TRS-80®

DWP-510
OPERATION MANUAL
Catalog Number 26-1270

Radio Shack®
TRS-80
COMPUTER PRODUCTS

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- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, you should consult the dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems.*

This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

DWP-510 Operation Manual:
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Introduction

Congratulations for selecting the TRS-80 DWP-510. We think it's one of the best medium-cost, high-quality printers available for microcomputers and it should provide you with years of reliable service.

With a simple change of print wheels, the DWP-510 can provide print-outs in a variety of font styles.

Other special features of the DWP-510 include:

- Selectable print pitch (characters per inch). The pitch can be specified via the DWP-510 front panel switches or, for maximum flexibility, via program control.
- Tractor Feed (optional/extra) paper handling for fanfold paper, or Friction Feed (standard) paper handling for single-sheet or fanfold paper.
- A Self-Test feature that lets you see if the Printer is operating properly before you begin printing.
- An Out-of-Ribbon Sensor that automatically stops printing when the ribbon runs out.
- Special Line Feeds (1/48", Reverse, etc.) for special printing applications.

and much more!

This manual will:

- Describe the DWP-510 to you.
- Show you how to set it up.
- Describe how to use the Printer in a variety of printing applications.

1/ Description of the DWP-510

When you unpack the DWP-510, be sure the package contains a:

- DWP-510
- Power Cord
- Print Wheel
- Ribbon Cartridge

Be sure to unpack the cushions found on the inside of the Printer. You'll have to grasp the front cover with both hands and gently lift it up to gain access to the inside of the Printer.

It's important to become familiar with the Printer before you begin using it. Study the following section carefully before setting up and using the DWP-510.

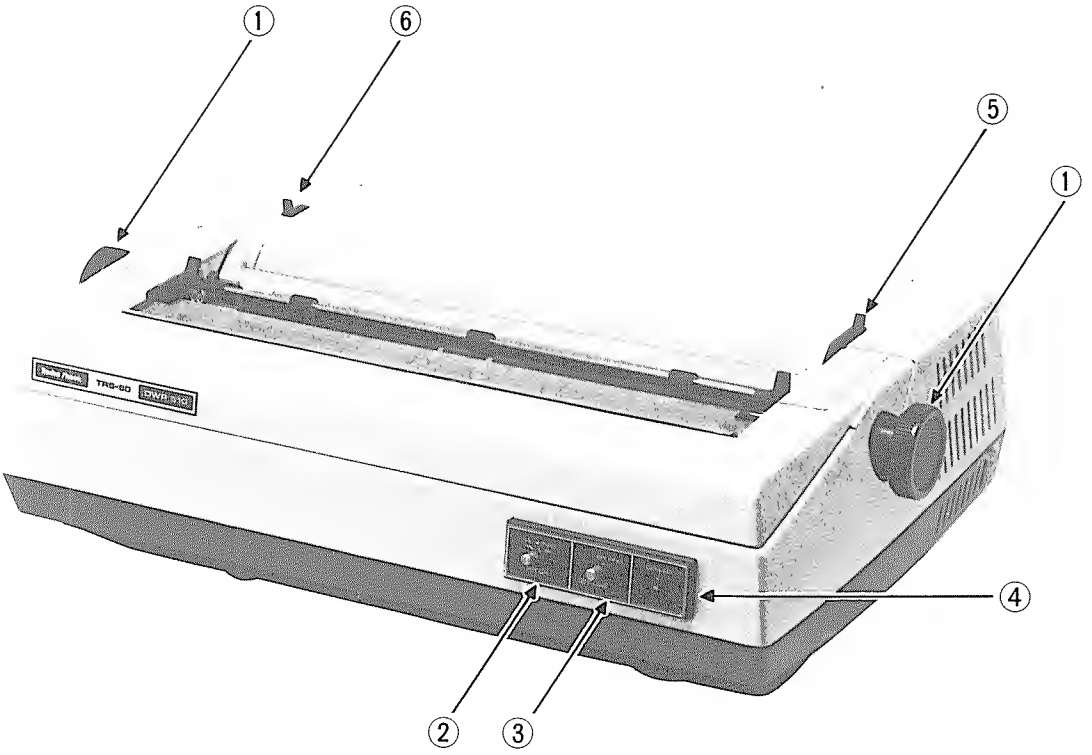


Figure 1. DWP-510 (Front View)

① **Paper Advance Knob**. Turn this knob to manually advance the paper.

② **PITCH Switch**. To print at 10 characters per inch, set this switch to 10; to print at 12 characters per inch, set the switch to 12; to print Proportionally Spaced text, set it to PS.

③ **ON-LINE/OFF-LINE Switch**. The Printer must be set to **ON-LINE** before printing can begin. If you have problems during printing, set this switch to **OFF-LINE** and printing will immediately stop.

④ **POWER Indicator**. Lights when the power is on.

⑤ **Platen Pressure Lever**. For friction feeding, this lever must be set toward the rear of the Printer. When using the optional/extra Tractor Feed unit, disengage platen pressure by setting the lever to the front position.

⑥ **Copy Control Lever**. This lever must be set to correspond with the number of copies you're printing. Pull forward for single-copy printing. Set toward the rear if you're using multi-copy paper.
Caution: Damage to the print wheel could occur if the Copy Control Lever is not adjusted correctly.

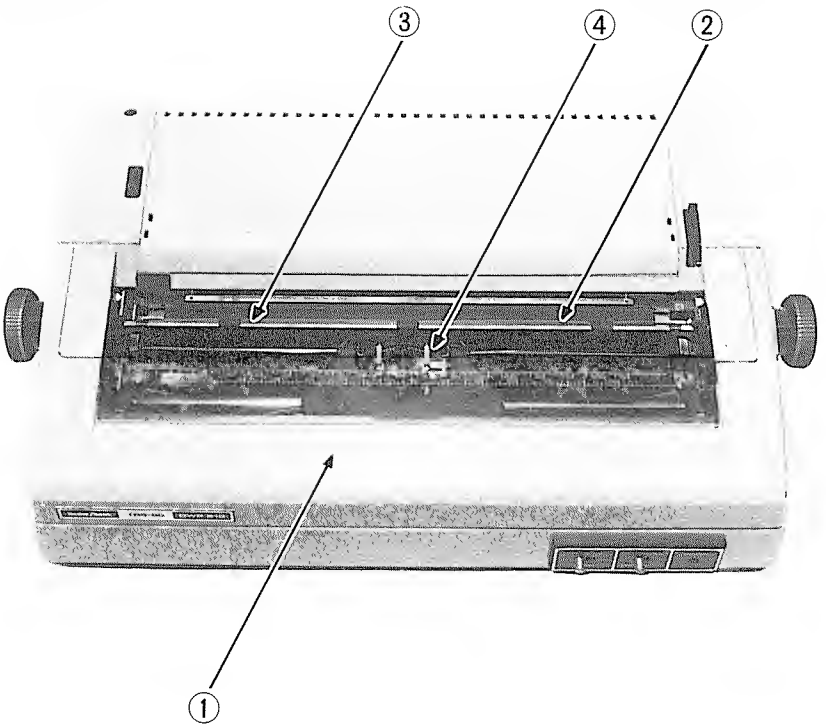


Figure 2. DWP-510 (Inside View)

① **Front Cover**. Always use both hands when lifting this cover. Note that the cover must be closed before printing will occur.

② **Platen.**

③ **Paper Bail**. For the best printing results, the bail should always be against the paper.

④ **Carriage**. This mechanism holds the ribbon cartridge and the print wheel. Always remove the ribbon cartridge before tilting the carriage back to get to the print wheel. To tilt the carriage back, grasp the two green handles closest to the paper and pull up and towards you. Do not move the carriage back and forth manually when the power is **ON**.

Figure 3. DWP-510 (Rear View)

① **Self-Test Switch**. When running the Self-Test, this switch must be set to **ON**. Be sure that it is set to **OFF** for all other applications.

② **Interface Connector**. Connect the cable from your TRS-80 to this connector.

③ **Power ON/OFF Switch**. Set this switch to **ON** to turn the Printer power on; push the switch in the opposite direction to turn the power **OFF**.

④ **Power Cord Connector**. Connect one end of the supplied power cord to this connector. Use only the supplied cord; connect the cord to a grounded wall outlet or to an approved power strip.

2/ Setting Up the DWP-510

When setting up the DWP-510, always be sure you pick a level, sturdy location with plenty of room for easy paper flow.

Print Wheel Installation/Removal

The DWP-510 package includes a Courier 10 print wheel which you will need to install before printing. Radio Shack carries a number of different print wheels for printing different font styles. These include:

- Courier (10 pitch) (26-1430)
- Prestige Elite (12 pitch) (26-1431)
- Madeleine (Proportional Space) (26-1432)
- Cubic (Proportional Space) (26-1433)
- Tile Italic (12 pitch) (26-1434)
- OCR-B (26-1435)
- Letter Gothic (12 pitch) (26-1436)
- Cubic 15 (26-1438)
- Bold Proportional Space (26-1439)
- Scientific A/N (26-1486)
- Pica (10 pitch) (26-1290)
- Narrator (26-1291)
- OCR-A (26-1292)
- Elite (12 pitch) (26-1293)

If these font styles don't fit your immediate printing needs, be sure to check with your local Radio Shack Computer Center or store since we are continually making more font styles available.

To Install the Print Wheel:

1. Remove the ribbon cartridge from the carriage by gently lifting the ribbon cartridge straight up.

2. Grasp the two green handles (which are closest to the platen) between your thumb and forefinger and gently tilt the carriage toward you.

3. Hold the print wheel by the green **hub**. When the print wheel is properly installed, the hub will be toward the paper.

4. Position the red dot (on the back of the print wheel, opposite the hub) so that it corresponds to and fits into the **open** notch on the carriage. (Match the red on both the hub and the notch.)

5. Push down on the hub until the wheel **clicks** into place. The green hub should be all the way **down**.

6. Grasp the two green handles (which are closest to the platen) between your thumb and forefinger and gently tilt the carriage away from you; firmly press the carriage down into its original position.

7. Replace or reinstall the ribbon cartridge.

To Remove the Print Wheel:

1. Remove the ribbon cartridge.

2. Tilt the carriage back as described above.

3. Grasp the green hub of the print wheel and pull up. For easier removal, gently twist the wheel back and forth while pulling it up.

Ribbon Cartridge Installation/Removal

Radio Shack carries two ribbon cartridges for the DWP-510 — a high-quality carbon ribbon (26-1419) and a long life nylon ribbon (26-1449). No matter which ribbon you choose, you'll find that they're both easy to install and remove.

Note: When the carbon ribbon (26-1419) runs out, the printer detects the end of the ribbon and stops printing. The nylon ribbon (26-1449) is an endless loop, so this will not happen.

To Install a Ribbon Cartridge:

1. Before installing the cartridge, remove all slack in the ribbon by turning the green knob on the cartridge in the direction indicated by the arrow (clockwise).

2. Position the cartridge so that the ribbon slides into position between the print wheel and the plastic card guide; the tabs on the cartridge should line up with the green **claws** on the carriage.

3. Press down on the cartridge and snap it into place.

4. Turn the ribbon feed knob 1/4 to 1/2 turn clockwise until the cartridge locks down.

To Remove a Ribbon Cartridge:

1. Gently press the green carriage **claws** away from the cartridge tabs.

2. Lift up on the cartridge. Be careful not to catch the ribbon on the print wheel.

Paper Loading

You can use either fanfold computer paper or single-sheet typewriter paper with the DWP-510.

If you're using fanfold paper, you'll find it most efficient to use the optional/extra DWP-510 Bidirectional Tractor Feed unit (26-1447).

Friction Feed Paper Loading

1. Gently pull the paper bail away from the platen.

2. Set the platen pressure lever toward the rear side of the Printer (pressure ON).

3. Insert the paper behind the platen and turn the platen manually(turn the paper advance knob) so that the paper advances past the card guide.

4. Set the platen pressure lever toward the front of the Printer (pressure OFF) so that the paper can move freely back and forth.

5. Align and position the paper at the left margin.

6. Hold the paper in position and move the platen pressure lever back toward the rear side of the Printer (pressure ON). The paper will no longer move freely.

