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PRELIMINARY OWNER/OPERATOR'S MANUAL

GAPLUS

PRELIMINARY

MIDWAY MFG. CO.

10601 W Belmont Avenue
Franklin Park, Illinois 60131
U.S.A.



Phone: (312) 451-9200 Cable Address: MIDCO Telex No.: 72-1596

WARNING

THIS GAME MUST BE GROUNDED. FAILURE TO DO SO MAY RESULT IN DESTRUCTION TO ELECTRONIC COMPONENTS.

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not 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.

ELECTRICAL BULLETIN: FOR ALL APPARATUS COVERED BY THE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARD C22.2 NO. 1, WHICH EMPLOYS A SUPPLY CORD TERMINATED WITH A POLARIZED 2-PRONG ATTACHMENT PLUG.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Bally MIDWAYTM

Invites You To Use

**OUR TOLL FREE NUMBERS FOR
SERVICE INFORMATION CONCERNING THIS GAME, OR ANY
OTHER BALLY MIDWAY GAME YOU NOW HAVE ON LOCATION.**

**CALL US FOR PROMPT, COURTEOUS
ANSWERS TO YOUR PROBLEMS.**

VIDEO → Continental U.S. 1-800-323-7182

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Bally MIDWAYTM

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Printed in U.S.A.

PRELIMINARY INSTRUCTIONS

FOR GAPLUS

INSTALLATION

1. Unlock and open the coin box door.
2. Remove four (4) "CABINET LEVELING LEGS" from inside the coin box.
3. Tip the cabinet to the side and remove the shipping cleats from its bottom.
 - ° Locate the threaded holes - one in each corner - and install the "CABINET LEVELING LEGS" in them.
 - ° Level the cabinet.
 - ° When finished, the cabinet should be stable in the upright position.
4. Close and lock the rear access door and plug the game into a **standard** A.C. wall outlet **ONLY**.

-----**WARNING**-----
Game **MUST** be
properly grounded.

LINE VOLTAGE SAFETY INTERLOCK SWITCHES

Line voltage SAFETY INTERLOCK SWITCHES have been provided for your protection. The locations of these SAFETY INTERLOCK SWITCHES are:

1. UPRIGHT MODEL: Inside the rear of the cabinet at the side of the rear access door.

When the cabinet access door(s) are secured in place, the SAFETY INTERLOCK SWITCH plunger(s) are in a fully depressed condition. The game circuit can function normally.

When any cabinet access door(s) are opened, the SAFETY INTERLOCK SWITCH plunger(s) are in a partially extended condition. This isolates the game circuit from the line voltage.

To restore power to the game circuit with the access door(s) open, gently pull the SAFETY INTERLOCK SWITCH plunger(s) out to the fully extended condition. **THIS IS TO BE USED FOR SERVICING THE GAME ONLY!**

SELF-TEST

A slide switch is provided to make the game run a "Self-Test" on itself. The SELF-TEST SWITCH is located on a mounting bracket just inside the coin door opening.

When in the Self-Test mode, the monitor screen will display the results of certain test functions it has run on itself.

TO SERVICE THE CONTROL PANEL

1. UPRIGHT MODEL:

- ° The control panel is held in place by three latches, one on the left side, one on the right side, and one in the center of the front of the cabinet.

They are spring loaded to provide constant positive pressure on their latch plates.

They can be reached through the coin door **AFTER** turning power to the game off.

To release the latches, lift up and toward the center of the control panel.

Once they are released, unhook them from their latch plates.

- ° To remove the control panel:

Cradling the control panel between yourself and the cabinet, disconnect it from its cabling and any miscellaneous hardware.

The control panel is now free and can be removed.

- ° To reinstall the control panel, reverse this procedure.

REMOVAL OF THE MAIN-DISPLAY-GLASS AND/OR THE T.V. BEZEL ASSEMBLY

1. UPRIGHT MODEL:

NOTE: In order to do this, the control panel **MUST** be removed first. See the "UPRIGHT MODEL" procedure.

- ° **Turn the power to the game off** and remove the control panel. This frees the main-display-glass so it can be lifted up.
- ° By putting your finger in the hole in the middle of the main-display-glass support, you can lift it up and out.
- ° Loosen the screws which secure the T.V. bezel-glass-clamps in place.

Move the clamps to the side and the bezel glass may be removed.

Remove the bezel securing screws and the bezel with four bezel-glass-clamps may be removed.

- ° To reinstall the T.V. bezel assembly and the main-display-glass, reverse this procedure.

VOLUME CONTROL POT

The volume control pot is located on the games Logic P.C. Board in the back of the game cabinet. For adjustment, it may be reached through the games rear access door.

To make the sounds louder, turn the pot clockwise as you face it.

To make the sounds **less** loud, turn the pot counterclockwise as you face it.

CAUTION

- ° Be sure to check the PC Board for any foreign particles i.e. dust, etc.. Foreign particles on the PC Board are one of the main causes of the PC Board malfunctions.
- ° When in doubt as to the cause of any particular problem, **ALWAYS** take the PC Board to your distributor for repair. DO NOT attempt to repair the PC Board yourself by using a volt-ohm meter or other testing equipment.
- ° When transporting the PC Board, be sure to pack the board carefully with air caps, sponge or other packing materials.

PC BOARD

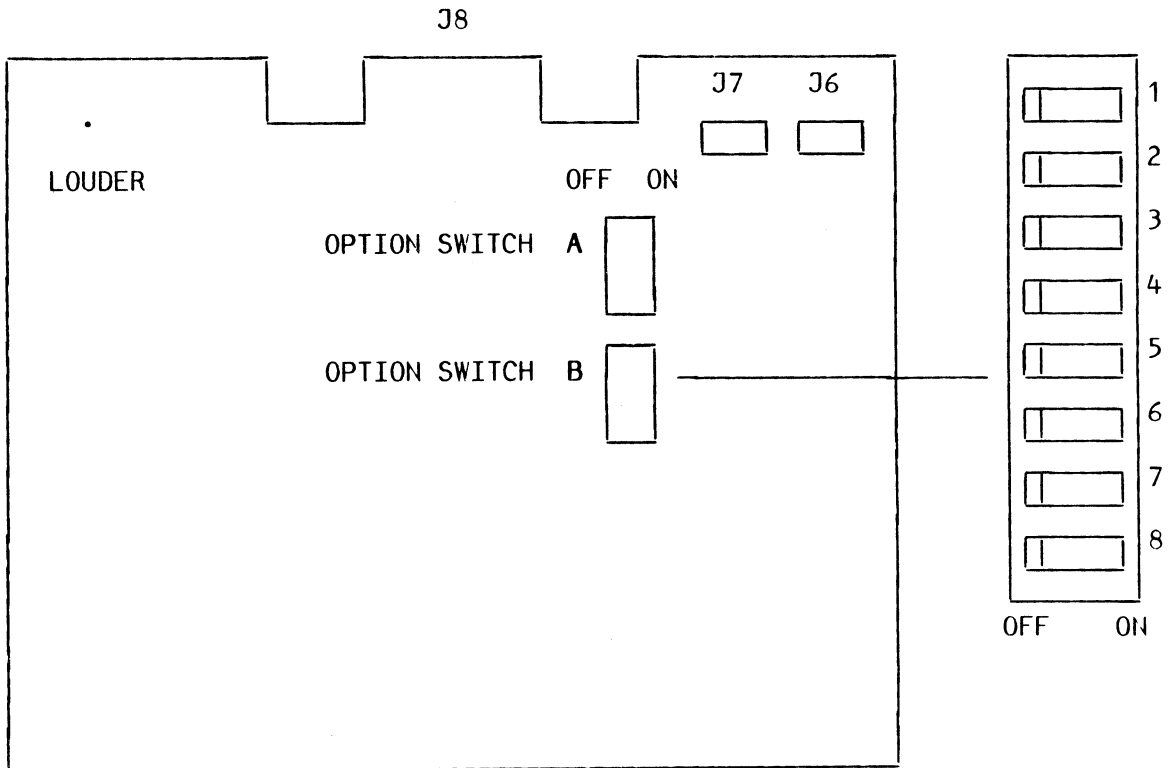
° Option Switches:

