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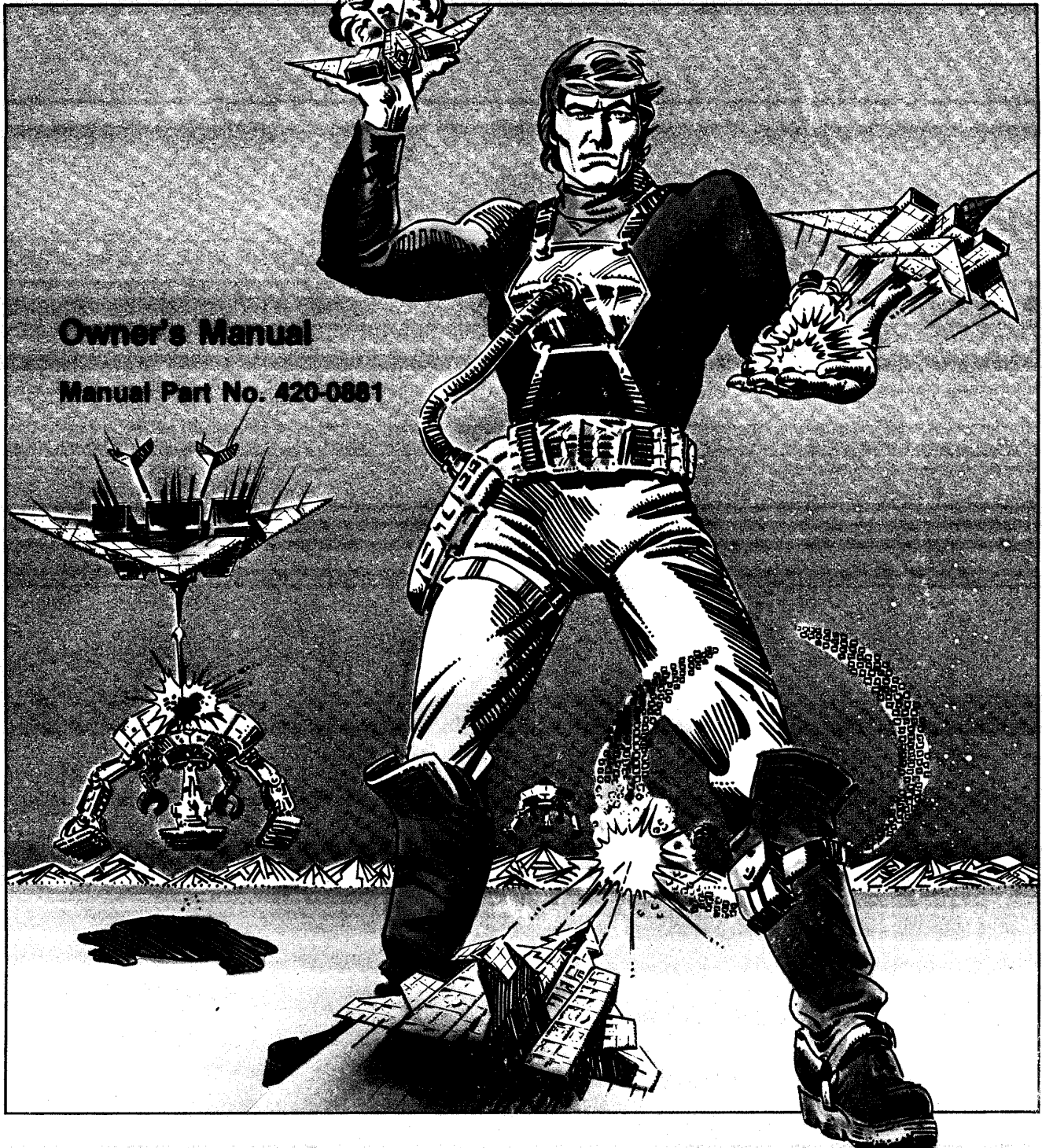
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# BUCK ROGER

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

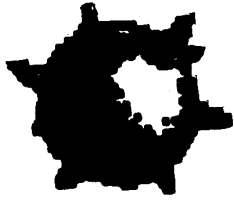
Flying skills and targeting accuracy must be honed to a fine edge, as you take command of Earth's last remaining hope of defense. Responsive 8-way joystick in hand, excitement is the name of the game as the Buck Rogers in all of us pilots a remote controlled spacecraft through the PLANET OF ZOOM™.

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.

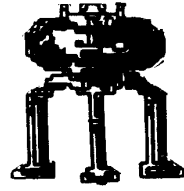
# Scoring



100



200



300



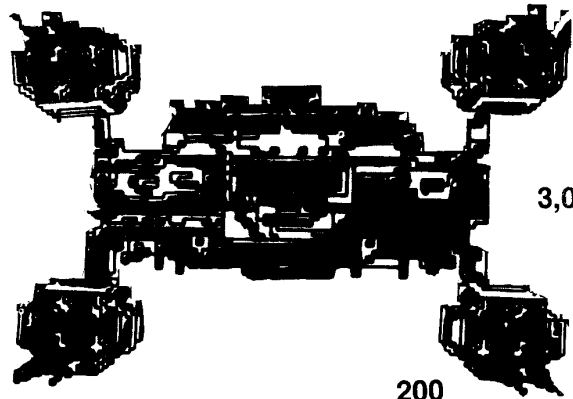
500



200



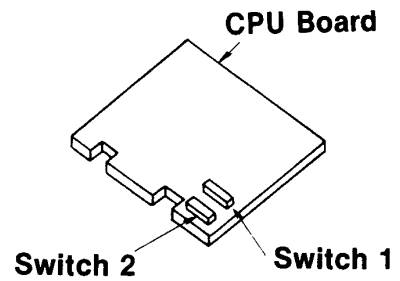
200



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,

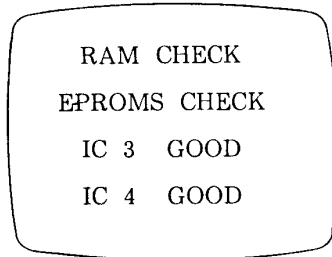
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game start and coinage to the input ports. IC119 and 121 input Coin B, and IC120 and 121 input Coin A, together with Game Start, Self-Test, Up/Down and Acceleration to I/O processor IC106 (Zone 4-D, Sht. 4, CPU Bd., 834-5120). IC111, 112 and 114 accesses/buffers 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:

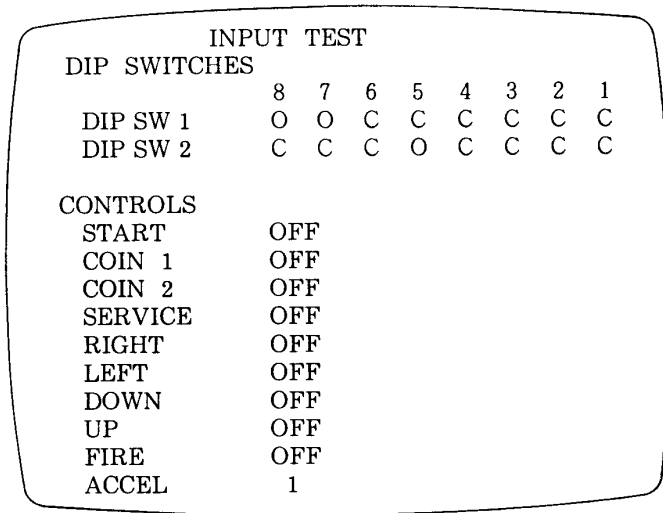
## Self-Test

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.

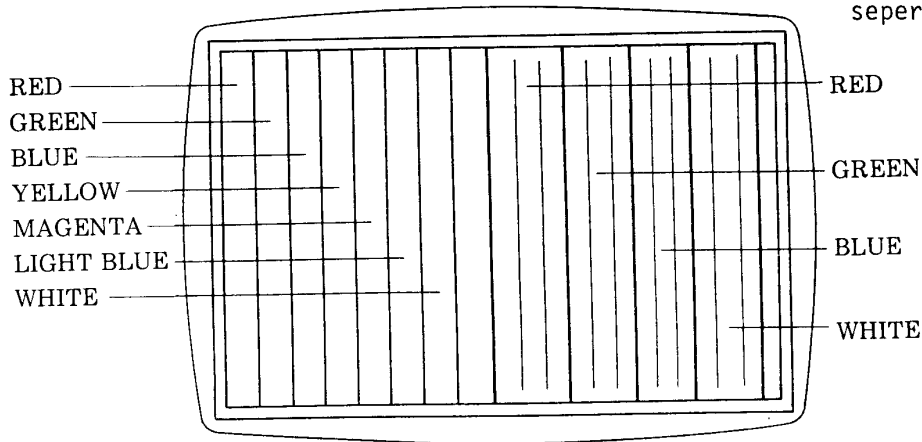


2.

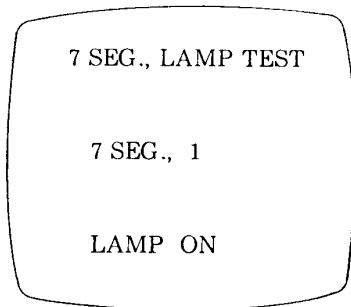


- Switch condition (ON or OFF) is verified by actuation.

3.

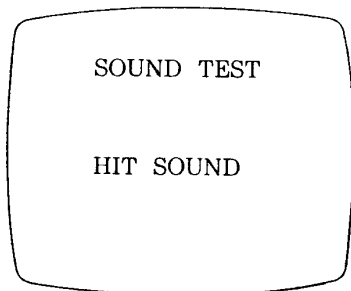


4.



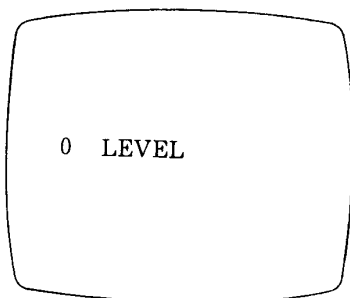
- START button sequences LED numerical read-out 0 - 9

5.



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

6. Character ROM Test

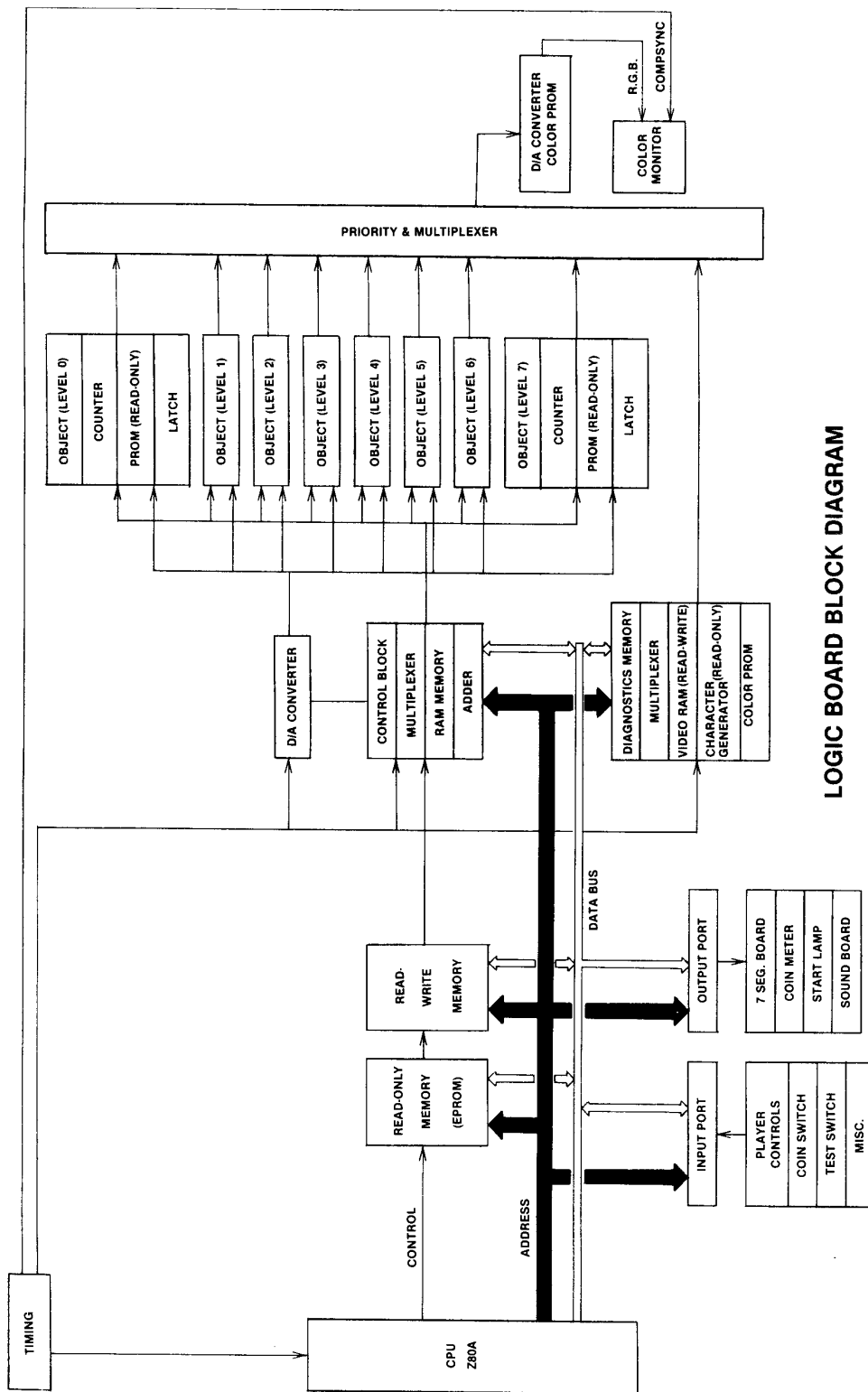


- Video display of character memory by Object Level.
- START button sequences Object Levels 0 through 7.

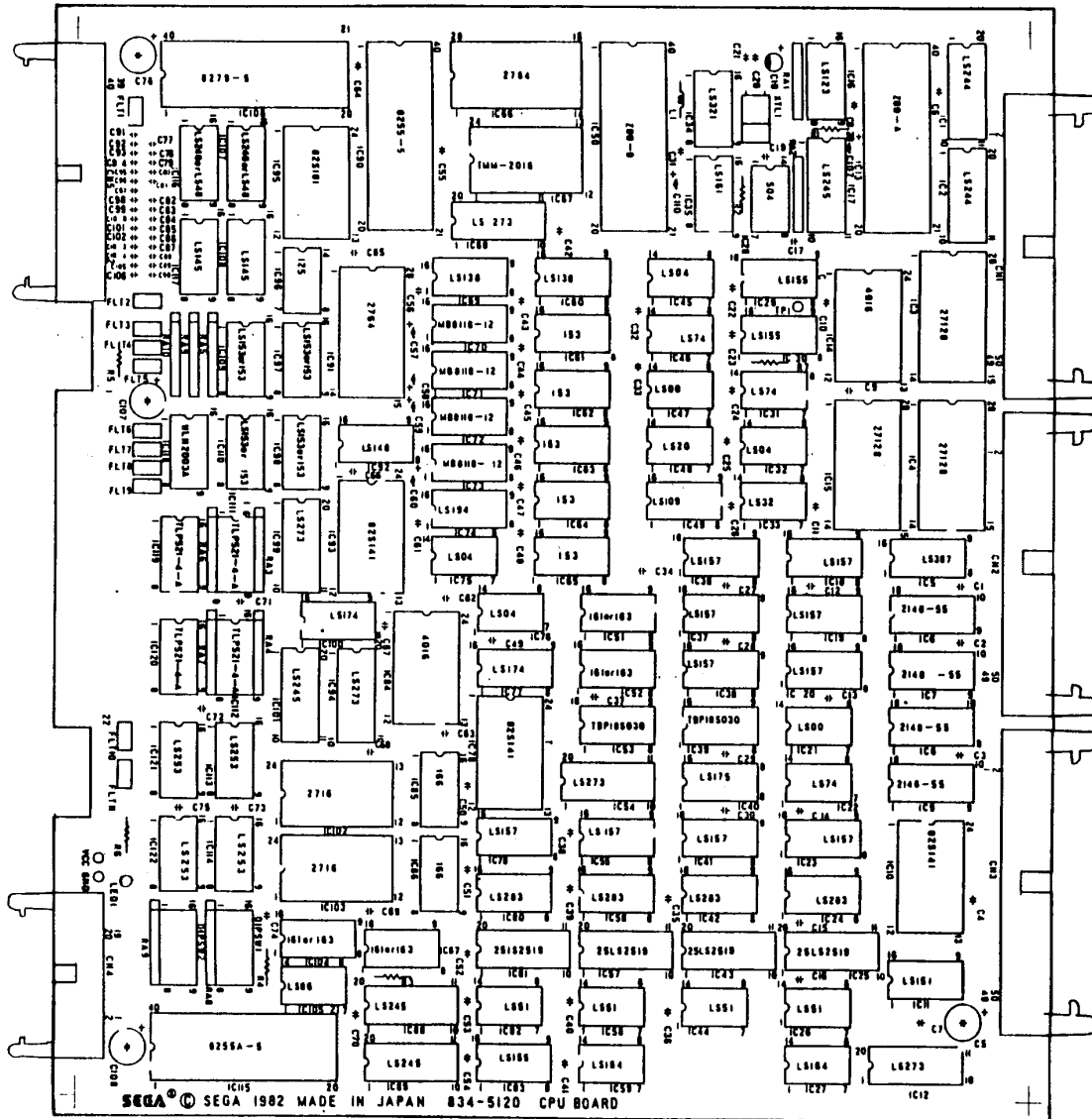


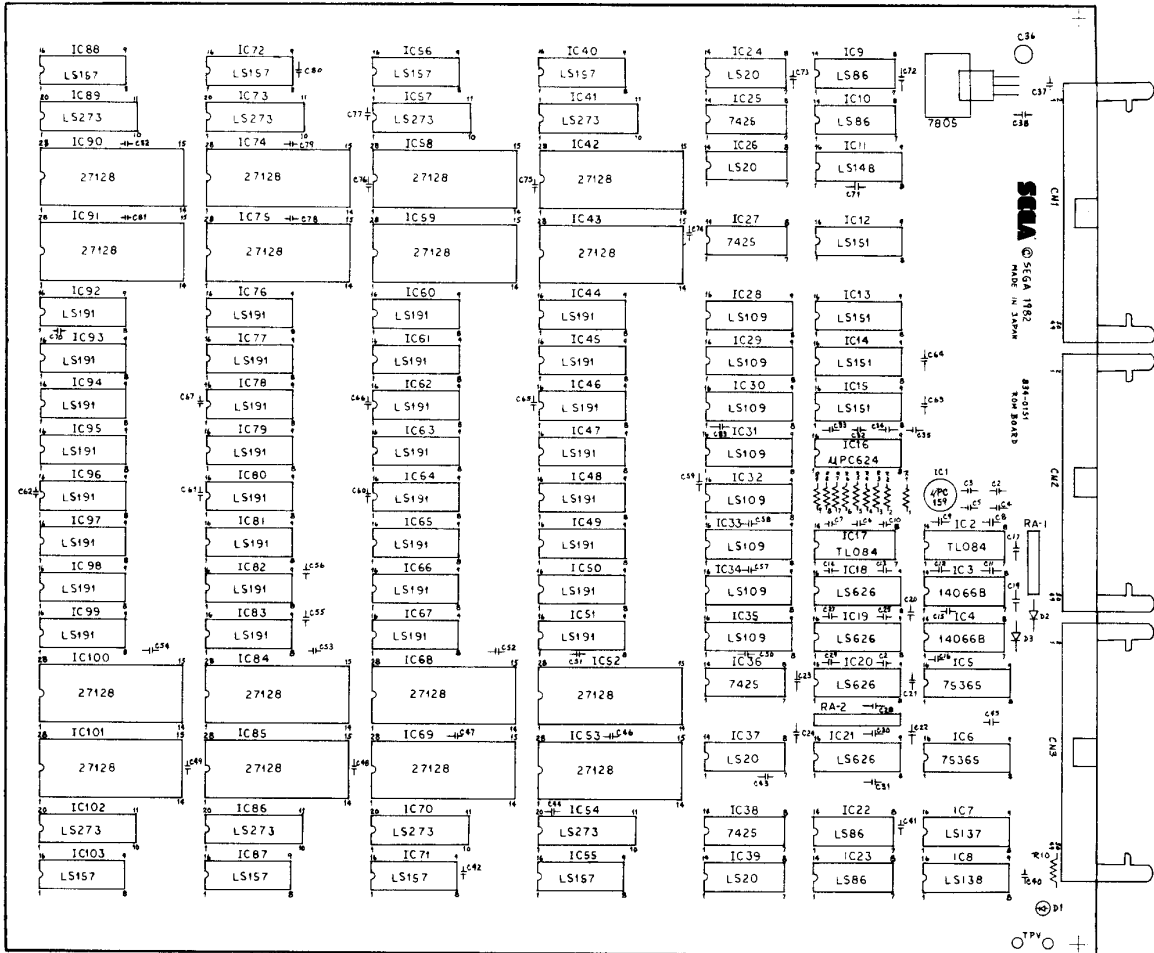
Due to the striking graphics employed in BUCK ROGERS™, memory requirements for background generation are significant. On the EPROM Bd. (834-5121) there are sixteen (16) 27128-3 16K X 8 EPROMs that hold video character, positioning, color and timing information. Background generation accessible memory (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.



