

16-3036-101
December 15, 1988



Service Manual

Programmed Chip Summary

(Continued on Inside-Back Cover)

IC	DESCRIPTION	TYPE	BOARD LOC.	PART NO.
GRAM 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-5343-3036-8
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

NARC



SERVICE MANUAL

- operation
- adjustment
- unique parts

- bookkeeping
- diagnostics

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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



101-3006-01
 8801 01 10/1988

Jumper Table

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

PART NO.	DESCRIPTION
101-3006-01	CPU Board
101-3006-02	ROM Board
101-3006-03	Sound Board
101-3006-04	Power Supply
101-3006-05	Keyboard
101-3006-06	Mouse
101-3006-07	Monitor
101-3006-08	System Unit



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Notes...

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2	General Information
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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

The logo for NARC, consisting of the letters 'NARC' in a stylized, bold, italicized font.

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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

The logo consists of the word "WILLIAMS" in a stylized, bold, italicized font. The letters are thick and slanted to the right, with a slightly irregular, hand-drawn appearance.

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-HARNESSE 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 logo consists of the word "WILLIAMS" in a stylized, bold, italicized font. The letters are thick and slanted to the right, with a slightly jagged or hand-drawn appearance.

- **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.

The logo for NARC (National Amusement and Reciprocity Council) is displayed in a stylized, bold, black font. The letters are thick and slightly irregular, giving it a hand-drawn or stamped appearance.

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.

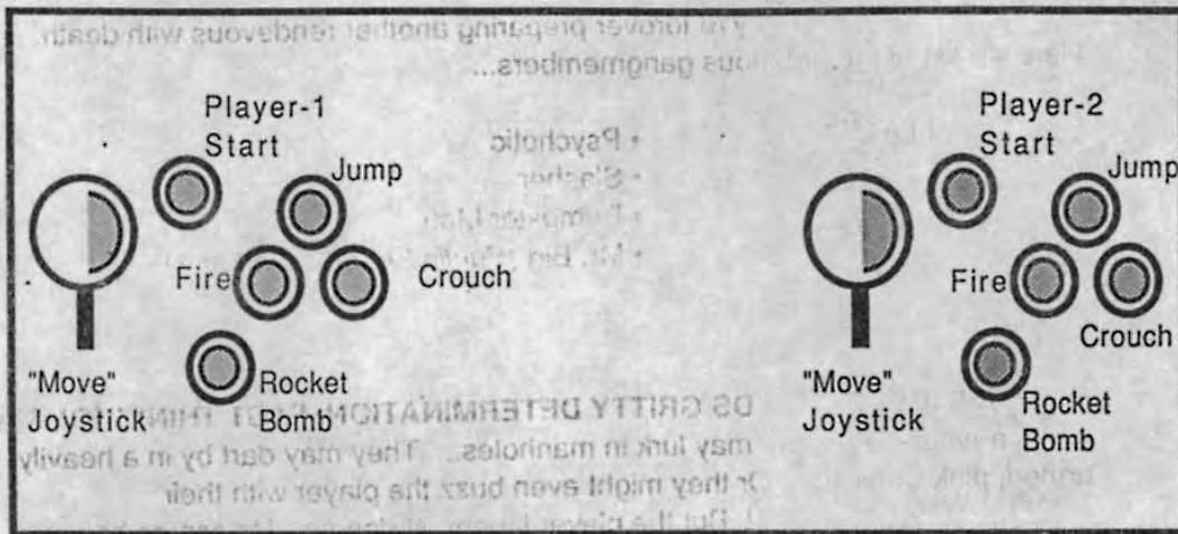
For a two-player game, at least two credits must be displayed. To initiate this two-player game, press the 2-PLAYER START button.

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.

The logo for the game NARC, featuring the letters 'NARC' in a stylized, bold, italicized font with a slight shadow effect.



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

CONARC

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

NARC

- 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.

NARC

NARC TEST MENU
NARC REVISION X.X

SELECT WITH UP/DOWN STICK
ACTIVATE WITH ANY BUTTON

DIAGNOSTIC TESTS
COIN BOOKKEEPING
GAME AUDITS
GAME ADJUSTMENT
UTILITIES
EXIT TO GAME OVER

VIEW GAMEPLAY
STATISTICS

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

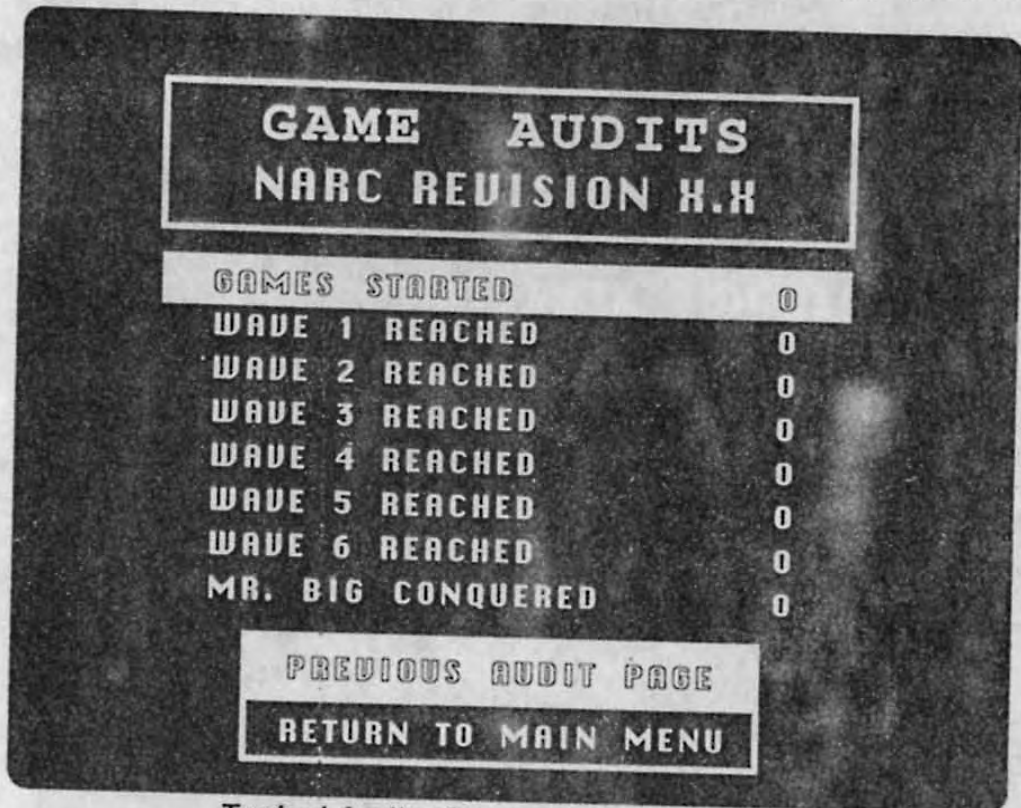
NEXT AUDIT PAGE

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.

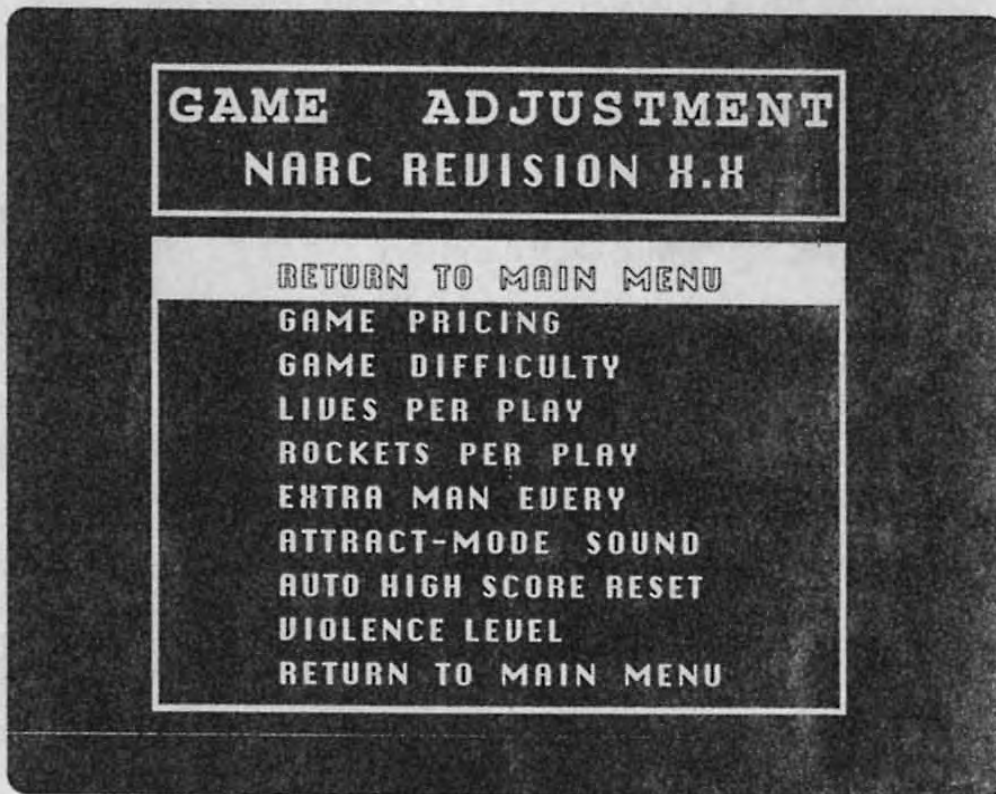


Typical Audits Screen, Page 2

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

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

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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...

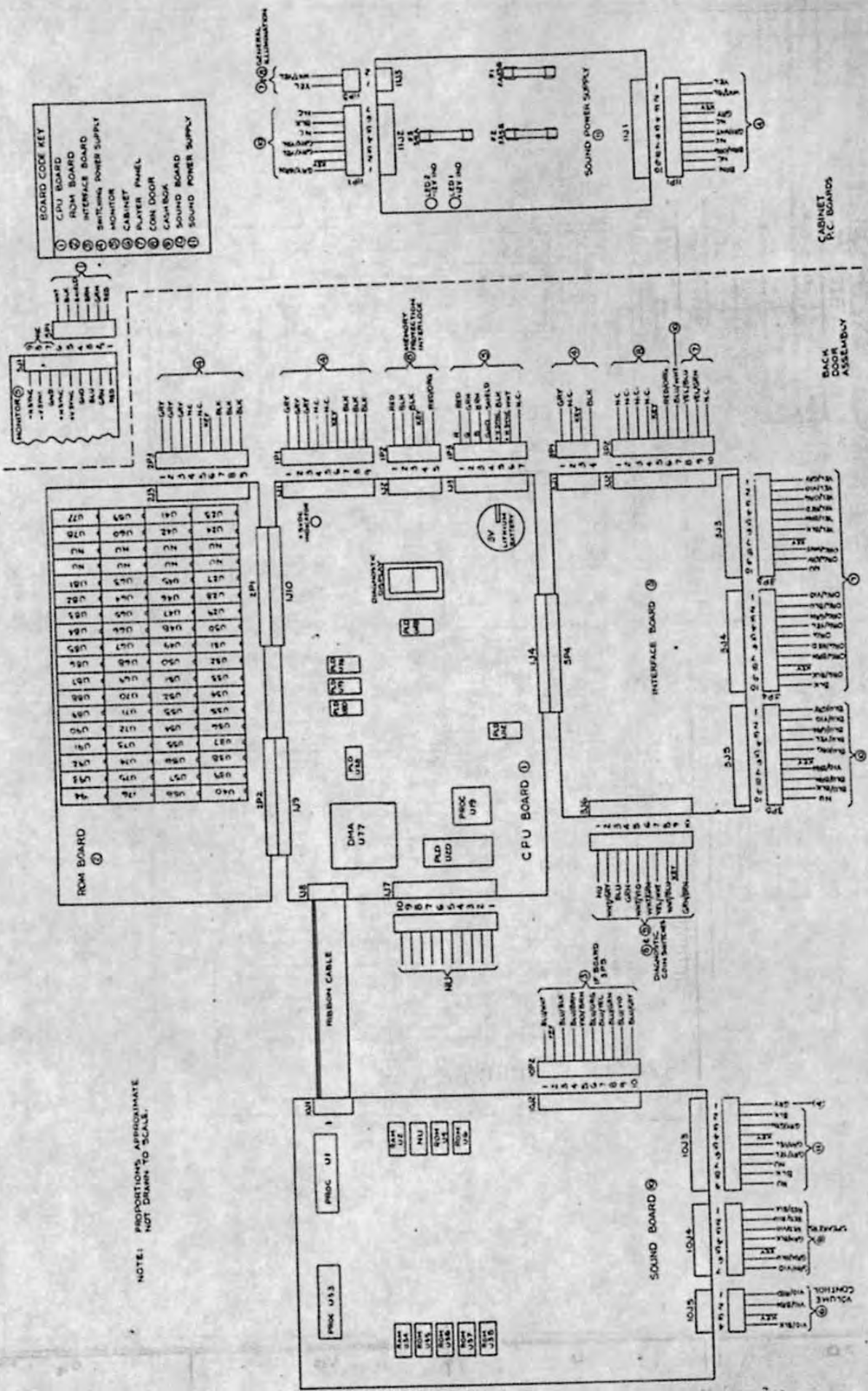
EXCLUSIVE GAME ADJUSTMENTS

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.

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NOTE: PROPORTIONS APPROXIMATE NOT DRAWN TO SCALE.



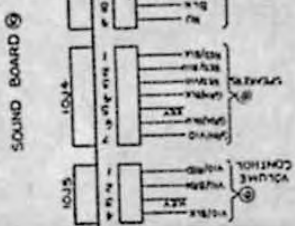
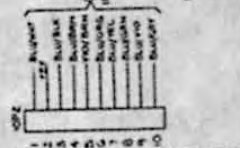
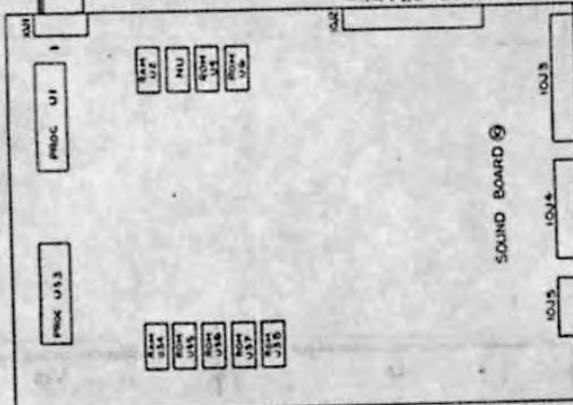
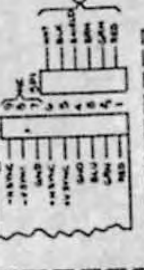
- BOARD CODE KEY**
- ① CPU BOARD
 - ② ROM BOARD
 - ③ INTERFACE BOARD
 - ④ SWITCHING POWER SUPPLY
 - ⑤ MONITOR
 - ⑥ CABINET PANEL
 - ⑦ COIN DOOR
 - ⑧ CASE/BOX
 - ⑨ SOUND BOARD
 - ⑩ SOUND POWER SUPPLY

CABINET P.C. BOARDS

BACK DOOR ASSEMBLY

ROM BOARD

U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17	U18	U19	U20	U21	U22	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	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	U77	U78	U79	U80	U81	U82	U83	U84	U85	U86	U87	U88	U89	U90	U91	U92	U93	U94	U95	U96	U97	U98	U99	U100
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SPEAKER

C-11879-

1

2

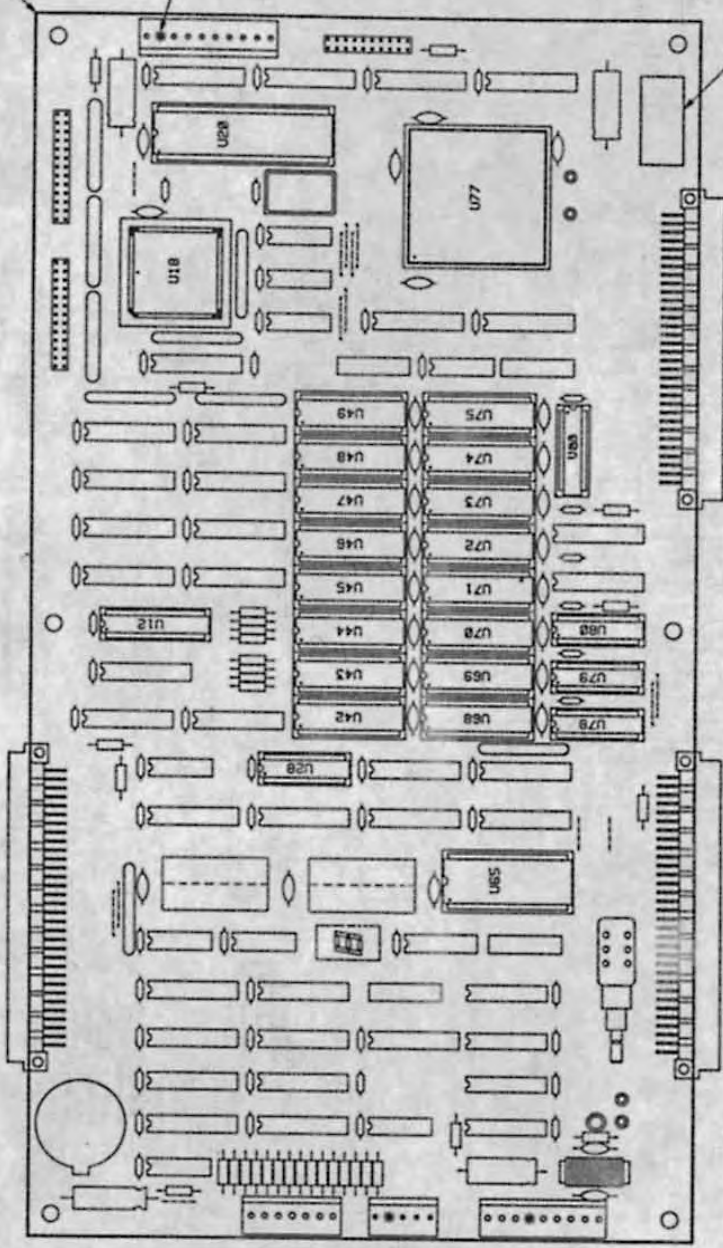
3

4

REV	DESCRIPTION OF CHANGE	DATE	BY
	NEW PART RELEASE	11/10/61	WJL
A	SEE SHT 2 OF 2.	11/22/61	WJL

(1)

INDICATES KEYING PIN



NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-5017.

