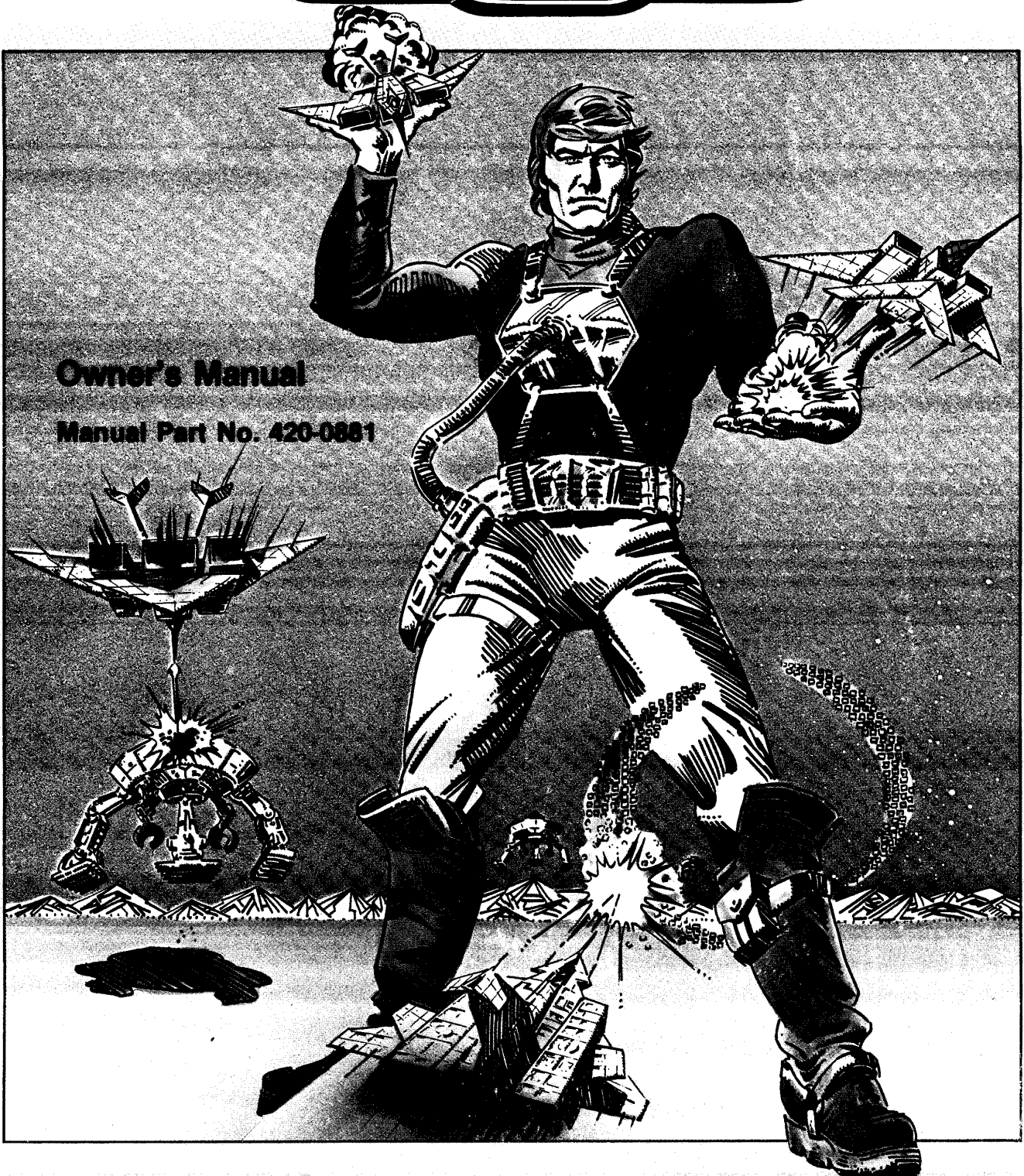


# BUCK ROGER

PLANET OF ZOOM  
SEGA

**Owner's Manual**

**Manual Part No. 420-0881**





**Owner's Manual**

**Manufactured By**

**SEGA<sup>®</sup>**

**TLX 910-335-1621**

**Buck Rogers<sup>™</sup> Planet of Zoom<sup>™</sup> Owner's Manual**

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## Introduction

BUCK ROGERS™ PLANET OF ZOOM™ is a micro-processor based coin-operated electronic game, that makes extensive use of digital integrated circuitry and television monitor concepts. This manual is intended for the use of the maintenance technicians who possess a general working knowledge of solid-state circuitry and video monitor theory. Any individual NOT knowledgeable in these areas SHOULD NOT attempt repair of the electronic portions of the game.

In addition to this manual and training in electronics, troubleshooting and repair will be facilitated by: access to general electronic type handtools, a multimeter, a 50 to 100 MHz oscilloscope and a logic probe would be helpful.

Technical assistance is available toll-free by calling:

1-800-854-1938 outside California

1-800-722-8576 inside California

Parts information assistance is available toll-free by calling:

1-800-854-1900 outside California

1-800-722-8575 inside California

Questions or comments concerning BUCK ROGERS™ PLANET OF ZOOM™ or any of our games are welcome and should be directed to:

Customer Service Manager

SEGA Electronics, Inc.

16250 Technology Drive

San Diego, California 92127-1985

## Important Notes

The following note is included in compliance with FCC rules:

WARNING: This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable 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.

## Other Notes

NEVER replace any components with anything other than exact replacement parts.

NEVER remove circuit board connections while power is on.

DO NOT replace fuses with anything other than the proper value. A blown fuse indicates an overload condition within the game. Replacing fuses with a higher value can cause severe damage to internal components if an overload occurs.

ALWAYS consult the manual before attempting repairs.

SPARE PARTS will be maintained at SEGA Electronics, Inc., for a period of five (5) years after the date of manufacture of the game concerned.

## Game Concept

Flying skills and targeting accuracy must be honed to a fine edge, as you take command of Earth's last remaining hope of defense. Responsive 8-way joystick in hand, excitement is the name of the game as the Buck Rogers in all of us pilots a remote controlled spacecraft through the PLANET OF ZOOM™.

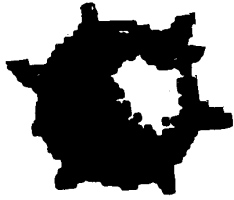
In the 25th century, Buck Rogers is confronted by a wicked warrior-world . . . the Planet of Zoom. It is a gargantuan out-of-orbit world that devastates everything in its path, and is ruled by an evil source ship. Buck Rogers mission: To destroy the source ship and liberate the Planet of Zoom before it reaches Earth.

Equipped with single-shot or rapid fire neutron cannon, and 2 level (upright) or 4 level (cockpit) speed control, you race your ship into and through heavily armed channels, through formidable smasher tunnels and around the towering spires of the cosmic city. You bank, dive and climb in pursuit of bizarre alien ships and ground forces to reach the climatic scene and primary target, the all powerful enemy source ship.

Fantastic game play graphics, great stereo sound effects, intense action and unique player controls makes this versatile one or two player video game as super as the Buck Rogers hero it is named for. With 3 to 6 extra ships (operator selectable) your score mounts and rounds proceed until the loss of the last player ship.



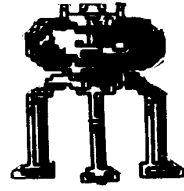
# Scoring



100



200



300



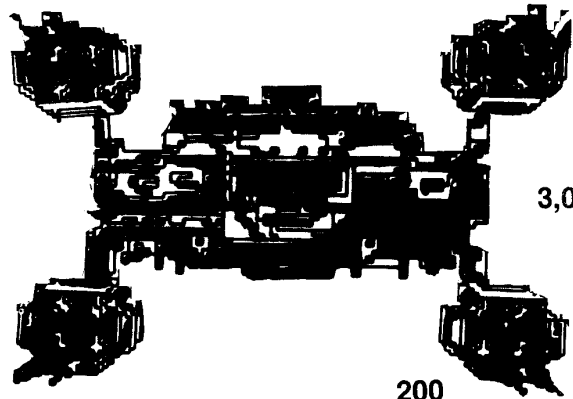
500



200



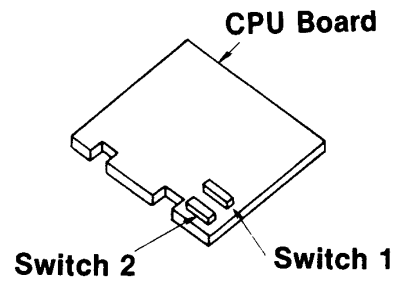
200



3,000

200

## Option Selection



<u>OPTION</u>	<u>SWITCH #1</u>							
	1	2	3	4	5	6	7	8
1 COIN/1 CREDIT	ON	ON	ON	ON	ON	ON	X	X
1 COIN/2 CREDIT	OFF	ON	ON	OFF	ON	ON	X	X
1 COIN/3 CREDIT	ON	OFF	ON	ON	OFF	ON	X	X
1 COIN/6 CREDIT	OFF	OFF	ON	OFF	OFF	ON	X	X
2 COIN/1 CREDIT	ON	ON	OFF	ON	ON	OFF	X	X
3 COIN/1 CREDIT	OFF	ON	OFF	OFF	ON	OFF	X	X
4 COIN/1 CREDIT	ON	OFF	OFF	ON	OFF	OFF	X	X
5 COIN/1 CREDIT	OFF	OFF	OFF	OFF	OFF	OFF	X	X

<u>OPTION</u>	<u>SWITCH #2</u>							
	1	2	3	4	5	6	7	8
COLLISIONS	ON	X	X	X	X	X	X	X
NO COLLISIONS	OFF	X	X	X	X	X	X	X
ACCEL. BY PEDAL	X	ON	X	X	X	X	X	X
ACCEL. BY BUTTON	X	OFF	X	X	X	X	X	X
BEST 5 SCORES ON	X	X	ON	X	X	X	X	X
BEST 5 SCORES OFF	X	X	OFF	X	X	X	X	X
SCORE DISPLAY ON	X	X	X	OFF	X	X	X	X
SCORE DISPLAY OFF	X	X	X	ON	X	X	X	X
DIFFICULT	X	X	X	X	ON	X	X	X
NORMAL	X	X	X	X	OFF	X	X	X
COCKPIT	X	X	X	X	X	X	X	ON
UPRIGHT	X	X	X	X	X	X	X	OFF
3 EXTRA SHIPS	X	X	X	X	X	ON	ON	X
4 EXTRA SHIPS	X	X	X	X	X	OFF	ON	X
5 EXTRA SHIPS	X	X	X	X	X	ON	OFF	X
6 EXTRA SHIPS	X	X	X	X	X	OFF	OFF	X

ON = CLOSED

OFF = OPEN

X = NOT USED

## Theory of Operation

BUCK ROGERS<sup>TM</sup> is a "state-of-the-art" electronic microprocessor based, video game. The result of hundreds of hours of work, design, research, experiment and more work. However, as with any electronic device, component failure or other problems can result in a game that doesn't function properly, or doesn't function at all. In either case, your game is "down", and so critically, are your profits.

Your objective is to fix it as quickly as possible, and logical troubleshooting goes a long way toward that repair. Although many troubleshooting methods may be familiar to you, procedural logic is common among them, and might be stated in this order: visual inspection, symptom recognition, symptom isolation, function isolation, component isolation and repair. Familiarity with the equipment in question will allow you to bypass one or more of these steps, as any particular problem may be obvious to you, or may have happened before. In general though, these 6 steps form a good premise upon which to approach your "down" game.

An extremely important item in our procedure is the first mentioned, giving the gear the "once over". A large percentage of failures found in electronics, show themselves visually and often a great deal of time can be saved by inspecting for burnt or blown components, loose or disconnected wiring or connectors, or PCB traces burnt or pulled up. Thorough visual inspections become increasingly important the closer you get to the faulty item, and should be repeated each time another portion of the game is eliminated. Symptom recognition (as with all electronic troubleshooting) in your BUCK ROGERS depends first, on knowing what a proper display is, and second, knowing how your display differs from a normal one. Symptom isolation follows naturally; (i.e., "I have no picture", "I have no sound", "I have no control over the ship", "the picture is scrambled"), ergo, a video, audio, input or logic problem. Function isolation, such as a sync problem with the video, requires that you consider those functions that go to make up video sync. Is it a monitor problem, or an "on-the-board" problem? A monitor input check to verify the signal will tell you. Does the board have the voltage (from the power supply) that it needs? Yes? We must have a board failure, as we've just isolated down to function. Taking our sync problem further, before we begin our search for an individual component, let's reapply that first item in

our "Logical Troubleshooting Procedure". Look at the board. Open resistors, diodes, and capacitors often give themselves away.

Noticing a trace literally burned open can save you serious "down-time". The board looks OK, so on we go. Specific component isolation relates to the specific nature of the failure, component commonality, proper inputting (both signal and power) and proper outputting (as in the case of an output held high, low, or floating by input port failure in the succeeding state). More general problems (such as a total loss of video sync) requires the more involved procedure of systematic elimination of possibilities. This operation can be expedited however, by dividing the circuit in half, establishing a "go-no/go" at that point, and again dividing the suspect circuit portion in half. The largest possible areas can be eliminated in this manner, dividing and subdividing until the individual component failure is found.

BUCK ROGERS<sup>TM</sup> is a microprocessor based, digital-integrated circuit computer video game. The heart of the computer is the CPU (IC13, Zone 8-D, Sht. 1, CPU Bd., 834-5120), a Z80A (P/N 315-0041). The Alpha type device MUST ALWAYS be used, as the Z80 is not fast enough to run the programs.

Master timing is crystal-driven at 20.00 MHz (X1, Zone 8-A, Sht. 1, CPU Bd., 834-5120) through IC34, 28, and 35. CPU timing is taken from IC34 p-7, applied to IC35 p-2 (Zone 8-B, Sht. 1, CPU Bd., 834-5120) clocked out of IC35 at p-13, inverted by IC28 (Zone 8-C, Sht. 1, CPU Bd., 834-5120) and finally applied to pin-6 of the CPU (IC13). Additionally, IC13 provides 5 MHz and 10 MHz for video timing and character generation, as well as processed interrupts and timing for the Select Address processor IC50 (Zone 8-D, Sht. 5, CPU Bd., 834-5120).

Manual system reset (Power-On) appears as a LO at IC16 p-4 (Zone 8-D, Sht. 1, CPU Bd., 834-5120) and is then felt at pin-26 of the CPU (IC13, Sht. 1, Zone 8-D, CPU Bd., 834-2150). Normal program interrupts (INT) are felt at pin-16 of the Z80A (an edge-triggered LO), and are the result of Input/Output activity timing with vertical blanking (an approx. 2 msec. instruction interrupt). The WAIT signal is used to synchronize that I/O activity during an interrupt to the CPU. IC1 and 2 (Zone 6-D, Sht. 1, CPU Bd., 834-5120) are address bus drivers. Two of the sixteen address lines pass through IC30 (Zone 6-D, Sht. 1, CPU Bd., 834-5120) and subsequently drive the Chip Enable inputs of EPROM IC's 3, 4, 15 and RAM IC 14 (Sht. 1, CPU Bd., 834-5120). IC's 113, 114, 121 and 122 (Sht. 4, CPU Bd., 834-5120) are input ports on the data bus. The 44-pin flat connector supplies player input information, service switch,

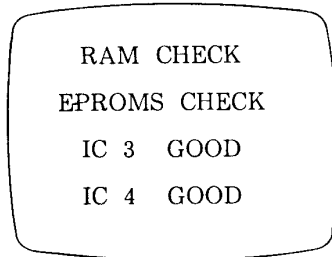
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game start and coinage to the input ports. IC119 and 121 input Coin B, and IC120 and 121 input Coin A, together with Game Start, Self-Test, Up/Down and Acceleration to I/O processor IC106 (Zone 4-D, Sht. 4, CPU Bd., 834-5120). IC111, 112 and 114 accesses/buffers Player Left/Right data, IC111 and 113 interfaces Fire data, and Option Selection is shared by all 4 74LS244's. Located in the Volume Control Block is the Self-Test switch. When closed, it applies a LO to IC119 p-6 (Zone 7-C, Sht. 4, CPU Bd., 834-5120) initiating a systems/function verification outlined on the following page:

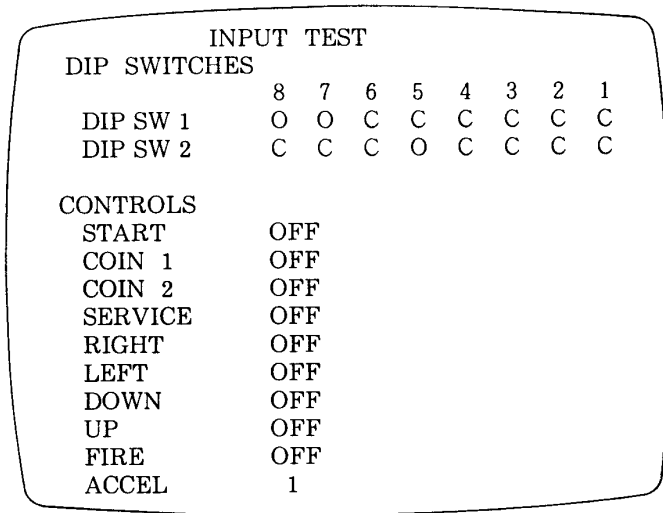
## Self-Test

BUCK ROGERS™ is equipped with a diagnostics sequence that is initiated by pressing the Self-Test button located on the Volume Control Block Assembly. The test appears in the following order, with each major category ending with the press of the Self-Test button:

1.

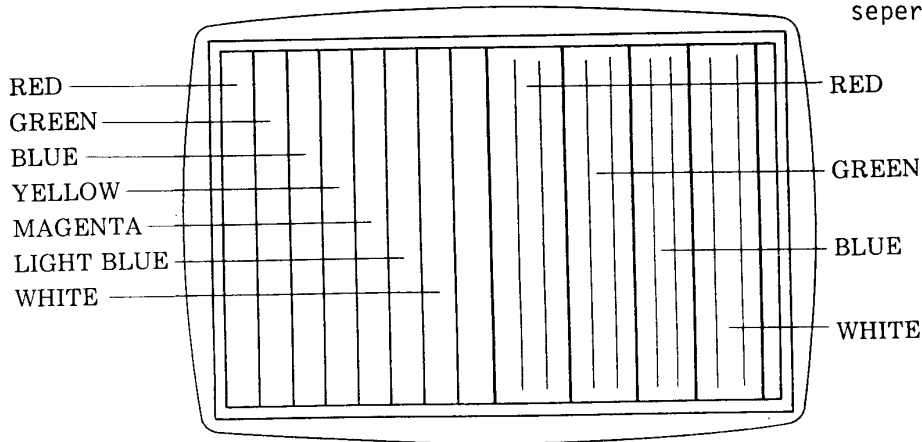


2.



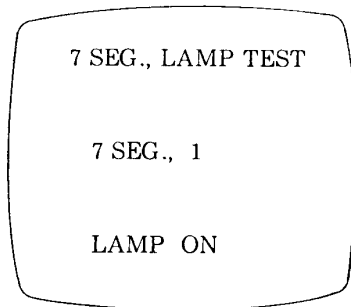
- Switch condition (ON or OFF) is verified by actuation.

3.



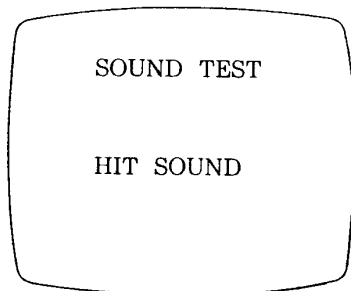
- Color tracking and separation

4.



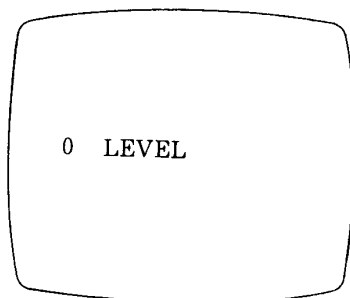
- START button sequences LED numerical read-out 0 - 9

5.



- FIRE button initiates each sound audibly.
- START button sequences each sound in turn.