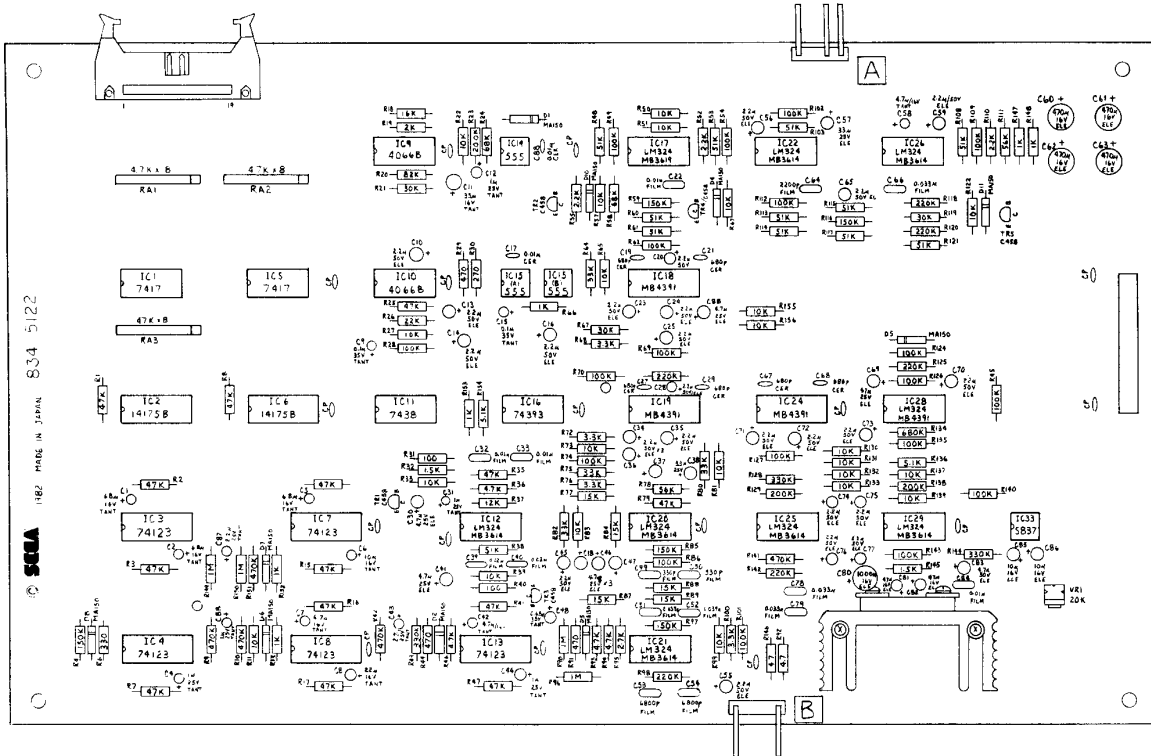
LOGIC BOARD BLOCK DIAGRAM

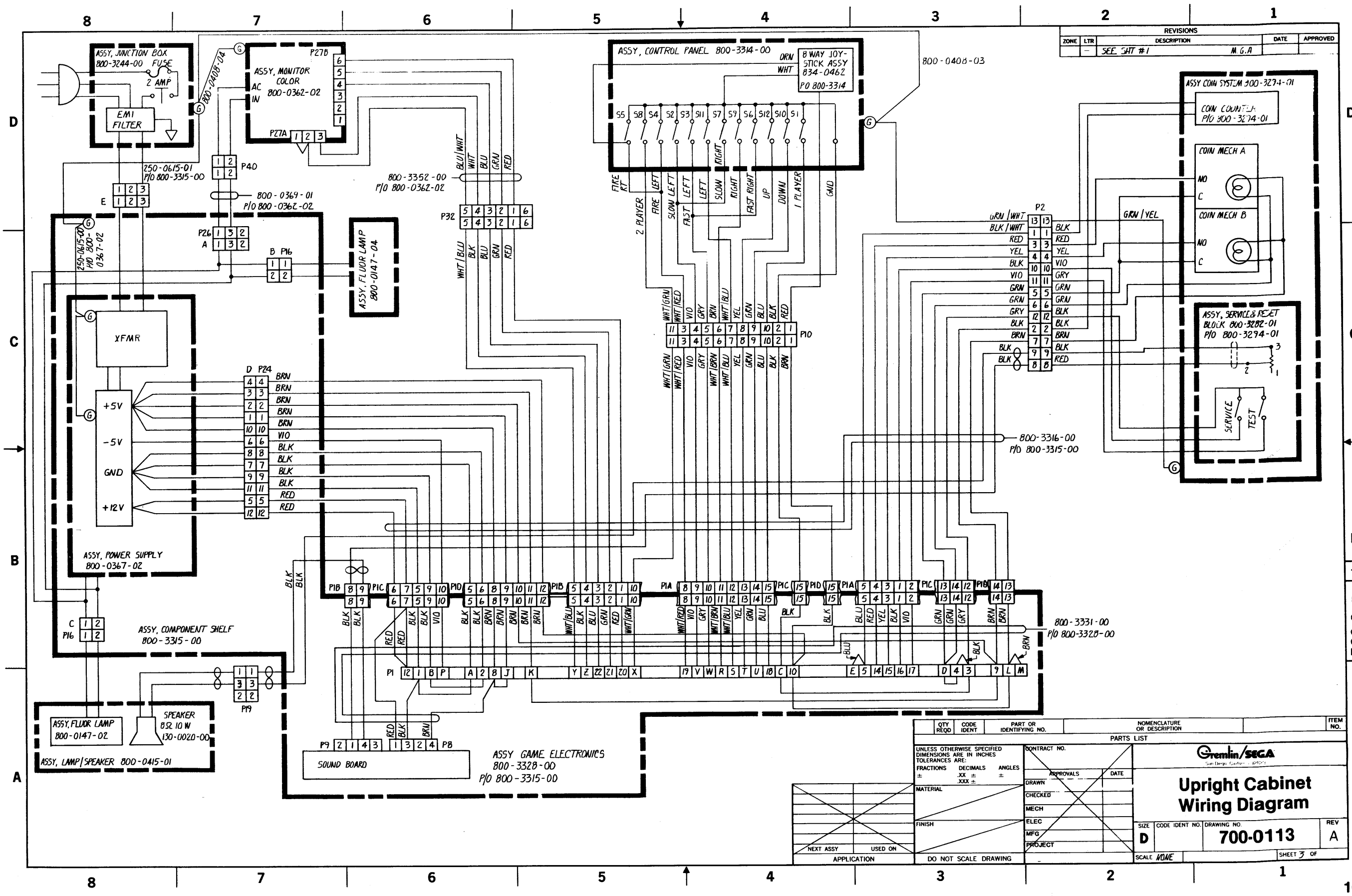




# Sound Board Assembly

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				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				
FRACTIONS	DECIMALS	ANGLES		
±	±	±		
MATERIAL			CONTRACT NO.	
FINISH			APPROVALS	
NEXT ASSY			DATE	
USED ON			DRAWN	
APPLICATION			CHECKED	
DO NOT SCALE DRAWING			MECH	
			ELEC	
			MFG	
			PROJECT	

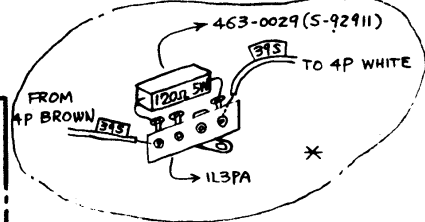
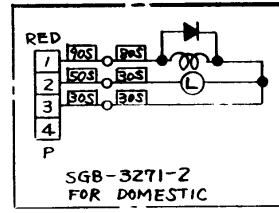
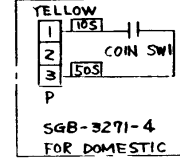
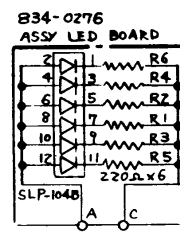
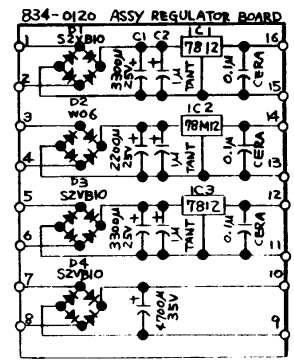
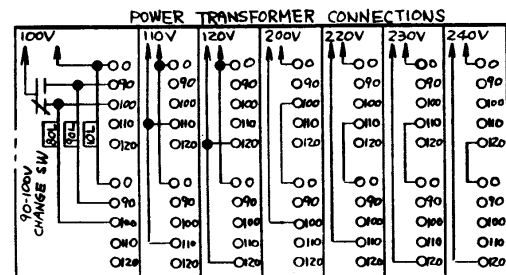
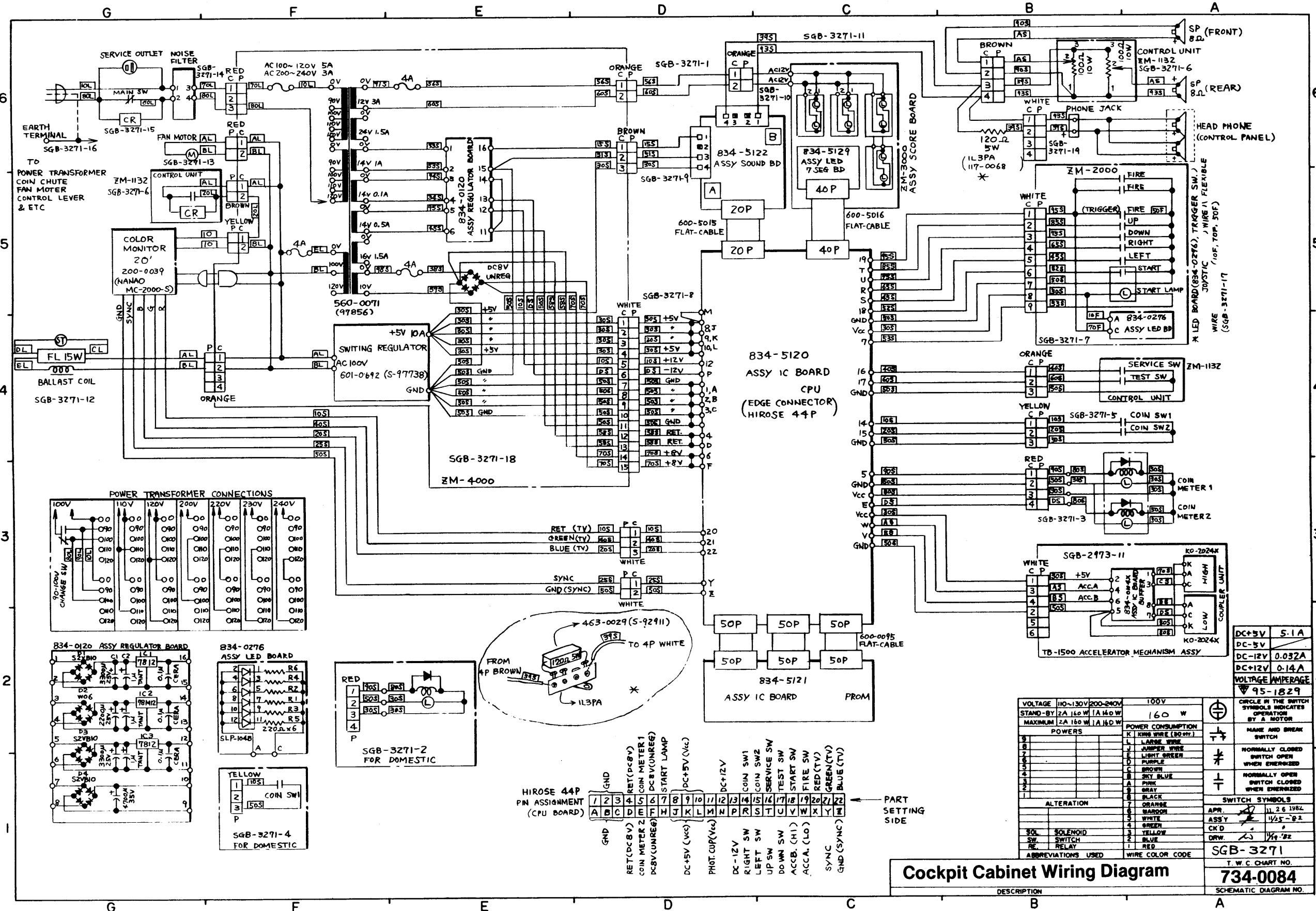
**Gremlin/SEGA**  
San Diego, California - 92121

## Upright Cabinet Wiring Diagram

SIZE: **D** CODE IDENT NO.: **700-0113** DRAWING NO.: **700-0113** REV: **A**

SCALE: **NONE** SHEET **3** OF **3**

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. (H)	ACC.A. (L)	ACC.B. (H)	ACC.B. (L)	FIRE SW	RED(TV)	GREEN(TV)	BLUE(TV)	SYNC GND(SYNC)

VOLTAGE	110-130V	200-240V	100V
STAND-BY	2A	1.6A	1A
MAXIMUM	2A	1.6A	1A
POWER CONSUMPTION	160 W		
POWERS	X (KING WIRE (20W))		
1	LARGE WIRE		
2	JUMPER WIRE		
3	LIGHT GREEN		
4	PURPLE		
5	PINK		
6	SKY BLUE		
7	PINK		
8	GRAY		
9	BLACK		
10	ORANGE		
11	ORANGE		
12	WHITE		
13	GREEN		
14	YELLOW		
15	BLUE		
16	RED		
17	RED		
18	RED		
19	RED		
20	RED		
21	RED		
22	RED		

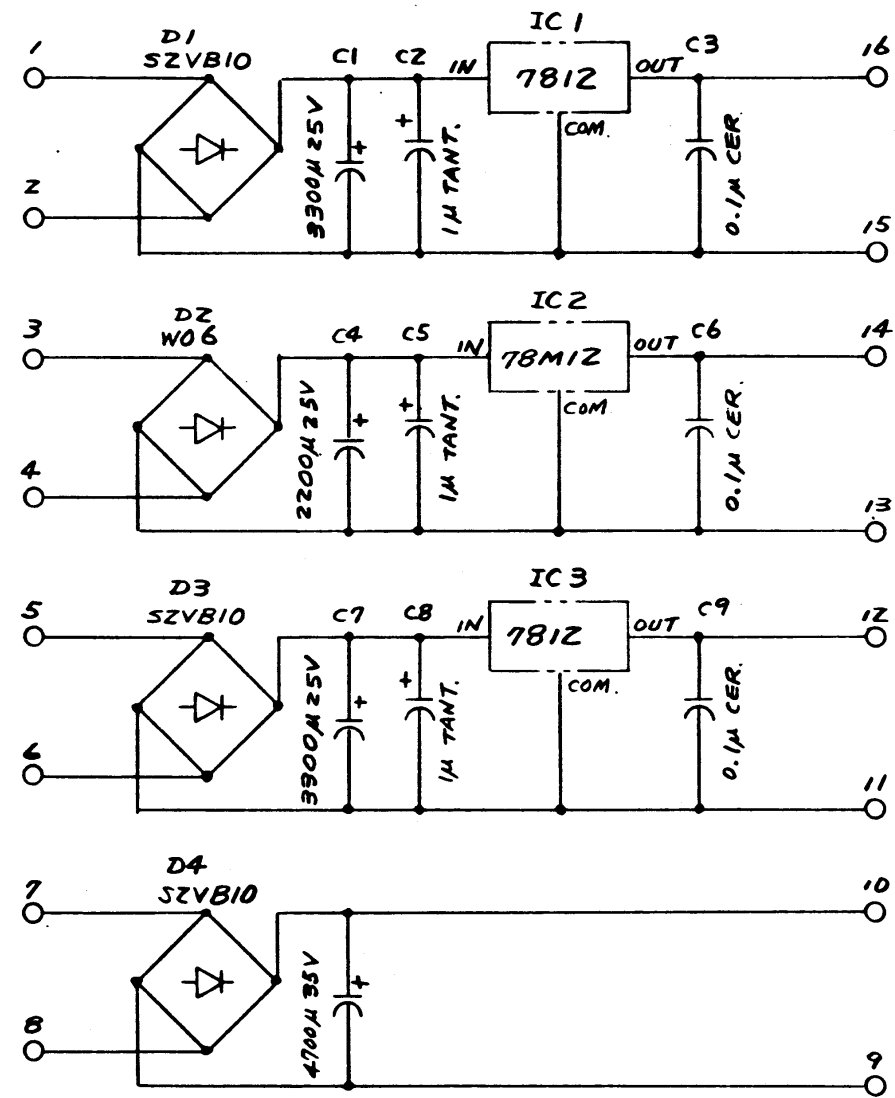
DC+5V	5.1A
DC-5V	
DC-12V	0.032A
DC+12V	0.14A
VOLTAGE AMPERAGE	
95-1829	

**Cockpit Cabinet Wiring Diagram**

ALTERATION	
SO.	SOLENOID
SW.	SWITCH
RE.	RELAY
ABBREVIATIONS USED	WIRE COLOR CODE
T. W. C. CHART NO.	
<b>734-0084</b>	
SCHEMATIC DIAGRAM NO.	

