

This document has been downloaded from:



The largest resource for amusement machines
documentation on the world wide web!



FLIPPERSPILL.COM

16-3036-101
December 15, 1988



Service Manual

Programmed Chip Summary

(Continued from Inside-Front Cover)

IC	DESCRIPTION	TYPE	BOARD LOC.	PART NO.
Image ROM	ROM	27512	ROM Board U55	A-5343-3036-43
Image ROM	ROM	27512	ROM Board U56	A-5343-3036-44
Image ROM	ROM	27512	ROM Board U57	A-5343-3036-45
Image ROM	ROM	27512	ROM Board U58	A-5343-3036-46
Program ROM	ROM	27512	ROM Board U59	A-5343-3036-11
Program ROM	ROM	27512	ROM Board U60	A-5343-3036-12
Image ROM	ROM	27512	ROM Board U61	A-5343-3036-47
Image ROM	ROM	27512	ROM Board U62	A-5343-3036-48
Image ROM	ROM	27512	ROM Board U63	A-5343-3036-49
Image ROM	ROM	27512	ROM Board U64	A-5343-3036-50
Image ROM	ROM	27512	ROM Board U65	A-5343-3036-51
Image ROM	ROM	27512	ROM Board U66	A-5343-3036-52
Image ROM	ROM	27512	ROM Board U67	A-5343-3036-53
Image ROM	ROM	27512	ROM Board U68	A-5343-3036-54
Image ROM	ROM	27512	ROM Board U69	A-5343-3036-55
Image ROM	ROM	27512	ROM Board U70	A-5343-3036-56
Image ROM	ROM	27512	ROM Board U71	A-5343-3036-57
Image ROM	ROM	27512	ROM Board U72	A-5343-3036-58
Image ROM	ROM	27512	ROM Board U73	A-5343-3036-59
Image ROM	ROM	27512	ROM Board U74	A-5343-3036-60
Image ROM	ROM	27512	ROM Board U75	A-5343-3036-61
Image ROM	ROM	27512	ROM Board U76	A-5343-3036-62
Program ROM	ROM	27512	ROM Board U77	A-5343-3036-13
Program ROM	ROM	27512	ROM Board U78	A-5343-3036-14
Image ROM	ROM	27512	ROM Board U79	A-5343-3036-63
Image ROM	ROM	27512	ROM Board U80	A-5343-3036-64
Image ROM	ROM	27512	ROM Board U81	A-5343-3036-65
Image ROM	ROM	27512	ROM Board U82	A-5343-3036-66
Image ROM	ROM	27512	ROM Board U83	A-5343-3036-67
Image ROM	ROM	27512	ROM Board U84	A-5343-3036-68
Image ROM	ROM	27512	ROM Board U85	A-5343-3036-69
Image ROM	ROM	27512	ROM Board U86	A-5343-3036-70
Image ROM	ROM	27512	ROM Board U87	A-5343-3036-71
Image ROM	ROM	27512	ROM Board U88	A-5343-3036-72
Image ROM	ROM	27512	ROM Board U89	A-5343-3036-73
Image ROM	ROM	27512	ROM Board U90	A-5343-3036-74
Image ROM	ROM	27512	ROM Board U91	A-5343-3036-75
Image ROM	ROM	27512	ROM Board U92	A-5343-3036-76
Image ROM	ROM	27512	ROM Board U93	A-5343-3036-77
Image ROM	ROM	27512	ROM Board U94	A-5343-3036-78

NARC

Service Manual

Programmed Chip Summary

(Continued on Inside-Back Cover)

IC	DESCRIPTION	TYPE	BOARD LOC.	PART NO.
CRAM Controller	PLD	EP153A	CPU Board U28	A-5346-3036-1
Local Ctlr	PLD	EP153A	CPU Board U78	A-5346-3036-2
Video RAM Ctlr	PLD	EP153A	CPU Board U79	A-5346-3036-3
Address Decoder	PLD	EP153A	CPU Board U80	A-5346-3036-4
Image ROM Ctlr	PLD	EP153A	CPU Board U83	A-5346-3036-5
Video RAM Seq.	PLD	EP600	CPU Board U12	A-5346-3036-6
Autoerase Ctlr	PLD	EP900	CPU Board U20	A-5346-3036-7
Program ROM	ROM	27512	ROM Board U23	A-5343-3036-7
Program ROM	ROM	27512	ROM Board U24	A-5343-3036-8
Image ROM	ROM	27512	ROM Board U25	A-5343-3036-15
Image ROM	ROM	27512	ROM Board U26	A-5343-3036-16
Image ROM	ROM	27512	ROM Board U27	A-5343-3036-17
Image ROM	ROM	27512	ROM Board U28	A-5343-3036-18
Image ROM	ROM	27512	ROM Board U29	A-5343-3036-19
Image ROM	ROM	27512	ROM Board U30	A-5343-3036-20
Image ROM	ROM	27512	ROM Board U31	A-5343-3036-21
Image ROM	ROM	27512	ROM Board U32	A-5343-3036-22
Image ROM	ROM	27512	ROM Board U33	A-5343-3036-23
Image ROM	ROM	27512	ROM Board U34	A-5343-3036-24
Image ROM	ROM	27512	ROM Board U35	A-5343-3036-25
Image ROM	ROM	27512	ROM Board U36	A-5343-3036-26
Image ROM	ROM	27512	ROM Board U37	A-5343-3036-27
Image ROM	ROM	27512	ROM Board U38	A-5343-3036-28
Image ROM	ROM	27512	ROM Board U39	A-5343-3036-29
Image ROM	ROM	27512	ROM Board U40	A-5343-3036-30
Program ROM	ROM	27512	ROM Board U41	A-5343-3036-9
Program ROM	ROM	27512	ROM Board U42	A-5343-3036-10
Image ROM	ROM	27512	ROM Board U43	A-5343-3036-31
Image ROM	ROM	27512	ROM Board U44	A-5343-3036-32
Image ROM	ROM	27512	ROM Board U45	A-5343-3036-33
Image ROM	ROM	27512	ROM Board U46	A-5343-3036-34
Image ROM	ROM	27512	ROM Board U47	A-5343-3036-35
Image ROM	ROM	27512	ROM Board U48	A-5343-3036-36
Image ROM	ROM	27512	ROM Board U49	A-5343-3036-37
Image ROM	ROM	27512	ROM Board U50	A-5343-3036-38
Image ROM	ROM	27512	ROM Board U51	A-5343-3036-39
Image ROM	ROM	27512	ROM Board U52	A-5343-3036-40
Image ROM	ROM	27512	ROM Board U53	A-5343-3036-41
Image ROM	ROM	27512	ROM Board U54	A-5343-3036-42

ANALOG



SERVICE MANUAL

- operation
- adjustment
- unique parts
- bookkeeping
- diagnostics

NARC and Z-UNIT are trademarks of WILLIAMS ELECTRONICS GAMES, INC.

Programmed Chips on the Sound Board

IC	DESCRIPTION	TYPE	BOARD LOC.	PART NO.
Sound ROM	ROM	27512	Sound Board U3	Not Used
Sound ROM	ROM	27512	Sound Board U4	A-5343-3036-1
Sound ROM	ROM	27512	Sound Board U5	A-5343-3036-2
Sound ROM	ROM	27512	Sound Board U35	A-5343-3036-3
Sound ROM	ROM	27512	Sound Board U36	A-5343-3036-4
Sound ROM	ROM	27512	Sound Board U37	A-5343-3036-5
Sound ROM	ROM	27512	Sound Board U38	A-5343-3036-6



Jumper Table

CPU Board	Connected	Not Used
	W3	W1
	W4	W2
	W6	W5
	W9	W7
	W10	W8
	W11	W12
ROM Board	W14	W13
	1 / 2	(None)
	3 / 4	
	5 / 6	
	7 / 8	
	9 / 10	
	11 / 12	
CPU Board	13 / 14	
	R1	
	W3	W1
	W4	W2
	W6	W5
	W9	W7
	W10	W8
Sound Board	W11	W12
	W14	W13
	W1 W9	W2 W13
	W4 W15	W3 W14
	W5 W17	W6 W16
	W7 W18	W10 W19
	W8 W20	W11 W21
		W12

NARC

Table of Contents

Chapter 1. Operating Procedures.....	1-5
Programmed Chip Summary--Part 1.....	1-2
Programmed Chips on the Sound Board.....	1-3
Jumper Table.....	1-4
Warnings and Notices.....	1-8
Examine Your Game.....	1-9
Control Locations.....	1-10
Power Turn-On.....	1-11
Game Operation.....	1-12
Player Panel (<i>Illustration</i>).....	1-13
Game Adjustments, Bookkeeping, Diagnostics.....	1-15
Main Test Menu (<i>Illustration</i>).....	1-16
Typical Audits Screen, Page 1 (<i>Illustration</i>).....	1-17
Typical Audits Screen, Page 2 (<i>Illustration</i>).....	1-18
Typical Game Adjustments Screen (<i>Illustration</i>).....	1-19
Electronic Drawings.....	1-21



Notes...



Chapter 1. Operating Procedures

Warnings and Notices
Examine Your Game
Control Locations
Power Turn-On

Game Operation
Player Panel (*Illustration*)
Game Adjustments, Bookkeeping, Diagnostics
Main Test Menu (*Illustration*)

Typical Audits Screen, Page 1 (*Illustration*)
Typical Audits Screen, Page 2 (*Illustration*)
Typical Game Adjustments Screen
(*Illustration*)

Pricing Table



Warnings and Notices

WARNING

FOR SAFETY AND RELIABILITY, substitute parts or modifications are not recommended.

USE OF NON-WILLIAMS PARTS or circuit modifications may cause injuries or equipment damage.

SUBSTITUTE PARTS OR MODIFICATIONS may void FCC Type Acceptance.

SINCE THIS GAME IS PROTECTED by Federal copyright, trademark and patent laws. Unauthorized software or hardware modifications may be illegal under Federal law.

THIS "MODIFICATION" PRINCIPLE ALSO APPLIES to unauthorized facsimiles of **WILLIAMS** logos, designs, publications and assemblies. Moreover, facsimiles of **WILLIAMS** equipment (*or any feature thereof*) may be illegal under Federal law. Whether or not such facsimiles are manufactured with **WILLIAMS** components, this rule applies.

WARNING

This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio 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.

WARNING

FCC STICKER. Check the back of your game for an FCC sticker. When **WILLIAMS** ships a game, the game has been found to comply with FCC Rules. *The sticker is proof.* If the sticker is missing, *legal repercussions to the owner and distributor of the game* may result. If your game (manufactured after December 1982) has no FCC sticker, call **WILLIAMS** for advice. Or write us a note on your game-registration card. *Be sure the card bears your game's serial number.*

WARNING

THREE-WIRE PLUG. Prevent shock hazard and assure proper game operation! Only plug this game into a properly grounded outlet. **DO NOT** use a "cheater" plug to defeat the power cord's ground pin. **DO NOT** cut off the ground pin.

RF-INTERFERENCE NOTICE

YOUR GAME'S CABLE-HARNESS PLACEMENT and ground-strap routing are very important. They are designed to keep RF radiation and conduction within levels accepted by FCC Regulations.

MAINTAIN THESE LEVELS. Servicing may require that you disconnect harnesses or ground straps. When you're finished, reposition and reconnect them as they were.

Examine Your Game

- **INSPECT THE OUTSIDE** of the carton or game cabinet for shipping damage.

The Williams logo, featuring the word "WILLIAMS" in a stylized, handwritten-style font.

- **UNLOCK AND OPEN** the bottom-rear door. Now check circuitry.
- **ARE CONNECTORS SECURELY ATTACHED?** Reconnect any found loose. *Don't force connectors!* They're keyed and only fit one way.
- **ARE PLUG-IN CHIPS FIRMLY SEATED** in their sockets?
- **UNWRAP THE POWER CORD** coiled inside the cabinet. *Don't plug it in yet!*
- **SCRUTINIZE MAJOR SUBASSEMBLIES**, such as the monitor, player panel, transformer chassis and power supply. Make sure they're securely mounted.
- **UNDO THE CONTROL-PANEL LATCHES.** You can reach these from the coin door by extending your arm upward and to either side. Now check connectors and circuitry as above.

Control Locations

THE ON-OFF SWITCH is above the back (*monitor*) door. Standing before the game, you'll find the switch at the game's top-left corner.

POWER INTERLOCK SWITCH. Your game has two power-interlock switches. These are located at the back of the game, behind the top and middle panels. Imagine that you're standing behind the game. An interlock is in the upper-right corner of each panel. Each interlock is a spring-loaded DPDT switch. It turns off the game when you remove the panel. For servicing purposes, pull the switch out and the game will power up.

THE VOLUME CONTROL is inside the coin door and to your right.



THREE DIAGNOSTIC SWITCHES are mounted together on a bracket behind the coin door. *These switches are useful for many purposes: Accessing Diagnostic Mode Tests, reading the bookkeeping totals or making game adjustments.* See relevant discussions later in this chapter.

THE MEMORY-PROTECT INTERLOCK SWITCH is behind the coin door. This switch must be open when you clear bookkeeping totals or make game adjustments. It automatically opens when the coin door is open. .

THE CPU-BOARD RESET SWITCH is on the CPU Board near the +5VDC indicator LED.

Power Turn-On

WHEN THE GAME IS FIRST TURNED ON general illumination should light. In a correctly running game, tests will be followed by the message "INITIAL CHECKS INDICATE: THIS GAME IS BITCHIN'." If failure messages come up on the screen instead, refer to **Built-In Test Procedures**.

DEMAGNETIZE THE GAME with a television degaussing coil. Besides the monitor, remember to degauss large steel parts (for example, the backdoor hinge). Do this whenever you move the game, and also as a regular, monthly procedure. Otherwise residual magnetism may cause color impurities that adversely affect your collections.



Game Operation

GAME START

INSERT COINS. The game allocates an adjustable number of credits per coin. This number appears on the CRT. For example, assume that your settings specify one credit for a quarter (*U.S. factory pricing*). A player deposits a quarter and presses 1-PLAYER START. On its screen, the game posts one credit. Then a one-player game begins.

Using player-2 controls for a one-player game is also possible: With one credit displayed, press 2-PLAYER START.

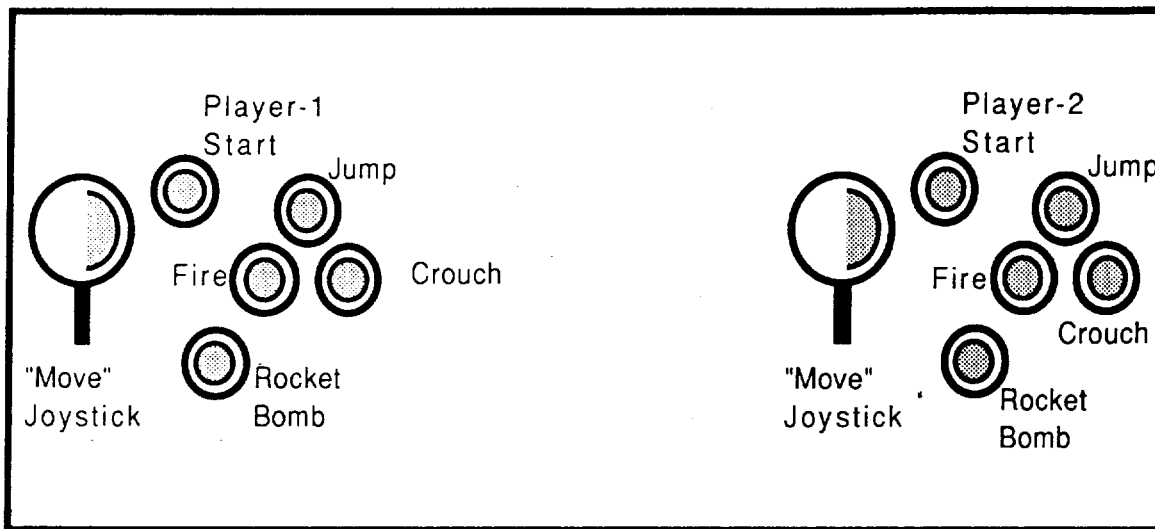
For a two-player game, at least two credits must be displayed. To initiate this two-player game, press the 2-PLAYER START button.

PLAYER CONTROLS

On its player panel, your **NARC™** game has four pushbuttons and a joystick. Players can...

- **FIRE** at evil pushers with the machine pistol.
- **PRESS ROCKET BOMB!** Eliminate several pushers in one blast!
- **JUMP** over broken sidewalks and other obstacles!
- **CROUCH** to duck bullets and garbage cans!
- **MOVE** in eight directions with the joystick.





Player Panel

GAMEPLAY

THE CITY'S OVERRUN! Slashers! Gangsters! Pimps! The punks are everywhere! The scum of the earth! And only the player can restore law and order! Trigger finger spraying hot metal before him... **ROCKET BOMB** at the ready... The player is a macho urban guerilla, defending our city from the ultimate urban scourge! This is his neighborhood too. He's committed. He says **NO** to inner city decadence. He carries a badge and a moral code. And he backs them both with screaming lead.

FEARLESS, ALOOF... He blazes away with his machine pistol. Then he launches a devastating **ROCKET BOMB** to trap several baddies in simultaneous ambush! With **JUMP** and **SQUAT** buttons, he dodges bullets, dynamite and other missiles. But the lurking Loaf, death-dealing Dumpster Man, patronizing Pimp and horrible Hypoman are everywhere. And these mangy marauders stop at nothing. This is their turf. So they'll hurl more bombs and deal more

NARC

corruption. Because they're forever preparing another rendezvous with death. Here's a list of the nefarious gangmembers...

- Loaf
- Gangster
- Pimp
- Hypoman
- Psychotic
- Slasher
- Dumpster Man
- Mr. Big (*Public Enemy Number 1*)

THIS JOB DEMANDS GRITTY DETERMINATION, FAST THINKING! The city is a *jungle*. Pushers may lurk in manholes... They may dart by in a heavily armed, pink Cadillac... Or they might even buzz the player with their preemptive pushercopter! But the player laughs at danger. He scores bonus points by seizing contraband (*evidence!*) hidden in the Cadillac. And by busting these parasites on society. Then he blows that manhole. And he downs that pushercopter. Because no pimp is too high... And no gangster's too low to eat hot justice!

ENTER BUILDINGS. The player must seek out and investigate gang strongholds. When enemies dart out of a tenement, the player must enter. If psycho fiends slither in the subway, the player relentlessly pursues them. Not bullets, not bombs, not even mad dogs can deter him. For our hero's sworn duty is to case the hideouts and seize the evidence. Then he can bust another offender!

THE PLAYER STARTS WITH 100 ENERGY UNITS. Busts and evidence win points. For every 25,000 points earned, the player receives 20 energy units. But there's a penalty whenever our hero's hit or if an innocent bystander's injured. Here are some of the major penalties...

- Hit by hypo, player loses 16 energy units



- Attacked by Slasher, player sacrifices 10 energy units
- Struck by a bullet, player's penalized five units

THE BIG TARGET. Ultimately the player pursues Public Enemy Number One, Mr. Big. Mr. Big is the shimmering, super slug king of the sleazy, slimy underworld empire. His glitzy, cosmopolitan crib is brimming with evidence. And he's the inevitable prospect for a megabust. But he's wily. He's quick. And he's amply equipped with the latest Hyper-Crimewave Technology. But the player must not permit him to escape! The dragnet must not fail!

