 6.5
RST 5.5
INTR
HOLD
SERIAL INP DATA
RESET OUT
ADR5 LATCH ENABL
SEL IO/MEM
READ
WRITE
STATUS 1
0
INTRACK
HOLD ACK
SERIAL OUT DATA
CLK
DATA 7
DATA 7/ADR5 128
DATA 0/ADR5 1
ADR5 32768
16384
8192
4096
2048
1024
512
256
6.25 MHZ
*3.125 MHZ CLK
*ADD 8-15
*ADD 0-7
-INH
*RST
*ALE
-RD
-WR
TP2
TP3
TP4
TP5
-H STB LF
-H STB RT
-HORIZ INT ENA
-V STB
-V STB ENA
-RESET STB INT
*CE FAULT
*SCAN SYNC
*GATE OPEN
*HOME OUT
-CONTROLLER RESET
+5V
+I/O MEM
NC

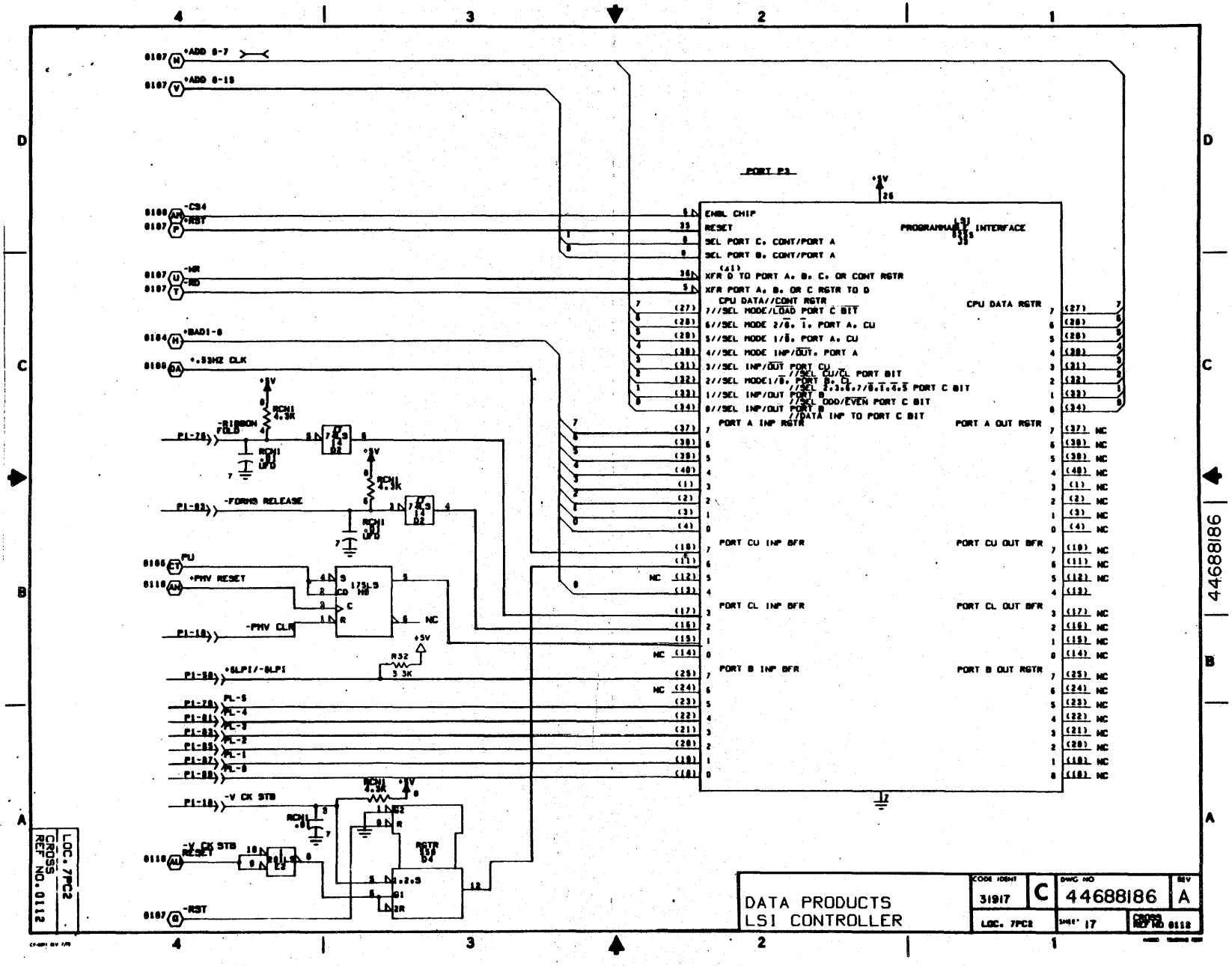

44688186
DATA PRODUCTS
LSI CONTROLLER
44688186
A
C
31917
LOC. 7PC2
LOC. 7PC2
CROSS
REF NO. 0108


44688186
DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
A
LOC. 7PC2
SHEET 14
LOC. 7PC2
CROSS
REF NO. 0109

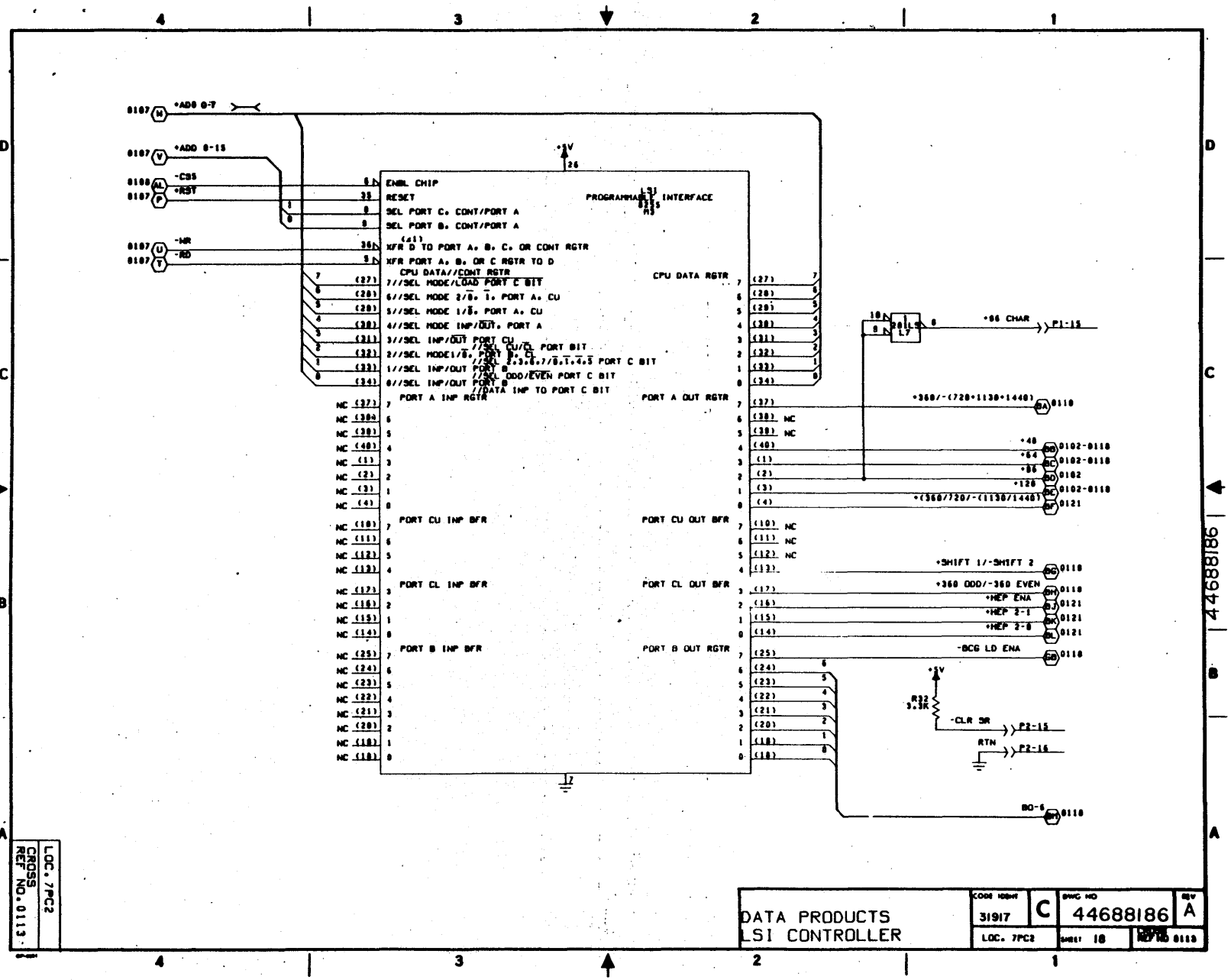

*ADD 8-7
*RST
-CS2
*ALE
*I/O MEM
-RD
-WR
-TIMER IN
RESET
CHIP ENBL
ADRS LATCH ENBL
IO/MEM SEL
READ
WRITE
TIMER IN
LSI
2048-BIT RAM WITH
I/O PORTS AND TIMER
8155
N3
TIMER OUT
DATA 7/ ADRS 128
6/ 64
5/ 32
4/ 16
3/ 8
2/ 4
1/ 2
0/ 1
PORT A INP RGTR
PORT A OUT RGTR
PORT C INP RGTR
PORT C OUT RGTR
5/B STB
B BUF FULL/
B INTR/
2/A STB
A BUF FULL/
A INTR/
PORT B INP RGTR
PORT B OUT RGTR
-ON LINE LAMP
- READY LAMP
-ALARM LAMP
-TEST PRINT LAMP
+ON LINE
+CP/+PE CLR
+IDENT 1
+IDENT 0
-V CK STB RESET
-I/O ENA STB
+I/O RESET
*READY
*CONT PNL RESET I/O CLR
-HI SLEW
*PAPER MOVING
-TOP LAMP
*TOP OF FORM
*PHV RESET
-RESET STB INT
DATA PRODUCTS
LSI CONTROLLER
CROSS REF NO. 0110
LOC. 7PC2
31917
C
44688186
A
SHEET 15