The game fee, bonus points, etc. are operator-adjustable. See the Option Switch Settings Table.

To perform the Self-Test, use the test switch located on the bracket just inside your games coin door.

° Volume:

Adjust the game volume as desired. **DO NOT** place any unnecessary pressure on the volume control knob.



SELF-TEST

The Self-Test mode is a special mode for checking game switches and computer functions. It is the easiest and best way to check for proper operation of the entire game.

You may begin a Self-Test at any time after the power to the game is on by sliding the Self-Test switch to the "ON" position. Now that the game is in the Self-Test mode, it will act as follows:

- ° The Self Test will take about five (5) seconds to perform. The following check list will appear on the screen.

RAM OK _____	A.
ROM OK _____	B.
I/O OK _____	C.
1ST 1 COIN 1 CREDIT _____(COIN 1)_____	D.*
2ND 1 COIN 1 CREDIT _____(COIN 2)_____	D.*
MYSHIP 3 _____	E.*
RANK 0 _____	F.
UPRIGHT _____	G.
SOUND 00 _____	H.
1ST BONUS 50000 PTS _____	I.*
2ND BONUS 150000 PTS _____	I.*
EVERY BONUS 150000 PTS _____	I.*

- A. RAM Test: If "OK" appears, RAM is normal.
- B. ROM Test: If "OK" appears, ROM is normal.
- C. I/O Test: If "OK" appears, I/O is normal.
- D. Game Fee Indicator: If 1 coin/1 game appears, the game fee is normal.
- E. Number of Fighters: If "3" appears, the number of Fighters is normal.
- F. Rank: If "0" appears, rank is normal.
- G. Table Specification: If "TABLE" appears for the Cocktail Table model and for the Upright Model, "UPRIGHT" appears, model specification is normal.
- H. Sound Test: A sound should appear when the control lever, firing button and the start button is pushed.
- I. Bonus Points: This game has been set for the first 50,000 points, then 150,000 points and for every 150,000 points thereafter.

* By using the OPTION SWITCH; "D", "E", and "I" are operator-adjustable.

When finished with the Self-Test mode, slide the Self-Test switch back to the "OFF" position and normal game functions will now return to the monitor screen.

CROSS HATCH PATTERN

Turn "ON" the Self-Test switch, push the Service button, and a cross hatch pattern will appear. Push the button one more time and the Self-Test mode will appear. Use this pattern when making adjustments to the monitor.

ADJUSTING GAME FEE, BONUS POINTS, ETC.

This is accomplished by using the various switches located on the games Logic P.C. Board. See the OPTION SWITCH SETTINGS tables and switch location information in this instruction sheet.

Turn the power switch "OFF" and then proceed to set the Option Switches.

After setting the option switches, again perform the Self-Test.

The settings of these switches are only read by the game on "POWER-UP".

<u>G A P L U S</u>										
<u>O P T I O N S W I T C H S E T T I N G S - D I P S W I T C H "A"</u>										
//////////////////////////////////////VARIOUS GAME PLAY OPTIONS//////////////////////////////////////										
NUMBER OF FIGHTERS GAME BEGINS WITH					<u>SW#1</u>	<u>SW#2</u>	<u>SW#3</u>	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u> <u>SW#7</u> <u>SW#8</u>
*	3	FIGHTERS			OFF	OFF				NOT USED
	2	FIGHTERS			OFF	ON				USED
	4	FIGHTERS			ON	OFF				OFF
	5	FIGHTERS			ON	ON				OFF
COIN #1 - NUMBER OF COINS PER CREDIT					<u>SW#1</u>	<u>SW#2</u>	<u>SW#3</u>	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u> <u>SW#7</u> <u>SW#8</u>
*	1	COIN	1	CREDIT			OFF	OFF		OFF
	1	COIN	2	CREDITS			OFF	ON		OFF
	2	COINS	1	CREDIT			ON	OFF		OFF
	3	COINS	1	CREDIT			ON	ON		OFF
SOUND					<u>SW#1</u>	<u>SW#2</u>	<u>SW#3</u>	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u> <u>SW#7</u> <u>SW#8</u>
		SOUND IN ATTRACT MODE							OFF	OFF
*		NO SOUND IN ATTRACT MODE							ON	OFF
COIN #2 - NUMBER OF COINS PER CREDIT					<u>SW#1</u>	<u>SW#2</u>	<u>SW#3</u>	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u> <u>SW#7</u> <u>SW#8</u>
*	1	COIN	1	CREDIT						OFF OFF OFF
	1	COIN	2	CREDITS						OFF OFF ON
	2	COINS	1	CREDIT						OFF ON OFF
	3	COINS	1	CREDIT						OFF ON ON
* INDICATES FACTORY RECOMMENDED SETTINGS								PART NO. M051-00A87-B007		

G A P L U S

OPTION SWITCH SETTINGS - DIP SWITCH "B"