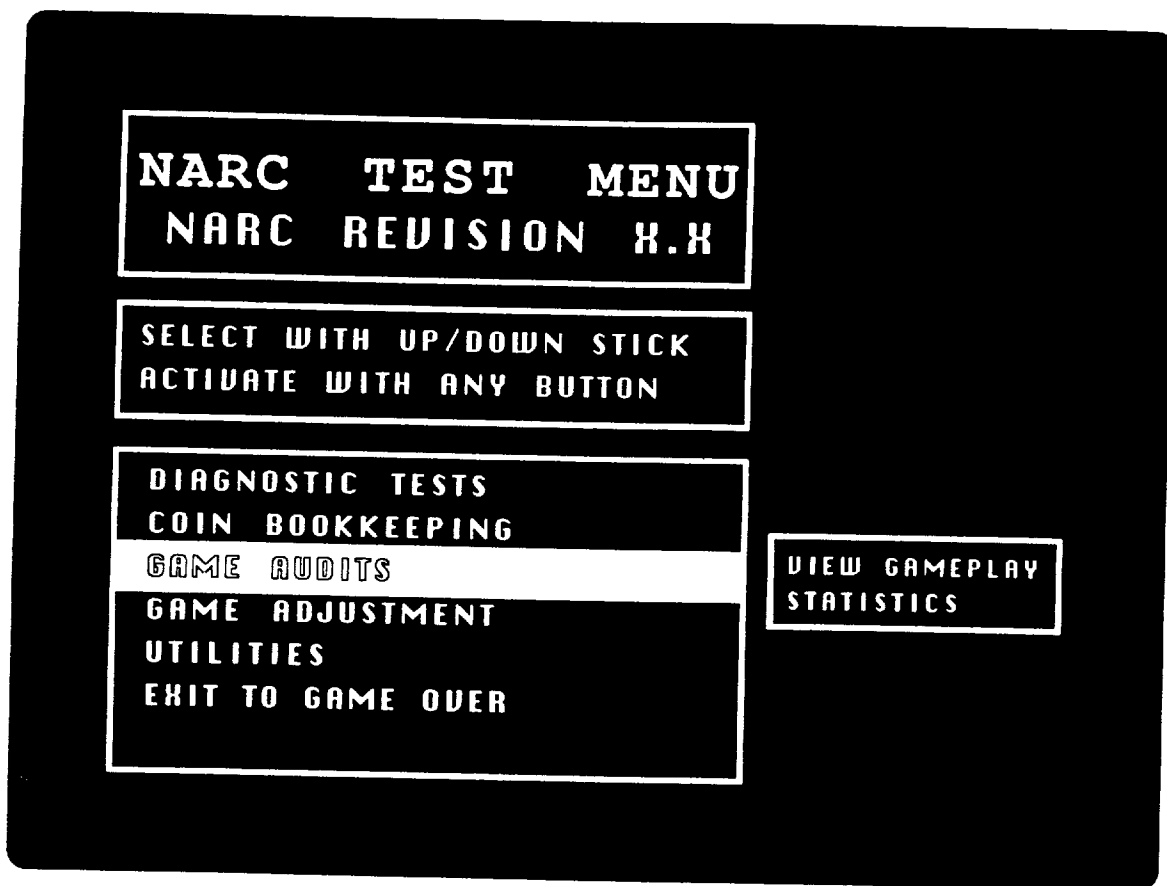
Game Adjustments, Bookkeeping, Diagnostics

MENU CONCEPT. For your convenience, game adjustment, bookkeeping, audit totals and diagnostics are *menu-driven* features. Each *menu* is a list of several choices that you may act upon as desired.

LEVELS OF MENUS. Your game has several levels of menus. That is, one menu selection will send the game to another menu. The menus are arranged in outline fashion. That is, a menu of general options selects menus of more specific options.

PRESS ADVANCE. Adjustments, bookkeeping and diagnostics are available from the main test menu. Enter the main test menu by pressing the ADVANCE button inside the coin door. ADVANCE is mounted on a bracket bolted to the inside of the door. Besides initiating diagnostics and other modes, ADVANCE permits you to browse through and alter menus. When you press ADVANCE, the game steps through the options of one menu.





Main Test Menu

Normally you may exit the menu you're inspecting and return to the previous menu. In fact, "RETURN TO MAIN MENU" and "EXIT TO GAME OVER" are typical menu options. Suppose that you select "RETURN TO MAIN MENU": *The game returns to the option where it was before on the previous menu.*

Pressing and holding ADVANCE also causes the game to exit from a menu.

NARC

However when you press and hold ADVANCE, the game exits to the next lower option on the previous menu. This capability of the ADVANCE button allows you to access menu features even when player panel controls malfunction.

GAME AUDITS

GAME AUDITS SHOW YOU AT A GLANCE if game settings are bringing you a satisfactory return on your investment! *Only games by WILLIAMS ELECTRONICS have this menu-driven feature.* Think of it as a unique way to keep your **NARC** game the *leader of the pack when it comes to earnings...*location after location, week in and week out!

GAME AUDITS	
NARC REVISION X.X	
TOTAL PLAYS	0
EXTRA MEN EARNED	0
HOURS OF SINGLE PLAY	0:00
HOURS OF DUAL PLAY	0:00
TOTAL HOURS OF PLAY	0:00
AUG. "PLAYER" GAME TIME (MIN.)	0:00
AUG. ELAPSED TIME/PLAY	0:00

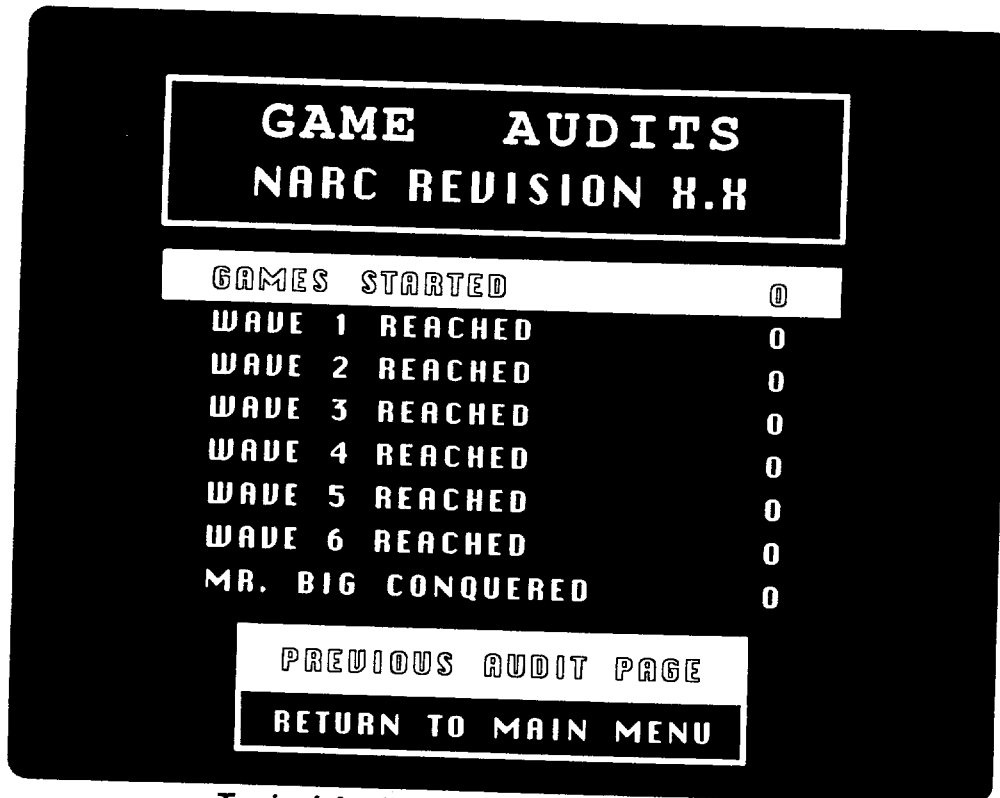
NEXT AUDIT PAGE

RETURN TO MAIN MENU

Typical Audits Screen, Page 1

NARC

ENTERING AUDIT MODE. Open the coin door and press ADVANCE. You'll see the main test menu on the CRT screen. Use either joystick to highlight GAME AUDITS. Now select GAME AUDITS by pressing *any* player panel button.



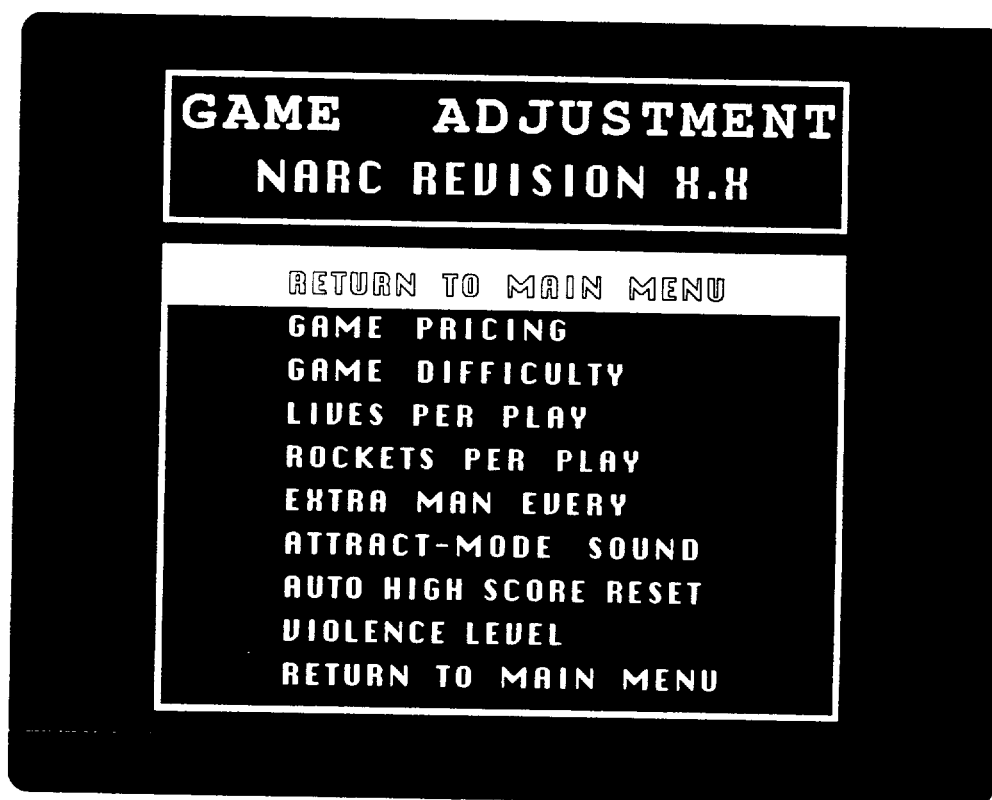
Typical Audits Screen, Page 2

The first GAME AUDITS page will appear. Total plays and the number of extra men that players earned are provided here. The remaining entries on this

NARC

page relate aspects of gameplay to time. The second audit page relates how many times players achieved each wave. (difficulty level). Now let's examine two audit entries...

AVERAGE TIME PER CREDIT: TWO MINUTES. Your most important figure on the first AUDITS page is AVG. PLAYER GAME TIME (MIN.). You'll want to pay special attention to this figure every day for this reason: Thorough field and factory research has shown that *two-minute games both satisfy players and also keep the quarters flowing.*



Typical Game Adjustments Screen

NARC

If games aren't running about two minutes long, then collections probably aren't at their peak. You'll want to tailor your game to your game-playing public. It's easy, and we'll talk about that subject in a moment. Meanwhile, another very useful figure is AVG. ELAPSED TIME/PLAY. This number tells you approximately how long your game must operate before earning a quarter.

Here are some tailoring suggestions...

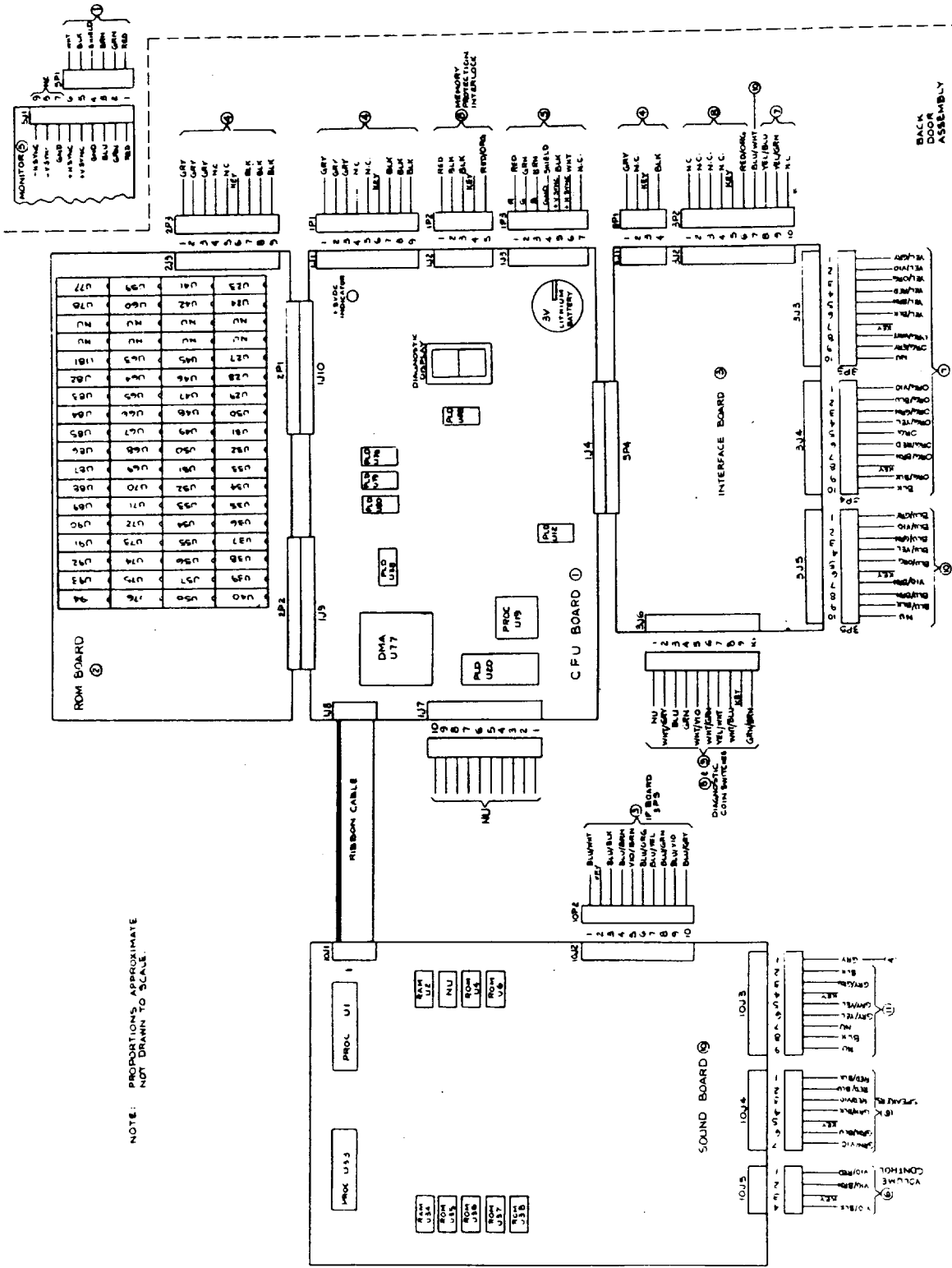
EXCLUSIVE GAME ADJUSTMENTS

1. Press ADVANCE to enter the main test menu *(described earlier)*.
2. Using either joystick, move the selection arrow down to GAME ADJUSTMENT.
3. To select GAME ADJUSTMENT, press any player panel button. Now you'll see the adjustment screen.
4. Use either joystick to highlight the feature you desire to adjust.
5. To select that feature, press any player panel button.
6. Use either joystick to alter the value of an adjustment.
(The joystick causes YES-NO settings to toggle between YES and NO.)
7. To return to Game-Over Mode, follow menu selections on your screen.



BOARD CODE KEY

1	CPU BOARD
2	ROM BOARD
3	INTERFACE BOARD
4	SWITCHING POWER SUPPLY
5	MONITOR
6	CABINET
7	PLAYER PANEL
8	CON DOOR
9	CASH BOX
10	SOUND BOARD
11	SOUND POWER SUPPLY



NOTE: PROPORTIONS APPROXIMATE
NOT DRAWN TO SCALE.

REV	DESCRIPTION OF CHANGE	FOR NO DATE
	NEW PART RELEASE	17101 5-17-68
A	ITEM 5 WAS 5340-1111-00 ADDED ITEM 15	17722 9-30-68

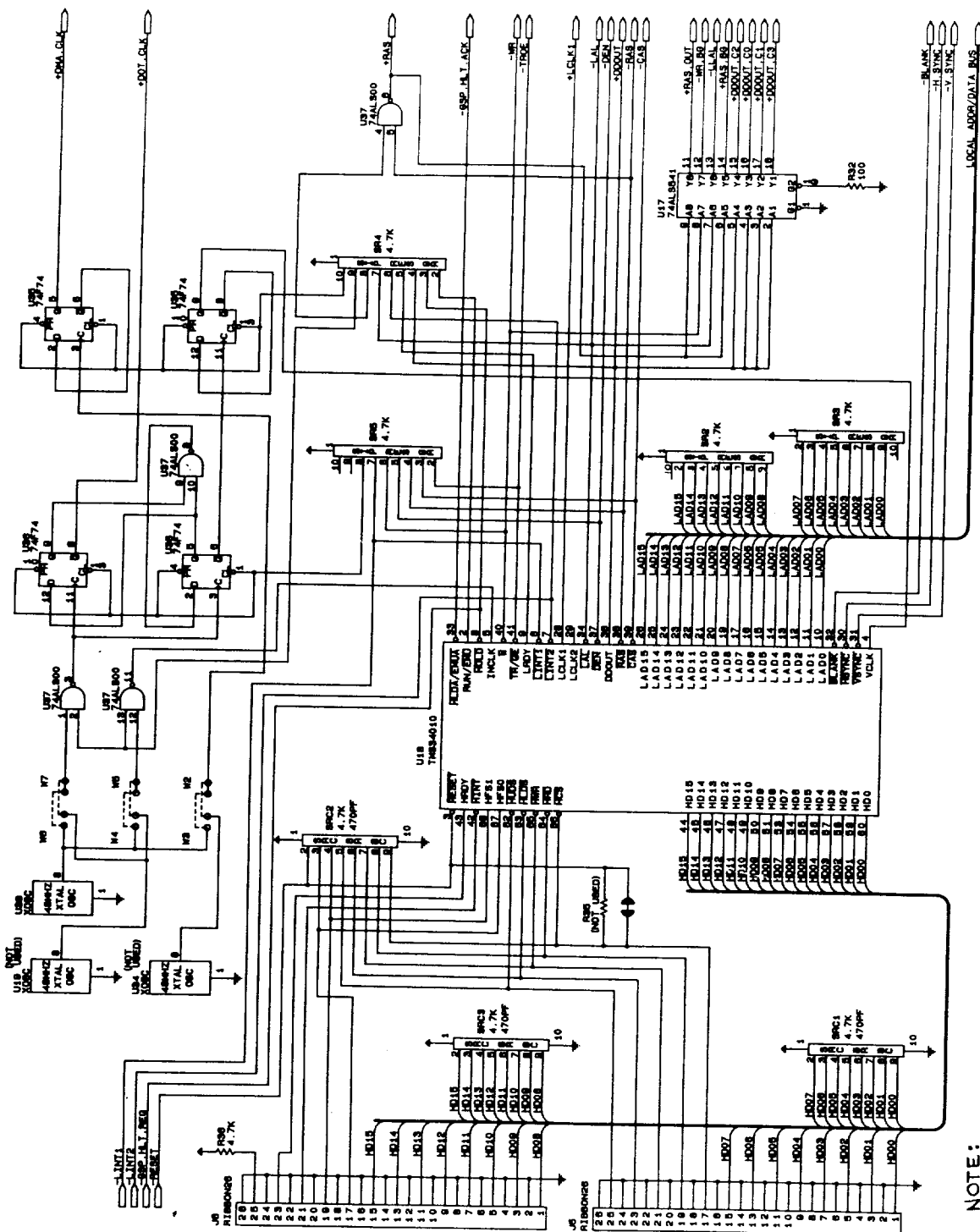
[illegible]

ITEM	PART NO.	PART DESCRIPTION	DESCRIPTION	QTY
20				
19				
18				
17				
16				
15	5850- 11050-00	B1	BATTERY - LITHIUM 5V. BUTTON	1
14	SEE CHART	U28	IC, PLD-COLOR RAM CNTL	1
13	SEE CHART	U78	IC, PLD-LOCAL CONTROL	1
12	SEE CHART	U79	IC, PLD-VIDEO RAM CNTL	1
11	SEE CHART	U80	IC, PLD-ADDRESS DECODE	1

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY
10	SEE CHART	U83	IC, PLD-IMAGE ROM CNTL	1
9	SEE CHART	U12	IC, PLD-VIDEO RAM SEQ.	1
8	SEE CHART	U20	IC, PLD-AUTOERASE CNTL	1
7	5340- 12019-00	U65	IC, RAM/S 5564 8K x 8	1
6	5340- 12213-00	U42 - U49 U6B - U75	IC, RAM/V 4461 24K x 4	16
5				
4	5400- 12220-00	U18	IC, TMS34010 G.S.P.	1
3	5410- 12239-00	U77	IC, CUSTOM ASIC	1
2	18-8850 -210		LABEL, PCB IDENT.	1
1	C-11870		SYS-Z CPU PCB SUB-ASSEMBLY	1

NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-9017.