7. Lower the paper bail so that it is against the paper.

8. Position the paper manually to the first line of printing by turning the paper advance knob.

Note: Be sure the Copy Control Lever is set to 1 unless you're using multiple form paper. If the Printer runs out of paper, no **out of paper** signal will be sent to the computer; the Printer will continue printing on the platen. If this happens, immediately turn the ON-LINE/OFF-LINE switch to OFF-LINE; after loading more paper, return this switch to ON-LINE.

Connecting the DWP-510 to a Power Source

Always be sure the DWP-510 is connected to a grounded wall outlet or grounded approved power strip, such as Radio Shack's Plug-In Power Strip (61-2619) or the Automatic Power Controller, Model SW-301 (26-1429).

Always use the supplied cord when connecting the DWP-510 to a power source.

1. Plug the female end of the cord into the connector on the rear side of the Printer.

2. Connect the other end of the cord into an approved power source.

Connecting the DWP-510 to a TRS-80

The DWP-510 can be used with any TRS-80 Computer or Data Terminal that has parallel interface capabilities. This includes the:

- Model I
- Model II
- Model III
- Model 4
- Model 12
- Model 16
- Model 100
- Model 2000
- DT-1 Data Terminal

However, before connecting the Printer to the TRS-80, be sure you have the correct cable. Table 1 summarizes the appropriate Radio Shack cables; Table 2 briefly describes the location points on the TRS-80s.

Table 1. Printer-to-Computer Cables

TRS-80	Cable Catalog Number
Model I/III/4	26-1401
Model II/12/16/2000/DT-1	26-4401
Model 100	26-1409

Table 2. TRS-80 Connection Locations

TRS-80	Location
Model I	Left side of E.I.
Model II/12/16/100/2000	Rear Panel
Model III/4/DT-1	Lower Panel

1. Connect one end of the appropriate cable to the interface connector on the DWP-510.
2. Connect the other end of the cable to your TRS-80.

3/ Using the DWP-510

Before using the DWP-510, you should perform the Self-Test to ensure that the Printer is operating properly. Before running the Self-Test, however, you should load wide paper (15") into the Printer because Self-Test performs printing across the full length of the platen. To run the Self-Test;

1. Set the Printer power ON/OFF switch to **ON**.

2. Set the ON-LINE/OFF-LINE switch to **OFF-LINE**.

3. Set the TEST switch to **ON**.

To end the Self-Test, set the TEST switch to **OFF**.

Setting the Pitch Switch

Be sure to set the PITCH switch (on the front panel) to the position that corresponds with the print wheel you are using. If you are using a Courier 10 print wheel, for example, set the Switch to 10; if you're using a Madeleine Proportional Space wheel, set the switch to PS.

Do not accidentally bump the PITCH switch during printing. Unless you change the pitch via software, the current switch setting remains in effect. (Once you change the pitch via software, you must turn the Printer power OFF to use the front panel switch.)

Setting the New Line Switch

Inside the front panel (right side of the frame) is a switch to select Carriage Return with Line Feed or Carriage Return only when the Printer receives code 13, the Carriage Return code (see next section).

Normally, you'll leave this switch in the **CR+LF** position. For some applications (like when you are using the Printer with an IBM PC), set it to **CR ONLY**

You can also select **CR+LF** or **CR** only via software (27 21/27 22 code sequence). However, once you change this function via software, you must turn the Printer power OFF to use this switch.

Control Codes and the DWP-510

Before using the DWP-510, consider how the TRS-80 communicates with the Printer.

All information is sent to the Printer as numbers between 0 and 255 decimal (00-FF for you hexadecimal fans). The printer interprets these numbers according to the American Standard Code for Information Interchange, commonly referred to as the ASCII code. (See Appendix A for a list of ASCII codes.) Most numbers (or codes) are printed as letters, numbers, or symbols. However, the numbers 0-31, as well as some special sequences of code numbers, are used to **control** various functions of the Printer. These **Control Codes** allow you to control line feeds, backspacing, underlining, etc.

Sending Control Codes from BASIC

Some Printer functions are activated by a single code, but many require a sequence of two or more codes. Most multiple-code sequences begin with decimal 27 (referred to as the **ESCape** code). The **ESC** code notifies the Printer that a special sequence is on its way. The next code(s) sent determines which Printer function is selected. In BASIC, use **CHR$ ( )** to send these codes to the Printer.

For instance, set up the DWP-510 as described earlier and enter BASIC in the normal way. Then type the following short program:

10 LPRINT CHR$(15); "UNDERLINE" CHR$(14); "NO UNDERLINE"
and RUN it.

Roll the paper forward and look at the results. The word **UNDERLINE** was underlined and the words **NO UNDERLINE** were not underlined. Why? The codes CHR$(15) and CHR$(14) are the guilty parties. Take a quick look at Table 3. This chart shows the various code sequences understood by the DWP-510.

Table 3. DWP-510 Control Codes

Code (Decimal)	Function
08 n	Backspace n/120" (1 < n < 255)
10	Line Feed*
13	Carriage Return with Line Feed**
14	End Underline
15	Start Underline
27 01	1/120" Space
27 02	2/120" Space
27 03	3/120" Space
27 04	4/120" Space
27 05	5/120" Space
27 06	6/120" Space
27 07	7/120" Space
27 08	8/120" Space
27 09	9/120" Space
27 10	Reverse Line Feed*
27 14	12 Pitch Select
27 15	10 Pitch Select
27 17	Proportional Space Select
27 21	Start Carriage Return Only**
27 22	End Carriage Return Only**
27 24	Enters External Program Mode***
27 25	Exits External Program Mode***
27 26	1/48" Line Feed
27 28	Half Line Feed
27 30	Reverse Half Line Feed
27 31	Bold Print On
27 32	Bold Print Off
27 56	1/8" Line Feed

* Line Feeds may be sent from machine-language programs, but not from BASIC's **LPRINT** statement. See the Technical Information section of your TRS-80 owner's manual for details on sending Line Feeds.

** Normally, **CHR$(13)** causes a Carriage Return plus a Line Feed. However, after a CHR$(27); CHR$(21) is sent, a CHR$(13) causes a Carriage Return only; **CHR$(27); CHR$(22)** causes a return to normal.

*** See **External Program Mode** later in this manual.

Note: There are three more control codes that function only when you are using the Optional Auto Sheet Feeder. Refer to the Auto Sheet Feeder owner's manual for the specific codes.

Examples of Code Program Lines

LPRINT CHR$(8); CHR$(1)
Backspaces 1/120".
LPRINT CHR$(13)
Returns carriage with Line Feed.
LPRINT CHR$(27); CHR$(3)
Moves 3/120" space.
LPRINT CHR$(27); CHR$(14)
All subsequent characters will be printed in 12 pitch.
LPRINT CHR$(27); CHR$(17)
All subsequent characters will be printed in Proportional Spacing.

External Program Mode

On some special print wheels, such as the OCR-B 10 and others, you'll need to **externally** control the:

- Spacing between Proportional Spaced characters
- Amount of ribbon feed.
- Printing impression level.

The print wheels that require external programming will be labeled **Require Special Programming** on the packaging material. Each print wheel package will contain external programming code information.

To enter the External Program Mode, send a CHR$(27); CHR$(24). Then send a two-byte code for each character or symbol.

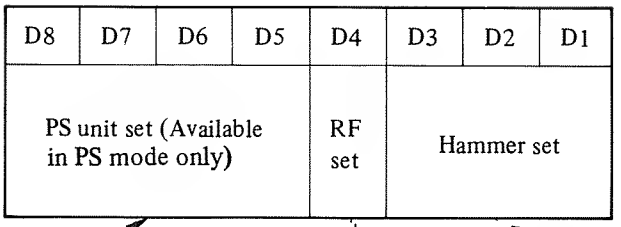
- The first byte is the ASCII code for the character.
- The second byte contains the data specifying the printing format (i.e., printing impression level, ribbon feed, and pitch).

Important Note! This must be done for each character during the External Program Mode or an error will occur.

Table 4 describes printing impression levels, Table 5 shows Ribbon Feed, and Table 6 details spacing between Proportional Spaced characters. Note that these tables list binary values. You'll need to combine the binary values and then convert the binary values (using the Base Conversion Chart in your TRS-80 owner's or reference manual) to a decimal value. then send that decimal value to the Printer with CHR$( ).

For example, in OCR-B, the letter T requires 1/10" spacing, normal ribbon feed and printing impression level 4.

Looking at Table 6, you'll see the 1/10" spacing is binary 0110. Table 5 shows you that normal ribbon feed is binary 1 and Table 4 shows that printing impression level 4 is binary 100. Adding these values together produces a binary value of 01101100 (0110 + 1 + 100 = 01101100). By referring to your Base Conversion Chart in a TRS-80 owner's or reference manual, you'll see that binary 01101100 is equal to decimal 108. Therefore, if you send a CHR$(84); CHR$(108) to the DWP-510, the letter T will be printed.



Unit amount (A/60")	D8	D7	D6	D5
0 (print without Carriage movement)	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Table 6

Hammer impression level	D3	D2	D1
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
(no hammer action)	1	1	1

Table 4

Ribbon Feed amount	D4
Normal	1
Long	0

Table 5

Example

```
10 LPRINT CHR$(27); CHR$(24) 'ENTERS EXTERNAL PROGRAM
20 LPRINT CHR$(84);  CHR$(108); 'PRINT T
30 LPRINT CHR$(97);  CHR$(107); 'PRINT a
40 LPRINT CHR$(110); CHR$(107); 'PRINT n
50 LPRINT CHR$(100); CHR$(108); 'PRINT d
60 LPRINT CHR$(121); CHR$(107); 'PRINT y
```

Special Functions

When using the DWP-510, you should be aware that there are special functions available.

Auto NL (New Line)

In some cases, the DWP-510 will automatically execute a New Line function (Carriage Return and Line Feed). These cases include:

- When the DWP-510 is set to 10 pitch and the carriage is in the 136th column position.
- When the DWP-510 is set to 12 pitch and the carriage is in the 163rd column position.
- When the DWP-510 is set to Proportional Spacing and the carriage moves to within 8 units (8/60") of the right margin.

REMEMBER! The **New Line** switch can be set to select either Carriage Return with Line Feed or Carriage Return only. Usually it is set to **CR+NL**. (when you are using the DWP-510 with an IBM PC, set this switch to CR ONLY.) Refer to **Setting the New Line Switch.**

Optimizer

For more efficient printing, the DWP-510 stores certain codes when they are received within 10 milliseconds of each other. These codes include:

- Space
- Backspace
- Line Feed (including New Line)
- Reverse Line Feed
- Half Line Feed
- Half Reverse Line Feed

These codes are stored until either the character codes or function codes are sent within intervals of 10 msec or more. When either of these situations occurs, the stored codes are executed one at a time. For example, when 10 Line Feed codes are entered with less than 10 msec intervals, the DWP-510 will automatically feed 10 lines at once.

4/ Care and Maintenance

Only the parts marked with green require any normal handling/adjustment. Any other maintenance should be performed only by a qualified service technician.

Of course, you can and should perform standard cleaning procedures – – just as you would with any office typewriter. Clean the platen, print wheel and other parts with standard typewriter cleaning fluids (use a soft, lint-free cloth).

Some do's and don'ts to assure maximum performance and reliability from your Printer:

DO	DON'T
Plug power cord into 3-wire grounded outlet.	Operate Printer in environments of high dust or dirt content, high temperature or humidity.
Position the Printer on a firm, clean, flat surface.	Place any objects on any part of the Printer (if anything falls inside the Printer, turn Printer power off and carefully remove the object).
Use only a lint-free cloth to clean the Printer case. Mild detergent solution can be used sparingly.	Use alcohol, solvents or harsh cleaning agents on any part of the Printer.
Ensure that all covers are closed and secured before operating.	Operate Printer without paper (if paper is less than 15″ wide take care not to print lines too long for the paper).
Turn off power before making any adjustment.	

Troubleshooting

If the Printer fails to operate properly, try to solve the problem as follows:

1. Power lamp does not turn on :
   A Check to see that the AC cord is plugged securely into an appropriate power source.

2. No communication with the TRS-80 :
   A Check to see if the interface cable is properly connected.
   B Check to see if the **ON-LINE/OFF-LINE** switch is **ON-LINE.**

3. Printer will not print :
   A Ensure that the cover is securely closed.
   B Check and change the ribbon, if necessary.
   C Perform the Self-Test operation to ensure that the Printer is internally capable of printing (see page 13).
   D Ensure that the print wheel is locked into position.
   E Check to see if anything has fallen into the mechanism that is physically obstructing the carriage movement.