//////////////////////////////////////VARIOUS GAME PLAY OPTIONS//////////////////////////////////////

SELF-TEST MODE		SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
*	NORMAL TEST	OFF							
"RANK" = DIFFICULTY LEVEL OF PLAY		SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
EASIEST LEVEL OF PLAY 1	* 0 STANDARD LEVEL OF PLAY	OFF	OFF	ON					
PROGRESSIVELY MORE DIFFICULT LEVELS OF PLAY	2	OFF	OFF	OFF					
	3	OFF	ON	OFF					
	4	OFF	ON	ON					
	5	ON	OFF	OFF					
	6	ON	OFF	ON					
	7	ON	ON	OFF					
	7	ON	ON	ON					
**	ROUND ADVANCE	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
*	NORMAL ADVANCE						OFF		
							ON		
BONUS SHIPS AWARDED AT:		SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
	1st @ 100,000; 2nd @ 300,000 & every 600,000						OFF	OFF	OFF
	1st @ 150,000; 2nd @ 400,000						OFF	OFF	ON
	1st @ 150,000; 2nd @ 400,000 & every 900,000						OFF	ON	OFF
	1st @ 100,000; 2nd @ 300,000 & every 300,000						OFF	ON	ON
	1st @ 50,000; 2nd @ 200,000 & every 300,000						ON	OFF	OFF
	1st @ 50,000; 2nd @ 150,000 & every 600,000						ON	OFF	ON
	1st @ 50,000; 2nd @ 150,000 & every 300,000						ON	ON	OFF
*	1st @ 30,000; 2nd @ 150,000 & every 600,000						ON	ON	ON
<p>** BY TURNING "ON" THE OPTION SWITCH WHILE "PARSEC" IS BEING INDICATED ON THE SCREEN, YOU CAN ADVANCE THROUGH THE "ROUNDS". PUSH THE ONE PLAYER CONTROL LEVER FORWARD (PLAYER NUMBER ONE UP SWITCH IS "ON") TO INDICATE THE NUMBER. THE INDICATED ROUND NUMBER WILL APPEAR ON THE MONITOR SCREEN WHEN THE OPTION SWITCH IS TURNED "OFF".</p>									
* INDICATES FACTORY RECOMMENDED SETTINGS								PART NO. M051-00A87-B007	

THIS TAG TO BE TYPESET AND REPRODUCED IN BLACK INK ON HEAVY WHITE 8" x 11" CARD STOCK

TOLERANCE = $\pm 1/2"$

GAME PLAY

With the eight-way joystick, maneuver your fighter and fire your missiles using the firing button to shoot down "GAPLUS".

"GAPLUS" comes in different varieties. Depending upon the variety and the flight pattern, the number of points received will vary. Also, when "GAPLUS" is in formation, the number of points received will vary. The following indicates the number of points each "GAPLUS" is worth at different times.

	When in Formation	When Attacking
(a) Queen Gaplus	100	400
(b) Ad Gaplus	100	400
(c) Cap Gaplus	100	300
(d) Lute Gaplus	100	200
(e) Zako Gaplus	100	100

Destroy all "GAPLUSES" and the round will clear. The "QUEEN GAPLUS" possesses the BLASTER HEAD. When the QUEEN GAPLUS is shot down, the Blaster Head will connect onto the player's fighter enabling it to power up!!!

° PHALANX ATTACK:

The tractor beam will swallow up the enemy and reform them to the good side as your fighter's ally. Result...multi-missile attacking capability.

° HYPER ATTACK:

Moving at lightening speed, the player's fighter will fire off missiles in the multiples of two.

° CYCLONE ATTACK:

The cyclone beam will draw in the enemy and smash them apart!!! Points received will double each time, 200, 400,... 6,400!

When throwing off his beam, the player's fighter can only move right and left. Also, when the Blaster Head is mounted onto the fighter's plane, he will become invincible.

When the Blaster Head is connected onto the Queen Gaplus and it is hit once, the Queen will change colors. You must hit it one more time to destroy the Queen.

Challenging Stage:

- ° The Challenging Stages are in Rounds 3, 8, 13, 18, During this stage, the enemy will continually fly about the screen. At the top of the screen, Gaplus will form a letter or a bar across the screen. When all the Gapluses leave the screen, the following bonus points are given.
- ° The number of Gapluses to form a letter x 100
- ° The number of Gapluses to form a bar x 200

Also, if the letters are completed, the following

- ° "B O N U S" --- Bonus points of 10,000
- ° "G A P L U S" --- Bonus points of 0 - 5,000
(Push the firing button to stop the rotating number located under your total score and then your grand total will appear.)
- ° "D O U B L E" --- Bonus points will double.
- ° "T R I P L E" --- Bonus points will triple.

Star Flash:

- ° A flash will appear on the screen and at the same time a star will appear attacking the player's fighter. When the star approaches the fighter, it will split up into four parts. The fighter must fire his missiles at all four parts.

"Bean Curd" (Tofu) Attack:

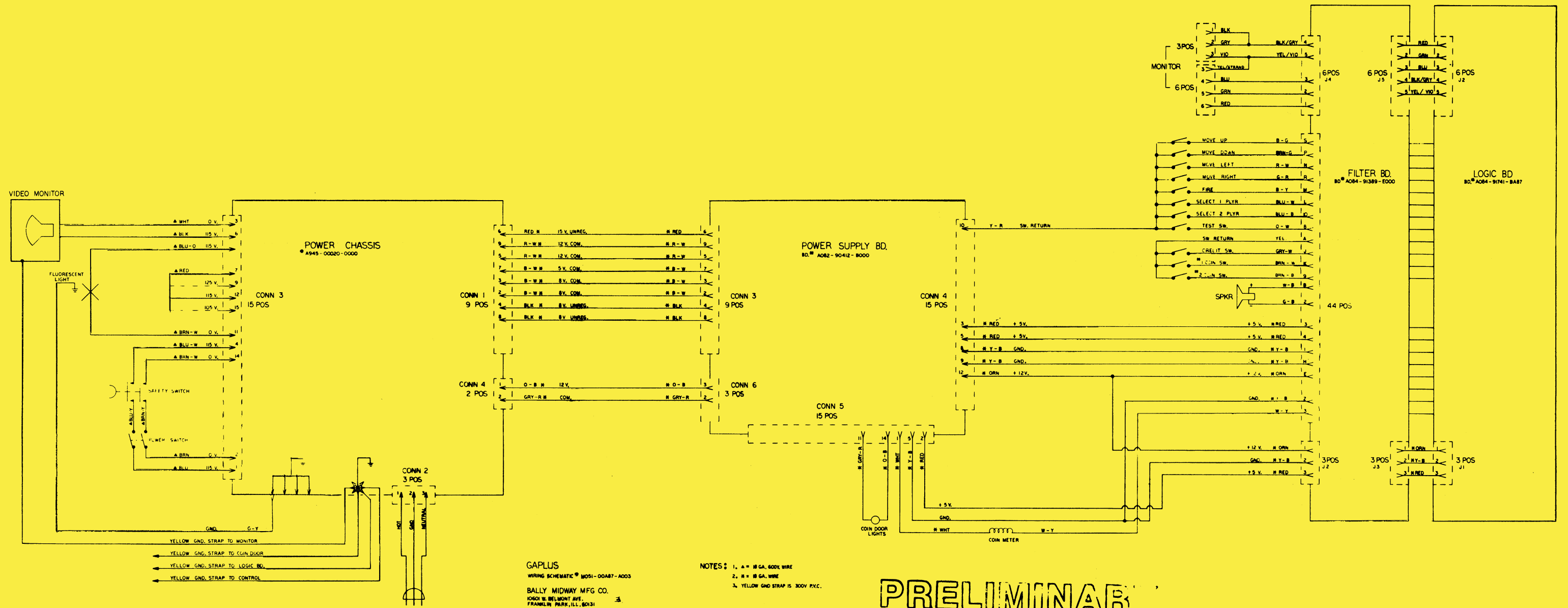
- ° When Gaplus peels off from the formation and is hit, his ghost (looking like a Bean Curd) will fall from the sky. The fighter must shoot it down.

If the player's fighter is touched by: Gaplus, missiles, star flash or the bean curd; it is a miss. The Blaster Head will disintegrate when a miss is made.