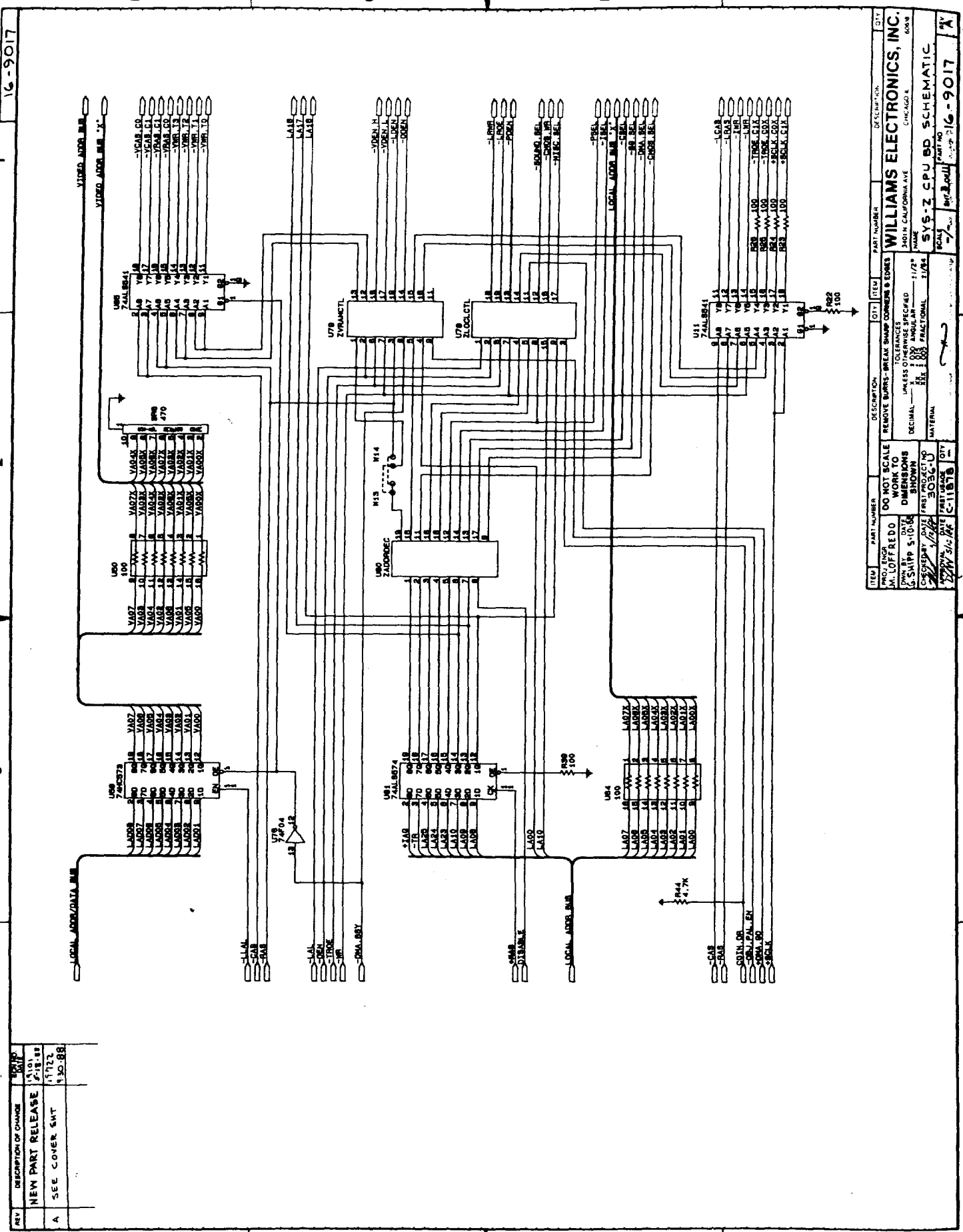
DO NOT TAG	DO NOT SCALE	REMOVE BURR - BURR FREE CONFORMS TO EDGES	WILLIAMS ELECTRONICS, INC.
WORK TO DIMENSIONS	WORK TO DIMENSIONS	UNLESS OTHERWISE SPECIFIED	1401 N. CALIFORNIA AVE CINCINNATI, OH 45203
P.C. # 4755/RE	P.C. # 4755/RE	ANGULAR $\frac{1}{2} \times$	NAME
DATE 10/1/79	DATE 10/1/79	FRACTIONAL 1/64	SYS-Z CPU PCB ASSEMBLY
QTY 101	QTY 101	MATERIAL	SCALE 1" = 200"
DATE 12-11-14	DATE 12-11-14		PART NO C-11879
APPROVAL D-W/H	APPROVAL D-W/H		REV



NOTE:
BUS & SIGNAL LABELS DESIGNATED WITH AN "X" SUFFIX ARE FORMED FROM ROOT SIGNALS DRIVEN THROUGH SERIES RESISTORS.

[illegible]

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	2-18-88
2	SEE COVER SHEET	1-30-88



ITEM NO.	16-9017	DESCRIPTION	REMOVE BURRS-BREAK CORNERS & EDGES	QTY	1
DATE	5-10-86	UNLESS OTHERWISE SPECIFIED	DECIMAL	1/100	FRACTIONAL
CHECKED	DATE	PROJECT NO.	306-U	QTY	1
DATE	5-10-86	PART NO.	16-9017	QTY	1

WILLIAMS ELECTRONICS, INC.
301 N. CALIFORNIA AVE
CHICAGO, IL 60604

SYS-Z CPU BD SCHEMATIC

16-9017

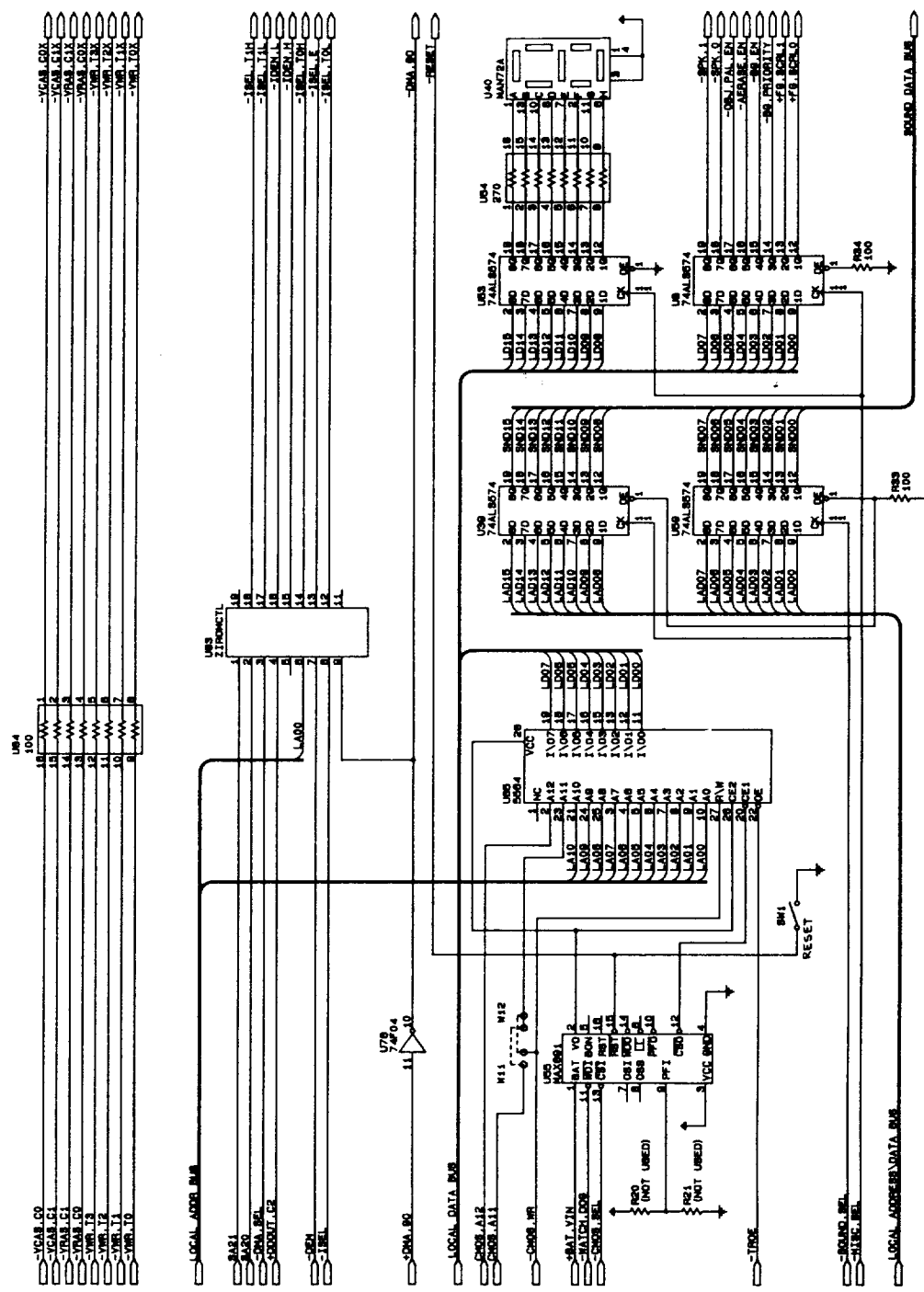
1

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11-10-58
2	A SEE COVER SHT	11-20-58



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	74ALS00	DO NOT SCALE	1	1	74ALS00	DO NOT SCALE	1
2	74ALS04	WORK TO	1	2	74ALS04	WORK TO	1
3	74ALS10	DATE	1	3	74ALS10	DATE	1
4	74ALS16	DATE	1	4	74ALS16	DATE	1
5	74ALS20	DATE	1	5	74ALS20	DATE	1
6	74ALS24	DATE	1	6	74ALS24	DATE	1
7	74ALS27	DATE	1	7	74ALS27	DATE	1
8	74ALS28	DATE	1	8	74ALS28	DATE	1
9	74ALS30	DATE	1	9	74ALS30	DATE	1
10	74ALS32	DATE	1	10	74ALS32	DATE	1
11	74ALS34	DATE	1	11	74ALS34	DATE	1
12	74ALS36	DATE	1	12	74ALS36	DATE	1
13	74ALS38	DATE	1	13	74ALS38	DATE	1
14	74ALS39	DATE	1	14	74ALS39	DATE	1
15	74ALS40	DATE	1	15	74ALS40	DATE	1
16	74ALS42	DATE	1	16	74ALS42	DATE	1
17	74ALS44	DATE	1	17	74ALS44	DATE	1
18	74ALS46	DATE	1	18	74ALS46	DATE	1
19	74ALS48	DATE	1	19	74ALS48	DATE	1
20	74ALS49	DATE	1	20	74ALS49	DATE	1
21	74ALS50	DATE	1	21	74ALS50	DATE	1
22	74ALS51	DATE	1	22	74ALS51	DATE	1
23	74ALS52	DATE	1	23	74ALS52	DATE	1
24	74ALS53	DATE	1	24	74ALS53	DATE	1
25	74ALS54	DATE	1	25	74ALS54	DATE	1
26	74ALS55	DATE	1	26	74ALS55	DATE	1
27	74ALS56	DATE	1	27	74ALS56	DATE	1
28	74ALS57	DATE	1	28	74ALS57	DATE	1
29	74ALS58	DATE	1	29	74ALS58	DATE	1
30	74ALS59	DATE	1	30	74ALS59	DATE	1
31	74ALS60	DATE	1	31	74ALS60	DATE	1
32	74ALS61	DATE	1	32	74ALS61	DATE	1
33	74ALS62	DATE	1	33	74ALS62	DATE	1
34	74ALS63	DATE	1	34	74ALS63	DATE	1
35	74ALS64	DATE	1	35	74ALS64	DATE	1
36	74ALS65	DATE	1	36	74ALS65	DATE	1
37	74ALS66	DATE	1	37	74ALS66	DATE	1
38	74ALS67	DATE	1	38	74ALS67	DATE	1
39	74ALS68	DATE	1	39	74ALS68	DATE	1
40	74ALS69	DATE	1	40	74ALS69	DATE	1
41	74ALS70	DATE	1	41	74ALS70	DATE	1
42	74ALS71	DATE	1	42	74ALS71	DATE	1
43	74ALS72	DATE	1	43	74ALS72	DATE	1
44	74ALS73	DATE	1	44	74ALS73	DATE	1
45	74ALS74	DATE	1	45	74ALS74	DATE	1
46	74ALS75	DATE	1	46	74ALS75	DATE	1
47	74ALS76	DATE	1	47	74ALS76	DATE	1
48	74ALS77	DATE	1	48	74ALS77	DATE	1
49	74ALS78	DATE	1	49	74ALS78	DATE	1
50	74ALS79	DATE	1	50	74ALS79	DATE	1
51	74ALS80	DATE	1	51	74ALS80	DATE	1
52	74ALS81	DATE	1	52	74ALS81	DATE	1
53	74ALS82	DATE	1	53	74ALS82	DATE	1
54	74ALS83	DATE	1	54	74ALS83	DATE	1
55	74ALS84	DATE	1	55	74ALS84	DATE	1
56	74ALS85	DATE	1	56	74ALS85	DATE	1
57	74ALS86	DATE	1	57	74ALS86	DATE	1
58	74ALS87	DATE	1	58	74ALS87	DATE	1
59	74ALS88	DATE	1	59	74ALS88	DATE	1
60	74ALS89	DATE	1	60	74ALS89	DATE	1
61	74ALS90	DATE	1	61	74ALS90	DATE	1
62	74ALS91	DATE	1	62	74ALS91	DATE	1
63	74ALS92	DATE	1	63	74ALS92	DATE	1
64	74ALS93	DATE	1	64	74ALS93	DATE	1
65	74ALS94	DATE	1	65	74ALS94	DATE	1
66	74ALS95	DATE	1	66	74ALS95	DATE	1
67	74ALS96	DATE	1	67	74ALS96	DATE	1
68	74ALS97	DATE	1	68	74ALS97	DATE	1
69	74ALS98	DATE	1	69	74ALS98	DATE	1
70	74ALS99	DATE	1	70	74ALS99	DATE	1
71	74ALS100	DATE	1	71	74ALS100	DATE	1

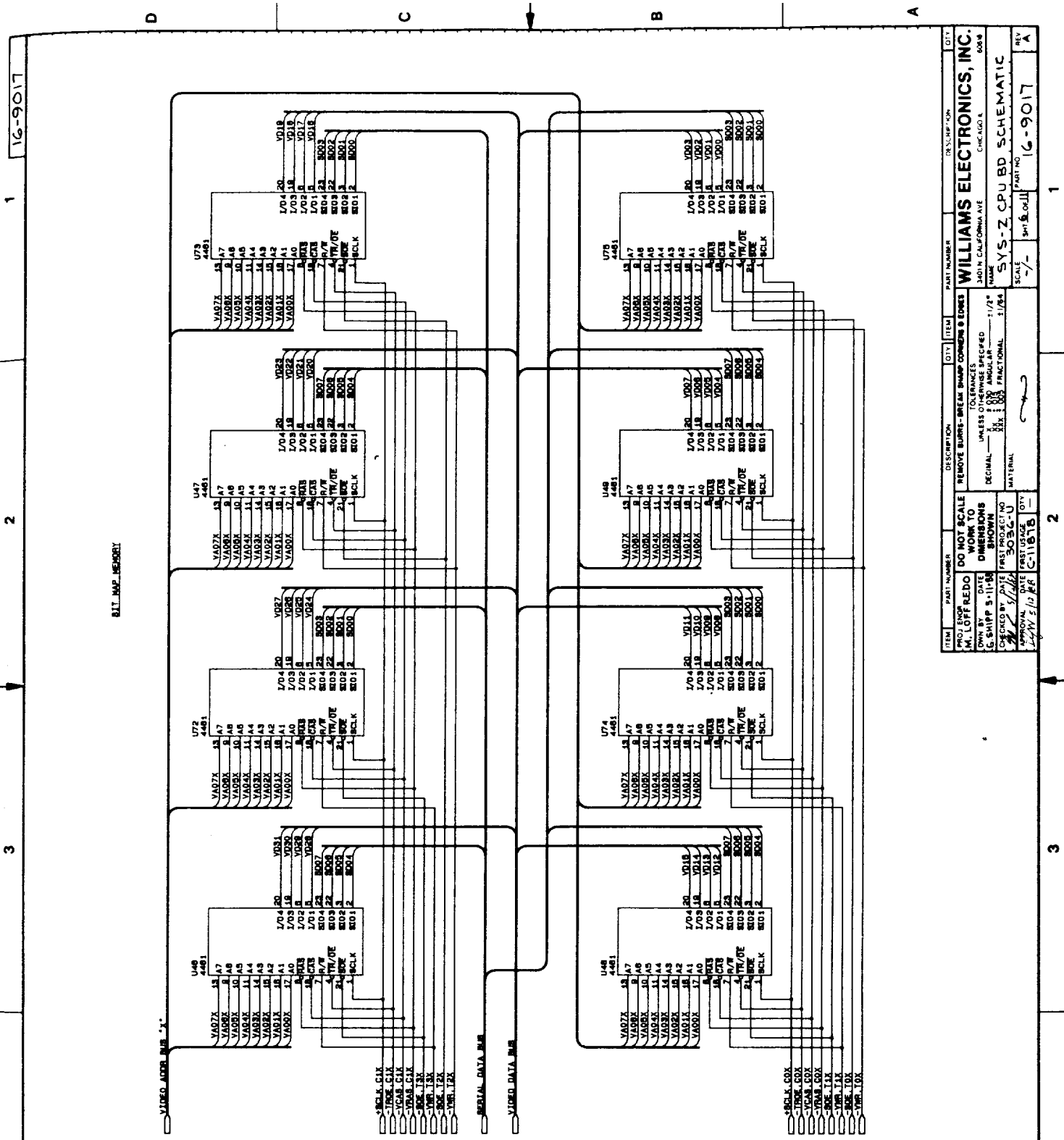
WILLIAMS ELECTRONICS, INC.		16-9017	
300 N. CALIFORNIA AVE.		16-9017	
SAN JOSE, CALIF. 95128		16-9017	
NAME		NAME	
SYN-E CPU BD SCHEMATIC		SYN-E CPU BD SCHEMATIC	
SCALE		SCALE	
1/8"		1/8"	
FRACTIONAL		FRACTIONAL	
1/8"		1/8"	
MATERIAL		MATERIAL	
C-11816		C-11816	
DATE		DATE	
11-20-58		11-20-58	
BY		BY	
J. J. JONES		J. J. JONES	
CHECKED BY		CHECKED BY	
J. J. JONES		J. J. JONES	
DATE		DATE	
11-20-58		11-20-58	
BY		BY	
J. J. JONES		J. J. JONES	