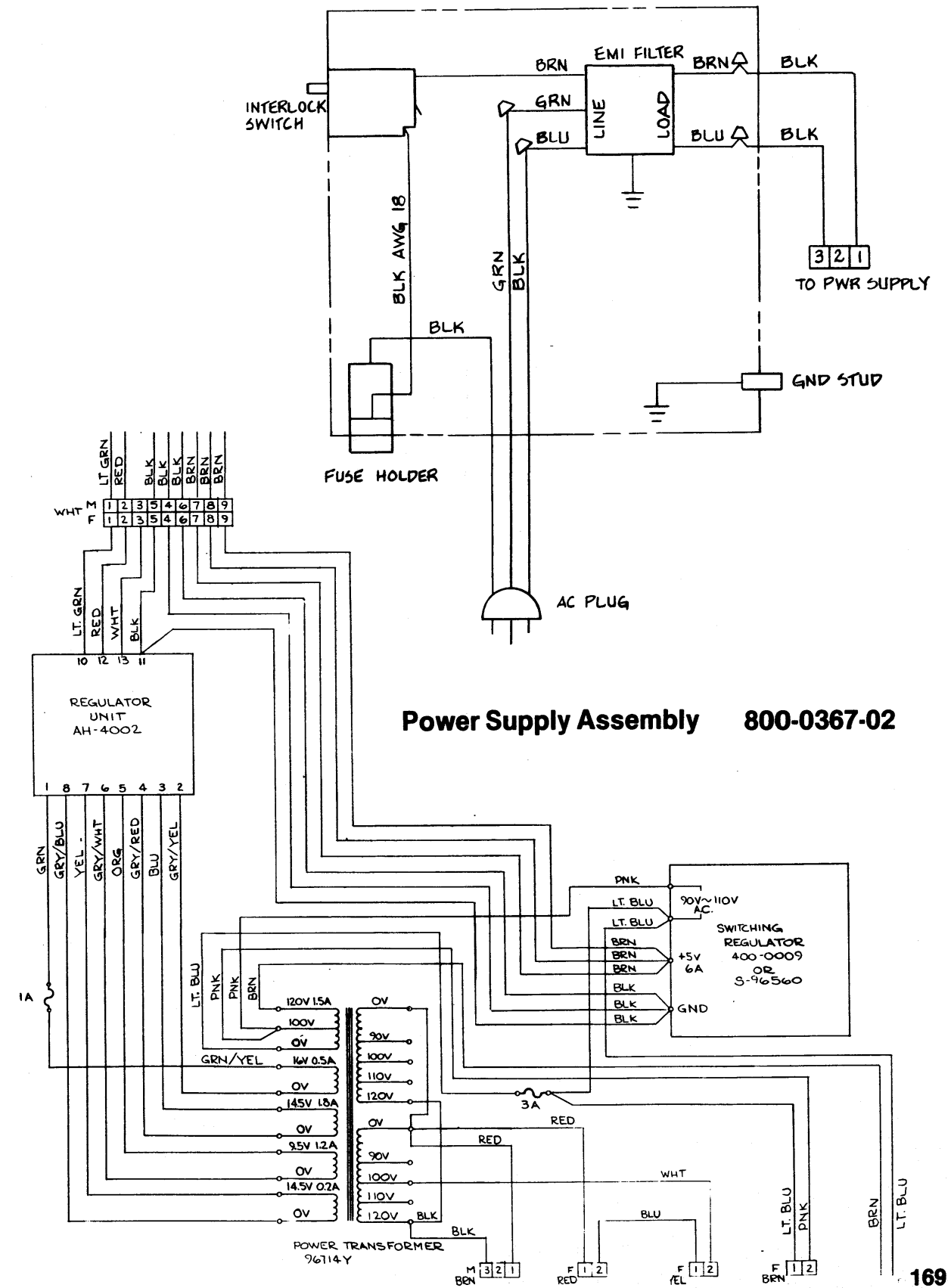
Regulator Board Assembly

834-0120



AC Junction Box Assembly

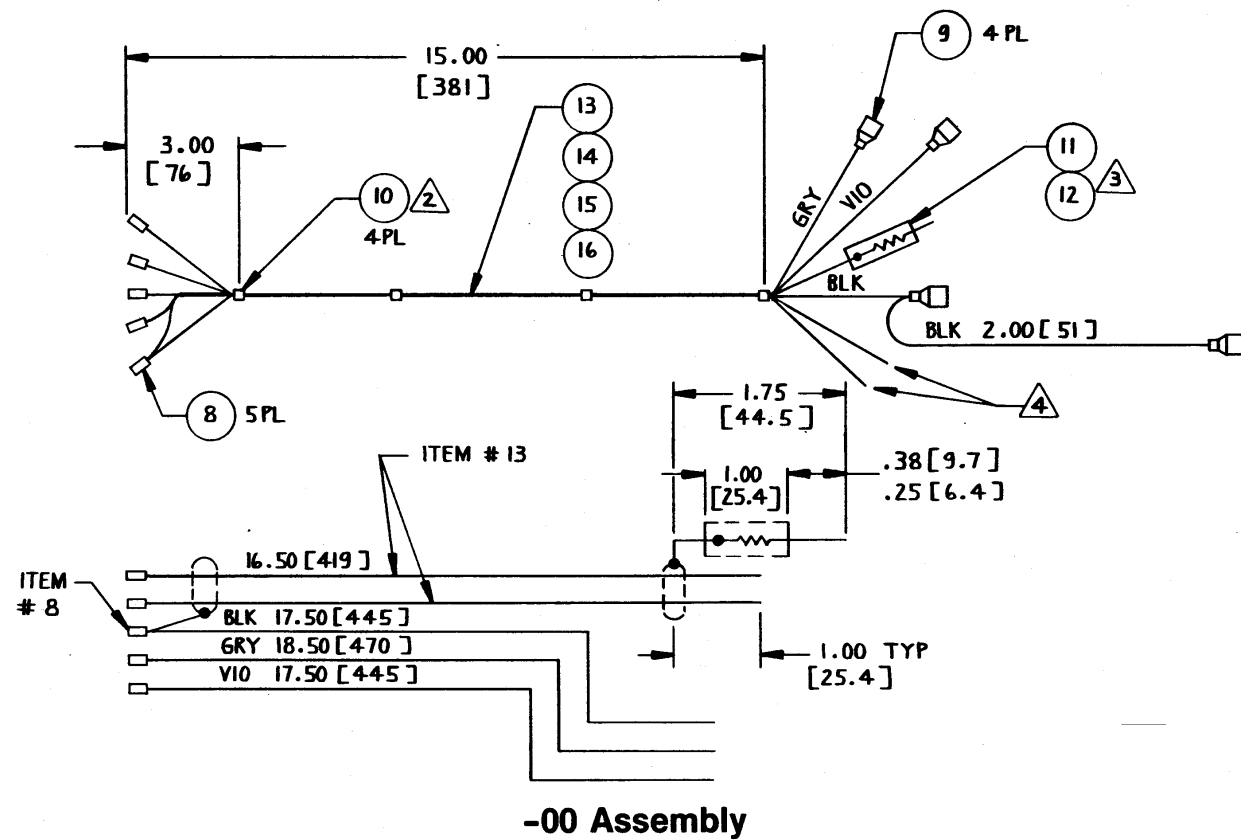
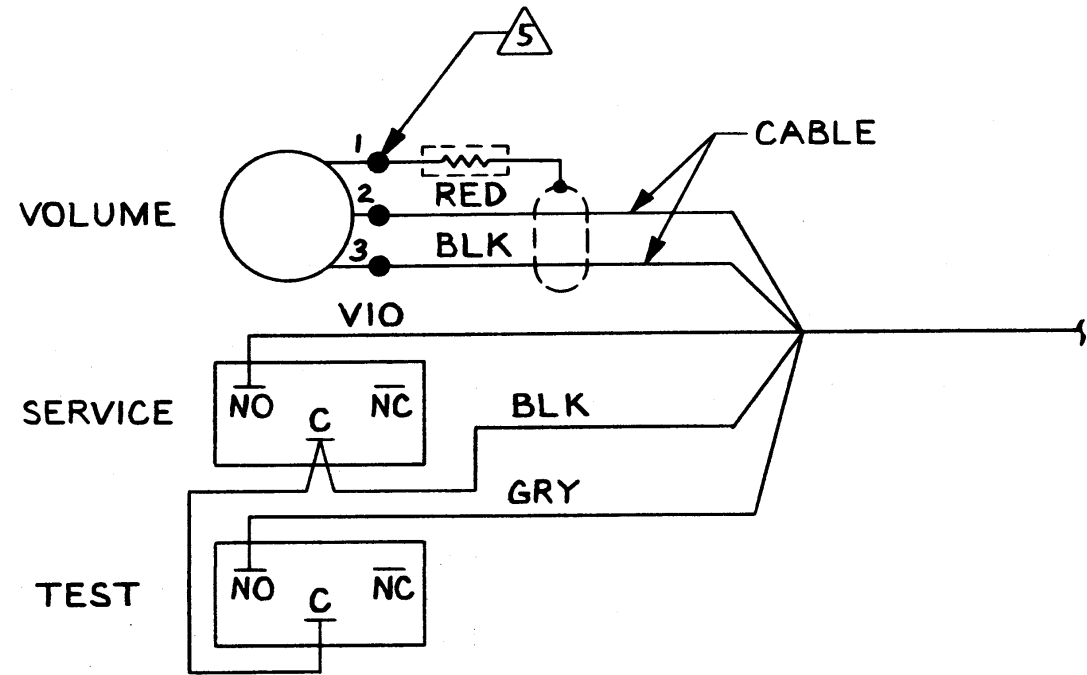
800-3244





Volume Control Block Assembly

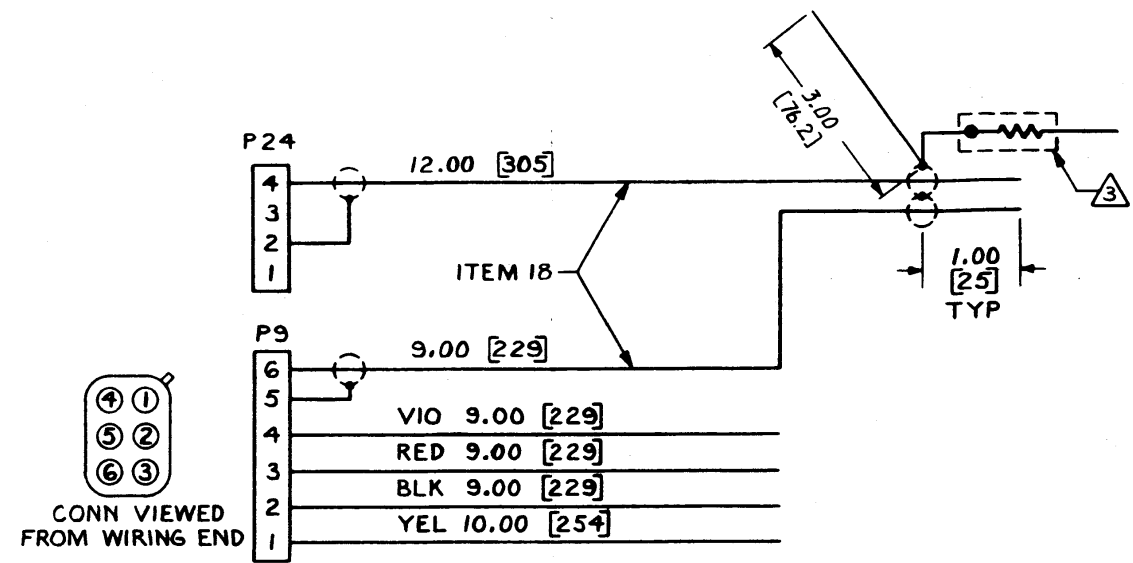
800-3282



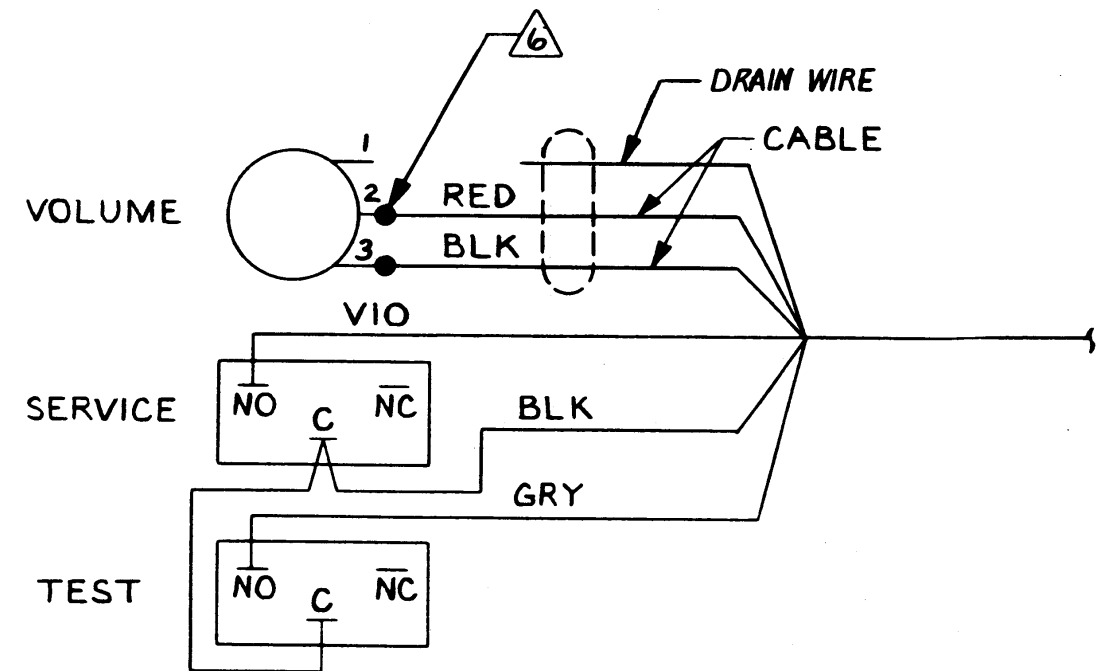
-00 Assembly

Volume Control Block Assembly

800-3282



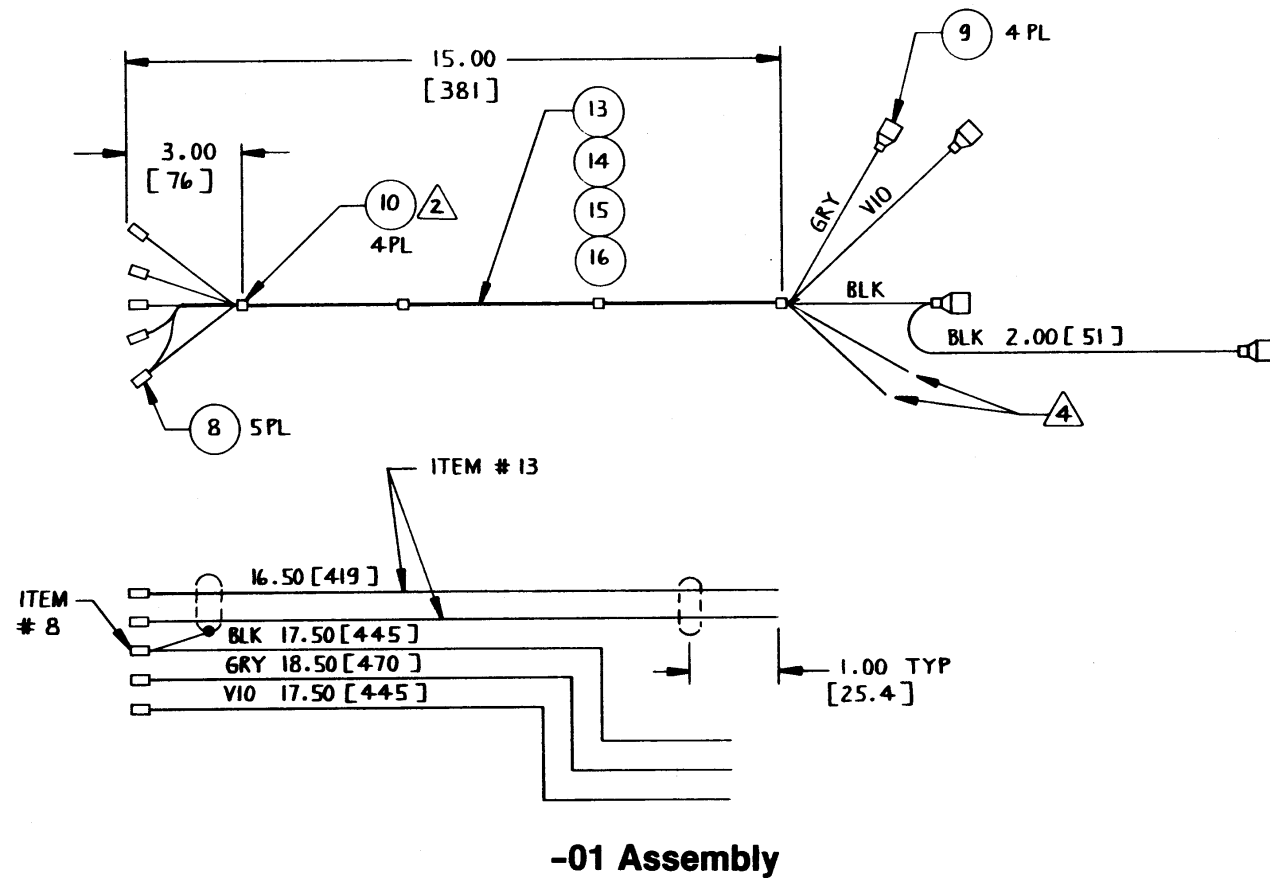
-00 Assembly



-01 Assembly

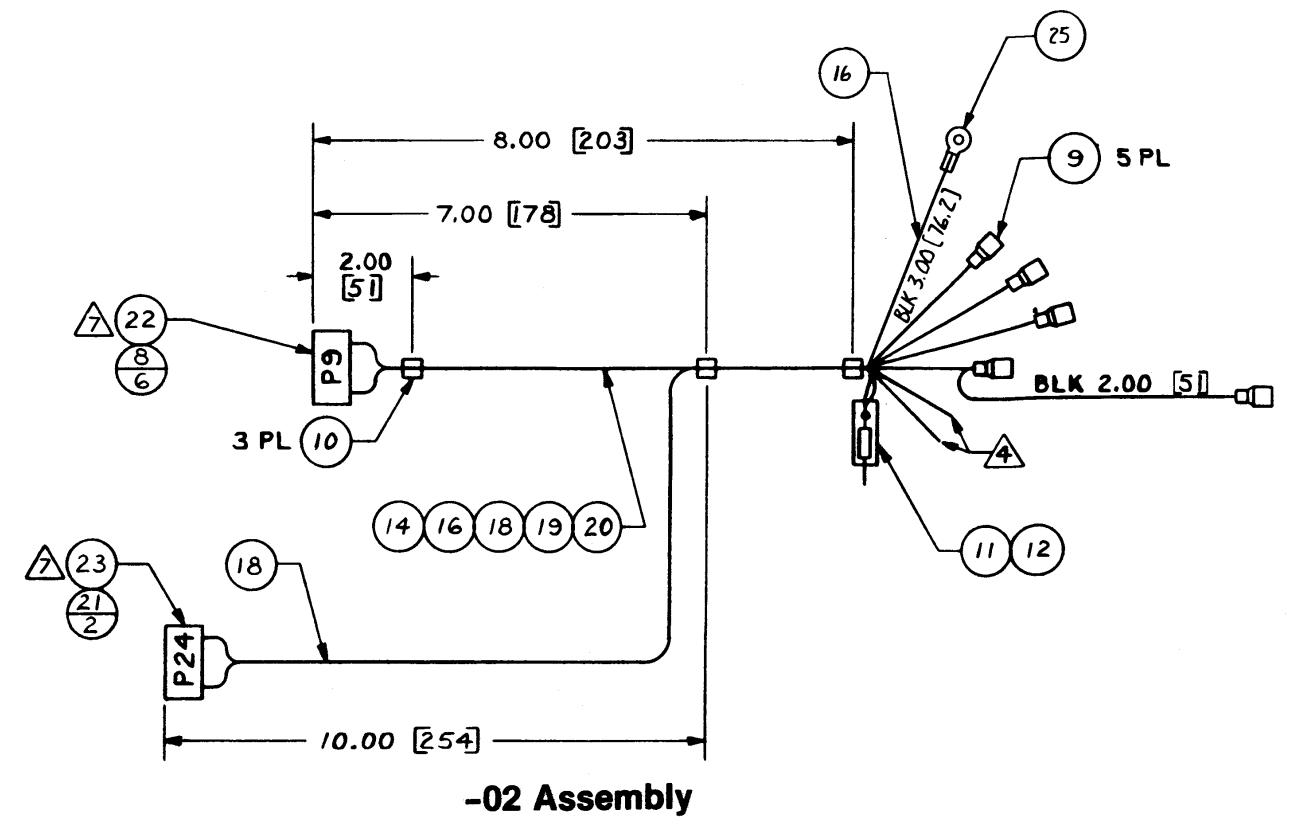
**Volume Control Block Assembly**

800-3282



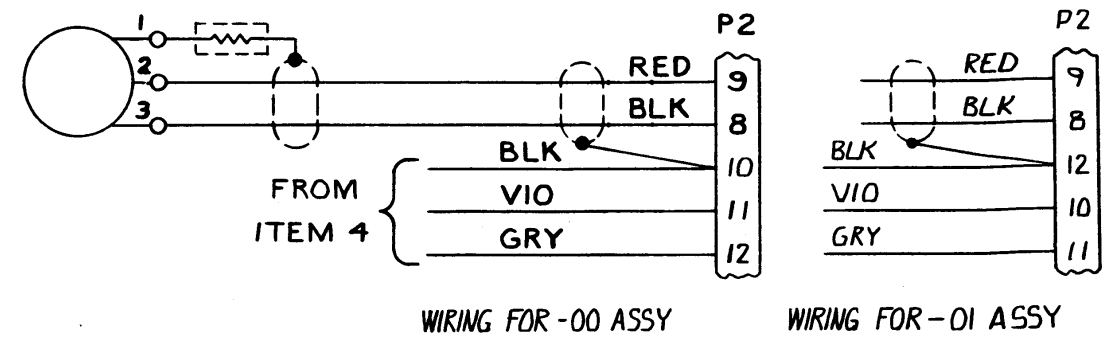
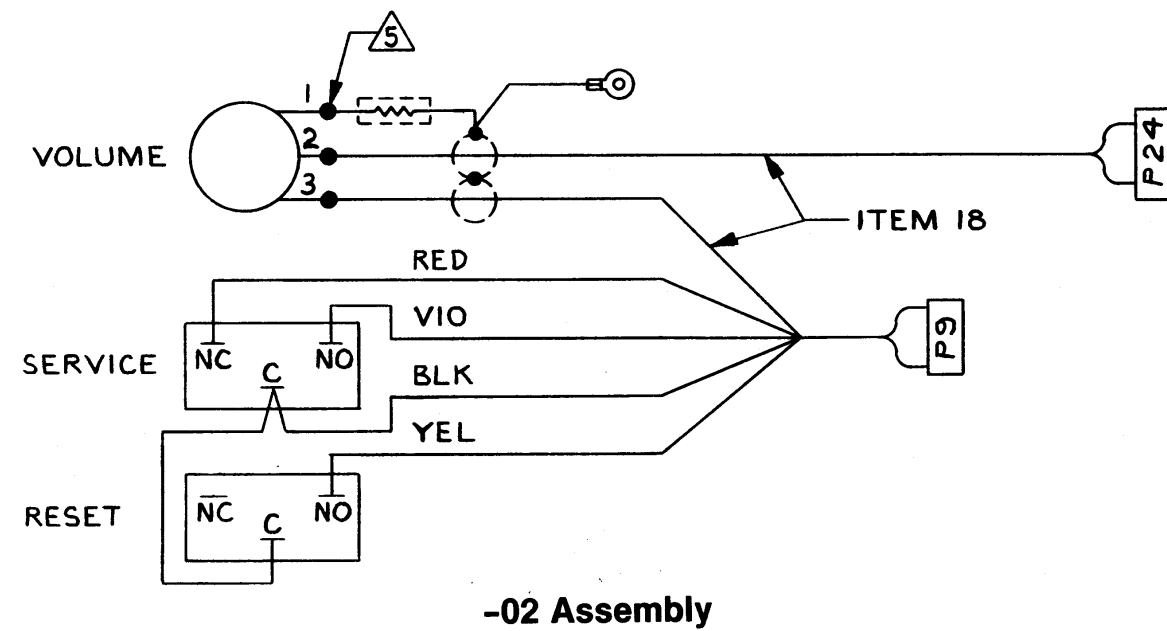
**Volume Control Block Assembly**