5/ Specifications

Printing Speed	43 characters per second
Carriage Return Speed	300 ms per 13.6 inches
Line Feed Speed	4 inches per second
Printing Pitch	1/10 inch, 1/12 inch, Proportional spacing
Line Feed Pitch	1/6 inch, 1/12 inch
Font	124 character positions on Double Daisy Print Wheel
Wheel	Courier 10 (Catalog Number 26-1430)
	Prestige Elite (Catalog Number 26-1431)
	Madeleine P.S. (Catalog Number 26-1432)
	Cubic P.S. (Catalog Number 26-1433)
	Tile Italic (Catalog Number 26-1434)
	OCR-B (Catalog Number 26-1435)
	Letter Gothic 12 (Catalog Number 26-1436)
	Cubic 15 (Catalog Number 26-1438)
	Bold P.S. (Catalog Number 26-1439)
	Scientific A/N (Catalog Number 26-1486)
	Pica 10 (Catalog Number 26-1290)
	Narrator (Catalog Number 26-1291)
	OCR-A (Catalog Number 26-1292)
	Elite 12 (Catalog Number 26-1293)
Characters per Line	136 characters in 10 pitch mode
	163 characters in 12 pitch mode
Print Wheel Life	40 million characters
Ribbon Life	Nominal 270,000 characters; may vary according to the text printed (Multistrike carbon ribbon)
	Nominal 1,600,000 characters (Fabric ribbon)
Interfaces	
Data	8 parallel data and 1 strobe
Code	Modified ASCII
Temperature Ranges	
Operating	41 to 95°F (5 to 35°C)
Storage	–40 to 149°F (–40 to 65°C)
Relative Humidity	
Operating	20 – 90% RH (No condensation)
Storage	5 – 95% RH (No condensation)
Paper Weight	Total weight: 26 pound/ft² max. (127.9 grams/m2 max.)
	One ply: 8 pound/ft² max. (40 grams/m2 max.)
Size	Width: 16.54 inches max. (420 mm max.)
	Length: 3.33 inches min. (84.7 mm min.)
Ribbon	Multi-strike, carbon ribbon (Catalog Number 26-1419)
	Fabric ribbon (Catalog Number 26-1449)
Size	8.05″ × 24.6″ × 15.55″
	204.5 mm × 625 mm × 395 mm (HWD)
Power Requirements	120 VAC, 50/60 Hz, 135 W typical

Optional bidirectional tractor is available (Catalog Number 26-1447).

Table 7. Fonts, Positions on Print Wheel, Impression Levels and Proportional Space Units

A: Font
B: Position on Print Wheel
C: Impression Level
D: Proportional Space Unit

A			Z	Q	J	X	.	M	,	W	L	Y	A	I	H	F
B	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
C			4	6	3	5	0	6	0	6	3	4	4	3	4	4
D			6	7	5	7	3	8	3	8	6	7	7	3	6	6

A	O	T	R	E	P	S	C	N	G	K	V	D	~	B	(	U
B	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
C	5	4	5	5	5	4	4	4	5	6	4	5	1	6	3	4
D	7	6	7	6	6	5	7	6	7	7	6	6	5	6	3	6

A	}	[	Ö	]	Ä	¨	3/4	TM	Ü	1/4	{	)	´	®	¨	1/2
B	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
C	3	3	6	3	5	0	5	4	5	5	3	3	0	5	2	5
D	3	3	7	3	7	5	5	5	6	5	3	3	5	6	4	5

A	ˆ	`	©	═	=	#	ç	β	+	&	–	@	°	%	*	—
B	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
C	1	0	5	4	3	6	4	6	2	6	0	6	2	5	3	0
D	5	5	6	5	5	6	5	5	5	7	4	7	4	7	5	5

A	¶	/	z	q	j	x	:	m	;	w	ℓ	y	a	i	h	f
B	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
C	6	3	4	5	3	4	1	6	2	5	3	4	5	3	4	3
D	5	4	5	5	3	5	3	7	3	7	3	5	5	3	5	4

A	ō	t	e	r	p	s	c	n	g	k	v	d	f	b	ė	u
B	90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F
C	4	3	4	3	5	3	4	4	5	4	3	5	4	5	5	4
D	5	4	5	4	5	4	5	5	5	5	5	5	5	5	5	5

A	ė	>	ö	<	ä	¢	à	†	ü	£	?	μ	¥	§	`	ù
B	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	AD	AE	AF
C	5	3	5	3	5	4	5	4	5	5	3	5	5	5	1	4
D	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5

A	!	$	|		\	5	6	¦	3	0	2	7	4	8	9	
B	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	BA	BB	BC	BD	BE	BF
C	2	6	3		3	4	5	3	4	4	4	4	4	5	5	
D	3	5	3		4	5	5	5	5	5	5	5	5	5	5	

Appendix A/ ASCII Character Codes

Printable Characters

The DWP-510 can produce all Modified ASCII characters. Here's what they look like:

Code			Char.	Code			Char.	Code			Char.	Code			Char.
Dec.	Hex	Oct.		Dec.	Hex	Oct.		Dec.	Hex	Oct.		Dec.	Hex	Oct.	
32	20	040	SP	64	40	100	@	96	60	140	`	128	80	200	à
33	21	041	!	65	41	101	A	97	61	141	a	156	9C	234	ç
34	22	042	"	66	42	102	B	98	62	142	b	163	A3	243	£
35	23	043	#	67	43	103	C	99	63	143	c	165	A5	245	μ
36	24	044	$	68	44	104	D	100	64	144	d	166	A6	246	°
37	25	045	%	69	45	105	E	101	65	145	e	167	A7	247	´
38	26	046	&	70	46	106	F	102	66	146	f	168	A8	250	†
39	27	047	'	71	47	107	G	103	67	147	g	169	A9	251	TM
40	28	050	(	72	48	110	H	104	68	150	h	170	AA	252	®
41	29	051	)	73	49	111	I	105	69	151	ı	171	AB	253	©
42	2A	052	*	74	4A	112	J	106	6A	152	j	172	AC	254	1/4
43	2B	053	+	75	4B	113	K	107	6B	153	k	173	AD	255	3/4
44	2C	054	,	76	4C	114	L	108	6C	154	l	174	AE	256	1/2
45	2D	055	–	77	4D	115	M	109	6D	155	m	175	AF	257	¶
46	2E	056		78	4E	116	N	110	6E	156	n	187	BB	273	ė
47	2F	057	/	79	4F	117	O	111	6F	157	o	188	BC	274	ù
48	30	060	0	80	50	120	P	112	70	160	p	189	BD	275	è
49	31	061	1	81	51	121	Q	113	71	161	q	190	BE	276	¨
50	32	062	2	82	52	122	R	114	72	162	r	191	BF	277	ƒ
51	33	063	3	83	53	123	S	115	73	163	s	192	CO	300	§
52	34	064	4	84	54	124	T	116	74	164	t	204	CC	314	¥
53	35	065	5	85	55	125	U	117	75	165	u	219	DB	333	Ä
54	36	066	6	86	56	126	V	118	76	166	v	220	DC	334	Ö
55	37	067	7	87	57	127	W	119	77	167	w	221	DD	335	Ü
56	38	070	8	88	58	130	X	120	78	170	x	222	DE	336	¢
57	39	071	9	89	59	131	Y	121	79	171	y	223	DF	337	═
58	3A	072	:	90	5A	132	Z	122	7A	172	z	251	FB	373	ä
59	3B	073	;	91	5B	133	[	123	7B	173	{	252	FC	374	ö
60	3C	074	<	92	5C	134	\	124	7C	174	|	253	FD	375	ü
61	3D	075	=	93	5D	135	]	125	7D	175	}	254	FE	376	ß
62	3E	076	>	94	5E	136	^	126	7E	176	~				
63	3F	077	?	95	5F	137	_	127	7F	177	(Blank)				

Proportional Character Set Units Per Column

3 UNITS	4 UNITS	5 UNITS		6 UNITS	7 UNITS	8 UNITS
. - 46/2E	'' - 34/22	J - 74/4A	v - 118/76	Z - 90/5A	Q - 81/51	M - 77/4D
, - 44/2C	– - 45/2D	S - 83/53	d - 100/64	L - 76/4C	X - 88/58	W - 87/57
I - 73/49	° - 166/A6	~ - 126/7E	f - 191/BF	H - 72/48	Y - 89/59	
(- 40/28	/ - 47/2F	¨ - 190/BE	b - 98/62	F - 70/46	A - 65/41	
} - 125/7D	f - 102/66	3/4 - 173/AD	é - 187/BB	T - 84/54	O - 79/4F	
[- 91/5B	t - 116/74	TM - 169/A9	u - 117/75	E - 69/45	R - 82/52	
] - 93/5D	r - 114/72	1/4 - 172/AC	é - 189/BD	P - 80/50	C - 67/43	
{ - 123/7B	s - 115/73	´ - 167/A7	> - 62/3E	N - 78/4E	G - 71/47	
) - 41/29	\ - 92/5C	1/2 - 174/AE	ö - 252/FC	V - 86/56	K - 75/4B	
j - 106/6A		^ - 94/5E	< - 60/3C	D - 68/44	Ö - 220/DC	
: - 58/3A		` - 96/60	ä - 251/FB	B - 66/42	Ä - 219/DB	
; - 59/3B		═ - 223/DF	¢ - 222/DE	U - 85/55	& - 38/26	
l - 108/6C		= - 61/3D	á - 128/80	Ü - 221/DD	@ - 64/40	
i - 105/69		ç - 156/9C	† - 168/A8	® - 170/AA	% - 37/25	
' - 39/27		β - 254/FE	ü - 253/FD	© - 171/AB	m - 109/6D	
! - 33/21		+ - 43/2B	£ - 163/A3	# - 35/23	w - 119/77	
| - 124/7C		* - 42/2A	? - 63/3F			
		— - 95/5F	µ - 165/A5			
		¶ - 175/AF	¥ - 204/CC			
		z - 122/7A	§ - 192/CO			
		q - 113/71	ù - 188/BC			
		x - 120/78	$ - 36/24			
		y - 121/79	5 - 53/35			
		a - 97/61	6 - 54/36			
		h - 104/68	1 - 49/31			
		o - 111/6F	3 - 51/33			
		e - 101/65	0 - 48/30			
		p - 112/70	2 - 50/32			
		c - 99/63	7 - 55/37			
		n - 110/6E	4 - 52/34			
		g - 103/67	8 - 56/38			
		k - 107/6B	9 - 57/39			

Note: Codes are in Decimal and Hexadecimal (Dec/Hex).