ITEM	PART NUMBER	DESCRIPTION	QTY
1	U18	REMOVE BURRS-SHARP CORNERS & EDGES	
2	U77	REMOVE BURRS-SHARP CORNERS & EDGES	
3	U42-U49	REMOVE BURRS-SHARP CORNERS & EDGES	
4	U71-U78	REMOVE BURRS-SHARP CORNERS & EDGES	
5	U79	REMOVE BURRS-SHARP CORNERS & EDGES	
6	U80	REMOVE BURRS-SHARP CORNERS & EDGES	
7	U81	REMOVE BURRS-SHARP CORNERS & EDGES	
8	U82	REMOVE BURRS-SHARP CORNERS & EDGES	
9	U83	REMOVE BURRS-SHARP CORNERS & EDGES	
10	U84	REMOVE BURRS-SHARP CORNERS & EDGES	
11	U85	REMOVE BURRS-SHARP CORNERS & EDGES	
12	U86	REMOVE BURRS-SHARP CORNERS & EDGES	
13	U87	REMOVE BURRS-SHARP CORNERS & EDGES	
14	U88	REMOVE BURRS-SHARP CORNERS & EDGES	
15	U89	REMOVE BURRS-SHARP CORNERS & EDGES	
16	U90	REMOVE BURRS-SHARP CORNERS & EDGES	
17	U91	REMOVE BURRS-SHARP CORNERS & EDGES	
18	U92	REMOVE BURRS-SHARP CORNERS & EDGES	
19	U93	REMOVE BURRS-SHARP CORNERS & EDGES	
20	U94	REMOVE BURRS-SHARP CORNERS & EDGES	
21	U95	REMOVE BURRS-SHARP CORNERS & EDGES	
22	U96	REMOVE BURRS-SHARP CORNERS & EDGES	
23	U97	REMOVE BURRS-SHARP CORNERS & EDGES	
24	U98	REMOVE BURRS-SHARP CORNERS & EDGES	
25	U99	REMOVE BURRS-SHARP CORNERS & EDGES	
26	U100	REMOVE BURRS-SHARP CORNERS & EDGES	

WILLIAMS ELECTRONICS, INC.
 1001 N. 1st St.
 Phoenix, Arizona 85001

REV	DESCRIPTION OF CHANGE	DATE
	NEW PART RELEASE	11-01-88
A	ITEM 5 WAS 5340-11111-00 ADDED ITEM 10	11-22-88

GAME NAME	3036
ASSY. NO.	C-11879-3036
8	A-5346-3036-7
9	A-5346-3036-6
10	A-5346-3036-5
11	A-5346-3036-4
12	A-5346-3036-3
13	A-5346-3036-2
14	A-5346-3036-1
ITEM NUMBER	
PART NUMBER	
JUMPERS REMOVED	NONE

20				
19				
18				
17				
16				
15	5880-11056-00	B1	BATTERY - LITHIUM 3V 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.

BILL OF MATERIALS

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 5524 8K X 8	1
6	5340-12213-00	U42-U49 U68-U75	IC, RAM/V 4461 64K 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	16-8858-218		LABEL, PCB IDENT.	1
1	C-11878		SYS-Z CPU PCB SUB-ASSEMBLY	1
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.

BILL OF MATERIALS

NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-9817.

DESIGNED BY M. LOFFREDO OWN BY R.C. 4/25/88 CHECKED BY DATE APPROVAL DATE DW 11/21/88	DO NOT SCALE WORK TO DIMENSIONS SHOWN FIRST PROJECT NO. 3836-U FIRST USAGE D-12114 QTY. 1	REMOVE BURRS-BREAK SHARP CORNERS & EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0 ANGULAR 11/2° FRACTIONAL 1/64	WILLIAMS ELECTRONICS, INC. 2401 N CALIFORNIA AVE CHICAGO IL 60648 NAME SYS-Z CPU PCB ASSEMBLY SCALE 1:1 SHEET 2 OF 2 PART NO. C-11879 REV A
---	---	---	--

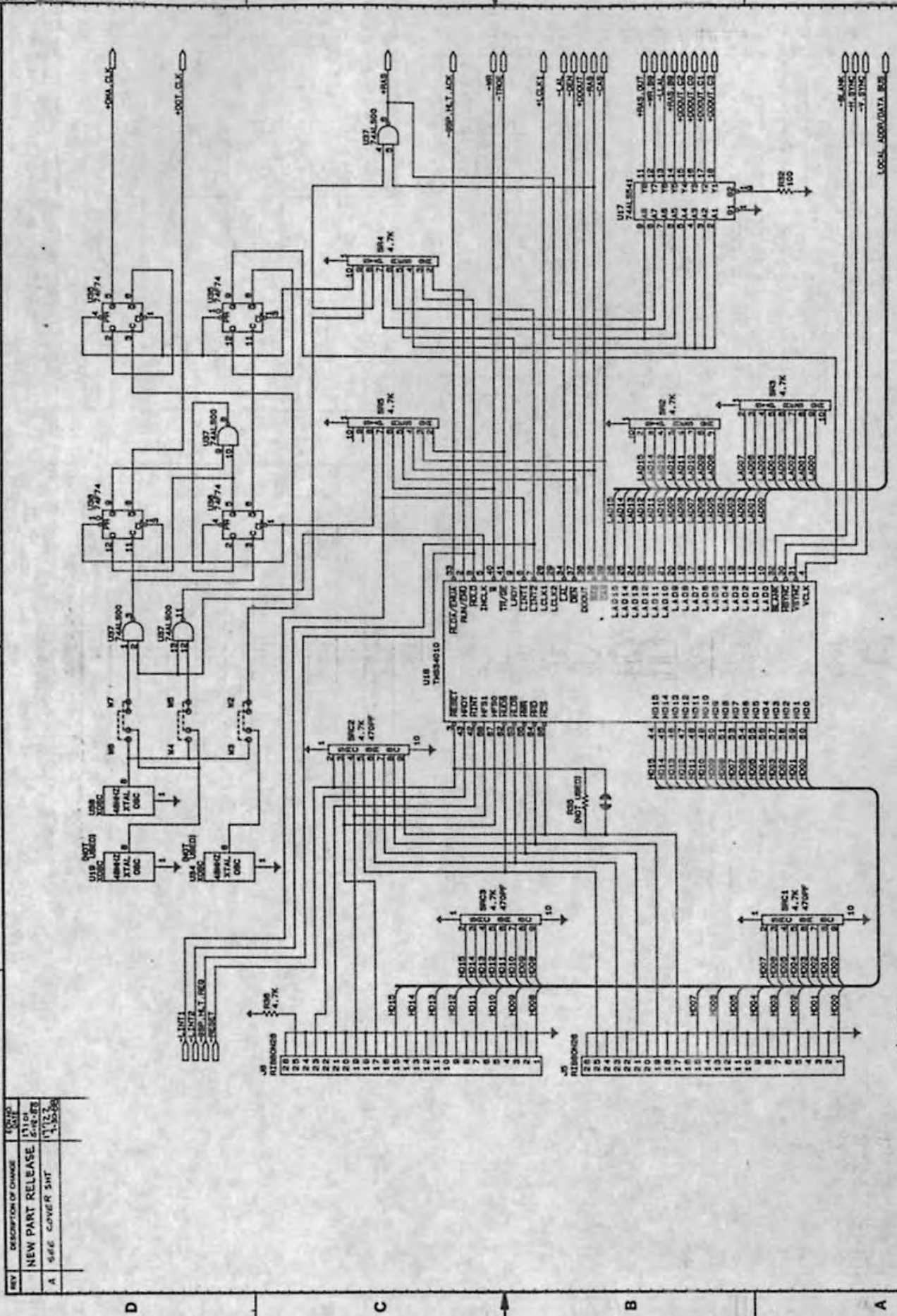
1 16-9017

2

3

4

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/10/81
A	SEE COVER SMT	11/12/81



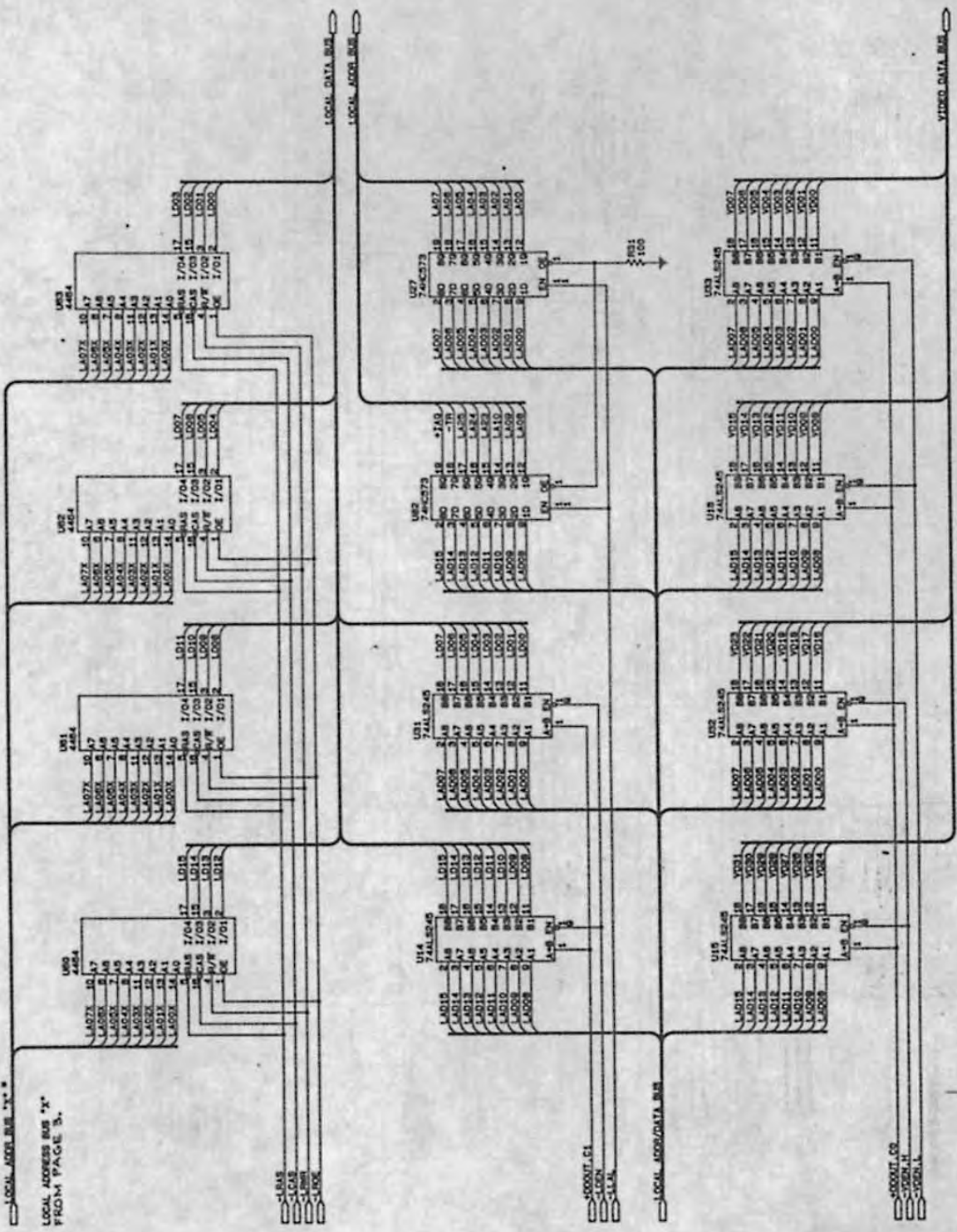
NOTE:
 BUS & SIGNAL LABELS DESIGNATED WITH AN "X" SUFX ARE FORMED FROM ROOT SIGNALS DRIVEN THROUGH SERIES

ITEM	PART NAME	DESCRIPTION	QTY	ITEM	PART NAME	DESCRIPTION	QTY
1	74181	ALU	1	1	74180	MAJORITY GATE	1
2	74107	FLIP FLOP	1	2	74109	FLIP FLOP	2
3	74101	AND GATE	1	3	74102	AND GATE	3
4	74103	AND GATE	1	4	74104	AND GATE	1
5	74105	AND GATE	1	5	74106	AND GATE	1
6	74107	AND GATE	1	6	74108	AND GATE	1
7	74109	AND GATE	1	7	74110	AND GATE	1
8	74111	AND GATE	1	8	74112	AND GATE	1
9	74113	AND GATE	1	9	74114	AND GATE	1
10	74115	AND GATE	1	10	74116	AND GATE	1
11	74117	AND GATE	1	11	74118	AND GATE	1
12	74119	AND GATE	1	12	74120	AND GATE	1
13	74121	AND GATE	1	13	74122	AND GATE	1
14	74123	AND GATE	1	14	74124	AND GATE	1
15	74125	AND GATE	1	15	74126	AND GATE	1
16	74127	AND GATE	1	16	74128	AND GATE	1
17	74129	AND GATE	1	17	74130	AND GATE	1
18	74131	AND GATE	1	18	74132	AND GATE	1
19	74133	AND GATE	1	19	74134	AND GATE	1
20	74135	AND GATE	1	20	74136	AND GATE	1
21	74137	AND GATE	1	21	74138	AND GATE	1
22	74139	AND GATE	1	22	74140	AND GATE	1
23	74141	AND GATE	1	23	74142	AND GATE	1
24	74143	AND GATE	1	24	74144	AND GATE	1
25	74145	AND GATE	1	25	74146	AND GATE	1
26	74147	AND GATE	1	26	74148	AND GATE	1
27	74149	AND GATE	1	27	74150	AND GATE	1
28	74151	AND GATE	1	28	74152	AND GATE	1

WILLIAMS ELECTRONICS, INC.
 1300 N. CALIFORNIA AVE
 CHICAGO, IL 60642

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/17/51
2	SEE COVER SHEET	5-12-52
3		11/17/51
4		1-25-56

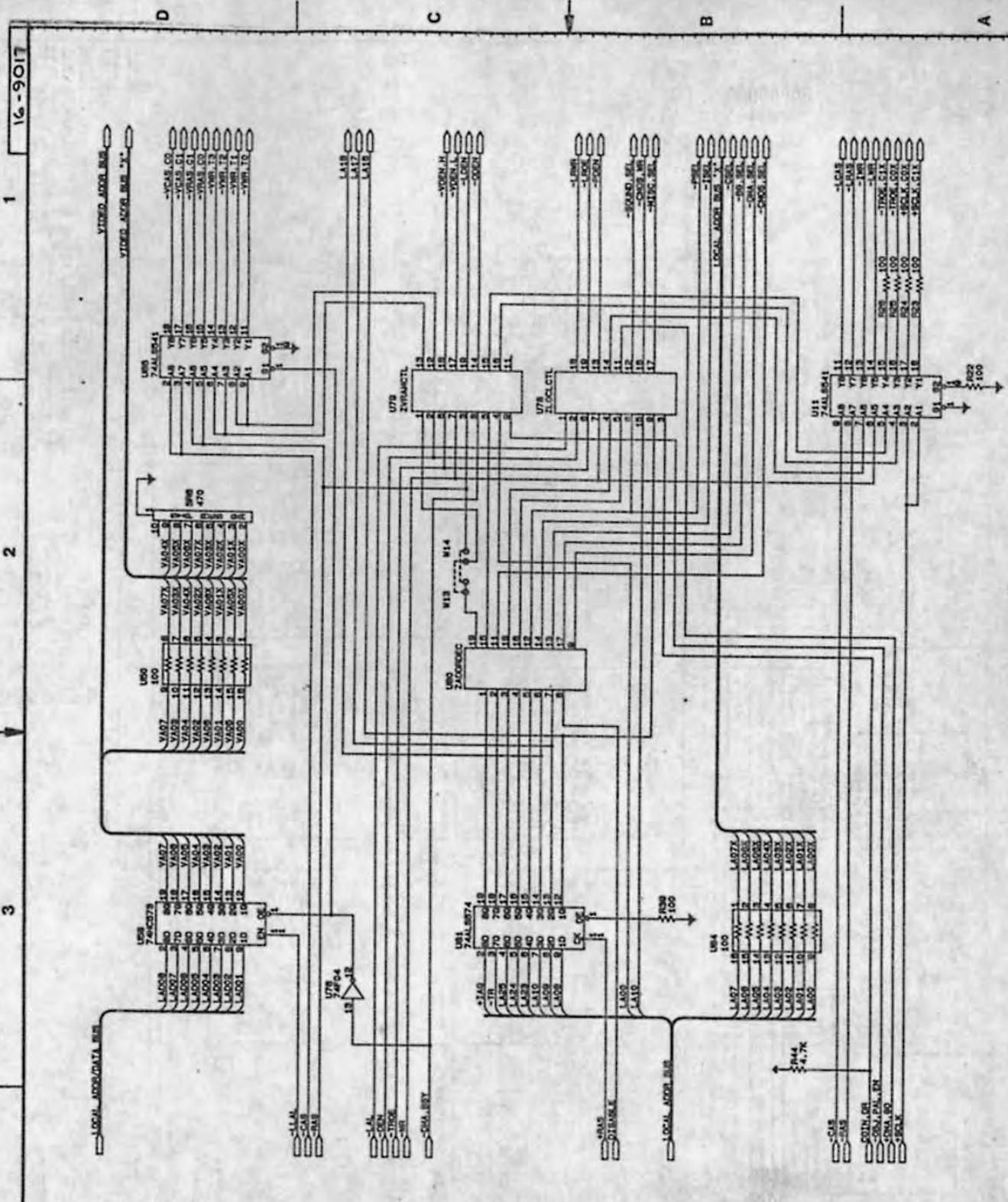
* NOTE: LOCAL ADDRESS BUS "X" FROM PAGE "B".