6. Character ROM Test

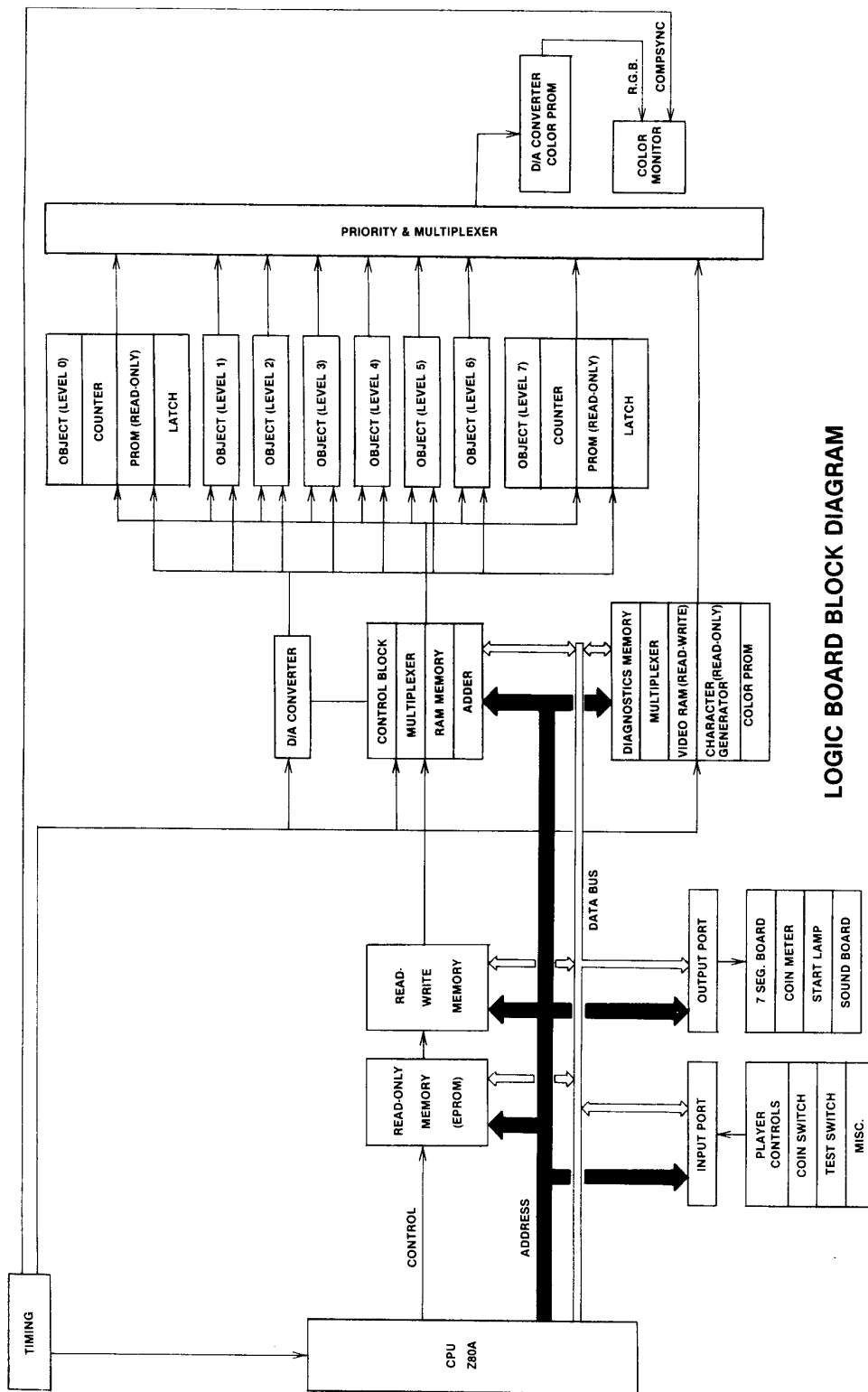


- Video display of character memory by Object Level.
- START button sequences Object Levels 0 through 7.

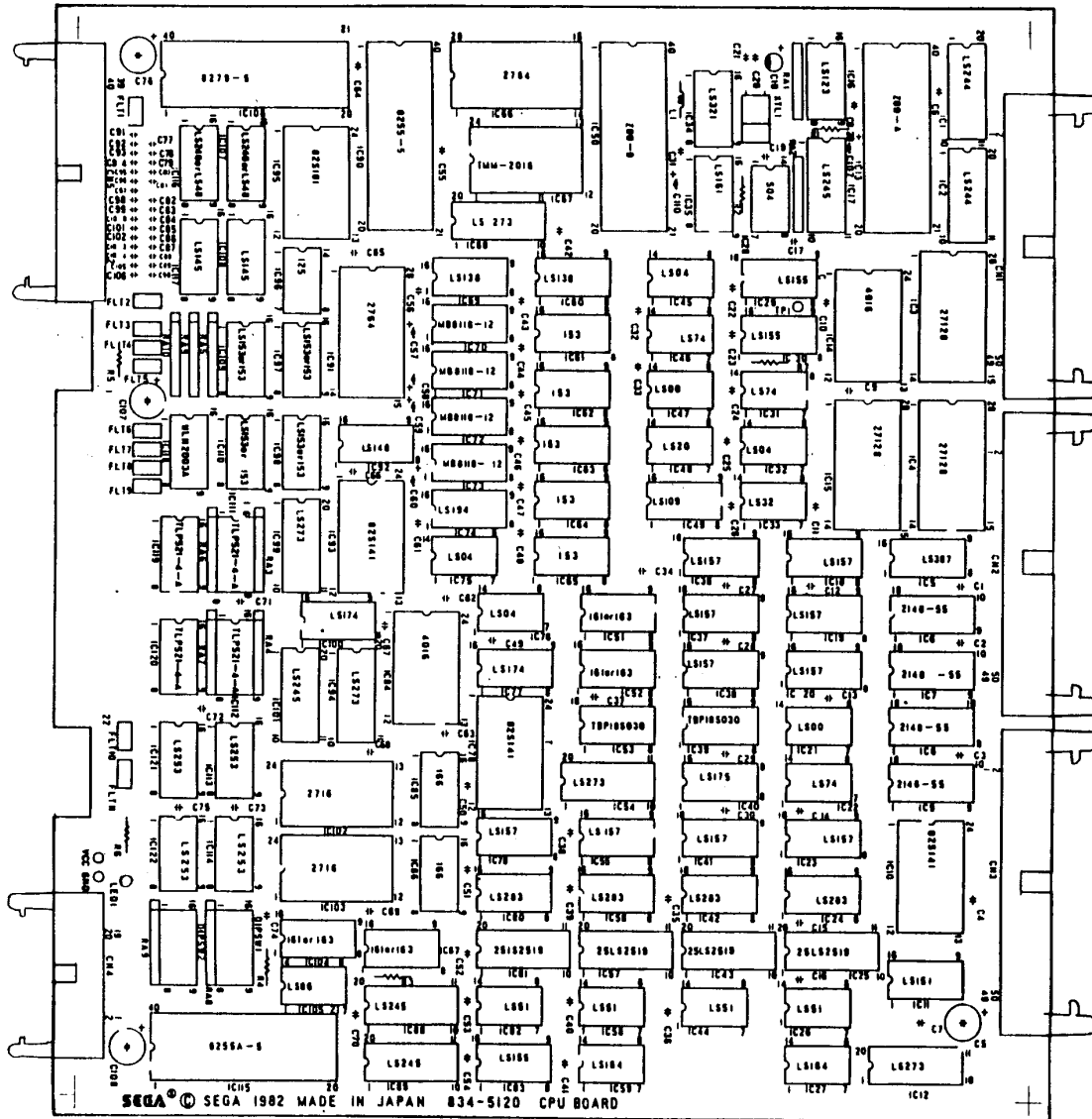
Due to the striking graphics employed in BUCK ROGERS™, memory requirements for background generation are significant. On the EPROM Bd. (834-5121) there are sixteen (16) 27128-3 16K X 8 EPROMs that hold video character, positioning, color and timing information. Background generation accessible memory (RAM) is provided by TTL IC14 and IC84 (Zone 2-D and 4-B respectively, Sht. 1, on the CPU Bd., 834-5120), in addition to IC's 6-9 on Sht. 3 of the CPU (834-5120). Back on the EPROM Board, program storage is organized into eight (8) levels of multiplexed data for troubleshooting efficiency (Sheets 3 through 10, EPROM Bd., 823-5121), with final pre-CPU input "mux" occurring on Sht. 2, EPROM Bd., 834-5121. Armed with program data and input port data, the CPU can then integrate timing and sync (Sht. 2, CPU Bd., 834-5120) with color requirements (Sht. 6, CPU Bd., 834-5120) to produce complete color video at the Output Ports consisting of IC's 97, 98, 109 and 110 (Sht. 6. CPU Bd., 834-5120).

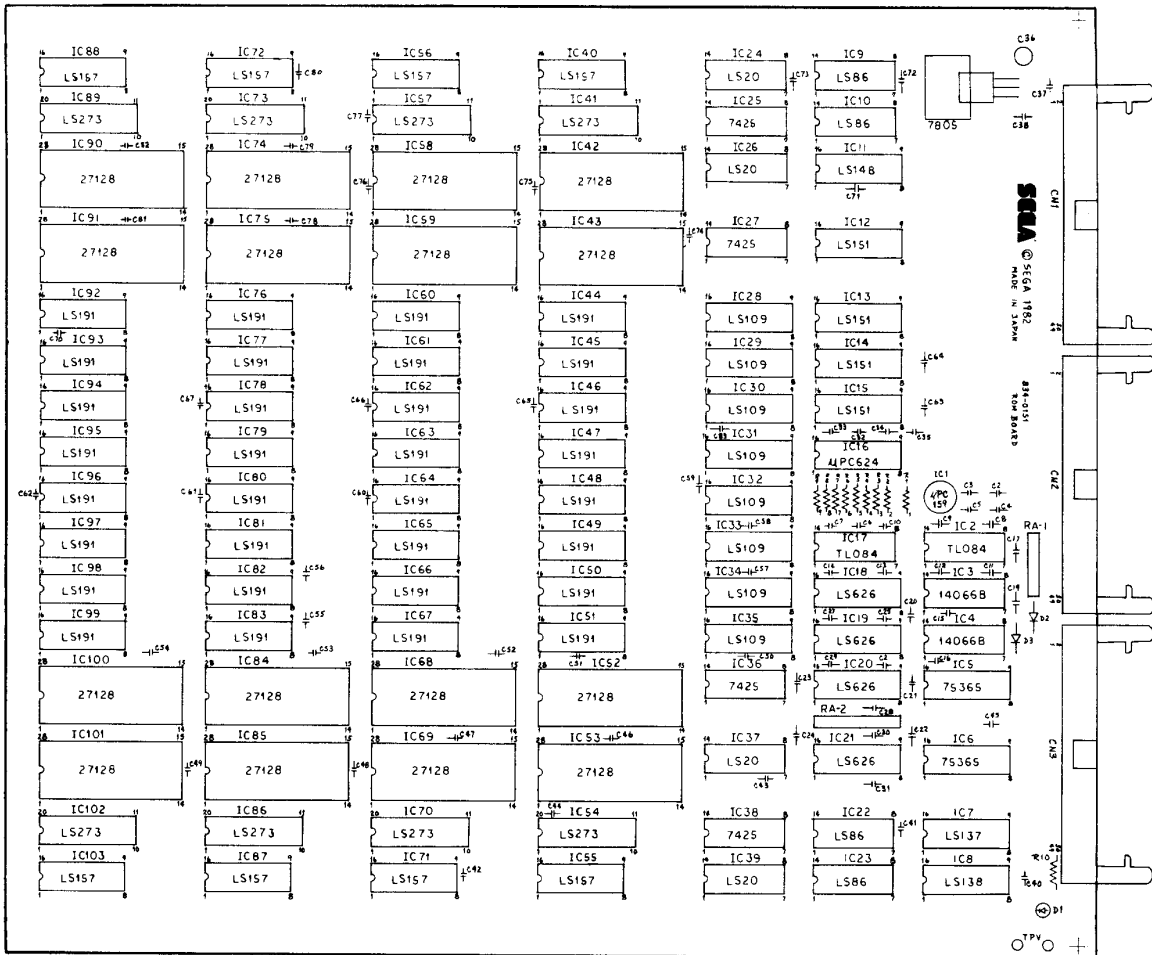
Just as the microprocessor Z80A is the heart of the game computer, so too is the 8255A-5 (IC113, Zone 2-D, Sht. 4, CPU Bd., 834-5120) the center of activity for Sound. Called a Sound Generator, IC113 interfaces data and address bus, as well as the noise generators on the Sound Bd. (834-5122), through the 20 pin flat cable, enabling specific sounds processing circuits. These circuits consist of individual sounds for Player ship flying sounds, rebound, explosion, laser and alarm. Those complete sounds not originating within the 8255A-5 are enabled by the Sound Generator through the noise generators on the Sound Bd. IC28 and VR1 (Volume Control, Sht. 1, Zone 6-A, Sound Bd.) set input biasing for the Audio Amplifier LA446 at an 8 ohm load.





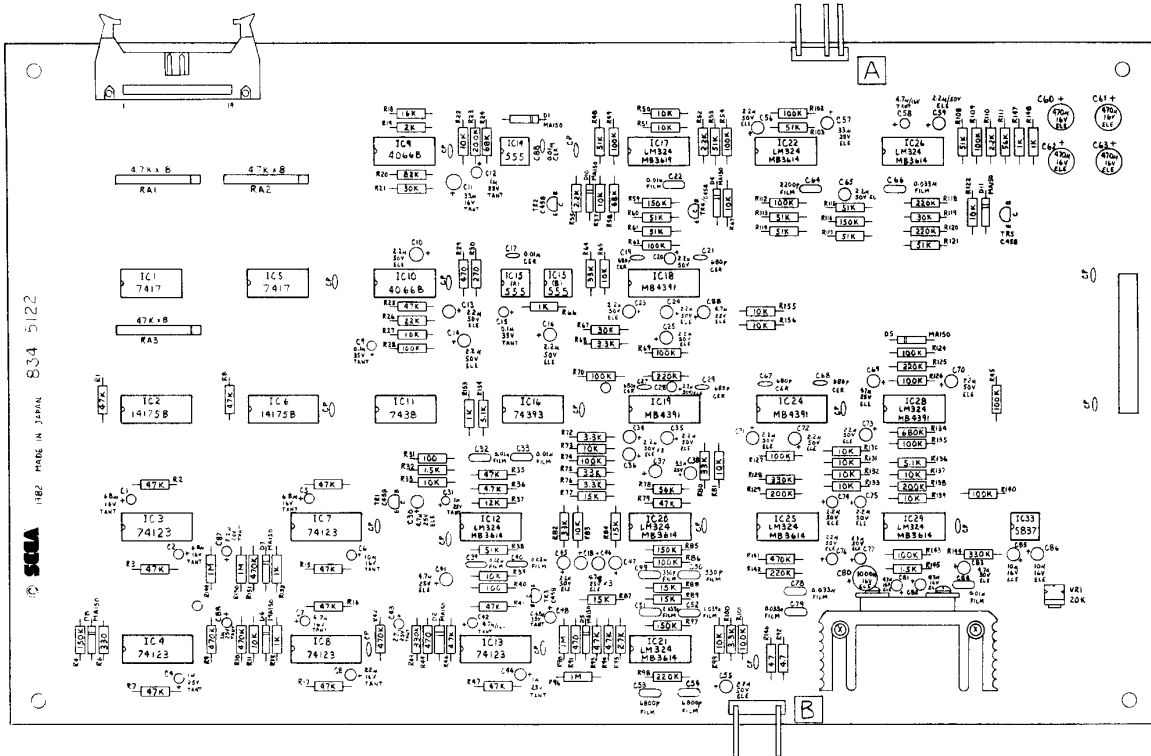
LOGIC BOARD BLOCK DIAGRAM

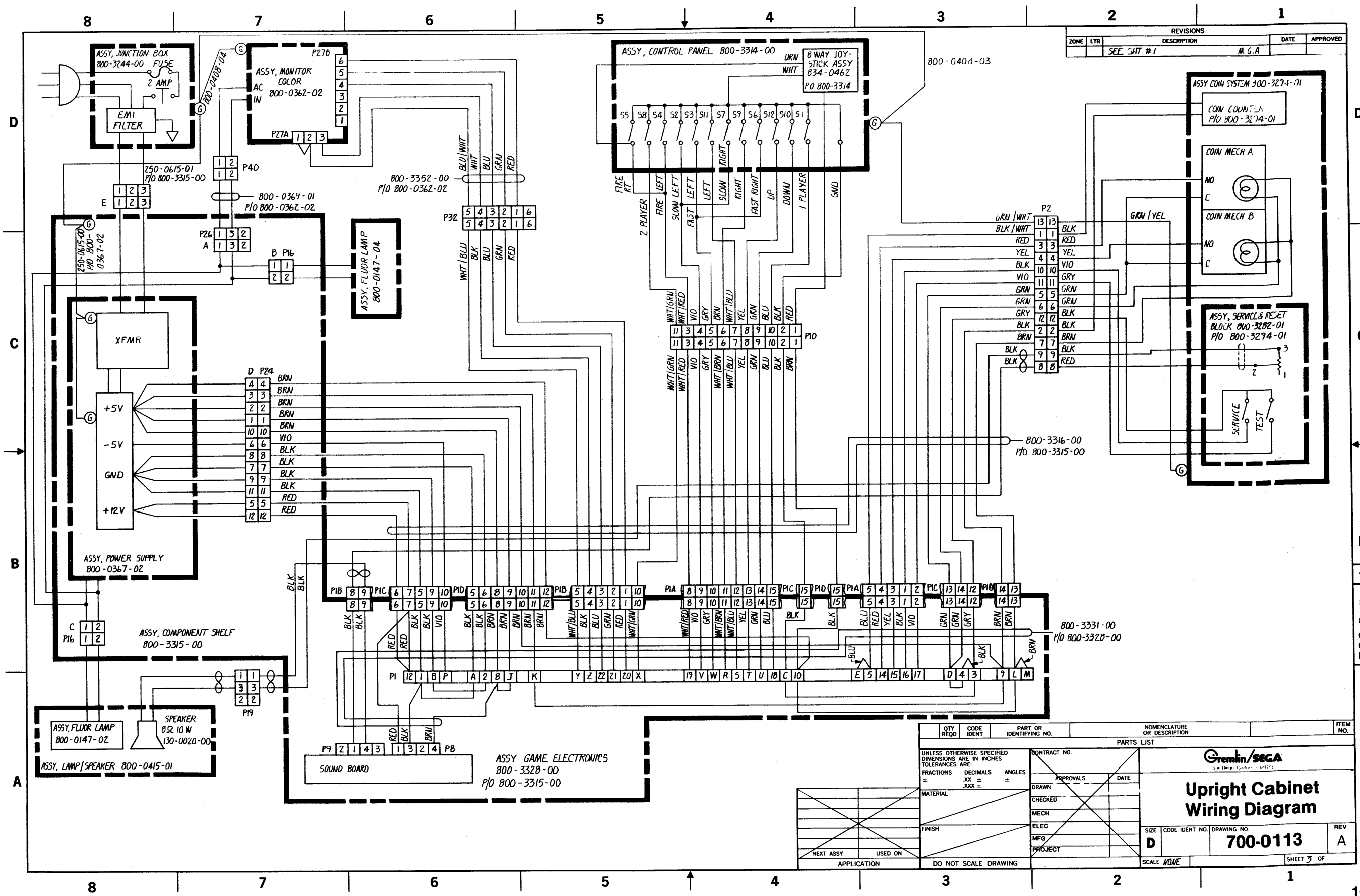




# Sound Board Assembly

834-5122



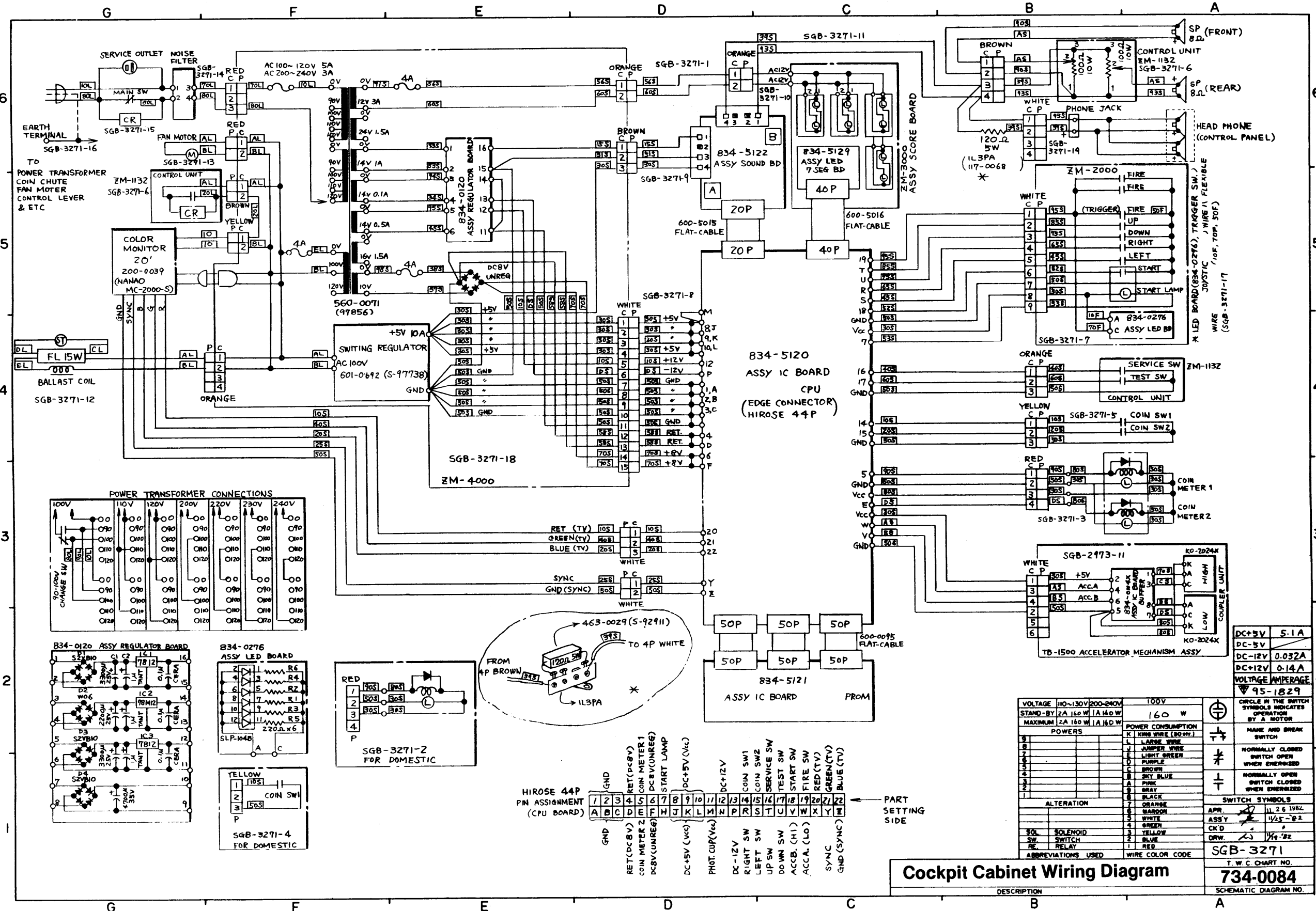


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	-	SEE SH#1	M.G.A	

P2	
GRN / WHT	13 13
BLK / WHT	1 1
RED	3 3
YEL	4 4
BLK	10 10
VIO	11 11
GRN	5 5
GRN	6 6
GRY	12 12
BLK	2 2
BRN	7 7
BLK	9 9
BLK	8 8