During the Phalanx Attack when Gaplus has become the fighter's ally, if Gaplus is touched by a missile or bean curd it is not a miss.

As bonus points are added up, a bonus ship will be awarded. The Queen Gaplus will bring down parts of the fighter's plane (three in all). When all three are put together, one bonus ship is added on.

The Best players to date can enter their initials on the screen by using the joystick to select a letter and then pushing the FIRE button.



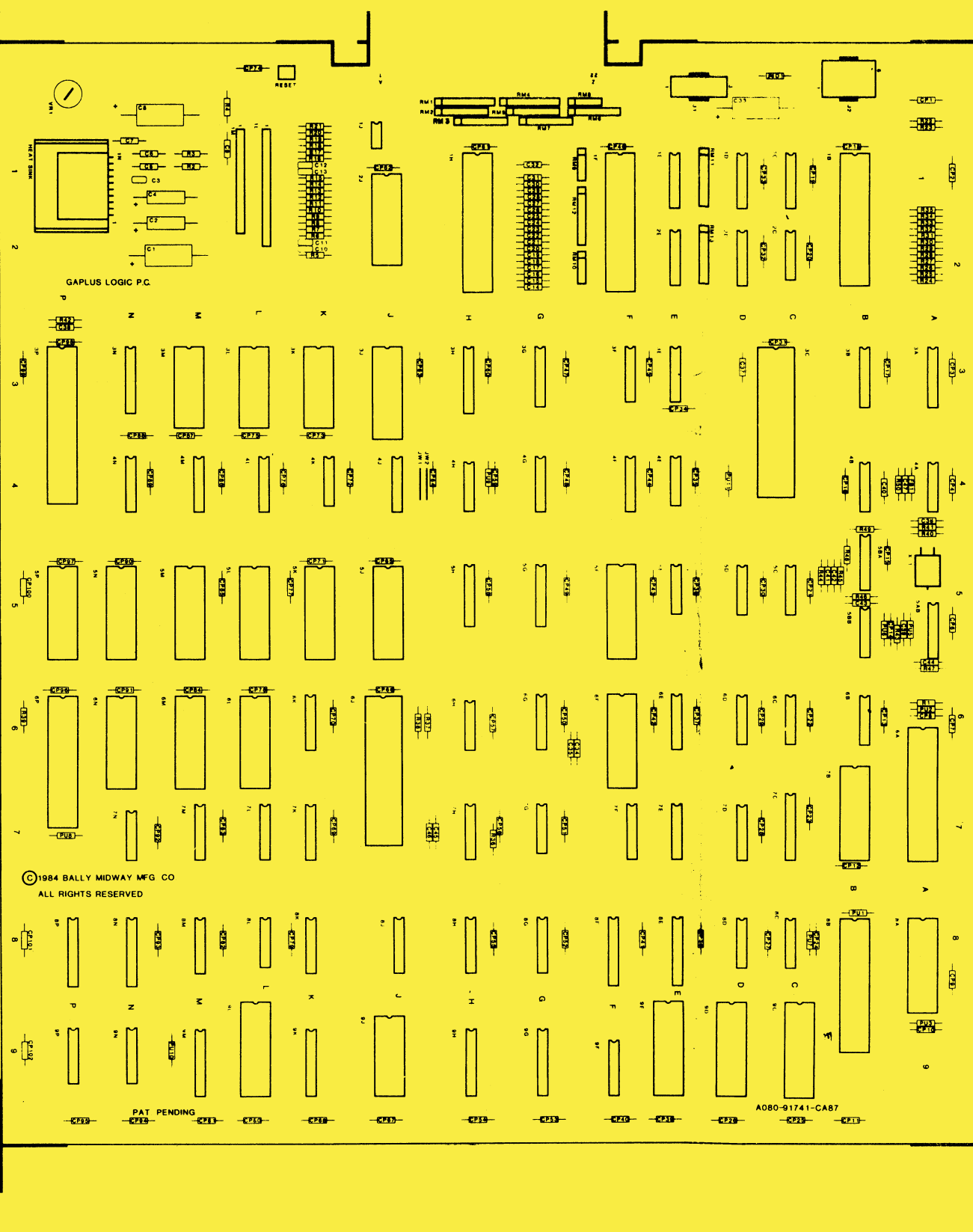
GAPLUS
 WIRING SCHEMATIC # MOSI-00A87-A003
 BALLY MIDWAY MFG CO.
 10601 W. BELMONT AVE.
 FRANKLIN PARK, ILL. 60151

- NOTES: 1. # = # GA, 600X WIRE
 2. # = # GA, WIRE
 3. YELLOW GND STRAP IS 300V PVC.