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	74ALS245	REMOVE BUBBLE-BREAK SHARP CORNERS & EDGES		1	74ALS245	REMOVE BUBBLE-BREAK SHARP CORNERS & EDGES	
2	74ALS245	DO NOT SCALE WORK TO DIMENSIONS SHOWN		2	74ALS245	DO NOT SCALE WORK TO DIMENSIONS SHOWN	
3	74ALS245	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: DECIMAL - .001 FRACTIONAL - 1/100		3	74ALS245	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: DECIMAL - .001 FRACTIONAL - 1/100	
4	74ALS245	DATE PREPARED TO: 11/17/51		4	74ALS245	DATE PREPARED TO: 11/17/51	
5	74ALS245	DATE CHECKED TO: 11/17/51		5	74ALS245	DATE CHECKED TO: 11/17/51	
6	74ALS245	DATE REWORKED TO: 11/17/51		6	74ALS245	DATE REWORKED TO: 11/17/51	
7	74ALS245	DATE REWORKED TO: 11/17/51		7	74ALS245	DATE REWORKED TO: 11/17/51	
8	74ALS245	DATE REWORKED TO: 11/17/51		8	74ALS245	DATE REWORKED TO: 11/17/51	
9	74ALS245	DATE REWORKED TO: 11/17/51		9	74ALS245	DATE REWORKED TO: 11/17/51	
10	74ALS245	DATE REWORKED TO: 11/17/51		10	74ALS245	DATE REWORKED TO: 11/17/51	

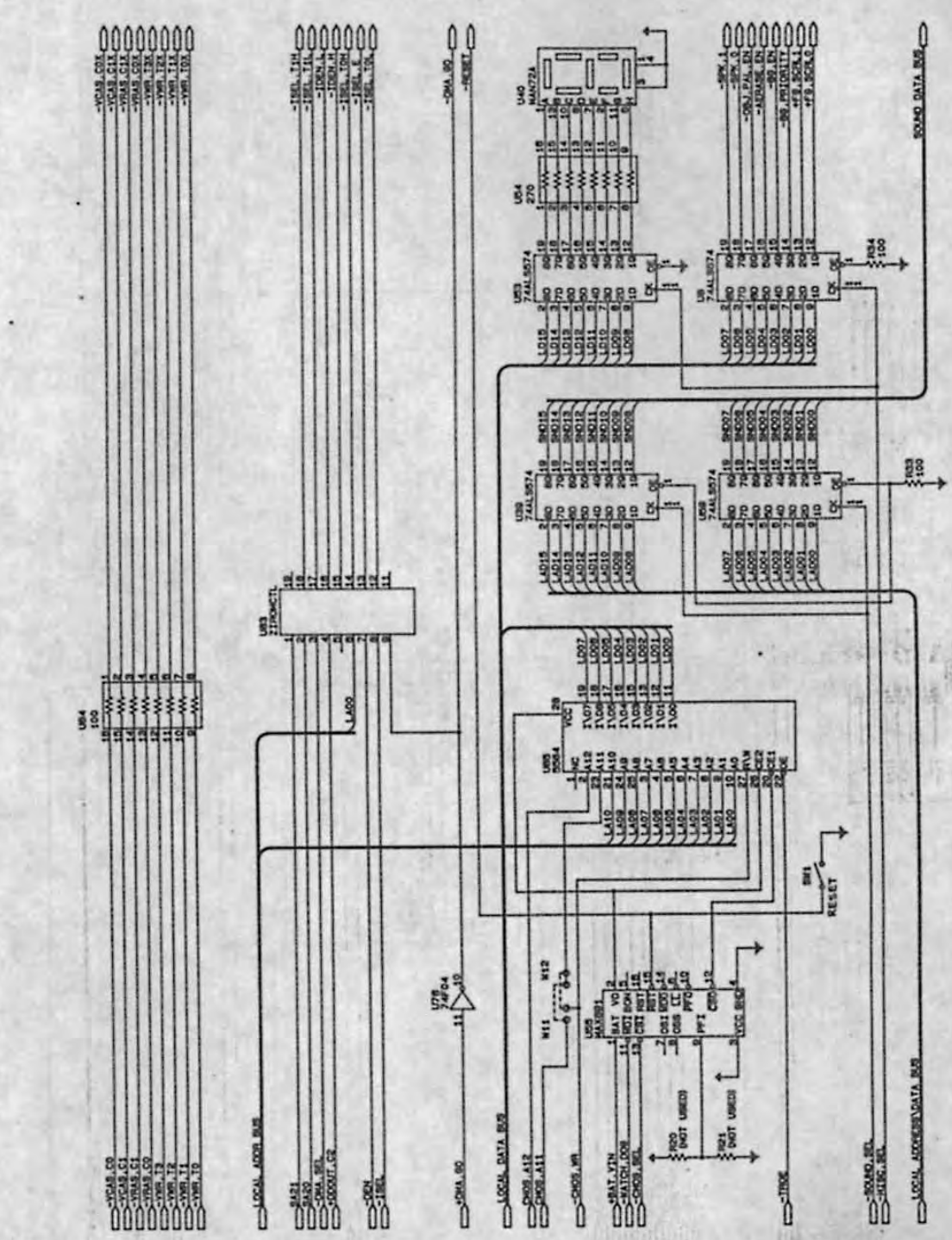
WILLIAMS ELECTRONICS, INC. 1000 CALIFORNIA AVE. CHICAGO, ILL.	
SYS-Z CPU BD SCHEMATIC	
SCALE: 1:1 PART NO: 16-9017	REV: 1

REV	DESCRIPTION OF CHANGE	DATE
4	NEW PART RELEASE	1/10/88
A	SEE COVER SMT	1/30/88



ITEM PART NUMBER DESCRIPTION QTY UNIT PART NUMBER DESCRIPTION QTY UNIT
 16-9017
 J.M. LOFFREDO
 DO SCALE
 REMOVE BUMPS - BREAK SHARP CORNERS & EDGES
 WORK TO TOLERANCES
 UNLESS OTHERWISE SPECIFIED
 WILLIAMS ELECTRONICS, INC.
 3401 N CALPORN AVE
 CHICAGO IL 60641

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/01/67
2	SIZE COVER SMT	1/30/68



REV	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	74ALS07A	REMOVE BURST-BREAK SWAMP CAPACITORS & DIODES TO WORK TO SPECIFICATION	1	000			
2	74ALS124	UNLESS OTHERWISE SPECIFIED	1	000			
DECIMAL: 1/16" FRACTIONAL: 1/32" MATERIAL:							
CONTROLLED BY DATE: 1/31/68 PART NO: 3033-CU							
APPROVED BY: J. J. GILBERT DATE: 2/10/68 C-1181B							
WILLIAMS ELECTRONICS, INC. CHICAGO, ILL. 3401 N. CALIFORNIA AVE.						SYS-2 CPU BD SCHEMATIC	
						SCALE: 1:1 PART NO: 16-9017	

4

16-9017

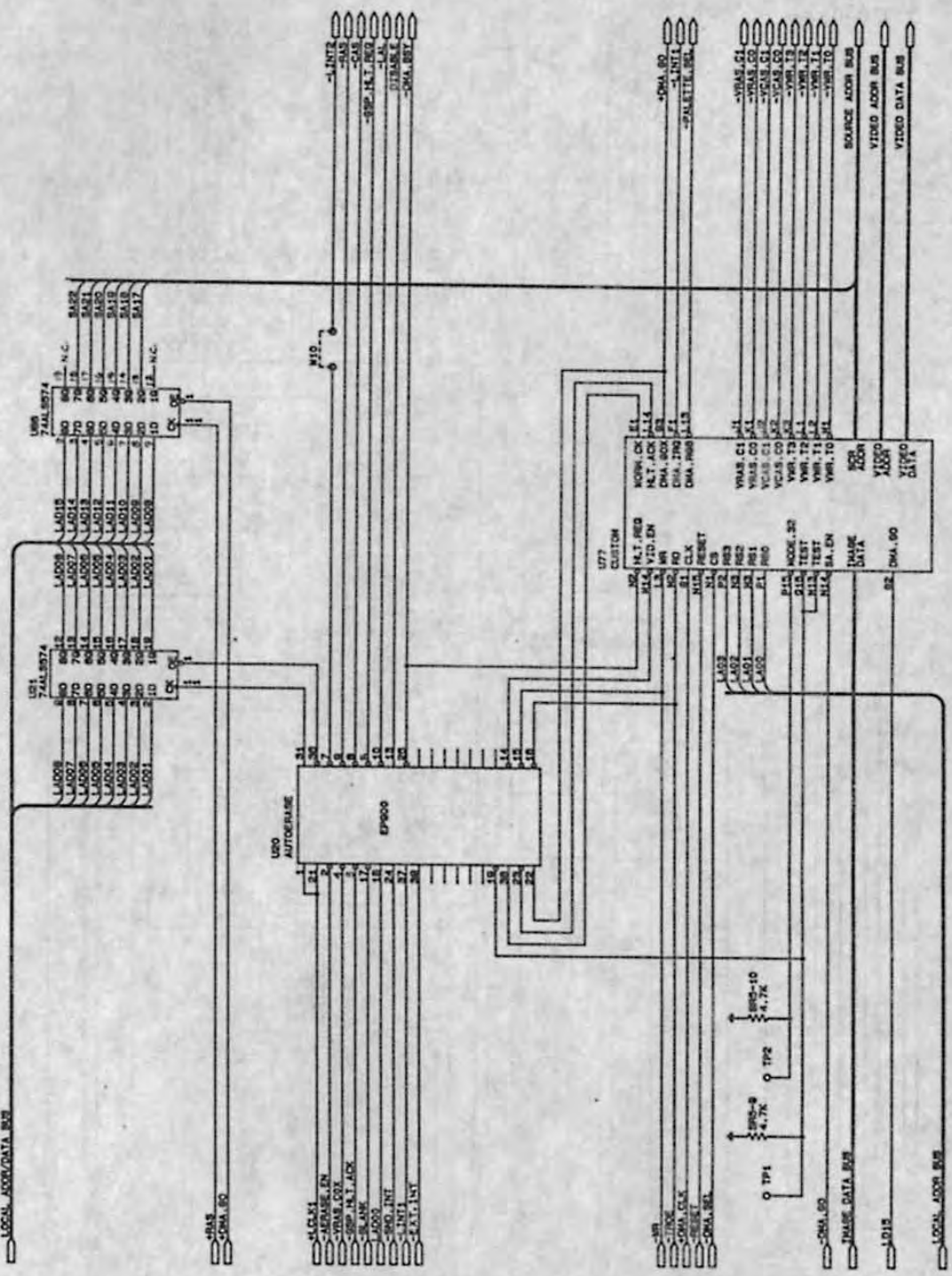
1

2

3

4

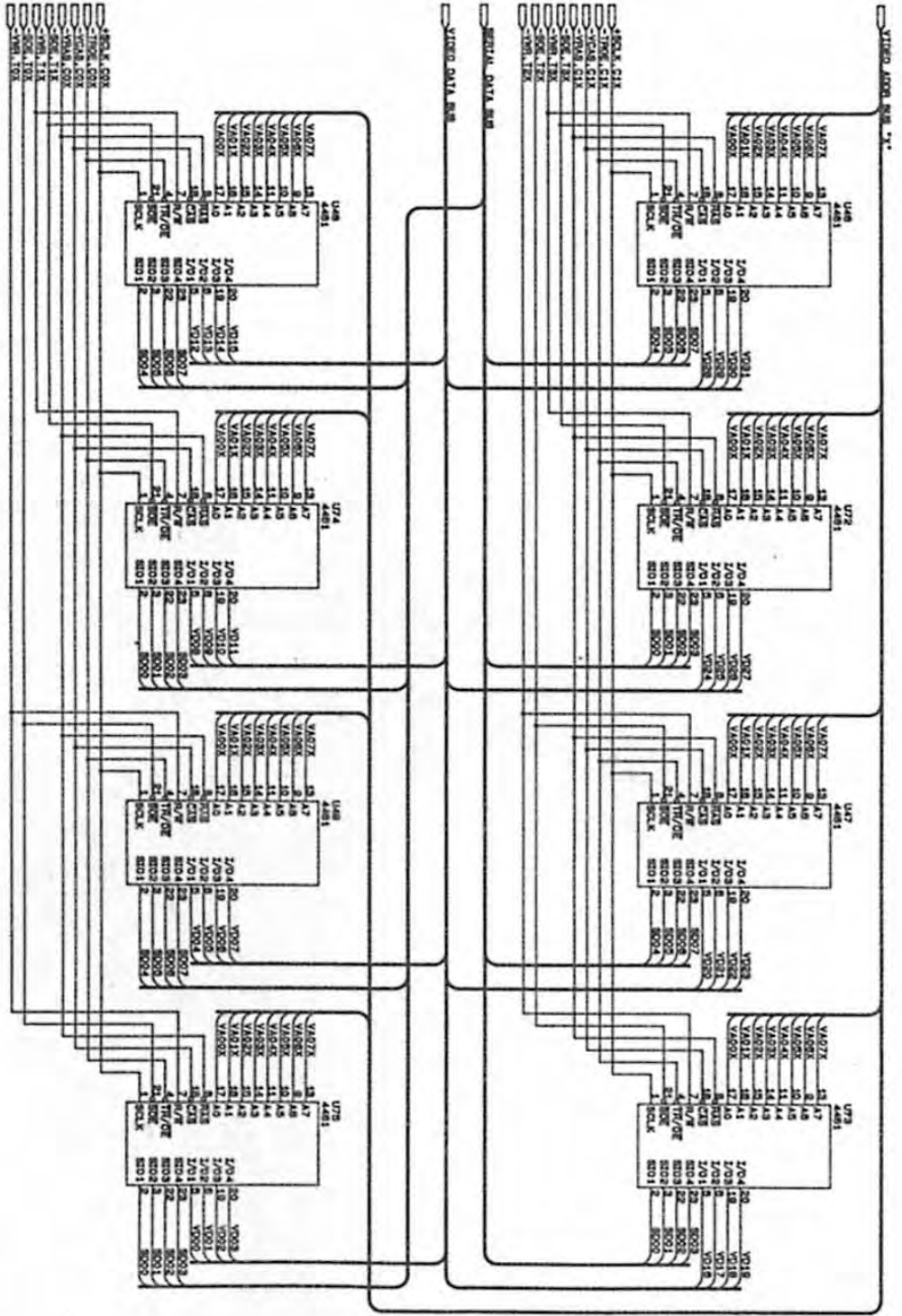
REV	DESCRIPTION OF CHANGE	DATE	BY
	NEW PART RELEASE	11/10/88	CHP/ST
A	SHIF COVER MHT	11/11/88	1/30/88



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	CITY
DO NOT SCALE							
1	EP9000	REMOVE BURRS-BREAK BURRS CORNERS & EDGES					
2	U07	TOLERANCES					
3	L001-L010	WASHERS					
4	U01, U02	DECIMAL					
5	U07	INSULATED					
6	U01, U02	11/2"					
7	U07	SIN/VRT					
WILLIAMS ELECTRONICS, INC.							
3030 N. CALIFORNIA AVE. CHICAGO, IL 60639							

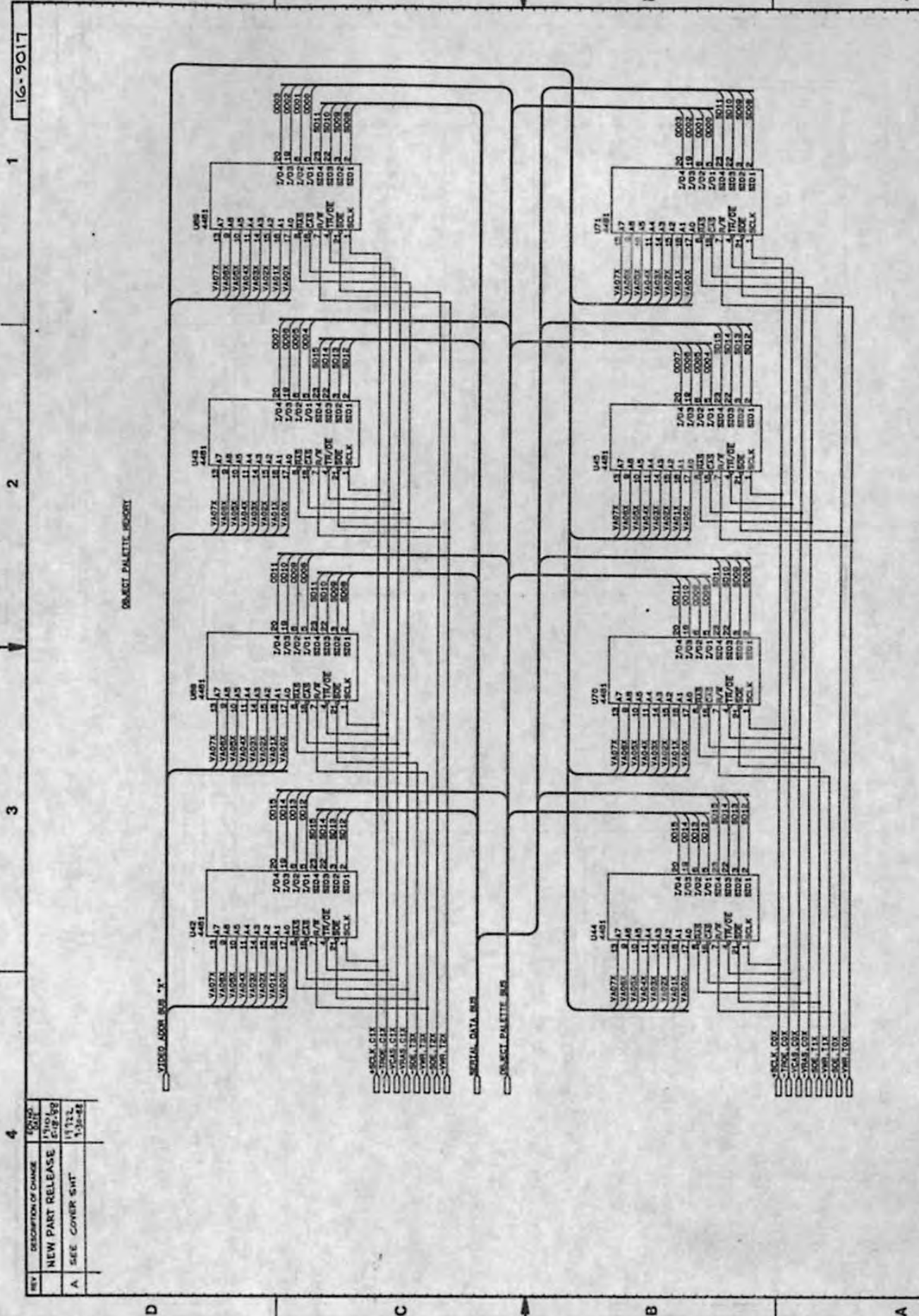
REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/10/72
2	SEE COVER SHEET	11/11/72
3		11/12/72
4		11/13/72

RTI MAP HOOKUP



ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT	PART NUMBER	DESCRIPTION	QTY
1	WILLIAMS ELECTRONICS, INC.	WILLIAMS ELECTRONICS, INC.			CHICAGO, ILL.		
2	DO NOT SCALE	REMOVE SURFS - BREAK SWAP CORNERS & EDGES					
3	WORK TO DIMENSIONS						
4	303C-U						
5	C-11878						
6	16-9017						

4 3 2 1



REV	DESCRIPTION OF CHANGE	DATE	BY
4	NEW PART RELEASE	11/22/81	YSP/RE
A	SEE COVER SMT		

16-9017

OBJECT PALETTE BUS

VIDEO SOURCE BUS *1

SERIAL DATA BUS

OBJECT PALETTE BUS

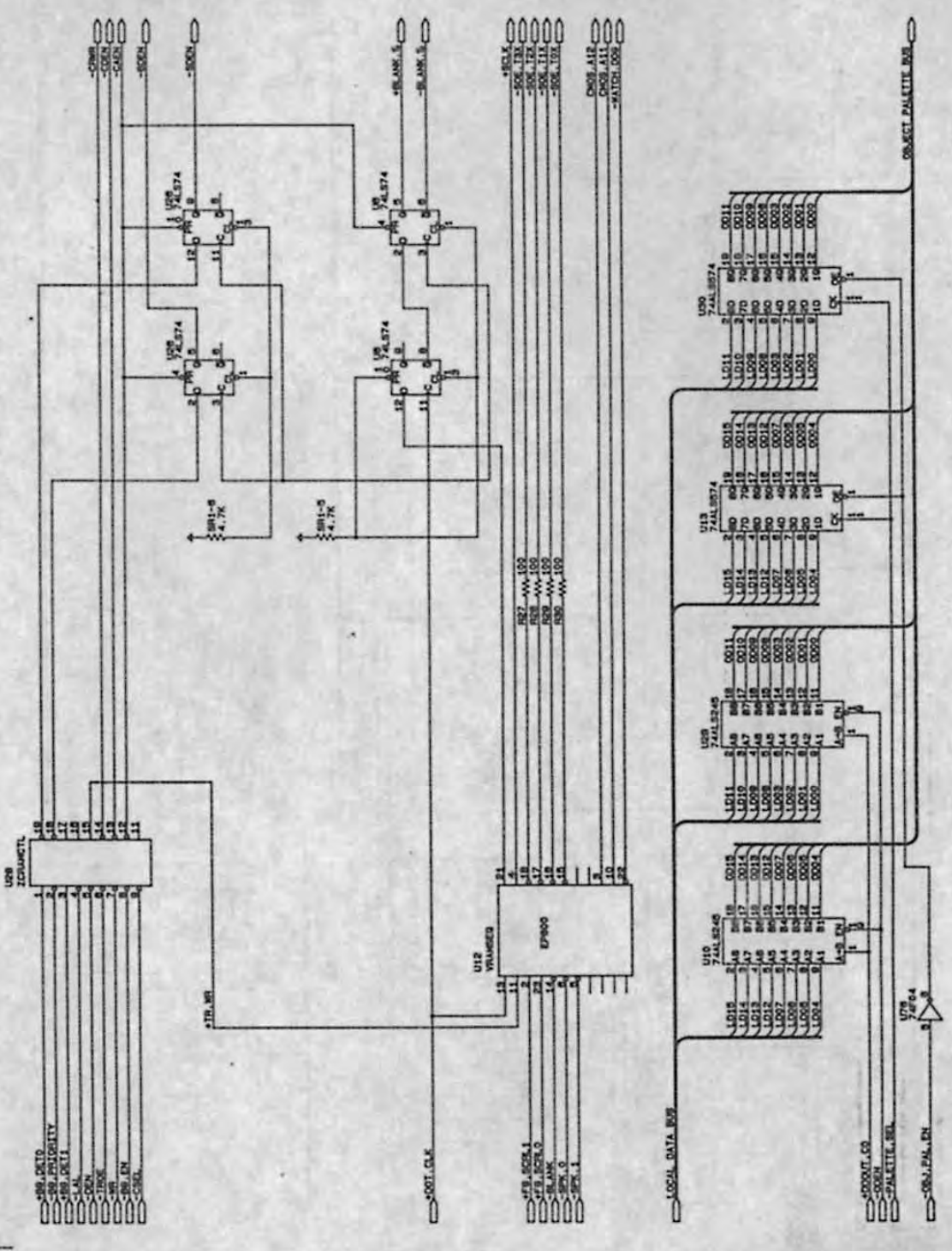
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	DO	REMOVE BURRS-BREAK SWAMP CORNERS & EDGES		1	WILLIAMS ELECTRONICS, INC.		
2	SCALE	TOLERANCES UNLESS OTHERWISE SPECIFIED		2	3430 N. CALIFORNIA AVE.		
3	DATE	DATE FIRST PROJECT NO.		3	CHICAGO, ILL.		
4	DR	DR		4	NAME		
5	DRAWN	DRAWN		5	1/2"		
6	SHOWNS	SHOWNS		6	SCALE		
7	BY	BY		7	1/8"		
8	CHECKED	CHECKED		8	FRACTIONAL		
9	DATE	DATE		9			