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
<h3>Upright Cabinet Wiring Diagram</h3>				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .005 ± .001 ± .001 ±		CONTRACT NO. _____ APPROVALS _____ DATE _____ DRAWN _____ CHECKED _____ MECH _____ ELEC _____ MFG _____ PROJECT _____		
MATERIAL _____ FINISH _____		SIZE CODE IDENT NO. DRAWING NO. REV <b>D 700-0113 A</b>		
NEXT ASSY _____ USED ON _____ APPLICATION _____		SCALE NONE SHEET 3 OF _____		

700-0113



HIROSE 44P PIN ASSIGNMENT (CPU BOARD)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
GND	RET(DC8V)	COIN METER 1	COIN METER 2	DC8V(UNREG)	DC+5V (Vcc)	PHOT.CUP(Vcc)	DC+12V	RIGHT SW	LEFT SW	UP SW	DOWN SW	START SW	ACC.A. (LO)	ACC.A. (HI)	FIRE SW	RED(TV)	GREEN(TV)	BLUE(TV)	SYNC	GND(SYNC)	

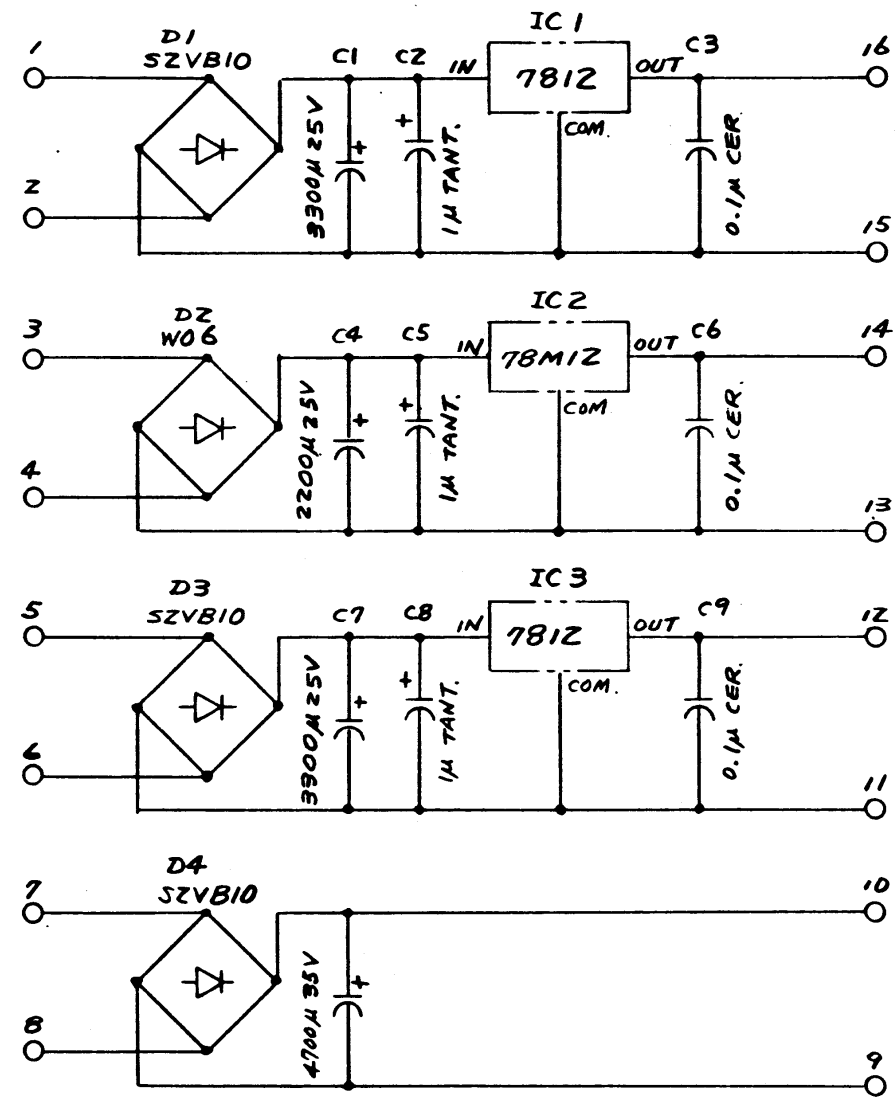
VOLTAGE	110-130V	200-240V	100V	
STAND-BY	2A	1.6A	1A	1.6A
MAXIMUM	2A	1.6A	1A	1.6A
POWER CONSUMPTION	160 W			
POWERS	K (KING WIRE (20WT.))			
1	L	JUMPER WIRE		
2	L	LIGHT GREEN		
3	P	PURPLE		
4	P	PINK		
5	S	SKY BLUE		
6	A	PINK		
7	B	GRAY		
8	B	BLACK		
9	O	ORANGE		
10	W	WANDON		
11	W	WHITE		
12	G	GREEN		
13	Y	YELLOW		
14	B	BLUE		
15	R	RELAY		
16	R	RED		
ABBREVIATIONS USED	WIRE COLOR CODE			