PRELIMINARY

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	10 UF AX CER	IC 5J	11XX CUSTOM IC
C2	2.2 UF AX CER	IC 5K,5L,5M,5N	ROM
C3	.01 UF AX CER	IC 5P	NOT USED
C4	47 UF AX ELEC	IC 6A	68A09E CPU
C5, C6	.033 UF POLY	IC 6B	74LS20
C7	.1 UF AX CER	IC 6C	74LS08
C8	470 UF AX ELEC	IC 6D	74LS04
C9	.1 UF AX CER	IC 6E	74LS365
C10-C13	.01 UF POLY	IC 6F	33XX CUSTOM IC
C14-C32	.01UF AX CER	IC 6G	74LS365
C33	470 UF AX ELEC	IC 6H	74LS32
C34, C35	880 PF AX CER	IC 6J	20XX CUSTOM IC
C36	100 PF AX CER	IC 6K	74LS157
C37	47 PF AX CER	IC 6L,6M,6N	ROM
C38-C46	100 PF AX CER	IC 6P	68A09E CPU
C47	68 PF AX CER	IC 7B	ROM
CP1-CP4	.1 UF AX CER	IC 7C	74LS245
CP6-CP102		IC 7D,7E	74LS257
		IC 7F	74LS158
		IC 7G	74LS04
		IC 7H	74LS368
R1	330 OHM 1/4W 5X	IC 7K,7L,7M	74LS157
R2, R3	4.7 OHM 1/4W 5X	IC 7N	74LS74
R4	22K OHM 1/4W 5X	IC 7A	34XX CUSTOM IC
R5	10K OHM 1/4W 5X	IC 8B	68A09E CPU
R6	150K OHM 1/4W 5X	IC 8C	74LS74
R7	4.7K OHM 1/4W 5X	IC 8D	74LS00
R8	10K OHM 1/4W 5X	IC 8E,8F	74LS245
R9	42K OHM 1/4W 5X	IC 8G	ROM
R10	4.7K OHM 1/4W 5X	IC 8H	74LS375
R11	10K OHM 1/4W 5X	IC 8J	NOT USED
R12	22K OHM 1/4W 5X	IC 8K	NOT USED
R13	4.7K OHM 1/4W 5X	IC 8L	74LS86
R14	150K OHM 1/4W 5X	IC 8M	74LS139
R15	470K OHM 1/4W 5X	IC 8N	ROM
R16	10K OHM 1/4W 5X	IC 8P	74LS245
R17, R18	470K OHM 1/4W 5X	IC 9C,9D,9E	ROM
R19	2.2K OHM 1/4W 5X	IC 9F	NOT USED
R20, R21	1K OHM 1/4W 5X	IC 9G	74LS273
R22	100 OHM 1/4W 5X	IC 9H	74LS245
R23	220 OHM 1/4W 5X	IC 9J	MS8725P RAM
R24	470 OHM 1/4W 5X	IC 9K	74LS273
R25	1K OHM 1/4W 5X	IC 9L	ROM
R26	2.2K OHM 1/4W 5X	IC 9M	74LS273
R27	1K OHM 1/4W 5X	IC 9N	74LS298
R28	470 OHM 1/4W 5X	IC 9P	74LS153
R29	220 OHM 1/4W 5X	IC 9S	40 PIN IC SOCKET
R30	2.2K OHM 1/4W 5X	IC 9T	16 PIN IC SOCKET
R31	1K OHM 1/4W 5X	IC 9U	42 PIN IC SOCKET
R32	470 OHM 1/4W 5X	IC 9V	16 PIN IC SOCKET
R33	220 OHM 1/4W 5X	IC 9W	28 PIN IC SOCKET
R34	2.2K OHM 1/4W 5X	IC 9X	18 PIN IC SOCKET
R35	330 OHM 1/4W 5X	IC 9Y	64 PIN IC SOCKET
R36	470 OHM 1/4W 5X	IC 9Z	28 PIN IC SOCKET
R37, R38	330 OHM 1/4W 5X	IC 9AA	40 PIN IC SOCKET
R39	330 OHM 1/4W 5X	IC 9AB	28 PIN IC SOCKET
R40, R41	180 OHM 1/4W 5X	IC 9AC	24 PIN IC SOCKET
R42	240 OHM 1/4W 5X	IC 9AD	16 PIN IC SOCKET
R43-R46	JUMPER WIRE	IC 9AE	16 PIN IC SOCKET
R47-R49	1K OHM 1/4W 5X	IC 9AF	28 PIN IC SOCKET
R50	NOT USED	IC 9AG	18 PIN IC SOCKET
PUI-PU3	1K OHM 1/4W 5X	IC 9AH	28 PIN IC SOCKET
PUS-PU11		IC 9AI	40 PIN IC SOCKET
RMB	1K OHM 5 PIN SIP	IC 9AJ	40 PIN IC SOCKET
RM1,4,11,13	1K OHM 9 PIN SIP	IC 9AK	64 PIN IC SOCKET
RM2,3,5,6,7	2.2K OHM 8 PIN SIP	IC 9AL	64 PIN IC SOCKET
RM9, RM10	4.7K OHM 6 PIN SIP	IC 9AM	28 PIN IC SOCKET
RM12	4.7K OHM 9 PIN SIP	IC 9AN	40 PIN IC SOCKET
IC 1B	26XX CUSTOM IC	IC 9AO	28 PIN IC SOCKET
IC 1C,1D	ROM	IC 9AP	28 PIN IC SOCKET
IC 1F	58XX CUSTOM IC	IC 9AQ	40 PIN IC SOCKET
IC 1H	56XX CUSTOM IC	IC 9AR	16 PIN IC SOCKET
IC 1J	OP AMP TL 082	IC 9AS	20 PIN IC SOCKET
IC 1L	98XX CUSTOM IC	IC 9AT	28 PIN IC SOCKET
IC 1M	99XX CUSTOM IC	IC 9AU	24 PIN IC SOCKET
IC 1N	4460 AUDIO AMP	IC 9AV	28 PIN IC SOCKET
IC 2C	74LS30	IC 9AW	24.576 MHZ XTAL
IC 2D	ROM	IC 9AX	8 POS DIP SW
IC 2J	62XX CUSTOM IC	IC 9AY	8 POS DIP SW
IC 3A, 3B	MB8148L-55 RAM	IC 9AZ	JUMPER WIRE
IC 3C	29XX CUSTOM IC	IC 9BA	JUMPER WIRE
IC 3E, 3F	ROM	IC 9BB	3 PIN AMP CONN
IC 3G	2114 RAM	IC 9BC	6 PIN AMP CONN
IC 3H	74LS245	IC 9BD	2K OHM POT
IC 3J	16XX CUSTOM IC	IC 9BE	ZENER DIODE 6.2V
IC 3K, 3L, 3M	MS8725 RAM	IC 9BF	JUMPER WIRE
IC 3N	74LS245	IC 9BG	HEATSINK AUD AMP
IC 3P	21XX CUSTOM IC	IC 9BH	HEATSINK
IC 4A	74S04	IC 9BI	MNTG SCRW 4-40X7
IC 4B	NOT USED	IC 9BJ	PAN HD
IC 4E	74LS20	IC 9BK	#4 FLT WASHER
IC 4F	ROM	IC 9BL	4-40 HEX NUTS
IC 4G	74LS157	IC 9BM	THERMAL CMPD
IC 4H	74LS74	IC 9BN	
IC 4J	74LS157	IC 9BO	
IC 4K	74LS00	IC 9BP	
IC 4L	74LS174	IC 9BQ	
IC 4M	74LS175	IC 9BR	
IC 4N	74LS378	IC 9BS	
IC 5AB	74S163	IC 9BT	
IC 5BA	74S139	IC 9BU	
IC 5BB	74LS86	IC 9BV	
IC 5C	74LS04	IC 9BW	
IC 5D	74LS08	IC 9BX	
IC 5E	74S10	IC 9BY	
IC 5F	15XX CUSTOM IC	IC 9BZ	
IC 5G, 5H	MB8148L-55 RAM		