16-9017

321

16-9017

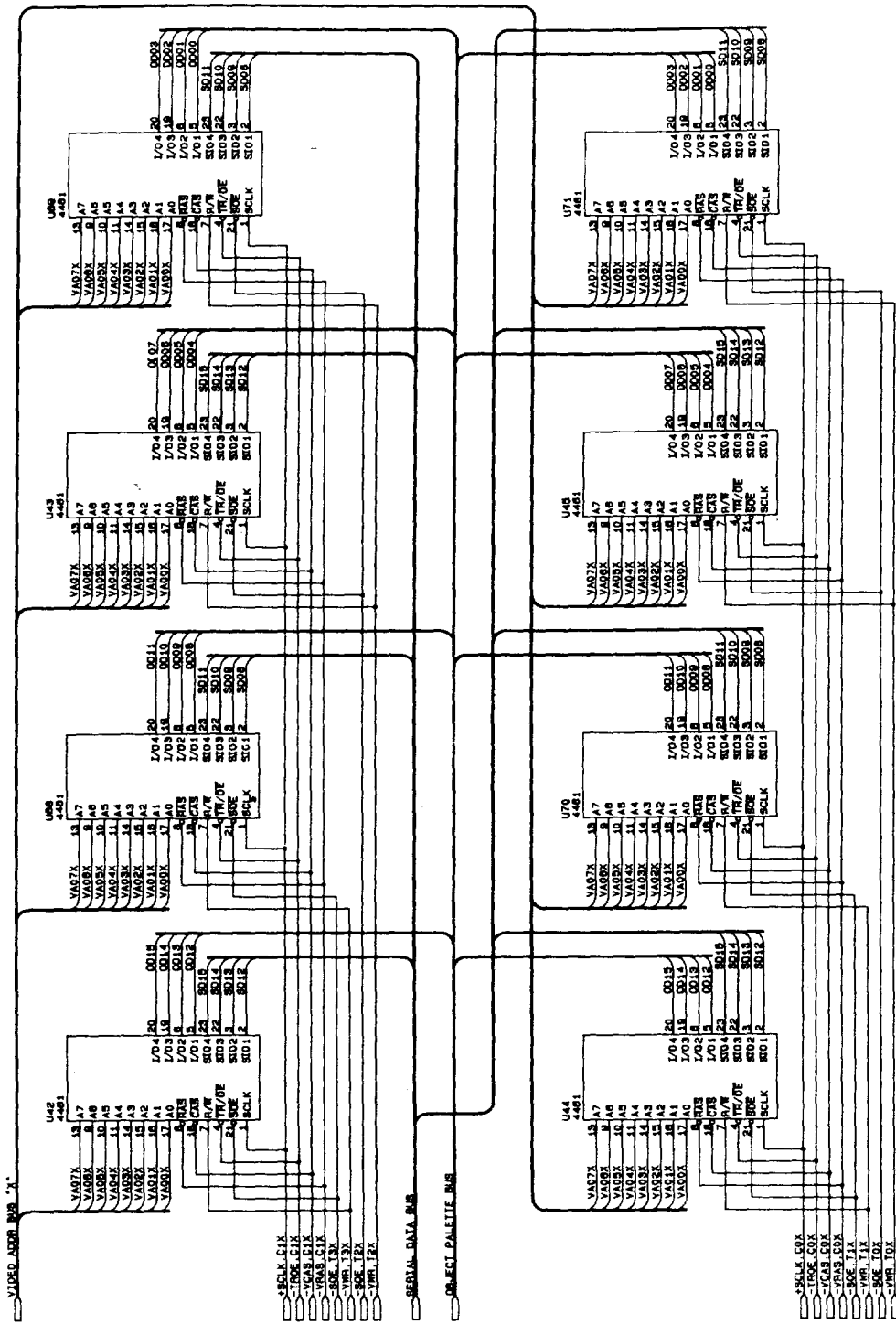
REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	9-13-83
2	SEE COVER SHT	9-30-83



ITEM		PART NUMBER		DESCRIPTION		QTY		ITEM		PART NUMBER		QTY	
PROJECT		M. LOPFERDO		REMOVE BURST-BREAK SWAP CONNECTOR		DO NOT SCALE		WILLIAMS ELECTRONICS, INC.		3800 REP CON		1	
DATE		5-11-88		UNLESS OTHERWISE SPECIFIED		DIMENSIONS TO		3800 N CALIFORNIA AVE		CHICAGO IL		60609	
CHECKED BY		DATE		DECIMAL		SHOWN		NAME		SYS-Z CPU BD SCHEMATIC		REV	
APPROVAL		DATE		FRACTIONAL		FIRST PROJECT NO		SCALE		PART NO		16-9017	
DATE		5-11-88		1/16		3036-U		1/16		16-9017		A	
DATE		5-11-88		1/16		3036-U		1/16		16-9017		A	

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1970-08-08
2	SEE COVER SHEET	1971-12-13
3		1972-08-08

OBJECT PALETTE MEMORY



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	U43	4481	1	1	U45	4481	1
2	U44	4481	1	2	U46	4481	1
3	U45	4481	1	3	U47	4481	1
4	U46	4481	1	4	U48	4481	1
5	U47	4481	1	5	U49	4481	1
6	U48	4481	1	6	U50	4481	1
7	U49	4481	1	7	U51	4481	1
8	U50	4481	1	8	U52	4481	1
9	U51	4481	1	9	U53	4481	1
10	U52	4481	1	10	U54	4481	1
11	U53	4481	1	11	U55	4481	1
12	U54	4481	1	12	U56	4481	1
13	U55	4481	1	13	U57	4481	1
14	U56	4481	1	14	U58	4481	1
15	U57	4481	1	15	U59	4481	1
16	U58	4481	1	16	U60	4481	1
17	U59	4481	1	17	U61	4481	1
18	U60	4481	1	18	U62	4481	1
19	U61	4481	1	19	U63	4481	1
20	U62	4481	1	20	U64	4481	1
21	U63	4481	1	21	U65	4481	1
22	U64	4481	1	22	U66	4481	1
23	U65	4481	1	23	U67	4481	1
24	U66	4481	1	24	U68	4481	1
25	U67	4481	1	25	U69	4481	1
26	U68	4481	1	26	U70	4481	1
27	U69	4481	1	27	U71	4481	1
28	U70	4481	1	28	U72	4481	1
29	U71	4481	1	29	U73	4481	1
30	U72	4481	1	30	U74	4481	1
31	U73	4481	1	31	U75	4481	1
32	U74	4481	1	32	U76	4481	1
33	U75	4481	1	33	U77	4481	1
34	U76	4481	1	34	U78	4481	1
35	U77	4481	1	35	U79	4481	1
36	U78	4481	1	36	U80	4481	1
37	U79	4481	1	37	U81	4481	1
38	U80	4481	1	38	U82	4481	1
39	U81	4481	1	39	U83	4481	1
40	U82	4481	1	40	U84	4481	1
41	U83	4481	1	41	U85	4481	1
42	U84	4481	1	42	U86	4481	1
43	U85	4481	1	43	U87	4481	1
44	U86	4481	1	44	U88	4481	1
45	U87	4481	1	45	U89	4481	1
46	U88	4481	1	46	U90	4481	1
47	U89	4481	1	47	U91	4481	1
48	U90	4481	1	48	U92	4481	1
49	U91	4481	1	49	U93	4481	1
50	U92	4481	1	50	U94	4481	1
51	U93	4481	1	51	U95	4481	1
52	U94	4481	1	52	U96	4481	1
53	U95	4481	1	53	U97	4481	1
54	U96	4481	1	54	U98	4481	1
55	U97	4481	1	55	U99	4481	1
56	U98	4481	1	56	U100	4481	1
57	U99	4481	1	57	U101	4481	1
58	U100	4481	1	58	U102	4481	1
59	U101	4481	1	59	U103	4481	1
60	U102	4481	1	60	U104	4481	1
61	U103	4481	1	61	U105	4481	1
62	U104	4481	1	62	U106	4481	1
63	U105	4481	1	63	U107	4481	1
64	U106	4481	1	64	U108	4481	1
65	U107	4481	1	65	U109	4481	1
66	U108	4481	1	66	U110	4481	1
67	U109	4481	1	67	U111	4481	1
68	U110	4481	1	68	U112	4481	1
69	U111	4481	1	69	U113	4481	1
70	U112	4481	1	70	U114	4481	1
71	U113	4481	1	71	U115	4481	1
72	U114	4481	1	72	U116	4481	1
73	U115	4481	1	73	U117	4481	1
74	U116	4481	1	74	U118	4481	1
75	U117	4481	1	75	U119	4481	1
76	U118	4481	1	76	U120	4481	1
77	U119	4481	1	77	U121	4481	1
78	U120	4481	1	78	U122	4481	1
79	U121	4481	1	79	U123	4481	1
80	U122	4481	1	80	U124	4481	1
81	U123	4481	1	81	U125	4481	1
82	U124	4481	1	82	U126	4481	1
83	U125	4481	1	83	U127	4481	1
84	U126	4481	1	84	U128	4481	1
85	U127	4481	1	85	U129	4481	1
86	U128	4481	1	86	U130	4481	1
87	U129	4481	1	87	U131	4481	1
88	U130	4481	1	88	U132	4481	1
89	U131	4481	1	89	U133	4481	1
90	U132	4481	1	90	U134	4481	1
91	U133	4481	1	91	U135	4481	1
92	U134	4481	1	92	U136	4481	1
93	U135	4481	1	93	U137	4481	1
94	U136	4481	1	94	U138	4481	1
95	U137	4481	1	95	U139	4481	1
96	U138	4481	1	96	U140	4481	1
97	U139	4481	1	97	U141	4481	1
98	U140	4481	1	98	U142	4481	1
99	U141	4481	1	99	U143	4481	1
100	U142	4481	1	100	U144	4481	1

PROJ. ENGINEER	WILLIAMS ELECTRONICS, INC.	16-9017
DATE	1970-08-08	16-9017
DESCRIPTION	REMOVE BURRS - BREAK SHARP CORNERS	16-9017
QTY	1	16-9017
ITEM	1	16-9017
PART NUMBER	U43	16-9017
DESCRIPTION	U43	16-9017
QTY	1	16-9017
ITEM	2	16-9017
PART NUMBER	U44	16-9017
DESCRIPTION	U44	16-9017
QTY	1	16-9017
ITEM	3	16-9017
PART NUMBER	U45	16-9017
DESCRIPTION	U45	16-9017
QTY	1	16-9017
ITEM	4	16-9017
PART NUMBER	U46	16-9017
DESCRIPTION	U46	16-9017
QTY	1	16-9017

16-9017

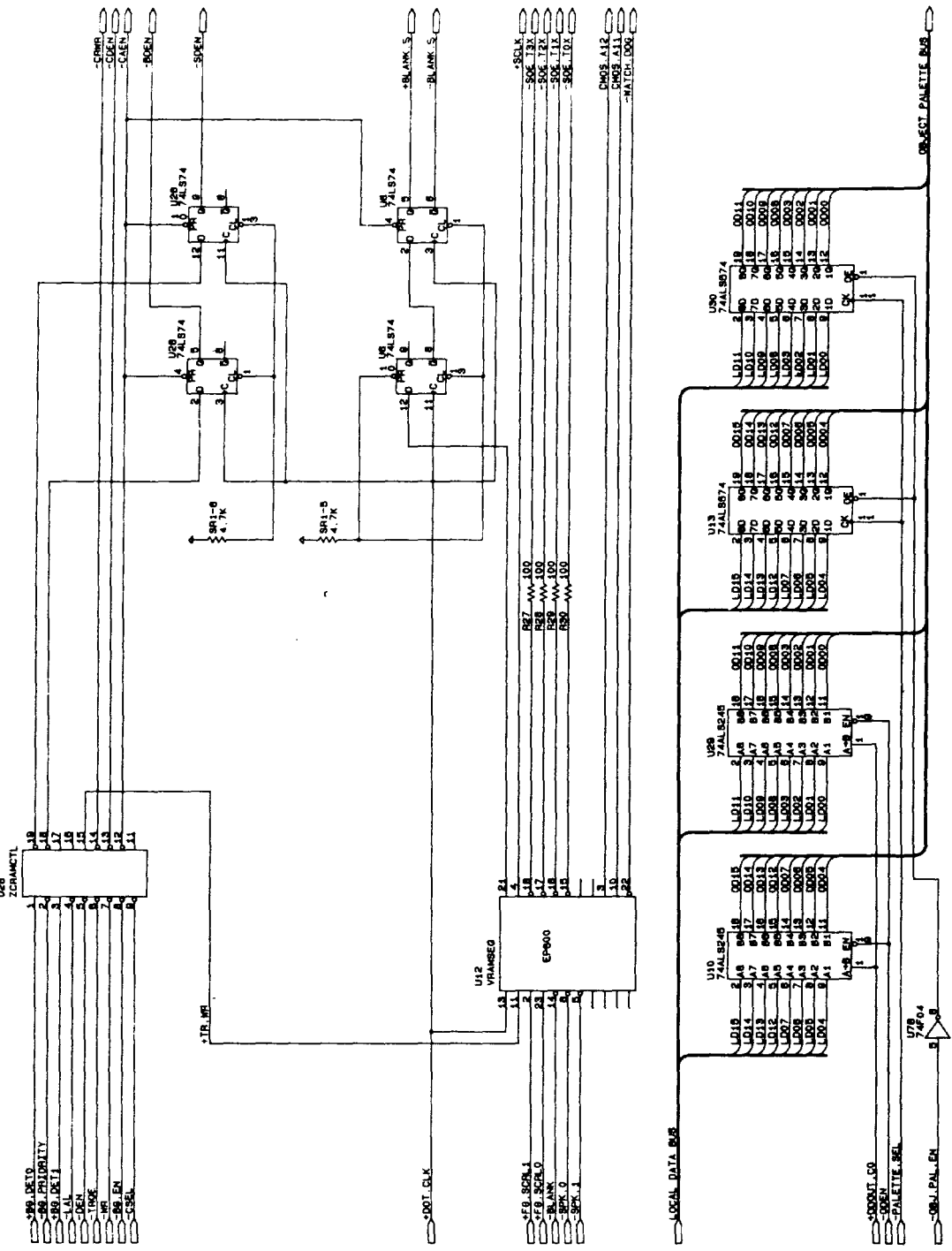
1

2

3

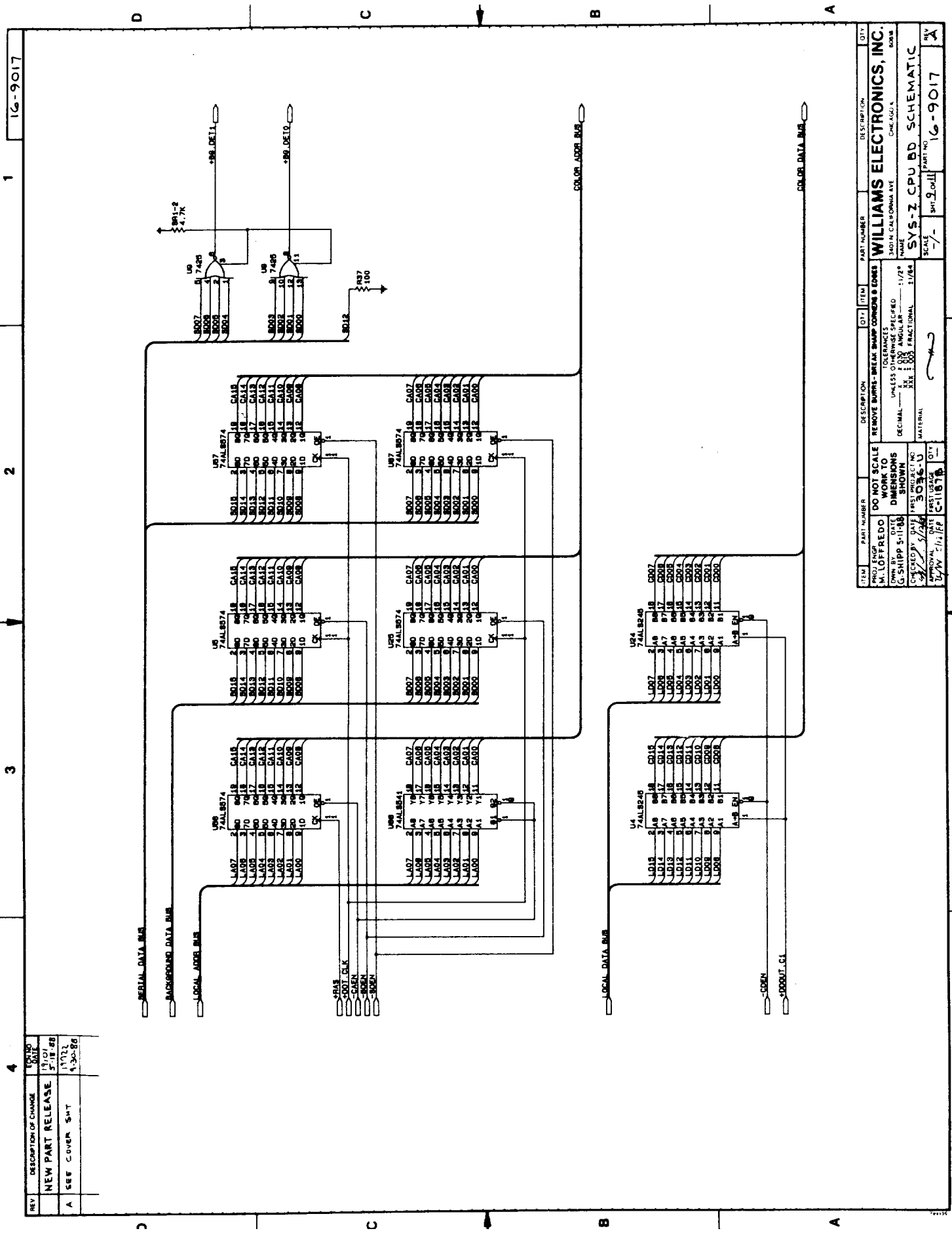
4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1971
2	SEE COVER SMT	1972
3		1973