SY-2 CPU BD SCHEMATIC

16-9017

16-9017

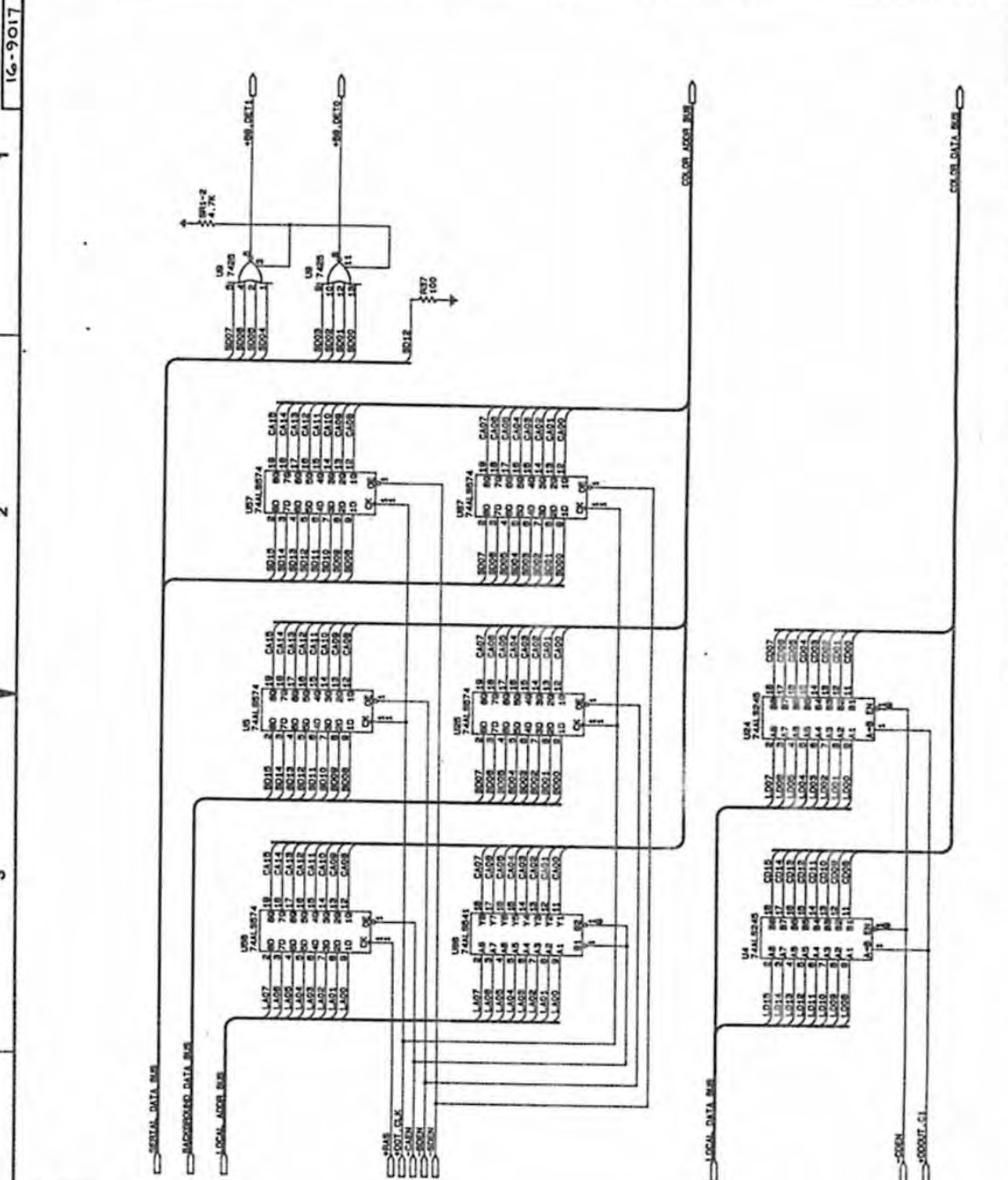
REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	5-17-68
A	SEE COVER SHEET	5-30-68



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	DESCRIPTION	CITY
1	U10	74ALS245	2	U11	74ALS245	CHICAGO, IL
2	U11	74ALS245	2	U12	74ALS245	CHICAGO, IL
3	U12	74ALS245	2	U13	74ALS245	CHICAGO, IL
4	U13	74ALS245	2	U14	74ALS245	CHICAGO, IL
5	U14	74ALS245	2	U15	74ALS245	CHICAGO, IL
6	U15	74ALS245	2	U16	74ALS245	CHICAGO, IL
7	U16	74ALS245	2	U17	74ALS245	CHICAGO, IL
8	U17	74ALS245	2	U18	74ALS245	CHICAGO, IL
9	U18	74ALS245	2	U19	74ALS245	CHICAGO, IL
10	U19	74ALS245	2	U20	74ALS245	CHICAGO, IL
11	U20	74ALS245	2	U21	74ALS245	CHICAGO, IL
12	U21	74ALS245	2	U22	74ALS245	CHICAGO, IL
13	U22	74ALS245	2	U23	74ALS245	CHICAGO, IL
14	U23	74ALS245	2	U24	74ALS245	CHICAGO, IL
15	U24	74ALS245	2	U25	74ALS245	CHICAGO, IL
16	U25	74ALS245	2	U26	74ALS245	CHICAGO, IL
17	U26	74ALS245	2	U27	74ALS245	CHICAGO, IL
18	U27	74ALS245	2	U28	74ALS245	CHICAGO, IL
19	U28	74ALS245	2	U29	74ALS245	CHICAGO, IL
20	U29	74ALS245	2	U30	74ALS245	CHICAGO, IL

ITEM 1000 M. LOTTREDO G. SHIPP 5-11-68 CHICAGO BY DATE APPROVAL DATE C-1181B		DO NOT SCALE WORK TO DIMENSIONS SHOWN BOBQ-U	REMOVE BURRS-BREAK SHARP CORNERS & EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL .005 ANGULAR 1/2° FRACTIONAL 1/32	PART NUMBER DESCRIPTION CITY WILLIAMS ELECTRONICS, INC. 3074 CALIFORNIA AVE CHICAGO, IL NAME SYS-Z CPU BD SCHEMATIC SCALE 1:1 PART NO 16-9017 A
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REV	DESCRIPTION OF CHANGE	DATE
NEW	NEW PART RELEASE	11/01 3-18-82
A	SEE COVER SHEET	11/01 4-30-82



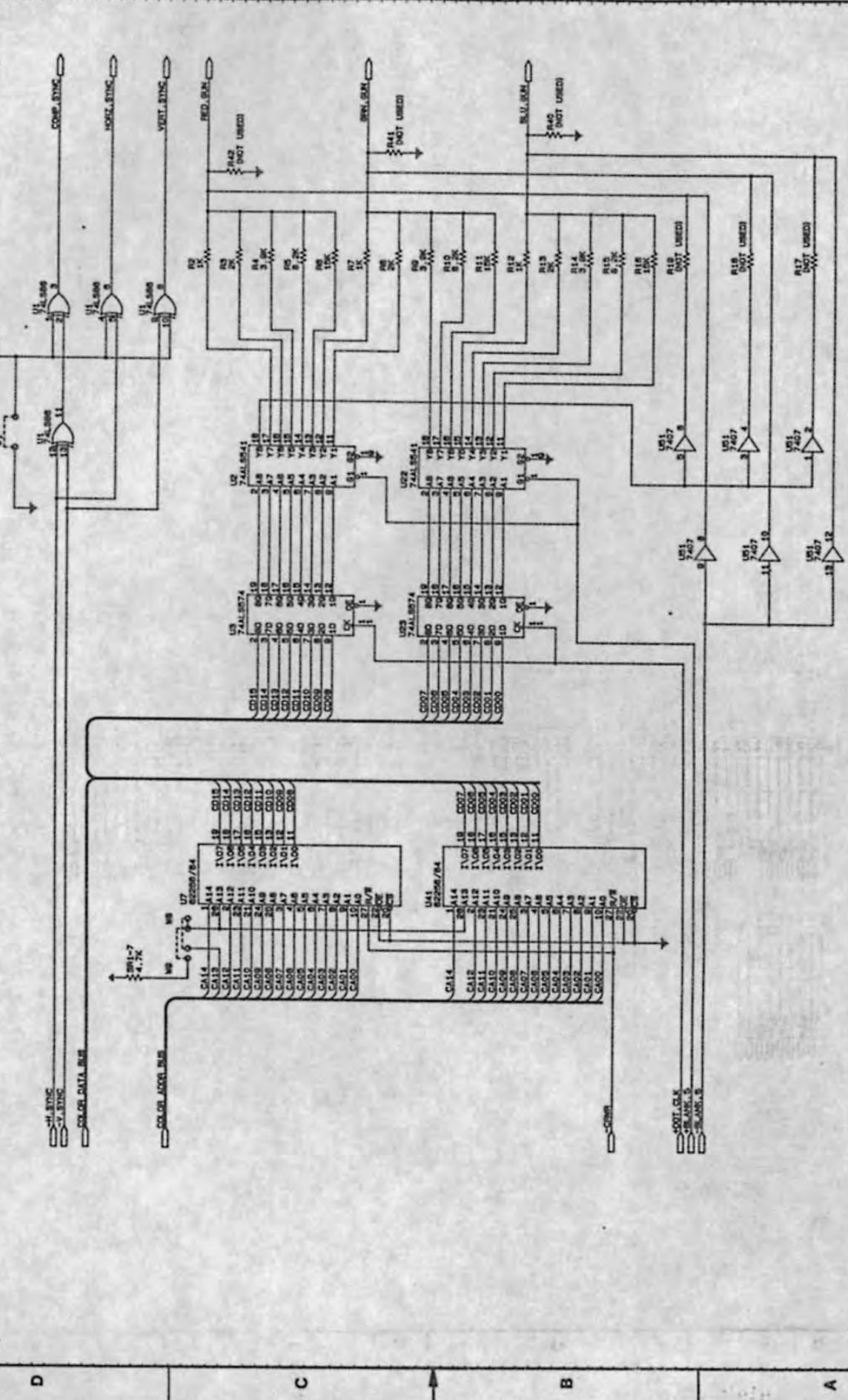
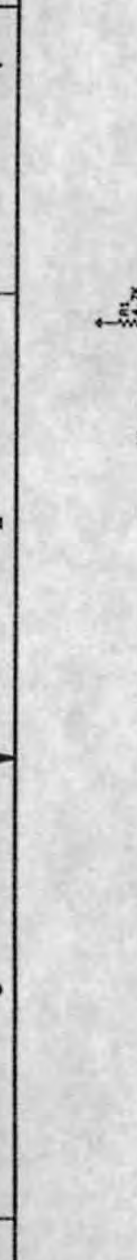
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT	PART NUMBER	DESCRIPTION	QTY
	DO NOT SCALE						
	REMOVE DIMS-SEEK SHIP CONDENS & DIMS						
	TOLERANCES UNLESS OTHERWISE SPECIFIED						
	UNLESS OTHERWISE SPECIFIED						
	DECIMAL	1/100	ANGULAR	1/12°			
	FRACTIONAL	1/100					
COPYRIGHT © 1981 FIRST PRODUCT NO. 11/84		E.V.C. - P.O. BOX 241881		CAGLE		11/84	
S.M. LOFFREDO		WILLIAMS ELECTRONICS, INC.		CAGLE		11/84	
G. SHIPP 5-11-82		2400 N. CALIFORNIA AVE.		CAGLE		11/84	
11/84		CAGLE		11/84		11/84	

16-9017

16-9017

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/01/58
2	SEE COVER SHT	11/12/58
3		1/30/59

16-9017



ITEM	PART NUMBER	QTY	ITEM	DESCRIPTION
U1	74ALS04	8	U1	74ALS04
U2	74ALS04	8	U2	74ALS04
U3	74ALS04	8	U3	74ALS04
U4	74ALS04	8	U4	74ALS04
U5	74ALS04	8	U5	74ALS04
U6	74ALS04	8	U6	74ALS04
U7	74ALS04	8	U7	74ALS04
U8	74ALS04	8	U8	74ALS04
U9	74ALS04	8	U9	74ALS04
U10	74ALS04	8	U10	74ALS04
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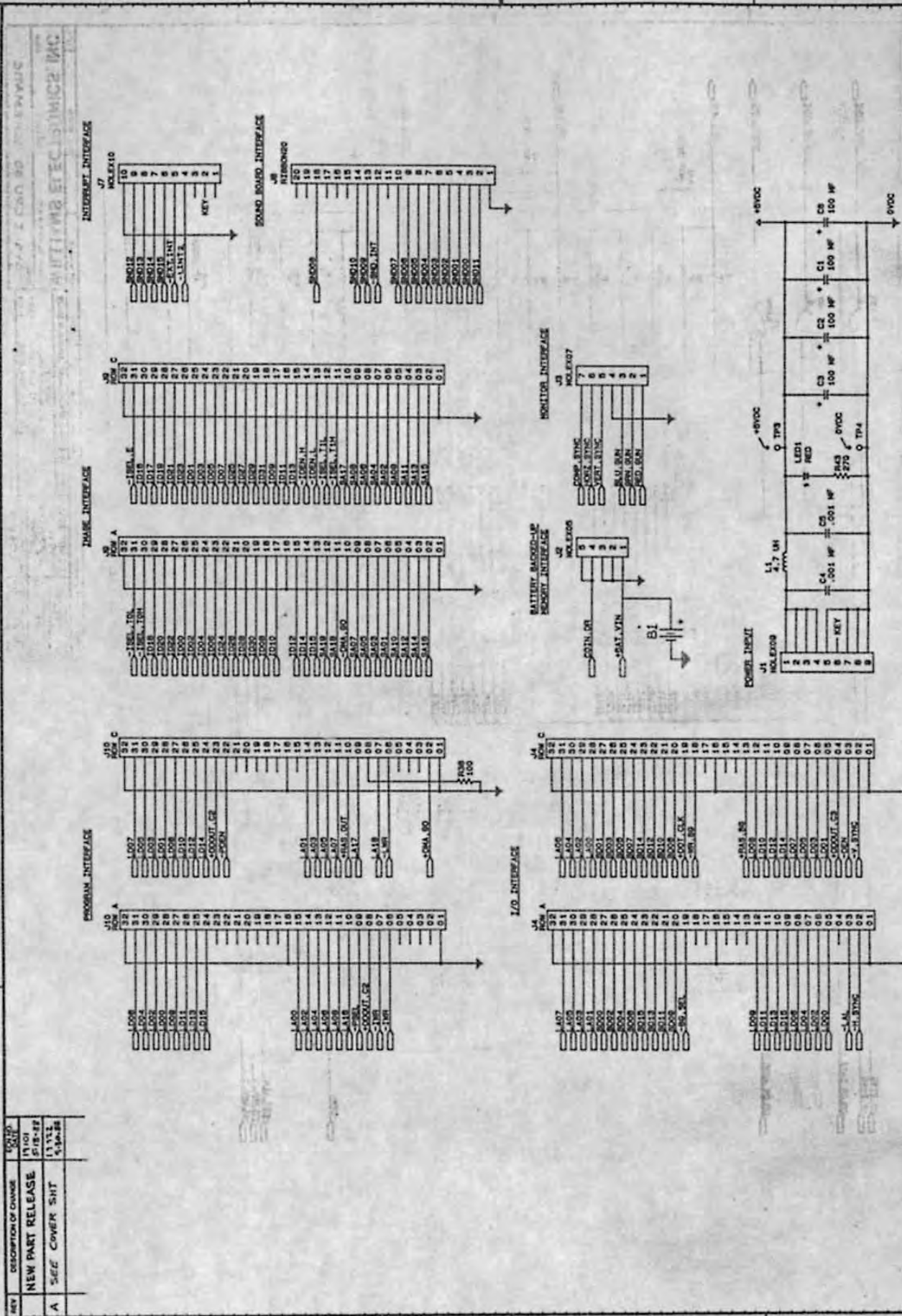
WILLIAMS ELECTRONICS, INC.
 CHICAGO, ILL.
 343 N. CALIFORNIA AVE.
 CHICAGO, ILL. 60604

SY5-Z CPU BD SCHEMATIC
 SCALE: 1/8" = 1" FRACTIONAL
 MATERIAL: 3036-U
 CITY: CHICAGO, ILL.
 DATE: 11/12/58
 DRAWN BY: J. J. B. JR.
 CHECKED BY: J. J. B. JR.

DO NOT SCALE
 WORK TO
 DIMENSIONS
 SHOWN
 3036-U
 CITY: CHICAGO, ILL.
 DATE: 11/12/58
 DRAWN BY: J. J. B. JR.
 CHECKED BY: J. J. B. JR.