CROSS REFERENCE LIST

DESCRIPTION	QTY	DESIGNATION NO.	PART NUMBER	DESCRIPTION	QTY	DESIGNATION NO.	PART NUMBER
47 PF AX CER	1	C37	0986-00800-2800	11XX CUSTOM IC	1	5J	0066-018CX-XAPX
68 PF AX CER	1	C47	0360-00800-0010	15XX CUSTOM IC	1	5F	0066-020CX-XAPX
100 PF AX CER	10	C36, C38-C46	0A64-00800-0006	16XX CUSTOM IC	1	3J	0066-021CX-XAPX
680 PF AX CER	2	C34, C35	0358-00800-0002	20XX CUSTOM IC	1	6J	0066-035CX-XAPX
.01 UF AX CER	19	C14-C32	0353-00800-0001	21XX CUSTOM IC	1	3P	0066-036CX-XAPX
.01 UF POLY	5	C3, C10-C13	0550-00800-1000	26XX CUSTOM IC	1	1B	0066-037CX-XAPX
.033 UF POLY	2	C5, C6	0553-00800-0002	29XX CUSTOM IC	1	3C	0066-038CX-XAPX
.1 UF AX CER	103	C7, C9, CP1-CP4	0508-00800-0900	33XX CUSTOM IC	1	6F	0066-039CX-XAPX
		CP6-CP102		34XX CUSTOM IC	1	8A	0066-040CX-XAPX
2.2 UF AX ELEC	1	C2	0353-00800-0005	56XX CUSTOM IC	1	1H	0066-022CX-XAPX
10 UF AX ELEC	1	C1	0508-00800-1100	58XX CUSTOM IC	1	1F	0066-028CX-XAPX
47 UF AX ELEC	1	C4	0353-00800-0003	62XX CUSTOM IC	1	2J	0066-041CX-XAPX
470 UF AX ELEC	2	C8, C33	0550-00800-1300	98XX CUSTOM IC	1	1L	0066-042CX-XAPX
				99XX CUSTOM IC	1	1M	0066-029CX-XAPX
4.7 OHM 1/4W 5X	2	R2, R3	100E-00005-0007	OP AMP TL 082	1	1J	0333-00803-0029
100 OHM 1/4W 5X	1	R23	100E-00005-0033	MB8148L-55 RAM	4	3A, 3B, 5G, 5H	
180 OHM 1/4W 5X	2	R40, R41	100E-00005-0039	MS8725 RAM	3	3K, 3L, 3M	
220 OHM 1/4W 5X	3	R24, R30, R34	100E-00005-0041	MS8725P RAM	1	9J	
240 OHM 1/4W 5X	1	R42	100E-00005-0043	2114 RAM	1	3G	0508-00803-0300
330 OHM 1/4W 5X	3	R1, R36, R39	100E-00005-0047	ROM	15	1C, 1D, 2D, 3E, 3F, 4F, 5K, 5L, 5M, 5N, 6L, 6M, 6N, 7B, 8G, 8H, 9C, 9D, 9E, 9I	SEE NOTE
470 OHM 1/4W 5X	5	R25, R29, R33, R37, R38	100E-00005-0051				
1K OHM 1/4W 5X	17	R22, R26, R28, R32, R47-R49, PU1-PU3, PUS-PU11	100E-00005-0061	68A09E CPU	3		
2.2K OHM 1/4W 5X	5	R20, R21, R27, R31, R35	100F-00005-0069	24.576 MHZ XTAL	1	X1	109E-00001-0020
4.7K OHM 1/4W 5X	2	R7, R11	100E-00005-0079				
10K OHM 1/4W 5X	5	R5, R8, R12, R17, R4	100E-00005-0088				
22K OHM 1/4W 5X	3	R4, R9, R13	100E-00005-0096				
47K OHM 1/4W 5X	2	R10, R14	100E-00005-0104				
150K OHM 1/4W 5X	2	R6, R15	100E-00005-0120				
470K OHM 1/4W 5X	2	R16, R19	100E-00005-0132				
1K OHM 5 PIN SIP	1	RMB	102E-00004-0010	42 PIN IC SOCKET	2	1FS, 1HS	100E-00001-0013
1K OHM 9 PIN SIP	4	RM1,4,11,13	102E-00004-0011	40 PIN IC SOCKET	4	1BS, 6AS, 6PS, 8BS	100E-00001-0011
2.2K OHM 8 PIN SIP	5	RM2,3,5,6,7	102E-00004-0042	64 PIN IC SOCKET	2	3CS, 6JS	100E-00001-0019
4.7K OHM 6 PIN SIP	2	RM9, RM10	102E-00004-0027	16 PIN IC SOCKET	7	3FS, 4FS, 8GS	100E-00001-0003
4.7K OHM 9 PIN SIP	1	RM12	102E-00004-0024	18 PIN IC SOCKET	4	3AS, 3BS, 3ES, 5HS	100E-00001-0004
2K OHM POT	1	VR1	105E-00001-0038	20 PIN IC SOCKET	1	8MS	100E-00001-0005
ZENER DIODE 6.2V	1	D1	103E-00001-0011	24 PIN IC SOCKET	6	3KS, 3LS, 3MS, 9JS, 3PS,	100E-00001-0007
				28 PIN IC SOCKET	18	2JS, 3JS, 5FS, 5JS,	100E-00001-0010
74LS00	2	4K, 8D	0300-00803-0027			5KS, 5LS, 5MS, 5NS,	
74LS04	3	5C, 6D, 7G	0300-00803-0029			6FS, 6LS, 6MS, 6NS,	
74S04	1	8A	0304-00803-0011			7BS, 8AS, 9CS, 9DS,	
74LS08	2	5D, 6C	0300-00803-0030			9ES, 9LS	
74S10	1	5E	0A87-00803-0001	8 POS DIP SW	2	1E, 2E	0300-00804-0700
74LS20	2	4E, 6B	0300-00803-0052				
74LS30	1	2C	0304-00803-0016				
74LS32	1	6H	0300-00803-0031	3 PIN AMP CONN	1	J1	0017-00021-0443
74LS74	2	4H, 7N	0300-00803-0032	6 PIN AMP CONN	1	J2	0017-00021-0424
74S74	1	8C	0986-00803-1500	JUMPER WIRE	7	JW1, JW2, R43-R46, FB1	0151-00087-0000
74LS86	2	5BB, 8L	0300-00803-0054				
74LS139	1	5BA	0508-00803-0034				
74S139	1	5BA	0300-00803-5100	HEATSINK AUD AMP	1	HEATSINK	0353-00900-0000
74LS153	1	9P	0986-00803-1000				
74LS157	6	4G, 4J, 6K, 7K, 7L, 7M	0300-00803-0050	MNTG SCRW 4-40X7	2		0017-00101-0511
74LS158	1	7F	0300-00803-0049	PAN HD			
74S163	1	5AB	0A87-00803-0002				
74LS174	1	4L	0300-00803-0047	#4 FLT WASHER	4		0017-00104-0092
74LS175	1	4M	0304-00803-0025	4-40 HEX NUTS	2		0017-00103-0093
74LS245	7	3H, 3N, 7C, 8E, 8F, 8P, 9H	0300-00803-0046	THERMAL CMPD	.001		0017-00009-0204
74LS257	2	7D, 7E	0316-00803-0002	BLANK PCB	1		A080-91741-CA87
74LS273	3	9G, 9K, 9M	0316-00803-0019				
74LS298	1	9N	0316-00803-0019				
74LS365	2	6E, 6G	0316-00803-0020				
74LS368	1	7H	0316-00803-0004				
74LS375	1	8H	0A29-00803-0007				
74LS378	1	4N	0316-00803-0018				
4460 AUDIO AMP	1	1N	0066-3758X-YBAX				

DM TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL .1 .002 DECIMAL .005 .002 HOLE DIA .002 ANGLE .125 DO NOT SCALE DWG