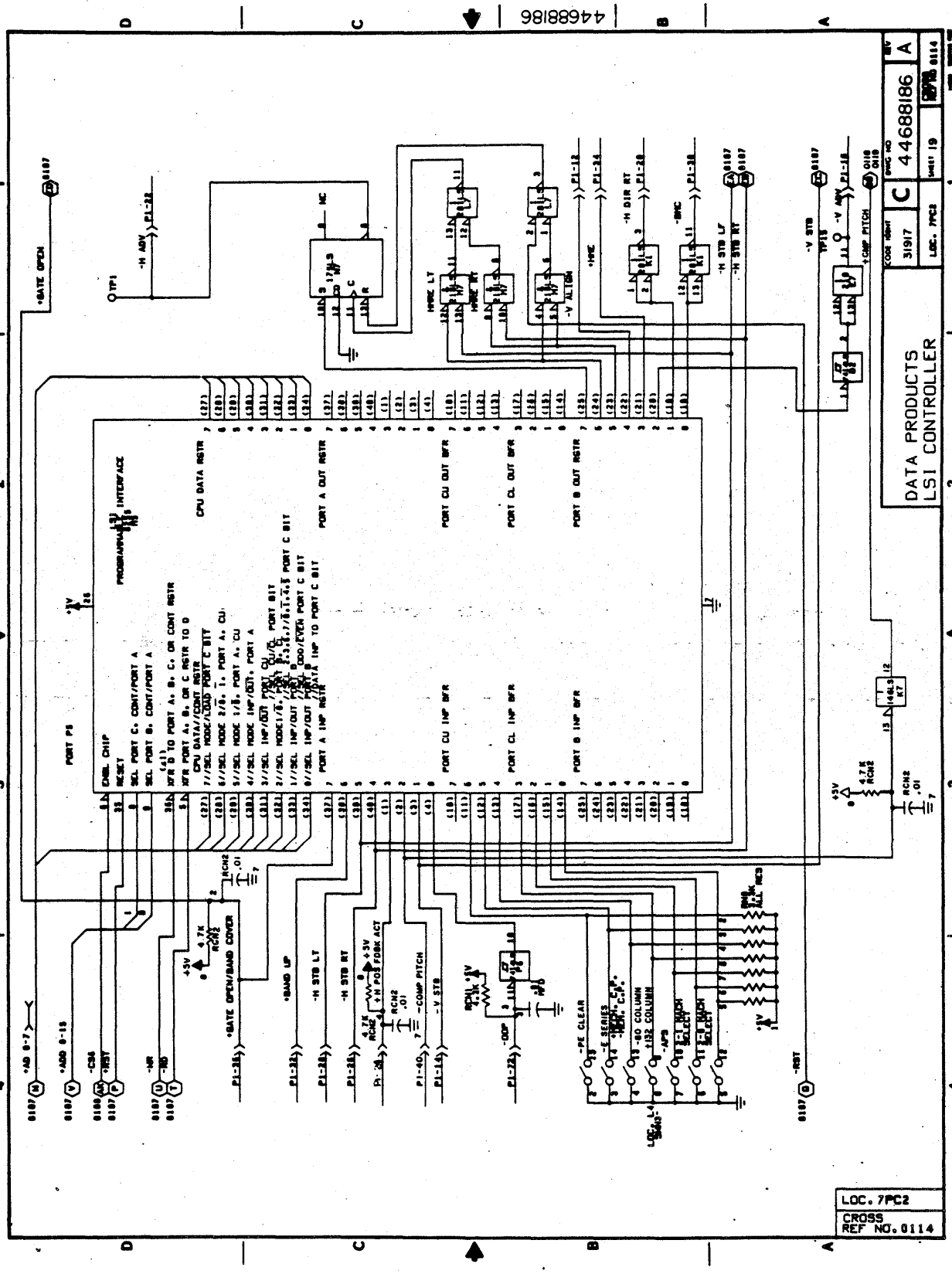
44688186

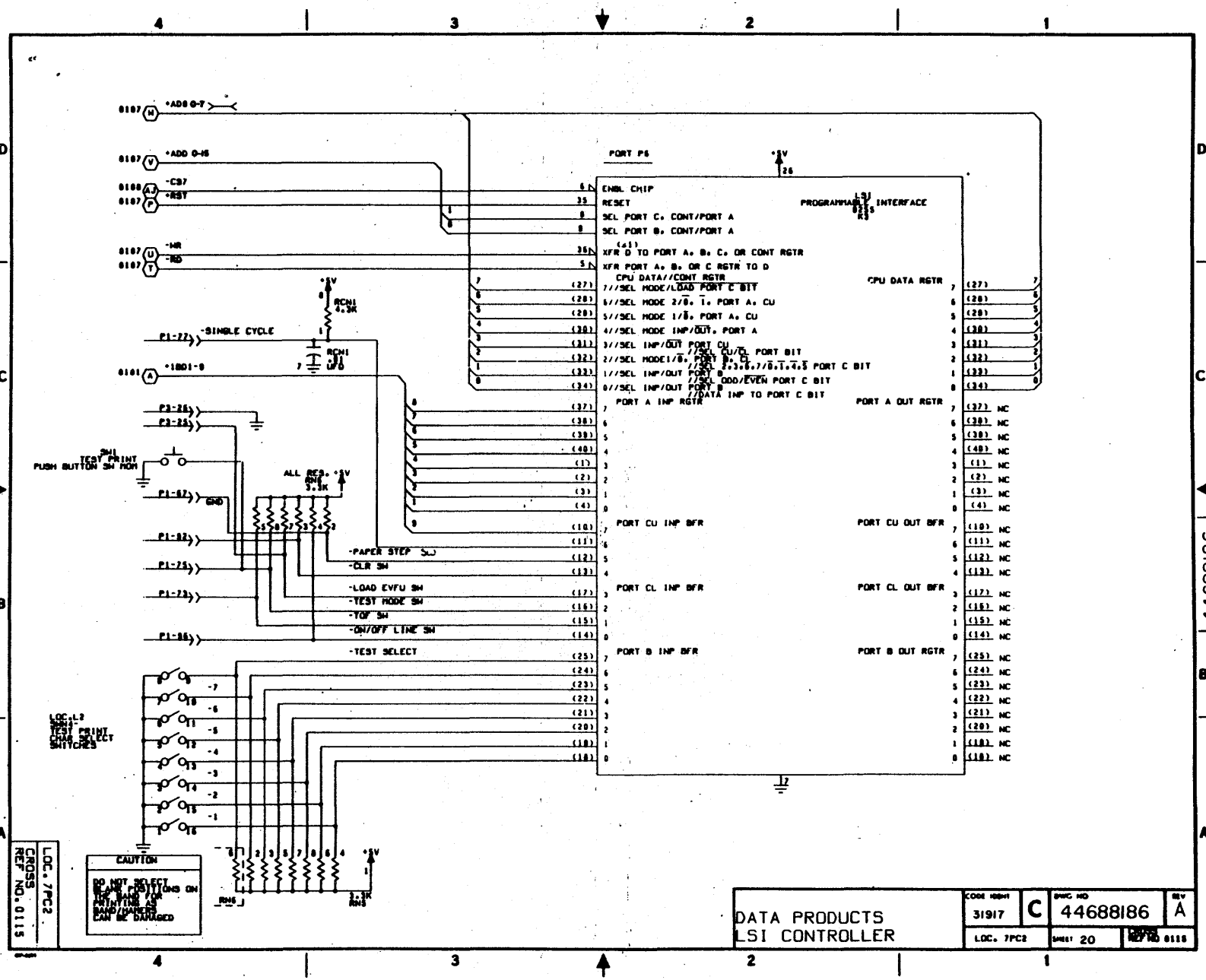

*ADO 0-7
PORT-P2
*RST
-CS3
*ALE
*I/O MEM
-RD
-WR
-TIMER IN
RESET
CHIP ENBL
ADR5 LATCH ENBL
IO/MEM SEL
READ
WRITE
TIMER IN
LSI
2048-BIT RAM WITH
I/O PORTS AND TIMER
8155
P3
TIMER OUT
DATA 7/ ADR5 128
6/ 64
5/ 32
4/ 16
3/ 8
2/ 4
1/ 2
0/ 1
DATA 7
PORT A INP RGTR
PORT A OUT RGTR
PORT C INP RGTR
PORT C OUT RGTR
PORT B INP RGTR
PORT B OUT RGTR
*CP80
*CP40
*CP20
*CP10
*CP8
*CP4
*CP2
*CP1
P1-57
P1-59
P1-63
P1-53
P1-65
P1-55
P1-61
P1-51
RCN2
4.7K
RCN2
01
*STACKER RDY
P1-74
*1ST STROBE
*I/O MC
*I/O ENA STATUS
-HMR FLT
-RIB MOT FLT.
-FUSE FLT.
-12 V. FLT.
-H SW FLT.
-BAND MOTOR FLT.
-H END STOP FLT.
-HOME FLT.
P1-66
P1-68
P1-48
P1-58
P1-56
P1-54
P1-64
P1-62
-HME FLT
P1-52
NC
RN7-8
RN7-7
RN7-6
RN7-4
RN7-3
RN7-2
RN7-5
RN11-6
ALL RES.
3.3K
B BUF FULL/
B INTR/
A BUF FULL/
A INTR/
LOC.7PC2
CROSS REF NO. 0111
DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
A
LOC.7PC2
SHEET 16
REV NO 0111

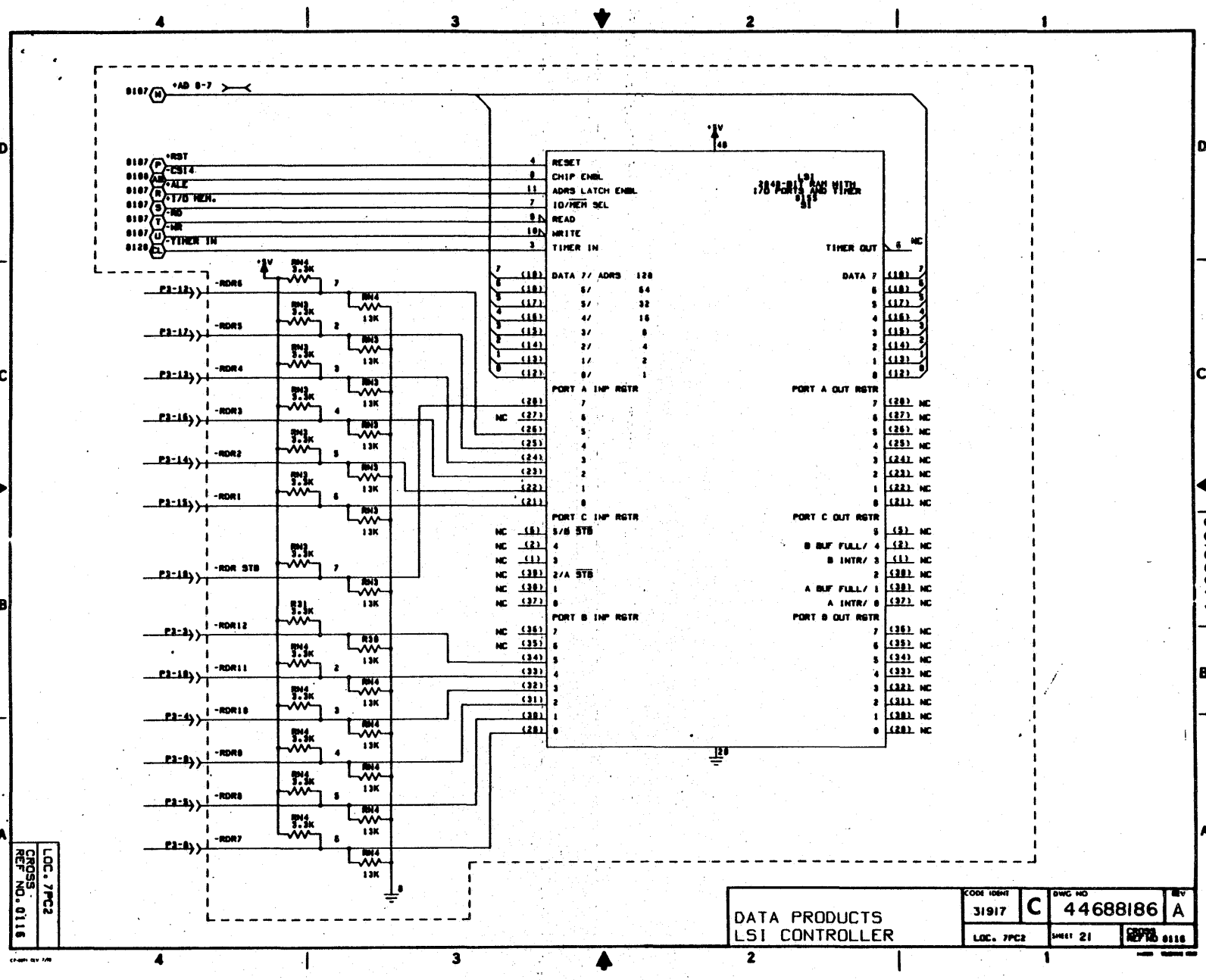

PORT P3
ENBL CHIP
RESET
SEL PORT C, CONT/PORT A
SEL PORT B, CONT/PORT A
XFR D TO PORT A, B, C, OR CONT RGSTR
XFR PORT A, B, OR C RGSTR TO D
CPU DATA//CONT RGSTR
7//SEL MODE/LOAD PORT C BIT
6//SEL MODE 2/B, 1, PORT A, CU
5//SEL MODE 1/B, PORT A, CU
4//SEL MODE INP/OUT, PORT A
3//SEL INP/OUT PORT CU
2//SEL MODE1/B, PORT B, CL
1//SEL INP/OUT PORT B
0//SEL INP/OUT PORT B
PORT A INP RGSTR
PORT CU INP BFR
PORT CL INP BFR
PORT B INP BFR
PROGRAMMABLE I/O INTERFACE
CPU DATA RGSTR
PORT A OUT RGSTR
PORT CU OUT BFR
PORT CL OUT BFR
PORT B OUT RGSTR
*ADD 0-7
*ADD 8-15
-CS4
*RST
-WR
-RD
*BAD1-8
*.83MHZ CLK
-RIBBON CLK
-FORMS RELEASE
PU
*PHV RESET
-PHV CLK
*SLPI/-SLPI
-V CK STB
-V CK STB RESET
LOC. 7PC2
CROSS REF NO. 0112
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 17

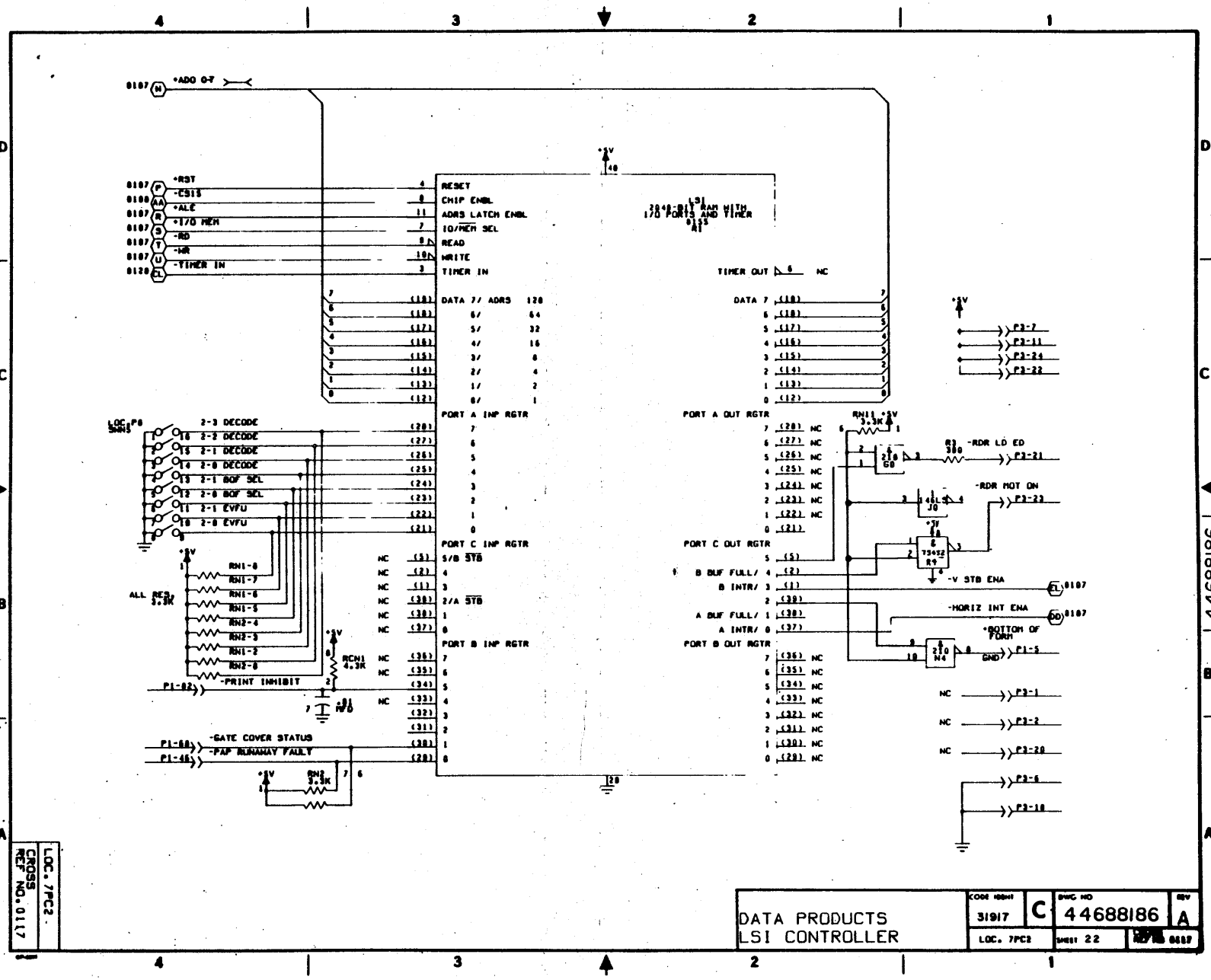
44688186


*ADD 0-7
*ADD 8-15
-CS5
*RST
-WR
-RD
+5V
ENBL CHIP
RESET
SEL PORT C. CONT/PORT A
SEL PORT B. CONT/PORT A
XFR D TO PORT A. B. C. OR CONT RGTR
XFR PORT A. B. OR C RGTR TO D
CPU DATA//CONT RGTR
7//SEL MODE/LOAD PORT C BIT
6//SEL MODE 2/0. 1. PORT A. CU
5//SEL MODE 1/0. PORT A. CU
4//SEL MODE INP/OUT. PORT A
3//SEL INP/OUT PORT CU
2//SEL MODE1/0. PORT B. CL
1//SEL INP/OUT PORT B
0//SEL INP/OUT PORT B
//DATA INP TO PORT C BIT
PORT A INP RGTR
PORT CU INP BFR
PORT CL INP BFR
PORT B INP BFR
PROGRAMMABLE I/O INTERFACE
CPU DATA RGTR
PORT A OUT RGTR
PORT CU OUT BFR
PORT CL OUT BFR
PORT B OUT RGTR
*86 CHAR
P1-15
+360/-(720+1130+1440)
+48
+64
+86
+128
+(360/720/-(1130/1440))
+SHIFT 1/-SHIFT 2
+360 ODD/-360 EVEN
+HEP ENA
+HEP 2-1
+HEP 2-8
-BCG LD ENA
R32
3.3K
-CLR SR
P2-15
RTN
P2-16
B0-6
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT
31917
C
DWG NO
44688186
REV
A
LOC. 7PC2
SHEET 18
CROSS REF NO. 0113
LOC. 7PC2