1G-9017

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	11/01/77
2	SEE COVER SHT	11/11/77



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	RESISTOR	10K	10	1	RESISTOR	100K	10
2	RESISTOR	100K	10	2	RESISTOR	10K	10
3	RESISTOR	10K	10	3	RESISTOR	100K	10
4	RESISTOR	100K	10	4	RESISTOR	10K	10
5	RESISTOR	10K	10	5	RESISTOR	100K	10
6	RESISTOR	100K	10	6	RESISTOR	10K	10
7	RESISTOR	10K	10	7	RESISTOR	100K	10
8	RESISTOR	100K	10	8	RESISTOR	10K	10
9	RESISTOR	10K	10	9	RESISTOR	100K	10
10	RESISTOR	100K	10	10	RESISTOR	10K	10

WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE
 CHICAGO, ILL. 60642

DO NOT SCALE
 WORK TO
 DIMENSIONS
 SHOWN

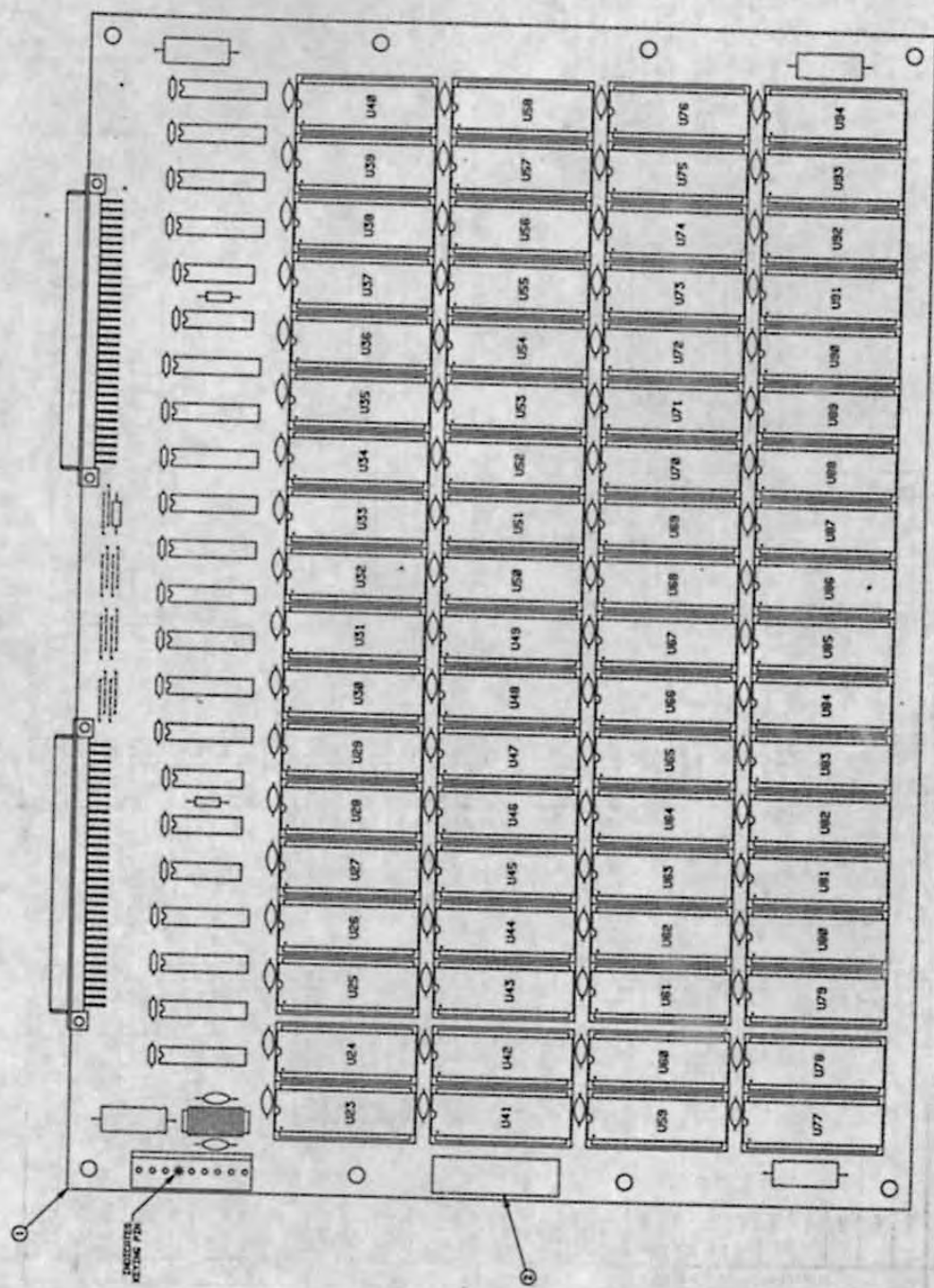
UNLESS OTHERWISE SPECIFIED
 TOLERANCES
 DECIMAL — .005
 ANGULAR — 1/8°
 FRACTIONAL — 1/16

REVISED 11/11/77
 8038-U
 MATERIAL

1G-9017
 CPU BOARD SCHEMATIC

C-12260-

KEY DESCRIPTION OF CHANGE
NEW PART RELEASE
10/17/68
10/17/68



NOTES: 1. FOR SCHEMATIC, REFER TO DRAWING NO. 16-9841.
 2. 28-PIN DEVICES (I.E. 27512 EPROMS) SHOULD BE BOTTOM JUSTIFIED IN SOCKETS.

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	U23-U94	REMOVE BURRS-BREAK SHARP CORNERS & EDGES				
2	U23-U94	DO NOT SCALE WORK TO DIMENSIONS SHOWN				
3	U23-U94	TOLERANCES UNLESS OTHERWISE SPECIFIED				
4	U23-U94	DECIMAL	0.005	ANGULAR	1/2°	
5	U23-U94	FRACTIONAL	1/32			
6	U23-U94	MATERIAL	NONE			
7	U23-U94	DATE	10/17/68	QTY		
8	U23-U94	APPROVAL	10/17/68			
9	U23-U94	SCALE	1/1			
10	U23-U94	PART NO	C-12260			
11	U23-U94	REV	1			

WILLIAMS ELECTRONICS, INC.
 3401 N CALIFORNIA AVE
 CHICAGO, ILL 60641
 NAME: SYS-Z ROM-2 PCB ASSEMBLY
 SCALE: 1/1
 PART NO: C-12260-1

1
2
3
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1 C-12260-

2

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REV	DESCRIPTION OF CHANGE	DATE
	NEW PART RELEASE	11-27-73

NAME	ASSTY. NO.	3028
U77		
U78		
U79		
U80		
U81		
U82		
U83		
U84		
U85		
U86		
U87		
U88		
U89		
U90		
U91		
U92		
U93		
U94		

NAME	ASSTY. NO.	3038
U95		
U96		
U97		
U98		
U99		
U100		
U101		
U102		
U103		
U104		
U105		
U106		
U107		
U108		
U109		
U110		
U111		
U112		
U113		
U114		
U115		
U116		
U117		
U118		
U119		
U120		

NAME	ASSTY. NO.	3028
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		

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
3		SEE CHART	SEE CHART	SEE CHART
2	16-1800-218		LABEL, PCB IDENT.	1
1	C-12261		SYS-2 ROM 2 SUB-ASSY.	1

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
3		SEE CHART	SEE CHART	SEE CHART
2	16-1800-218		LABEL, PCB IDENT.	1
1	C-12261		SYS-2 ROM 2 SUB-ASSY.	1

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
3		SEE CHART	SEE CHART	SEE CHART
2	16-1800-218		LABEL, PCB IDENT.	1
1	C-12261		SYS-2 ROM 2 SUB-ASSY.	1

BILL OF MATERIALS

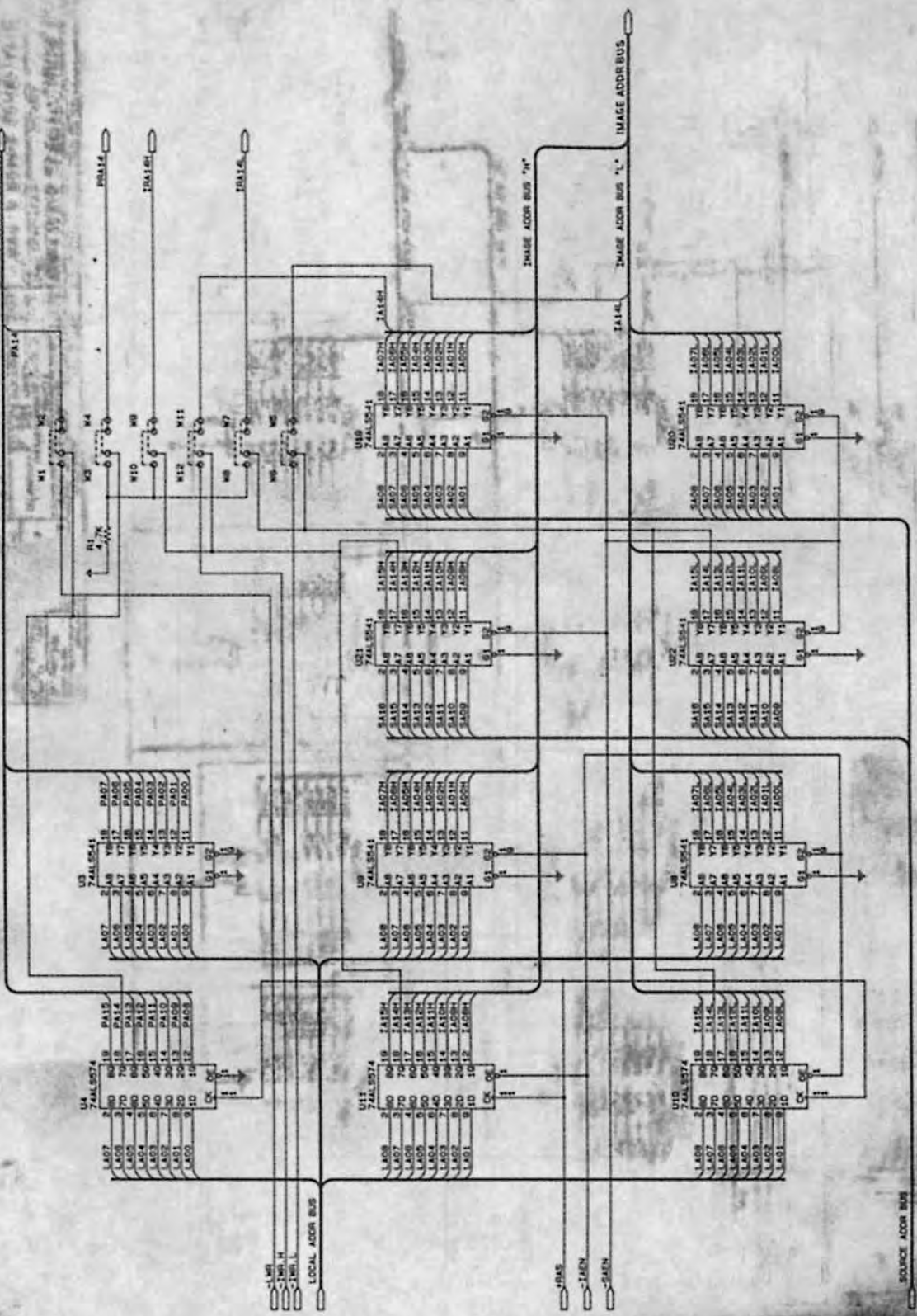
DO NOT SCALE
DIMENSIONS
UNLESS OTHERWISE SPECIFIED
DECIMALS - 1/100 ANGULAR - 1/16°
FRACTIONS - 1/32, 1/64, 1/8, 1/4

WILLIAMS ELECTRONICS, INC.
CHICAGO, ILL.
340 N. CALIFORNIA AVE.
CHICAGO, ILL. 60604

SYS-2 ROM-2 PCB ASSEMBLY

NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-9041

REV	DESCRIPTION OF CHANGE
1	NEW PART RELEASE



QTY	DESCRIPTION	PART NUMBER	DESCRIPTION
1	REMOVE BURR-BREAK SHARP CORNERS & EDGES (OPTIONAL)	WILLIAMS ELECTRONICS, INC.	CHICAGO, ILL.
1	UNLESS OTHERWISE SPECIFIED	3401 N. CALIFORNIA AVE.	CHICAGO, ILL.
1/16"	DECIMAL	1/32"	ANGULAR
1/16"	FRACTIONAL	1/16"	FRACTIONAL
1	MATERIAL	3036-U1	
1	PRODUCTION PART	74ALS274	
1	TEST SAMPLE	C-1222 C1	

QTY	DESCRIPTION	PART NUMBER	DESCRIPTION
1	REMOVE BURR-BREAK SHARP CORNERS & EDGES (OPTIONAL)	WILLIAMS ELECTRONICS, INC.	CHICAGO, ILL.
1	UNLESS OTHERWISE SPECIFIED	3401 N. CALIFORNIA AVE.	CHICAGO, ILL.
1/16"	DECIMAL	1/32"	ANGULAR
1/16"	FRACTIONAL	1/16"	FRACTIONAL
1	MATERIAL	3036-U1	
1	PRODUCTION PART	74ALS274	
1	TEST SAMPLE	C-1222 C1	

16-9041

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16-9041

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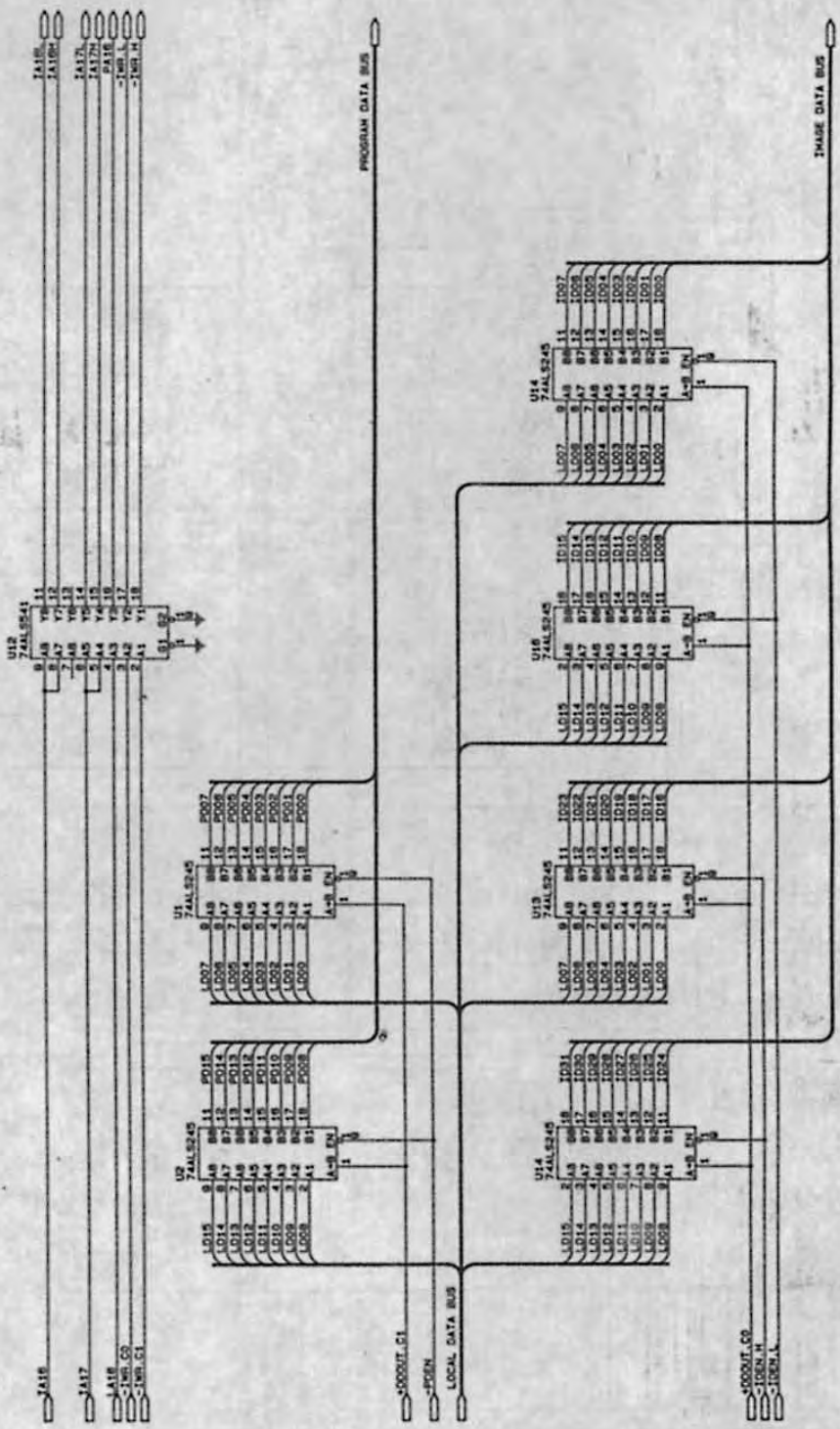
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REV	DESCRIPTION OF CHANGE	DATE	BY
1	NEW PART RELEASE	11/11/78	11/11/78

D C B A

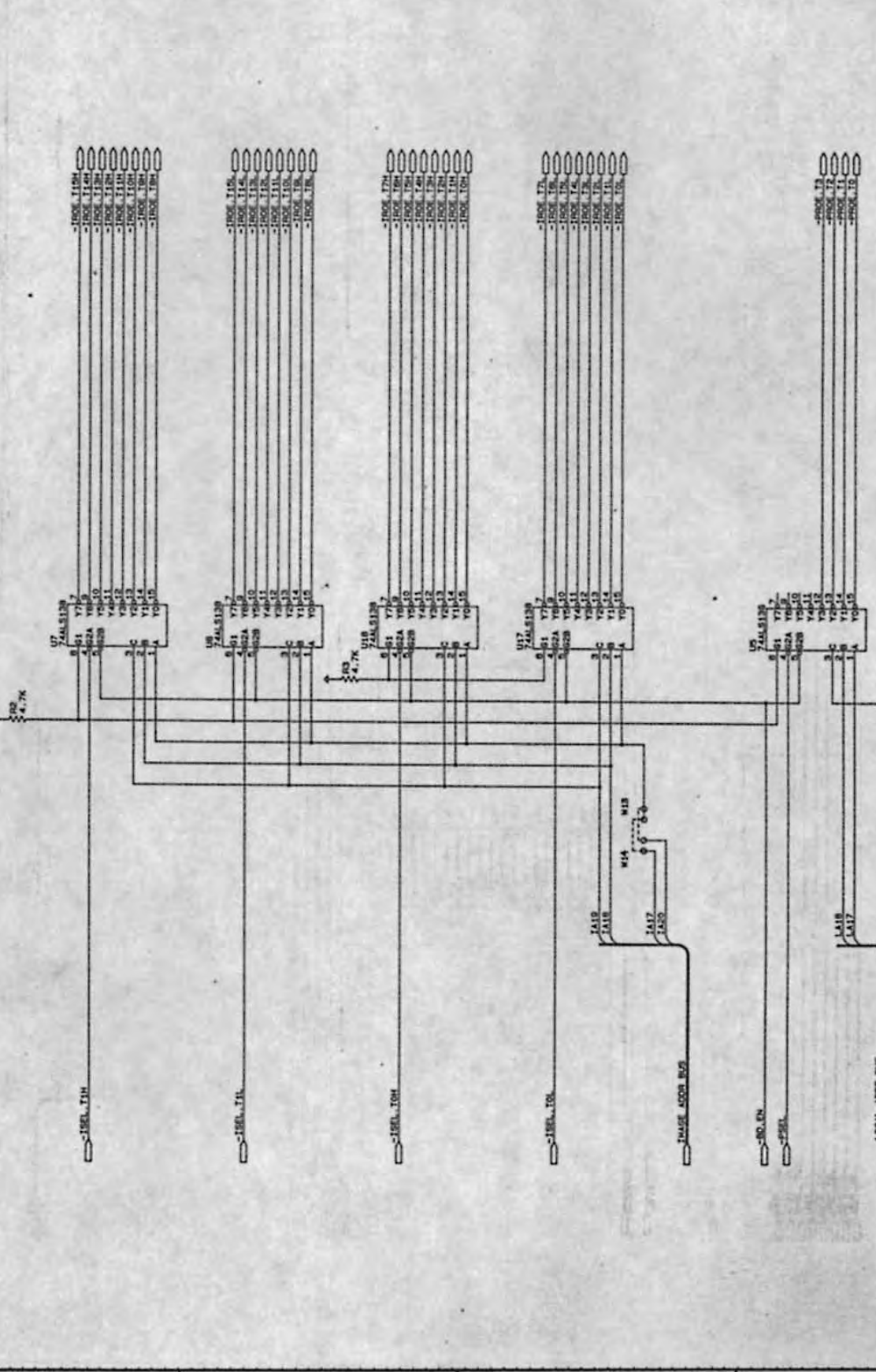
D C B A



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	74ALS245	REMOVE BURRS - BREAK SWAMP CORNERS & EDGES	1	1	74ALS245	REMOVE BURRS - BREAK SWAMP CORNERS & EDGES	1
2	74ALS245	TOLERANCES	1	2	74ALS245	TOLERANCES	2
3	74ALS245	ANGLES	1/2"	3	74ALS245	ANGLES	3
4	74ALS245	DECIMAL	1	4	74ALS245	DECIMAL	4
5	74ALS245	FRACTIONAL	1/16"	5	74ALS245	FRACTIONAL	5