800-3282



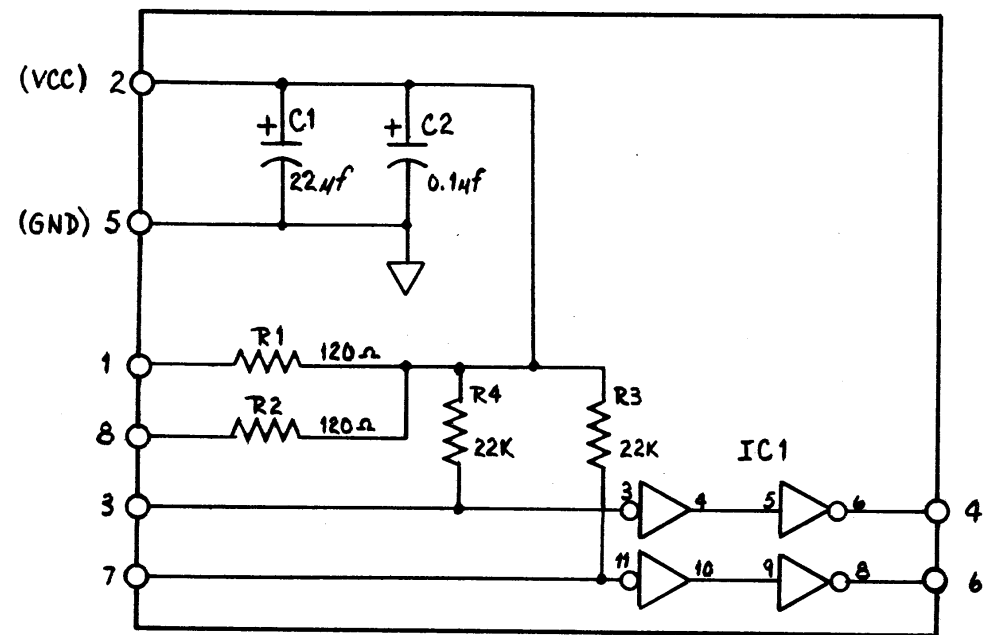
**Coin System Assembly**

800-3294-01



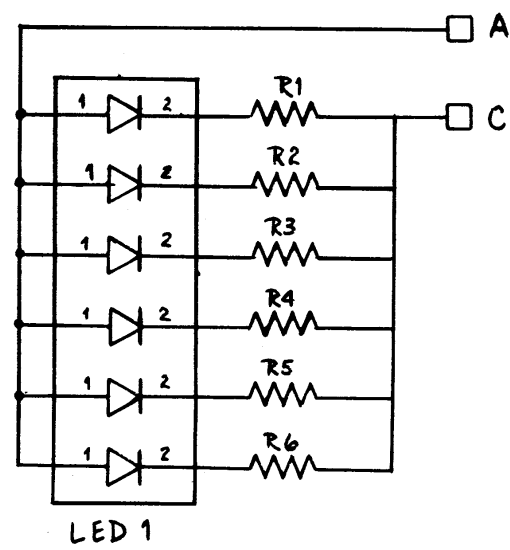
IC Buffer Board Assembly

834-0104



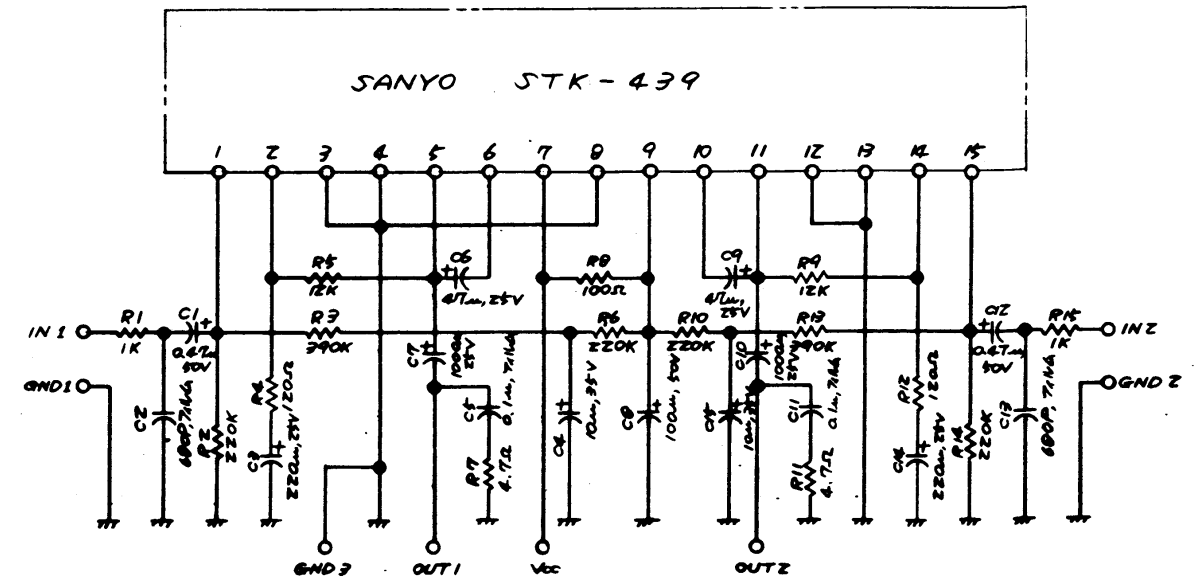
LED Board Assembly

834-0276



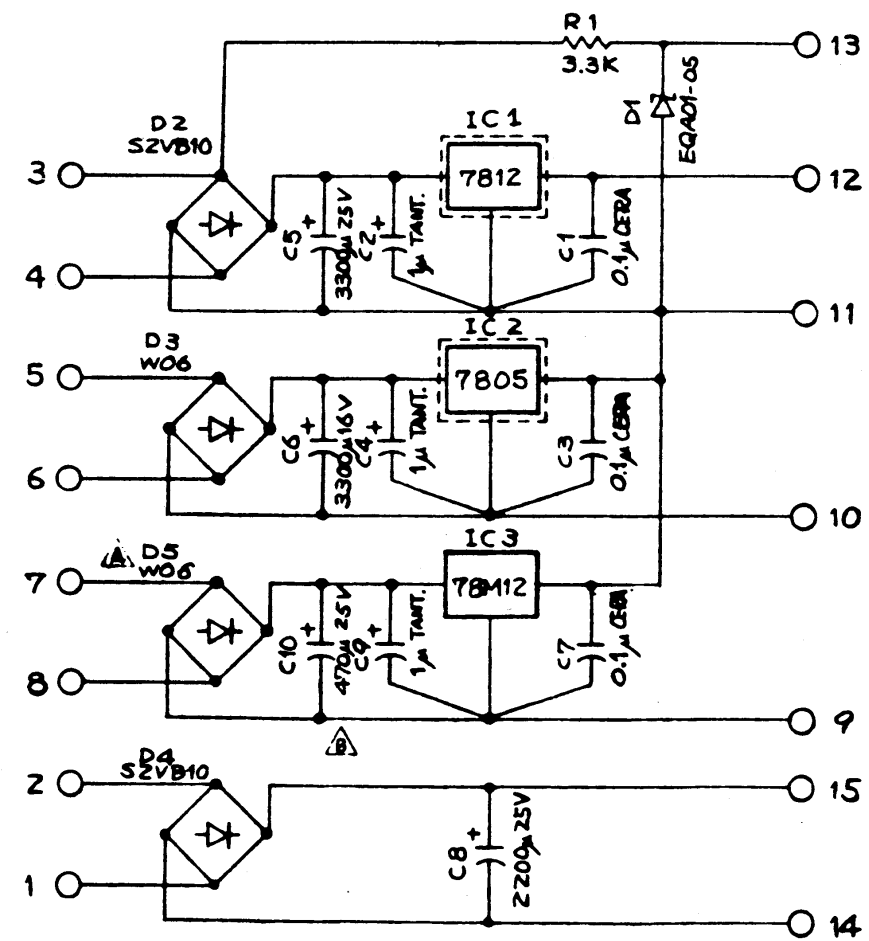
Power Amp Assembly

834-0121

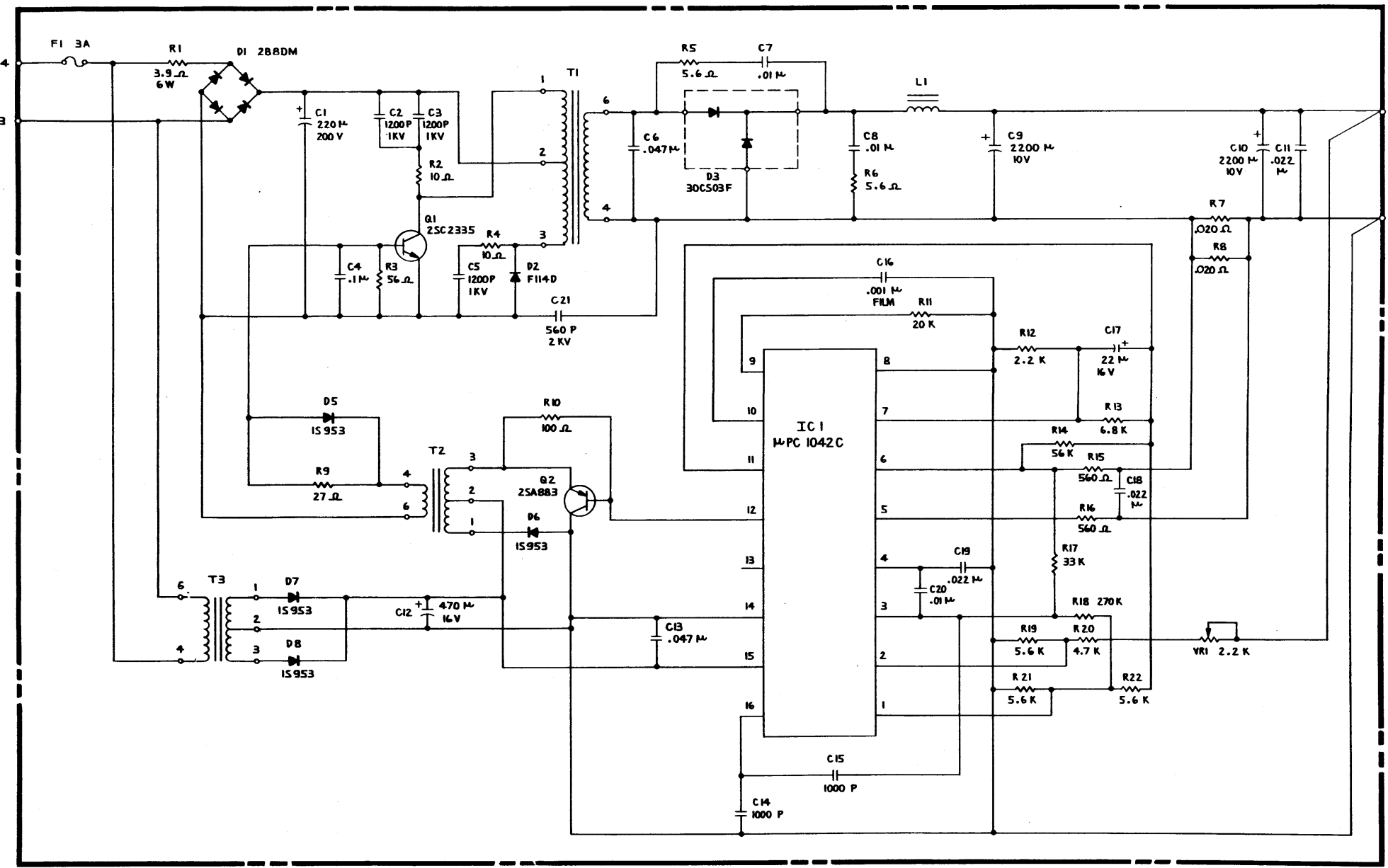


Regulator Unit

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:				
FRACTIONS	DECIMALS	ANGLES		
±	.XX ±	±		
	.XXX ±			
MATERIAL		CONTRACT NO.		
FINISH		APPROVALS		
NEXT ASSY		DRAWN <i>SJM</i> <i>DUONG</i>		
USED ON		CHECKED <i>G. GRICE</i>		
APPLICATION		MECH		
		ELEC		
		MFG		
		PROJECT		
		SCALE NONE		
		DO NOT SCALE DRAWING		
		SHEET 1 OF 1		

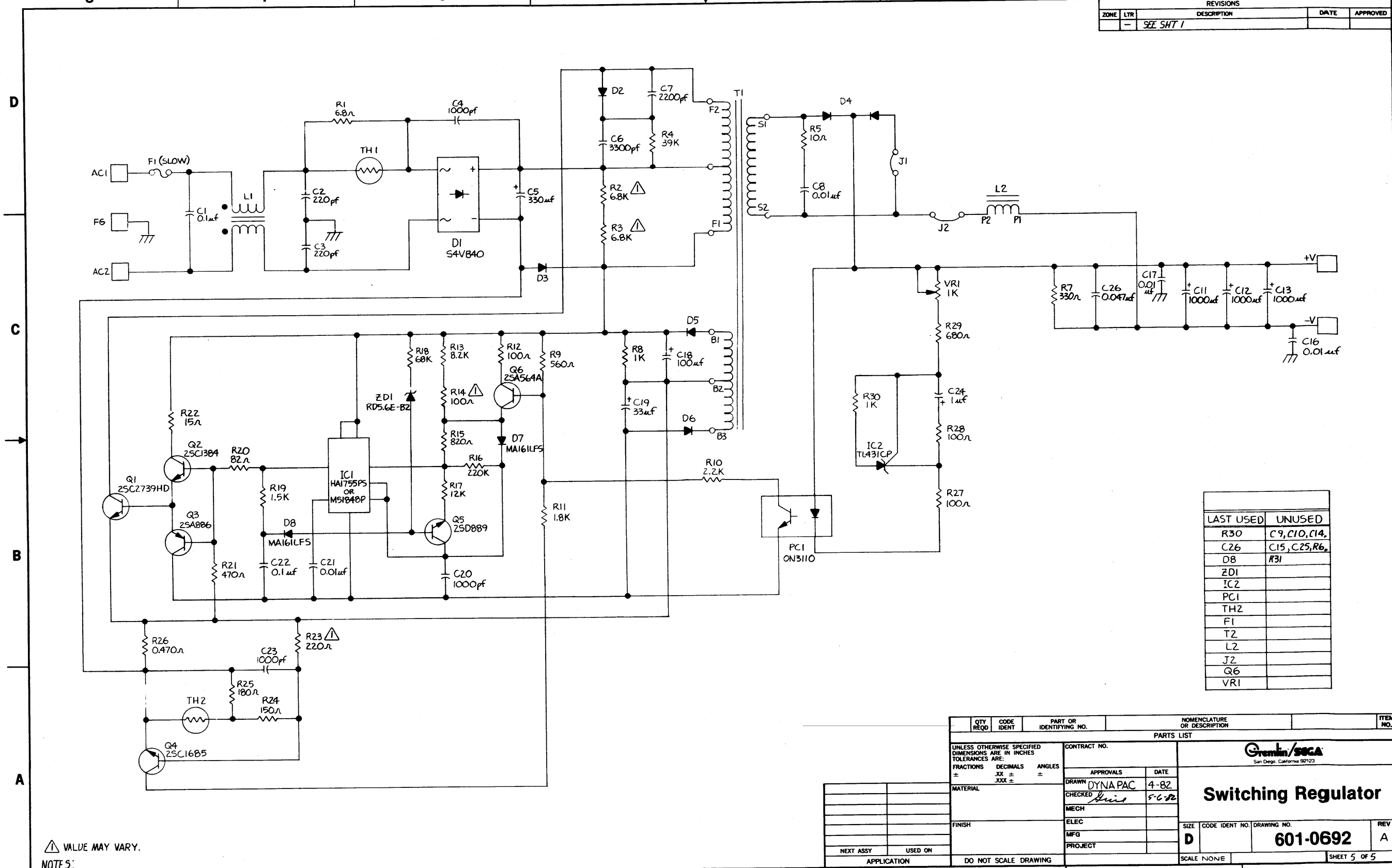
**Green/SECA**  
San Diego, California 92123