**Cockpit Cabinet Wiring Diagram**

T. W. C. CHART NO.  
**734-0084**  
SCHEMATIC DIAGRAM NO.

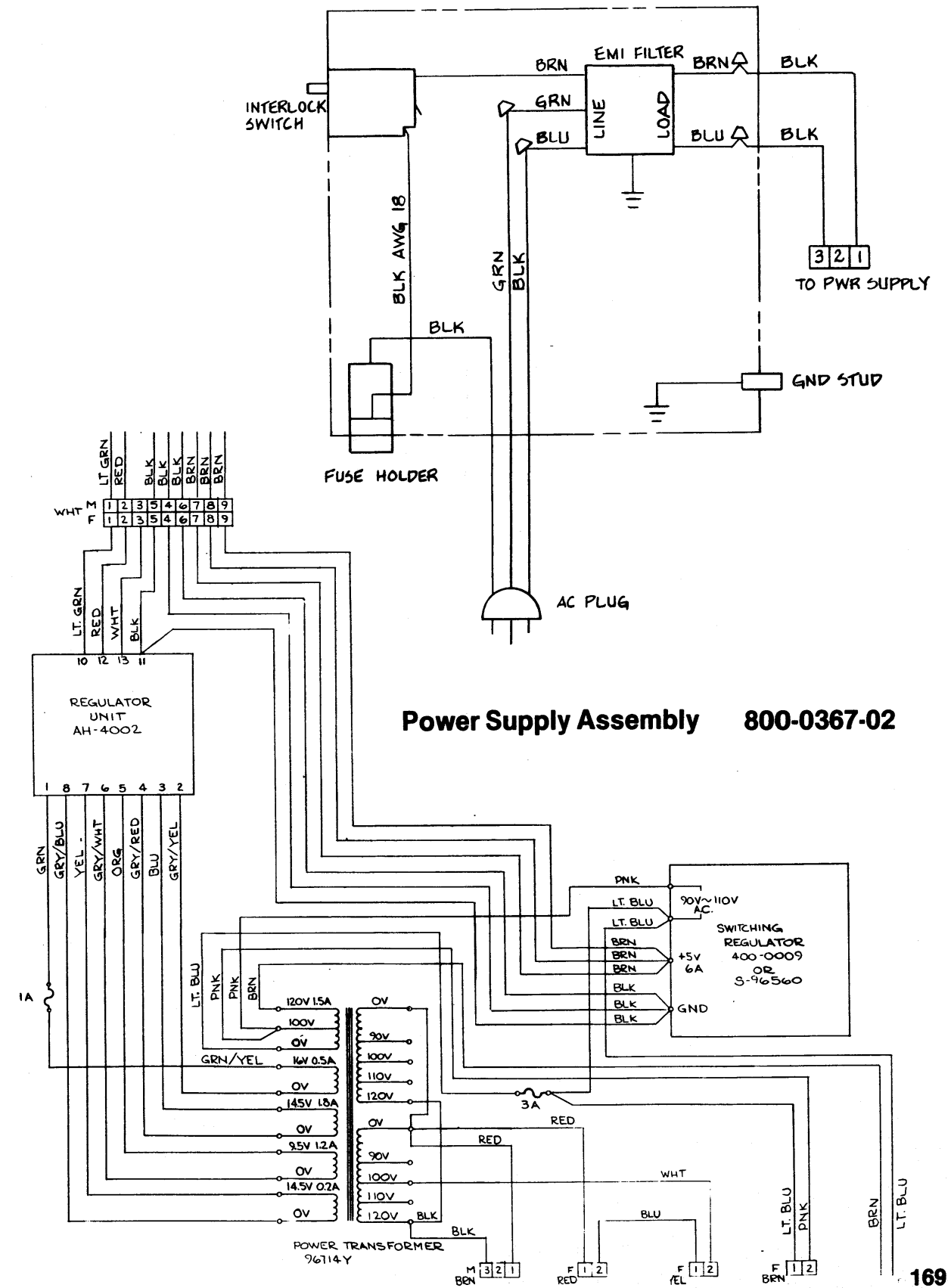
Regulator Board Assembly

834-0120



AC Junction Box Assembly

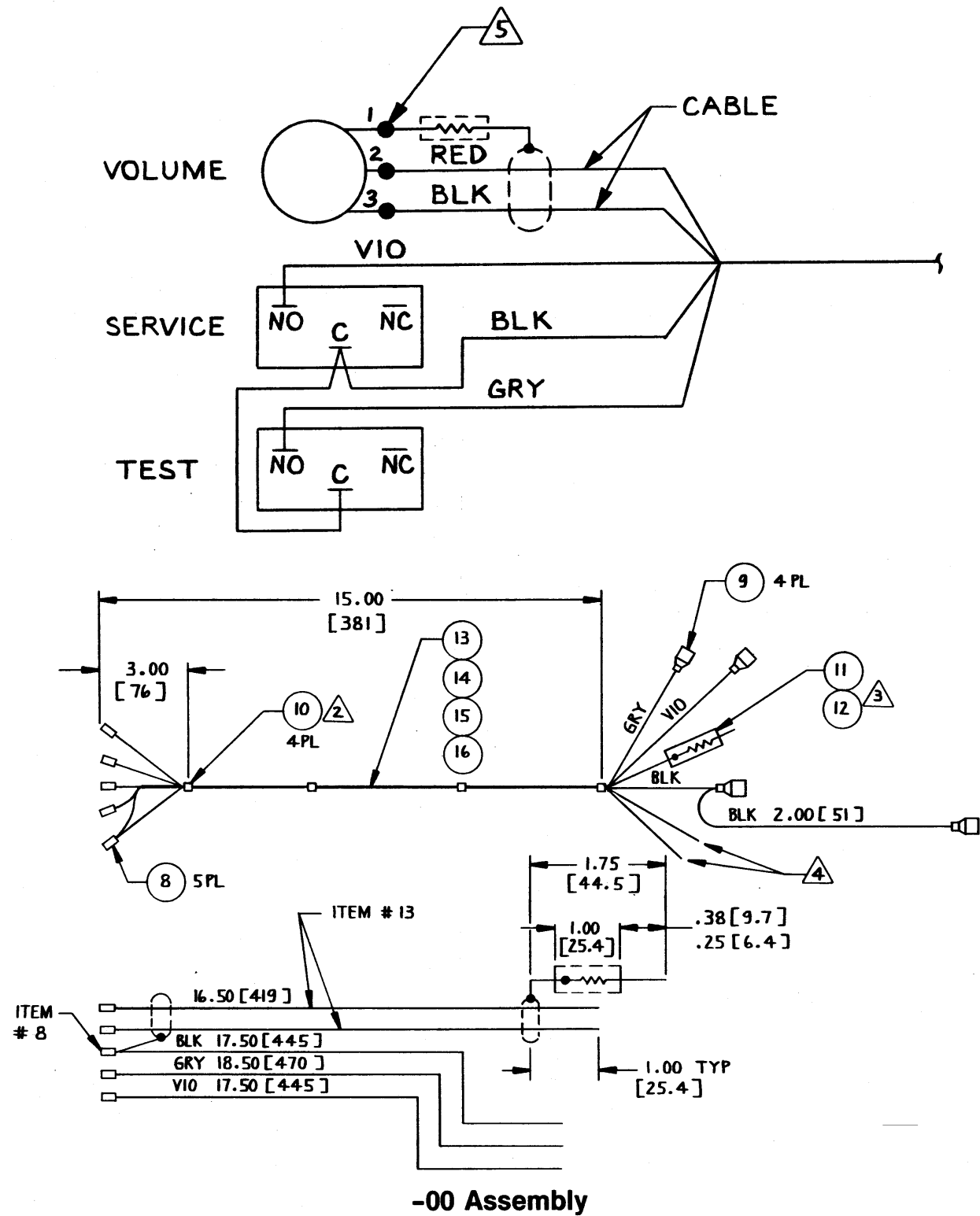
800-3244



Power Supply Assembly 800-0367-02

Volume Control Block Assembly

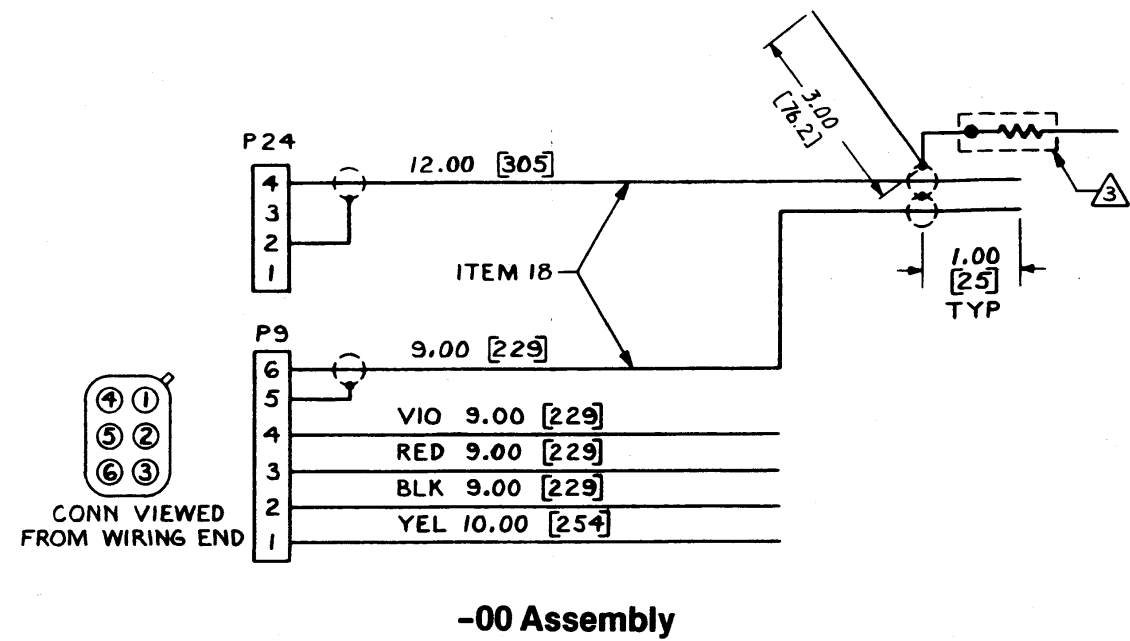
800-3282



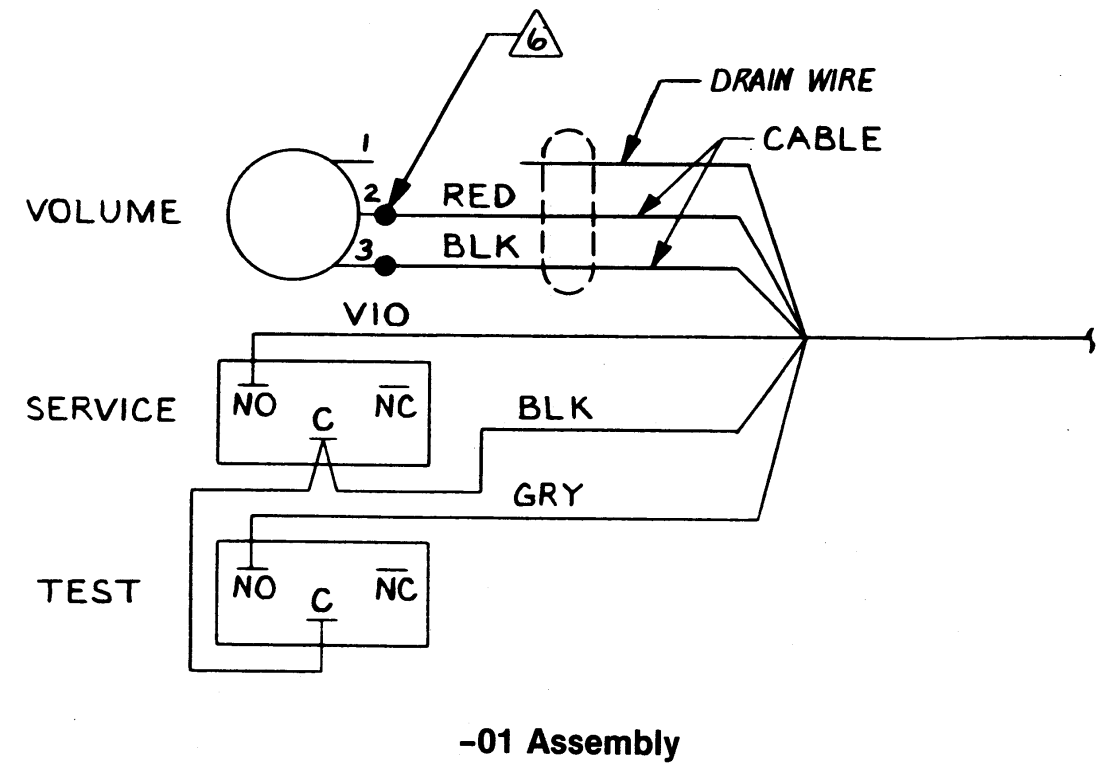
-00 Assembly

Volume Control Block Assembly

800-3282



-00 Assembly

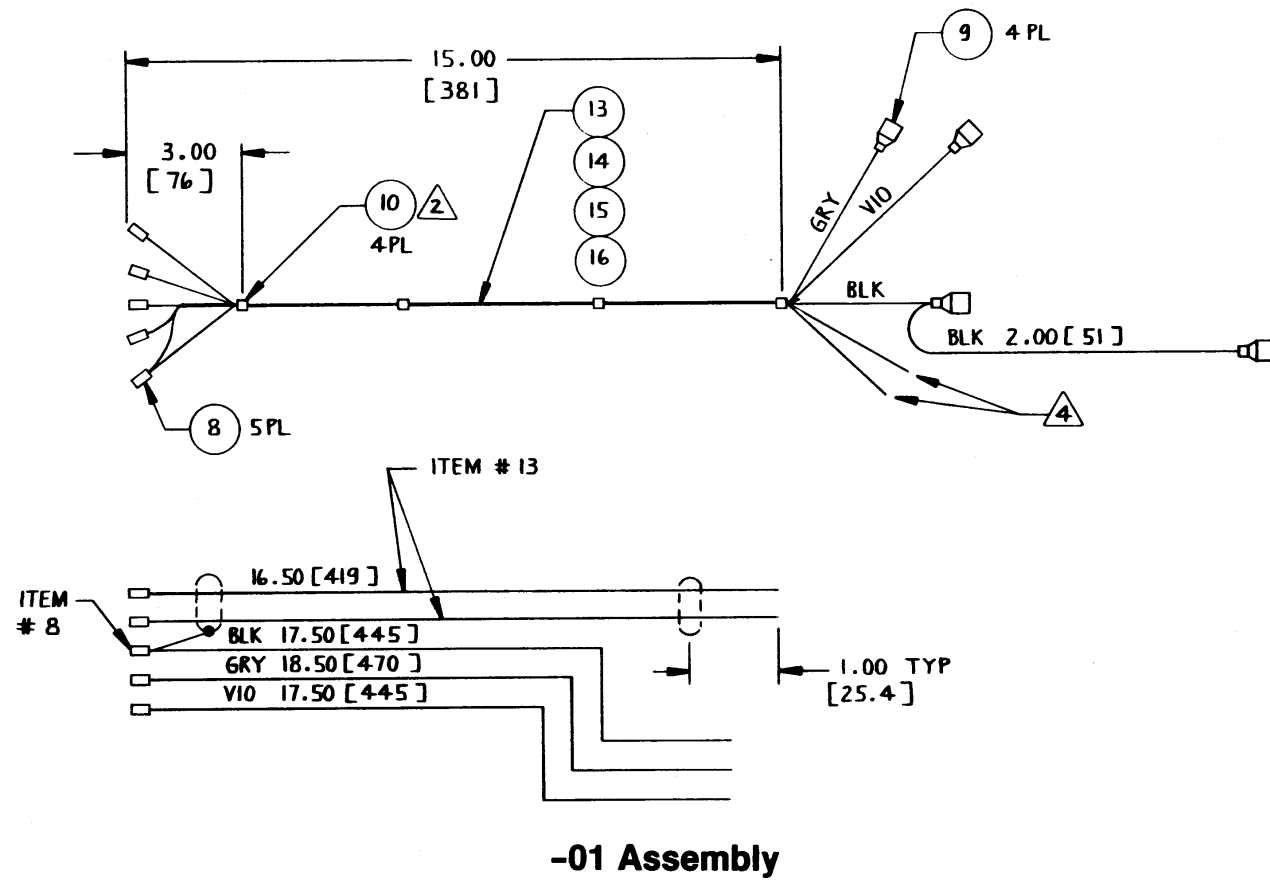


-01 Assembly



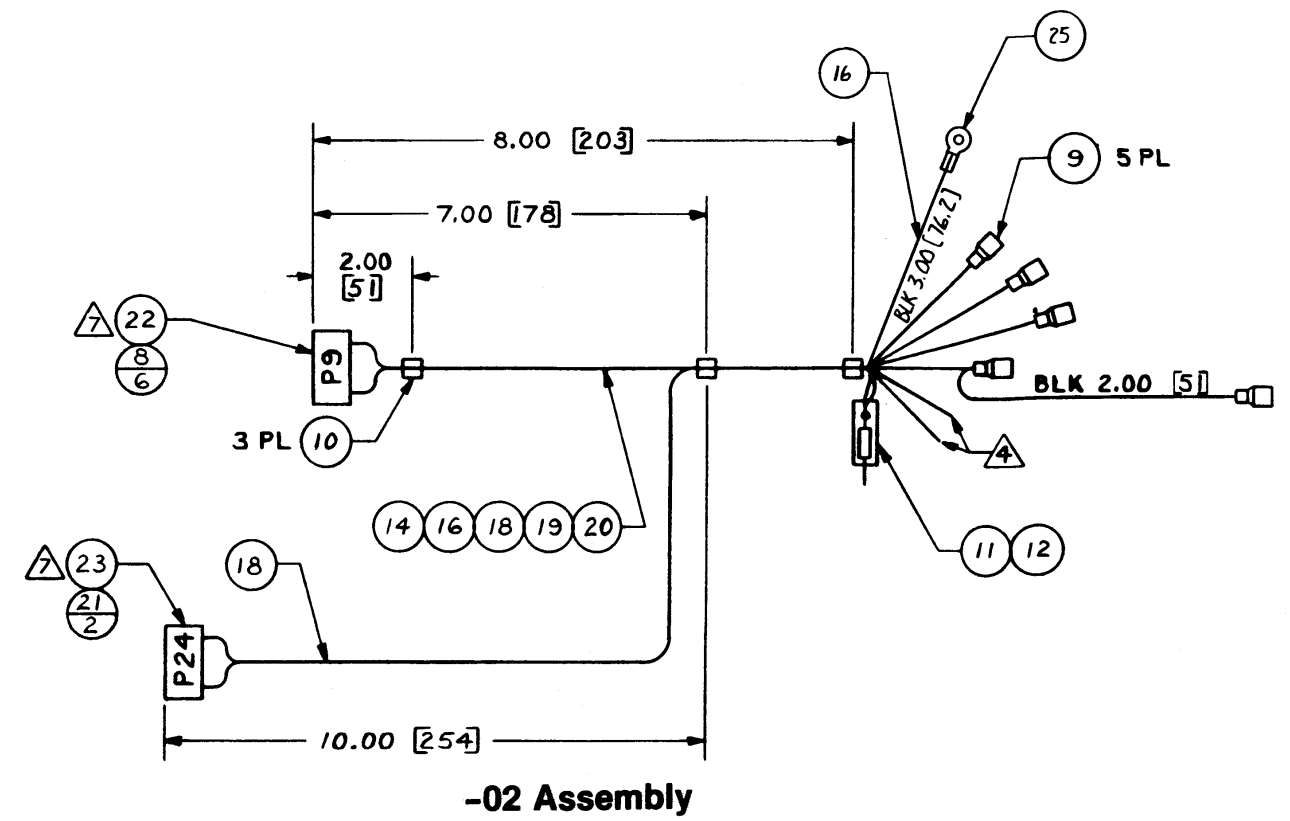
**Volume Control Block Assembly**

800-3282



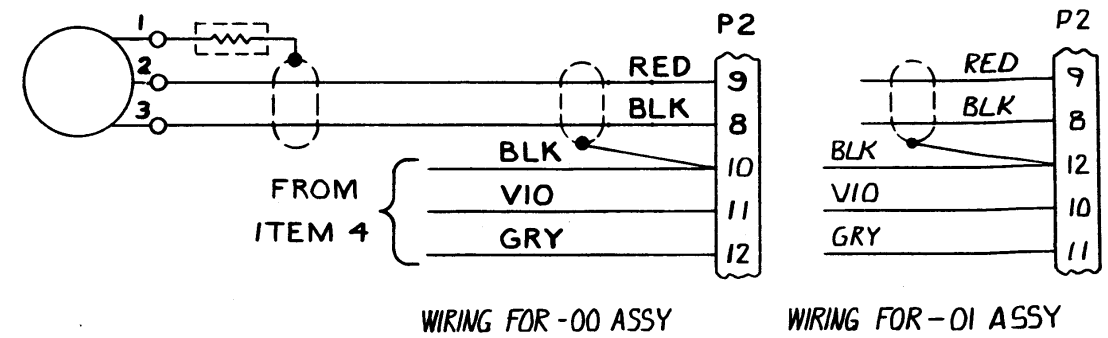
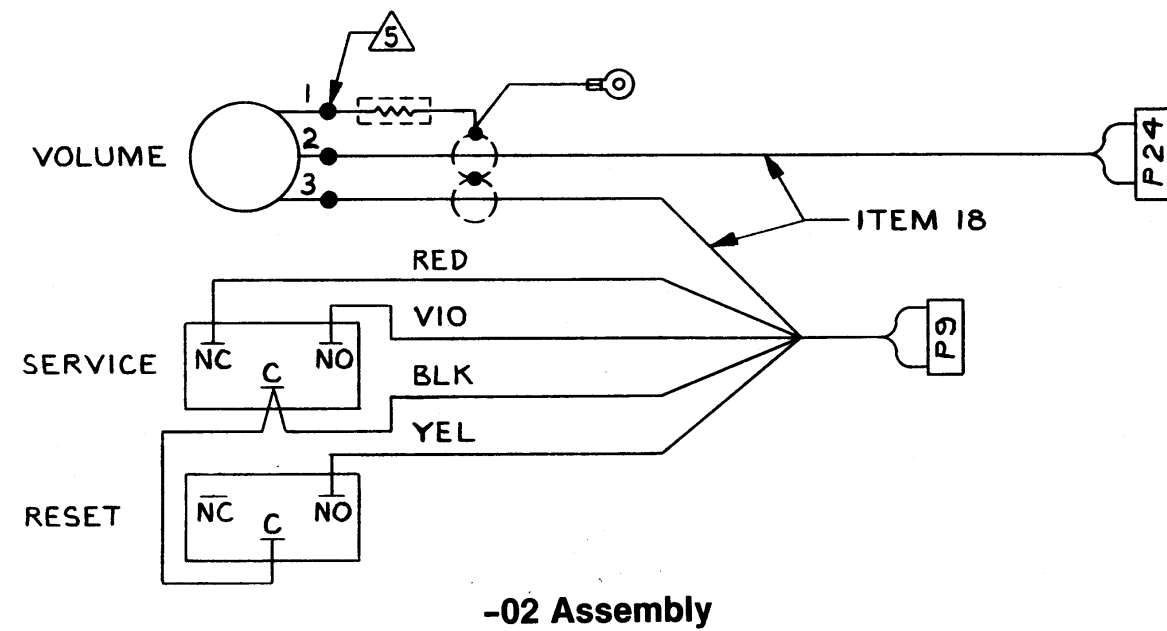
**Volume Control Block Assembly**

800-3282



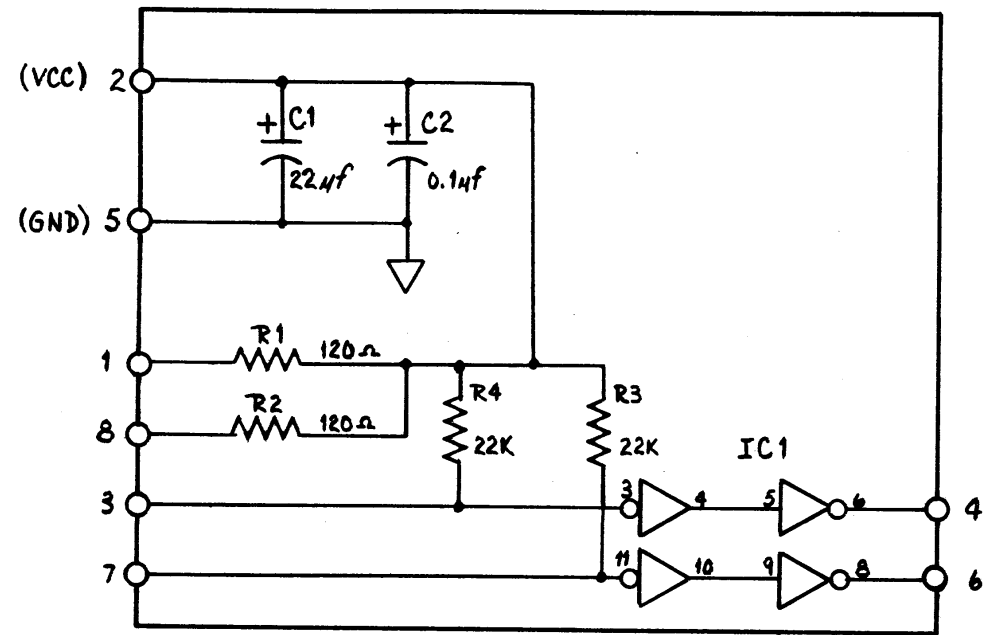
**Coin System Assembly**

800-3294-01



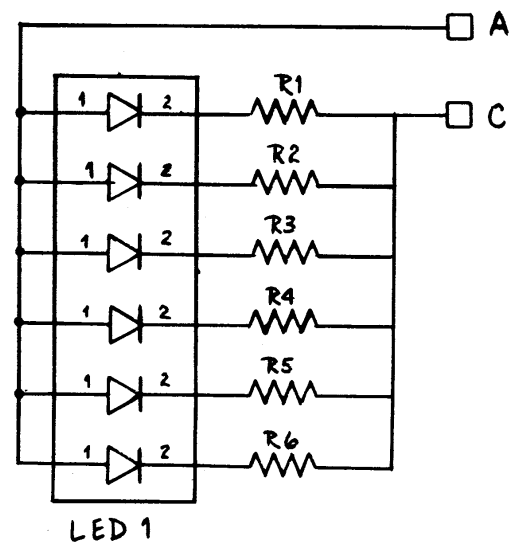
IC Buffer Board Assembly

834-0104



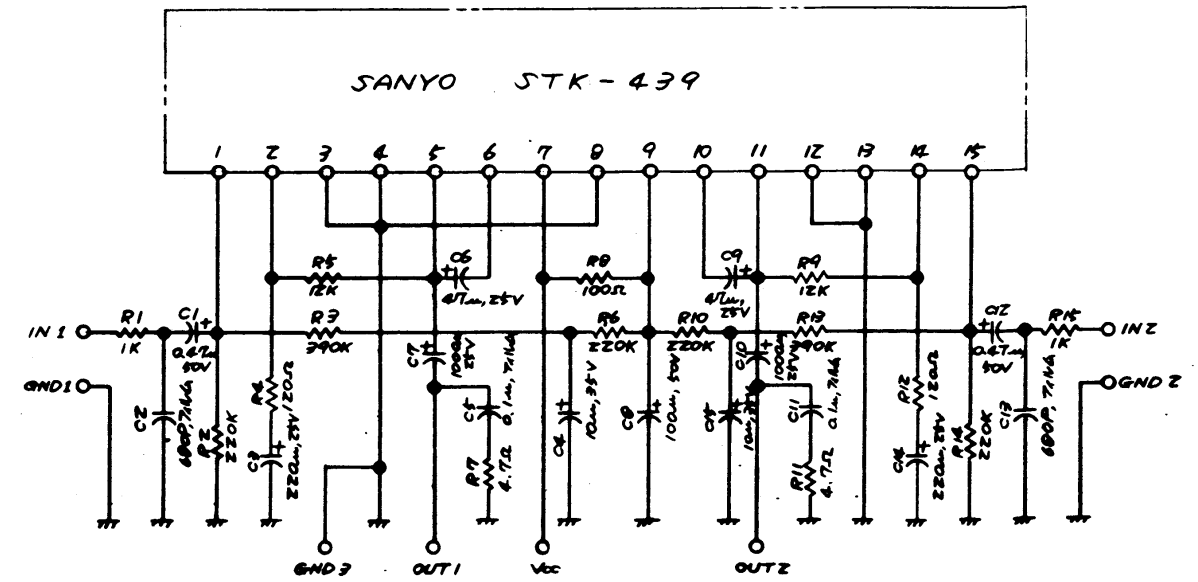
LED Board Assembly

834-0276



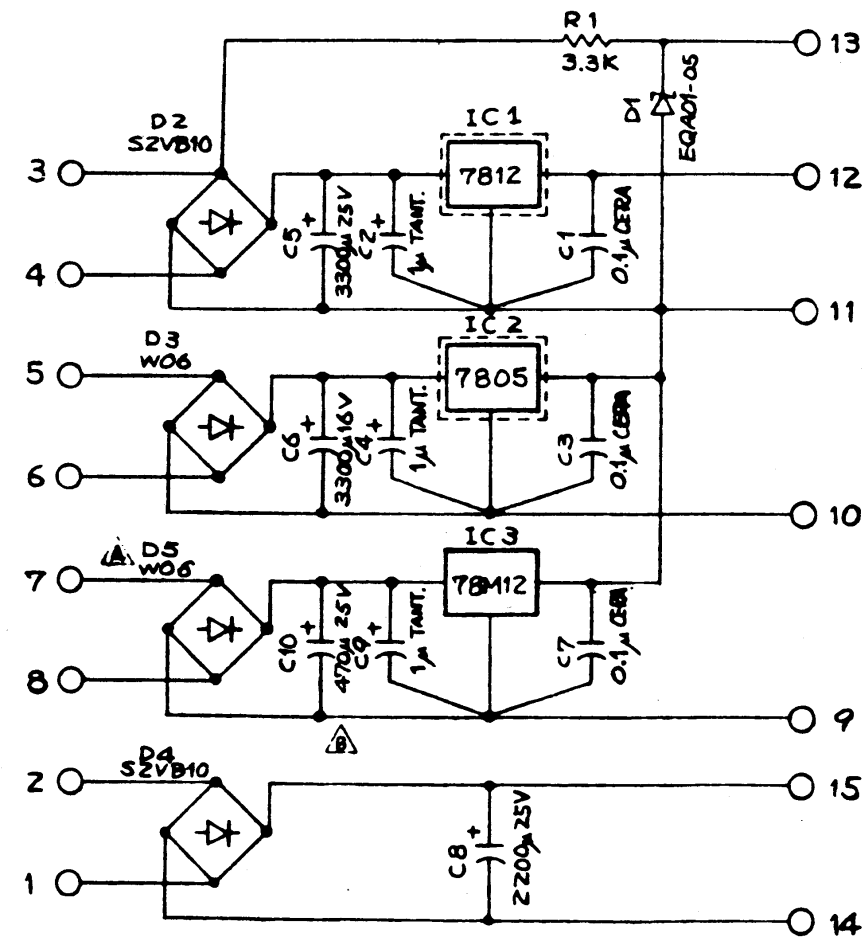
Power Amp Assembly

834-0121

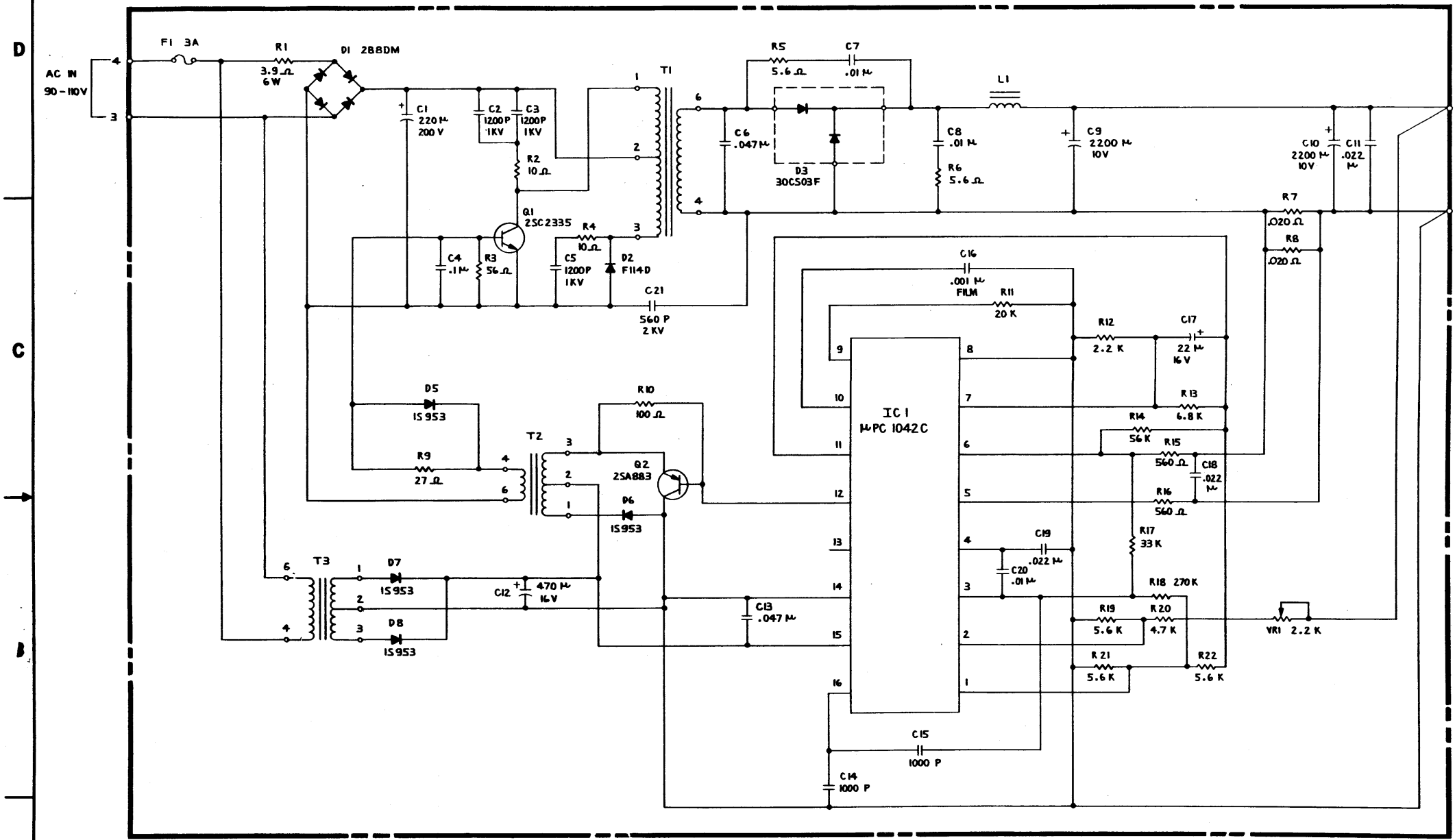


Regulator Unit

601-0612



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		8-17-81	<i>Robert</i>



NOTES:  
1. R7, R8 AS REQUIRED OTHERWISE USE JUMPER WIRE.

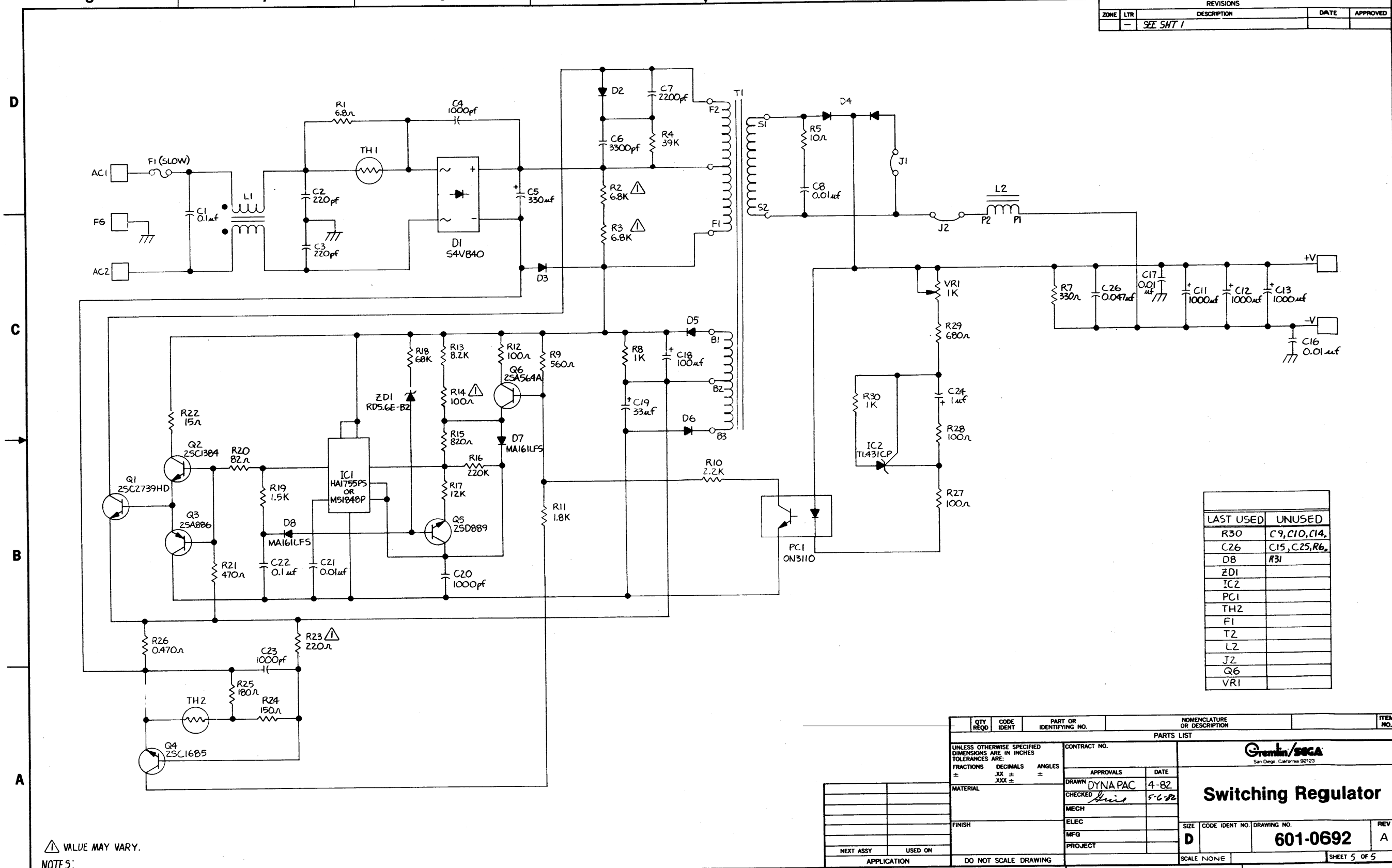
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS ±	DECIMALS .XX ±	ANGLES ° ±	APPROVALS	DATE
	.XXX ±		DRAWN <i>SJM</i>	8-17-81
MATERIAL			CHECKED <i>G. GRICE</i>	8-17-81
FINISH			ELEC	
NEXT ASSY	USED ON		MFG	
APPLICATION		DO NOT SCALE DRAWING	PROJECT	