PROJ ENGR: G. SHIPP
 CHECKED BY: G. SHIPP
 DATE: 11/11/78
 PART NUMBER: 16-9041
 DESCRIPTION: ROM-2 SCHEMATIC
 WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE.
 CHICAGO, ILL. 60641

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1/17/78



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	74ALS128	REMOVE BURRS-BREAK SHARP CORNERS & EDGES	1
2	74ALS129	REMOVE BURRS-BREAK SHARP CORNERS & EDGES	1
3	74ALS128	REMOVE BURRS-BREAK SHARP CORNERS & EDGES	1
4	74ALS129	REMOVE BURRS-BREAK SHARP CORNERS & EDGES	1

WILLIAMS ELECTRONICS, INC. 3430 N. CALIFORNIA AVE. CHICAGO, ILL. 60641	
NAME: WILLIAMS ELECTRONICS, INC. ADDRESS: 3430 N. CALIFORNIA AVE. CITY: CHICAGO, ILL. STATE: ILL. ZIP: 60641	PROJECT NO.: 16-9041 PART NO.: 16-9041 REV: 1
DO NOT SCALE DRAWING TO DIMENSIONS SHOWN	TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL: ±.000 ANGULAR: ±1/2° FRACTIONAL: ±1/100 FRACTIONAL: ±1/64
CRYSTAL: 2.0MHz APPROVAL: DATE 7/17/78 BY 78/166	MATERIAL: 303C-U1 APPROVAL: DATE 7/17/78 BY 78/166

16-9041

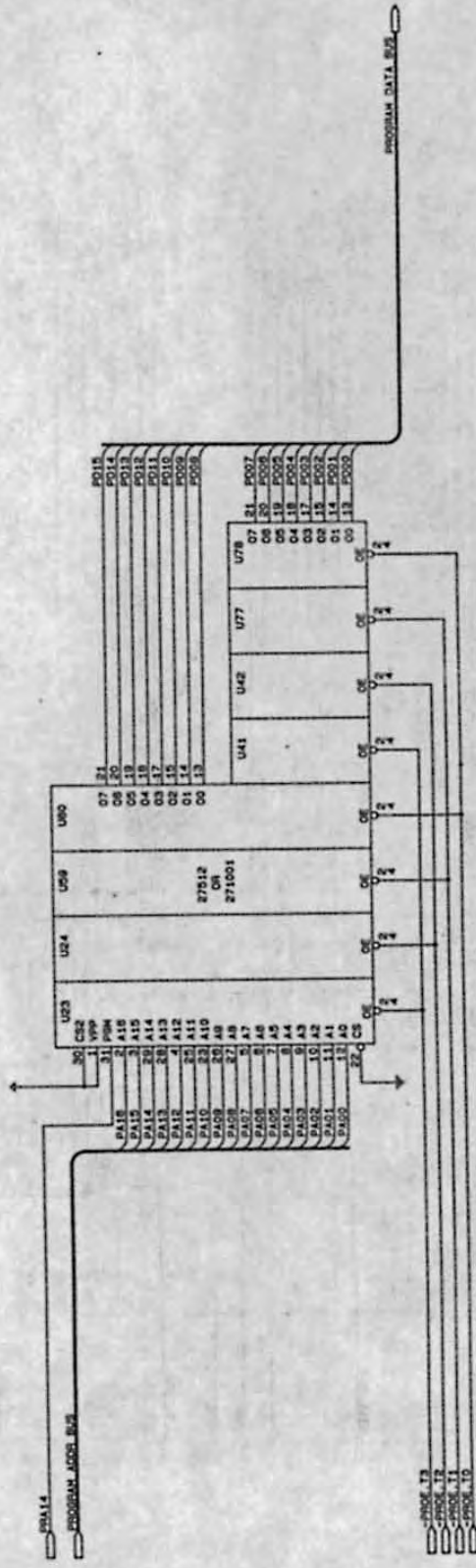
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REV	DESCRIPTION OF CHANGE	DATE
	NEW PART RELEASE	1994.1
		9-20-83

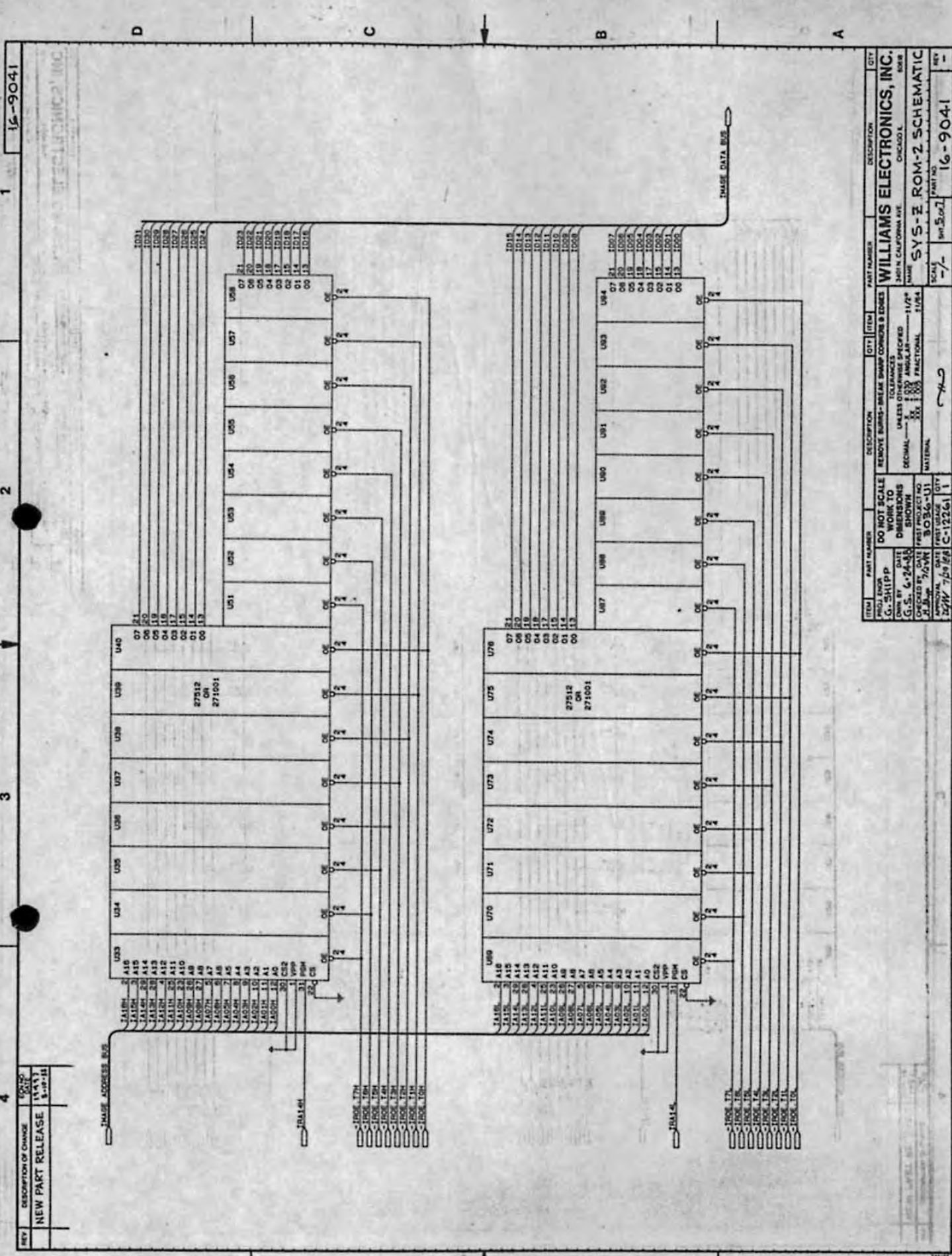


ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	U23	271612 ON	1	PCB
2	U24	271601 ON	1	PCB
3	U29	271612 ON	1	PCB
4	U39	271601 ON	1	PCB
5	U41	271612 ON	1	PCB
6	U42	271601 ON	1	PCB
7	U77	271612 ON	1	PCB
8	U78	271601 ON	1	PCB
9	R015	10K	1	PCB
10	R016	10K	1	PCB
11	R017	10K	1	PCB
12	R018	10K	1	PCB
13	R019	10K	1	PCB
14	R001	10K	1	PCB
15	R002	10K	1	PCB
16	R003	10K	1	PCB
17	R004	10K	1	PCB
18	R005	10K	1	PCB
19	R006	10K	1	PCB
20	R007	10K	1	PCB
21	R008	10K	1	PCB
22	R009	10K	1	PCB

WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE.
 CHICAGO, ILL. 60641

SYN-Z ROM-2 SCHEMATIC

DATE: 9-20-83



15-9041

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REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1-10-55

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	U33	74181	1	1	U33	1
2	U34	74181	1	2	U34	1
3	U35	74181	1	3	U35	1
4	U36	74181	1	4	U36	1
5	U37	74181	1	5	U37	1
6	U38	74181	1	6	U38	1
7	U39	74181	1	7	U39	1
8	U40	74181	1	8	U40	1
9	U41	74181	1	9	U41	1
10	U42	74181	1	10	U42	1
11	U43	74181	1	11	U43	1
12	U44	74181	1	12	U44	1
13	U45	74181	1	13	U45	1
14	U46	74181	1	14	U46	1
15	U47	74181	1	15	U47	1
16	U48	74181	1	16	U48	1
17	U49	74181	1	17	U49	1
18	U50	74181	1	18	U50	1
19	U51	74181	1	19	U51	1
20	U52	74181	1	20	U52	1
21	U53	74181	1	21	U53	1
22	U54	74181	1	22	U54	1
23	U55	74181	1	23	U55	1
24	U56	74181	1	24	U56	1
25	U57	74181	1	25	U57	1
26	U58	74181	1	26	U58	1
27	U59	74181	1	27	U59	1
28	U60	74181	1	28	U60	1
29	U61	74181	1	29	U61	1
30	U62	74181	1	30	U62	1
31	U63	74181	1	31	U63	1
32	U64	74181	1	32	U64	1
33	U65	74181	1	33	U65	1
34	U66	74181	1	34	U66	1
35	U67	74181	1	35	U67	1
36	U68	74181	1	36	U68	1
37	U69	74181	1	37	U69	1
38	U70	74181	1	38	U70	1
39	U71	74181	1	39	U71	1
40	U72	74181	1	40	U72	1
41	U73	74181	1	41	U73	1
42	U74	74181	1	42	U74	1
43	U75	74181	1	43	U75	1
44	U76	74181	1	44	U76	1
45	U77	74181	1	45	U77	1
46	U78	74181	1	46	U78	1
47	U79	74181	1	47	U79	1
48	U80	74181	1	48	U80	1
49	U81	74181	1	49	U81	1
50	U82	74181	1	50	U82	1
51	U83	74181	1	51	U83	1
52	U84	74181	1	52	U84	1
53	U85	74181	1	53	U85	1
54	U86	74181	1	54	U86	1
55	U87	74181	1	55	U87	1
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59	U91	74181	1	59	U91	1
60	U92	74181	1	60	U92	1
61	U93	74181	1	61	U93	1
62	U94	74181	1	62	U94	1
63	U95	74181	1	63	U95	1
64	U96	74181	1	64	U96	1
65	U97	74181	1	65	U97	1
66	U98	74181	1	66	U98	1
67	U99	74181	1	67	U99	1
68	U100	74181	1	68	U100	1
69	U101	74181	1	69	U101	1
70	U102	74181	1	70	U102	1
71	U103	74181	1	71	U103	1
72	U104	74181	1	72	U104	1
73	U105	74181	1	73	U105	1
74	U106	74181	1	74	U106	1
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77	U109	74181	1	77	U109	1
78	U110	74181	1	78	U110	1
79	U111	74181	1	79	U111	1
80	U112	74181	1	80	U112	1
81	U113	74181	1	81	U113	1
82	U114	74181	1	82	U114	1
83	U115	74181	1	83	U115	1
84	U116	74181	1	84	U116	1
85	U117	74181	1	85	U117	1
86	U118	74181	1	86	U118	1
87	U119	74181	1	87	U119	1
88	U120	74181	1	88	U120	1
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91	U123	74181	1	91	U123	1
92	U124	74181	1	92	U124	1
93	U125	74181	1	93	U125	1
94	U126	74181	1	94	U126	1
95	U127	74181	1	95	U127	1
96	U128	74181	1	96	U128	1
97	U129	74181	1	97	U129	1
98	U130	74181	1	98	U130	1
99	U131	74181	1	99	U131	1
100	U132	74181	1	100	U132	1
101	U133	74181	1	101	U133	1
102	U134	74181	1	102	U134	1
103	U135	74181	1	103	U135	1
104	U136	74181	1	104	U136	1
105	U137	74181	1	105	U137	1
106	U138	74181	1	106	U138	1
107	U139	74181	1	107	U139	1
108	U140	74181	1	108	U140	1
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112	U144	74181	1	112	U144	1
113	U145	74181	1	113	U145	1
114	U146	74181	1	114	U146	1
115	U147	74181	1	115	U147	1
116	U148	74181	1	116	U148	1
117	U149	74181	1	117	U149	1
118	U150	74181	1	118	U150	1
119	U151	74181	1	119	U151	1
120	U152	74181	1	120	U152	1
121	U153	74181	1	121	U153	1
122	U154	74181	1	122	U154	1
123	U155	74181	1	123	U155	1
124	U156	74181	1	124	U156	1
125	U157	74181	1	125	U157	1
126	U158	74181	1	126	U158	1
127	U159	74181	1	127	U159	1
128	U160	74181	1	128	U160	1
129	U161	74181	1	129	U161	1
130	U162	74181	1	130	U162	1
131	U163	74181	1	131	U163	1
132	U164	74181	1	132	U164	1
133	U165	74181	1	133	U165	1
134	U166	74181	1	134	U166	1
135	U167	74181	1	135	U167	1
136	U168	74181	1	136	U168	1
137	U169	74181	1	137	U169	1
138	U170	74181	1	138	U170	1
139	U171	74181	1	139	U171	1
140	U172	74181	1	140	U172	1
141	U173	74181	1	141	U173	1
142	U174	74181	1	142	U174	1
143	U175	74181	1	143	U175	1
144	U176	74181	1	144	U176	1
145	U177	74181	1	145	U177	1
146	U178	74181	1	146	U178	1
147	U179	74181	1	147	U179	1
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151	U183	74181	1	151	U183	1
152	U184	74181	1	152	U184	1
153	U185	74181	1	153	U185	1
154	U186	74181	1	154	U186	1
155	U187	74181	1	155	U187	1
156	U188	74181	1	156	U188	1
157	U189	74181	1	157	U189	1
158	U190	74181	1	158	U190	1
159	U191	74181	1			

16-9041

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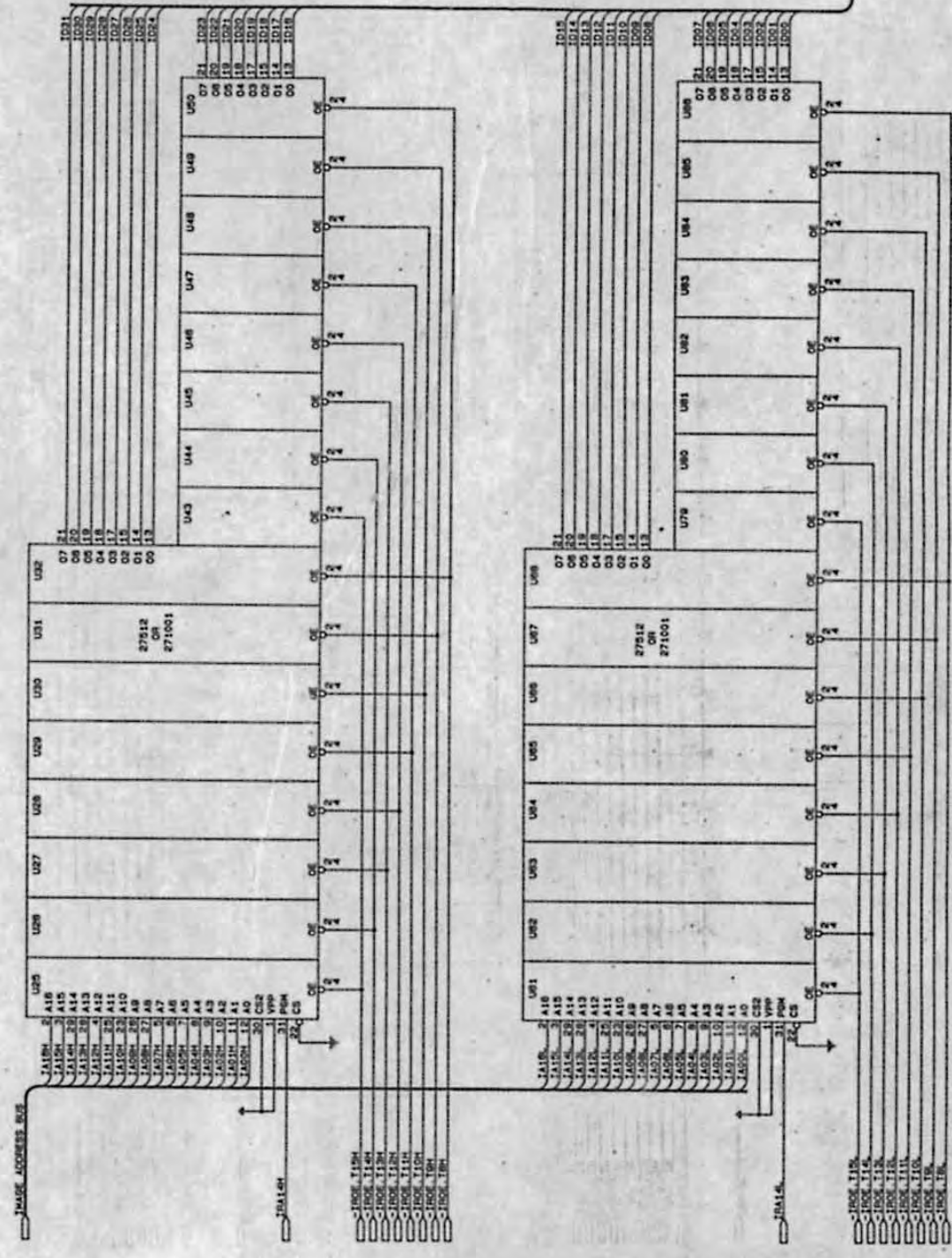
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REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1-22-54

WILLIAMS ELECTRONICS, INC.