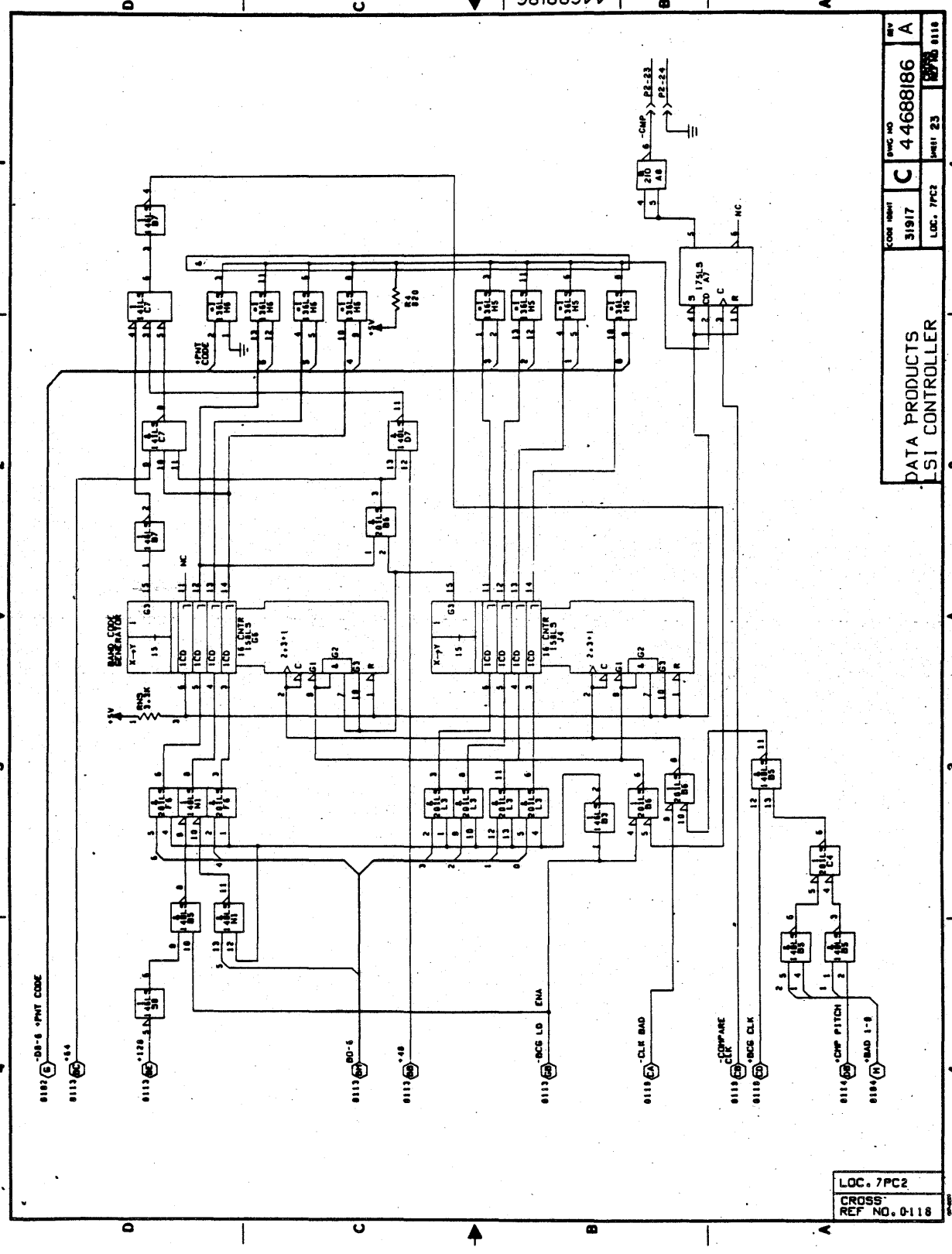

DATA PRODUCTS
LSI CONTROLLER
44688186
C
LOC. 7PC2
CROSS
REF NO. 0114

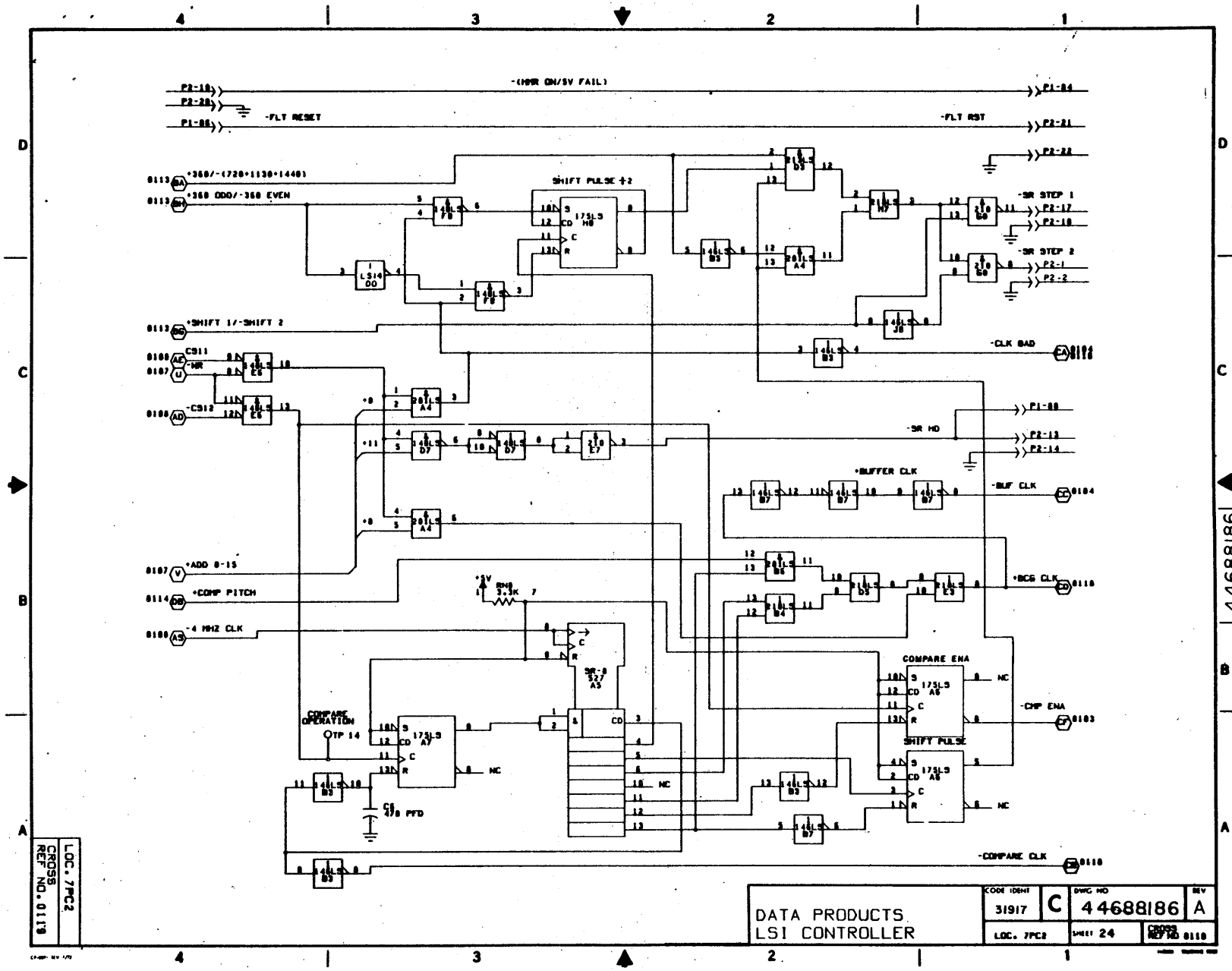

PORT P6
PROGRAMMABLE INTERFACE
ENBL CHIP
RESET
SEL PORT C, CONT/PORT A
SEL PORT B, CONT/PORT A
XFR D TO PORT A, B, C, OR CONT RGTR
XFR PORT A, B, OR C RGTR TO D
CPU DATA//CONT RGTR
CPU DATA RGTR
PORT A INP RGTR
PORT A OUT RGTR
PORT CU INP BFR
PORT CU OUT BFR
PORT CL INP BFR
PORT CL OUT BFR
PORT B INP BFR
PORT B OUT RGTR
-SINGLE CYCLE
TEST PRINT PUSH BUTTON SW NOR
-PAPER STEP SW
-CLR SW
-LOAD EVFU SW
-TEST MODE SW
-TOF SW
-ON/OFF LINE SW
-TEST SELECT
LOC.L2 THRU 7 TEST PRINT CHAR SELECT SWITCHES
CAUTION
DO NOT SELECT ALARM POSITIONS ON THIS BANK FOR PRINTING AS BOARD/WIRES CAN BE DAMAGED
CROSS REF NO. 0115
LOC. 7PC2
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 20
REF NO 0115

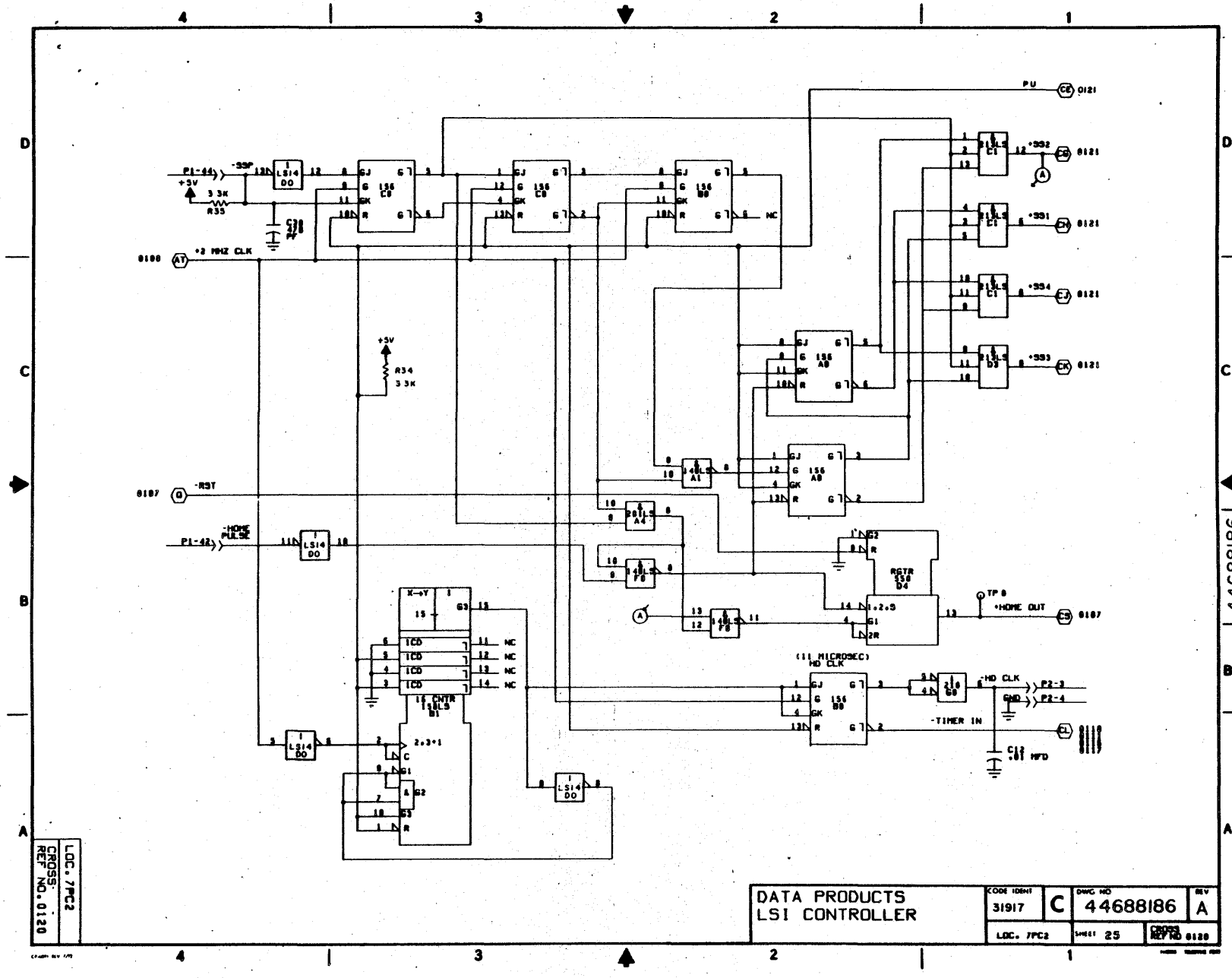

DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 21
CROSS REF NO. 0116
44688186