## Switching Regulator

DATE: 8-17-81  
 DRAWN: *SJM* *DUONG*  
 CHECKED: *G. GRICE*  
 SIZE: D  
 CODE IDENT NO.: 601-0158  
 REV: A

601-0158 A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	-	SEE SHT 1		



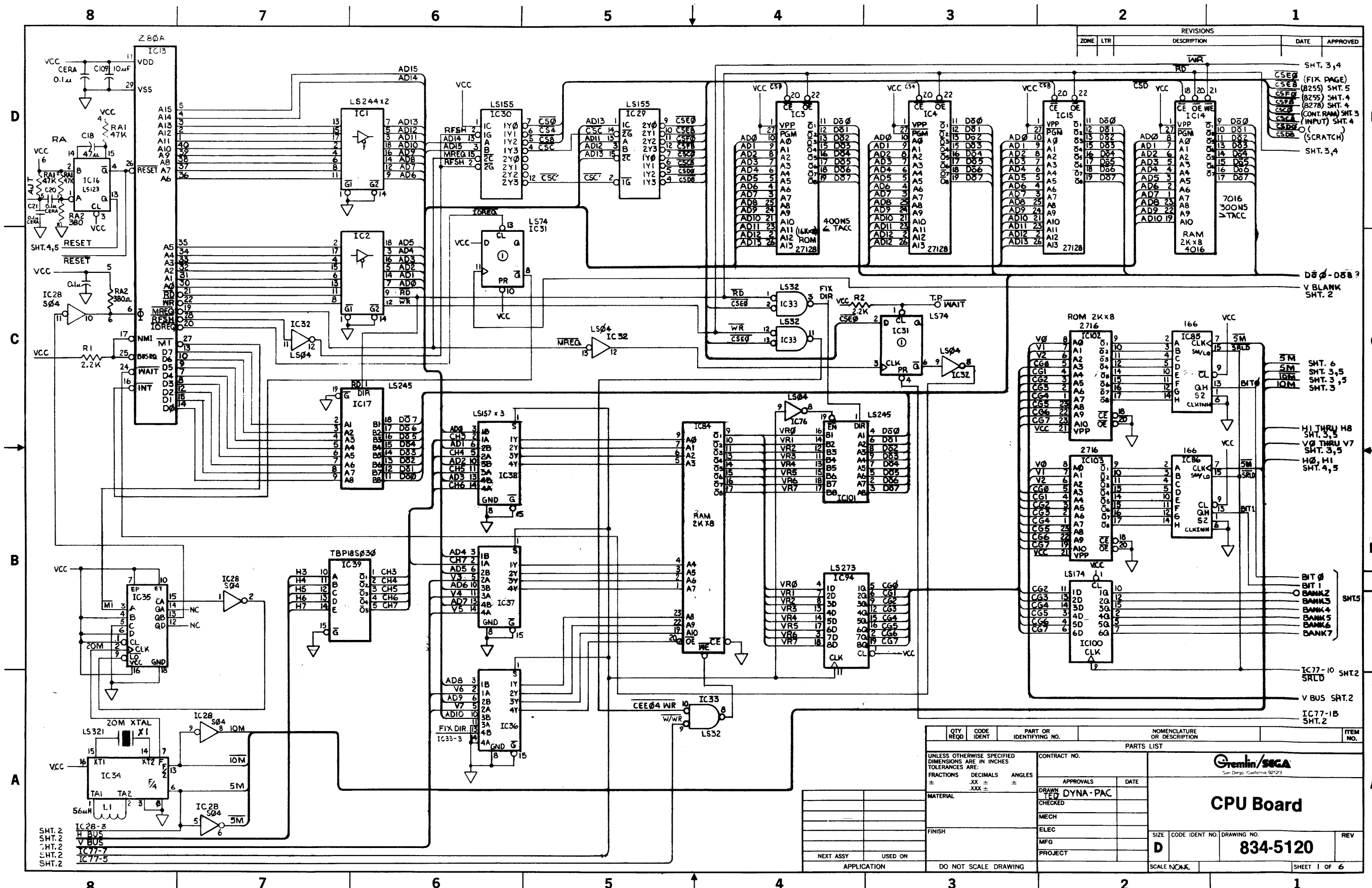
LAST USED	UNUSED
R30	C9, C10, C14,
C26	C15, C25, R6,
D8	R31
ZD1	
IC2	
PC1	
TH2	
F1	
T2	
L2	
J2	
Q6	
VR1	

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



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

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

D8-D87  
V BLANK  
SHT. 2

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

H1 THRU H8  
SHT. 3,5  
V0 THRU V7  
SHT. 3,5  
H0, H1  
SHT. 4,5

SHT. 5  
SHT. 1  
SHT. 2  
SHT. 2

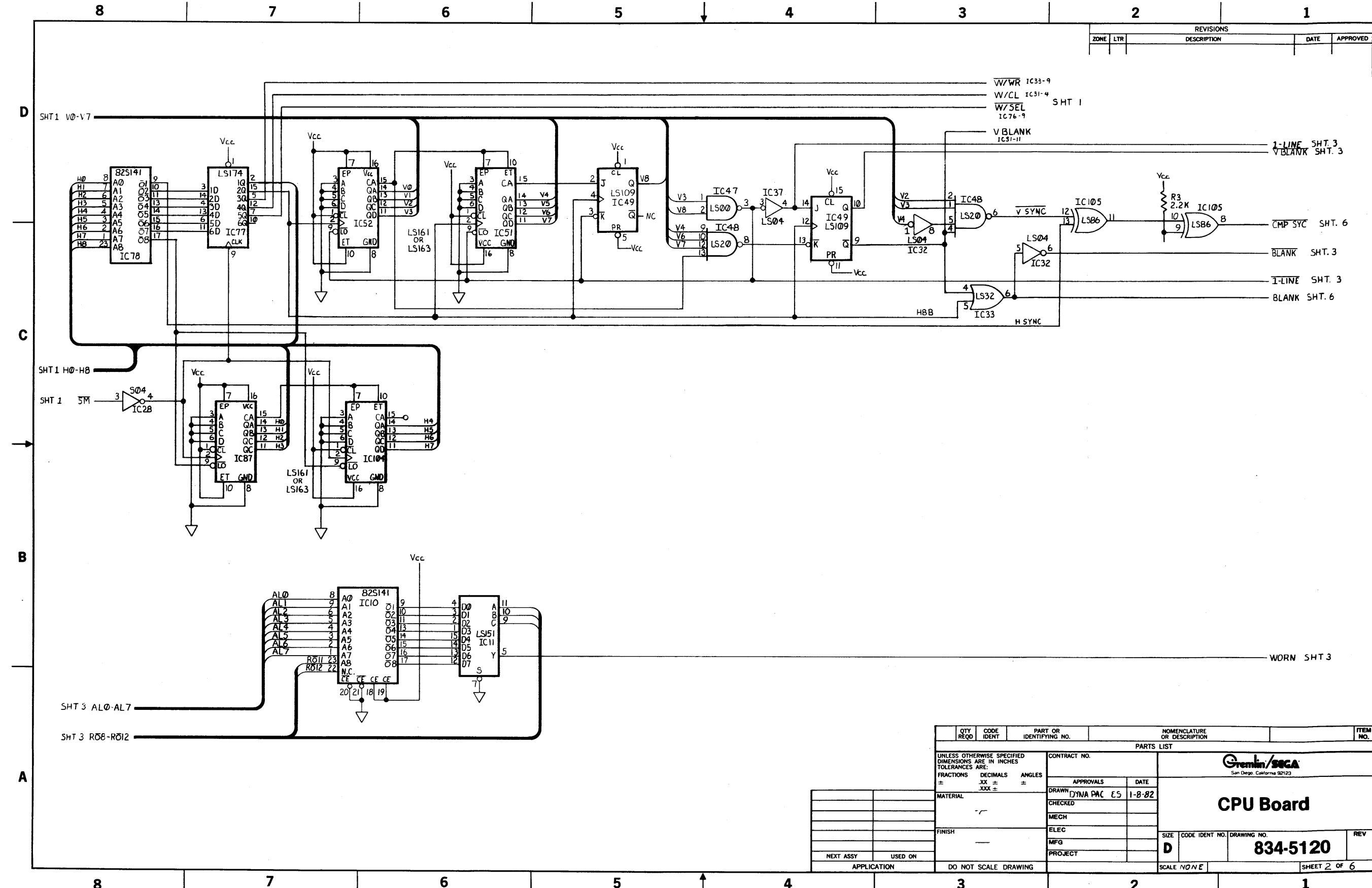
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				
FRACTIONS	DECIMALS	ANGLES		
±	.XX ±	±		
MATERIAL	PARTS LIST			
FINISH	CONTRACT NO.			
	APPROVALS DATE			
	DRAWN BY DYNA-PAC			
	CHECKED			
	MECH			
	ELEC			
	MFG			
	PROJECT			
NEXT ASSY		USED ON		
DO NOT SCALE DRAWING				
SIZE CODE IDENT NO. DRAWING NO.			REV	
D			834-5120	
SCALE NONE			SHEET 1 OF 6	

**Griffin/SEGA**  
San Diego, California 92121

**CPU Board**

**834-5120**

- SHT. 2 IC 28-3
- SHT. 2 H BUS
- SHT. 2 V BUS
- SHT. 2 IC 77-7
- SHT. 2 IC 77-5



ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			

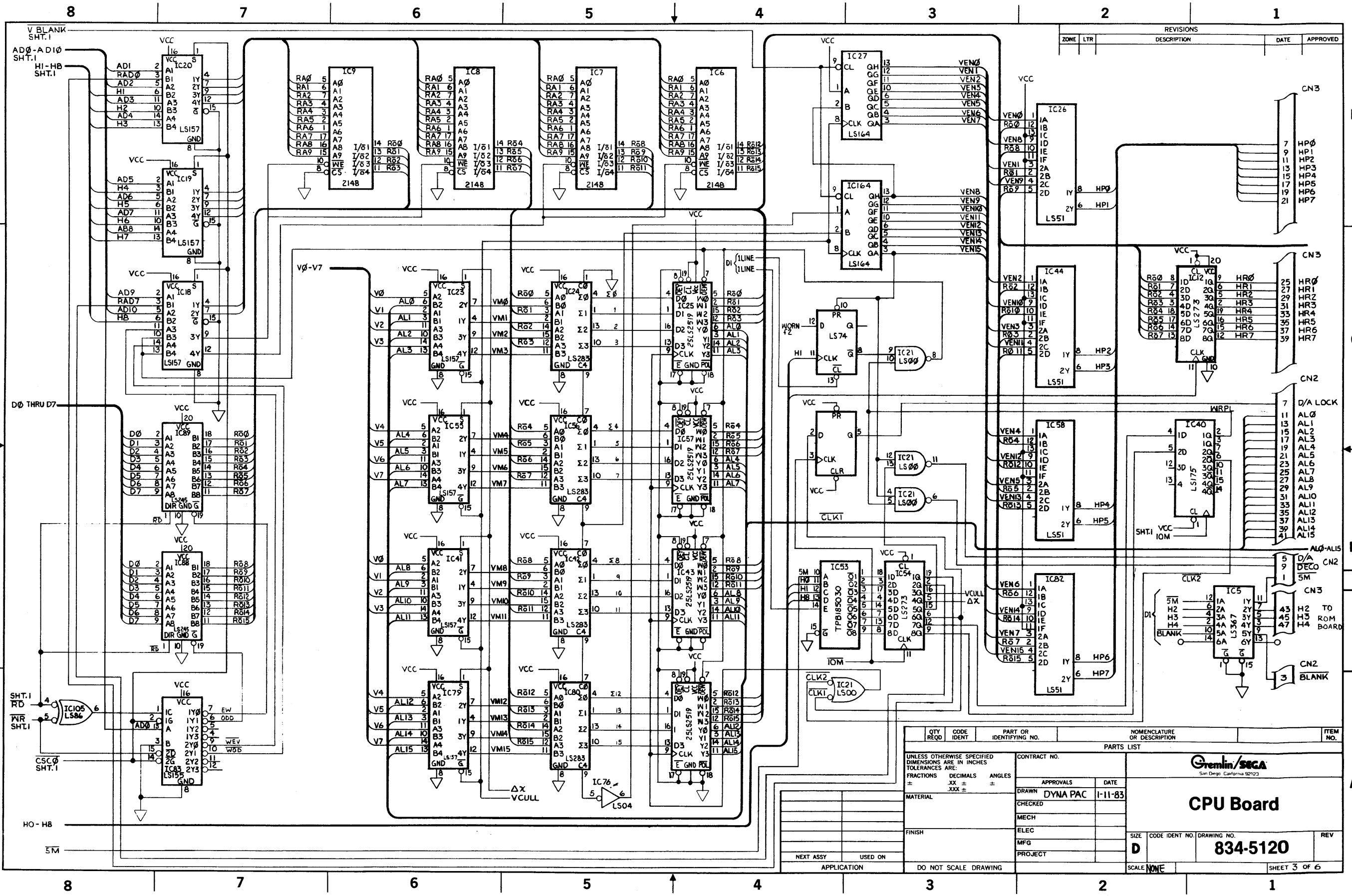
W/WR IC33-9  
W/CL IC31-4  
W/SEL IC76-9  
V BLANK IC51-11

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

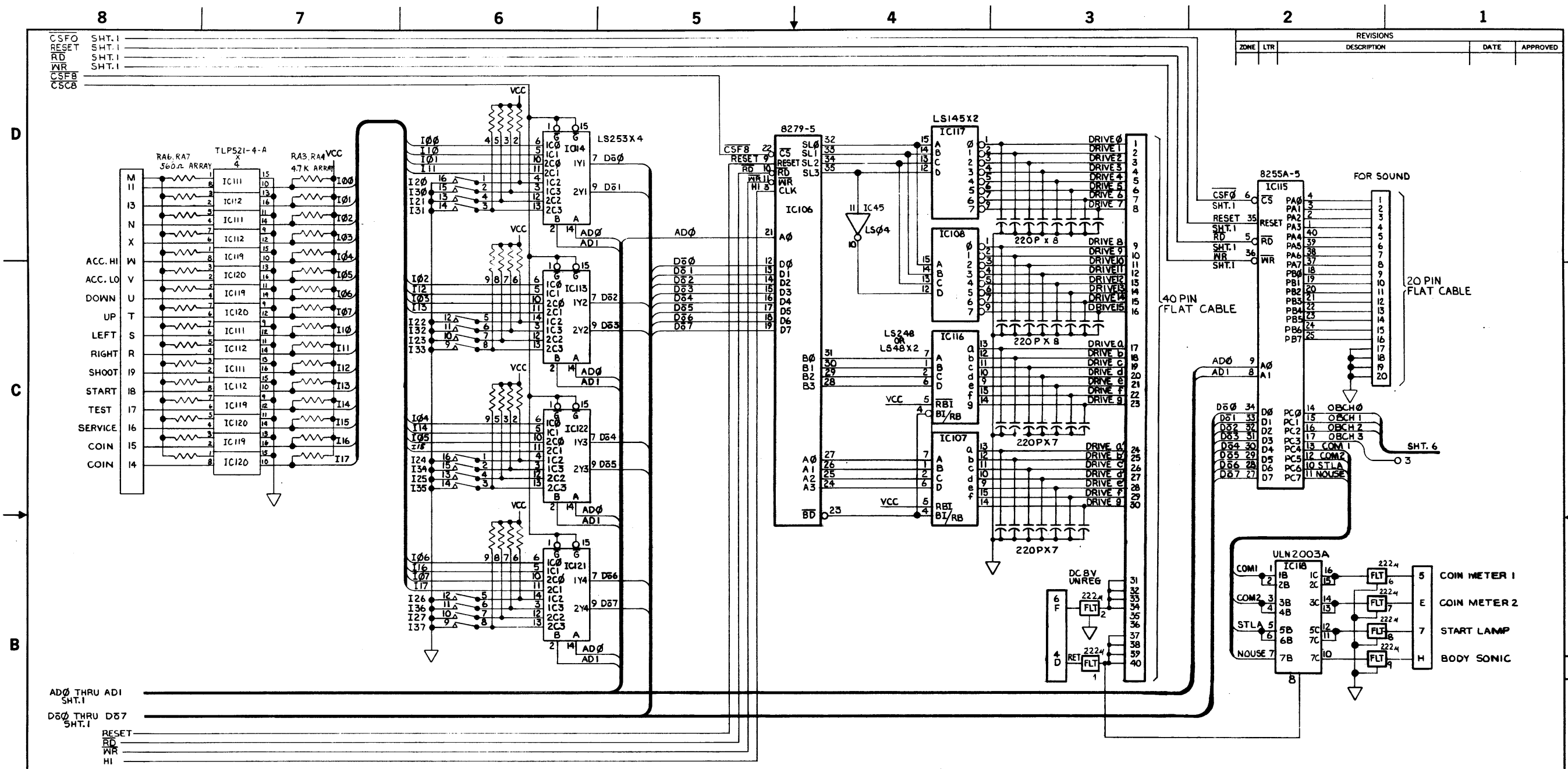
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS ±	DECIMALS .XX ±	ANGLES .XXX ±	APPROVALS	DATE
MATERIAL		DRAWN DYNA PAC ES 1-8-82		
FINISH		CHECKED		
NEXT ASSY		MECH		
USED ON		ELEC		
APPLICATION		MPFG		
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/E				SHEET 2 OF 6



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

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





REVISIONS			
ZONE	LTR	DESCRIPTION	DATE

DATE	APPROVED

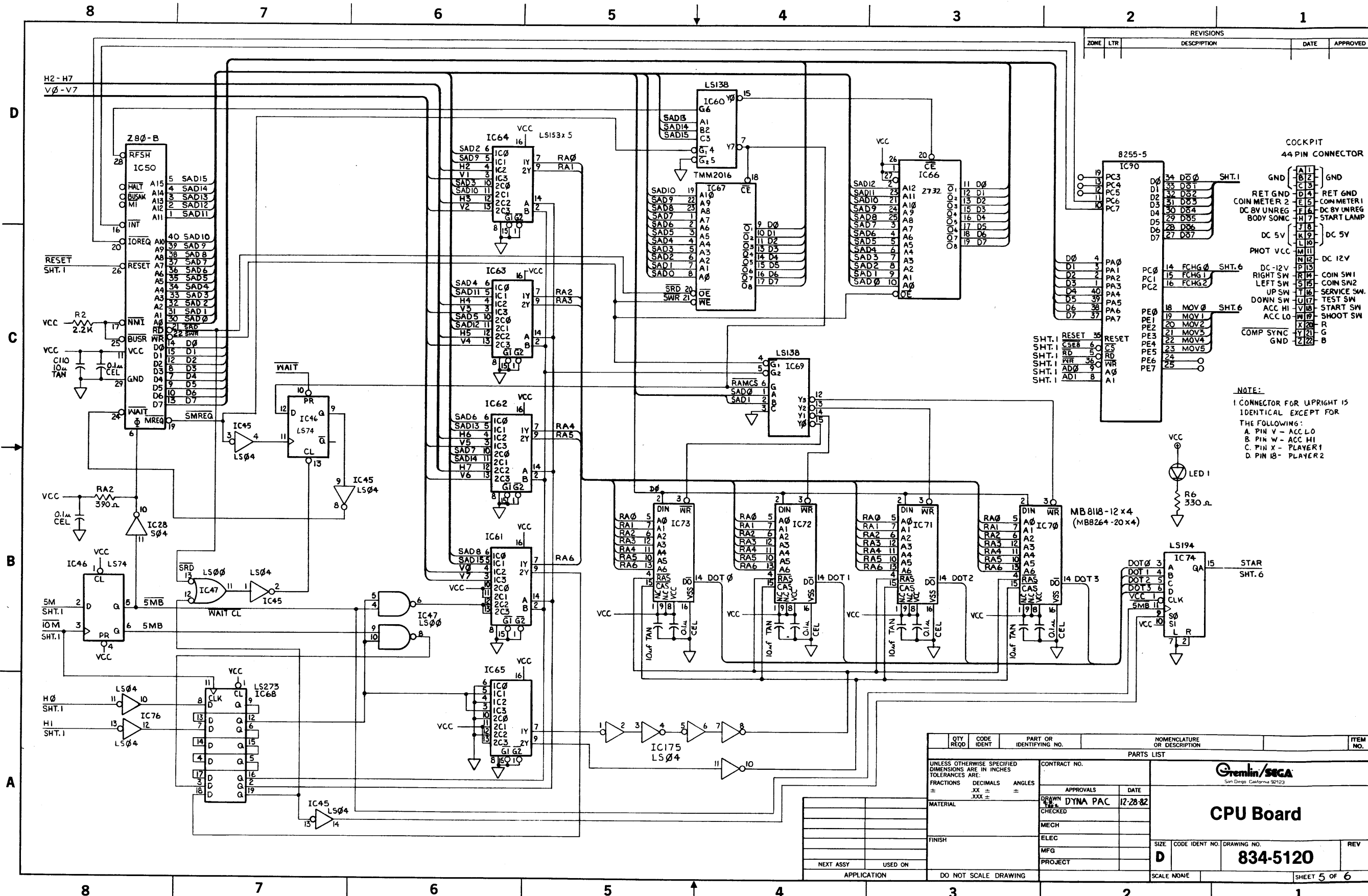
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PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	XX ±	±	DATE	
±	XXX ±	±	DRAWN DYN-FAC 12-29-82	
MATERIAL		CHECKED		
FINISH		MECH		
NEXT ASSY		ELEC		
USED ON		MFG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