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION
1	G. SHIRP	SCALE REMOVE BARRIERS BEHIND CONSOLE 8 EDGES		1	WILLIAMS ELECTRONICS, INC.	
UNLESS OTHERWISE SPECIFIED						
DRAWN BY: G. S. G. 1-22-54						
CHECKED BY: J. P. M. 1-22-54						
DATE: 1-22-54						
LOCATION: CHICAGO, ILL.						

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	1/25/74

C-12037

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

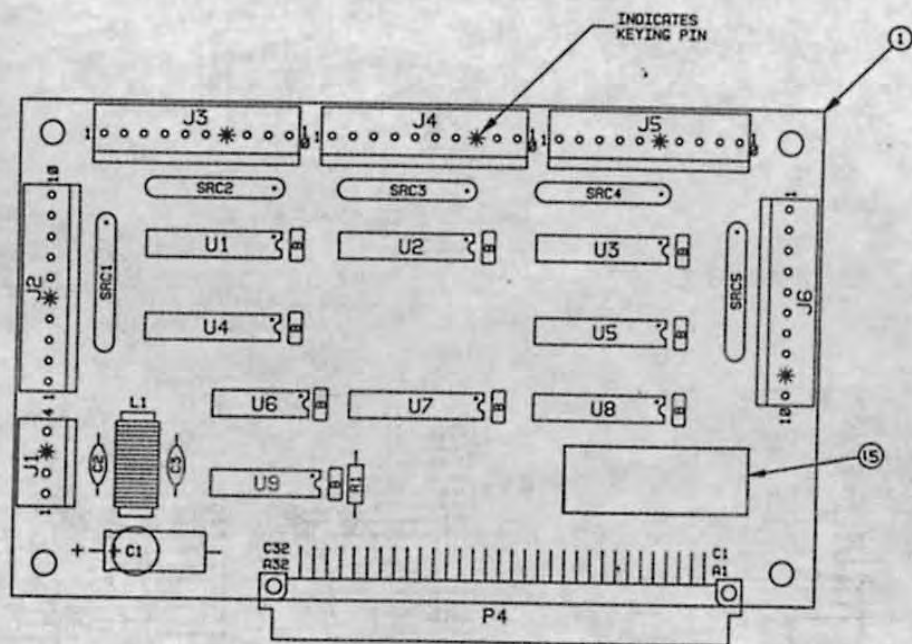
Pin/Function

- 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



NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-9828.

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
15	16-8850-212		LABEL, PCB IDENT.	1
14	5792-10026-00	P4	CONNECTOR, 64P EURO-DIN CARD CONN. FEMALE	1
13	5791-10862-10	J2, J3, J4, J5, J6	CONNECTOR, 18P MOLEX, .156" CENTER PINS	5
12	5791-10862-04	J1	CONNECTOR, 4P MOLEX, .156" CENTER PINS	1
11	5043-09845-00	C2, C3	CAPACITOR, .001 MFD.	2
10	5048-09986-00	C1	CAPACITOR, 100 MFD.	1
9	5043-09980-00	8	CAPACITOR, 0.01 MFD.	9
8	5018-08991-00	R1	RESISTOR, 4.7K, 1/4W, 5%	1
7	5060-10396-00	SCR1, SCR2, SCR3, SAC4, SRC5	SIP, 18P 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	5311-12207-00	U1, U2, U3, U4, U5	74HC541, HC TTL OCTAL BUFFER	5
1	5779-12265-00		BARE PC BOARD	1

BILL OF MATERIALS

PROJ ENGR
M. LOFFREDO
DATE
R.G. 2/12/80

NOT SCALE
WORK TO
DIMENSIONS
SHOWN

REMOVE BURRS-BREAK SHARP CORNERS & EDGES
TOLERANCES
UNLESS OTHERWISE SPECIFIED
DECIMAL .0005 ANGULAR 11/2°

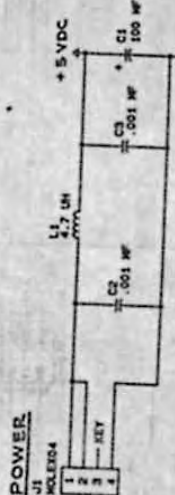
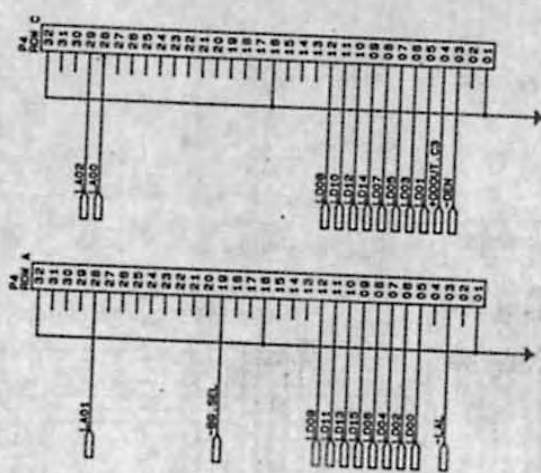
WILLIAMS ELECTRONICS, INC.
3401 N. CALIFORNIA AVE. CHICAGO, IL 60641
NAME

KEY	DESCRIPTION OF CHANGE	DATE
	NEW PART RELEASE	10/15/54

16-9026

4 3 2 1

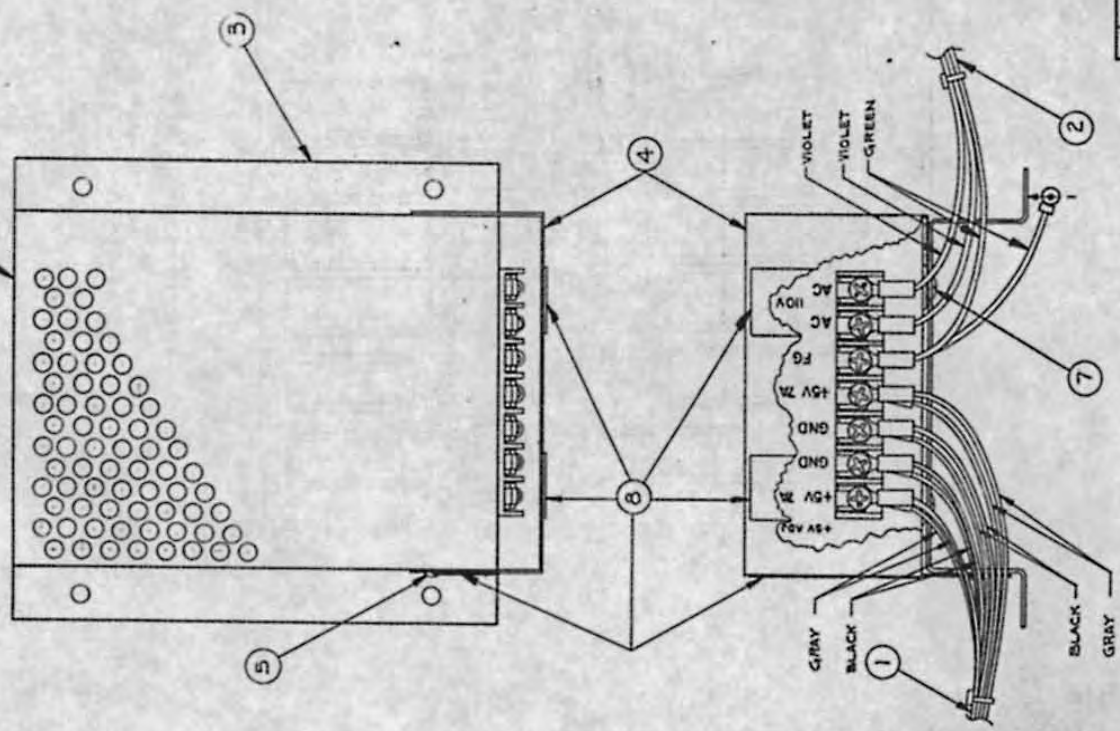
CPU INTERFACE



ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	16-9026	REMOVE BURRS-MILK SWAMP CORNERS & EDGES		1	16-9026	REMOVE BURRS-MILK SWAMP CORNERS & EDGES	
SCALE		TOLERANCES		UNLESS OTHERWISE SPECIFIED		DECIMAL	
1/8"		1/16"		1/32"		1/16"	
DIMENSIONS		SHOW		DIMENSIONS		SHOW	

WILLIAMS ELECTRONICS, INC.
340 N. CALIFORNIA AVE.
CHICAGO, ILL.

REV	DESCRIPTION OF CHANGE	DATE
1	N. P. R.	11-13-58
2		10-1-58

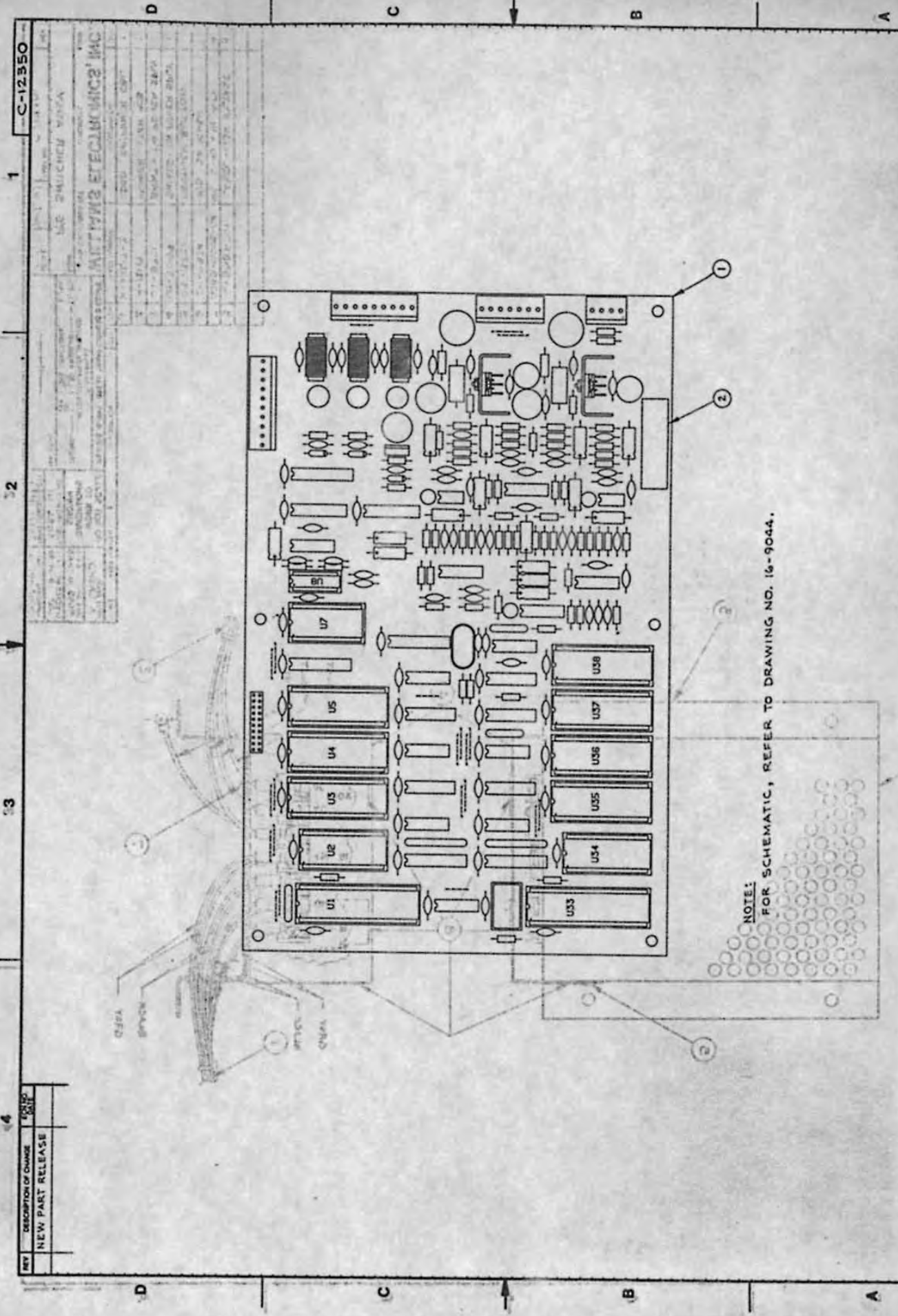


ITEM	PART NUMBER	DESCRIPTION	QTY
1	H-10217-3	VIDEO SW/POWER CBL	1
2	H-10219	POWER INTER PCB	1
3	O1-8931	BRKT - SW POWER SPLY	1
4	O1-9009	SHIELD - SW POWER SPLY	1
5	O3-8231	FASTNER BUTTON	1
6	ZO-9574	P/S SWITCHER	1
7	4005-0005-04	M/S S-40 X 1/4 P-PH	4
8	16-8987-101	LABEL-HIGH VOLTAGE	3

PROJ DATA	DO NOT SCALE	DESCRIPTION	QTY
A. L. A. S. H. O.	WORK TO	REMOVE BURRS-BREAK SHARP CORNERS & EDGES	
PROJ NO. 11-11-58	DIMENSIONS	TOLERANCES	
DESIGNED BY: G. L. T.	SHOWN	UNLESS OTHERWISE SPECIFIED	
CHECKED BY: G. L. T.	NO	DECIMAL: 1/100	1/2"
DATE: 11-13-58	FRAC. NO.	FRACTIONAL: 1/16	
APPROVAL: D. W. W.	DATE: 11-13-58	MATERIAL:	
WILLIAMS ELECTRONICS, INC.		CHICAGO, ILL.	
P/S SWITCHER ASSY		SCALE: 1/1	PART NO: C-12401
			REV: 1

D C B A

D C B A



1
C-12350

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REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	

ITEM	QTY	DESCRIPTION
1	1	PCB
2	1	U1
3	1	U2
4	1	U3
5	1	U4
6	1	U5
7	1	U6
8	1	U7
9	1	U8
10	1	RESISTORS
11	1	CAPACITORS
12	1	DIODES
13	1	TRANSISTORS
14	1	RELAYS
15	1	CONNECTORS
16	1	COILS
17	1	INDUCTORS
18	1	VARCAPS
19	1	THERMISTORS
20	1	PHOTORESISTORS
21	1	PHOTOVARISTORS
22	1	PHOTOCONDUCTORS
23	1	PHOTOCELLS
24	1	PHOTOEMITTERS
25	1	PHOTOVOLTAIC CELLS
26	1	PHOTOGRAPHIC FILMS
27	1	PHOTOGRAPHIC PAPERS
28	1	PHOTOGRAPHIC PLATES
29	1	PHOTOGRAPHIC TUBES
30	1	PHOTOGRAPHIC CATHODES
31	1	PHOTOGRAPHIC ANODES
32	1	PHOTOGRAPHIC SCREENS
33	1	PHOTOGRAPHIC MASKS
34	1	PHOTOGRAPHIC RESISTS
35	1	PHOTOGRAPHIC DEVELOPERS
36	1	PHOTOGRAPHIC FIXERS
37	1	PHOTOGRAPHIC TONERS
38	1	PHOTOGRAPHIC WASHES
39	1	PHOTOGRAPHIC DRYERS
40	1	PHOTOGRAPHIC STORAGE

WILLIAMS ELECTRONICS, INC.

16-9044

1/2" X 1/2" X 1/2"

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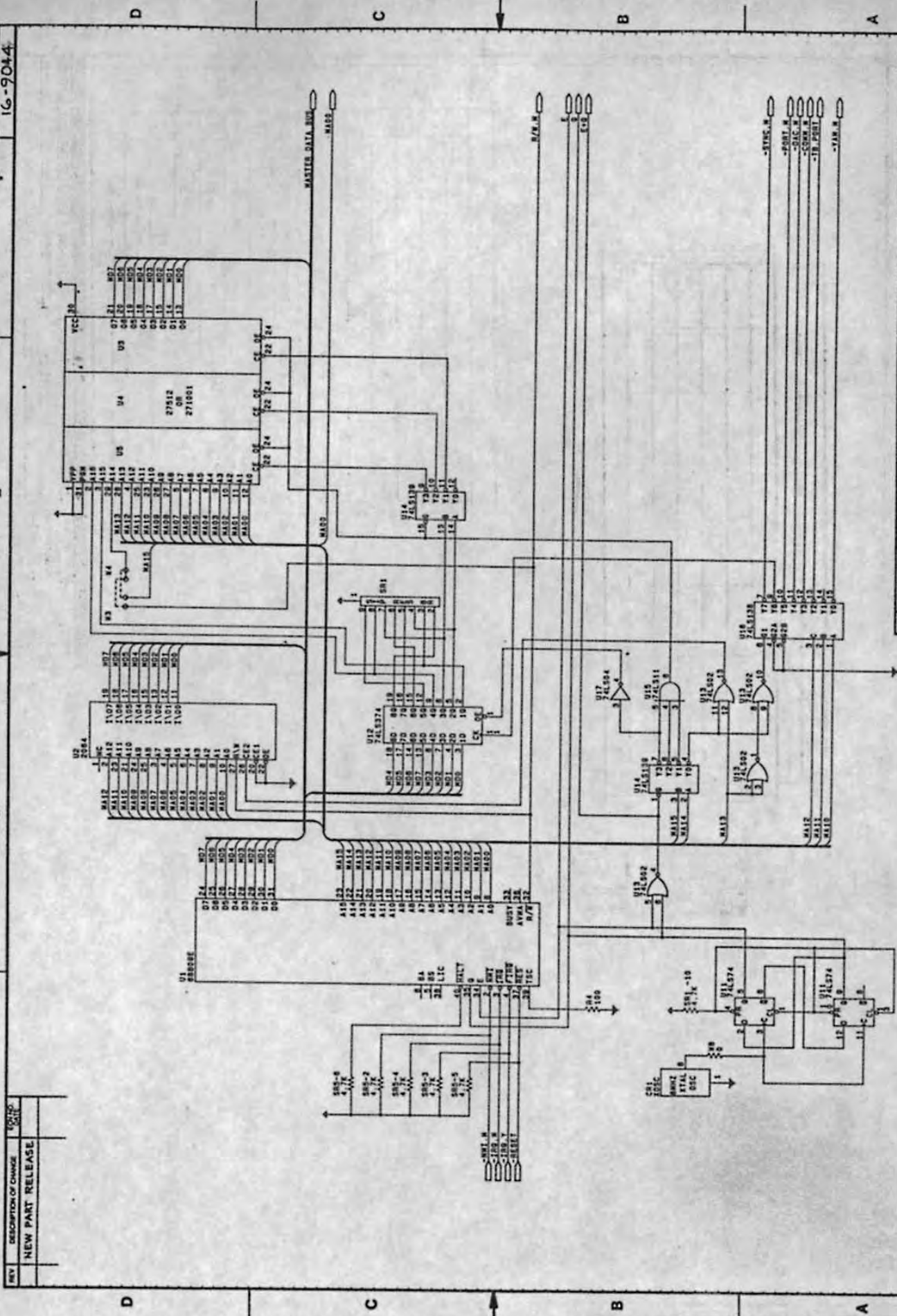
NOTE: FOR SCHEMATIC, REFER TO DRAWING NO. 16-9044.