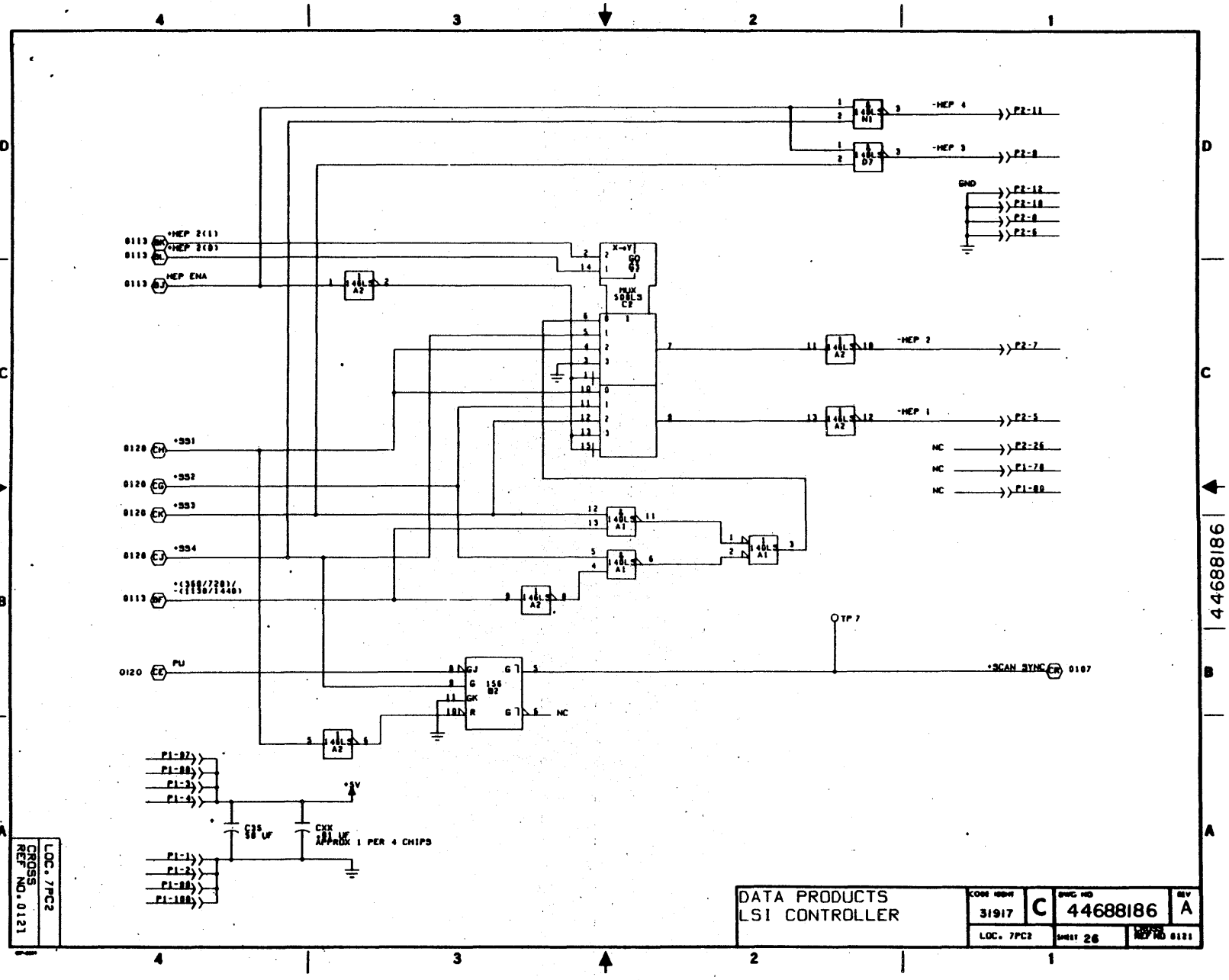

*ADO 0-7
*RST
-CS1S
*ALE
*I/O MEM
-RD
-WR
-TIMER IN
RESET
CHIP ENBL
ADRS LATCH ENBL
IO/MEM SEL
READ
WRITE
TIMER IN
DATA 7/ ADRS 128
6/ 64
5/ 32
4/ 16
3/ 8
2/ 4
1/ 2
0/ 1
PORT A INP RGTR
PORT C INP RGTR
5/B STB
2/A STB
PORT B INP RGTR
2-3 DECODE
2-2 DECODE
2-1 DECODE
2-0 DECODE
2-1 BOF SEL
2-0 BOF SEL
2-1 EVFU
2-0 EVFU
ALL RES 3.3K
RCN1 4.3K
-PRINT INHIBIT
P1-82
-GATE COVER STATUS
-PAP RUNAWAY FAULT
P1-68
P1-46
RN2 3.3K
TIMER OUT
PORT A OUT RGTR
PORT C OUT RGTR
B BUF FULL/
B INTR/
A BUF FULL/
A INTR/
PORT B OUT RGTR
RN11 3.3K
-RDR LD ED
-RDR MOT ON
-V STB ENA
-HORIZ INT ENA
*BOTTOM OF FORM
P3-7
P3-11
P3-24
P3-22
P3-21
P3-23
P1-5
P3-1
P3-2
P3-20
P3-6
P3-18
LOC. 7PC2
CROSS REF NO. 0117
DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
A
SHEET 22

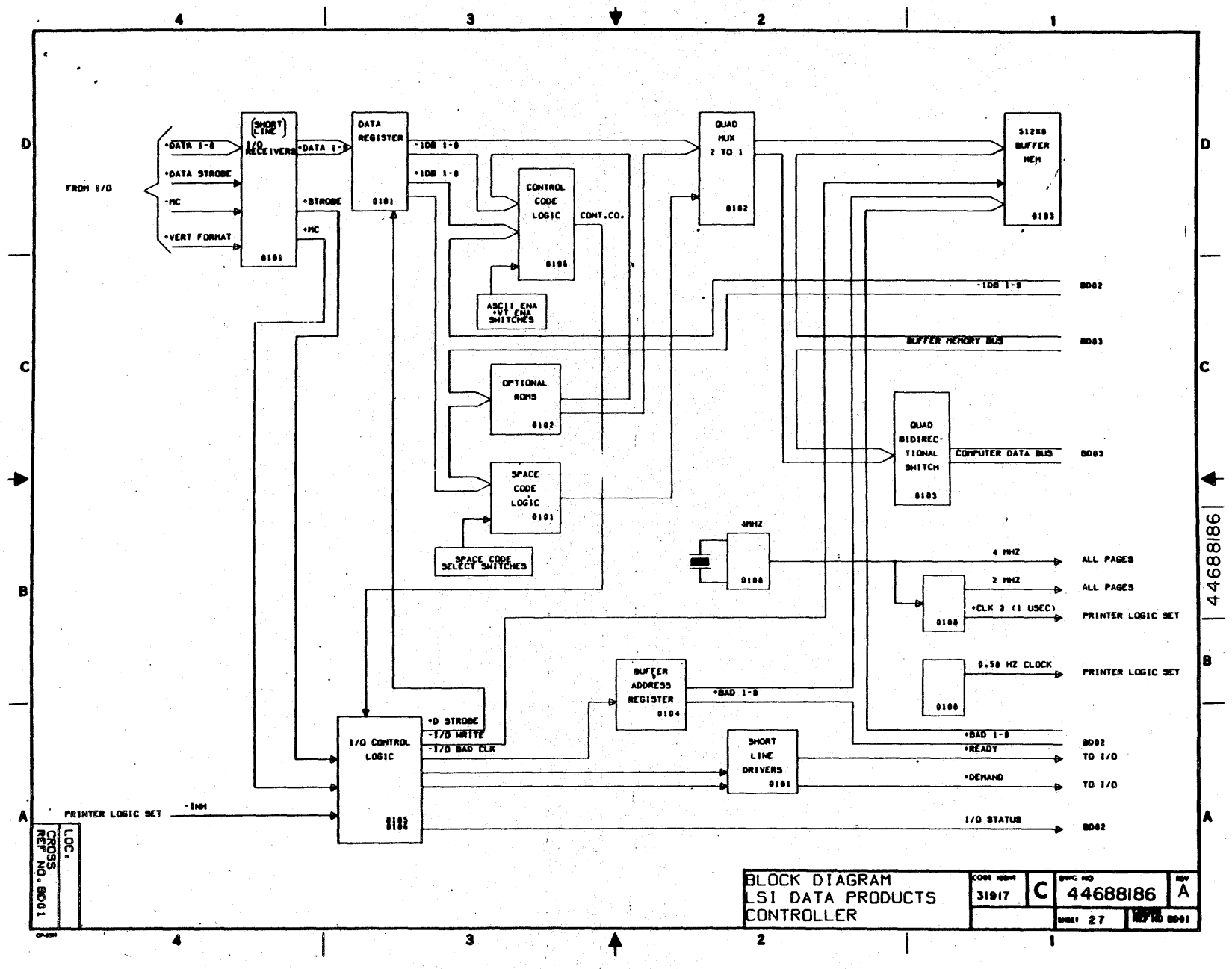
44688186

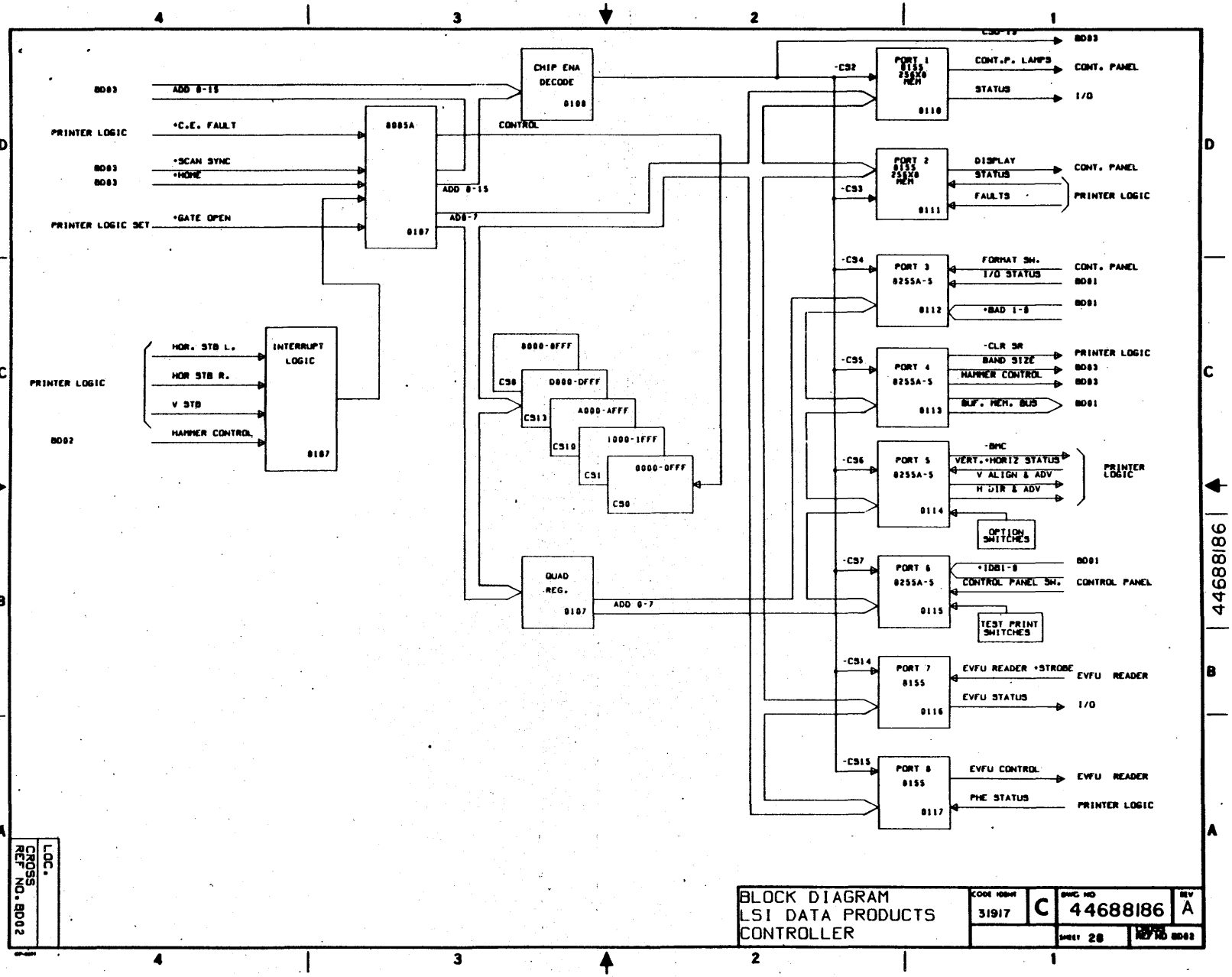

44688186
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 23
LOC. 7PC2
CROSS REF NO. 0-118