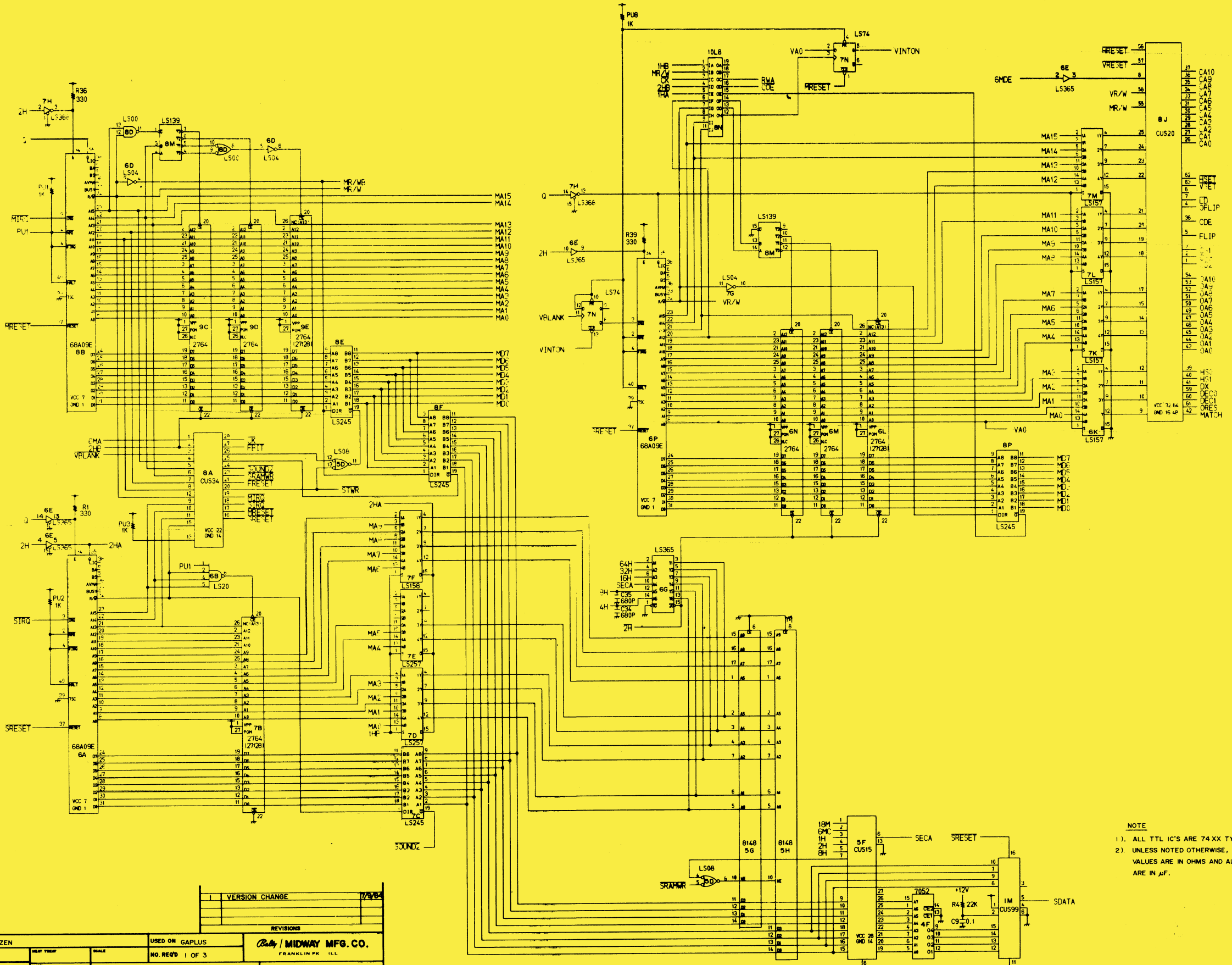
GAPLUS 7/10/84

Bally/MIDWAY MFG. CO. FRANKLIN PARK, ILL. 60131

ASS'Y DRAWING GAPLUS LOGIC P.C. A084-91741-CA87

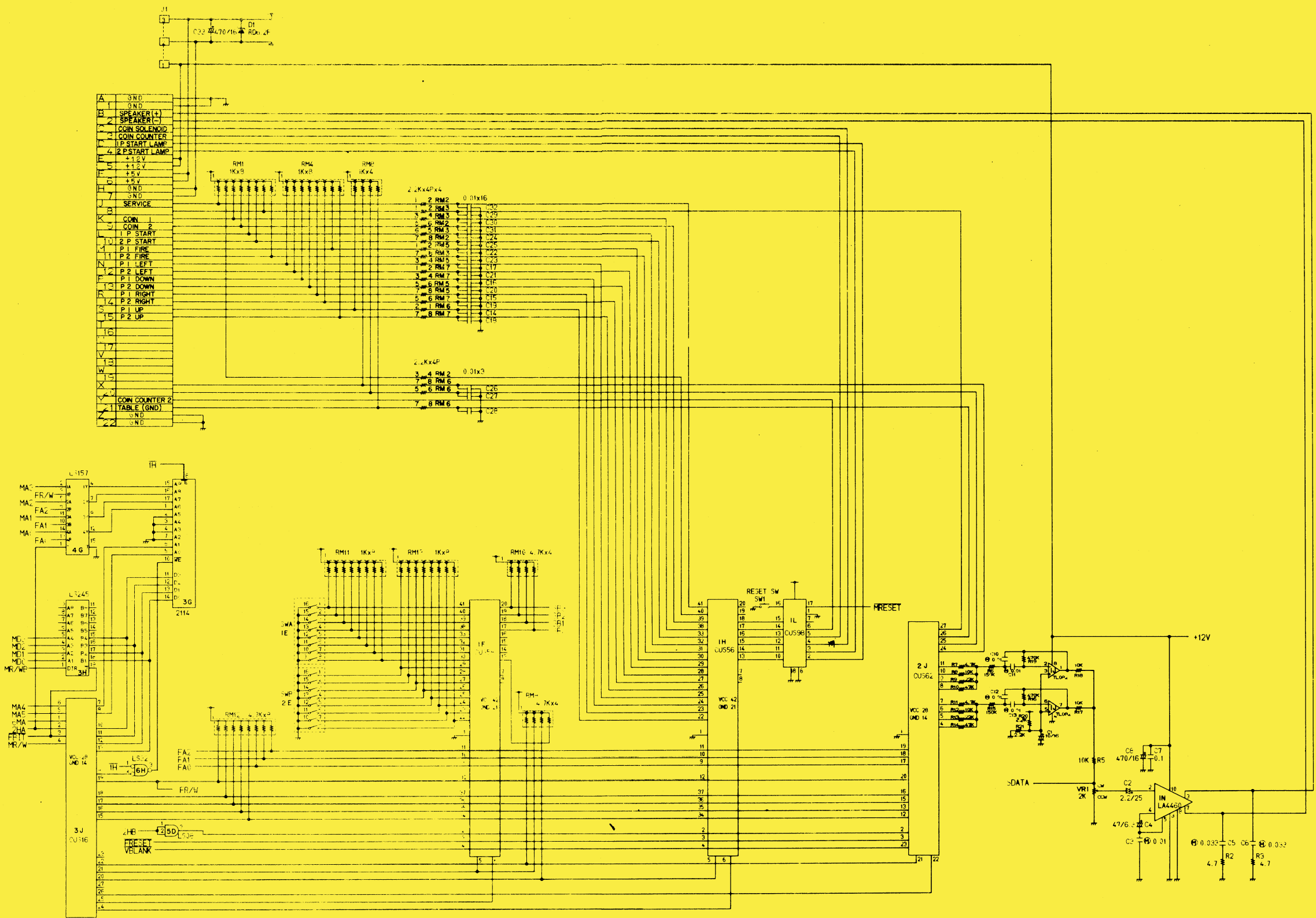
REVISIONS

PART NO. MO51-00A87-C009



VERSION CHANGE	DATE

PROJECT ENG: JERRY SZERSZEN		USED ON GALPUS		Baby / MIDWAY MFG. CO.	
DO NOT SCALE DWG		NO. REV'D 1 OF 3		FRANKLIN PK. ILL.	
DIM TOLERANCES UNLESS SPECIFIED		SHEET NO. 7 OF 84		PART NO. MOSI - 00A87 - C010	
DATE 7 09 84		SCHEMATIC DRAWING		GAPLUS LOGIC P.C.	
		A080 - 91741 - CA87			