Proportional Character Style Code Chart

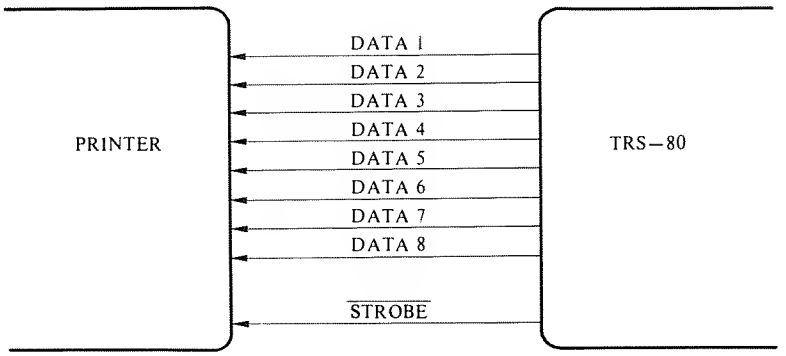
CODE	32/20	33/21	34/22	35/23	36/24	37/25	38/26	39/27	40/28	41/29
CHAR	SP	!	"	#	$	%	&	'	(	)
WIDTH	5	3	4	6	5	7	7	3	3	3
CODE	42/2A	43/2B	44/2C	45/2A	46/2E	47/2F	48/30	49/31	50/32	51/33
CHAR	*	+	,	—	.	/	0	1	2	3
WIDTH	5	5	3	4	3	4	5	5	5	5
CODE	52/34	53/35	54/36	55/37	56/38	57/39	58/3A	59/3B	60/3C	61/3D
CHAR	4	5	6	7	8	9	:	;	<	=
WIDTH	5	5	5	5	5	5	3	3	5	5
CODE	62/3E	63/3F	64/40	65/41	66/42	67/43	68/44	69/45	70/46	71/47
CHAR	>	?	@	A	B	C	D	E	F	G
WIDTH	5	5	7	7	6	7	6	6	6	7
CODE	72/48	73/49	74/4A	75/4B	76/4C	77/4D	78/4E	79/4F	80/50	81/51
CHAR	H	I	J	K	L	M	N	O	P	Q
WIDTH	6	3	5	7	6	8	6	7	6	7
CODE	82/52	83/53	84/54	85/55	86/56	87/57	88/58	89/59	90/5A	91/5B
CHAR	R	S	T	U	V	W	X	Y	Z	[
WIDTH	7	5	6	6	6	8	7	7	6	3
CODE	92/5C	93/5D	94/5E	95/5F	96/60	97/61	98/62	99/63	100/64	101/65
CHAR	\	]	^	_	`	a	b	c	d	e
WIDTH	4	3	5	5	5	5	5	5	5	5
CODE	102/66	103/67	104/68	105/69	106/6A	107/6B	108/6C	109/6D	110/6E	111/6F
CHAR	f	g	h	ı	j	k	l	m	n	o
WIDTH	4	5	5	3	3	5	3	7	5	5
CODE	112/70	113/71	114/72	115/73	116/74	117/75	118/76	119/77	120/78	121/79
CHAR	p	q	r	s	t	u	v	w	x	y
WIDTH	5	5	4	4	4	5	5	7	5	5
CODE	122/7A	123/7B	124/7C	125/7D	126/7E	127/7F	128/80	156/9C	163/A3	165/A5
CHAR	z	{	|	}	~	Not used	ä	ç	£	μ
WIDTH	5	3	3	3	5	-	5	5	5	5
CODE	166/A6	167/A7	168/A8	169/A9	170/AA	171/AB	172/AC	173/AD	174/AE	175/AF
CHAR	°	'	†	TM	®	©	1/4	3/4	1/2	¶
WIDTH	4	5	5	5	6	6	5	5	5	5
CODE	187/BB	188/BC	189/BD	190/BE	191/BF	192/CO	204/CC	219/DB	220/DC	221/DD
CHAR	é	ù	è	¨	ƒ	§	¥	Ä	Ö	Ü
WIDTH	5	5	5	5	5	5	5	7	7	6
CODE	222/DE	223/DF	251/FB	252/FC	253/FD	254/FE				
CHAR	¢	═	ä	ö	ü	β				
WIDTH	5	5	5	5	5	5				

Note: Codes are in Decimal and Hexadecimal (Dec/Hex).

Appendix B/ Interface Description

Interface Input Signal

Input Signal System Diagram



* Ground not shown.

Description of Each Input Signal

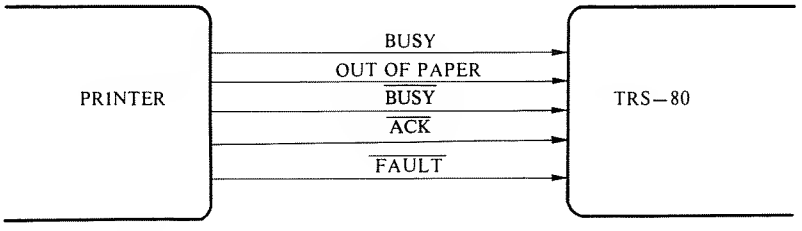
(1) DATA Lines (DATA 1 – DATA 8)
These DATA lines provide 8 input signals for actuating the Printer. The Printer will ignore any invalid code applied.

(2) $\overline{\text{STROBE}}$
A sampling signal for the DATA lines which provide instruction signals for actuating the Printer.

A control signal generated by the computer which latches data into the Printer.

Output Signal

Output Signal System Diagram



* Ground not shown.

Description of Each Output Signal

- **BUSY**
  Busy condition:
  1) Data is in buffer
  2) Initial state
  3) Off-line mode
  4) Error state
  5) Ribbon fault state
  6) Cover open state

  Ready condition:
  1) Condition other than one of those listed in 1 through 6 above
  2) Cover closed state

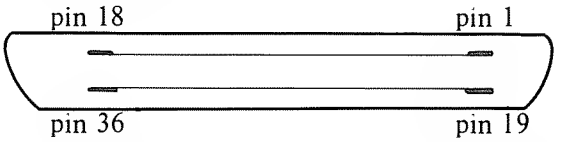
- **OUT OF PAPER**
  No function. This line is always a "0" signal.

- **$\overline{\text{BUSY}}$**
  This signal is the logical inverse of BUSY.

- **$\overline{\text{ACK}}$**
  This signal indicates the Printer has accepted data from CPU.

- **$\overline{\text{FAULT}}$**
  This signal indicates the Printer is in an error state, ribbon fault state, cover open state or off-line state.

Interface Signal Pin Assignments



Pin	Signal Name	Pin	Signal Name
1	$\overline{\text{STROBE}}$	19	GND
2	DATA 1	20	GND
3	DATA 2	21	GND
4	DATA 3	22	GND
5	DATA 4	23	GND
6	DATA 5	24	GND
7	DATA 6	25	GND
8	DATA 7	26	GND
9	DATA 8	27	GND
10	$\overline{\text{ACK}}$	28	GND
11	BUSY	29	GND
12	OUT OF PAPER	30	GND
13	$\overline{\text{BUSY}}$	31	N.C
14	GND	32	$\overline{\text{FAULT}}$
15	GND	33	GND
16	GND	34	N.C
17	GND	35	N.C
18	+5 VDC	36	N.C

Note: N.C. pins are actually pulled up to +5 VDC through a 4.7K resistor.
Pin 18 provides +5 VDC to the TRS-80 (less than 80 mA of current).

Appendex C/ Print Samples

Courier (10 pitch)

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨[¾™¼´®]½"
ƒéèöä¢à ü†£µ¥§$ÖÄÜ
!%.(){}*+-=,;:/\<>?_¶~ßç&@
°#|©'^ù`_
```

Cubic (Proportional Space)

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨[¾™¼´®]½"
ƒéèöä¢à ü†£µ¥§$ÖÄÜ
!%.(){}*+-=,;:/\<>?_¶~ßç&@
°#|©'^ù`_
```

Prestige Elite (12 pitch)

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨[¾™¼´®]½"
ƒéèöä¢à ü†£µ¥§$ÖÄÜ·
!%.(){}*+-=,;:/\<>?_¶~ßç&@
°#|©'^ù`_
```

Tile Italic (12 pitch)

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨[¾™¼´®]½"
ƒéèöä¢à ü†£µ¥§$ÖÄÜ
!%.(){}*+-=,;:/\<>?_¶~ßç&@
°#|©'^ù`_
```

Madeleine (Proportional Space)

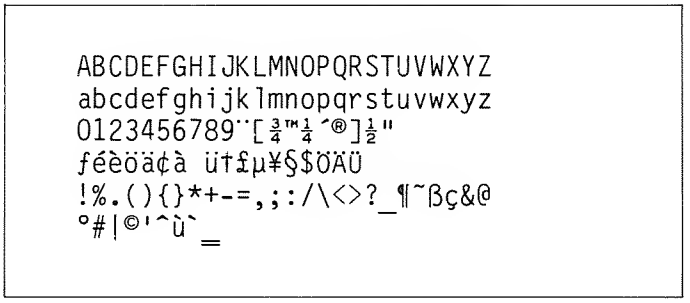
```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨[¾™¼´®]½"
ƒéèöä¢à ü†£µ¥§$ÖÄÜ
!%.(){}*+-=,;:/\<>?_¶~ßç&@
°#|©'^ù`_
```

OCR-B

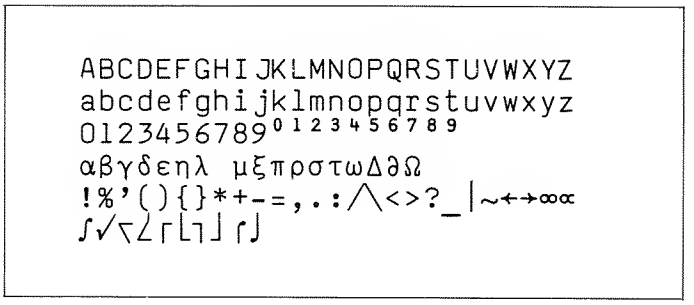
```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789¨´§¥¿^¤£øØ
!"#$%&'()=~|`{_+*}<>?-^\@[
;:],./ßijIJèéÆßöÖ
çÆæüÜéÑùäÄ¢ài
```

External Program Mode (EPM) required

Letter Gothic (12 pitch)

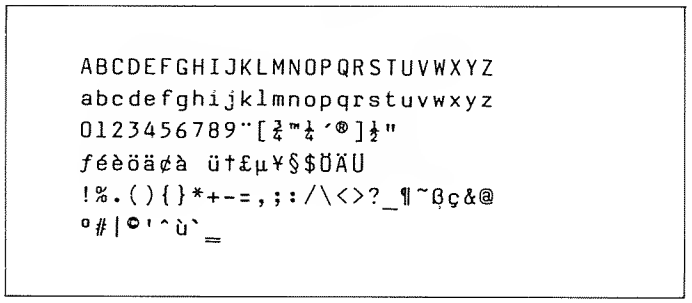


Scientific A/N

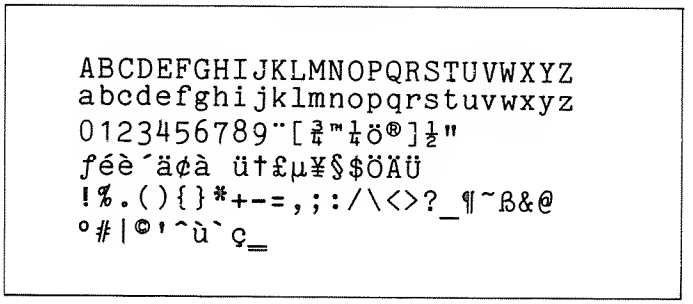


EPM required

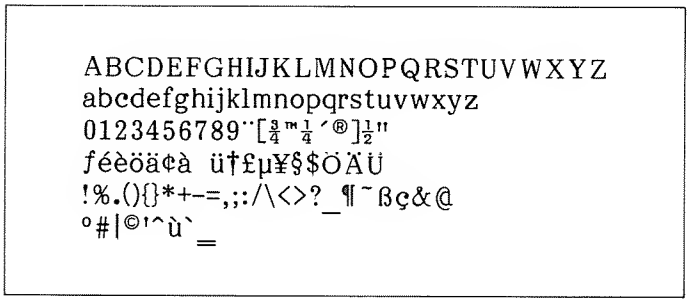
Cubic 15



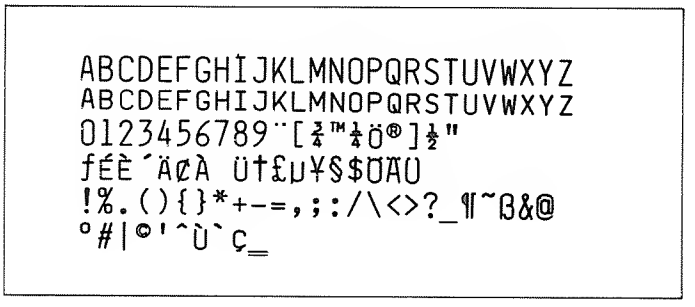
Pica (10 pitch)