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	DO NOT SCALE	REMOVE BURRS - BREAK SHARP CORNERS & EDGES		PROJ ENGR	DO NOT SCALE	REMOVE BURRS - BREAK SHARP CORNERS & EDGES	
M. LOT FREQ	WORK TO	TECHNICAL		M. LOT FREQ	WORK TO	TECHNICAL	
OWN BY	DATE	DIMENSIONS		OWN BY	DATE	DIMENSIONS	
G. SHIPP	5-11-80	SHOWN		G. SHIPP	5-11-80	SHOWN	
CHECKED BY	DATE	FIRST PROJECT NO		CHECKED BY	DATE	FIRST PROJECT NO	
APPROVAL	DATE	PRELIMINARY		APPROVAL	DATE	PRELIMINARY	
10/12/80	10/12/80	C11818		10/12/80	10/12/80	C11818	

WILLIAMS ELECTRONICS, INC.		3401 N. CALIFORNIA AVE.		CHICAGO, IL 60618	
SYS-7 CPU BD SCHEMATIC		SCALE		PART NO	
16-9017		16-9017		16-9017	



16-9017

1

2

3

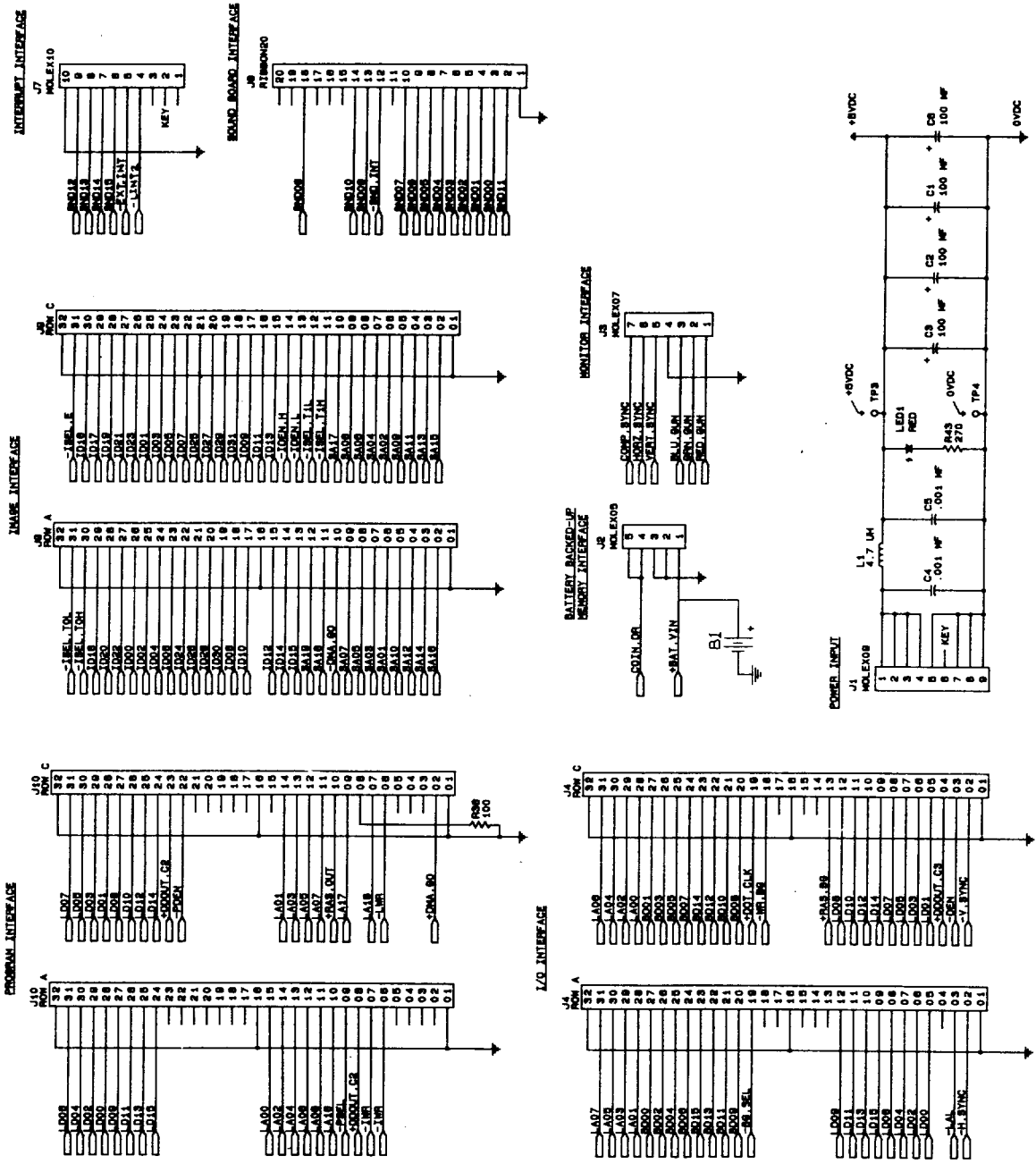
4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	10/01
2	A SEE COVER SHT	1/02
3		9-30-88

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROD ENGR	M. LOFFREDO	DO NOT SCALE		PROD ENGR	M. LOFFREDO	DO NOT SCALE	
DATE	5-11-88	WORK TO		DATE	5-11-88	WORK TO	
CHECKED BY	G. SHIPP	DIMENSIONS		CHECKED BY	G. SHIPP	DIMENSIONS	
DATE	5/26	SHOWN		DATE	5/26	SHOWN	
APPROVAL	DATE	PRESTIGIA	QTY	APPROVAL	DATE	PRESTIGIA	QTY
UW	5/26	C-11818		UW	5/26	C-11818	

WILLIAMS ELECTRONICS, INC.	3401 N. CALIFORNIA AVE.	CHE-AGU-A
SYS-2 CPU BD SCHEMATIC		
SCALE	SMT 9.0011	PART NO 16-9017

REV	DESCRIPTION OF CHANGE	DATE
NEW PART RELEASE	19101	5/18/88
A	SEE COVER SHT	1/11/82
		4/30/88



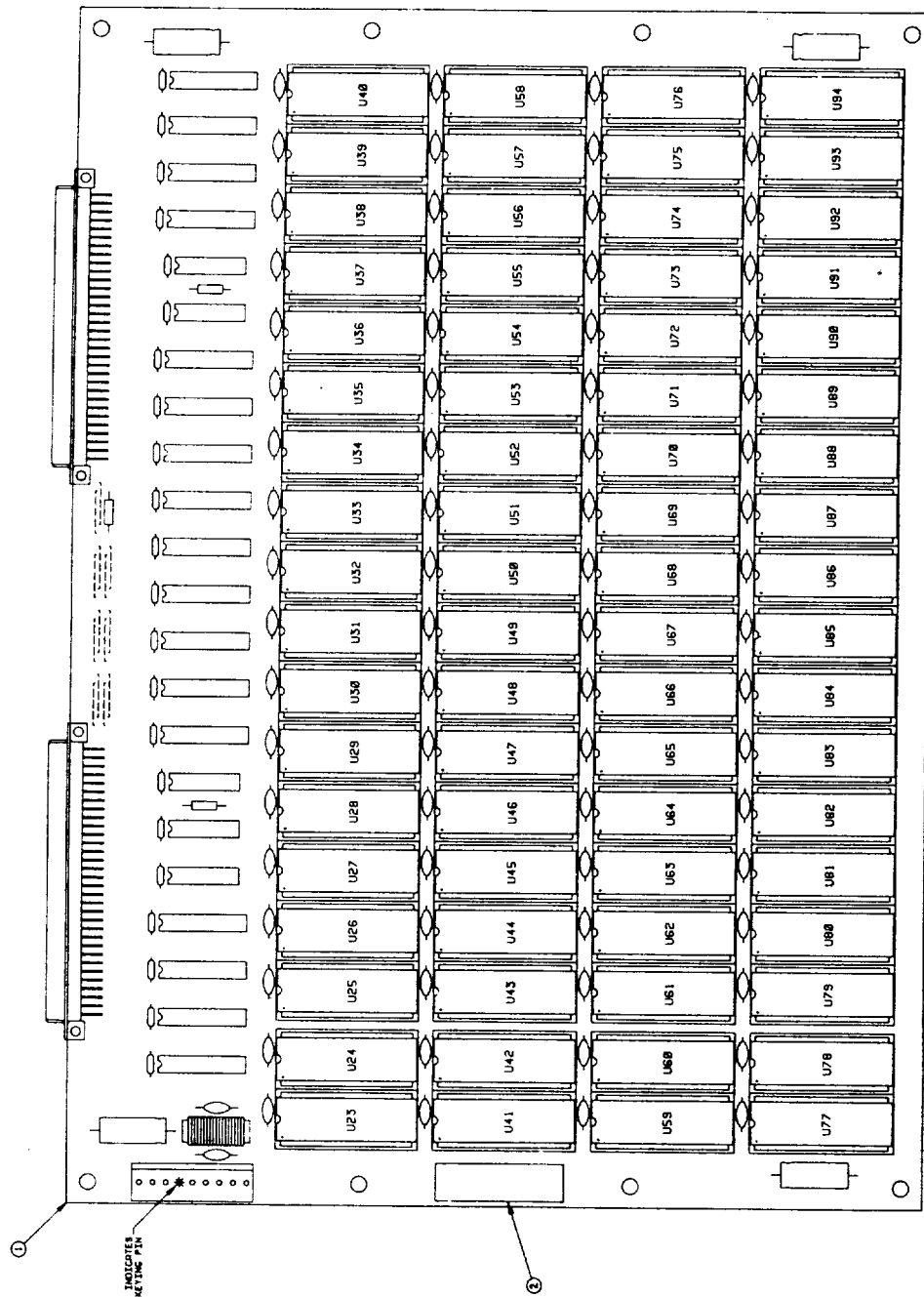
ITEM	PART NUMBER	DESCRIPTION	QTY	TEST	DATE
REMOVE BARRIERS - SEE PARTS LIST FOR DETAILS					
UNLESS OTHERWISE SPECIFIED					
DECIMAL - 1/100 ANGULAR - 1/160					
FRACTIONAL - 1/8					
MATERIAL					
APPROVAL DATE					
BY					
C-11878					

REV	DESCRIPTION	DATE
16-9017	SYS-Z CPU BD SCHEMATIC	1/11/82

REV	DESCRIPTION	DATE
16-9017	SYS-Z CPU BD SCHEMATIC	1/11/82

DESCRIPTION OF CHANGE	DATE
NEW PART RELEASE	5-10-88

C-12260-



NOTES: 1. FOR SCHEMATIC, REFER TO DRAWING NO. 16-9041.
2. 28-PIN DEVICES (I.E. 27S12 EPROMS) SHOULD BE BOTTOM BOTTOM JUSTIFIED IN SOCKETS.

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	WILLIAMS ELECTRONICS, INC.	REMOVE BURR - METAL SHARP CORNERS & EDGES		1	WILLIAMS ELECTRONICS, INC.	REMOVE BURR - METAL SHARP CORNERS & EDGES	
2	DATE 6/17/88	TOLERANCES UNLESS OTHERWISE SPECIFIED		2	DATE 6/17/88	TOLERANCES UNLESS OTHERWISE SPECIFIED	
3	DESIGNED BY DATE 7/24/88	DECIMAL .0005 ANGULAR 1/2°		3	DESIGNED BY DATE 7/24/88	DECIMAL .0005 ANGULAR 1/2°	
4	APPROVAL DATE 7/24/88	FRACTIONAL 1/16		4	APPROVAL DATE 7/24/88	FRACTIONAL 1/16	
PROJECT NO. 3056-U1		MATERIAL		PROJECT NO. 3056-U1		MATERIAL	
PART 1		QTY 1		PART 1		QTY 1	
DATE 7/24/88		DATE 7/24/88		DATE 7/24/88		DATE 7/24/88	

WILLIAMS ELECTRONICS, INC.	
3056	
SYS-Z ROM-2 PCB ASSEMBLY	
SCALE 1/1	PART NO C-12260-

C-12260-

1

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
NEW	NEW PART RELEASE	8-2-78

GAME NAME	3036	3036	3036
ASSY. NO.	ASSY. NO.	ASSY. NO.	ASSY. NO.
U23			
U24			
U25			
U26			
U27			
U28			
U29			
U30			
U31			
U32			
U33			
U34			
U35			
U36			
U37			
U38			
U39			
U40			
U41			
U42			
U43			
U44			
U45			
U46			
U47			
U48			
U49			

GAME NAME	3036	3036	3036
ASSY. NO.	ASSY. NO.	ASSY. NO.	ASSY. NO.
U50			
U51			
U52			
U53			
U54			
U55			
U56			
U57			
U58			
U59			
U60			
U61			
U62			
U63			
U64			
U65			
U66			
U67			
U68			
U69			
U70			
U71			
U72			
U73			
U74			
U75			
U76			

GAME NAME	3036	3036	3036
ASSY. NO.	ASSY. NO.	ASSY. NO.	ASSY. NO.
U77			
U78			
U79			
U80			
U81			
U82			
U83			
U84			
U85			
U86			
U87			
U88			
U89			
U90			
U91			
U92			
U93			
U94			

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY
3	SEE CHART	SEE CHART	GAME ROM SET	SEE CHART
2	1P-8850-219		LABEL, PCB IDENT.	1
1	C-12261		SYS-2 ROM 2 SUB-ASSY	1

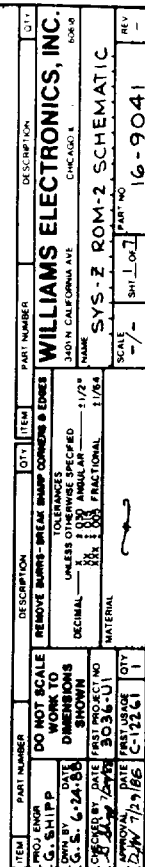
BILL OF MATERIALS

NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 18-9041

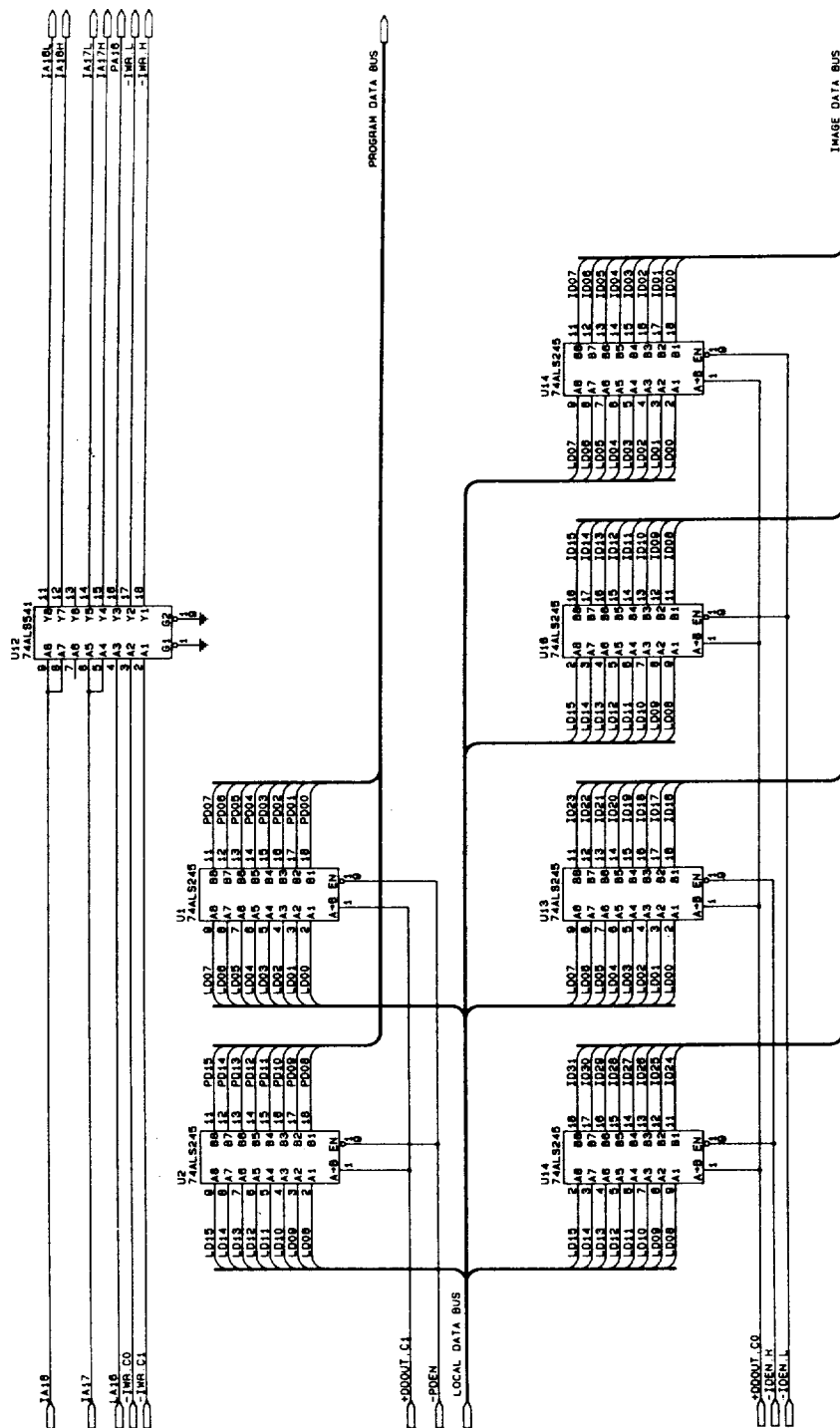
DO NOT SCALE		REMOVE BURRS-BREAK SHARP CORNERS & EDGES	
PROJ. NO.	C-12260	DATE	8-2-78
DESIGNED BY	C. SHIPP	CHECKED BY	DATE
C.S.	6-24-78	DATE	8-2-78
DIMENSIONS SHOWN		TOLERANCES UNLESS OTHERWISE SPECIFIED	
DECIMAL		1/32	
FRACTIONAL		1/64	
ANGULAR		1/4°	
FIRST PROJECT NO.		3036-01	
DATE		8-2-78	
APPROVAL		DATE	
DATE		8-2-78	
QTY		1	
D-12260		1	
MATERIAL		NONE	
SCALE		1/2"=1"	
PART NO.		C-12260-	
REV		-	

WILLIAMS ELECTRONICS, INC.
3401 N. CALIFORNIA AVE.
CHICAGO, ILL. 60618

SYS-2 ROM-2 PCB ASSEMBLY



REV	DESCRIPTION OF CHANGE	ED NO DATE
	NEW PART RELEASE	19497 02-2-80

[illegible]

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	WILLIAMS ELECTRONICS, INC.		