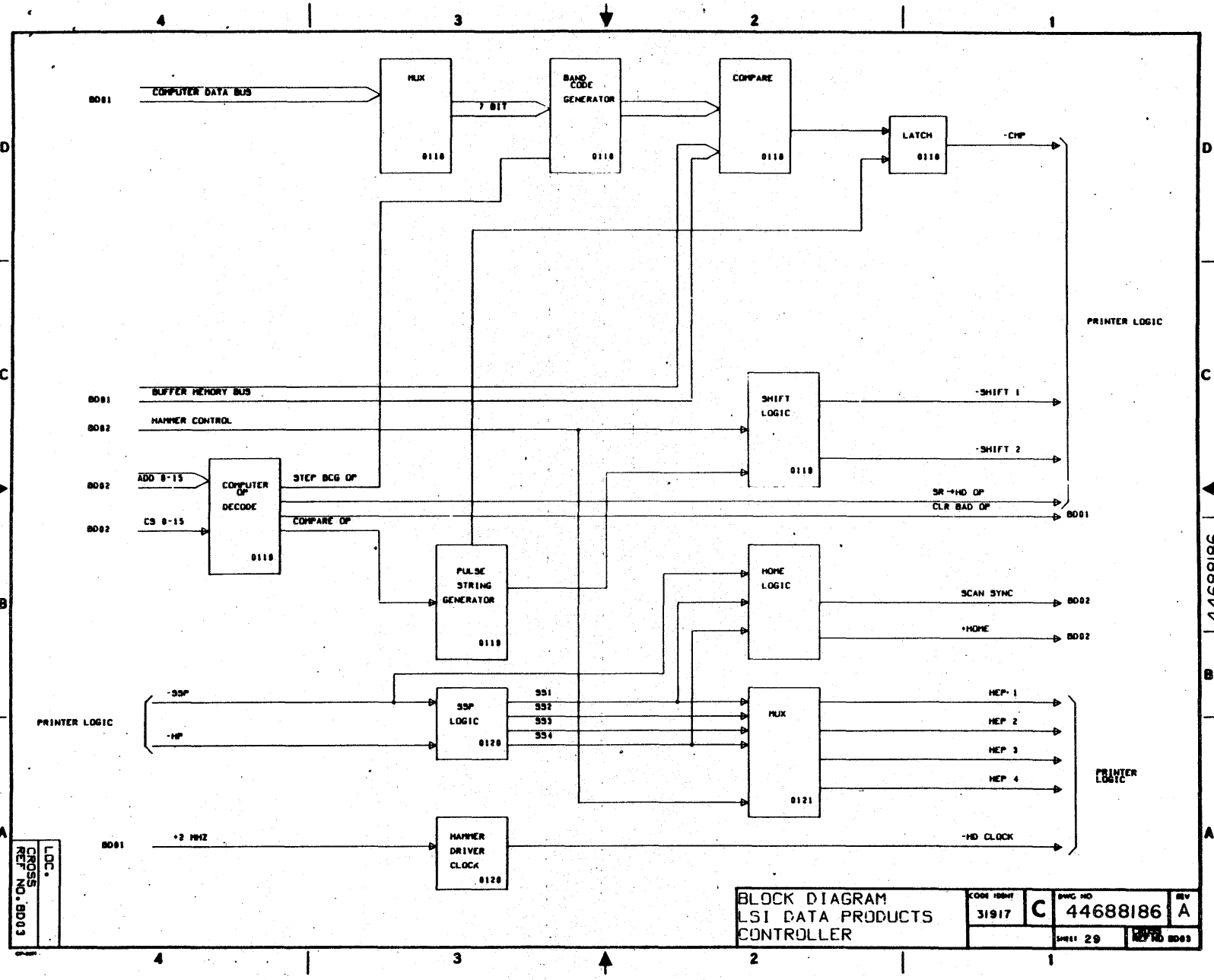

-(HWR ON/5V FAIL)
-FLT RESET
-FLT RST
*360/-(720+1130+1440)
*360 ODD/-360 EVEN
SHIFT PULSE ÷2
-SR STEP 1
-SR STEP 2
*SHIFT 1/-SHIFT 2
-CLK BAD
CS11
-CS12
-SR HD
*BUFFER CLK
-BUF CLK
*ADD 0-15
*COMP PITCH
*BCG CLK
-4 MHZ CLK
COMPARE ENA
-CMP ENA
SHIFT PULSE
COMPARE OPERATION
TP 14
-COMPARE CLK
DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 24
CROSS REF NO 0110
CROSS REF NO. 0110
LOC. 7PC2

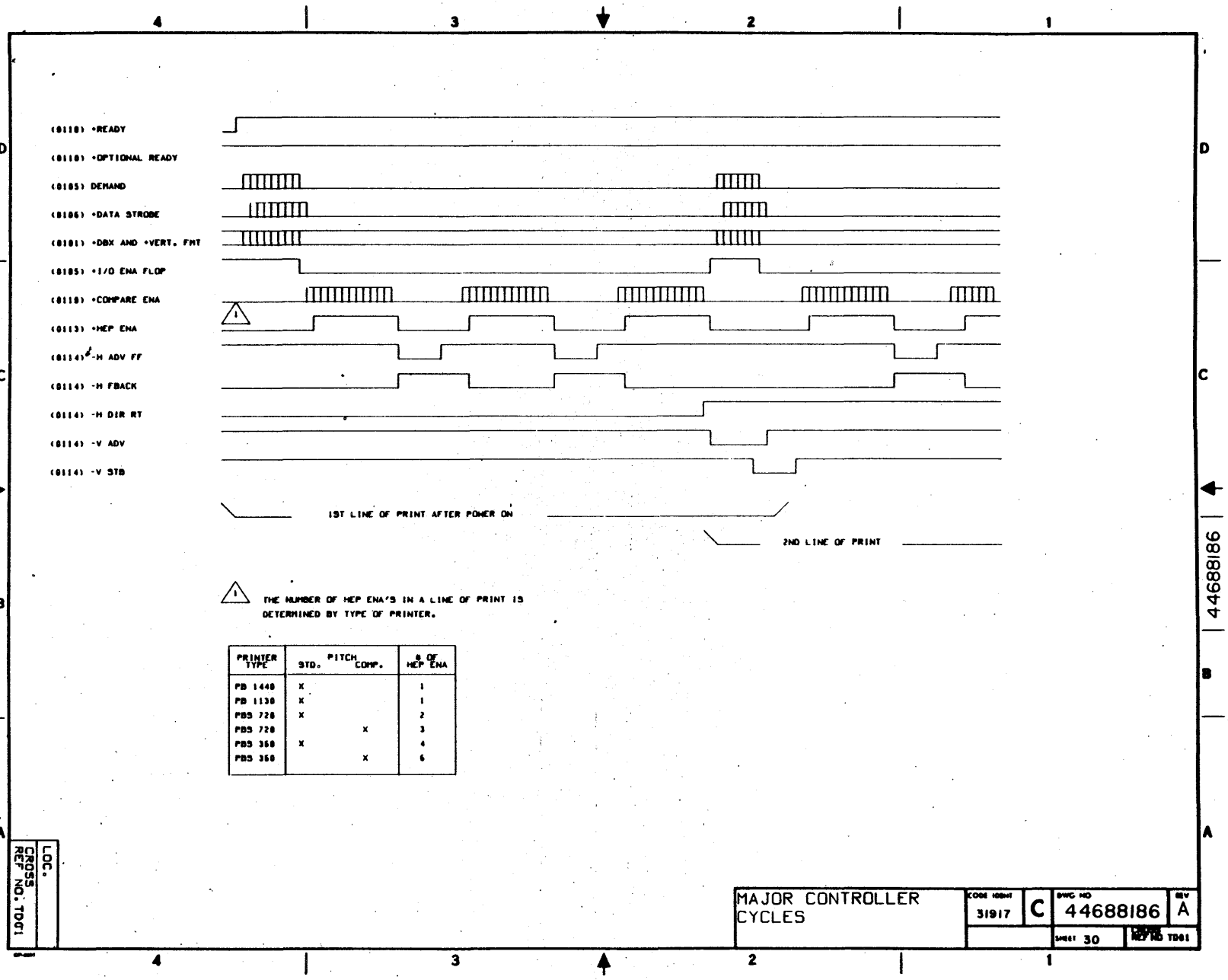

DATA PRODUCTS
LSI CONTROLLER
CODE IDENT 31917
C
DWG NO 44688186
REV A
LOC. 7PC2
SHEET 25
CROSS REF NO. 0120
CROSS: REF NO. 0120
LOC. 7PC2
44688186
P1-44
-35P
+5V
3.3K
R33
C38
.01 MFD
+2 MHZ CLK
0100
AT
+5V
R34
3.3K
0107
Q
-RST
P1-42
-HOME PULSE
PU
0121
*352
*351
*354
*353
RGTR 558 D4
TP 8
+HOME OUT
0107
(11 MICROSEC) HD CLK
-HD CLK
P2-3
P2-4
GND
-TIMER IN
C37
.01 MFD
16 CNTR 54LS 81
2+3+1

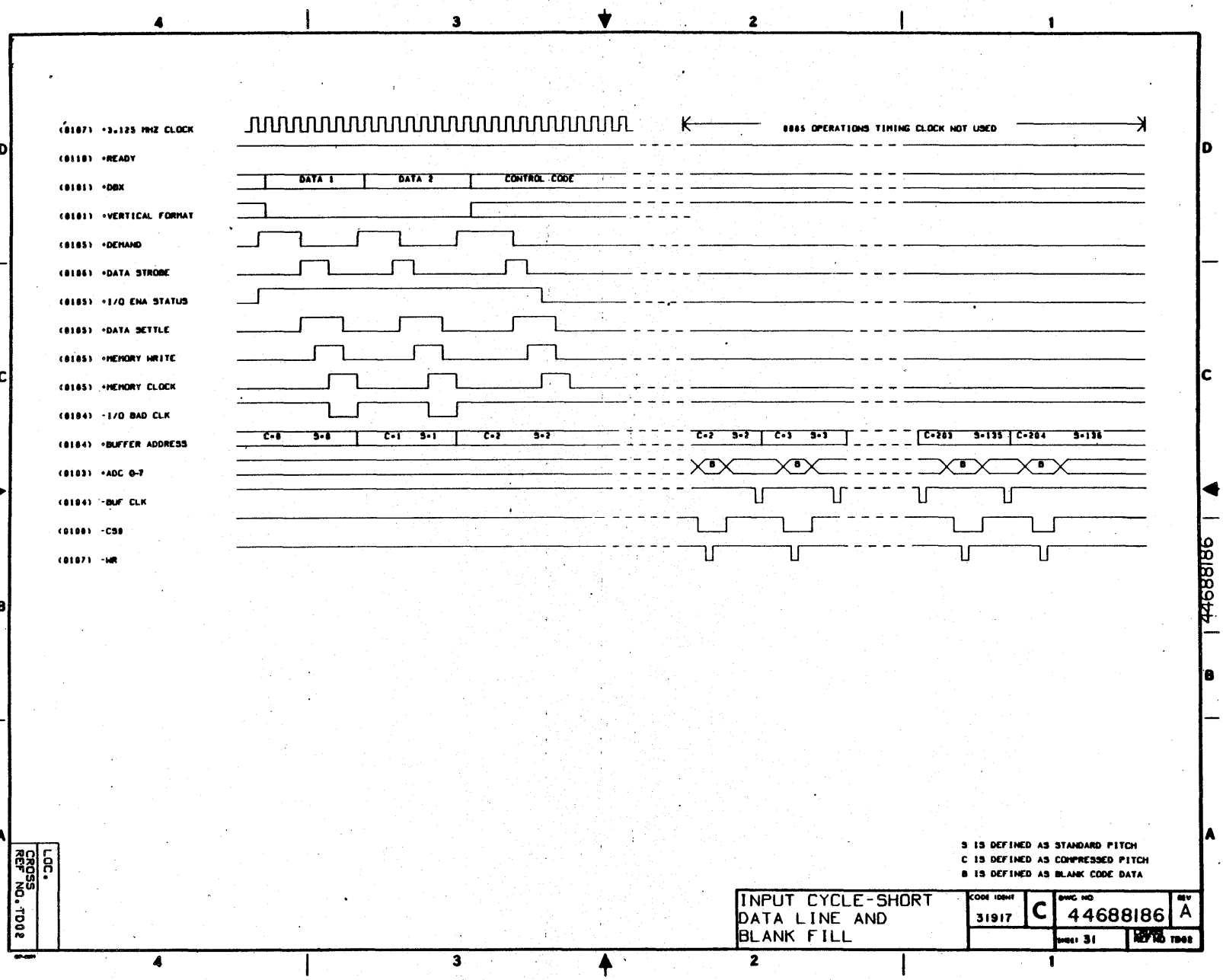

DATA PRODUCTS
LSI CONTROLLER
31917
C
44688186
A
LOC. 7PC2
SHEET 26
CROSS REF NO. 0121
LOC. 7PC2
*HEP 4
*HEP 3
*HEP 2
*HEP 1
HEP ENA
*SCAN SYNC
TP 7
GND
NC
*5V
C35 68 UF
CXX .01 UF APPROX 1 PER 4 CHIPS