Gremlin/SEGA  
San Diego, California 92123

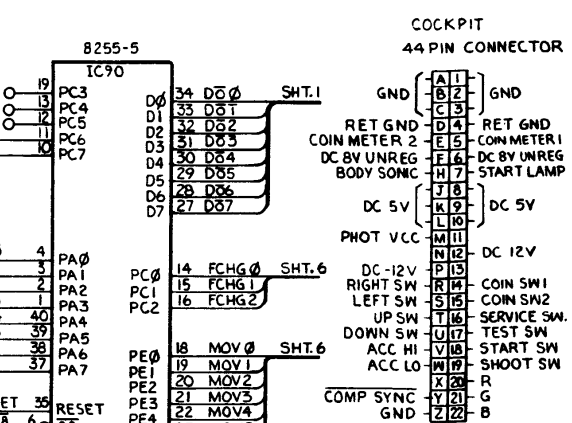
**CPU Board**

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

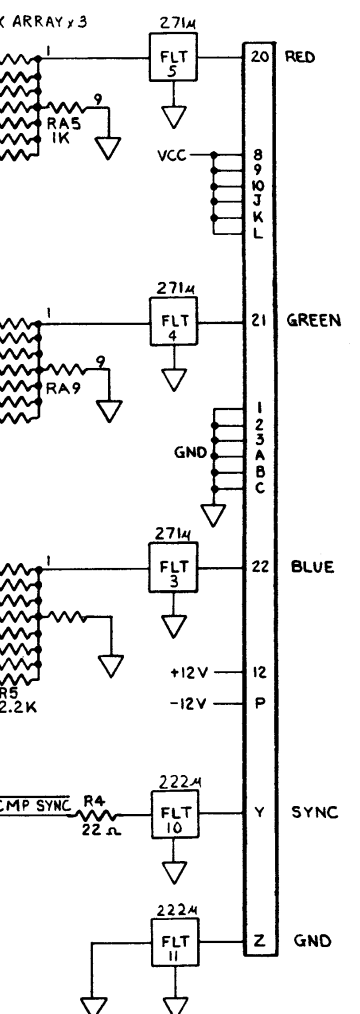
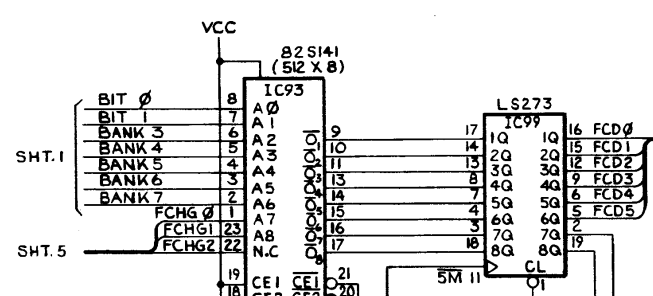
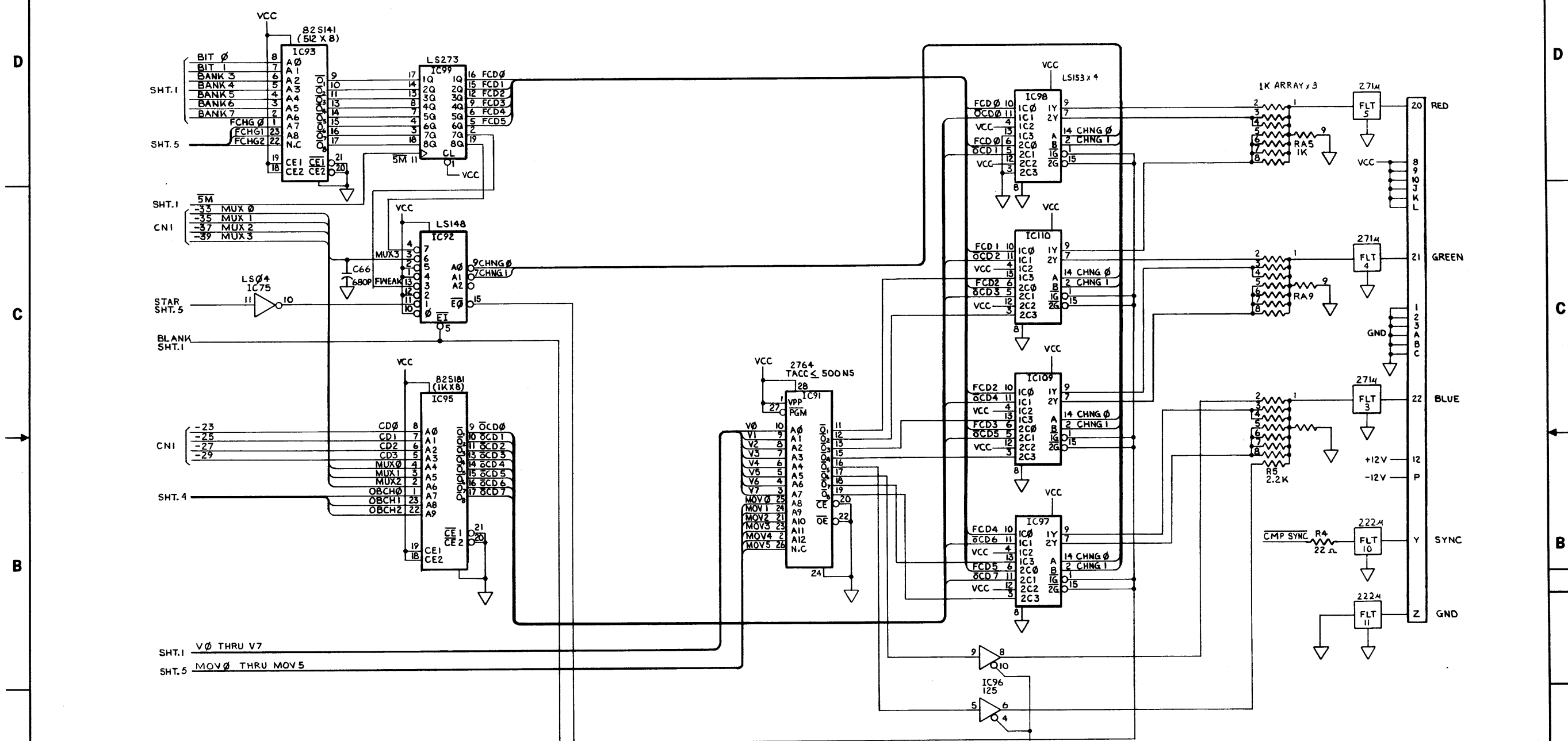
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				
FRACTIONS	DECIMALS	ANGLES		
±	.XX	±		
	.XXX	±		
MATERIAL			CONTRACT NO.	
FINISH			APPROVALS	
NEXT ASSY USED ON			DATE	
APPLICATION		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

Gremlin/SEGA  
 San Diego, California 92123

**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	
±	±	±	DATE	
±	±	±	DRAWN BY DYNA PAC 12-21-82	
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 6 OF 6		180		

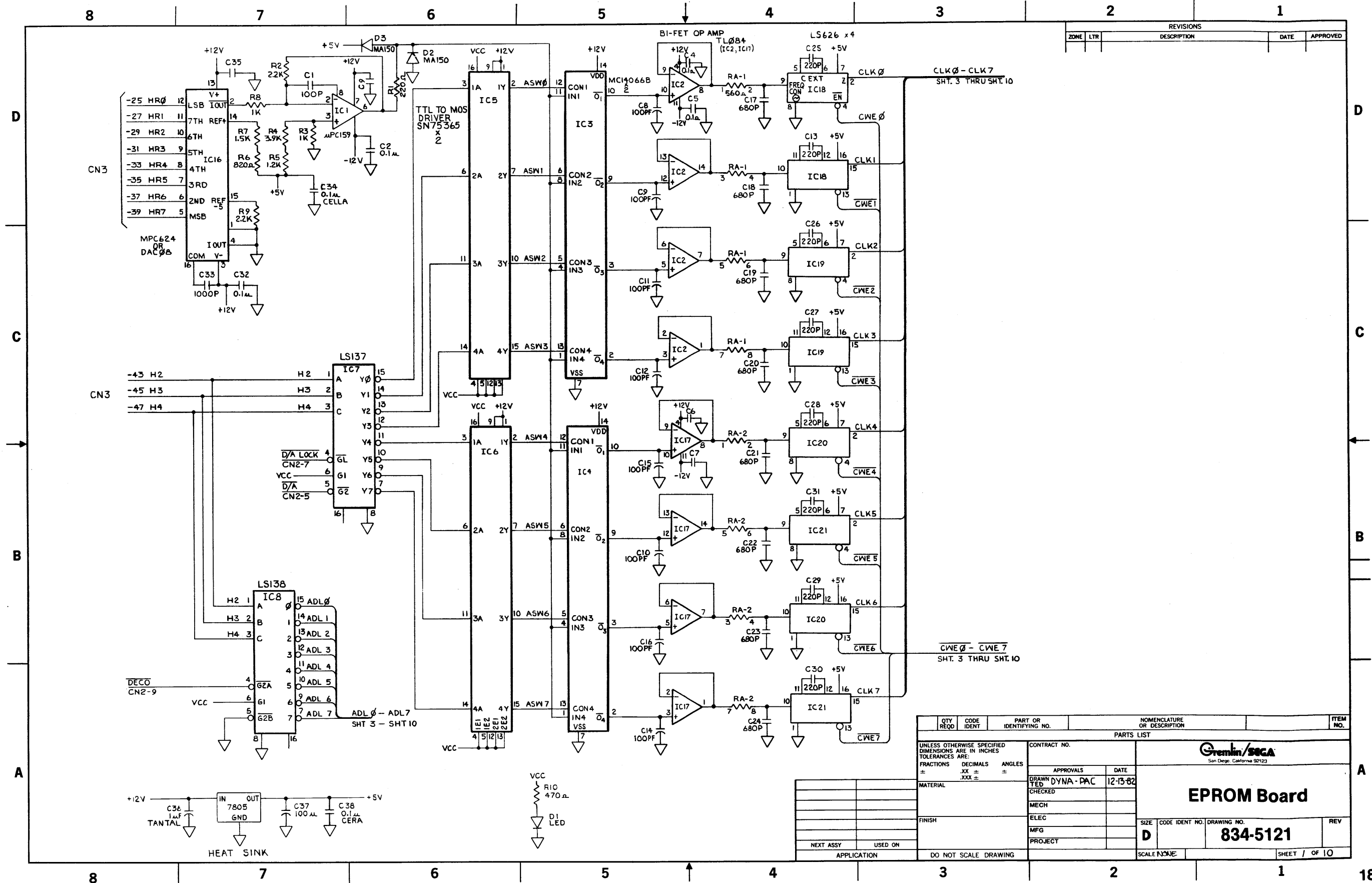


**CPU Board**

**834-5120**

SHEET 6 OF 6

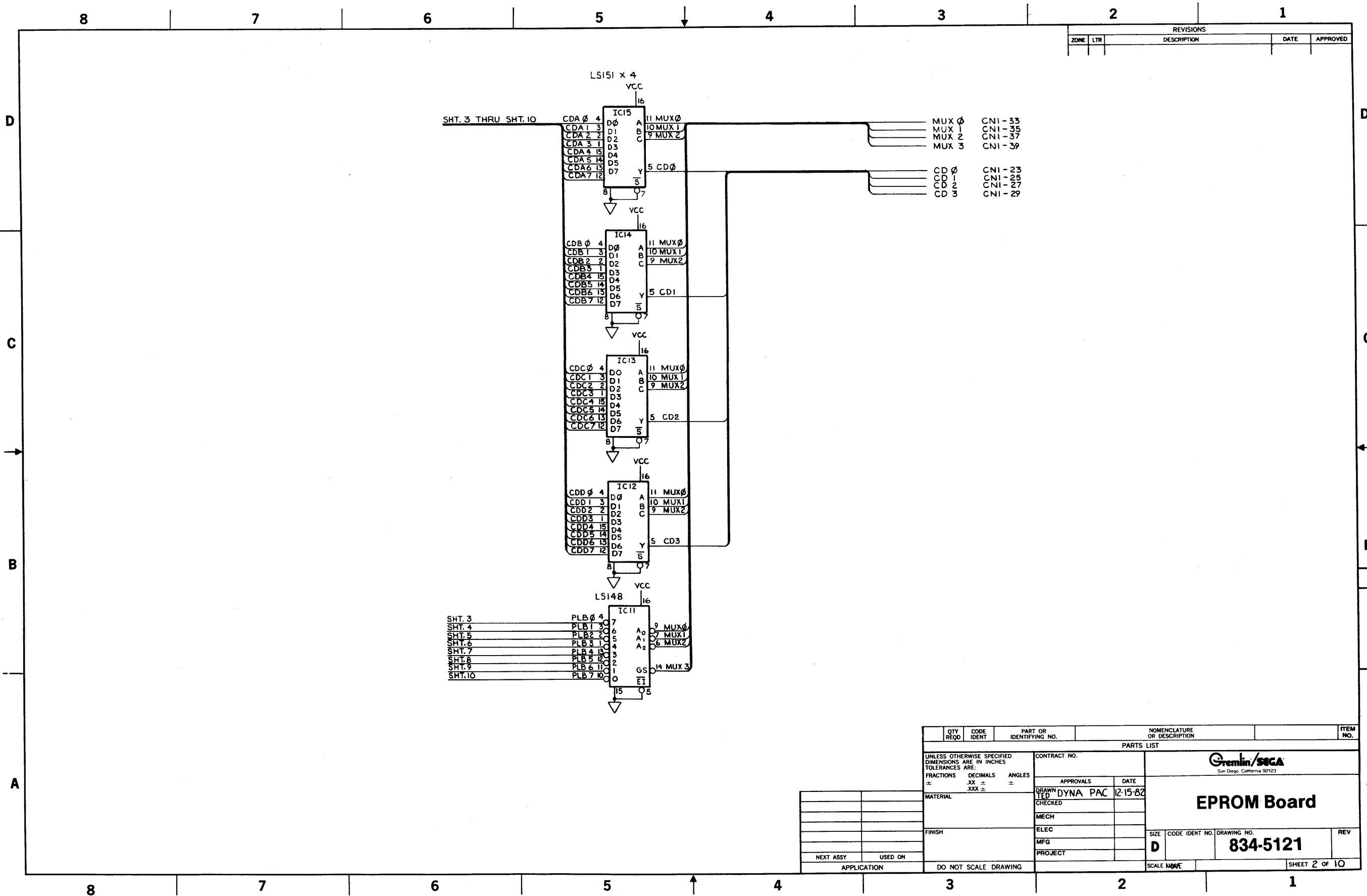
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



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	
±	.XX ±	±	DATE	
	.XXX ±		DRAWN DYNA-PAC 12-13-82	
MATERIAL		MECH		
FINISH		ELEC		
NEXT ASSY USED ON		MFG		
APPLICATION		PROJECT		

<b>Gremlin/SIGA</b> San Diego, California 92123	
<b>EPROM Board</b>	
SIZE	CODE IDENT NO. DRAWING NO.
<b>D</b>	<b>834-5121</b>
SCALE	REV
SCALE NONE	



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 BY DYNA PAC 12-15-82	
MATERIAL		MECH		
FINISH		ELEC		
NEXT ASSY		MFG		
USED ON		PROJECT		
APPLICATION		SCALE NAME		

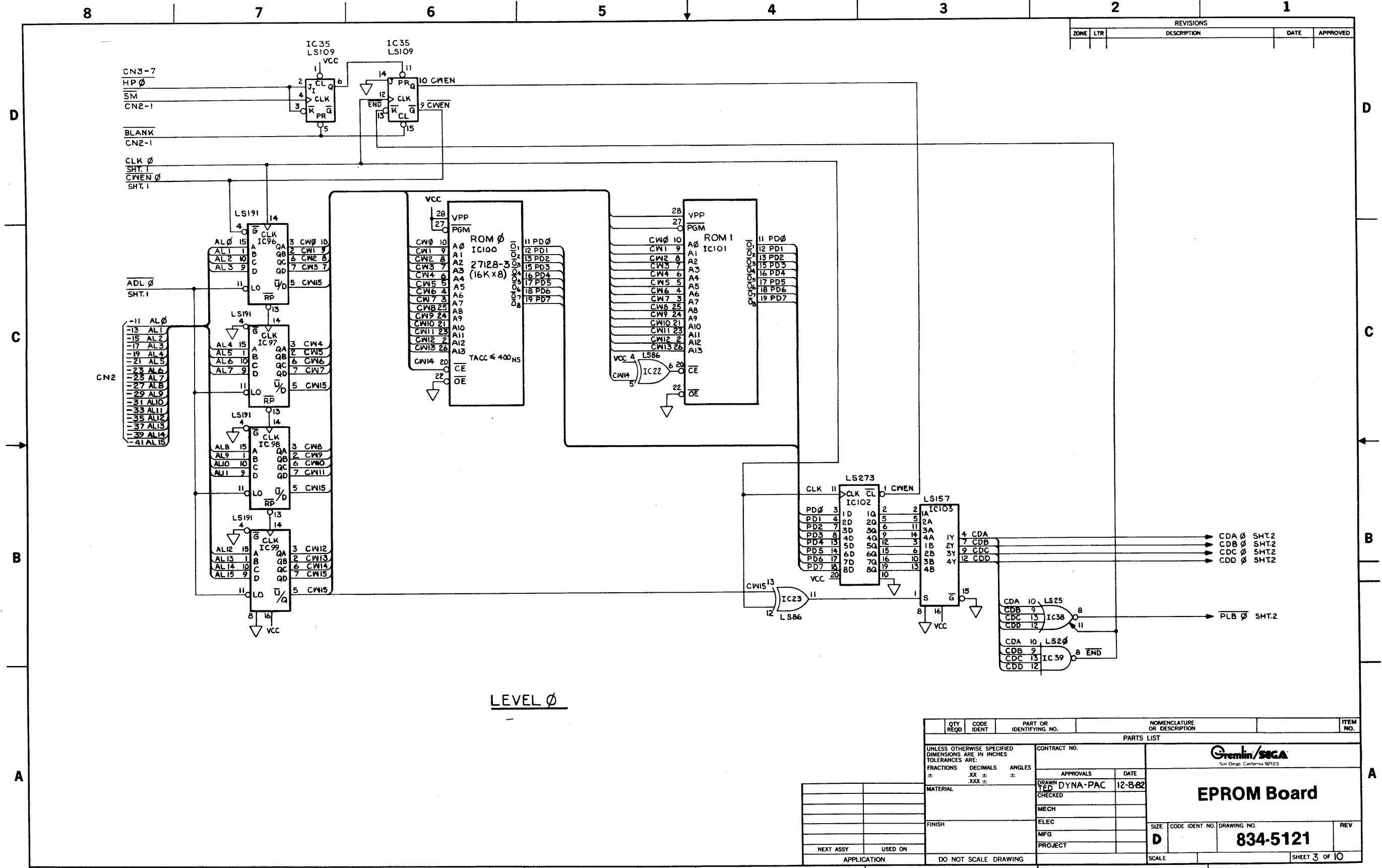
**Gremlin/SEGA**  
San Diego, California 92123

**EPROM Board**

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

SHEET 2 OF 10

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	
±	.XX ±	±	DATE	
MATERIAL		DRAWN BY: DYNA-PAC		
FINISH		CHECKED: 12-8-82		
NEXT ASSY		MECH:		
USED ON		ELEC:		
APPLICATION		MFG:		
DO NOT SCALE DRAWING		PROJECT:		
SCALE		SIZE CODE IDENT NO. DRAWING NO.		
SCALE		D 834-5121		
SCALE		REV		
SCALE		SHEET 3 OF 10		