3401 N CALIFORNIA AVE CHICAGO IL 60618

NAME
SYS-Z ROM-2 SCHEMATIC

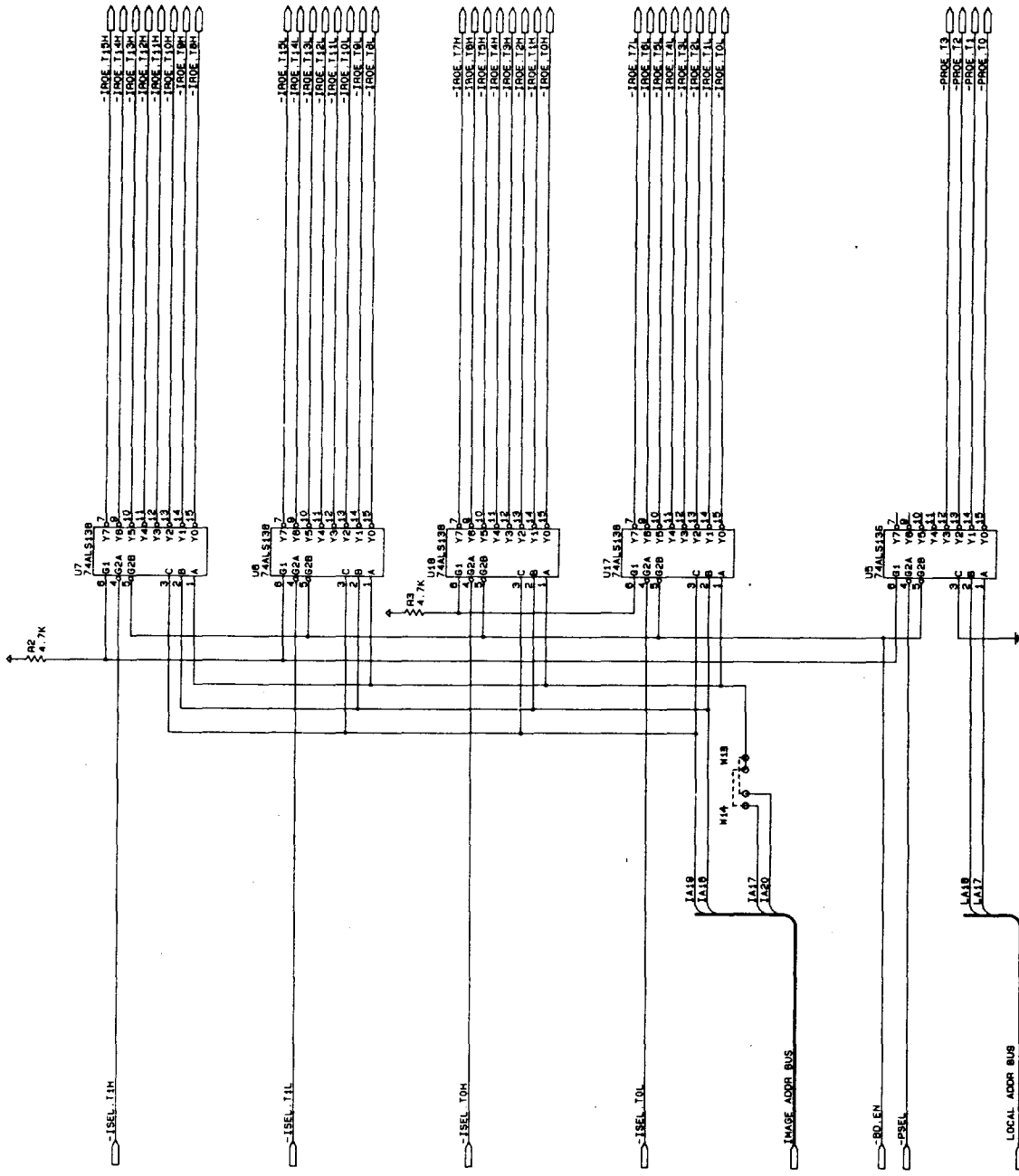
SCALE	SHEET 2 OF 7	PART NO	REV

1406-91			
---------	--	--	--

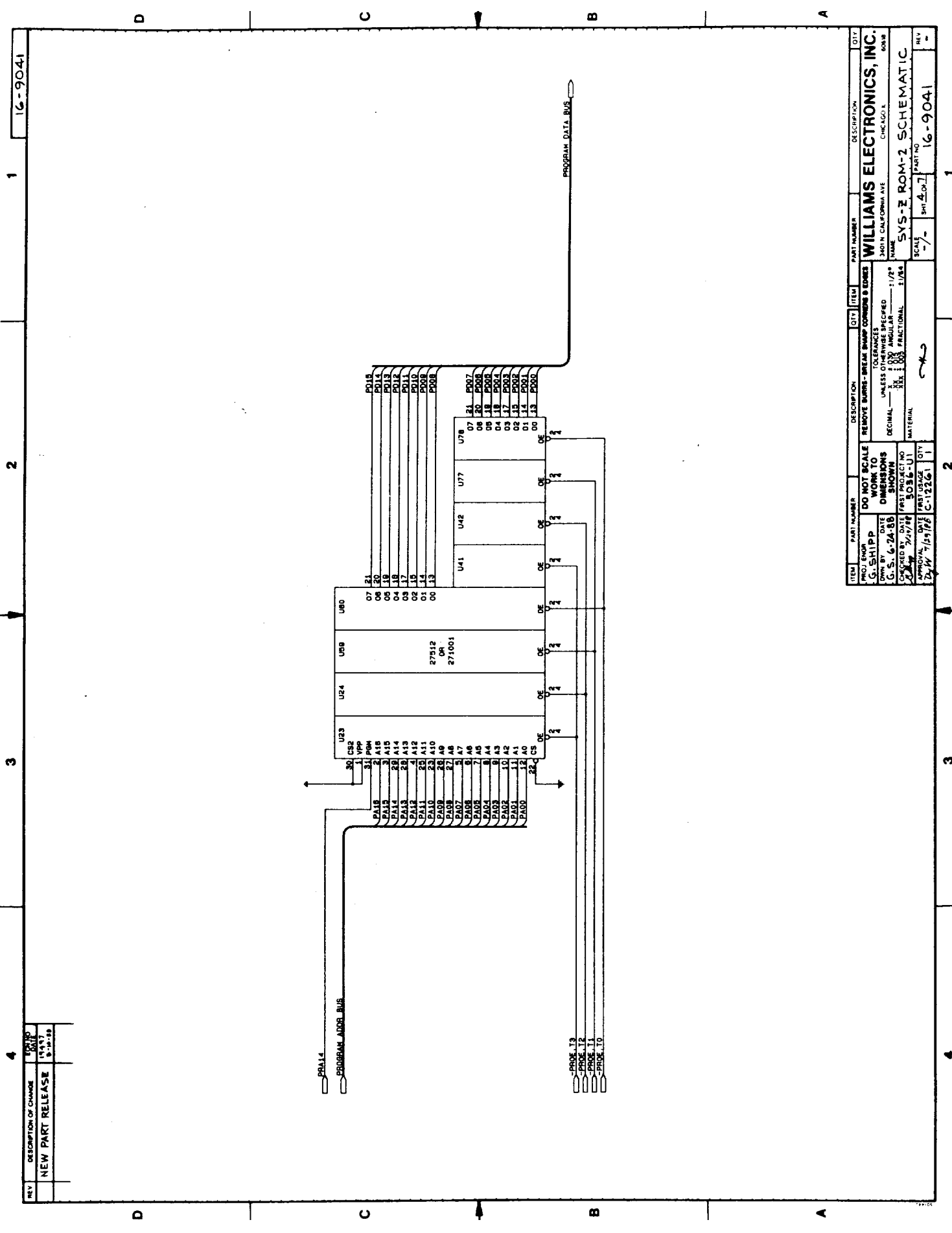
$\frac{1}{2} \sqrt{2}$

NEW PART RELEASE
1997
11-11-96

16-9041



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
WILLIAMS ELECTRONICS, INC. 2401 CALIFORNIA AVE CHICAGO, IL 60618							
SYN-2 ROM-2 SCHEMATIC							
SCALE: 1/4" = 1"							
DATE: 7/29/88							
APPROVAL: [Signature]							



16-9041

1

2

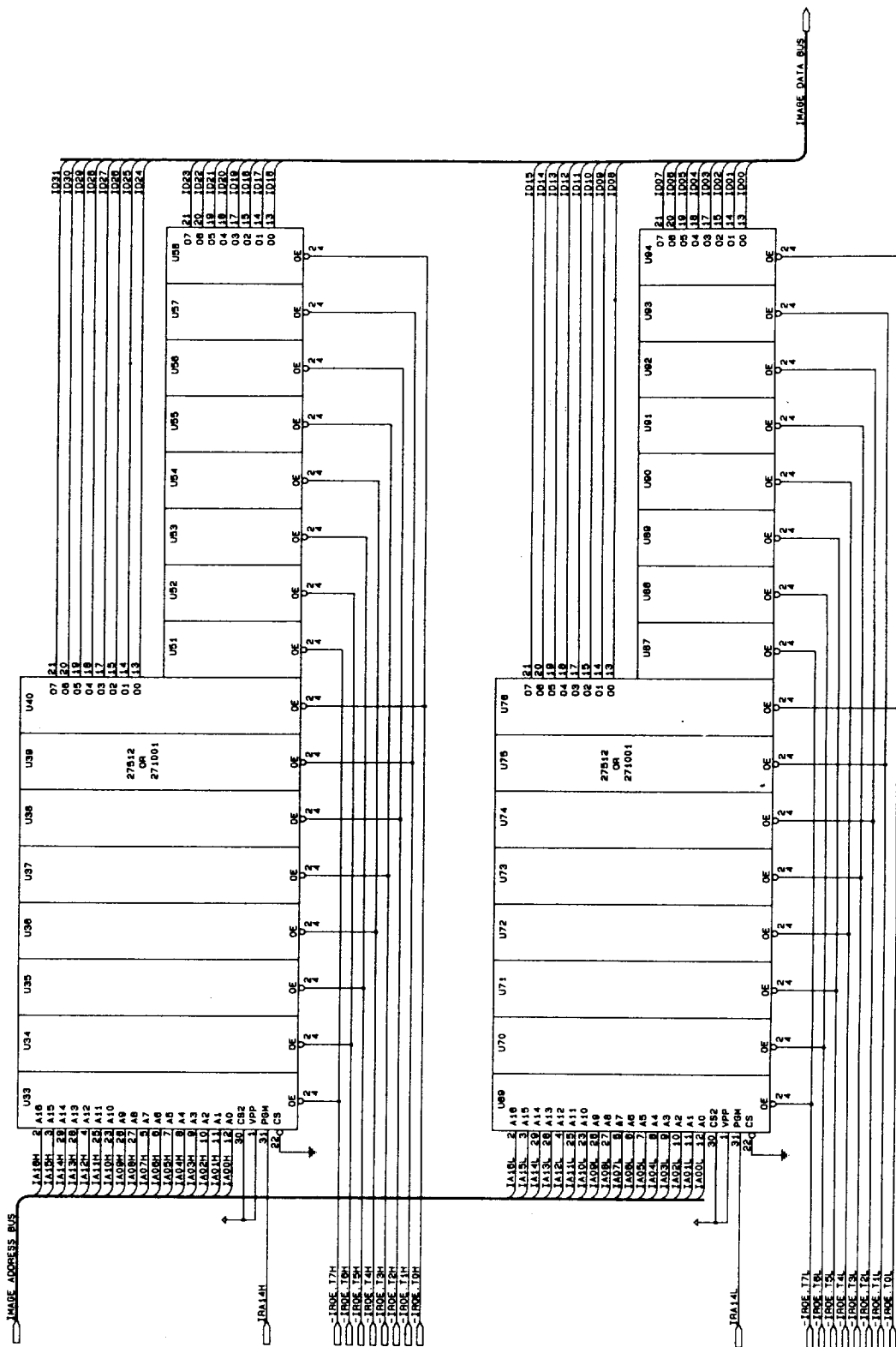
3

4

REV	DESCRIPTION OF CHANGE	DATE	BY
1	NEW PART RELEASE	8-1-78	

ITEM	PART NUMBER	QTY	ITEM	DESCRIPTION	QTY
PROJ. ENGR	G. SHIPP	DO NOT SCALE	REMOVE BURRS - BREAK CORNERS & EDGES	WILLIAMS ELECTRONICS, INC.	
DATE	6-24-86	WORK TO DIMENSIONS SHOWN	UNLESS OTHERWISE SPECIFIED	3401 N CALIFORNIA AVE	CHICAGO, IL 60608
APPROVAL	7/1/86	3036-U1	DECIMAL	1/16"	
DATE	7/1/86	3036-U1	FRACTIONAL	1/16"	
APPROVAL	7/1/86	C-12261	MATERIAL		
SCALE	-/-	16-9041	PART NO		
REV					

REV	DESCRIPTION OF CHANGE	CONTROL DATE
	NEW PART RELEASE	1944 8-10-58



ITEM	QTY	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
			DO NOT SCALE					
			REMOVE BURRS - BREAK SHARP CORNERS & EDGES					
			UNLESS OTHERWISE SPECIFIED					
			DECIMAL					
			1/16					
			1/8					
			3/16					
			1/2					
			3/4					
			1					
			2					
			3					
			4					
			5					
			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
			23					
			24					
			25					
			26					
			27					
			28					
			29					
			30					
			31					
			32					
			33					
			34					
			35					
			36					
			37					
			38					
			39					
			40					
			41					
			42					
			43					
			44					
			45					
			46					
			47					
			48					
			49					
			50					
			51					
			52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					

QTY		DESCRIPTION		PART NUMBER		QTY		DESCRIPTION	
		REMOVE BURRS - BREAK SHARP CORNERS & EDGES							
		UNLESS OTHERWISE SPECIFIED							
		DECIMAL							
		1/16							
		1/8							
		3/16							
		1/2							
		3/4							
		1							
		2							
		3							
		4							
		5							
		6							
		7							
		8							
		9							
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							
		21							
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							
		43							
		44							
		45							
		46							
		47							
		48							
		49							
		50							
		51							
		52							
		53							
		54							
		55							
		56							
		57							
		58							
		59							
		60							
		61							
		62							
		63							
		64							

QTY		DESCRIPTION		PART NUMBER		QTY		DESCRIPTION	
		REMOVE BURRS - BREAK SHARP CORNERS & EDGES							
		UNLESS OTHERWISE SPECIFIED							
		DECIMAL							
		1/16							
		1/8							
		3/16							
		1/2							
		3/4							
		1							
		2							
		3							
		4							
		5							
		6							
		7							
		8							
		9							
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							
		21							
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							
		43							
		44							
		45							
		46							
		47							
		48							
		49							
		50							
		51							
		52							
		53							
		54							
		55							
		56							
		57							
		58							
		59							
		60							
		61							
		62							
		63							
		64							

QTY		DESCRIPTION		PART NUMBER		QTY		DESCRIPTION	
		REMOVE BURRS - BREAK SHARP CORNERS & EDGES							
		UNLESS OTHERWISE SPECIFIED							
		DECIMAL							
		1/16							
		1/8							
		3/16							
		1/2							
		3/4							
		1							
		2							
		3							
		4							
		5							
		6							
		7							
		8							
		9							
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							
		21							
		22							
		23							
		24							
		25							
		26							
		27							
		28							
		29							
		30							
		31							
		32							
		33							
		34							
		35							
		36							
		37							
		38							
		39							
		40							
		41							
		42							
		43							
		44							
		45							
		46							
		47							
		48							
		49							
		50							
		51							
		52							
		53							
		54							
		55							
		56							
		57							
		58							
		59							
		60							
		61							

16-9041

1

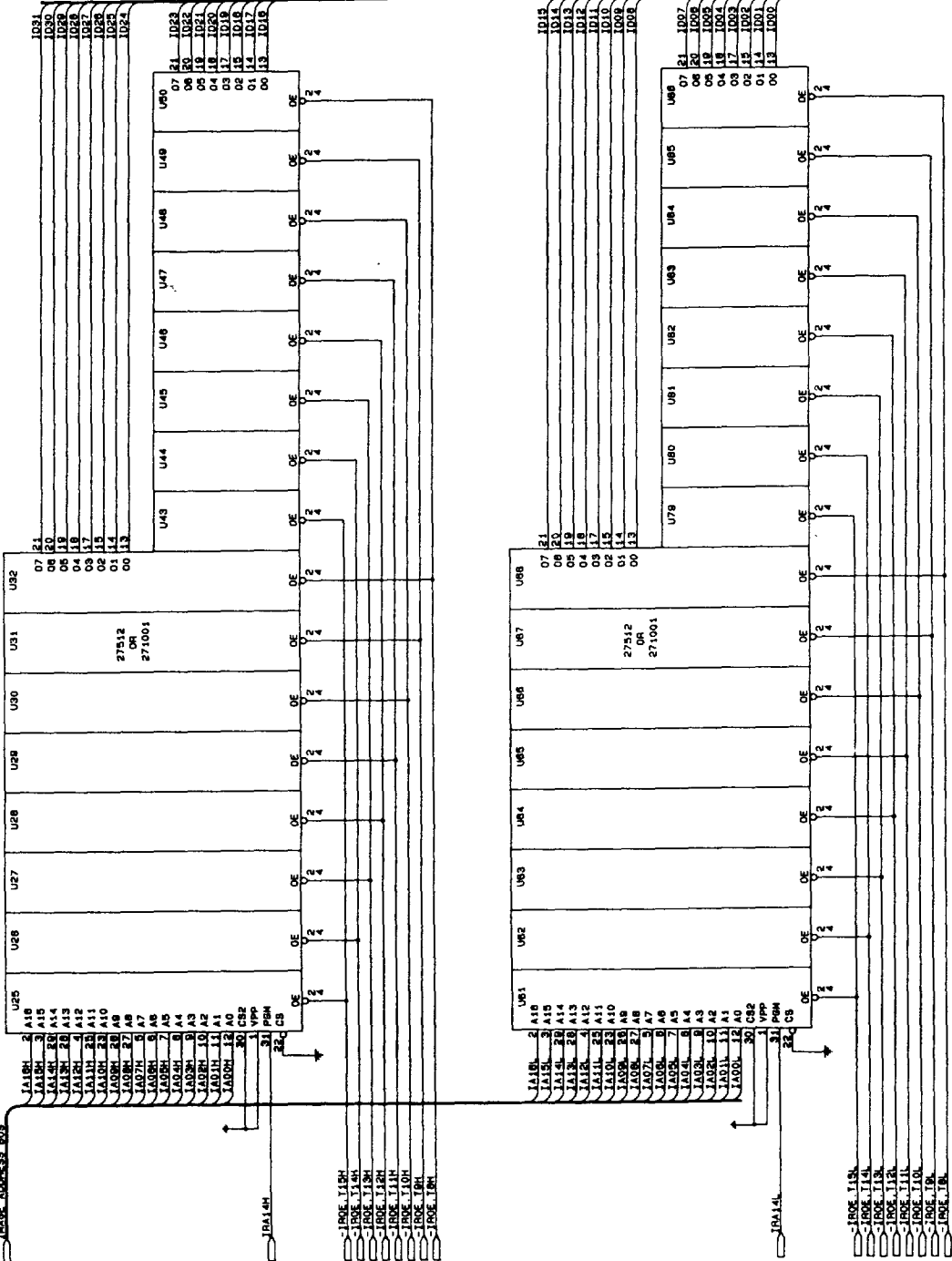
2

3

4

REV	DESCRIPTION OF CHANGE	DATE
NEW PART RELEASE		10/27/78

IMAGE ADDRESS BUS

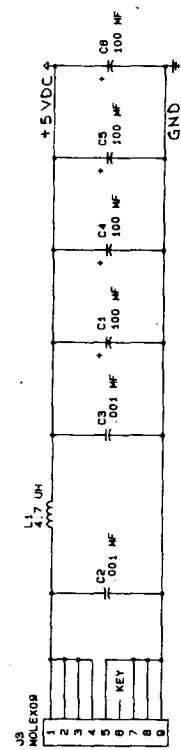
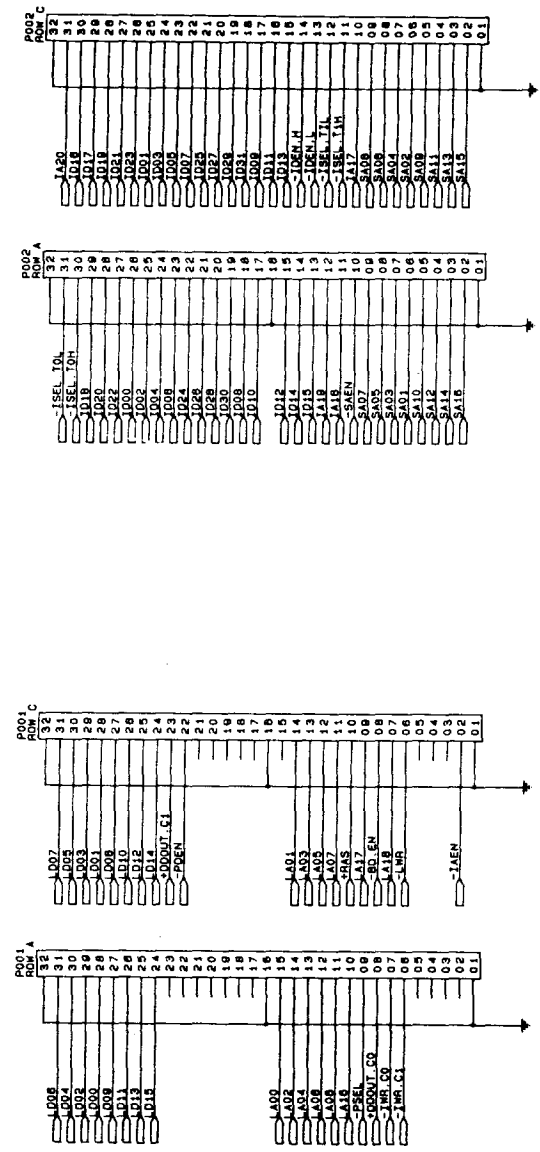


ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	G. SHIMP	DO NOT SCALE WORK TO DIMENSIONS SHOWN		REMOVE BUBBLES - BREAK SHARP CORNERS & EDGES			
OWN BY	G. S. 6-24-88	DATE		TOLERANCES			
DESIGNED BY	DATE	17/2/78		UNLESS OTHERWISE SPECIFIED			
APPROVAL	DATE	17/2/78		DECIMAL	1/16"	ANGULAR	1/2°
				FRACTIONAL	1/4"		
				MATERIAL			
				SCALE	1/4" = 1"		
				PART NO	16-9041		
				REV			

WILLIAMS ELECTRONICS, INC.	
3401 N. CALIFORNIA AVE. CHICAGO, IL 60648	
SYS-Z ROM-2 SCHEMATIC	
SCALE	1/4" = 1"
PART NO	16-9041
REV	

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	3-10-68

16-9041



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY	
1	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	2	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
3	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	4	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
5	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	6	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
7	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	8	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
9	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	10	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
11	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	12	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
13	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	14	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
15	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	16	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
17	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	18	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
19	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	20	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
21	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	22	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
23	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	24	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
25	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	26	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
27	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	28	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
29	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	30	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1
31	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1	32	WILLIAMS ELECTRONICS, INC.	ROM-2 SCHEMATIC	1

NAV	DESCRIPTION OF CHANGE	DATE
	NEW PART RELEASE	1/8/94
		4-28-98

- ### 3J2 Functions

Pin/Function

- 1 - NC
- 2 - NC
- 3 - NC
- 4 - NC
- 5 - Key
- 6 - Memory Protect
- 7 - T/B Strobe
- 8 - Player 2 Start
- 9 - Player 1 Start

- ### 3J4 Functions

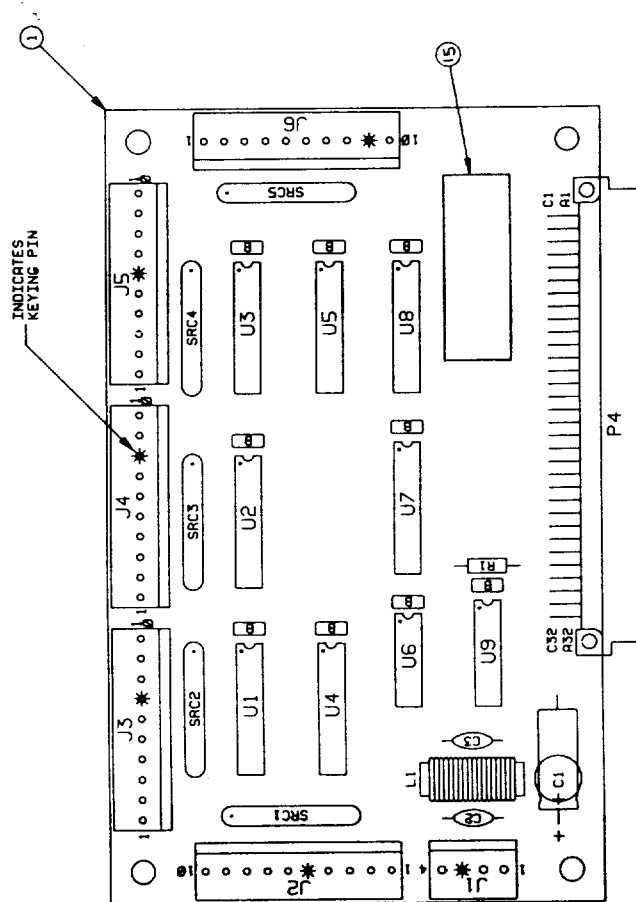
Pin/Function

- 1 - Player 1 Rocket
- 2 - Player 1 Jump
- 3 - Player 1 Fire
- 4 - Player 1 Crouch
- 5 - Player 1 Right
- 6 - Player 1 Left
- 7 - Player 1 Down
- 8 - Key
- 9 - Player 1 Up
- 10-Ground

- ### 3J3 Functions

Pin/Function

- 1 - Player 2 Rocket
- 2 - Player 2 Jump
- 3 - Player 2 Fire
- 4 - Player 2 Crouch
- 5 - Player 2 Right
- 6 - Player 2 Left
- 7 - Key
- 8 - Player 2 Down
- 9 - Player 2 Up
- 10-Ground

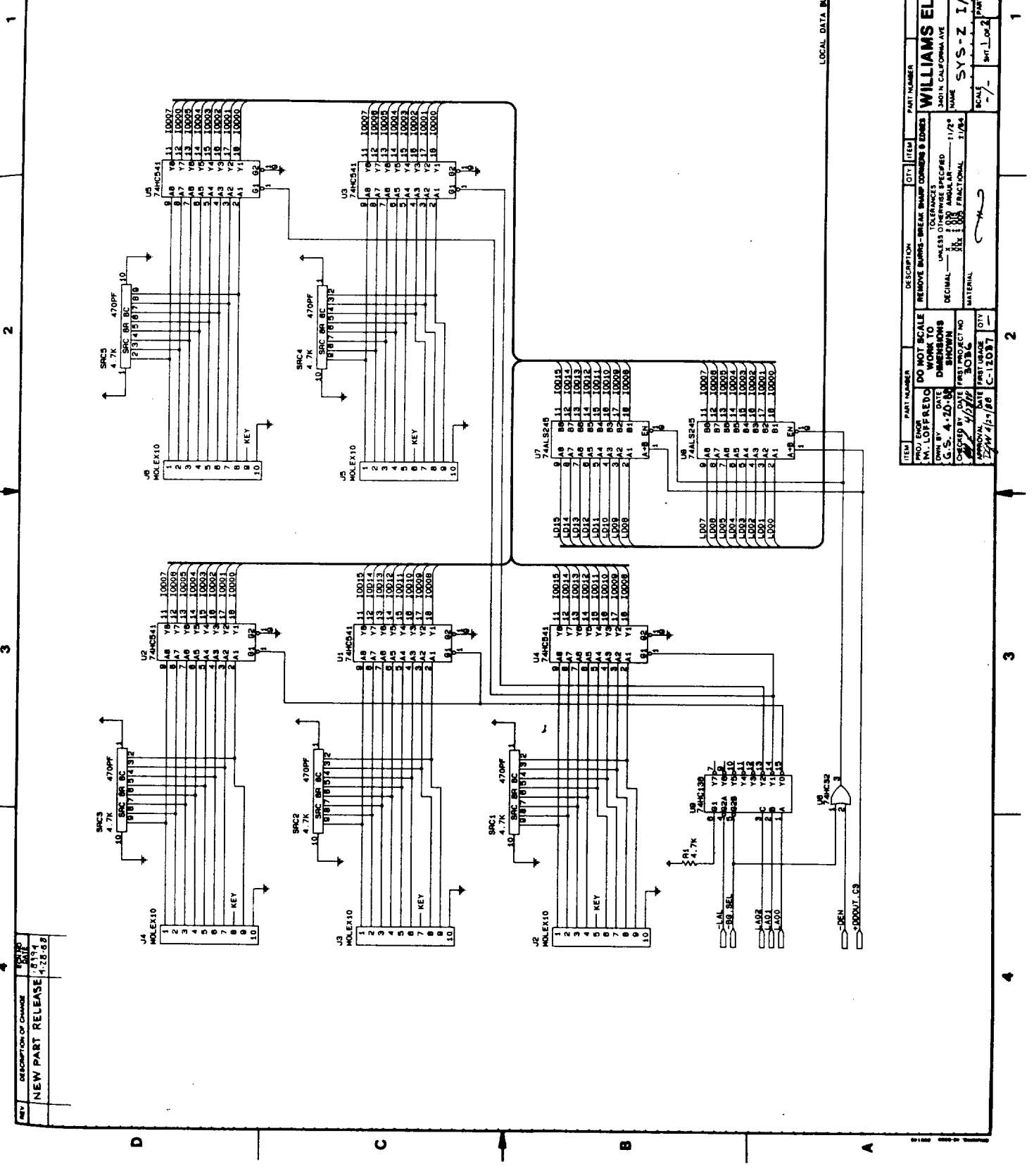


ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
15	1C-8850-212		LABEL, PCB IDENT.	1
14	5792-10026-00	P4	CONNECTOR, 64P EURO-DIN CARD CONN. FEMALE	1
13	5791-10062-10	J2, J3 J4, J5, J6	CONNECTOR, 10P MOLEX, .156" CENTER PINS	5
12	5791-10062-04	J1	CONNECTOR, 4P MOLEX, .156" CENTER PINS	1
11	5043-093845-00	C2, C3	CAPACITOR, .001 MFD.	2
10	5040-08986-00	C1	CAPACITOR, 100 MFD.	1
9	5043-08980-00	B	CAPACITOR, 0.01 MFD.	9
8	5010-08991-00	R1	RESISTOR, 4.7K, 1/4W, 5% 1/4W, 5%	1
7	5060-10398-00	SCR1, SCR2, SCR3 SRC4, SRC5	SCR, 10P 8-RES/8-CAP NETWORK, 4.7K, 470 PF	5
6	5551-09822-00	L1	INDUCTOR, 4.7 UH	1
5	5311-10948-00	U9	74HC138, H-CMOS 3/8 DECODER	1
4	5317-12208-00	U7, U8	74ALS245, ALS TTL OCTAL BUS TRANSCEIVER	2
3	5311-10945-00	U6	74HC32, H-CMOS QUAD 2-INPUT OR GATE	1
2	5311-12287-00	U1, U2, U3, U4, U5	74HC541, HC TTL OCTAL BUFFER	5
1	5779-12265-00		BARE PC BOARD	1

BILL OF MATERIALS

DO NOT SCALE THIS DRAWING TO CONFORM TO DIMENSIONS SHOWN	NO PART 3063	DATE 4/29/71	DRAWN BY 2/12/68	INCHES 1/8"	DATE 2/12/68	NO 101
MATERIAL NONE		DECIMAL UNLESS OTHERWISE SPECIFIED 1/8" ANGULAR 1/16" FRACTIONAL		REMOVE BURRS - BREAK SHARP CORNERS & EDGES OPERATES AS SHOWN UNLESS OTHERWISE SPECIFIED		
NAME 3401 N. CALIFORNIA AVE. CHICAGO, ILL. 60618		WILLIAMS ELECTRONICS, INC. SYS-Z I/O PCB ASSEMBLY SCALE 1.5"=1" SHIT-LOUL PART NO C 12037 REV 1				

16-9028



REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	4-20-88

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR	M. LOFFREDO	DO NOT SCALE WORK TO DIMENSIONS SHOWN		PROJ ENGR	M. LOFFREDO	DO NOT SCALE WORK TO DIMENSIONS SHOWN	
DATE	4-20-88			DATE	4-20-88		
CHKD BY	G.S. 4-20-88			CHKD BY	G.S. 4-20-88		
DESIGNED BY	DATE PREP	PROJECT NO		DESIGNED BY	DATE PREP	PROJECT NO	
2/24/88	2/24/88	6-11031		2/24/88	2/24/88	6-11031	
PREPARED BY	DATE PREP	PROJECT NO		PREPARED BY	DATE PREP	PROJECT NO	
2/24/88	2/24/88	6-11031		2/24/88	2/24/88	6-11031	
MATERIAL				MATERIAL			
1/100				1/100			
FRACTIONAL				FRACTIONAL			
1/20				1/20			
ANGULAR				ANGULAR			
UNLESS OTHERWISE SPECIFIED				UNLESS OTHERWISE SPECIFIED			
TOLERANCES				TOLERANCES			
REMOVE BURRS-BREAK SHARP CORNERS & EDGES				REMOVE BURRS-BREAK SHARP CORNERS & EDGES			
DESCRIPTION				DESCRIPTION			
WILLIAMS ELECTRONICS, INC.				WILLIAMS ELECTRONICS, INC.			
3401 N. CALIFORNIA AVE.				3401 N. CALIFORNIA AVE.			
CHICAGO, IL 60644				CHICAGO, IL 60644			
NAME				NAME			
SYS-2 I/O SCHEMATIC				SYS-2 I/O SCHEMATIC			
SCALE				SCALE			
1/100				1/100			
PART NO				PART NO			
16-9028				16-9028			
REV				REV			
1				1			

C-12350

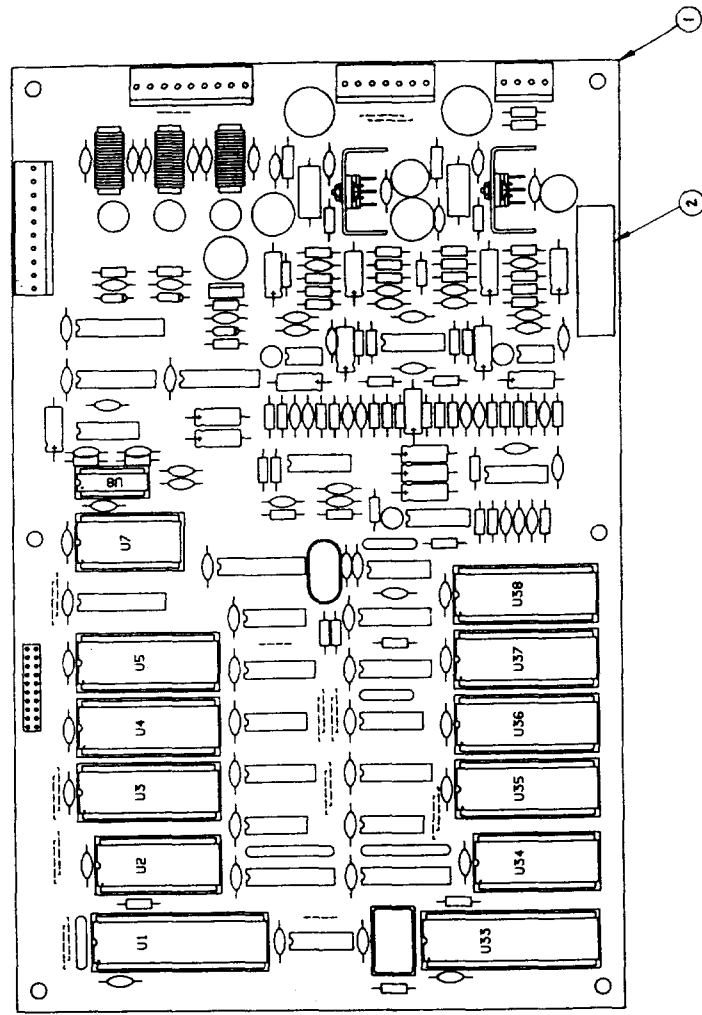
1

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	10/1/68

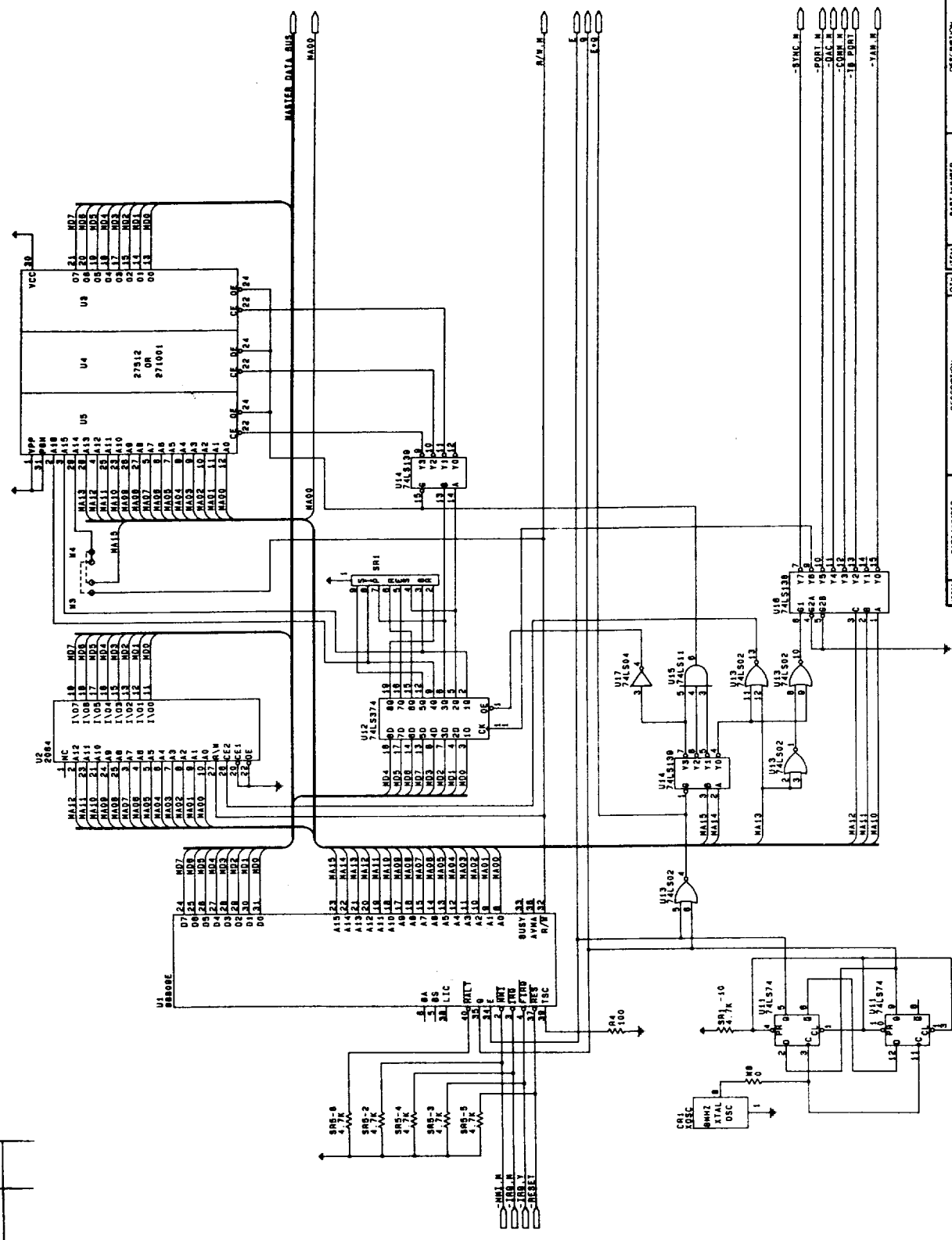


NOTE:
FOR SCHEMATIC, REFER TO DRAWING NO. 16-9044.