<b>Green/SOCA</b> San Diego, California 92123	
<b>Switching Regulator</b>	
SIZE <b>D</b>	CODE IDENT NO. DRAWING NO. <b>601-0158</b>
SCALE NONE	REV <b>A</b>
SHEET 1 OF 1	

601-0158 A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	-	SEE SHT 1		



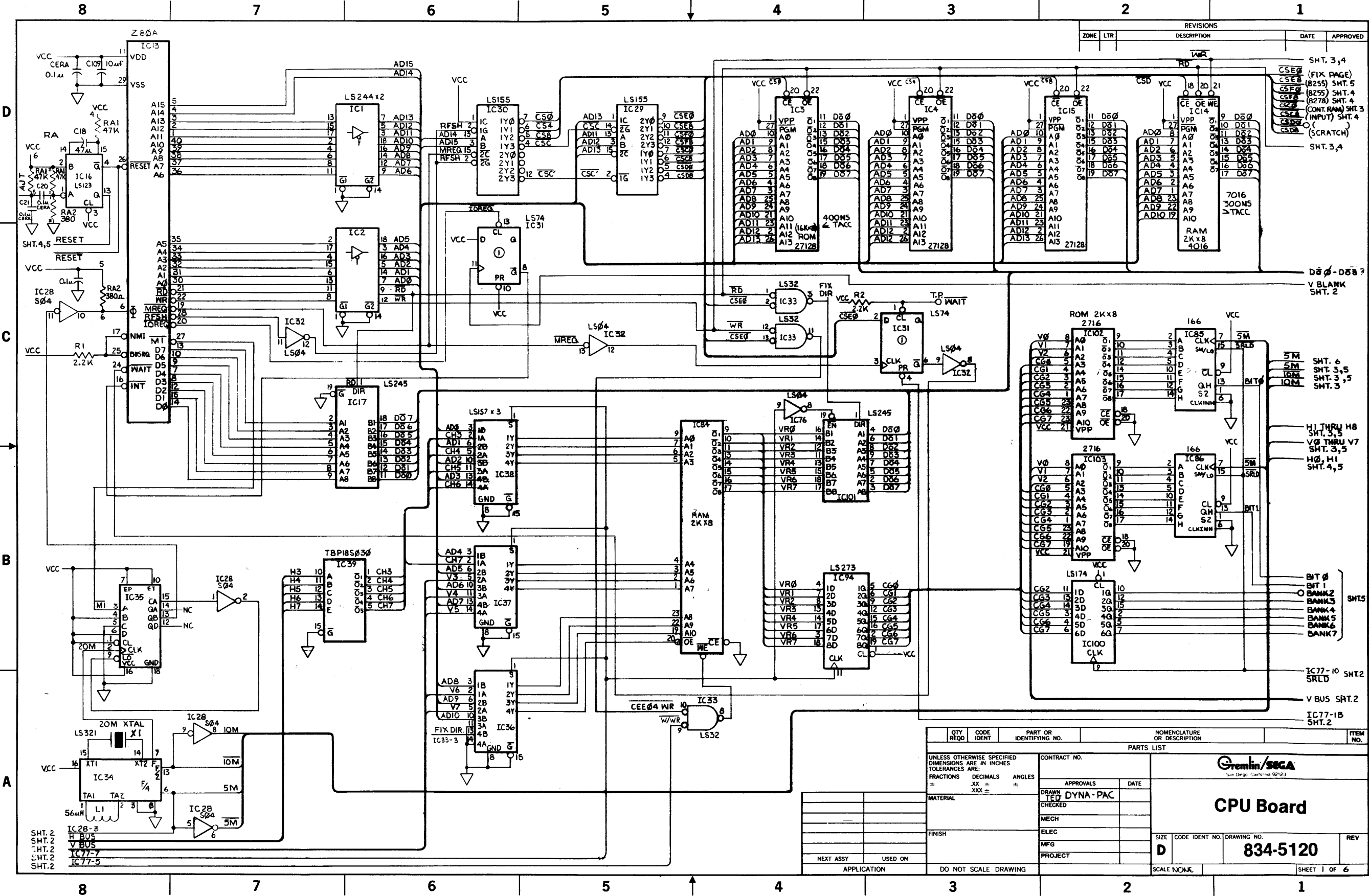
LAST USED	UNUSED
R30	C9, C10, C14,
C26	C15, C25, R6,
D8	R31
ZD1	
IC2	
PC1	
TH2	
F1	
T2	
L2	
J2	
Q6	
VR1	

NOTES:  
 △ VALUE MAY VARY.

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ±				
CONTRACT NO.		Grenin/seca San Diego, California 92123		
APPROVALS		DATE		
DRAWN DYNA PAC		4-82		
CHECKED <i>[Signature]</i>		5-6-82		
MECH				
ELEC				
MFG				
PROJECT				
SCALE NONE		SHEET 5 OF 5		

### Switching Regulator

601-0692



ZONE	LTR	DESCRIPTION	DATE	APPROVED

- REVISIONS
- REVISIONS
- SHT. 3,4  
(FIX PAGE)  
(8255) SHT. 5  
(8255) SHT. 4  
(CONT. RAM) SHT. 3  
(INPUT) SHT. 4  
(SCRATCH)  
SHT. 3,4
- D $\phi$  - D $\phi$  3  
V BLANK SHT. 2
- 5M SHT. 6  
5M SHT. 3,5  
5M SHT. 3,5  
5M SHT. 3,5
- H1 THRU H8 SHT. 3,5  
V $\phi$  THRU V7 SHT. 3,5  
H $\phi$ , H1 SHT. 4,5
- BIT 0 SHT. 1  
BIT 1 SHT. 1  
BIT 2 SHT. 1  
BIT 3 SHT. 1  
BIT 4 SHT. 1  
BIT 5 SHT. 1  
BIT 6 SHT. 1  
BIT 7 SHT. 1
- IC77-10 SHT. 2  
SRLD  
V BUS SHT. 2  
IC77-1B SHT. 2
- IC28-3 SHT. 2  
H BUS SHT. 2  
V BUS SHT. 2  
IC77-7 SHT. 2  
IC77-5 SHT. 2

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCES ARE:  
FRACTIONS DECIMALS ANGLES  
 $\pm$  .XX  $\pm$   $\pm$   
MATERIAL

CONTRACT NO.

APPROVALS DATE

DRAWN BY DYNA-PAC

CHECKED

MECH

ELEC

MFG

PROJECT

DO NOT SCALE DRAWING

SCALE NONE

REVISIONS

SHT. 3,4  
(FIX PAGE)  
(8255) SHT. 5  
(8255) SHT. 4  
(CONT. RAM) SHT. 3  
(INPUT) SHT. 4  
(SCRATCH)  
SHT. 3,4

D $\phi$  - D $\phi$  3  
V BLANK SHT. 2

5M SHT. 6  
5M SHT. 3,5  
5M SHT. 3,5  
5M SHT. 3,5

H1 THRU H8 SHT. 3,5  
V $\phi$  THRU V7 SHT. 3,5  
H $\phi$ , H1 SHT. 4,5

BIT 0 SHT. 1  
BIT 1 SHT. 1  
BIT 2 SHT. 1  
BIT 3 SHT. 1  
BIT 4 SHT. 1  
BIT 5 SHT. 1  
BIT 6 SHT. 1  
BIT 7 SHT. 1

IC77-10 SHT. 2  
SRLD  
V BUS SHT. 2  
IC77-1B SHT. 2

IC28-3 SHT. 2  
H BUS SHT. 2  
V BUS SHT. 2  
IC77-7 SHT. 2  
IC77-5 SHT. 2

Gremlin/SEGA  
San Diego, California 92121

**CPU Board**

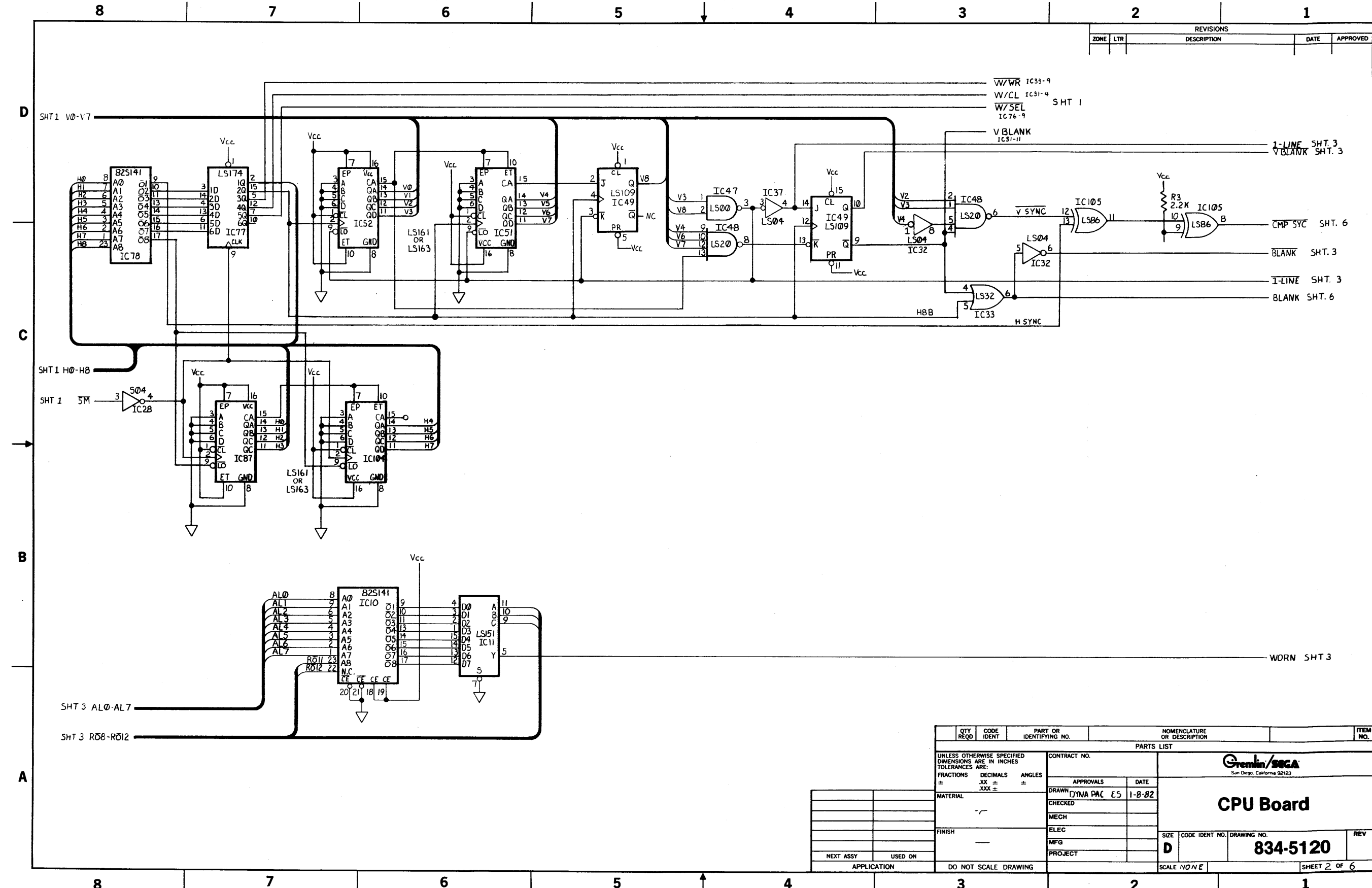
SIZE CODE IDENT NO. DRAWING NO.

**834-5120**

REV

SCALE NONE

SHEET 1 OF 6



ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			

W/WR IC33-9  
W/CL IC31-4  
W/SEL IC76-9  
SHT 1  
V BLANK IC51-11

1-LINE SHT. 3  
V BLANK SHT. 3

CMP SYNC SHT. 6

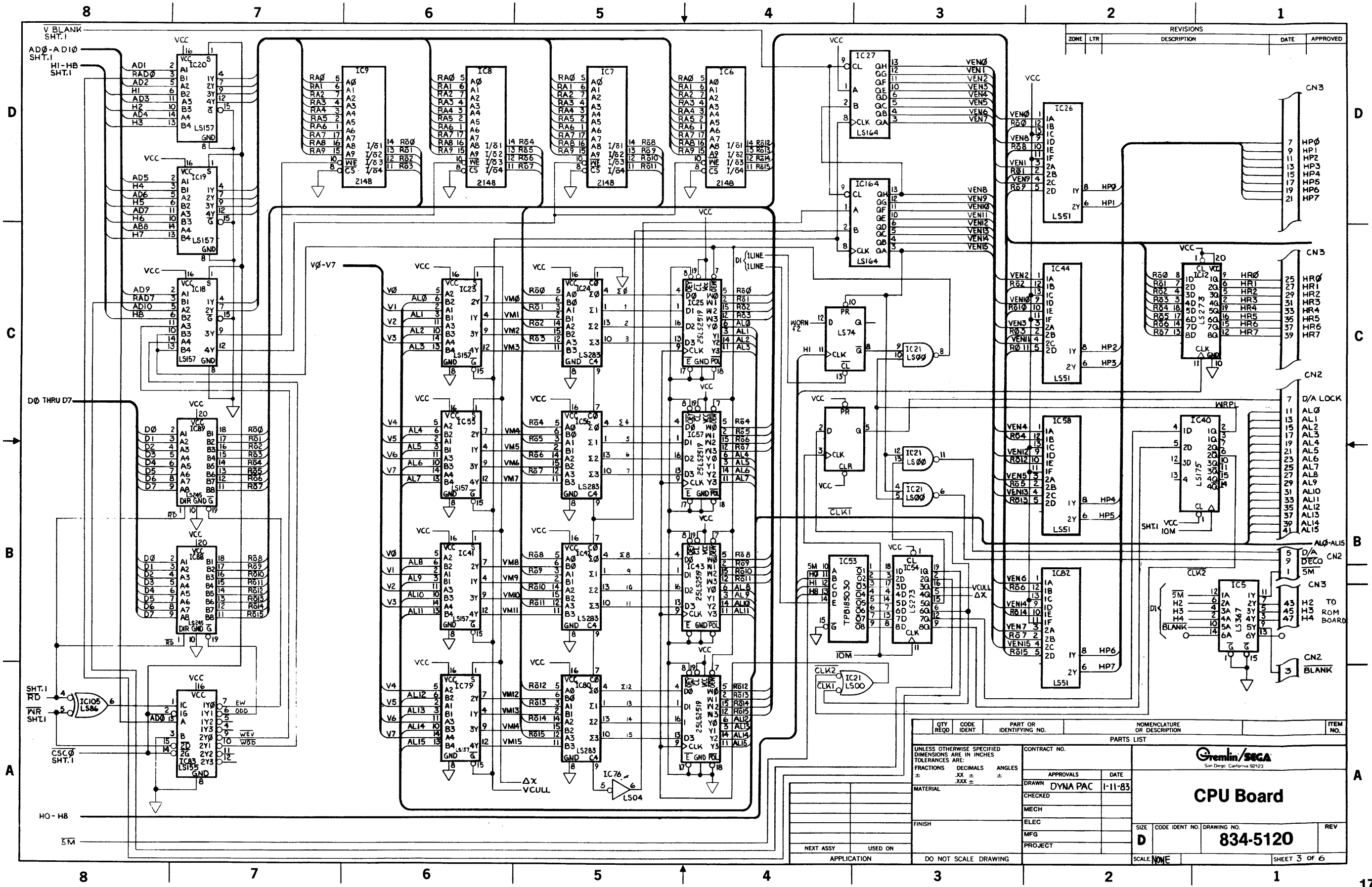
BLANK SHT. 3

I-LINE SHT. 3

BLANK SHT. 6

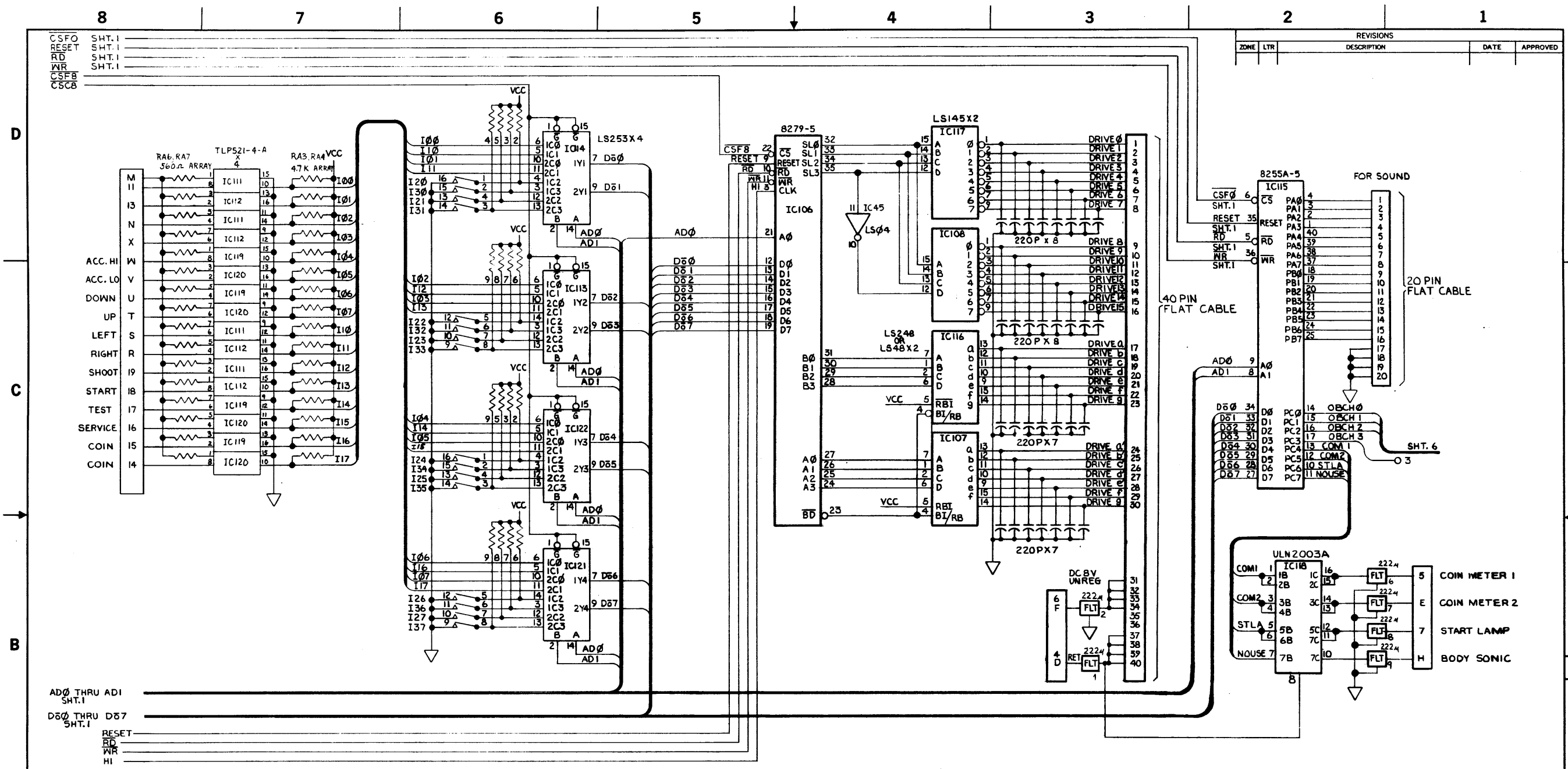
WORN SHT 3

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS ±	DECIMALS .XX ±	ANGLES .XXX ±	APPROVALS	DATE
MATERIAL		DRAWN DYNA PAC ES 1-8-82		
FINISH		CHECKED		
NEXT ASSY		MECH		
USED ON		ELEC		
APPLICATION		MFG		
DO NOT SCALE DRAWING		PROJECT		
<b>Gremlin/BOGA</b> San Diego, California 92123				
<b>CPU Board</b>				
SIZE	CODE IDENT NO.	DRAWING NO.	REV	
D		834-5120		
SCALE N/D N/E				SHEET 2 OF 6



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

QTY REQD		CODE IDENT		PARTY OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION		ITEM NO.	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES = .XX ± = °									
MATERIAL				FINISH		CONTRACT NO.		APPROVALS	
NEXT ASSY				USED ON		DRAWN DYNA PAC		DATE 1-11-83	
APPLICATION				DO NOT SCALE DRAWING		CHECKED		MECH	
						ELEC		MFG	
						PROJECT			
PARTS LIST						 <b>CPU Board</b>			
SIZE						CODE IDENT NO. DRAWING NO.		REV	
D						834-5120			
SCALE NONE						SHEET 3 OF 6			



REVISIONS			
ZONE	LTR	DESCRIPTION	DATE

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	XX ±	±	DATE	
±	XXX ±	±	DRAWN DYN-FAC 12-29-82	
MATERIAL		CHECKED		
FINISH		MECH		
NEXT ASSY		ELEC		
USED ON		MFG		
APPLICATION		PROJECT		
DO NOT SCALE DRAWING		SIZE CODE IDENT NO. DRAWING NO. REV		
SCALE NONE		D 834-5120		
SHEET 4 OF 6				