ITEM	QTY	DESCRIPTION
1	1	PCB
2	1	U1
3	1	U2
4	1	U3
5	1	U4
6	1	U5
7	1	U6
8	1	U7
9	1	U8
10	1	RESISTORS
11	1	CAPACITORS
12	1	DIODES
13	1	TRANSISTORS
14	1	RELAYS
15	1	CONNECTORS
16	1	COILS
17	1	INDUCTORS
18	1	VARCAPS
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34	1	PHOTOGRAPHIC RESISTS
35	1	PHOTOGRAPHIC DEVELOPERS
36	1	PHOTOGRAPHIC FIXERS
37	1	PHOTOGRAPHIC TONERS
38	1	PHOTOGRAPHIC WASHES
39	1	PHOTOGRAPHIC DRYERS
40	1	PHOTOGRAPHIC STORAGE

WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE.
 OCAJON, CALIF. 92051
 R.G. 9-22-68
 DIMENSIONS UNLESS OTHERWISE SPECIFIED
 DECIMALS TO 1/32 ANGLES TO 1/2°

REV	DESCRIPTION OF CHANGE
1	NEW PART RELEASE

16-9044



ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT	PART NUMBER	DESCRIPTION	CITY
1	74LS137A	REMOVE BUMPS-BREAK SWAMP CORNERS & EDGES					CHICAGO, ILL.
2	74LS138	TOLERANCES UNLESS OTHERWISE SPECIFIED					CHICAGO, ILL.
3	74LS02	DECIMAL	1	1000	ANGULAR	11/2"	CHICAGO, ILL.
4	74LS00	FRACTIONAL	1	1000	FRACTIONAL	1/2"	CHICAGO, ILL.

DO NOT SCALE
DIMENSIONS SHOWN
CHECKED BY DA
PROJECT NO. 10066-01
MATERIAL 10066-01

WILLIAMS ELECTRONICS, INC.
1504 N. CALIFORNIA AVE.
CHICAGO, ILL. 60642

SYS-2 SOUND-2 BD. SCHEMATIC

16-9044

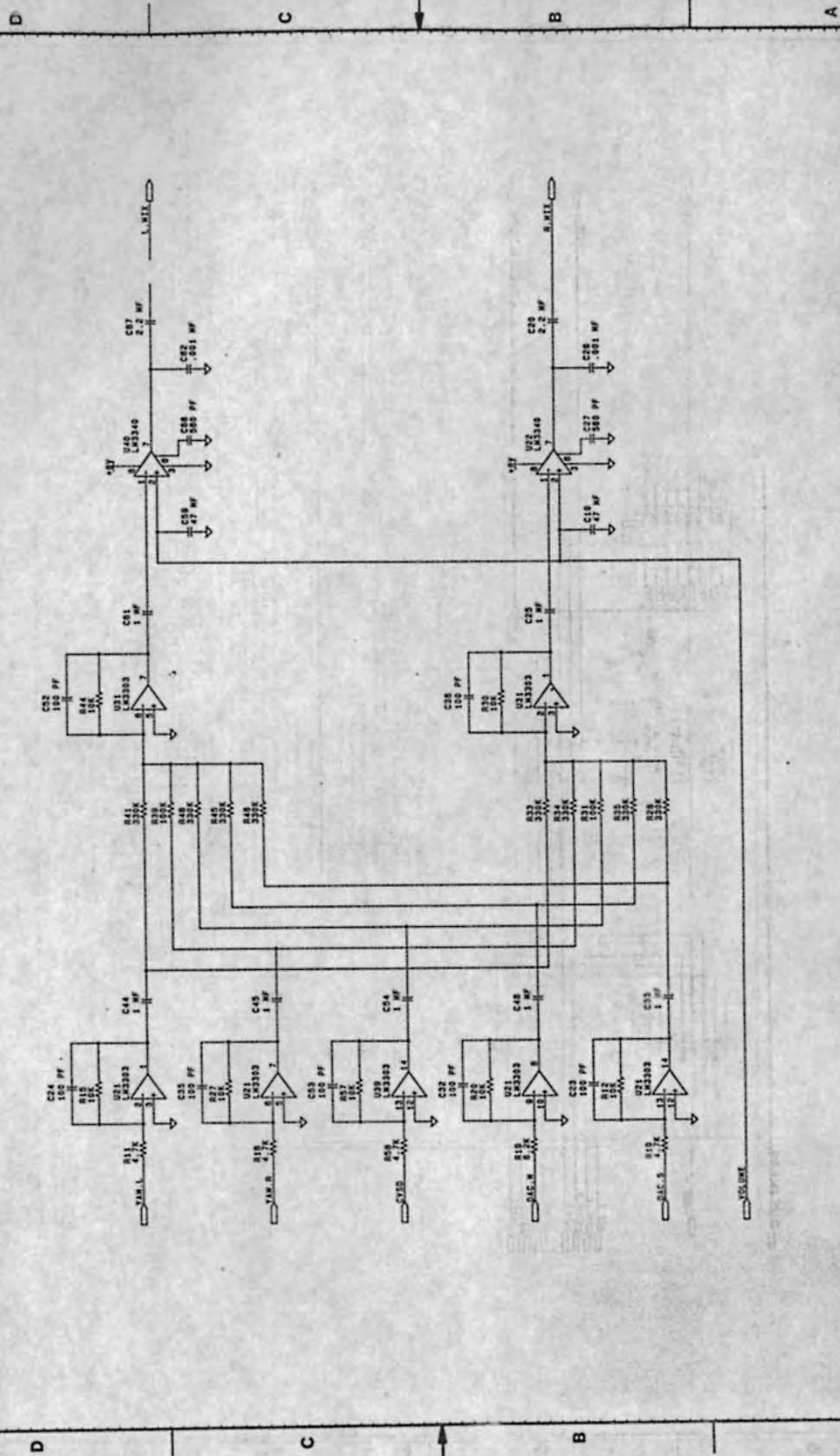
1

2

3

4

REV	DESCRIPTION OF CHANGE
	NEW PART RELEASE.

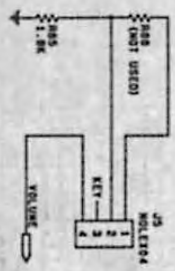
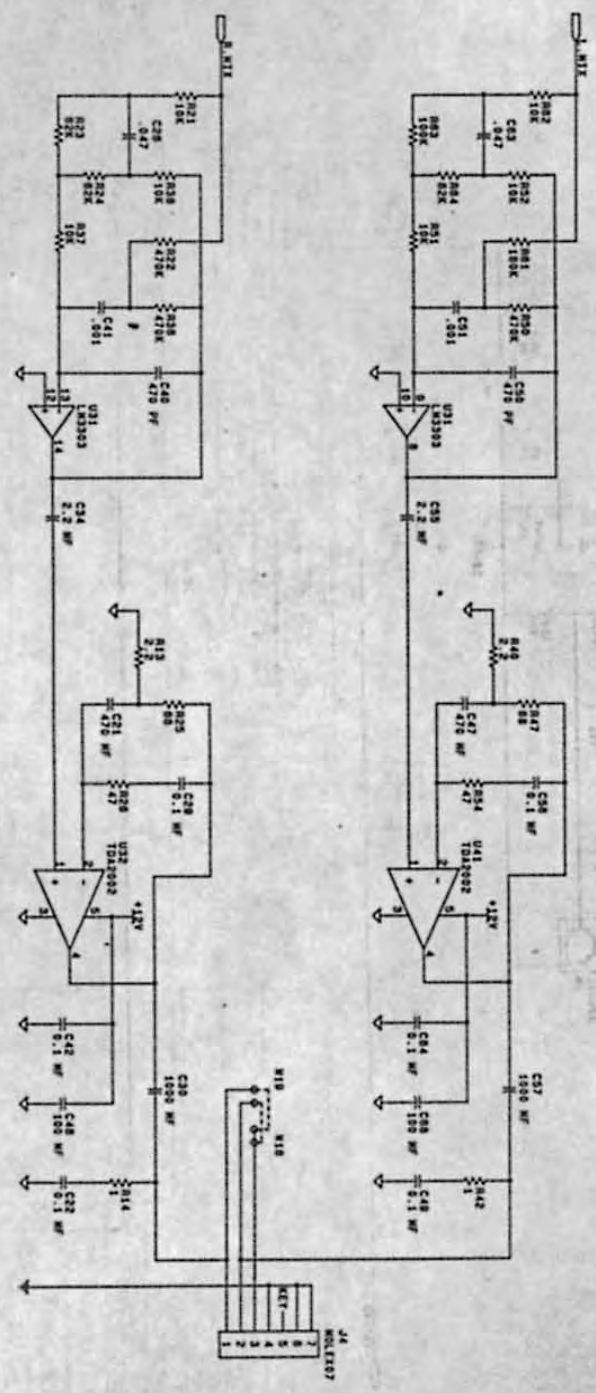


ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION
1	U1	LM3303	1	1	U1	LM3303
2	U2	LM3303	1	2	U2	LM3303
3	U3	LM3303	1	3	U3	LM3303
4	U4	LM3303	1	4	U4	LM3303
5	U5	LM3303	1	5	U5	LM3303
6	U6	LM3303	1	6	U6	LM3303
7	R1	10K	1	7	R1	10K
8	R2	10K	1	8	R2	10K
9	R3	10K	1	9	R3	10K
10	R4	10K	1	10	R4	10K
11	R5	10K	1	11	R5	10K
12	R6	10K	1	12	R6	10K
13	R7	10K	1	13	R7	10K
14	R8	10K	1	14	R8	10K
15	R9	10K	1	15	R9	10K
16	R10	10K	1	16	R10	10K
17	C1	100PF	1	17	C1	100PF
18	C2	100PF	1	18	C2	100PF
19	C3	100PF	1	19	C3	100PF
20	C4	100PF	1	20	C4	100PF
21	C5	100PF	1	21	C5	100PF
22	C6	100PF	1	22	C6	100PF
23	C7	100PF	1	23	C7	100PF
24	C8	100PF	1	24	C8	100PF
25	C9	100PF	1	25	C9	100PF
26	C10	100PF	1	26	C10	100PF

WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE
 CHICAGO, ILL. 60641
 NAME: SYS-2 SOUND-2 BD. SCHEMATIC
 DATE: 11/74
 DRAWN BY: J. J. FRACTIONAL
 CHECKED BY: J. J. FRACTIONAL

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	

16-9044

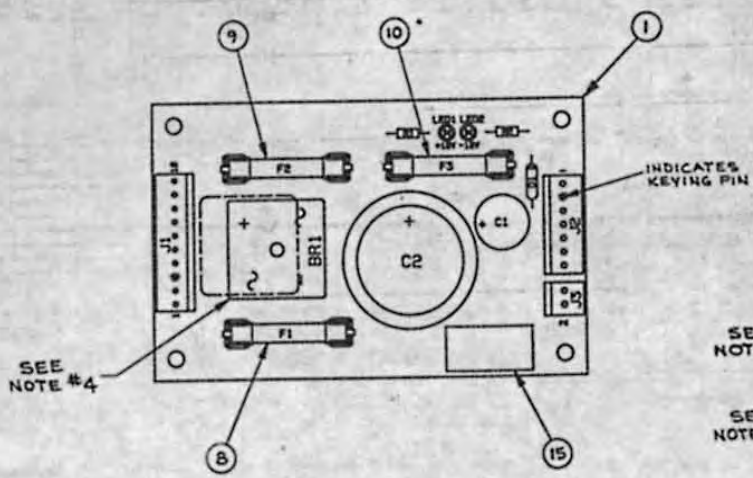


ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT	PART NUMBER	DESCRIPTION	QTY
1	WILLIAMS ELECTRONICS, INC.						
2	WILLIAMS ELECTRONICS, INC.						
3	WILLIAMS ELECTRONICS, INC.						
4	WILLIAMS ELECTRONICS, INC.						

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	

REV	DESCRIPTION OF CHANGE	DATE
1	NEW PART RELEASE	

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



SEE NOTE #4

INDICATES KEYING PIN

SEE NOTE #3

SEE NOTE #2

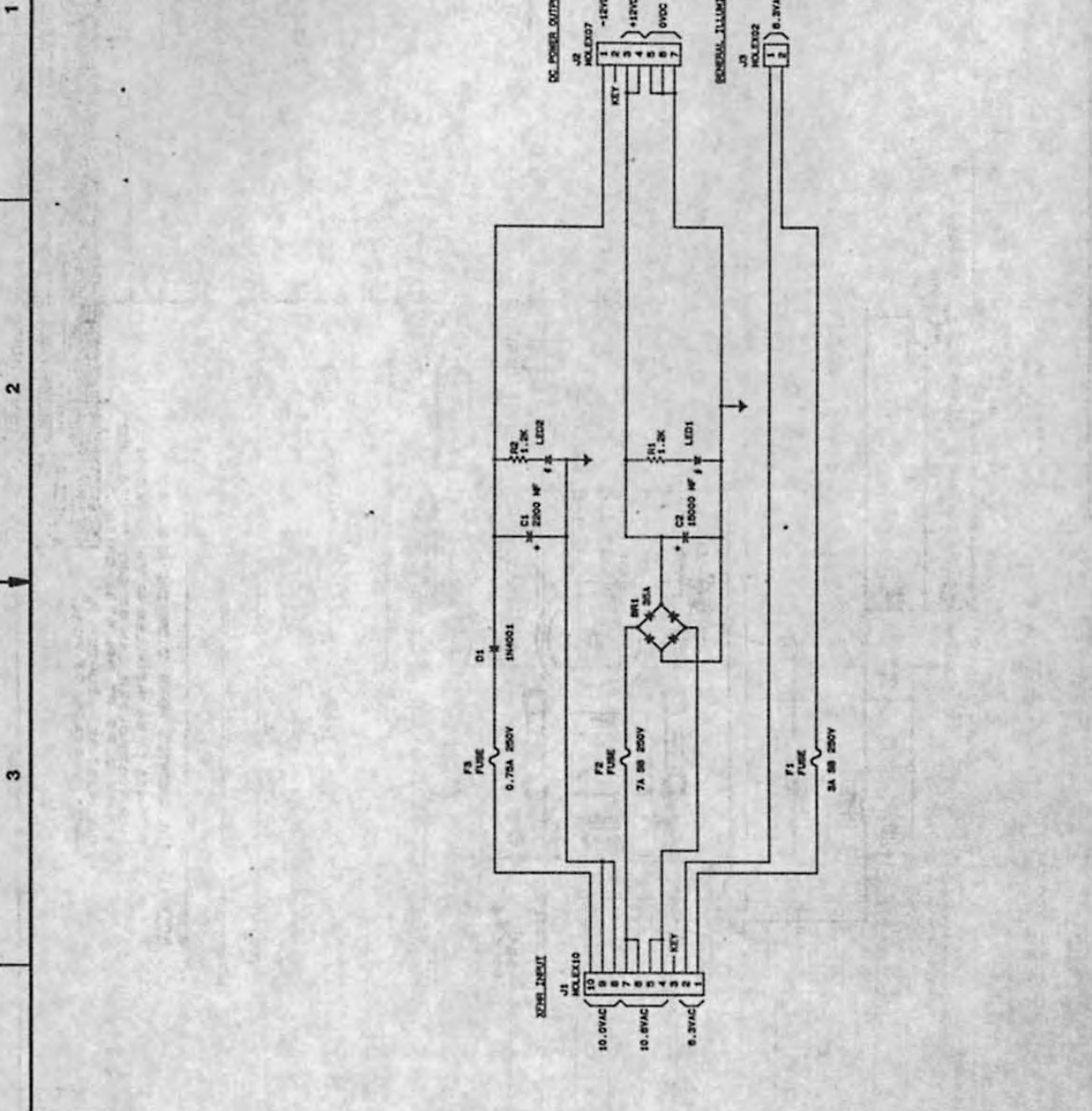
15	16-8850-216		LABEL, PCB IDENT.	1
14	5791-10862-10	J1	CONN., 10-PIN MOLEX, .156" CENTER PINS	1
13	5791-10862-07	J2	CONN., 7-PIN MOLEX, .156" CENTER PINS	1
12	5791-10862-02	J3	CONN., 2-PIN MOLEX, .156" CENTER PINS	1
11	5733-12060-01	F1, F2, F3	FUSEHOLDER	3
10	5730-09197-00	F3	FUSE, 0.75A, 250V	1
9	5731-09432-00	F2	FUSE, 7A 5B, 250V	1
8	5731-10356-00	F1	FUSE, 3A 5B, 250V	1
7	5040-12315-00	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, 35V.	1
3	5070-06258-00	D1	DIODE, IN4001	1
2	5010-09314-00	R1, R2	RESISTOR, C.F., 1.2K 5% 1/4 WATT	2
1	5773-12309-00		BARE PC BOARD	1
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.

- NOTES:**
- FOR SCHEMATIC, REFER TO DRAWING NO. 16-9857.
 - ALL FUSES TO BE INSTALLED AFTER SOLDER WASH.
 - EACH FUSEHOLDER CAN BE SUBSTITUTED WITH 2 FUSE CLIPS PT. NO. 5732-09178-00.
 - BR1 MUST BE MOUNTED 1/8" ABOVE SURFACE OF PCB.

BILL OF MATERIALS

PROJ ENGR M. LOFFREDO CHK BY R.C. 5/18/88 CHECKED BY DATE DATE 5/18/88 APPROVAL DATE DATE 5/18/88	DO NOT SCALE WORK TO DIMENSIONS SHOWN FIRST PROJECT NO. 3836-U FIRST USAGE C-12259	REMOVE BURRS - BREAK SHARP CORNERS & EDGES TOLERANCES UNLESS OTHERWISE SPECIFIED DECIMAL .005 ANGULAR 11/2° FRACTIONAL 1/16"	WILLIAMS ELECTRONICS, INC. 3401 N. CALIFORNIA AVE. CHICAGO IL 60618 NAME SYS-7 12 UNREG P/S ASSY SCALE 1/1 SH. 1 OF 1 PART NO. C-12218
MATERIAL	NONE		REV -

16-9037



REV	DESCRIPTION OF CHANGE	DATE	BY
4	NEW PART RELEASE	17/06/06	S.P.F. 06

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
		REMOVE BARRS-BREAK SHARP CORNERS & EDGES		
		TOLERANCES		
		UNLESS OTHERWISE SPECIFIED		
		DECIMAL	1/100	ANGULAR
		FRACTIONAL	1/16"	
		MATERIAL		

WILLIAMS ELECTRONICS, INC.
 3401 N. CALIFORNIA AVE
 CHICAGO, IL 60642
 NAME: 12 UNREG P/S BD., SCHEMATIC
 SCALE: 1:1
 DATE: 11/94
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]

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