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT	PART NUMBER	DESCRIPTION	QTY
PROJ ENG	DO NOT SCALE	REMOVE BURRS-BREAK BUMP CORNERS & EDGES					
ALL LOF REQS	WORK TO DIMENSIONS	UNLESS OTHERWISE SPECIFIED					
DATE	9-22-68	DECIMAL	1/16	ANGULAR	1/2°		
CHECKED BY	DATE	3036-U1	FRACTIONAL	1/8	1/8		
APPROVAL	DATE	3036-U1					
DATE	11-2-68	3036-U1					
DATE	11-2-68	3036-U1					
DATE	11-2-68	3036-U1					

WILLIAMS ELECTRONICS, INC.	
2401 N. CALIFORNIA AVE.	
CHICAGO, ILL. 60642	
NAME	SYS-2 SOUND-2 ASSEMBLY
SCALE	1/1
PART NO	C-12350
REV	1

REV	DESCRIPTION OF CHANGE
1	NEW PART RELEASE



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	74LS139	74LS139	1	1	74LS139	74LS139	1
2	74LS139	74LS139	1	2	74LS139	74LS139	1
3	74LS139	74LS139	1	3	74LS139	74LS139	1
4	74LS139	74LS139	1	4	74LS139	74LS139	1
5	74LS139	74LS139	1	5	74LS139	74LS139	1
6	74LS139	74LS139	1	6	74LS139	74LS139	1
7	74LS139	74LS139	1	7	74LS139	74LS139	1
8	74LS139	74LS139	1	8	74LS139	74LS139	1
9	74LS139	74LS139	1	9	74LS139	74LS139	1
10	74LS139	74LS139	1	10	74LS139	74LS139	1
11	74LS139	74LS139	1	11	74LS139	74LS139	1
12	74LS139	74LS139	1	12	74LS139	74LS139	1
13	74LS139	74LS139	1	13	74LS139	74LS139	1
14	74LS139	74LS139	1	14	74LS139	74LS139	1
15	74LS139	74LS139	1	15	74LS139	74LS139	1
16	74LS139	74LS139	1	16	74LS139	74LS139	1
17	74LS139	74LS139	1	17	74LS139	74LS139	1
18	74LS139	74LS139	1	18	74LS139	74LS139	1
19	74LS139	74LS139	1	19	74LS139	74LS139	1
20	74LS139	74LS139	1	20	74LS139	74LS139	1
21	74LS139	74LS139	1	21	74LS139	74LS139	1
22	74LS139	74LS139	1	22	74LS139	74LS139	1
23	74LS139	74LS139	1	23	74LS139	74LS139	1
24	74LS139	74LS139	1	24	74LS139	74LS139	1
25	74LS139	74LS139	1	25	74LS139	74LS139	1
26	74LS139	74LS139	1	26	74LS139	74LS139	1
27	74LS139	74LS139	1	27	74LS139	74LS139	1
28	74LS139	74LS139	1	28	74LS139	74LS139	1
29	74LS139	74LS139	1	29	74LS139	74LS139	1
30	74LS139	74LS139	1	30	74LS139	74LS139	1
31	74LS139	74LS139	1	31	74LS139	74LS139	1
32	74LS139	74LS139	1	32	74LS139	74LS139	1
33	74LS139	74LS139	1	33	74LS139	74LS139	1
34	74LS139	74LS139	1	34	74LS139	74LS139	1
35	74LS139	74LS139	1	35	74LS139	74LS139	1
36	74LS139	74LS139	1	36	74LS139	74LS139	1
37	74LS139	74LS139	1	37	74LS139	74LS139	1
38	74LS139	74LS139	1	38	74LS139	74LS139	1
39	74LS139	74LS139	1	39	74LS139	74LS139	1
40	74LS139	74LS139	1	40	74LS139	74LS139	1
41	74LS139	74LS139	1	41	74LS139	74LS139	1
42	74LS139	74LS139	1	42	74LS139	74LS139	1
43	74LS139	74LS139	1	43	74LS139	74LS139	1
44	74LS139	74LS139	1	44	74LS139	74LS139	1
45	74LS139	74LS139	1	45	74LS139	74LS139	1
46	74LS139	74LS139	1	46	74LS139	74LS139	1
47	74LS139	74LS139	1	47	74LS139	74LS139	1
48	74LS139	74LS139	1	48	74LS139	74LS139	1
49	74LS139	74LS139	1	49	74LS139	74LS139	1
50	74LS139	74LS139	1	50	74LS139	74LS139	1
51	74LS139	74LS139	1	51	74LS139	74LS139	1
52	74LS139	74LS139	1	52	74LS139	74LS139	1
53	74LS139	74LS139	1	53	74LS139	74LS139	1
54	74LS139	74LS139	1	54	74LS139	74LS139	1
55	74LS139	74LS139	1	55	74LS139	74LS139	1
56	74LS139	74LS139	1	56	74LS139	74LS139	1
57	74LS139	74LS139	1	57	74LS139	74LS139	1
58	74LS139	74LS139	1	58	74LS139	74LS139	1
59	74LS139	74LS139	1	59	74LS139	74LS139	1
60	74LS139	74LS139	1	60	74LS139	74LS139	1
61	74LS139	74LS139	1	61	74LS139	74LS139	1
62	74LS139	74LS139	1	62	74LS139	74LS139	1
63	74LS139	74LS139	1	63	74LS139	74LS139	1
64	74LS139	74LS139	1	64	74LS139	74LS139	1
65	74LS139	74LS139	1	65	74LS139	74LS139	1
66	74LS139	74LS139	1	66	74LS139	74LS139	1
67	74LS139	74LS139	1	67	74LS139	74LS139	1
68	74LS139	74LS139	1	68	74LS139	74LS139	1
69	74LS139	74LS139	1	69	74LS139	74LS139	1
70	74LS139	74LS139	1	70	74LS139	74LS139	1
71	74LS139	74LS139	1	71	74LS139	74LS139	1
72	74LS139	74LS139	1	72	74LS139	74LS139	1
73	74LS139	74LS139	1	73	74LS139	74LS139	1
74	74LS139	74LS139	1	74	74LS139	74LS139	1
75	74LS139	74LS139	1	75	74LS139	74LS139	1
76	74LS139	74LS139	1	76	74LS139	74LS139	1
77	74LS139	74LS139	1	77	74LS139	74LS139	1
78	74LS139	74LS139	1	78	74LS139	74LS139	1
79	74LS139	74LS139	1	79	74LS139	74LS139	1
80	74LS139	74LS139	1	80	74LS139	74LS139	1
81	74LS139	74LS139	1	81	74LS139	74LS139	1
82	74LS139	74LS139	1	82	74LS139	74LS139	1
83	74LS139	74LS139	1	83	74LS139	74LS139	1
84	74LS139	74LS139	1	84	74LS139	74LS139	1
85	74LS139	74LS139	1	85	74LS139	74LS139	1
86	74LS139	74LS139	1	86	74LS139	74LS139	1
87	74LS139	74LS139	1	87	74LS139	74LS139	1
88	74LS139	74LS139	1	88	74LS139	74LS139	1
89	74LS139	74LS139	1	89	74LS139	74LS139	1
90	74LS139	74LS139	1	90	74LS139	74LS139	1
91	74LS139	74LS139	1	91	74LS139	74LS139	1
92	74LS139	74LS139	1	92	74LS139	74LS139	1
93	74LS139	74LS139	1	93	74LS139	74LS139	1
94	74LS139	74LS139	1	94	74LS139	74LS139	1
95	74LS139	74LS139	1	95	74LS139	74LS139	1
96	74LS139	74LS139	1	96	74LS139	74LS139	1
97	74LS139	74LS139	1	97	74LS139	74LS139	1
98	74LS139	74LS139	1	98	74LS139	74LS139	1
99	74LS139	74LS139	1	99	74LS139	74LS139	1
100	74LS139	74LS139	1	100	74LS139	74LS139	1

WILLIAMS ELECTRONICS, INC.		16-9044	
3401N CALIFORNIA AVE		CHICAGO, ILL.	
NAME		SYS-Z SOUND-2 BD. SCHEMATIC	
SCALE		1/8"	
REV		1	
DATE		11-25-66	
BY		C-11843	
CHECKED BY		DATE	
APPROVAL		DATE	
DO NOT SCALE		WORK TO DIMENSIONS SHOWN	
REMOVE BURRS-BREAK SHARP CORNERS & EDGES		UNLESS OTHERWISE SPECIFIED	
TO FRANCES		DECIMAL - 1/16" ANGULAR - 1/2"	
MATERIAL		FRONT PROJECT NO	
QTY		QTY	
C-11843		C-11843	

16-9044

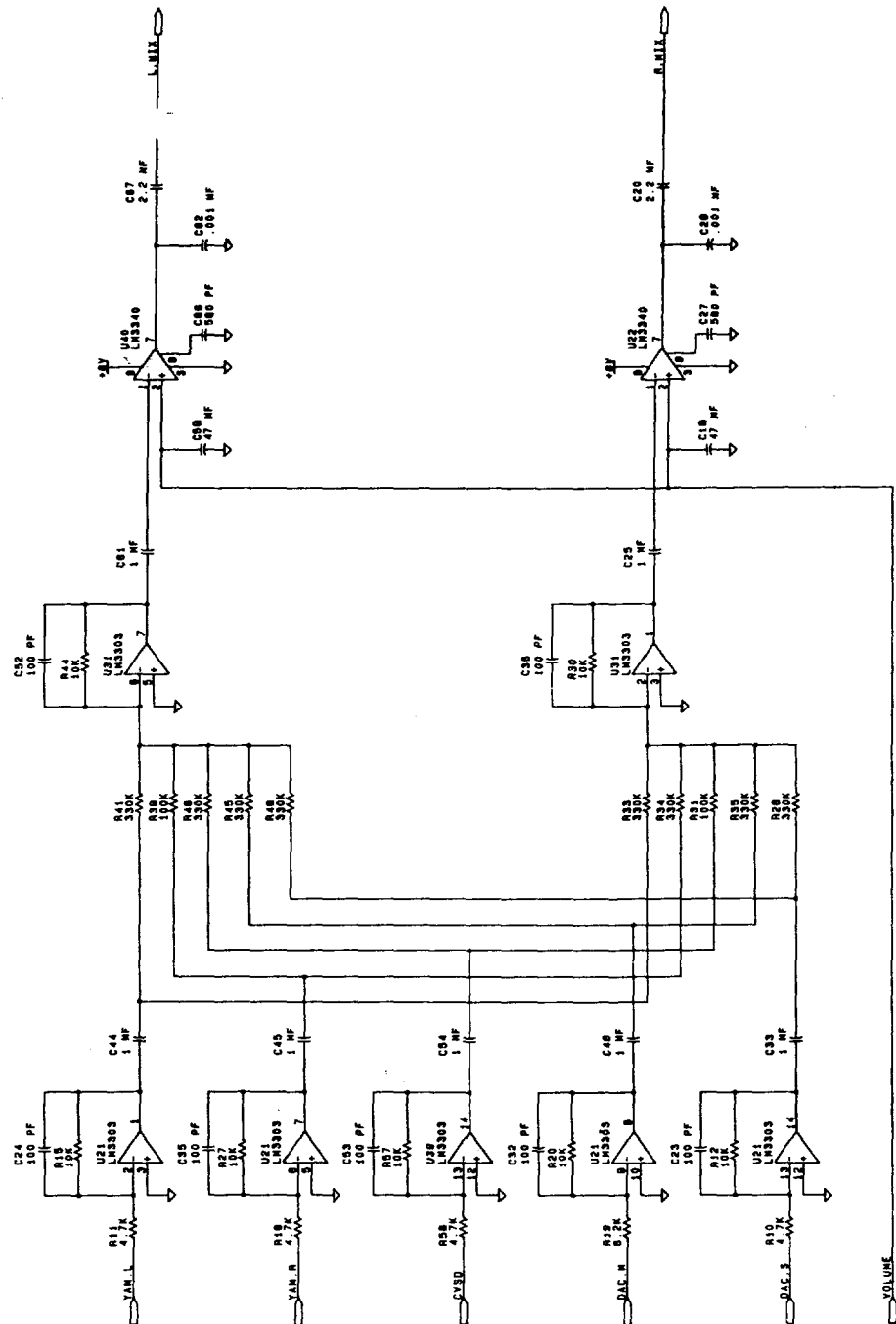
1

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	

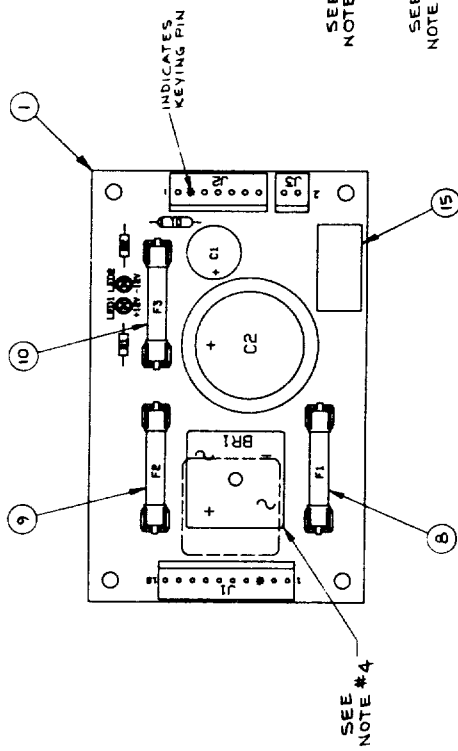


ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
PROJ ENGR		DO NOT SCALE		REMOVE BURRS - BREAK SHARP CORNERS & EDGES			
DATE		WORK TO		TOLERANCES			
10-18-88		DIMENSIONS		UNLESS OTHERWISE SPECIFIED			
11-21-88		SHOWN		DECIMAL		1/16"	
11-22-88		PROJECT NO		FRACTIONAL		1/32"	
11-22-88		DATE		MATERIAL			
11-22-88		DATE					

WILLIAMS ELECTRONICS, INC.	CHICAGO, IL
3401 N. CALIFORNIA AVE.	CHICAGO, IL
NAME	SYN-E SOUND-2 BD. SCHEMATIC
SCALE	1/8"=1"
PART NO	16-9044
REV	-

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	5/18/88

C-12218



NOTES: 1. FOR SCHEMATIC, REFER TO DRAWING NO. 16-9837.
 2. ALL FUSES TO BE INSTALLED AFTER SOLDER WASH.
 3. EACH FUSEHOLDER CAN BE SUBSTITUTED WITH
 2 FUSE CLIPS PT. NO. 5732-09178-00.
 4. BR1 MUST BE MOUNTED 1/8"
 ABOVE SURFACE OF PCB.

ITEM	PART NO.	PART DESCRIPTION	DESCRIPTION	QTY.
15	16-BR50-216		LABEL, PCB IDENT.	1
14	5791-10662-10	J1	CONN., 10-PIN MOLEX, .156" CENTER PINS	1
13	5791-10662-07	J2	CONN., 7-PIN MOLEX, .156" CENTER PINS	1
12	5791-10662-02	J3	CONN., 2-PIN MOLEX, .156" CENTER PINS	1
11	5733-12060-01	F1, F2, F3	FUSEHOLDER	3
10	5730-09197-00	F3	FUSE, 0.75A, 250V	1
9	5731-09432-00	F2	FUSE, 7A 5B, 250V	1
8	5731-10356-00	F1	FUSE, 3A 5B, 250V	1
7	5040-12313-00	C2	CAPACITOR, ELECT., RAD., 1500 MFD. 25V.	1
6	5040-12314-00	C1	CAPACITOR, ELECT., RAD., 2200 MFD. 25V.	1
5	5671-09019-00	LED1, LED2	LIGHT EMITTING DIODE, RED	2
4	5100-09418-00	BR1	BRIDGE RECTIFIER, 55V.	1
3	5070-06258-00	D1	DIODE, 1N4001	1
2	5010-09514-00	R1, R2	RESISTOR, C.F., 1.2K 5% 1/4 WATT	2
1	5773-12389-00		BARE PC BOARD	1

BILL OF MATERIALS

DO NOT SCALE		REMOVE BURST-BREAK FROM COMPONENTS		WILLIAMS ELECTRONICS, INC.	
DATE	BY	DATE	BY	DATE	BY
5/18/88	R.C.	5/18/88	R.C.	5/18/88	R.C.
CHECKED BY		CHECKED BY		CHECKED BY	
5/18/88		5/18/88		5/18/88	
APPROVAL		APPROVAL		APPROVAL	
5/18/88		5/18/88		5/18/88	
PROJECT NO.		PROJECT NO.		PROJECT NO.	
C-12218		C-12218		C-12218	
SCALE		SCALE		SCALE	
1/1		1/1		1/1	
PART NO.		PART NO.		PART NO.	
C-12218		C-12218		C-12218	

16-9037

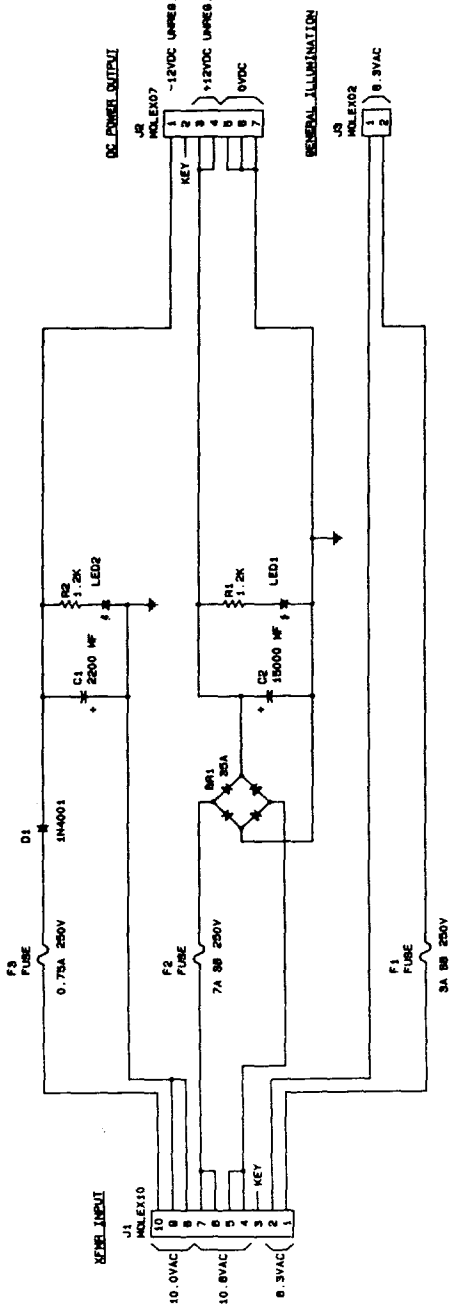
1

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1-18-68



ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	16-9037	REMOTE SUPPLY - 12VDC UNREG. - 1/2" ANGULAR	1	PCB
DO NOT SCALE				
DIMENSIONS SHOWN				
DATE	5/1/68	FIRST PROJECT NO	3036-U	
APPROVAL	DATE	DATE	DATE	DATE
1-18-68	5/1/68	5/1/68	5/1/68	5/1/68

WILLIAMS ELECTRONICS, INC.	
3401 N. CALIFORNIA AVE.	
CHICAGO, ILL. 60648	
NAME	12 UNREG P/S BD., SCHEMATIC
SCALE	1/8"
PART NO.	16-9037