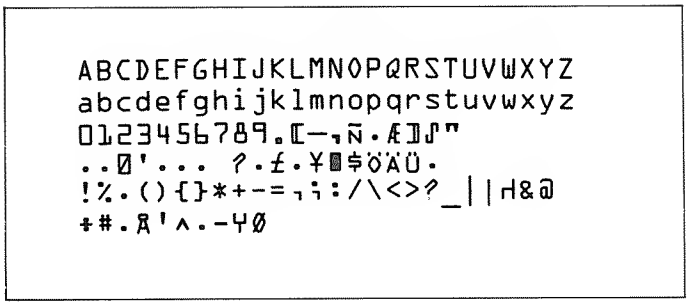
Bold Proportional Space



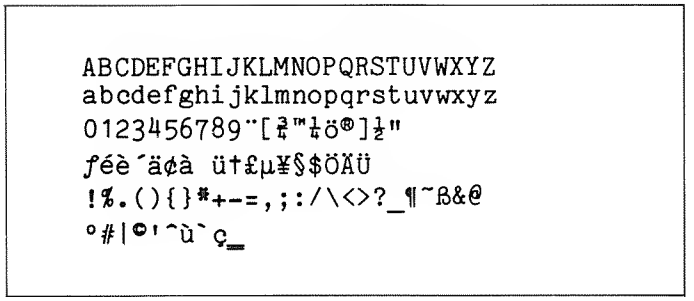
Narrator



OCR-A



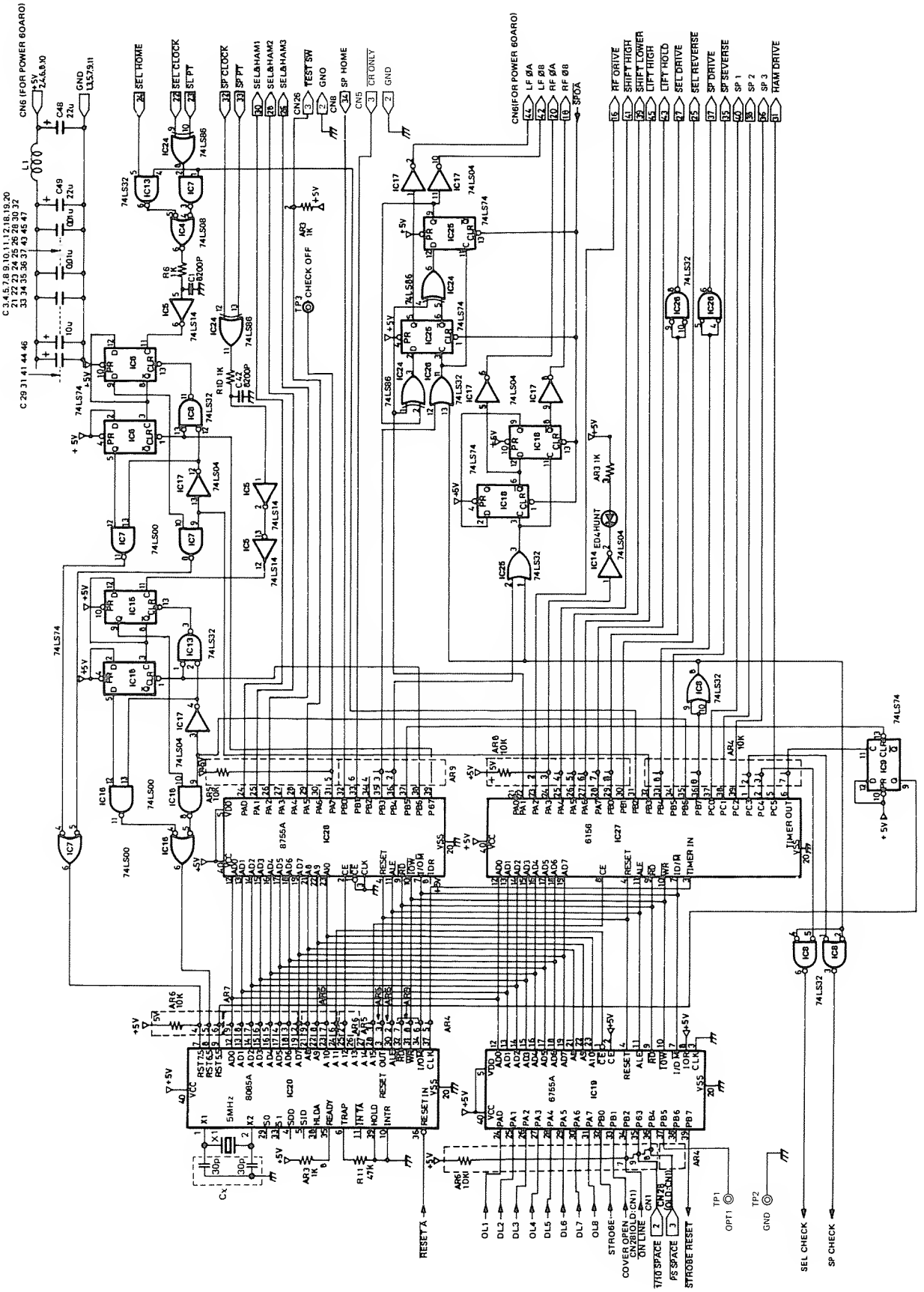
Elite (12 pitch)



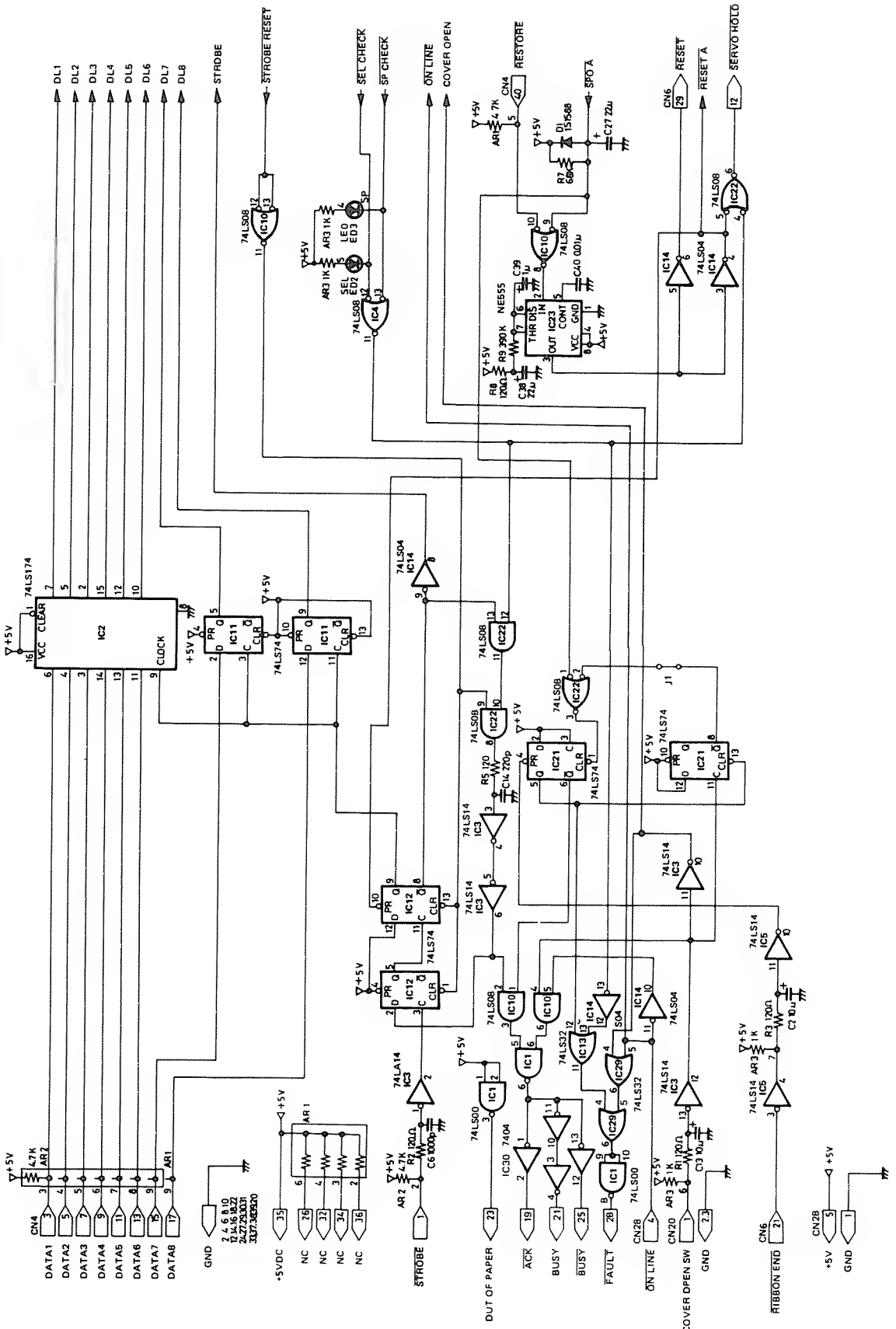
EPM required

Appendix D/ Schematic Diagrams

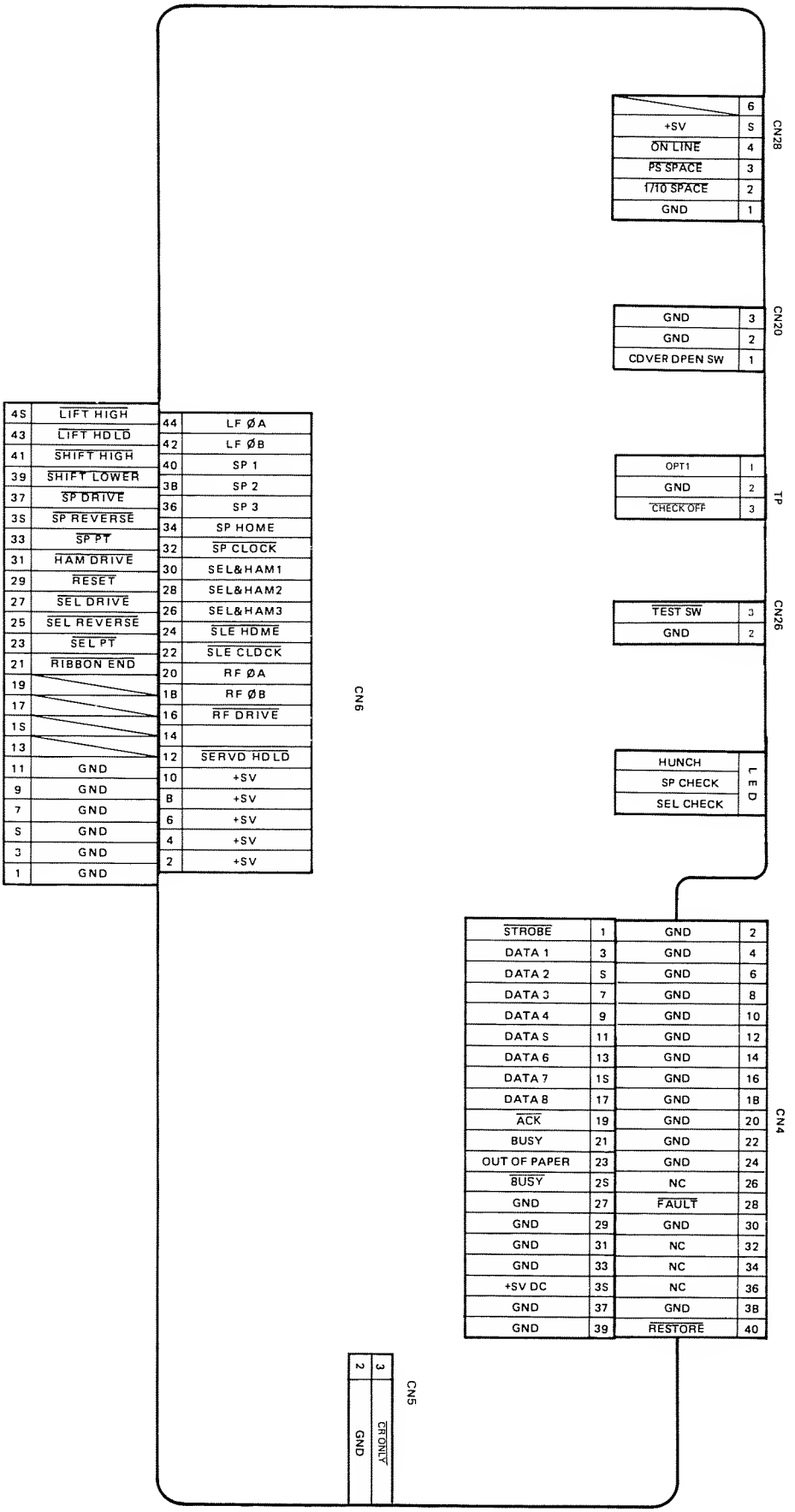
Main Control Logic (Page 1 of 3)