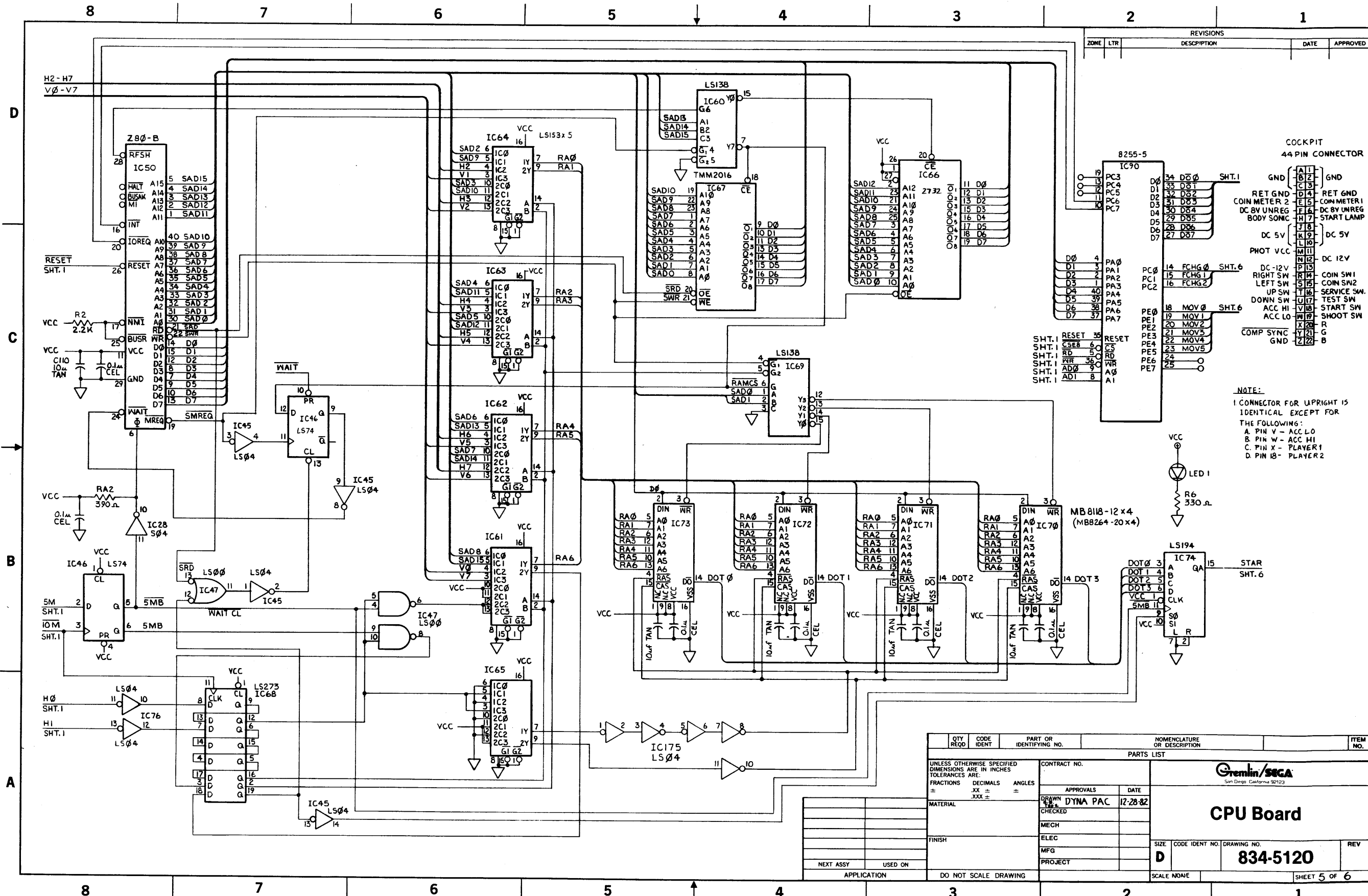
Gremlin/SEGA  
San Diego, California 92123

### CPU Board

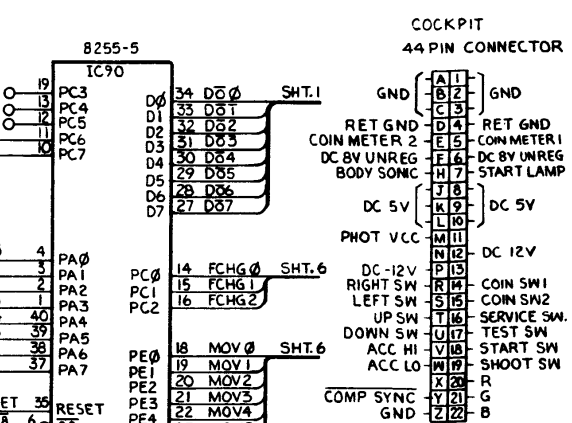
834-5120

SHEET 4 OF 6





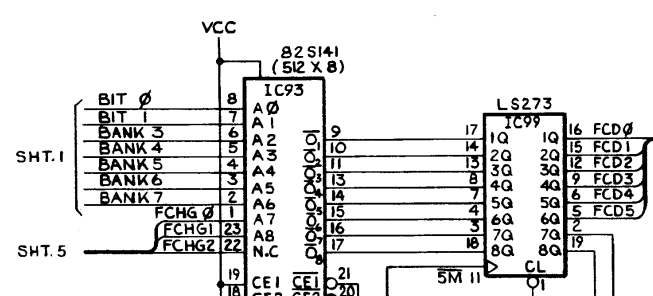
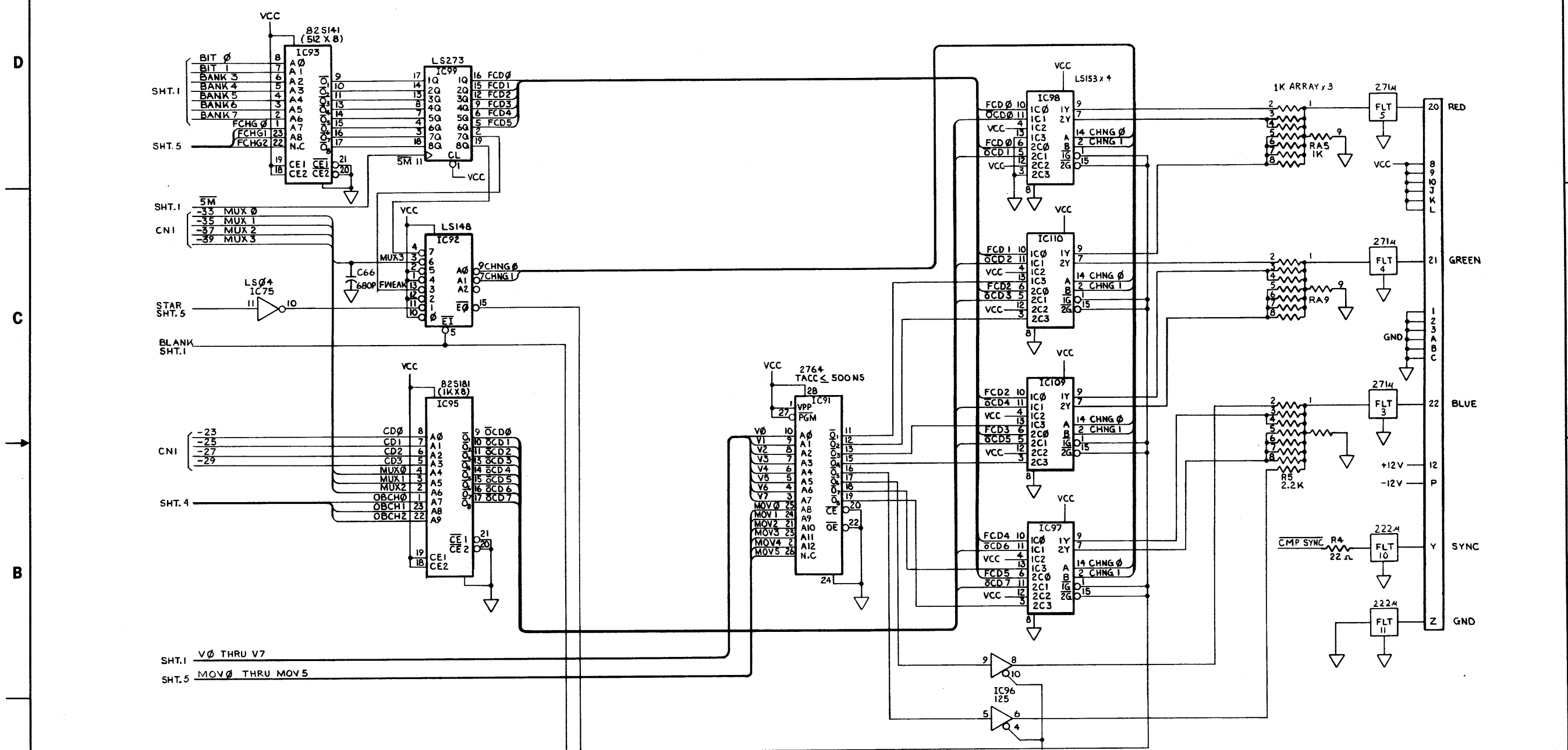
ZONE		LTR		REVISIONS	DATE	APPROVED
				DESCRIPTION		



NOTE:  
 1 CONNECTOR FOR UPRIGHT IS IDENTICAL EXCEPT FOR THE FOLLOWING:  
 A. PIN V - ACC LO  
 B. PIN W - ACC HI  
 C. PIN X - PLAYER 1  
 D. PIN 18 - PLAYER 2

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				
FRACTIONS	DECIMALS	ANGLES		
±	.XX	±		
	.XXX	±		
MATERIAL			CONTRACT NO.	
FINISH			APPROVALS	
NEXT ASSY USED ON			DRAWN BY DYNA PAC	
APPLICATION			CHECKED	
DO NOT SCALE DRAWING			MECH	
SCALE NONE			ELEC	
SCALE NONE			MFG	
SCALE NONE			PROJECT	
SCALE NONE			DATE 12-28-82	
SCALE NONE			SIZE CODE IDENT NO. DRAWING NO.	
SCALE NONE			D 834-5120	
SCALE NONE			REV	
SCALE NONE			SHEET 5 OF 6	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



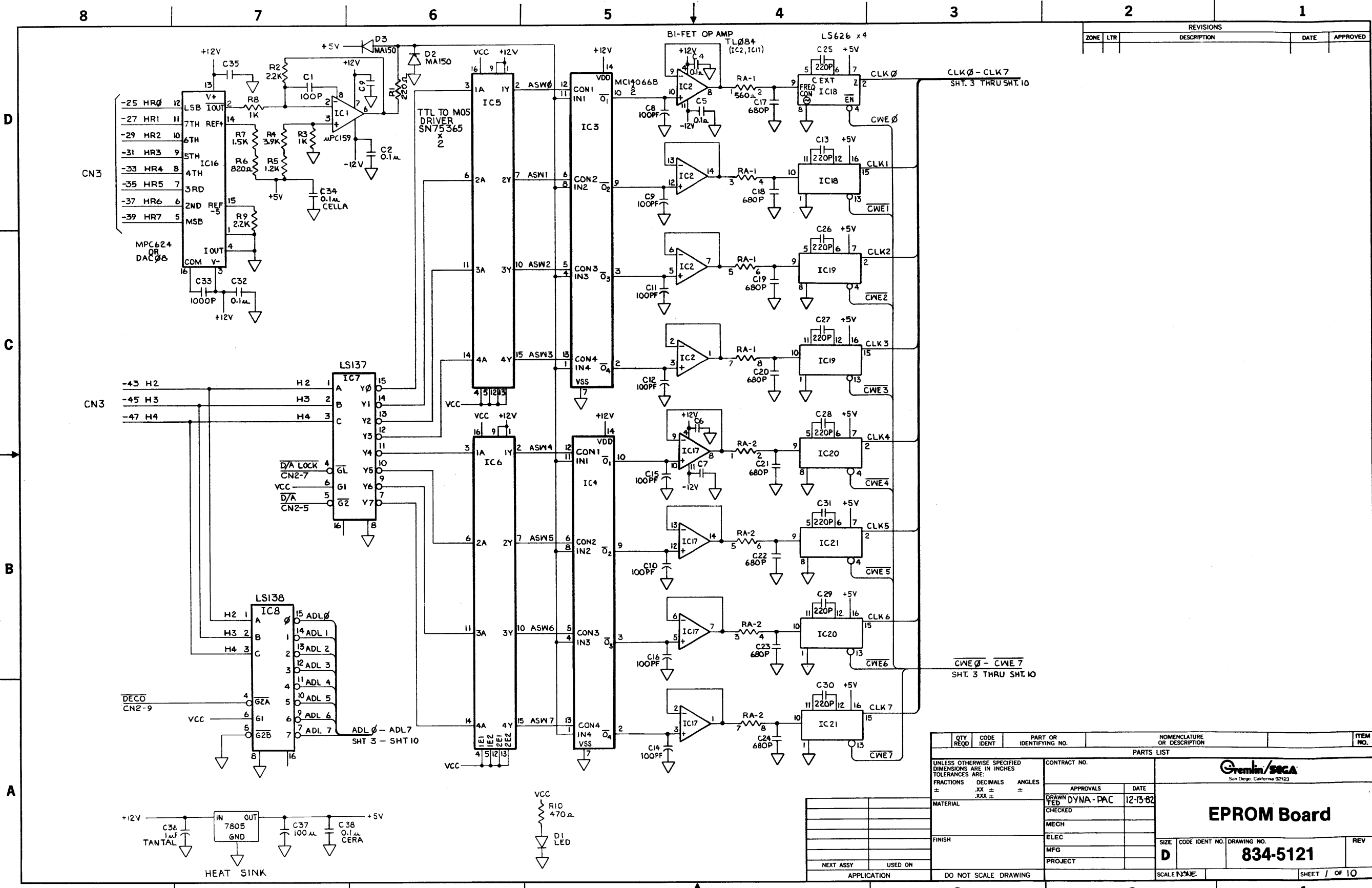
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	±	±	DATE	
±	±	±	DRAWN BY DYNA PAC	
MATERIAL		CHECKED		12-21-82
FINISH		MECH		
NEXT ASSY		ELEC		
USED ON		MFG		
APPLICATION		PROJECT		
DO NOT SCALE DRAWING			SIZE	CODE IDENT NO. DRAWING NO.
SCALE NONE			D	834-5120
SHEET 6 OF 6				REV




**CPU Board**

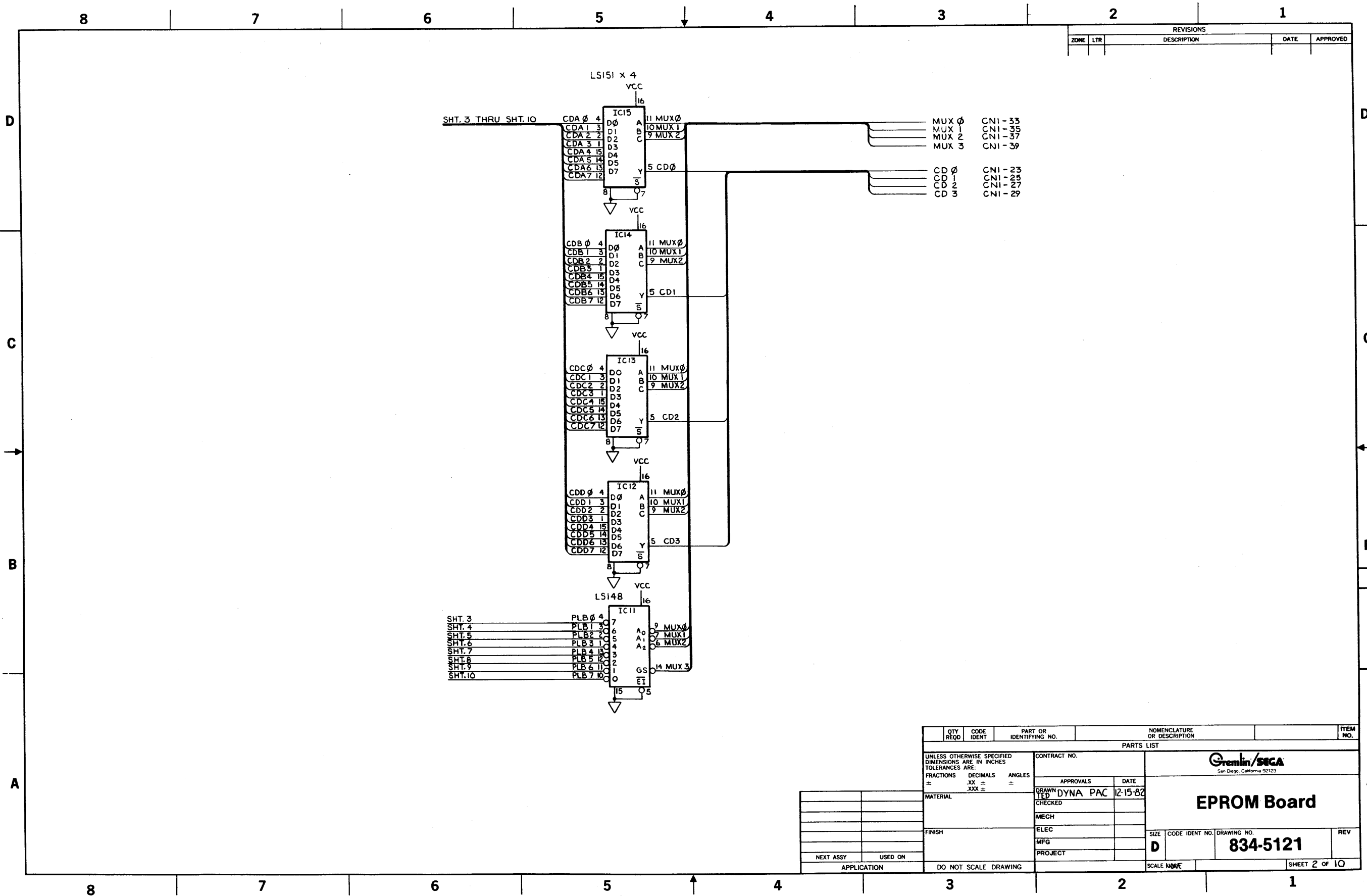
**834-5120**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	.XX ±	±	DATE	
	.XXX ±		DRAWN DYNA-PAC 12-13-82	
MATERIAL		MECH		
FINISH		ELEC		
NEXT ASSY USED ON		MFG		
APPLICATION		PROJECT		
DO NOT SCALE DRAWING		SCALE NONE		

  
 San Diego, California 92123  
**EPROM Board**  
 SIZE CODE IDENT NO. DRAWING NO. REV  
**D 834-5121**



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

MUX 0	CNI-33
MUX 1	CNI-35
MUX 2	CNI-37
MUX 3	CNI-39
CD 0	CNI-23
CD 1	CNI-25
CD 2	CNI-27
CD 3	CNI-29

SHT. 3	PLB 0	4	7
SHT. 4	PLB 1	3	6
SHT. 5	PLB 2	2	5
SHT. 6	PLB 3	1	4
SHT. 7	PLB 4	0	3
SHT. 8	PLB 5	0	2
SHT. 9	PLB 6	0	1
SHT. 10	PLB 7	0	0

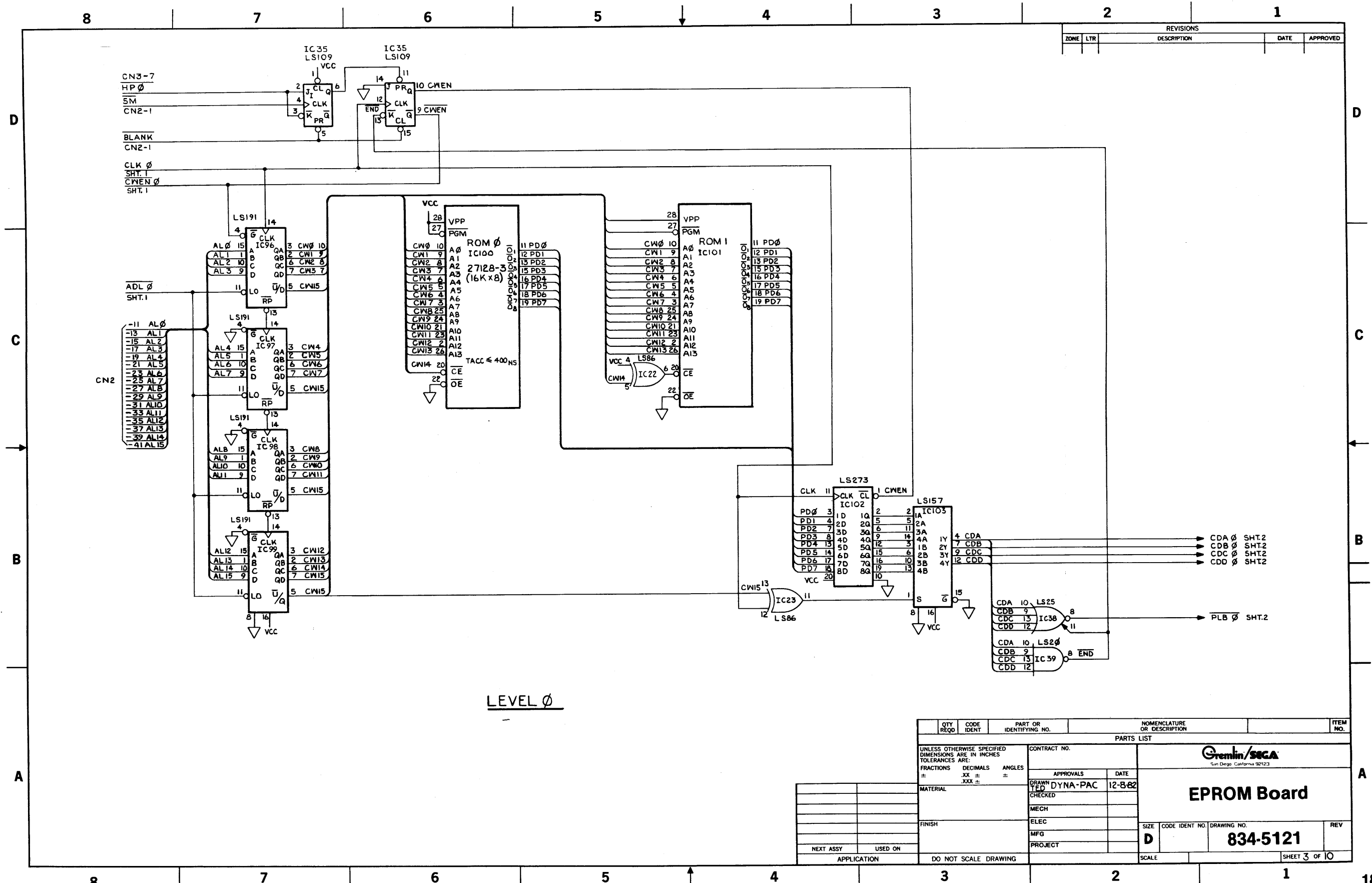
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	.XX ±	±	DATE	
	.XXX ±		DRAWN BY DYNA PAC 12-15-82	
MATERIAL		MECH		
FINISH		ELEC		
NEXT ASSY USED ON		MFG		
APPLICATION		PROJECT		
DO NOT SCALE DRAWING		SCALE NAME		