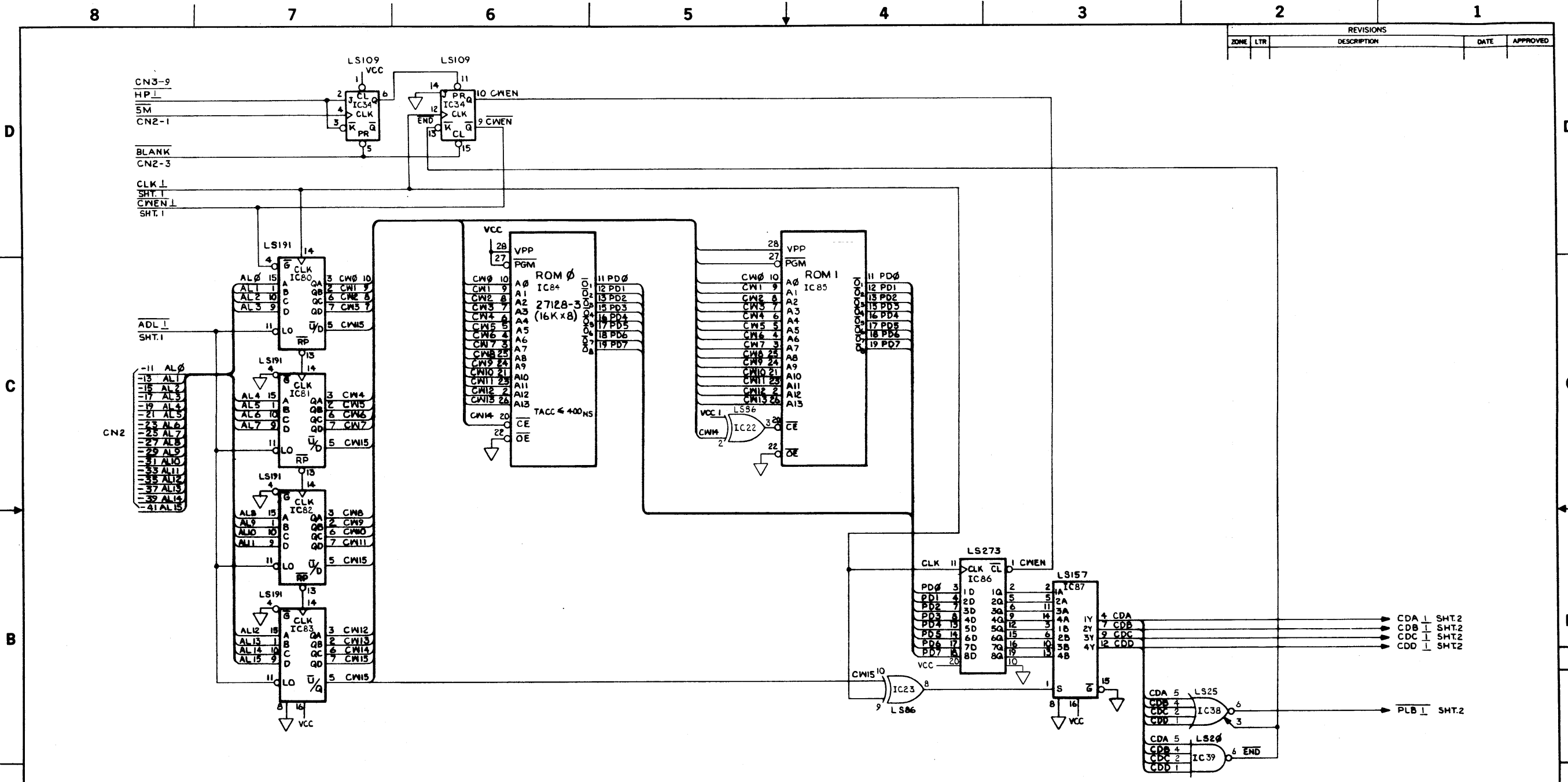
Gremlin/SEGA  
San Diego, California 92123

### EPROM Board

834-5121

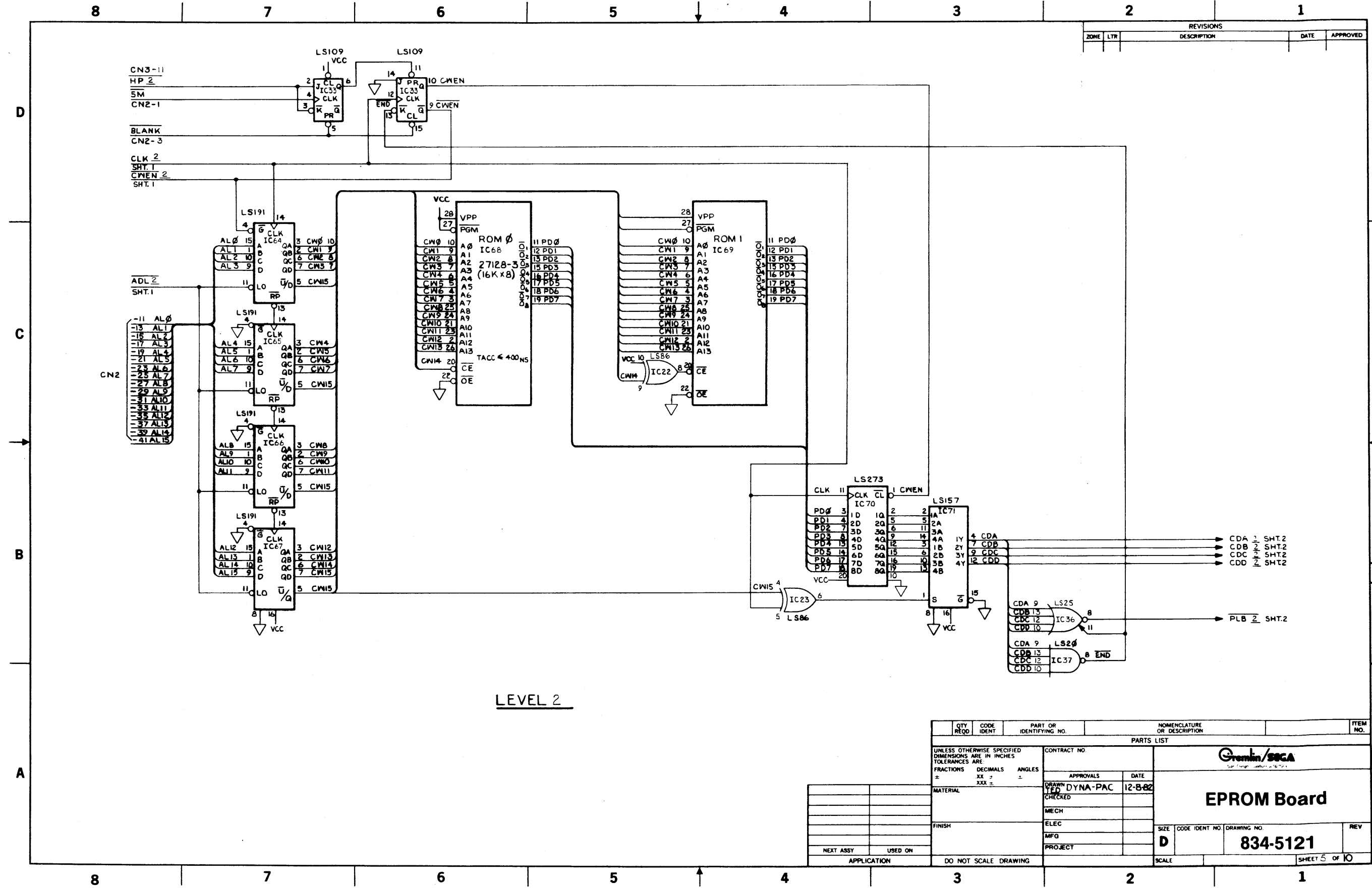
SHEET 3 OF 10

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



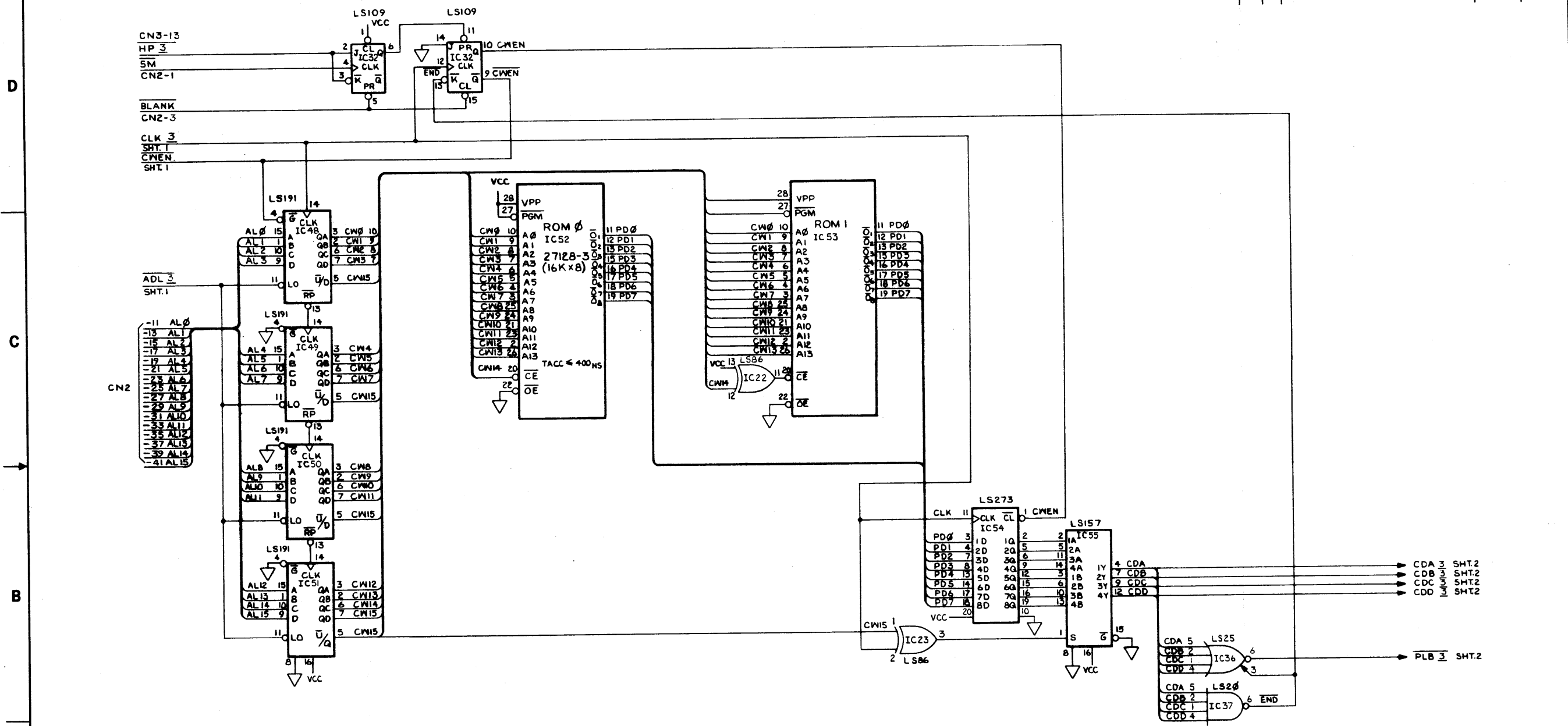
LEVEL 1

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 ±	±	DRAWN BY DYNAPAC 12-8-82	
±	.XXX ±	±	CHECKED	
MATERIAL		MECH		 <b>EPROM Board</b>
FINISH		ELEC		
NEXT ASSY		MFG		
USED ON		PROJECT		SIZE CODE IDENT NO DRAWING NO. REV
APPLICATION		DO NOT SCALE DRAWING		D 834-5121
SCALE				SHEET 4 OF 10





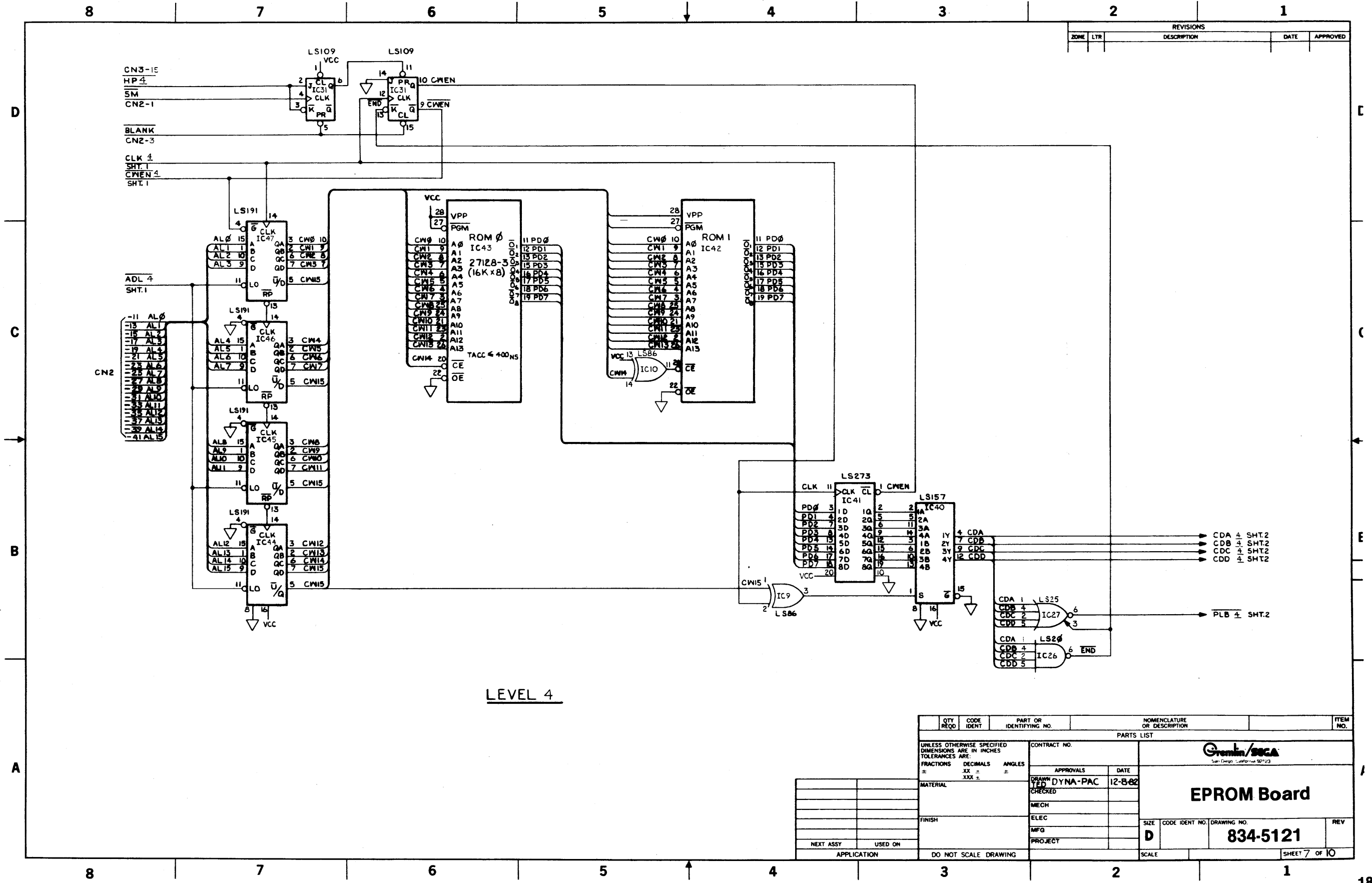
ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			



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:												
FRACTIONS DECIMALS ANGLES												
MATERIAL			<table border="1"> <tr> <td>APPROVALS</td> <td>DATE</td> </tr> <tr> <td>DYNA-PAC</td> <td>12-8-82</td> </tr> </table>		APPROVALS	DATE	DYNA-PAC	12-8-82				
APPROVALS	DATE											
DYNA-PAC	12-8-82											
FINISH			<table border="1"> <tr> <td>MECH</td> <td></td> </tr> <tr> <td>ELEC</td> <td></td> </tr> <tr> <td>MFG</td> <td></td> </tr> <tr> <td>PROJECT</td> <td></td> </tr> </table>		MECH		ELEC		MFG		PROJECT	
MECH												
ELEC												
MFG												
PROJECT												
NEXT ASSY USED ON			<table border="1"> <tr> <td>SIZE</td> <td>CODE IDENT NO</td> <td>DRAWING NO</td> <td>REV</td> </tr> <tr> <td>D</td> <td></td> <td>834-5121</td> <td></td> </tr> </table>		SIZE	CODE IDENT NO	DRAWING NO	REV	D		834-5121	
SIZE	CODE IDENT NO	DRAWING NO	REV									
D		834-5121										
APPLICATION			<table border="1"> <tr> <td>SCALE</td> <td>SHEET 6 OF 10</td> </tr> </table>		SCALE	SHEET 6 OF 10						
SCALE	SHEET 6 OF 10											

ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			



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		MECH		
APPLICATION		ELEC		
		MFG		
		PROJECT		
DO NOT SCALE DRAWING		SIZE CODE IDENT NO. DRAWING NO.		REV
		D 834-5121		
		SCALE		SHEET 7 OF 10



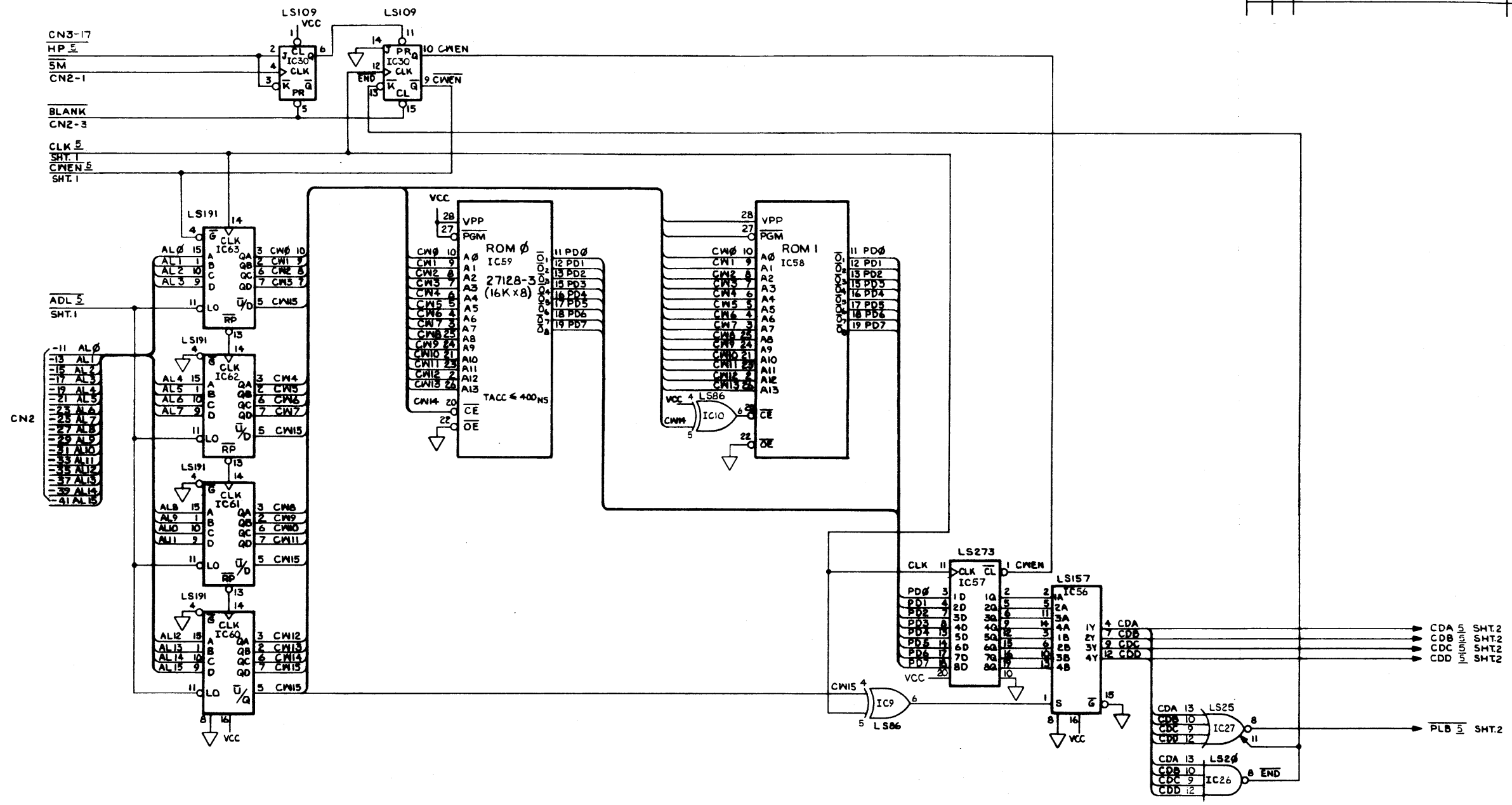
**EPROM Board**

**834-5121**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

8 7 6 5 4 3 2 1

D  
C  
B  
A



LEVEL 5

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
±	XX ±	XXX ±	BY: DYNAPAC	12-8-82
MATERIAL	FINISH	MECH	ELEC	PROJECT
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	SCALE