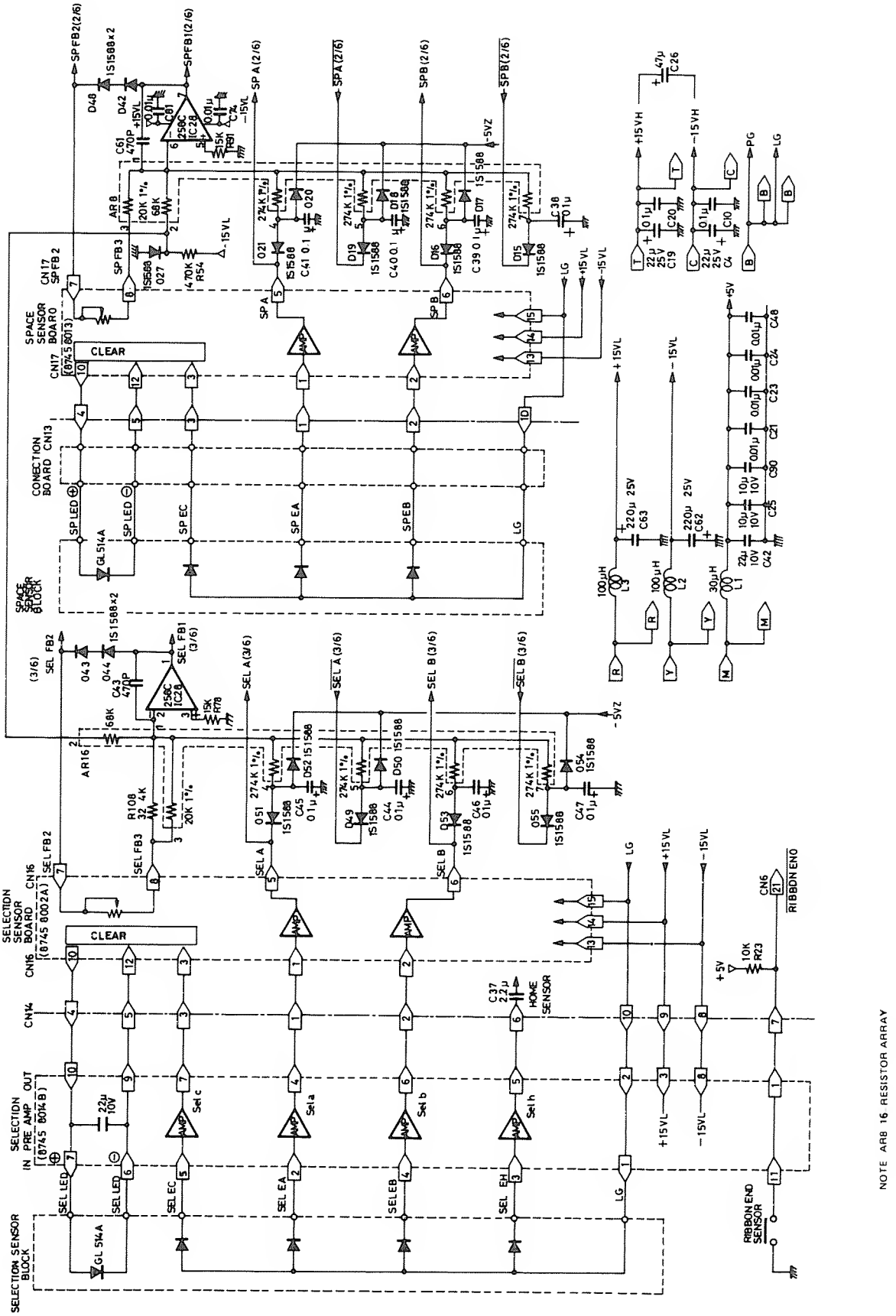
Main Control Logic (Page 2 of 3)



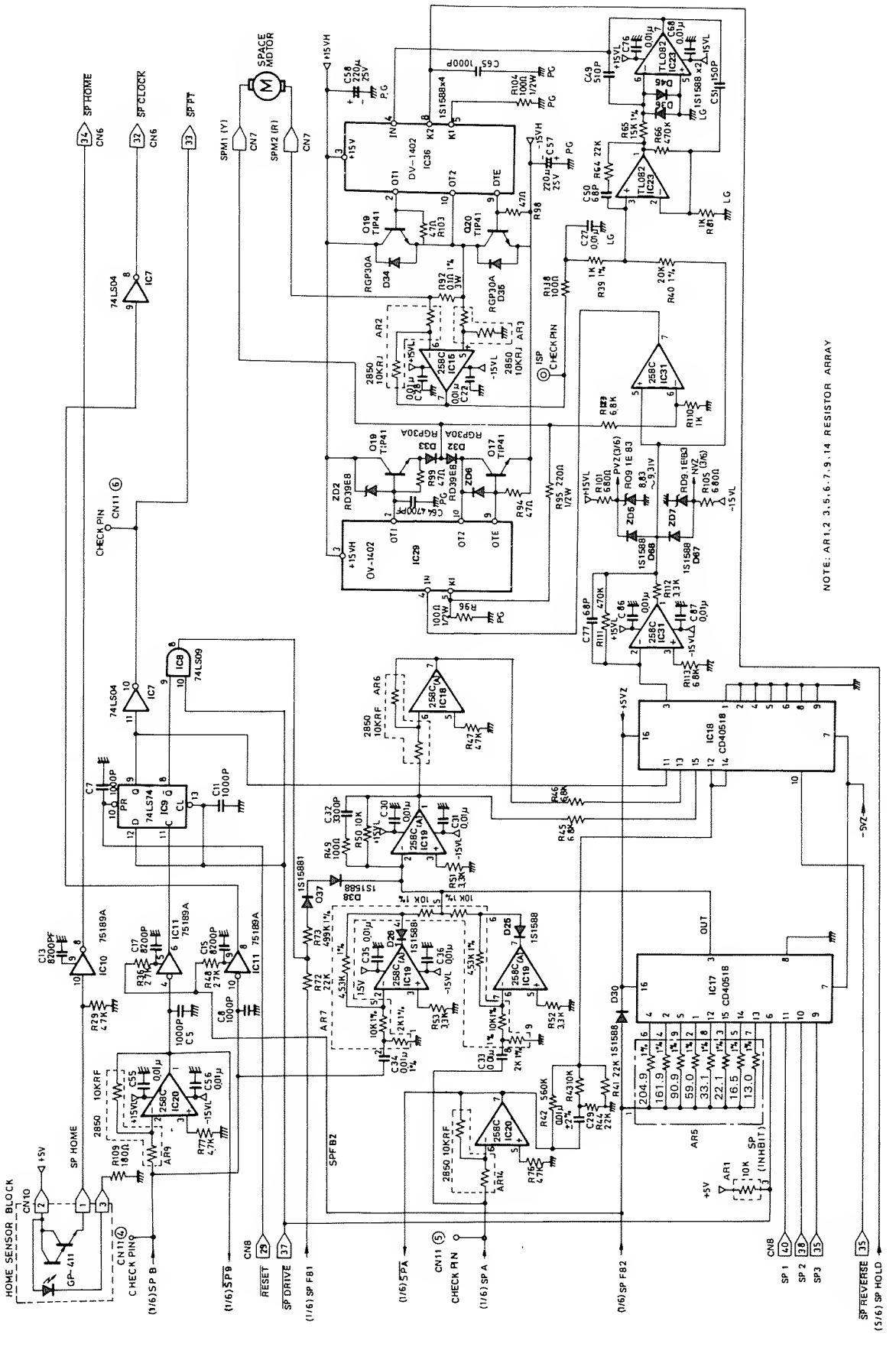
Main Control Logic (Page 3 of 3)



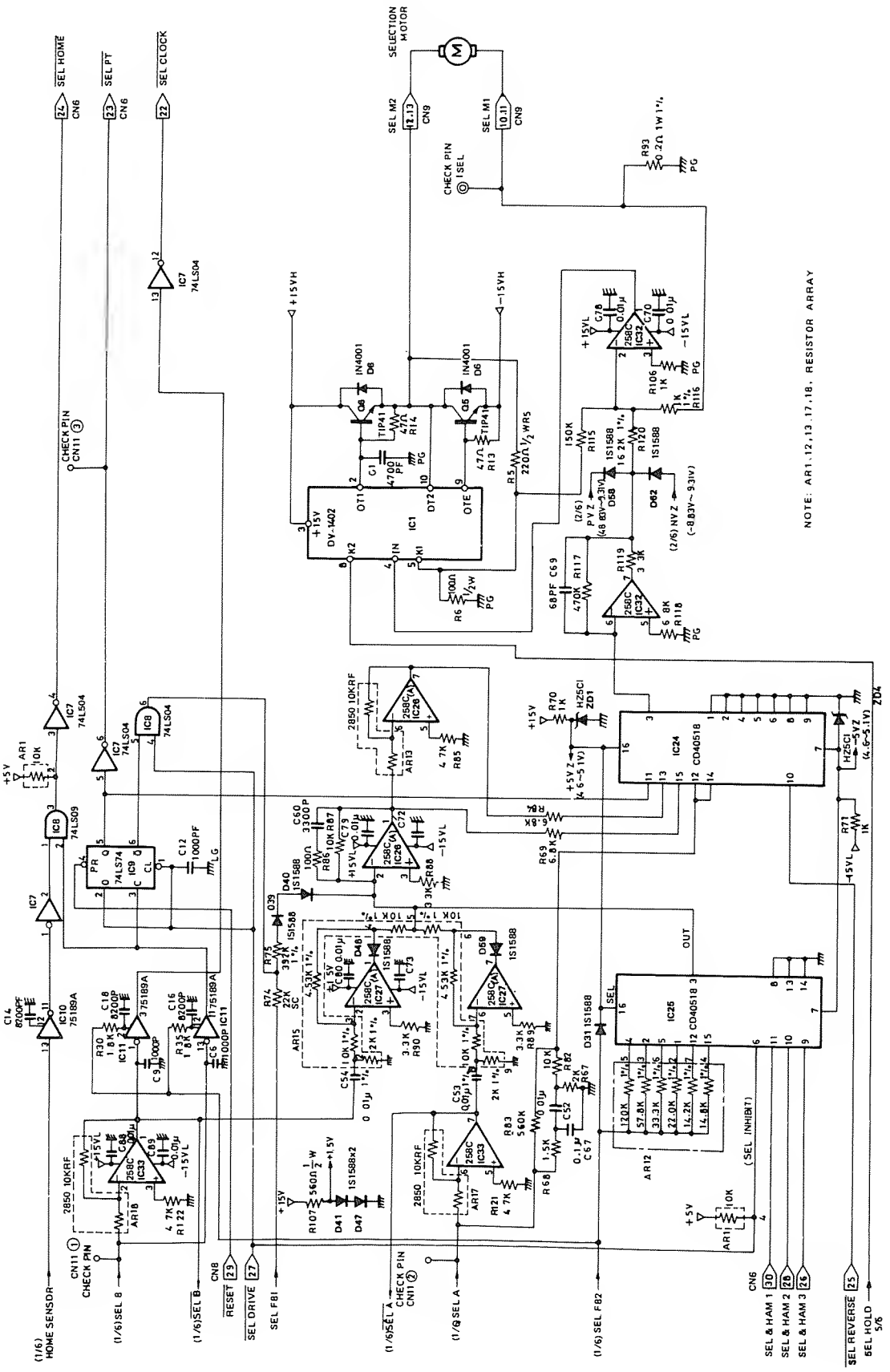
Power Board Logic (Page 1 of 6)