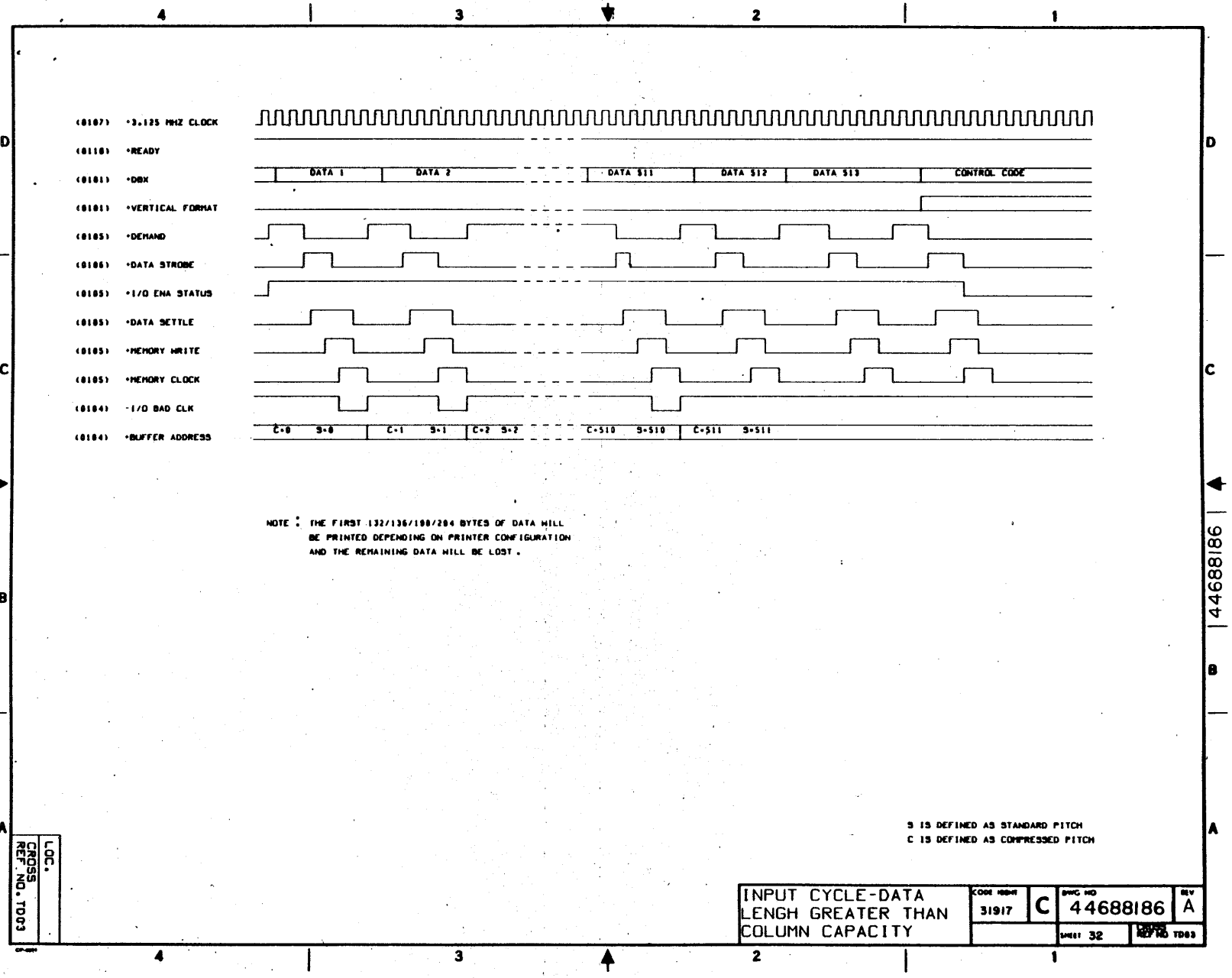

FROM I/O
*DATA 1-8
*DATA STROBE
-MC
*VERT FORMAT
(SHORT LINE) I/O RECEIVERS
0101
*DATA 1-8
*STROBE
*MC
DATA REGISTER
0101
-IDB 1-8
*IDB 1-8
CONTROL CODE LOGIC
0106
CONT.CO.
ASCII ENA *VT ENA SWITCHES
OPTIONAL ROMS
0102
SPACE CODE LOGIC
0101
SPACE CODE SELECT SWITCHES
QUAD MUX 2 TO 1
0102
512X8 BUFFER MEM
0103
-IDB 1-8
BD02
BUFFER MEMORY BUS
BD03
QUAD BIDIREC-TIONAL SWITCH
0103
COMPUTER DATA BUS
BD03
4MHZ
0108
4 MHZ
ALL PAGES
2 MHZ
ALL PAGES
0108
*CLK 2 (1 USEC)
PRINTER LOGIC SET
0108
0.50 HZ CLOCK
PRINTER LOGIC SET
BUFFER ADDRESS REGISTER
0104
*BAD 1-8
*D STROBE
-I/O WRITE
-I/O BAD CLK
I/O CONTROL LOGIC
0102
SHORT LINE DRIVERS
0101
*BAD 1-8
*READY
BD02
TO I/O
*DEMAND
TO I/O
PRINTER LOGIC SET
-INH
I/O STATUS
BD02
CROSS REF NO. BD01
LOC.
BLOCK DIAGRAM
LSI DATA PRODUCTS
CONTROLLER
31917
C
44688186
A
SHEET 27
REVISED BD01

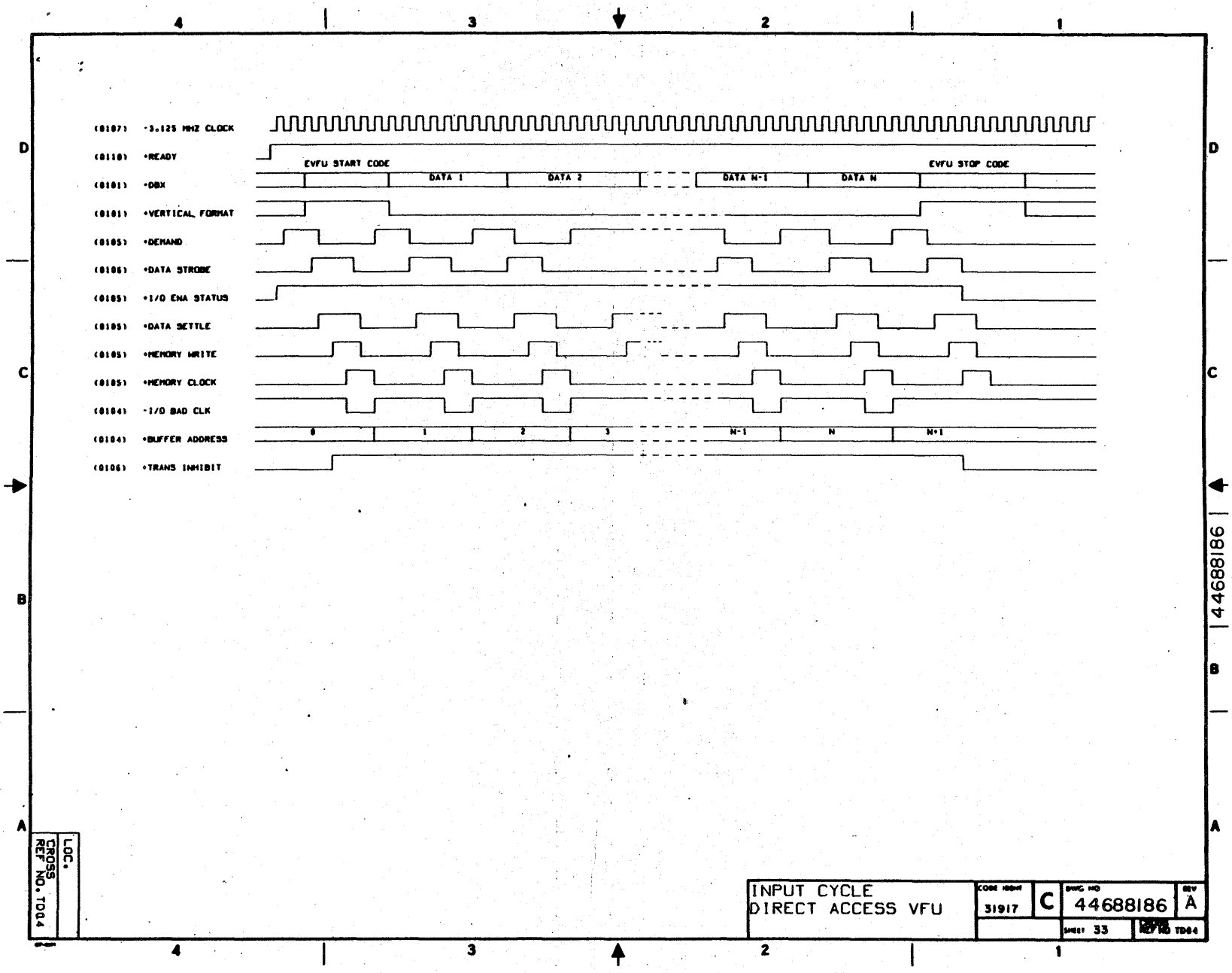

4
3
2
1
D
C
B
A
8083
ADD 0-15
PRINTER LOGIC
*C.E. FAULT
8083
*SCAN SYNC
8083
*HOME
PRINTER LOGIC SET
*GATE OPEN
8085A
8107
CHIP ENA DECODE
8108
CONTROL
ADD 8-15
ADD 0-7
PRINTER LOGIC
HOR. STB L.
HOR STB R.
V STB
8002
HAMMER CONTROL
INTERRUPT LOGIC
8107
8000-8FFF
C58
D000-DFFF
C513
A000-AFFF
C510
1000-1FFF
C51
0000-0FFF
C50
QUAD REG.
8107
ADD 0-7
-CS2
PORT 1 8155 256X8 MEM
8110
CONT.P. LAMPS
CONT. PANEL
STATUS
I/O
-CS3
PORT 2 8155 256X8 MEM
8111
DISPLAY
STATUS
FAULTS
CONT. PANEL
PRINTER LOGIC
-CS4
PORT 3 8255A-5
8112
FORMAT SW.
I/O STATUS
*BAD 1-8
CONT. PANEL
8081
8081
-CS5
PORT 4 8255A-5
8113
-CLR SR
BAND SIZE
HAMMER CONTROL
BUF. MEM. BUS
PRINTER LOGIC
8083
8083
8081
-CS6
PORT 5 8255A-5
8114
-BHC
VERT.+HORIZ STATUS
V ALIGN & ADV
H DIR & ADV
OPTION SWITCHES
PRINTER LOGIC
-CS7
PORT 6 8255A-5
8115
+IDBI-8
CONTROL PANEL SW.
TEST PRINT SWITCHES
8081
CONTROL PANEL
-CS14
PORT 7 8155
8116
EVFU READER +STROBE
EVFU STATUS
EVFU READER
I/O
-CS15
PORT 8 8155
8117
EVFU CONTROL
PHE STATUS
EVFU READER
PRINTER LOGIC
LOC.
CROSS REF NO. 8002
BLOCK DIAGRAM
LSI DATA PRODUCTS
CONTROLLER
CODE IDENT
31917
C
DWG NO
44688186
REV
A
SHEET 28
REF ID 8083
44688186

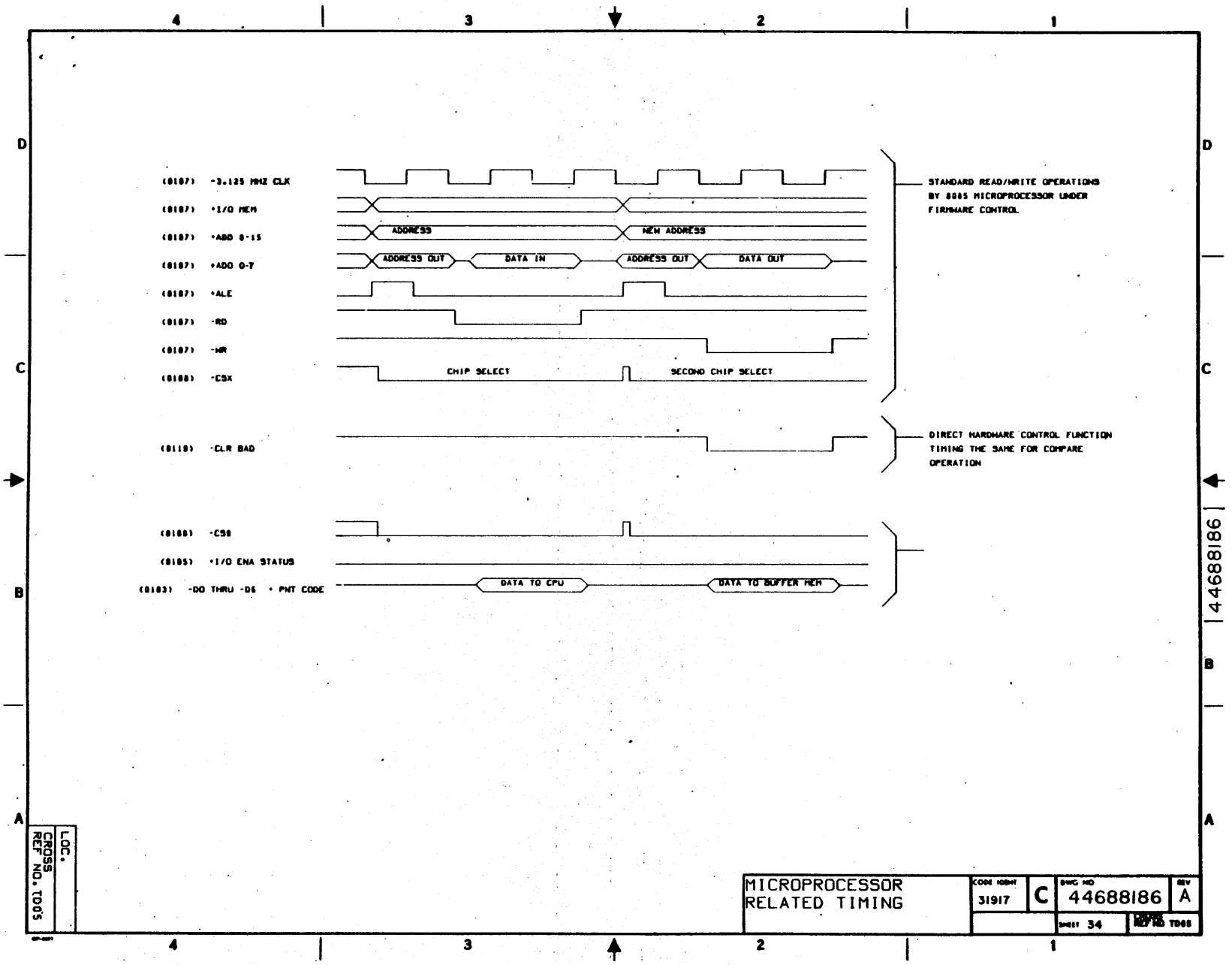

4
3
2
1
D
C
B
A
BD01
COMPUTER DATA BUS
MUX
0118
7 BIT
BAND CODE GENERATOR
0118
COMPARE
0118
LATCH
0118
-CMP
PRINTER LOGIC
BD01
BUFFER MEMORY BUS
BD02
HAMMER CONTROL
SHIFT LOGIC
0118
-SHIFT 1
-SHIFT 2
ADD 0-15
COMPUTER OP DECODE
0118
STEP BCG OP
SR→HD OP
CLR BAD OP
CS 0-15
COMPARE OP
PULSE STRING GENERATOR
0118
HOME LOGIC
SCAN SYNC
*HOME
-SSP
-HP
PRINTER LOGIC
SSP LOGIC
0120
SS1
SS2
SS3
SS4
MUX
0121
HEP 1
HEP 2
HEP 3
HEP 4
PRINTER LOGIC
*2 MHZ
HAMMER DRIVER CLOCK
0120
-HD CLOCK
LOC.
CROSS REF NO. BD03
BLOCK DIAGRAM
LSI DATA PRODUCTS
CONTROLLER
CODE IDENT
31917
C
DWG NO
44688186
REV
A
SHEET 29
CROSS REF NO BD03