**Gremlin/SEGA**  
San Diego, California 92123

# EPROM Board

SIZE CODE IDENT NO. DRAWING NO. REV  
**D** **834-5121**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



LEVEL 0

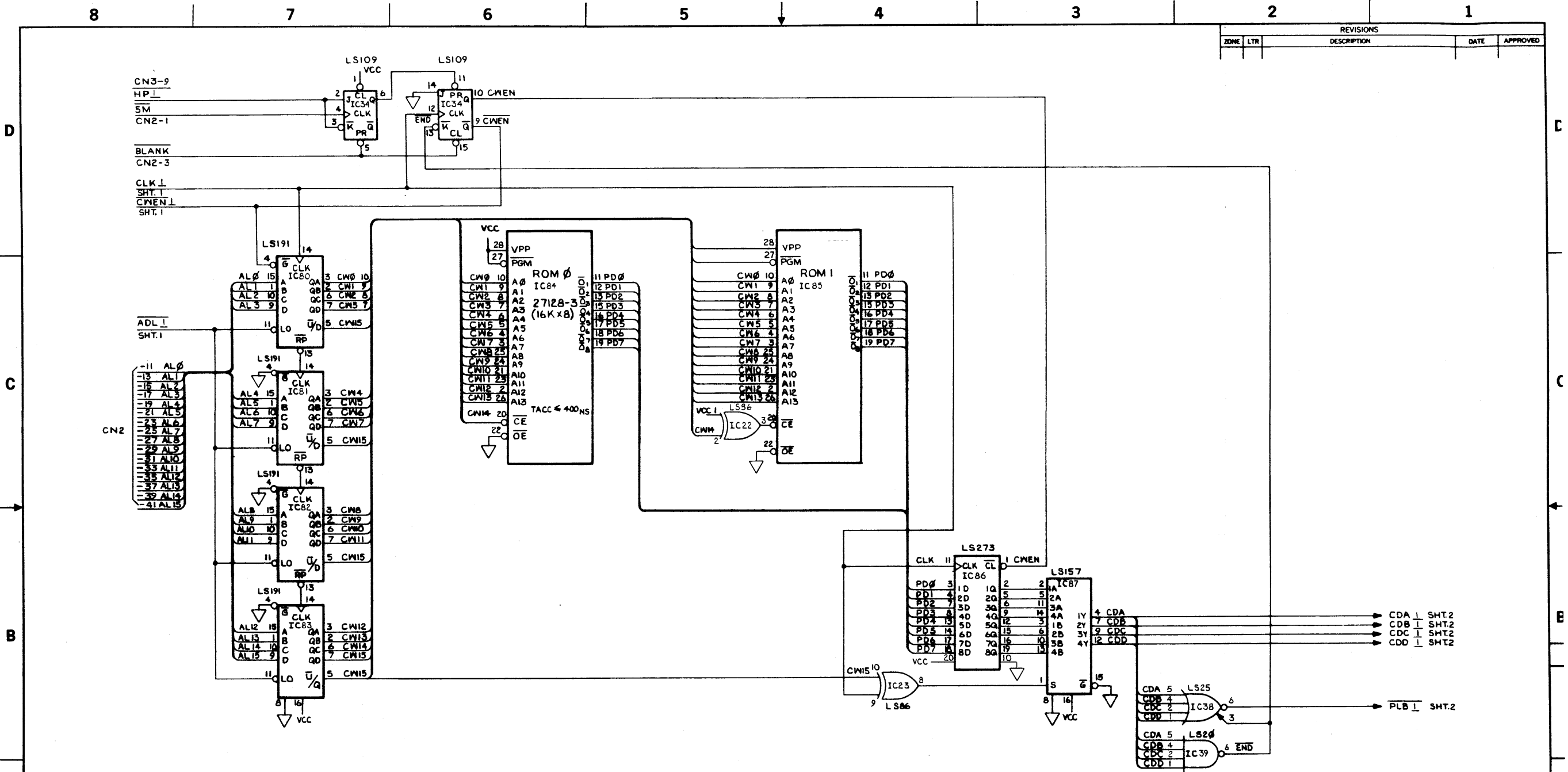
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
±	.XX ±	±	DRAWN TED DYNA-PAC	12-8-82
MATERIAL			MECH	
FINISH			ELEC	
NEXT ASSY			MFG	
USED ON			PROJECT	
APPLICATION			DO NOT SCALE DRAWING	
SCALE			SHEET 3 OF 10	

**Gremlin/SEGA**  
San Diego, California 92123

**EPROM Board**

SIZE CODE IDENT NO. DRAWING NO. REV  
**D** **834-5121**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



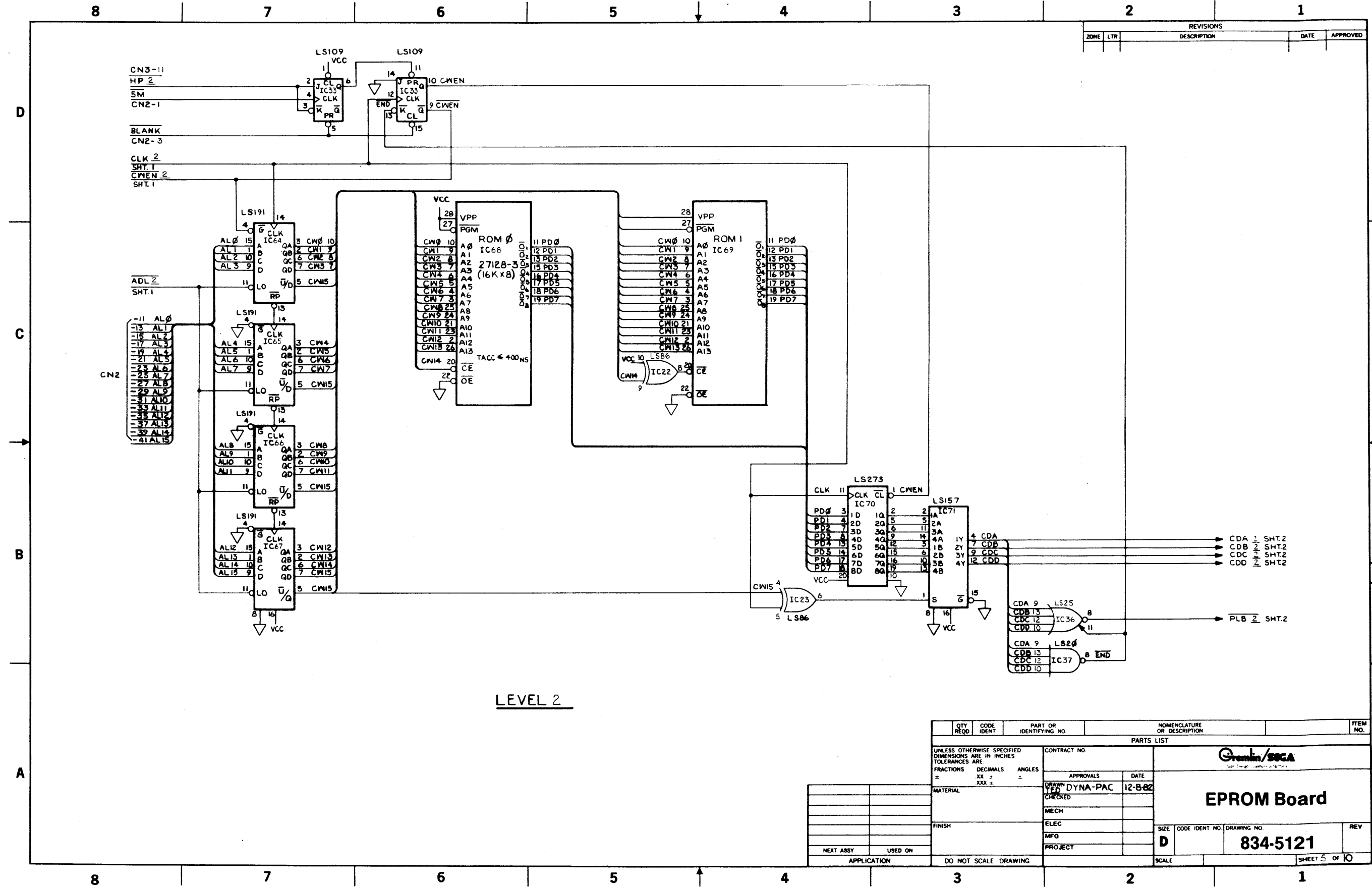
LEVEL 1

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	.XX ±	±	DATE 12-8-82	
±	.XXX ±	±	DRAWN BY DYNAPAC	
MATERIAL		CHECKED		
FINISH		ELEC		
NEXT ASSY		MFG		
USED ON		PROJECT		
APPLICATION		DO NOT SCALE DRAWING		
SCALE		SIZE CODE IDENT NO DRAWING NO. REV		
		D 834-5121		
		SHEET 4 OF 10		

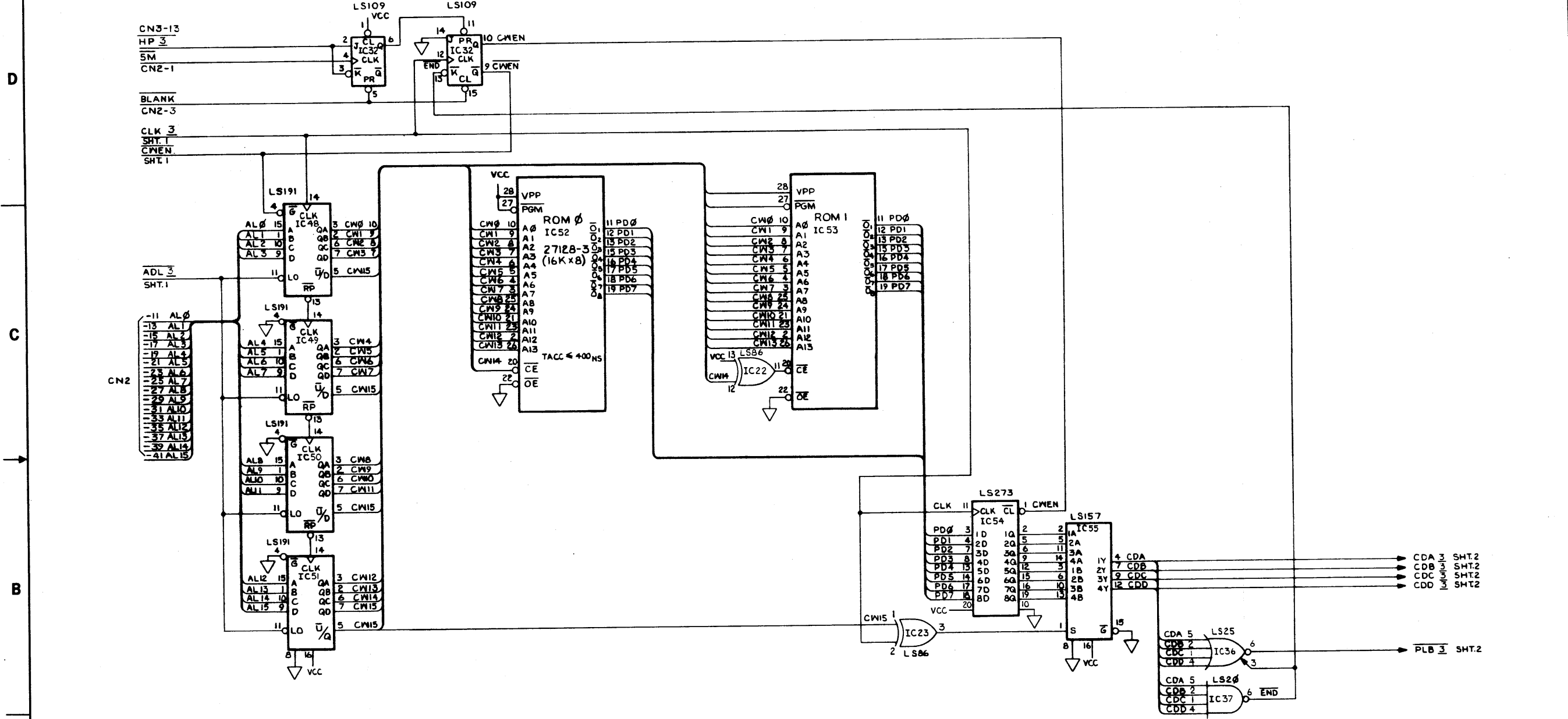


**EPROM Board**

**834-5121**



ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			

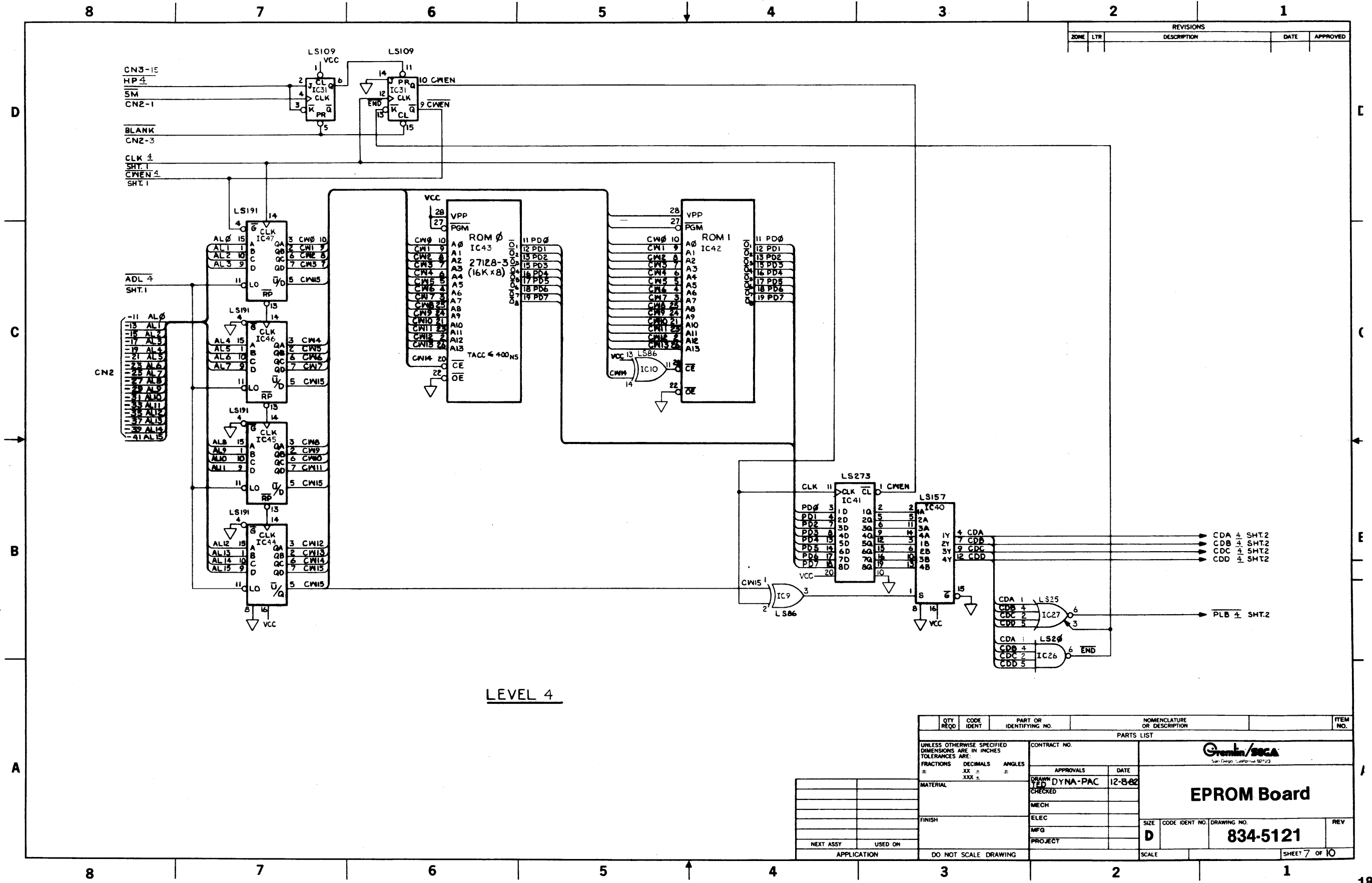


LEVEL 3

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	±	±	DATE	
DRAWN BY: DYNA-PAC		12-8-82		
CHECKED:				
MECH:				
ELEC:				
MFG:				
PROJECT:				
NEXT ASSY:				
USED ON:				
APPLICATION:		DO NOT SCALE DRAWING		
		Glen/SOCA		
		<b>EPROM Board</b>		
		SIZE	CODE IDENT NO	DRAWING NO
		D		<b>834-5121</b>
		SCALE		SHEET 6 OF 10



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



LEVEL 4

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	.XX ±	XXX ±	DATE	
MATERIAL		DRAWN BY DYNA-PAC		12-8-82
FINISH		CHECKED		
NEXT ASSY		USED ON		
APPLICATION		DO NOT SCALE DRAWING		
		MECH		
		ELEC		
		MFG		
		PROJECT		
		SIZE		
		CODE IDENT NO.		
		DRAWING NO.		
		REV		
		D		
		834-5121		
		SCALE		
		SHEET 7 OF 10		



**EPROM Board**

**834-5121**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

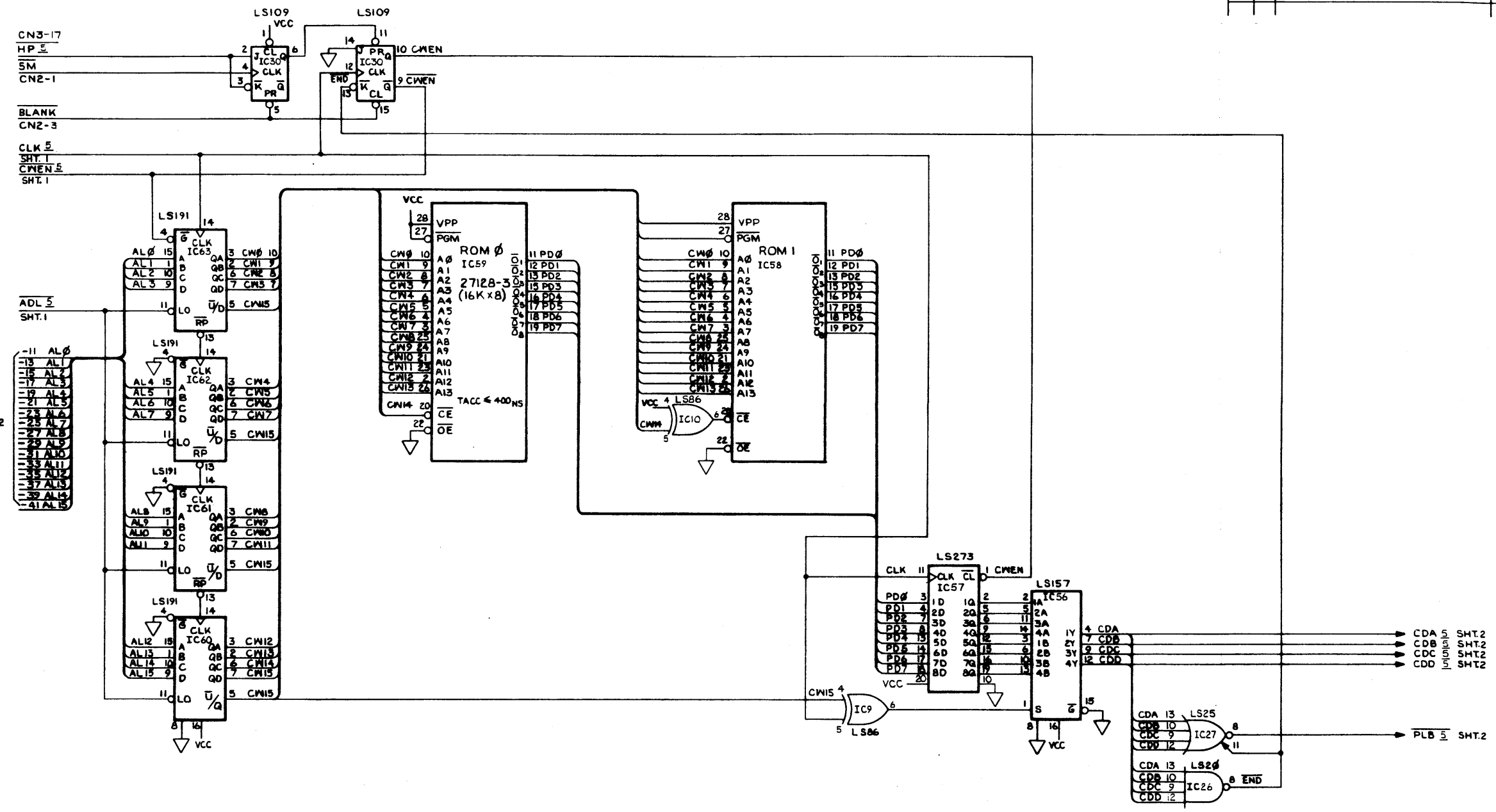
8 7 6 5 4 3 2 1

D

C

B

A



LEVEL 5

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
±	XX ±	XXX ±	BY: DYNAPAC	12-8-82
MATERIAL	FINISH	MECH	ELEC	PROJECT
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	SCALE