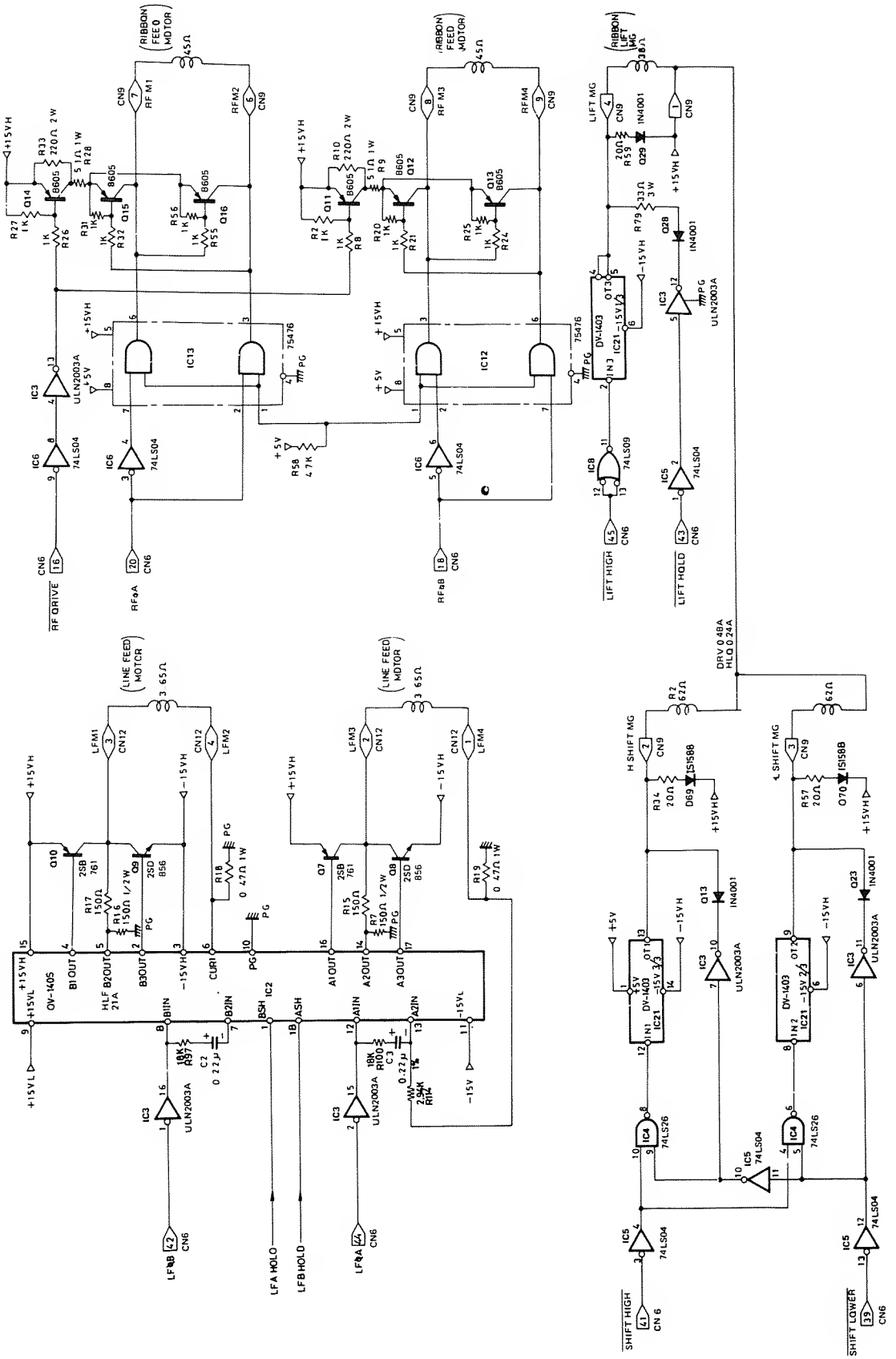
Power Board Logic (Page 2 of 6)



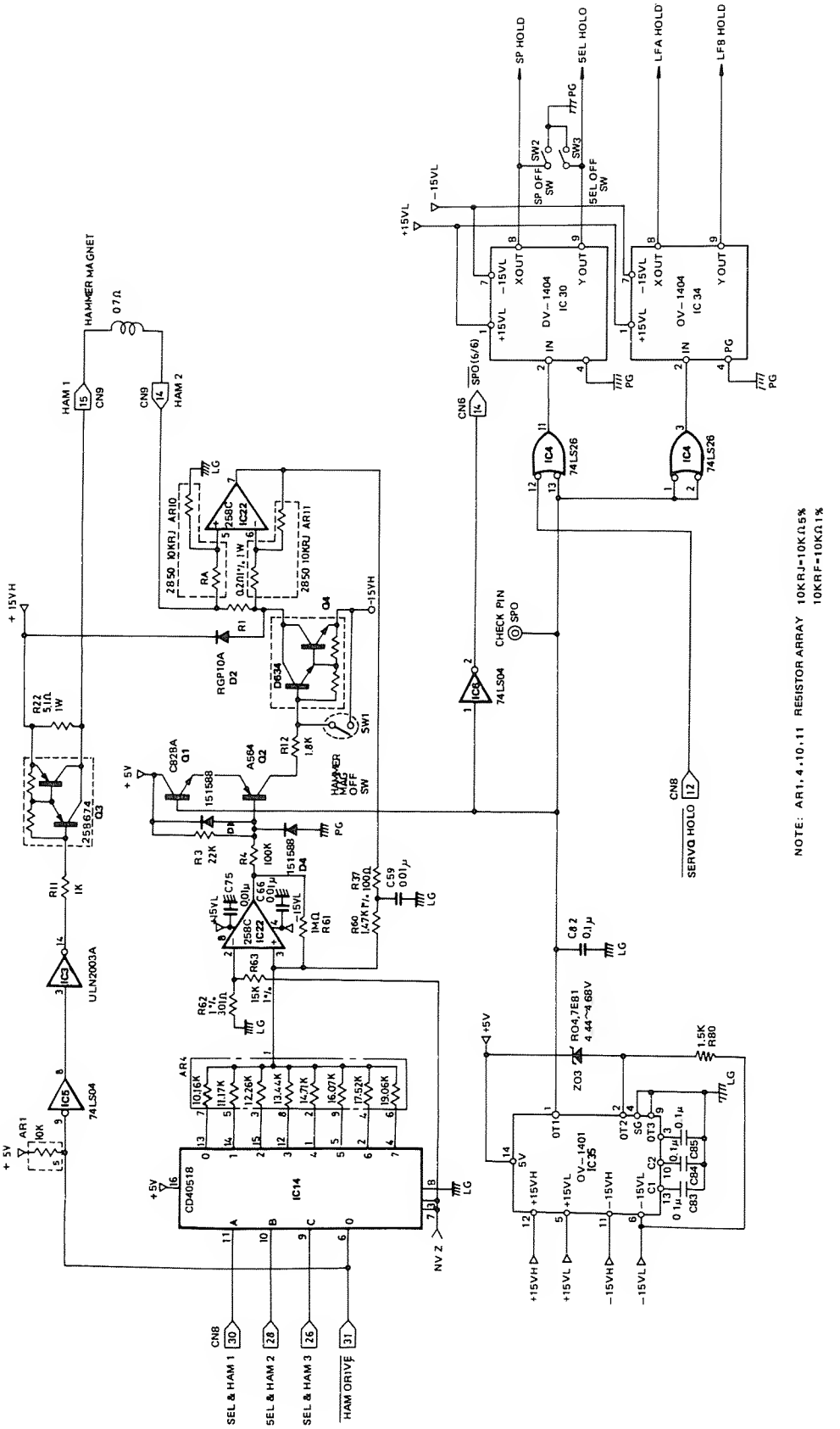
Power Board Logic (Page 3 of 6)



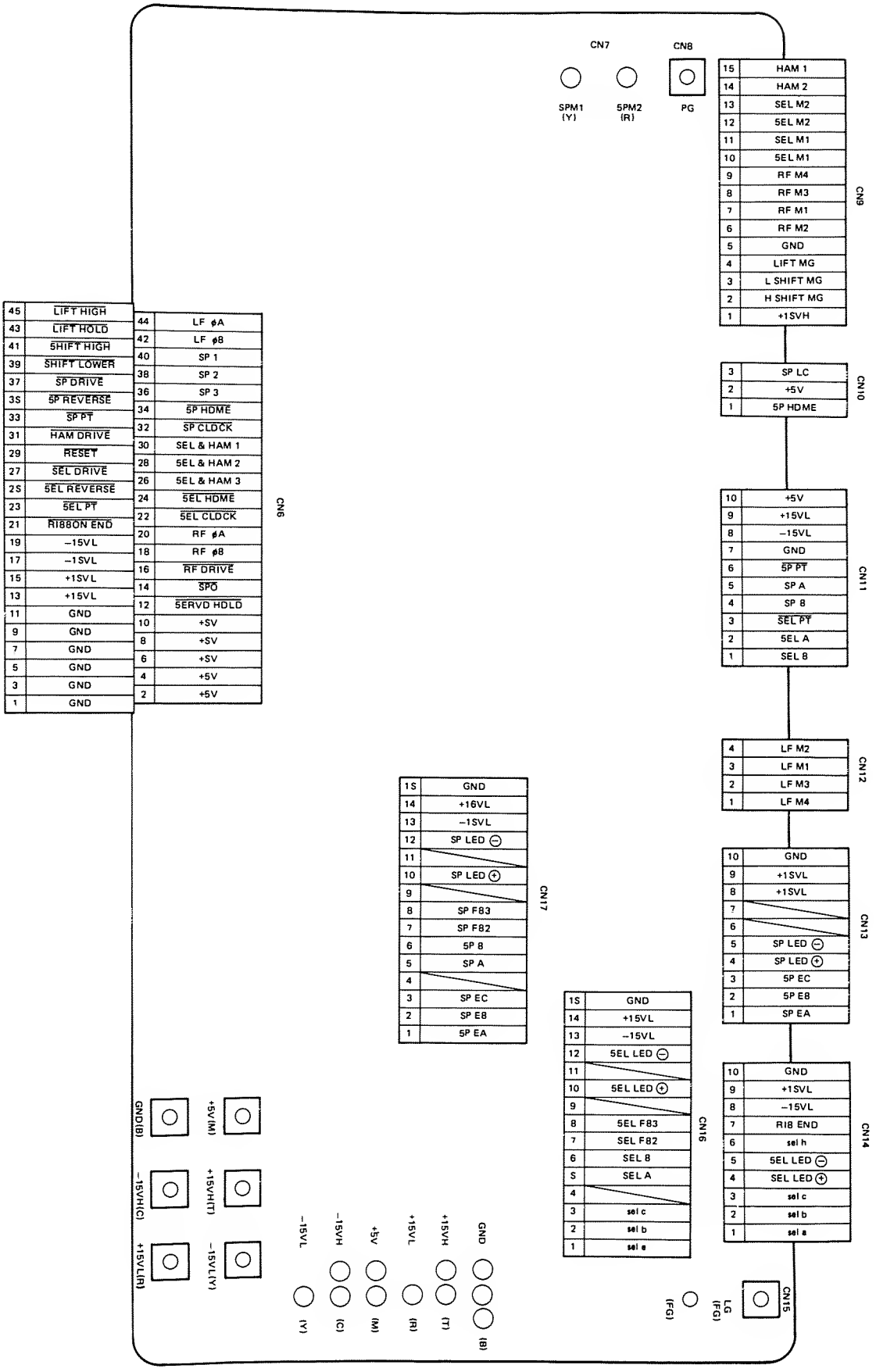
Power Board Logic (Page 4 of 6)