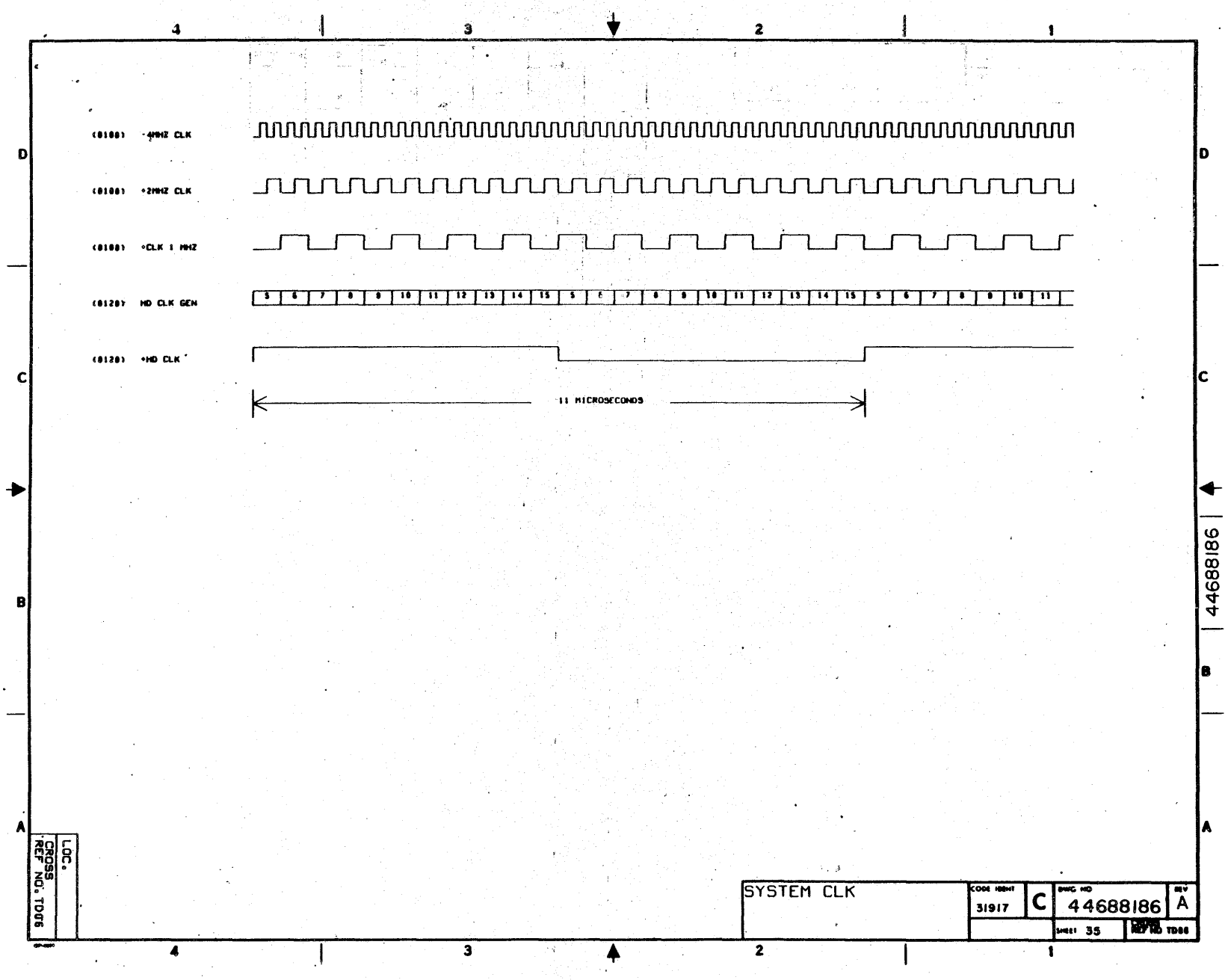

(8110) *READY
(8110) *OPTIONAL READY
(8105) DEMAND
(8106) *DATA STROBE
(8101) *DBX AND *VERT. FMT
(8105) *I/O ENA FLOP
(8110) *COMPARE ENA
(8113) *HEP ENA
(8114) -H ADV FF
(8114) -H FBACK
(8114) -H DIR RT
(8114) -V ADV
(8114) -V STB
1ST LINE OF PRINT AFTER POWER ON
2ND LINE OF PRINT
1 THE NUMBER OF HEP ENA'S IN A LINE OF PRINT IS DETERMINED BY TYPE OF PRINTER.
PRINTER TYPE
PITCH STD.
PITCH COMP.
OF HEP ENA
PB 1440 X 1
PB 1130 X 1
PBS 720 X 2
PBS 720 X 3
PBS 360 X 4
PBS 360 X 6
CROSS REF NO. TD01
LOC.
MAJOR CONTROLLER CYCLES
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 30
CROSS REF NO TD01
44688186

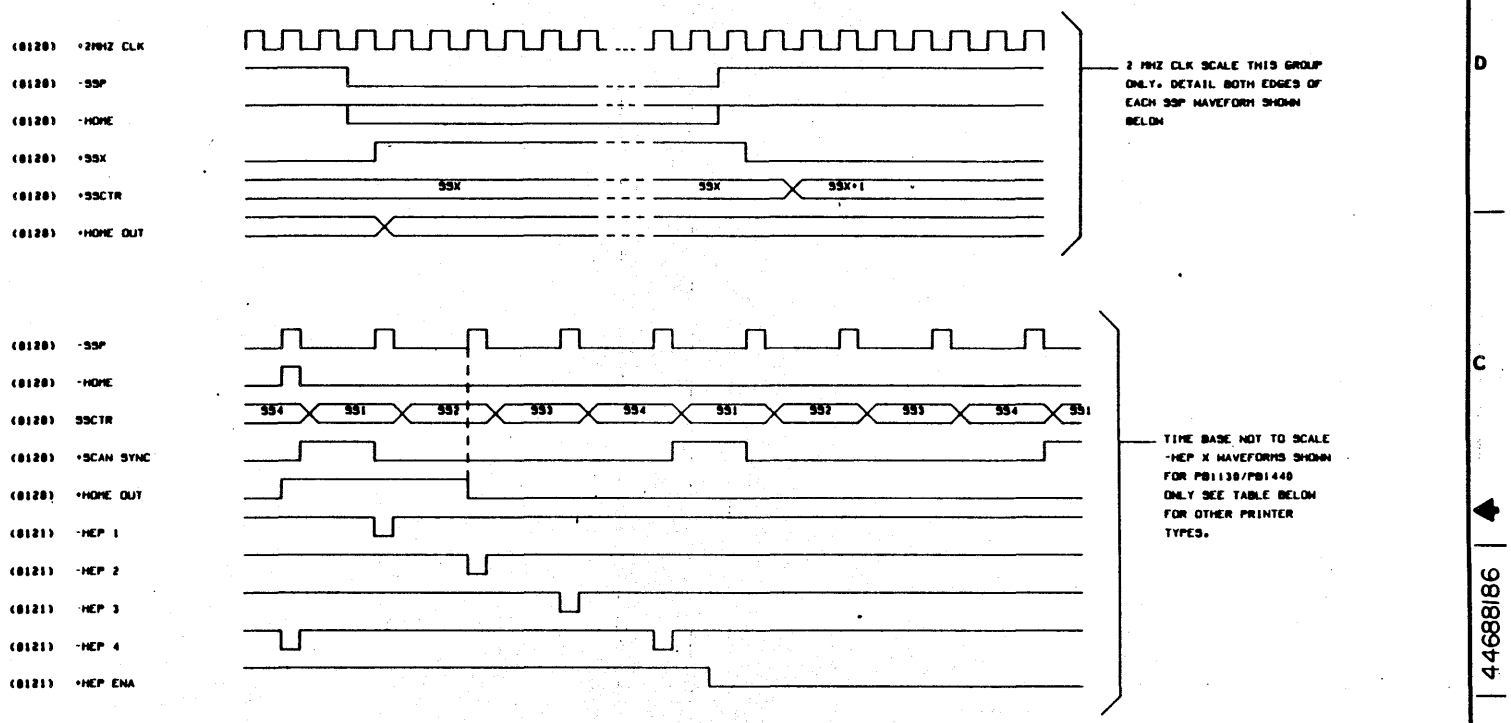

(0107) *3.125 MHZ CLOCK
(0110) *READY
(0101) *DBX
(0101) *VERTICAL FORMAT
(0105) *DEMAND
(0106) *DATA STROBE
(0105) *I/O ENA STATUS
(0105) *DATA SETTLE
(0105) *MEMORY WRITE
(0105) *MEMORY CLOCK
(0104) -I/O BAD CLK
(0104) *BUFFER ADDRESS
(0103) *ADC 0-7
(0104) -BUF CLK
(0100) -CS0
(0107) -WR
8085 OPERATIONS TIMING CLOCK NOT USED
DATA 1
DATA 2
CONTROL CODE
C=0 S=0
C=1 S=1
C=2 S=2
C=2 S=2
C=3 S=3
C=203 S=135
C=204 S=136
B
B
B
B
LOC.
CROSS
REF NO. TD02
S IS DEFINED AS STANDARD PITCH
C IS DEFINED AS COMPRESSED PITCH
B IS DEFINED AS BLANK CODE DATA
INPUT CYCLE-SHORT
DATA LINE AND
BLANK FILL
CODE IDENT
31917
C
DWG NO
44688186
REV
A
SHEET 31
44688186


(0107) *3.125 MHZ CLOCK
(0110) *READY
(0101) *DBX
(0101) *VERTICAL FORMAT
(0105) *DEMAND
(0106) *DATA STROBE
(0105) *I/O ENA STATUS
(0105) *DATA SETTLE
(0105) *MEMORY WRITE
(0105) *MEMORY CLOCK
(0104) -I/O BAD CLK
(0104) *BUFFER ADDRESS
DATA 1
DATA 2
DATA S11
DATA S12
DATA S13
CONTROL CODE
C-0 S-0
C-1 S-1
C-2 S-2
C-510 S-510
C-511 S-511
NOTE : THE FIRST 132/136/198/204 BYTES OF DATA WILL BE PRINTED DEPENDING ON PRINTER CONFIGURATION AND THE REMAINING DATA WILL BE LOST .
S IS DEFINED AS STANDARD PITCH
C IS DEFINED AS COMPRESSED PITCH
LOC.
CROSS REF. NO. TD03
INPUT CYCLE-DATA LENGH GREATER THAN COLUMN CAPACITY
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 32
CROSS REF NO TD03
44688186


(0107) -3.125 MHZ CLOCK
(0110) *READY
(0101) *DBX
(0101) *VERTICAL FORMAT
(0105) *DEMAND
(0106) *DATA STROBE
(0105) *I/O ENA STATUS
(0105) *DATA SETTLE
(0105) *MEMORY WRITE
(0105) *MEMORY CLOCK
(0104) -I/O BAD CLK
(0104) *BUFFER ADDRESS
(0106) *TRANS INHIBIT
EVFU START CODE
DATA 1
DATA 2
DATA N-1
DATA N
EVFU STOP CODE
0
1
2
3
N-1
N
N+1
LOC.
CROSS REF NO. TD04
INPUT CYCLE
DIRECT ACCESS VFU
31917
C
44688186
A
SHEET 33
TD04
44688186


(0107) -3.125 MHZ CLK
(0107) +I/O MEM
(0107) +ADD 8-15
(0107) +ADD 0-7
(0107) +ALE
(0107) -RD
(0107) -WR
(0108) -CSX
ADDRESS
NEW ADDRESS
ADDRESS OUT
DATA IN
ADDRESS OUT
DATA OUT
CHIP SELECT
SECOND CHIP SELECT
STANDARD READ/WRITE OPERATIONS BY 8085 MICROPROCESSOR UNDER FIRMWARE CONTROL
(0118) -CLR BAD
DIRECT HARDWARE CONTROL FUNCTION TIMING THE SAME FOR COMPARE OPERATION
(0108) -CSR
(0105) +I/O ENA STATUS
(0103) -DO THRU -D6 + PNT CODE
DATA TO CPU
DATA TO BUFFER MEM
LOC.
CROSS REF NO. TD05
MICROPROCESSOR RELATED TIMING
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 34
44688186


(8188) 4MHZ CLK
(8188) 2MHZ CLK
(8188) CLK 1 MHZ
(8128) HD CLK GEN
(8128) HD CLK
11 MICROSECONDS
SYSTEM CLK
31917
C
44688186
A
SHEET 35
LOC.
CROSS REF NO. TD06
4468186



PRINTER TYPE	PITCH	HAMMER BANK POS.	HEP-1	HEP-2	HEP-3	HEP-4
PB9 360	STD	HOME	SS1			
		2	SS2			
		3	SS3			
		4	SS4			
PB9 360	CMPRS	HOME	SS1			
		2	SS3			
		3	SS1			
		4	SS3			
		5	SS1			
		6	SS3			
PB9 720	STD	HOME	SS1	SS3		
		2	SS2	SS4		
PB9 720	CMPRS	HOME	SS1	SS3		
		2	SS3	SS1		
		3	SS1	SS3		
PB 1130/1440	STD	N/A	SS1	SS2	SS3	SS4