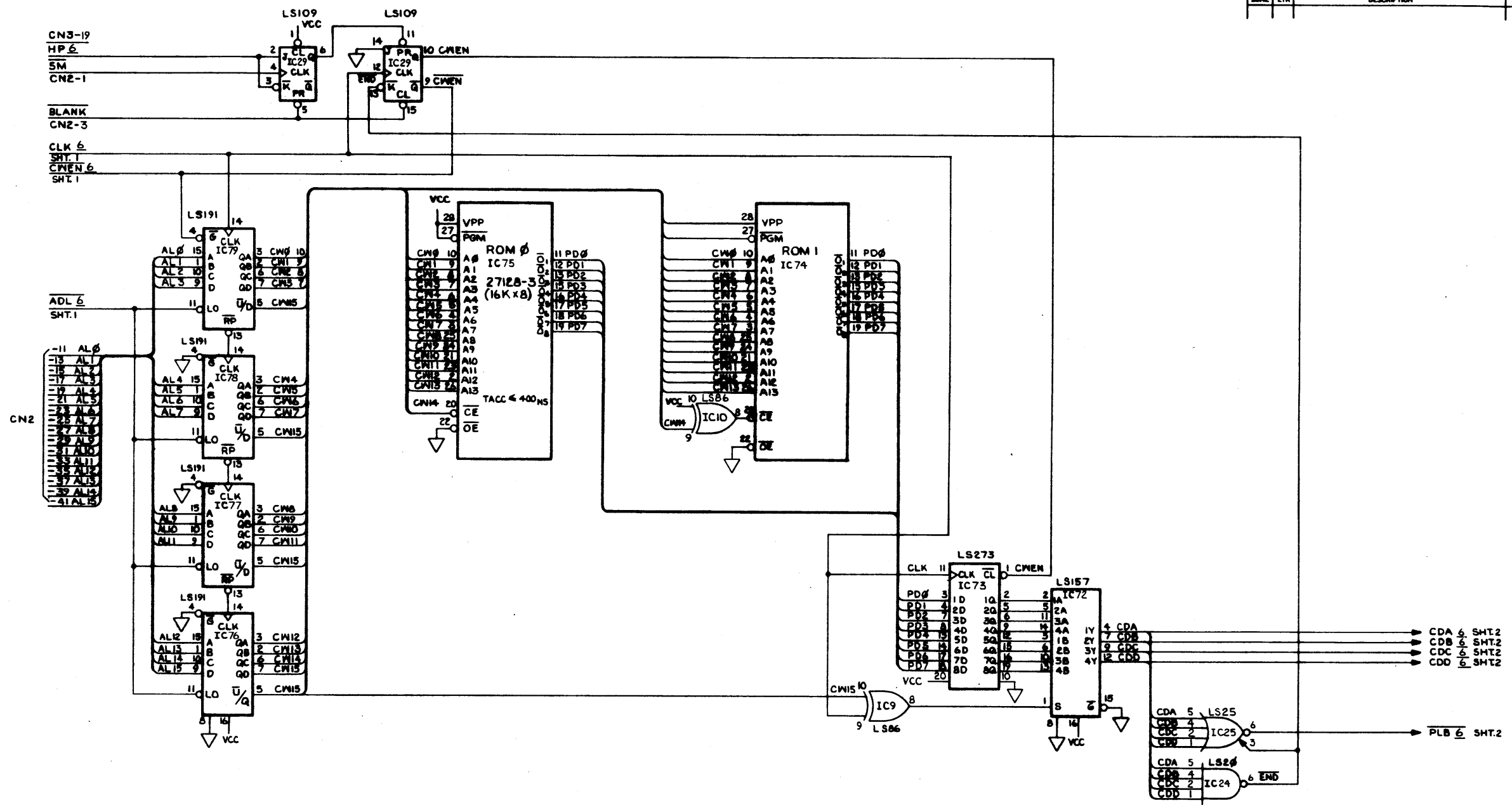
**EPROM Board**

SIZE CODE IDENT NO. DRAWING NO. **834-5121** REV

8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



LEVEL 6

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS DATE	
±	.XX ±	±	DYNAPAC 12-8-82	
MATERIAL	FINISH		ELEC	
			MECH	
			MFG	
			PROJECT	
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	SCALE

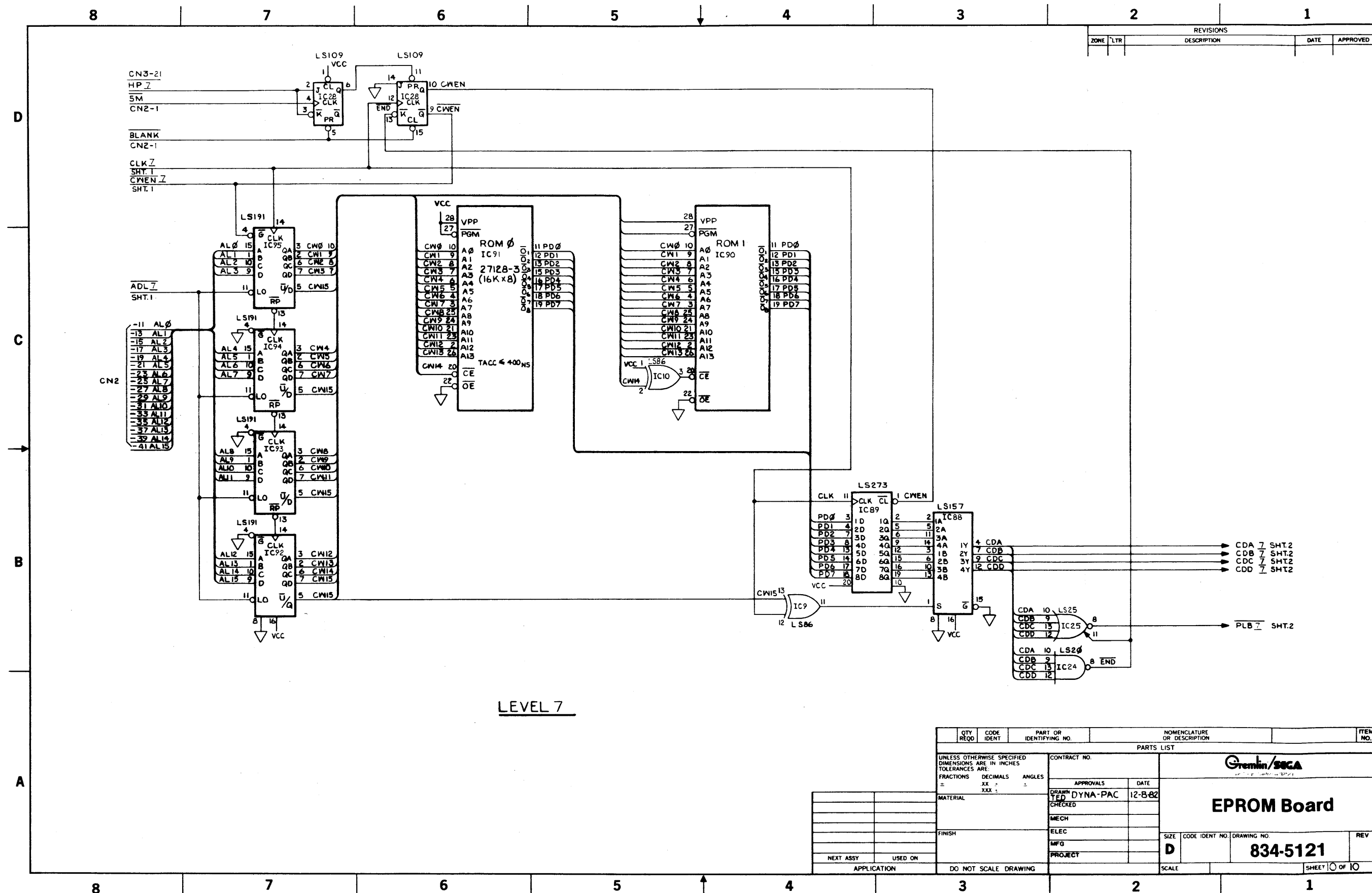


**EPROM Board**

834-5121

SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		834-5121	

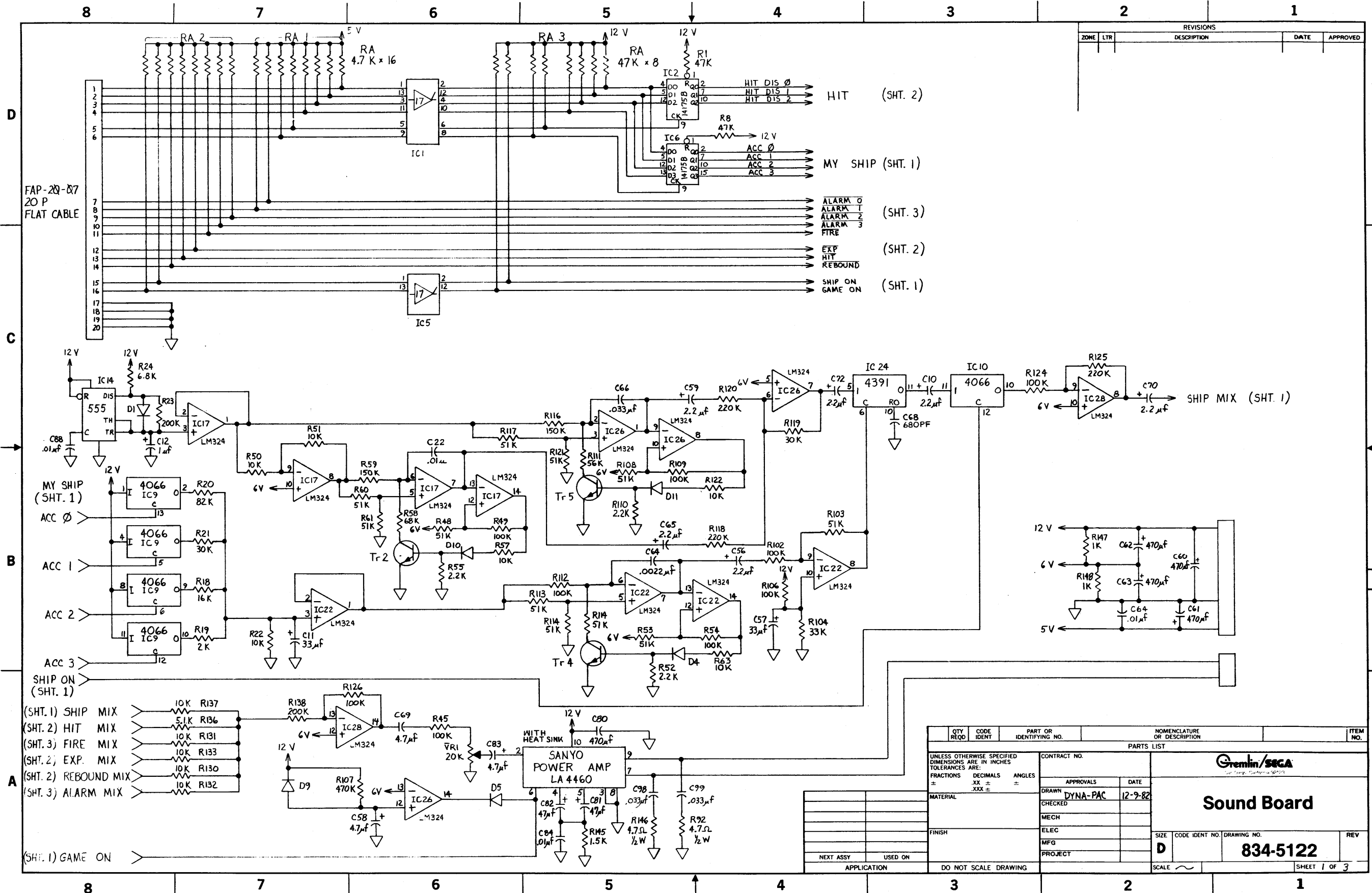
8 7 6 5 4 3 2 1



LEVEL 7

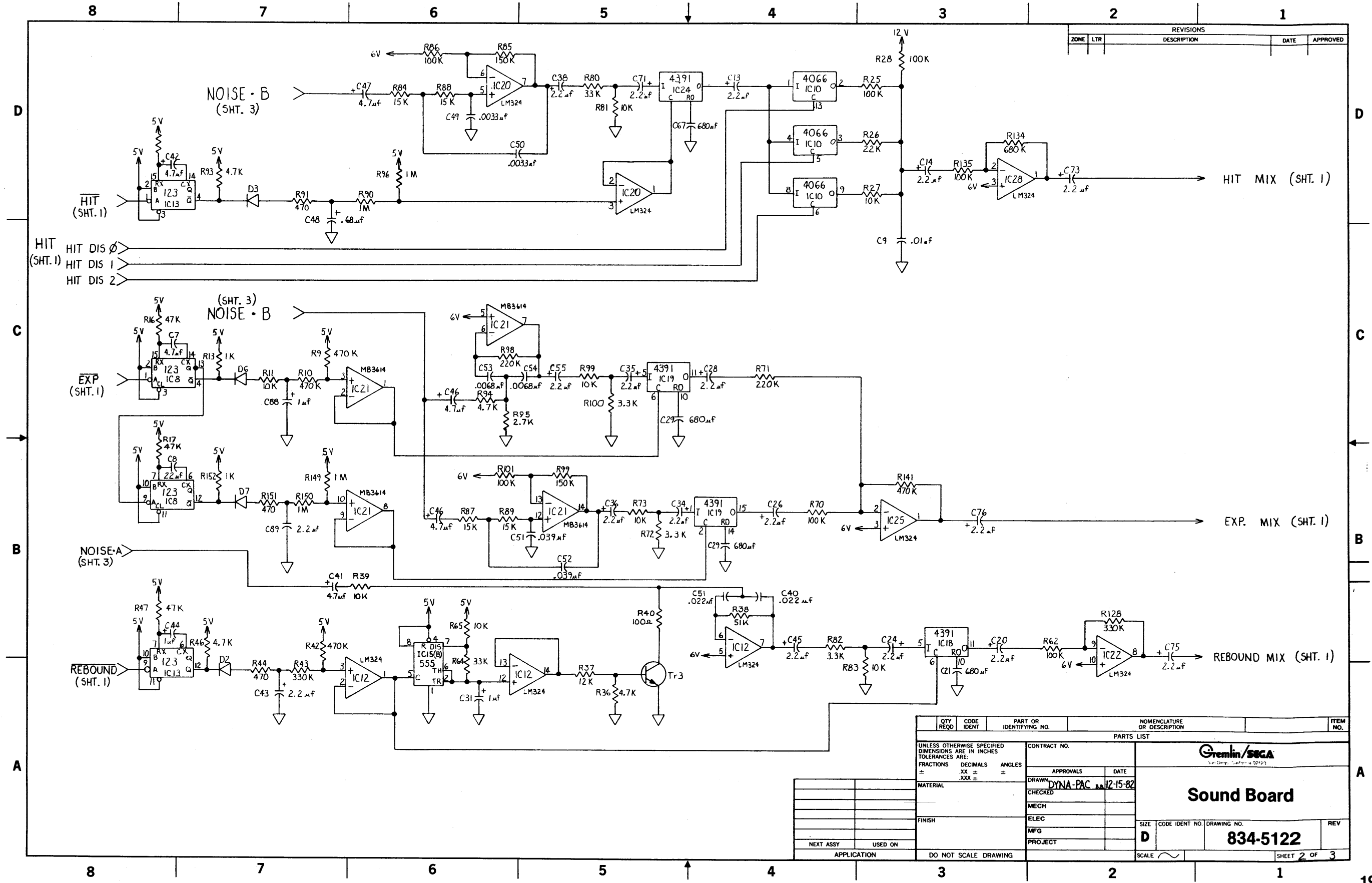
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	±	±	DATE	
MATERIAL		DRAWN BY DYNA-PAC 12-8-82		
FINISH		CHECKED		
NEXT ASSY USED ON		MECH		
APPLICATION		ELEC		
DO NOT SCALE DRAWING		MFG		
		PROJECT		
		SIZE CODE IDENT NO. DRAWING NO. REV		
		D 834-5121		
		SCALE SHEET 1 OF 10		

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
±	.xx ±	° ±	DYNA-PAC	12-9-82
MATERIAL		DRAWN		
FINISH		CHECKED		
NEXT ASSY		MECH		
USED ON		ELEC		
APPLICATION		MFG		
DO NOT SCALE DRAWING		PROJECT		
<b>Sound Board</b> SIZE CODE IDENT NO. DRAWING NO. REV <b>D 834-5122</b>				SCALE SHEET 1 OF 3

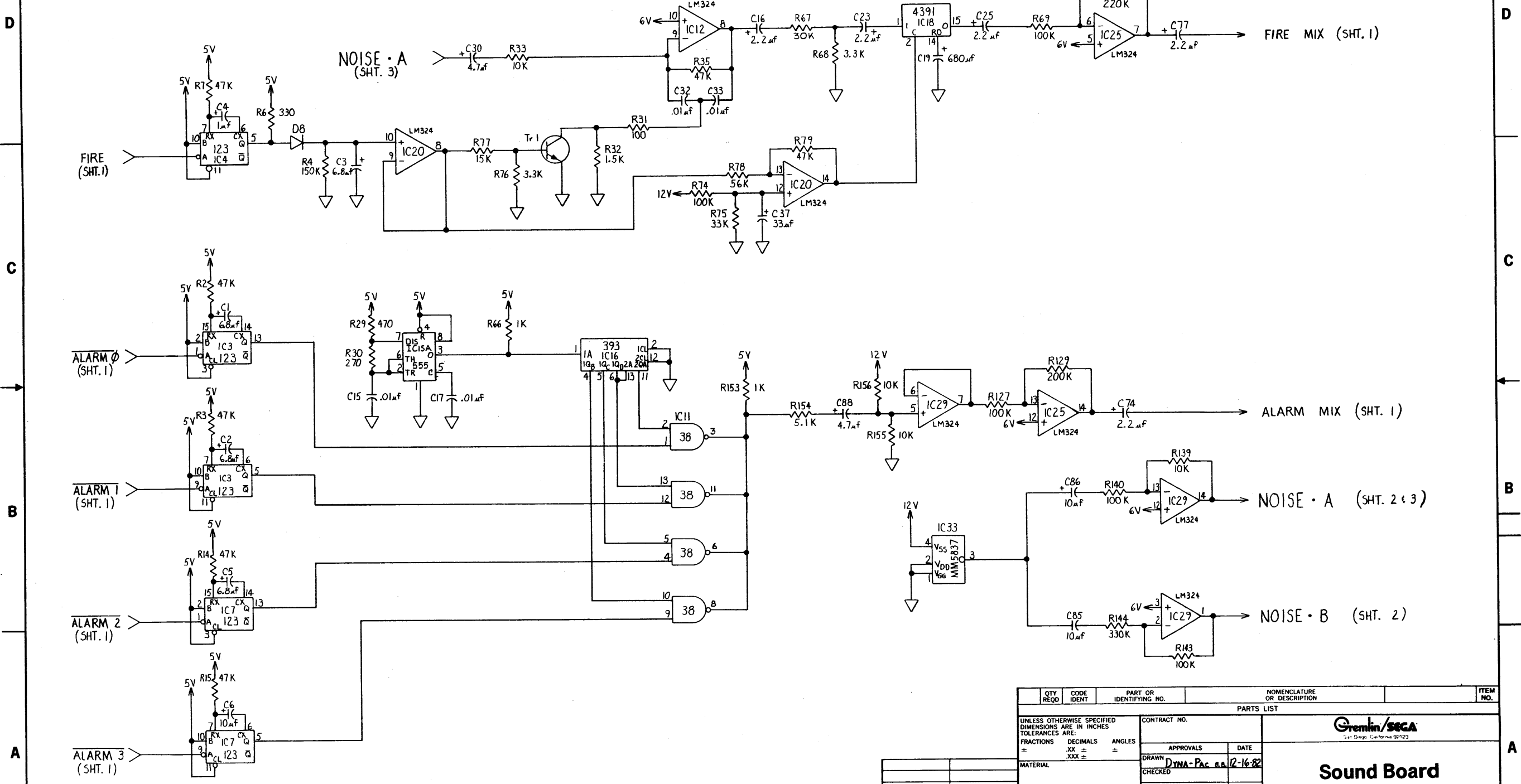
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± ± .XXX ± ±				
MATERIAL		CONTRACT NO.		<b>Gremlin/SECA</b> Sun Diego, California 92102 <h2>Sound Board</h2>
FINISH		APPROVALS DATE		
NEXT ASSY USED ON		DRAWN <b>DYNA-PAC</b> <b>12-15-82</b>		
APPLICATION		CHECKED		
DO NOT SCALE DRAWING		ELEC		SIZE CODE IDENT NO. DRAWING NO.
		MECH		<b>D</b> <b>834-5122</b>
		MFG		REV
		PROJECT		SCALE
				SHEET 2 OF 3

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

8 7 6 5 4 3 2 1



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
±	±	±	DYNA-Pac s.s.	12-16-82
MATERIAL		DRAWN		
FINISH		CHECKED		
NEXT ASSY		MECH		
USED ON		ELEC		
APPLICATION		MFG		
DO NOT SCALE DRAWING		PROJECT		

**Gremlin/SECA**  
San Diego, California 92123

## Sound Board

SIZE: **D** CODE IDENT NO: **834-5122** DRAWING NO. **834-5122** REV:

SCALE:  SHEET **3** OF **3**

8 7 6 5 4 3 2 1 193