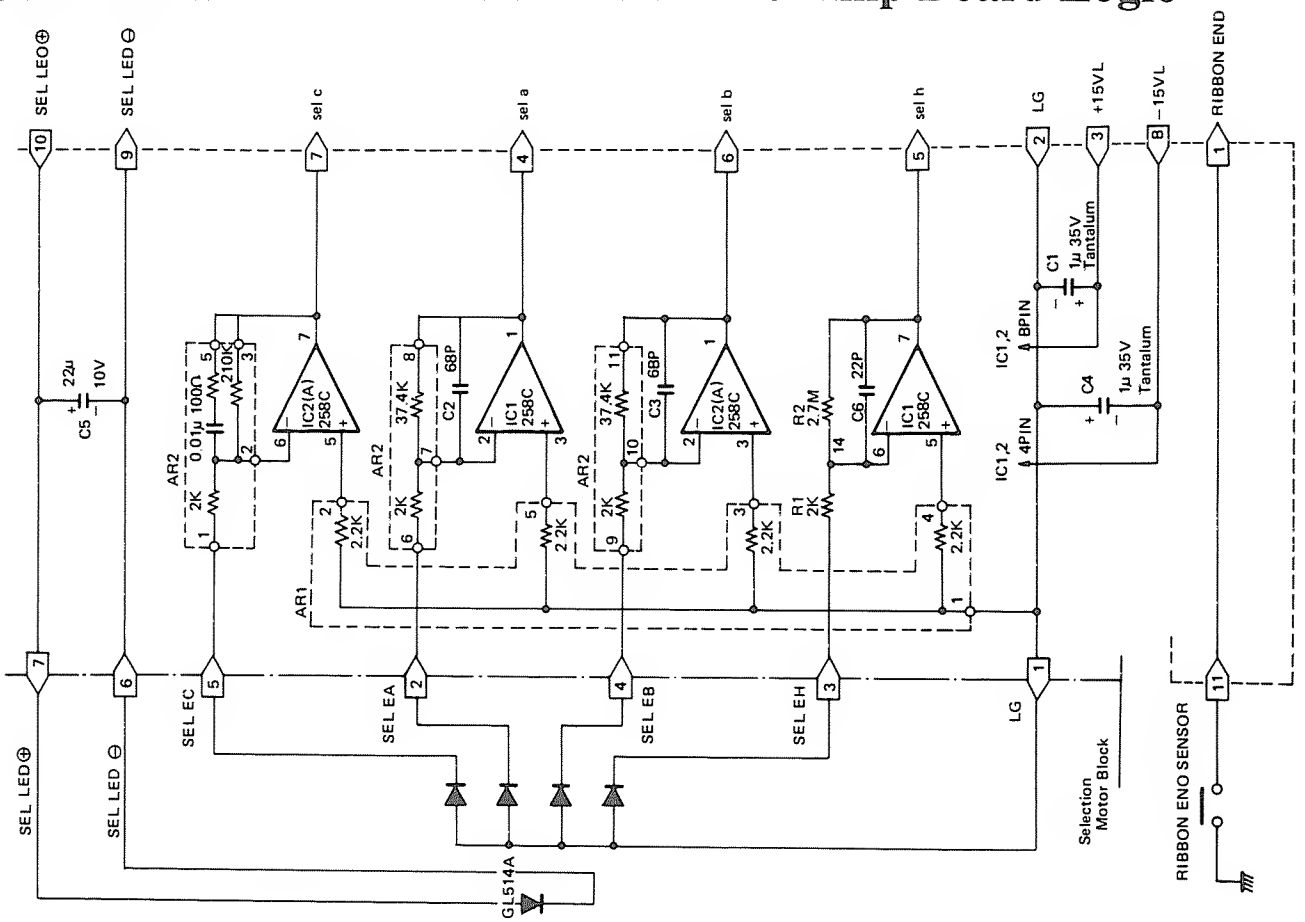
Power Board Logic (Page 5 of 6)

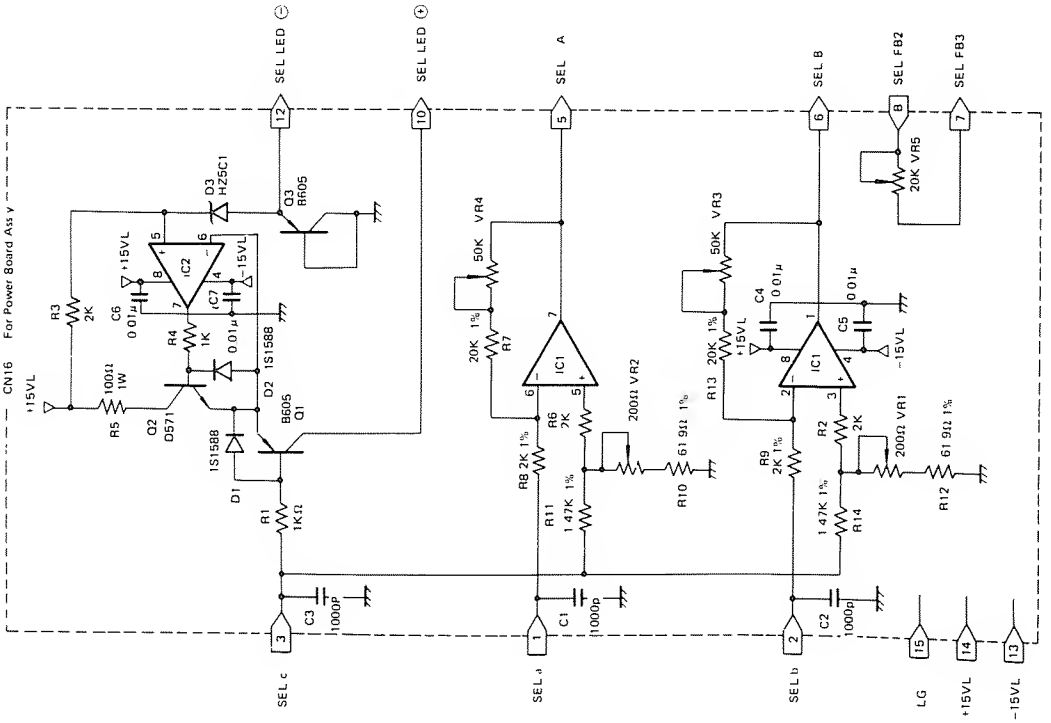


Power Board Logic (Page 6 of 6)

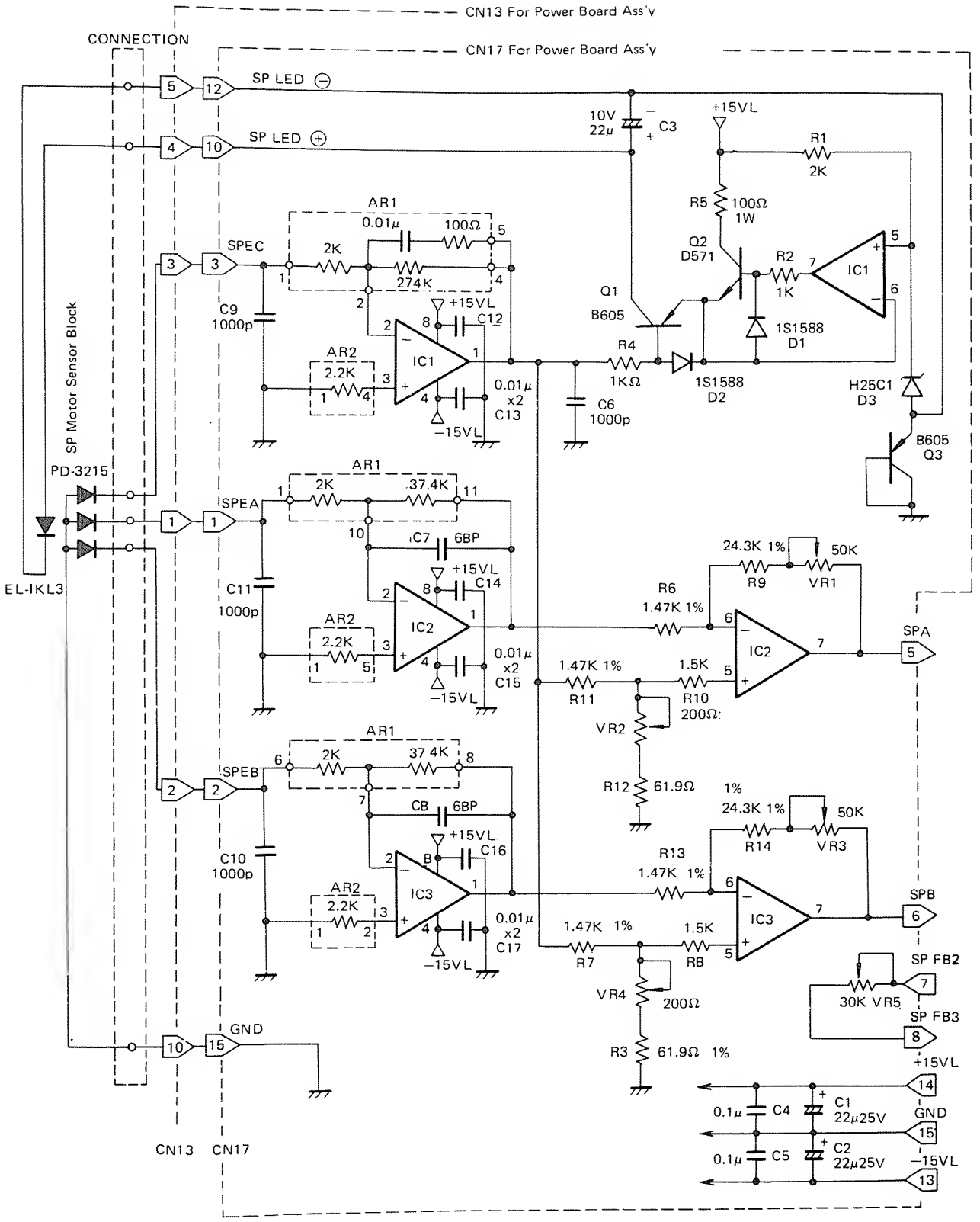


Selection Sensor Board/Selection Pre-Amp Board Logic

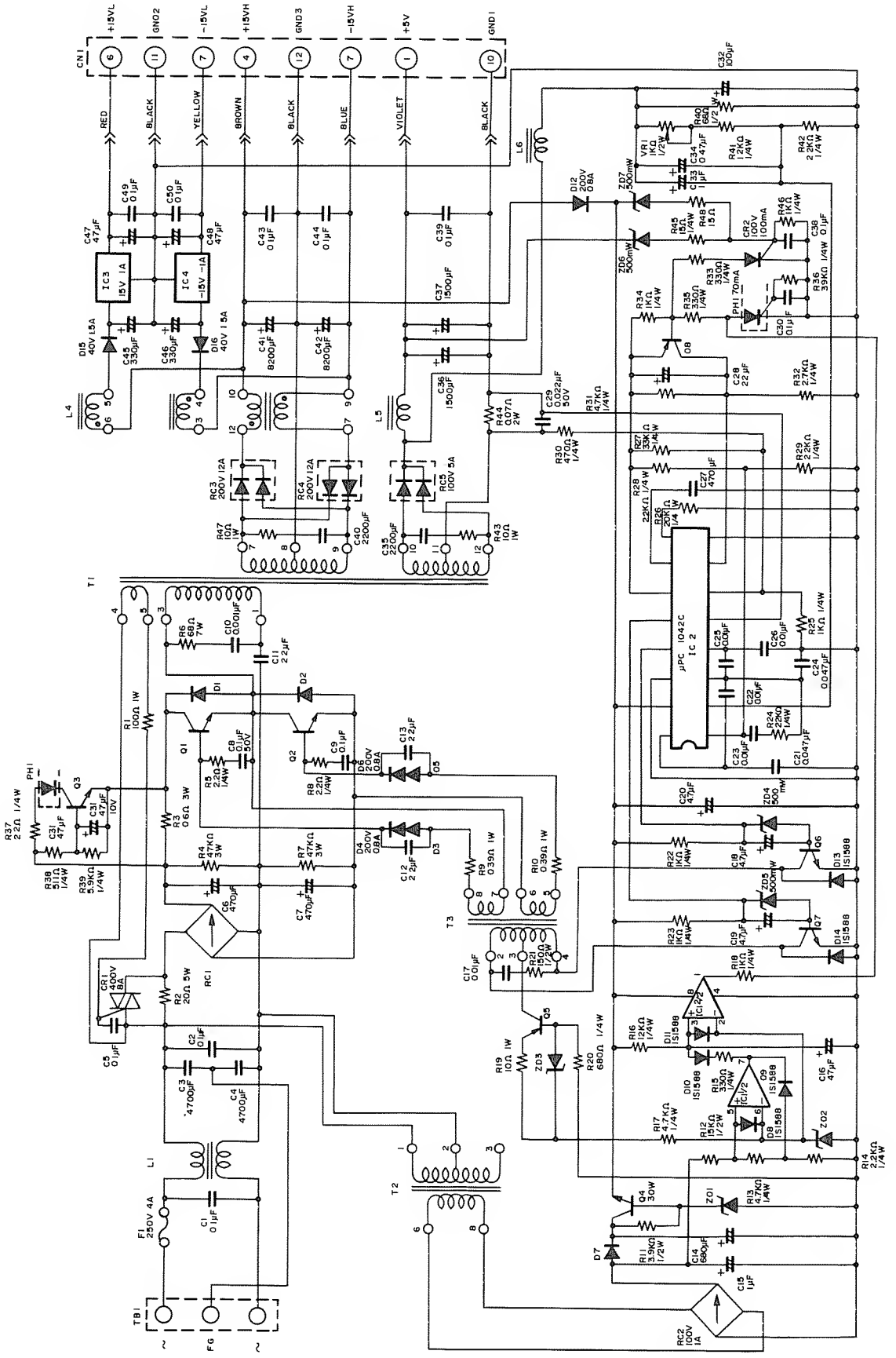




Space Sensor Board Logic



Power Supply Logic (100 Volt Series)



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