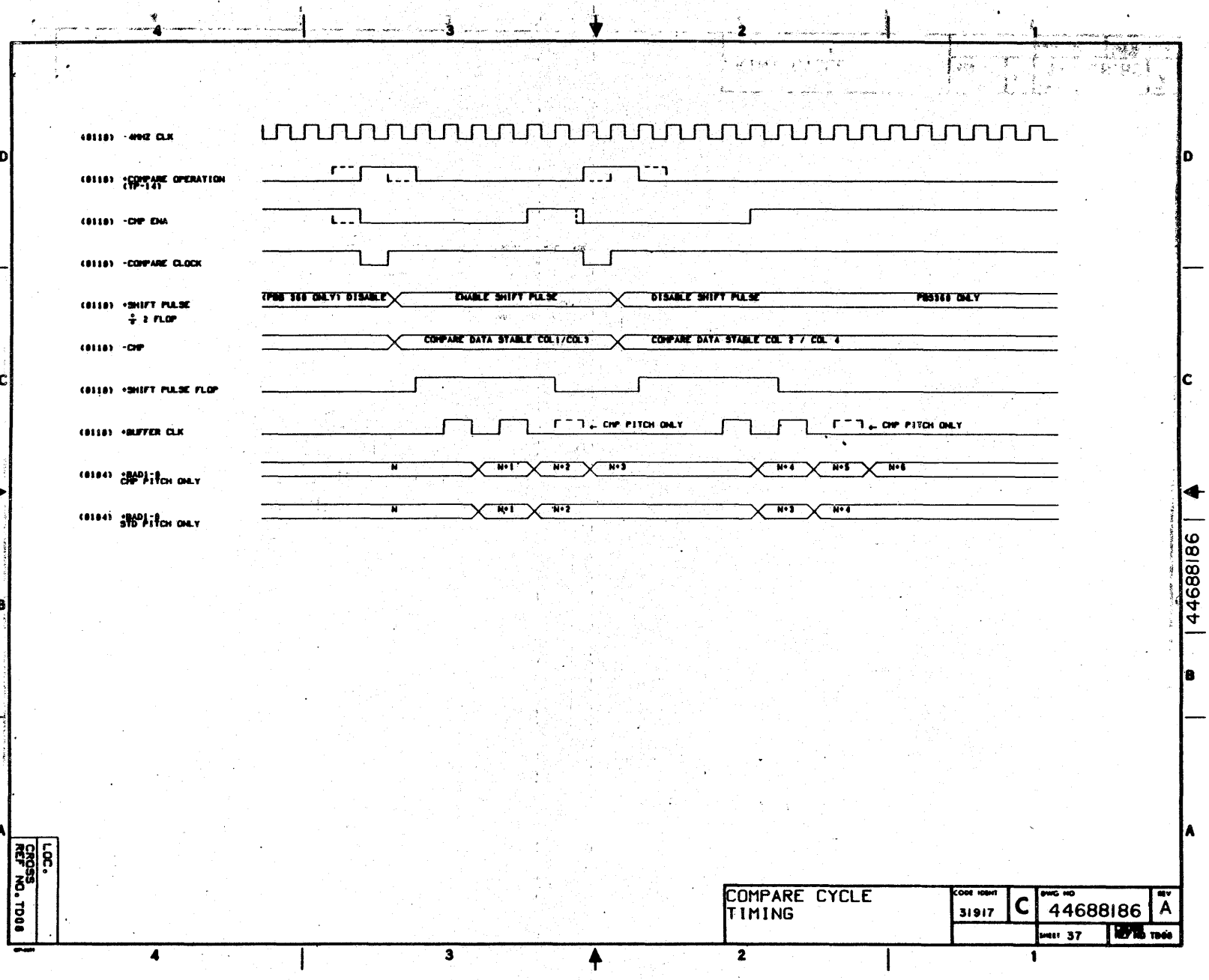
CROSS REF NO. T007

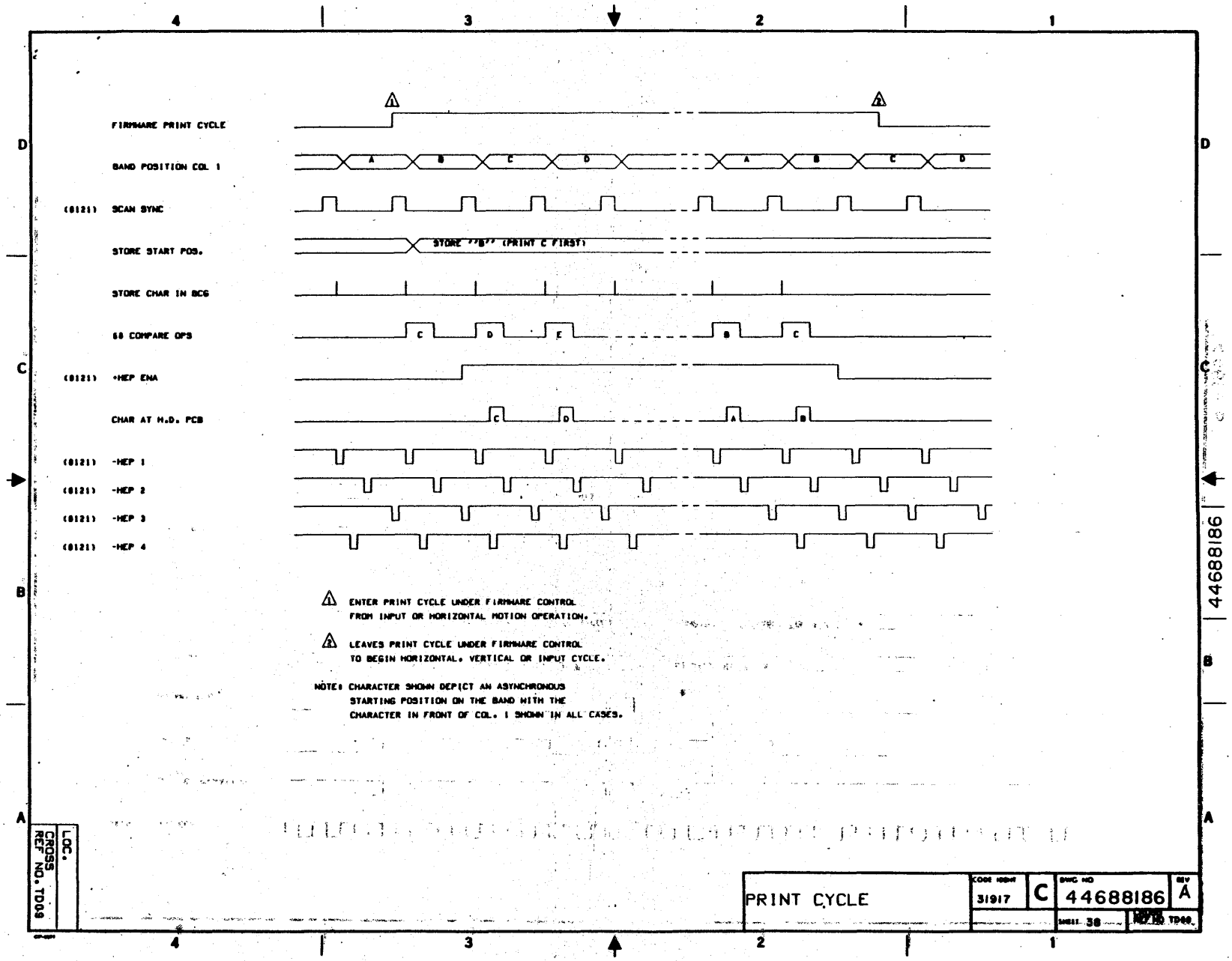
LOC.

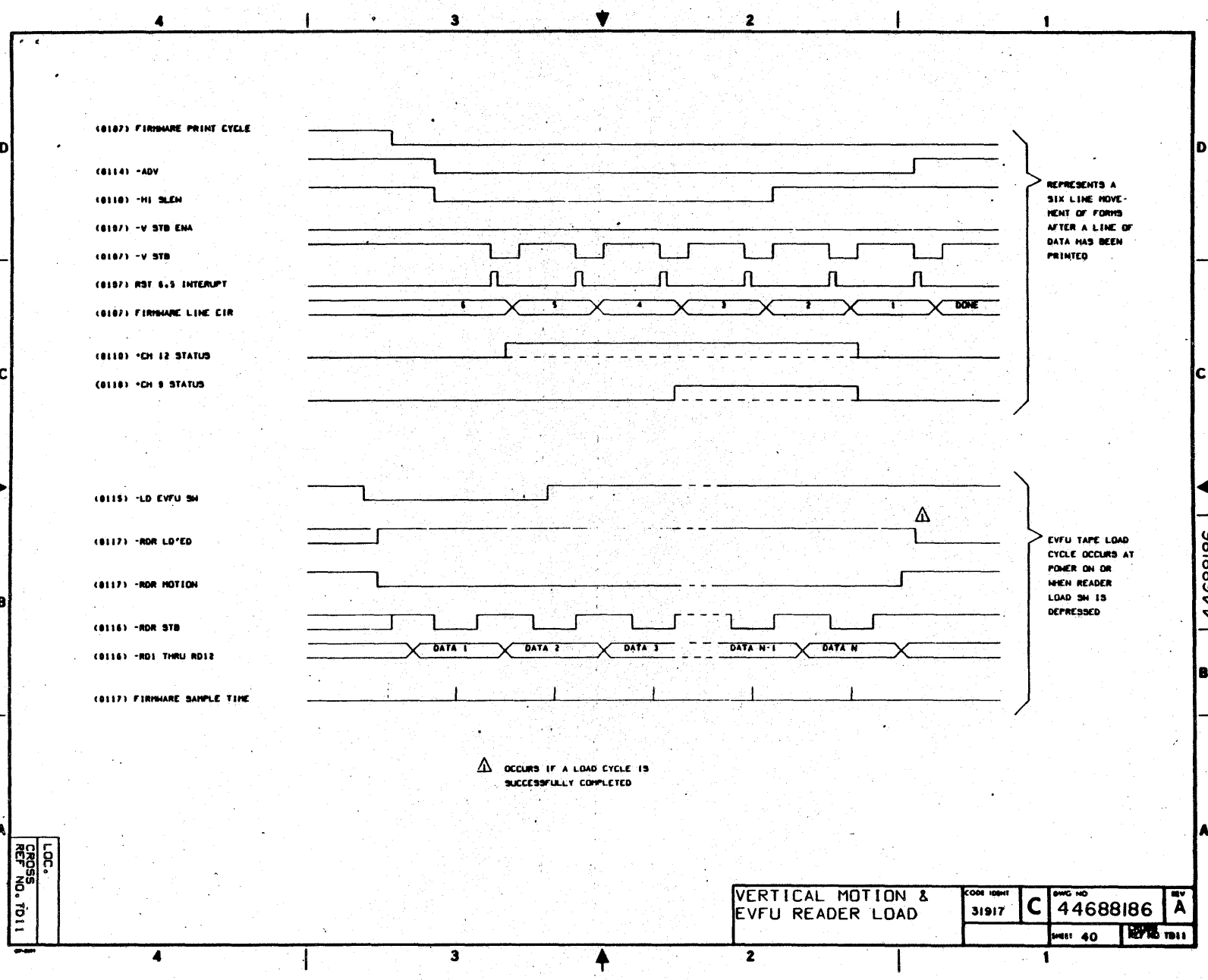
SUBSCAN PULSE TIMING

CODE IDENT 31917 | C | DWG NO 44688186 | REV A | SHEET 36 | CROSS REF NO T007

44688186


(8110) -4MHZ CLK
(8110) *COMPARE OPERATION (TP-14)
(8110) -CMP ENA
(8110) -COMPARE CLOCK
(8110) *SHIFT PULSE ÷ 2 FLOP
(PBB 368 ONLY) DISABLE
ENABLE SHIFT PULSE
DISABLE SHIFT PULSE
PBB368 ONLY
(8110) -CMP
COMPARE DATA STABLE COL1/COL3
COMPARE DATA STABLE COL 2 / COL 4
(8110) *SHIFT PULSE FLOP
(8110) *BUFFER CLK
← CMP PITCH ONLY
← CMP PITCH ONLY
(8104) *BADI-0 CMP PITCH ONLY
N
N+1
N+2
N+3
N+4
N+5
N+6
(8104) *BADI-0 STD PITCH ONLY
N
N+1
N+2
N+3
N+4
LOC.
CROSS REF NO. TD08
COMPARE CYCLE TIMING
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 37
44688186


FIRMWARE PRINT CYCLE
BAND POSITION COL 1
(8121) SCAN SYNC
STORE START POS.
STORE CHAR IN BCG
68 COMPARE OPS
(8121) +HEP ENA
CHAR AT H.D. PCB
(8121) -HEP 1
(8121) -HEP 2
(8121) -HEP 3
(8121) -HEP 4
STORE "B" (PRINT C FIRST)
1 ENTER PRINT CYCLE UNDER FIRMWARE CONTROL FROM INPUT OR HORIZONTAL MOTION OPERATION.
2 LEAVES PRINT CYCLE UNDER FIRMWARE CONTROL TO BEGIN HORIZONTAL, VERTICAL OR INPUT CYCLE.
NOTE: CHARACTER SHOWN DEPICT AN ASYNCHRONOUS STARTING POSITION ON THE BAND WITH THE CHARACTER IN FRONT OF COL. 1 SHOWN IN ALL CASES.
LOC. CROSS REF NO. TD09
PRINT CYCLE
31917
C
44688186
A
SHEET 38
REV TD00


(0107) FIRMWARE PRINT CYCLE
(0114) -ADV
(0110) -HI SLEW
(0107) -V STB ENA
(0107) -V STB
(0107) RST 6.5 INTERUPT
(0107) FIRMWARE LINE CTR
6
5
4
3
2
1
DONE
(0110) *CH 12 STATUS
(0110) *CH 9 STATUS
REPRESENTS A SIX LINE MOVEMENT OF FORMS AFTER A LINE OF DATA HAS BEEN PRINTED
(0115) -LD EVFU SW
(0117) -RDR LD'ED
(0117) -RDR MOTION
(0116) -RDR STB
(0116) -RD1 THRU RD12
DATA 1
DATA 2
DATA 3
DATA N-1
DATA N
(0117) FIRMWARE SAMPLE TIME
EVFU TAPE LOAD CYCLE OCCURS AT POWER ON OR WHEN READER LOAD SW IS DEPRESSED
⚠ OCCURS IF A LOAD CYCLE IS SUCCESSFULLY COMPLETED
LOC.
CROSS REF NO. TD11
VERTICAL MOTION & EVFU READER LOAD
CODE IDENT 31917
C
DWG NO 44688186
REV A
SHEET 40
CROSS REF NO TD11
44688186