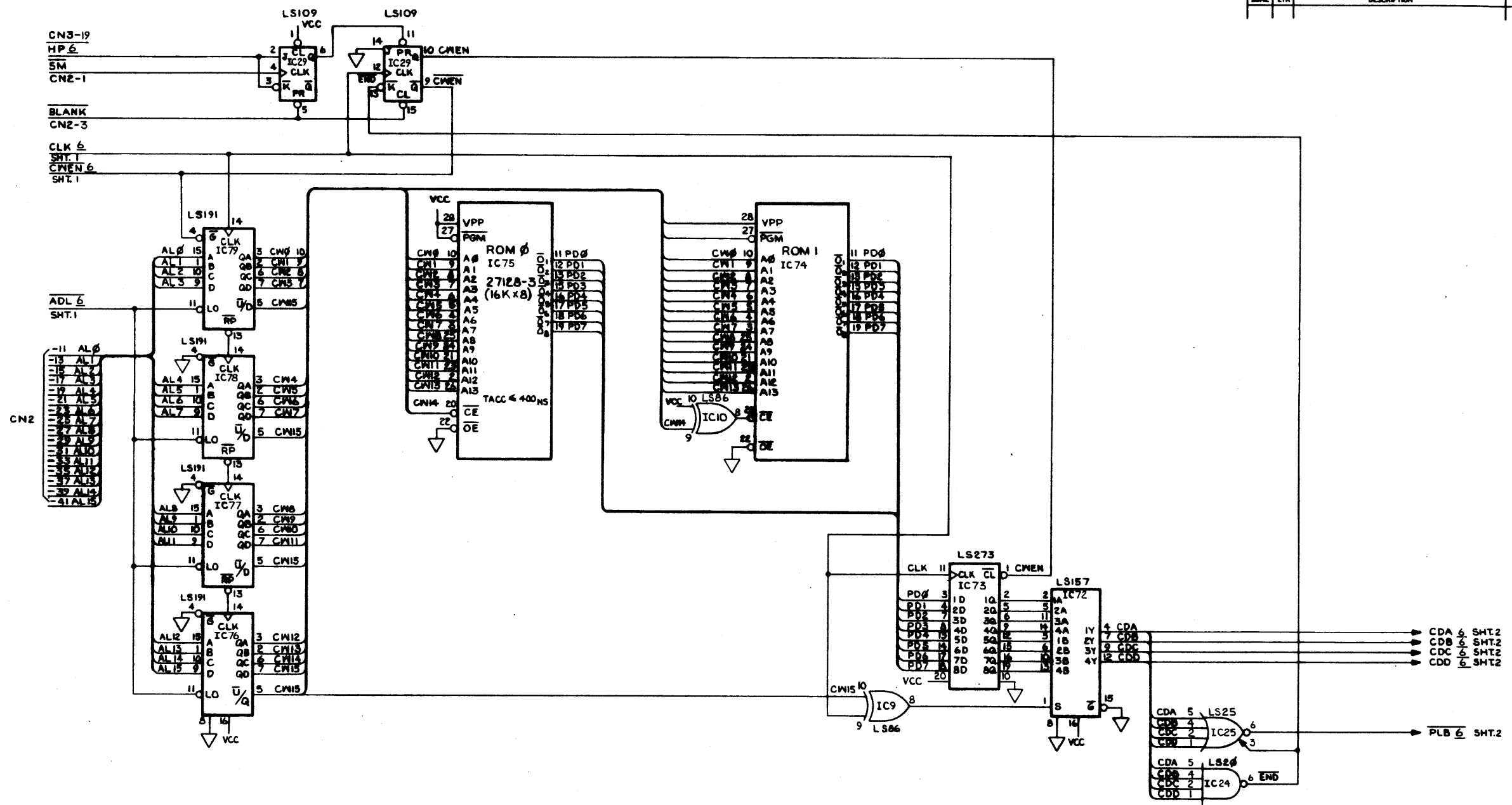
**EPROM Board**

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

D SHEET 5 OF 10

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



LEVEL 6

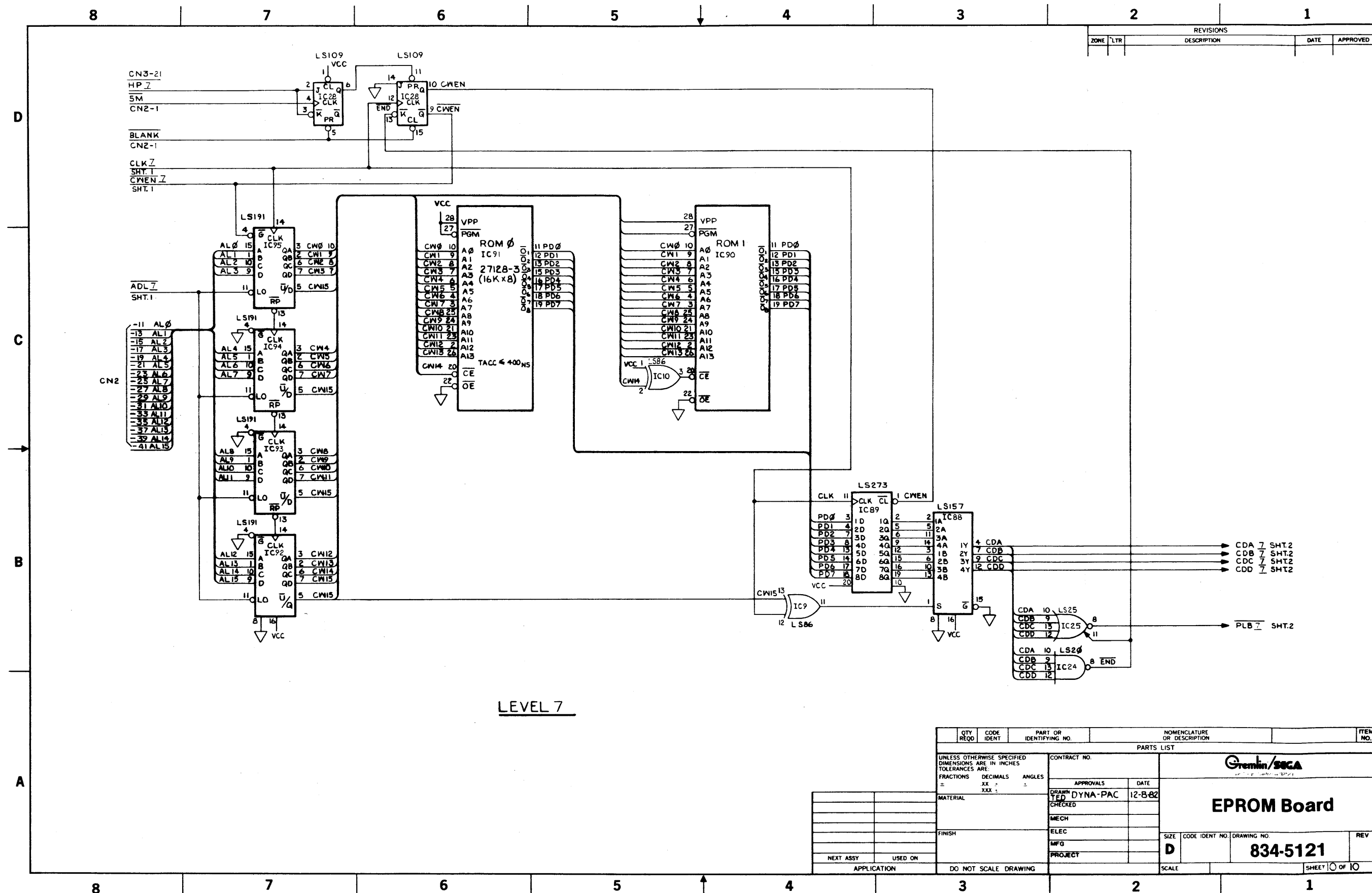
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	APPROVALS DATE	
±	.XX ±	±	DYNAPAC 12-8-82	
MATERIAL	FINISH		ELEC	
			MECH	
			MFG	
			PROJECT	
NEXT ASSY	USED ON	SIZE CODE IDENT NO. DRAWING NO.		REV
		D 834-5121		
APPLICATION		DO NOT SCALE DRAWING		SCALE
				SHEET 9 OF 10



EPROM Board

834-5121

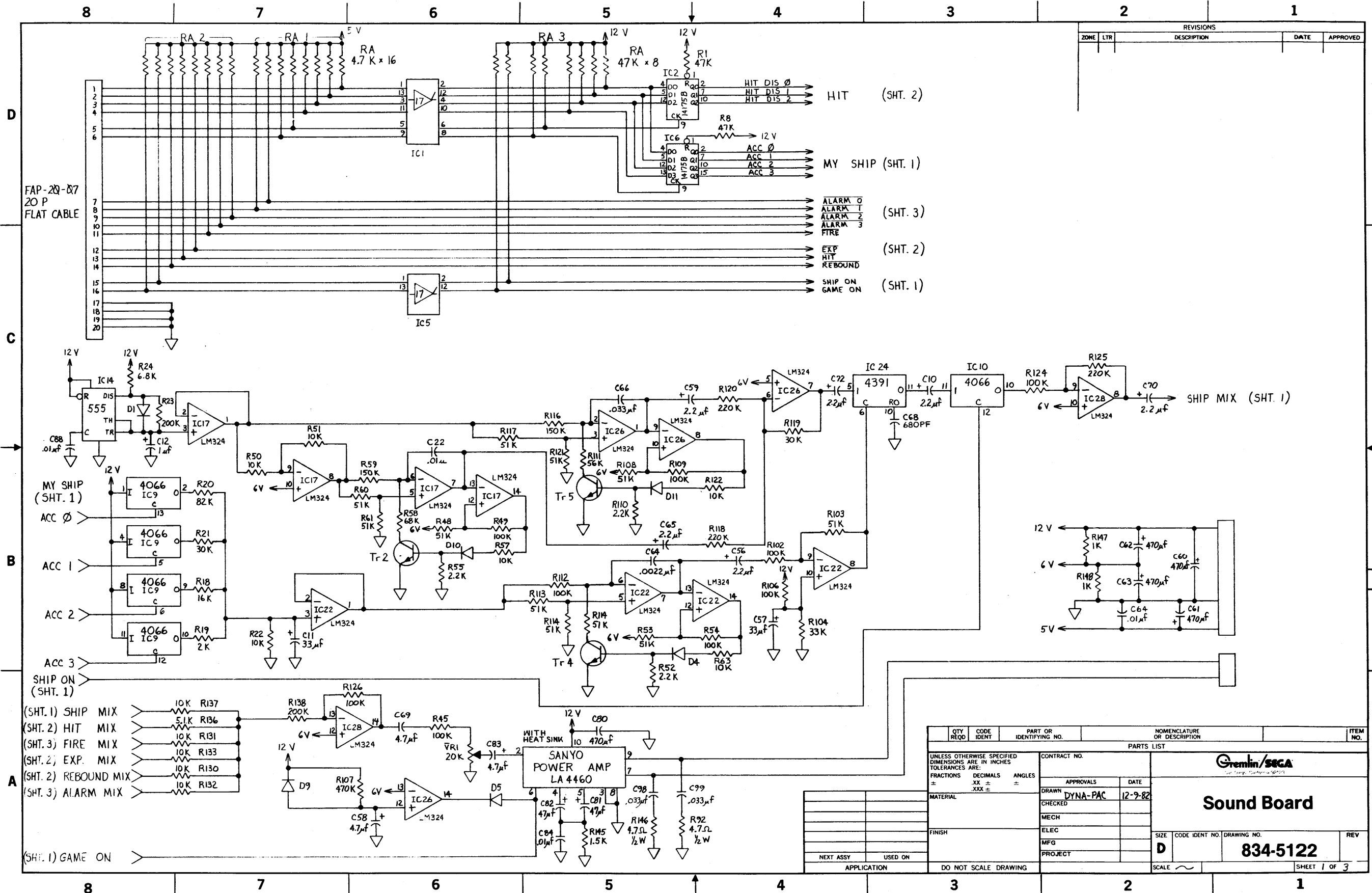
8 7 6 5 4 3 2 1



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	
±	.XX ±	° ±	DRAWN	DATE
	.XXX ±		DYNA-PAC	12-9-82
MATERIAL	CHECKED	MECH		
FINISH	ELEC	MFG		
NEXT ASSY	USED ON	PROJECT		
APPLICATION		DO NOT SCALE DRAWING		SCALE

**Gremlin/SECA**  
Small Signal Semiconductor Division

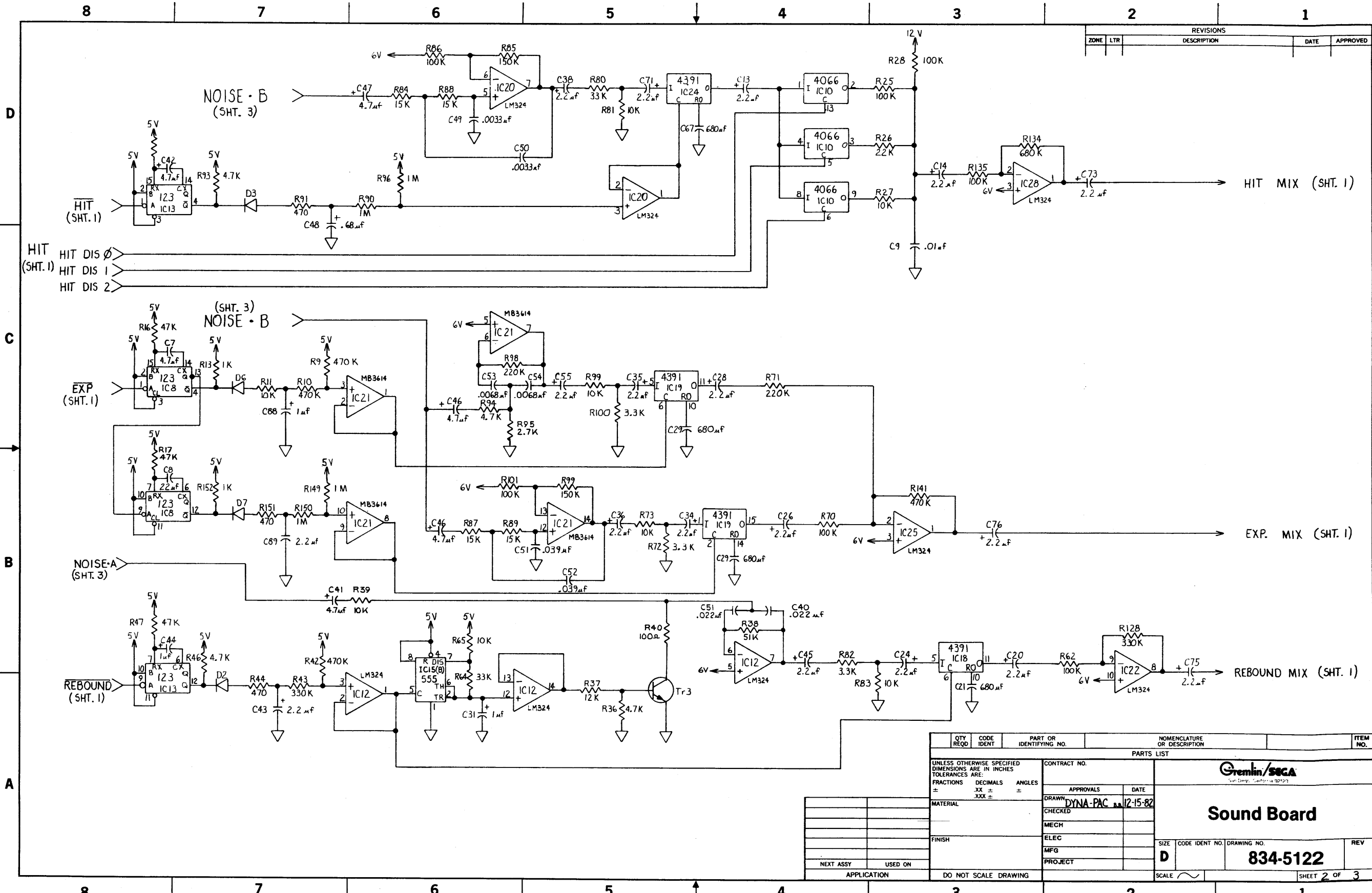
## Sound Board

SIZE CODE IDENT NO. DRAWING NO. REV

**D** **834-5122**

SHEET 1 OF 3

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



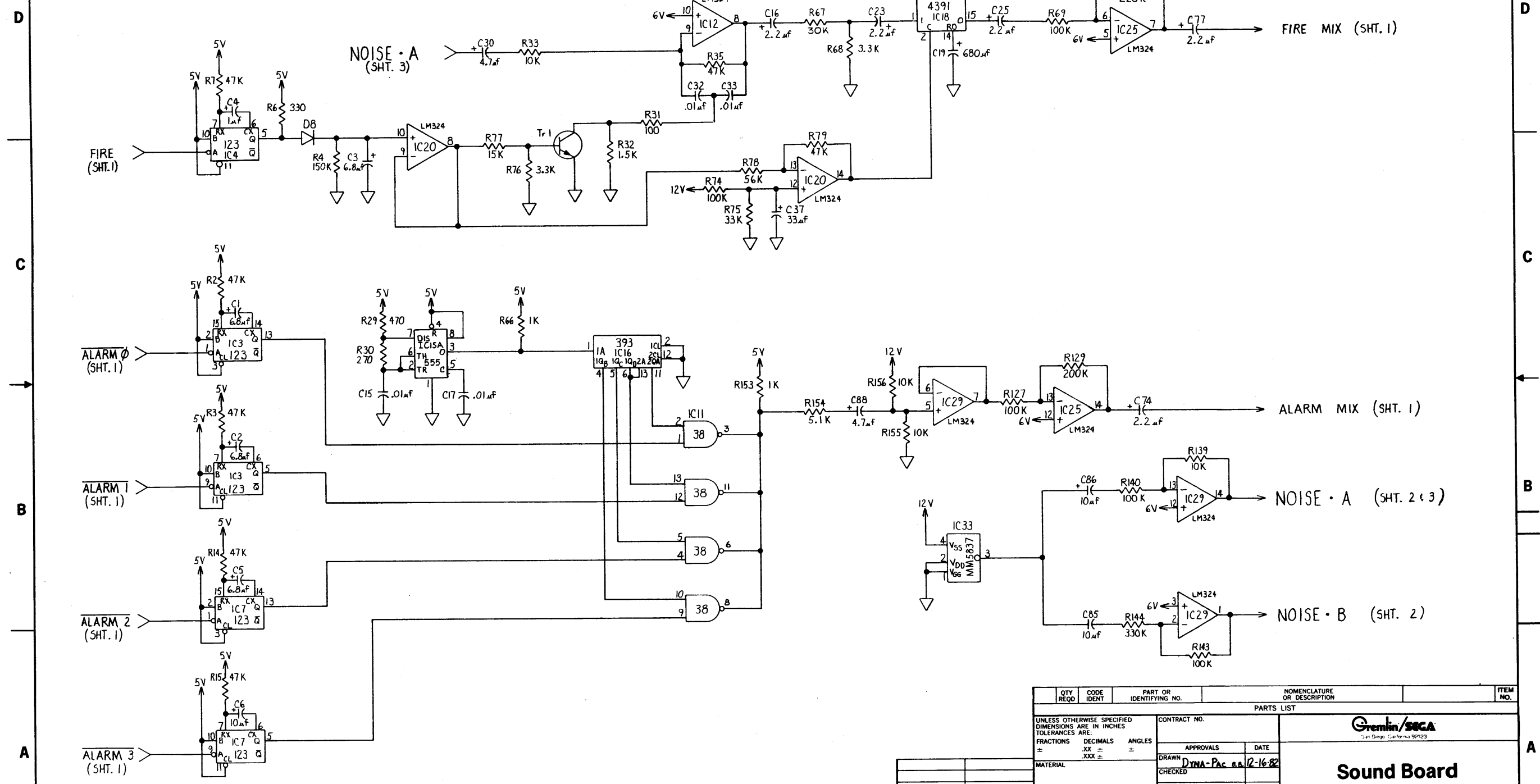
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				
FRACTIONS	DECIMALS	ANGLES		
±	.XX ±	±		
MATERIAL				
FINISH				
NEXT ASSY USED ON				
APPLICATION				
DO NOT SCALE DRAWING				

CONTRACT NO.		<b>Grembin/SECA</b>	
APPROVALS		DATE	
DRAWN <b>DYNA-PAC</b>		<b>12-15-82</b>	
CHECKED			
MECH			
ELEC			
MFG			
PROJECT			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
<b>D</b>		<b>834-5122</b>	
SCALE		SHEET <b>2</b> OF <b>3</b>	

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	
±	±	±	DRAWN BY: DYNAPAC s.s. 12-16-82	
MATERIAL		CHECKED		
FINISH		MECH		
NEXT ASSY		ELEC		
USED ON		MFG		
APPLICATION		PROJECT		
DO NOT SCALE DRAWING		SCALE		

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

## Sound Board

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

SHEET 3 OF 3

8 7 6 5 4 3 2 1 193