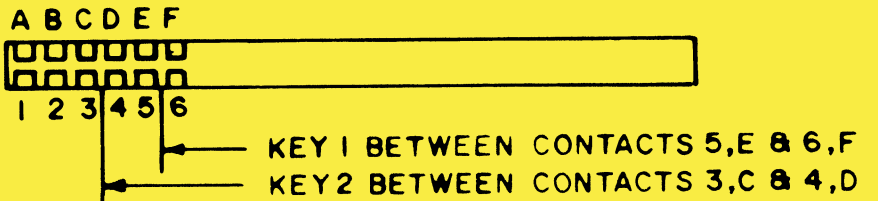
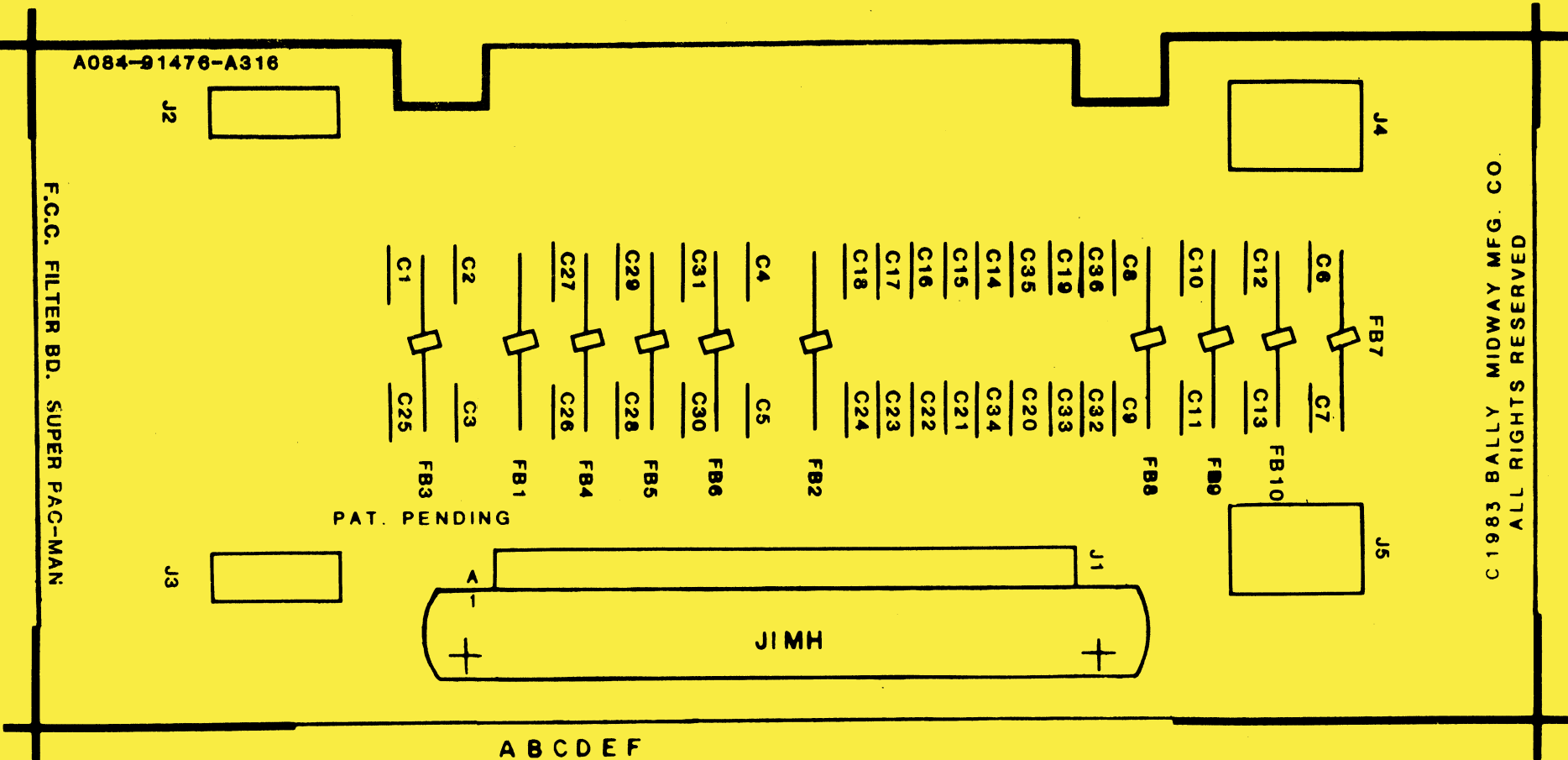
- NOTE
- 1) ALL TTL IC'S ARE 74XX TYPE.
 - 2) UNLESS NOTED OTHERWISE, ALL RESISTOR VALUES ARE IN OHMS AND ALL CAPATORS ARE IN μ F.
 - 3) (M) DENOTES POLYESTER FILM CAP.

PRELIMINARY

VERSION CHANG	7/9/84
REVISIONS	

PROJECT ENG: JERRY SZERSZEN	USED ON: GAPLUS	REVISIONS
DO NOT SCALE D.V.G.	NO REQ'D 3 OF 3	FRANKLIN PK ILL
DIM TOLERANCES UNLESS SPECIFIED	DATE: 7/09/84	PART NO: M051 - 00A87 - C010
SCHEMATIC DRAWING	A080-91741-CAB7	

DESIGNATION NO.	DESCRIPTION
C1 - C5	390pf 50V. AX. CER.
C6, C7	470pf " " "
C8 - C13	100pf " " "
C14-C24	.01μf " " "
C25	390pf " " "
C26-C29	.01μf " " "
C30, C31	390pf " " "
C32-C36	.01μf " " "
FBI - FB10	FERRITE BEAD
J1	P.C. EDGE CONN.
J2, J3	3 PIN HEADER
J4, J5	6 PIN HEADER
JIMH	(2) P.C. EDGE CONN. KEY
"	(2) 6-32 X 10 SLOT PAN SCREW
"	(2) WSH. 6 145-.250-.032
"	(1) BRKT. - CONN. FIN.
"	(1) INSULATED GND. STRAP
"	(1) 8-32 X 5 SLOT PAN SCREW
"	(1) 8-32 NUT HEX
A080-91476-A316	F.C.C. FILTER BD. SUPER PAC-MAN



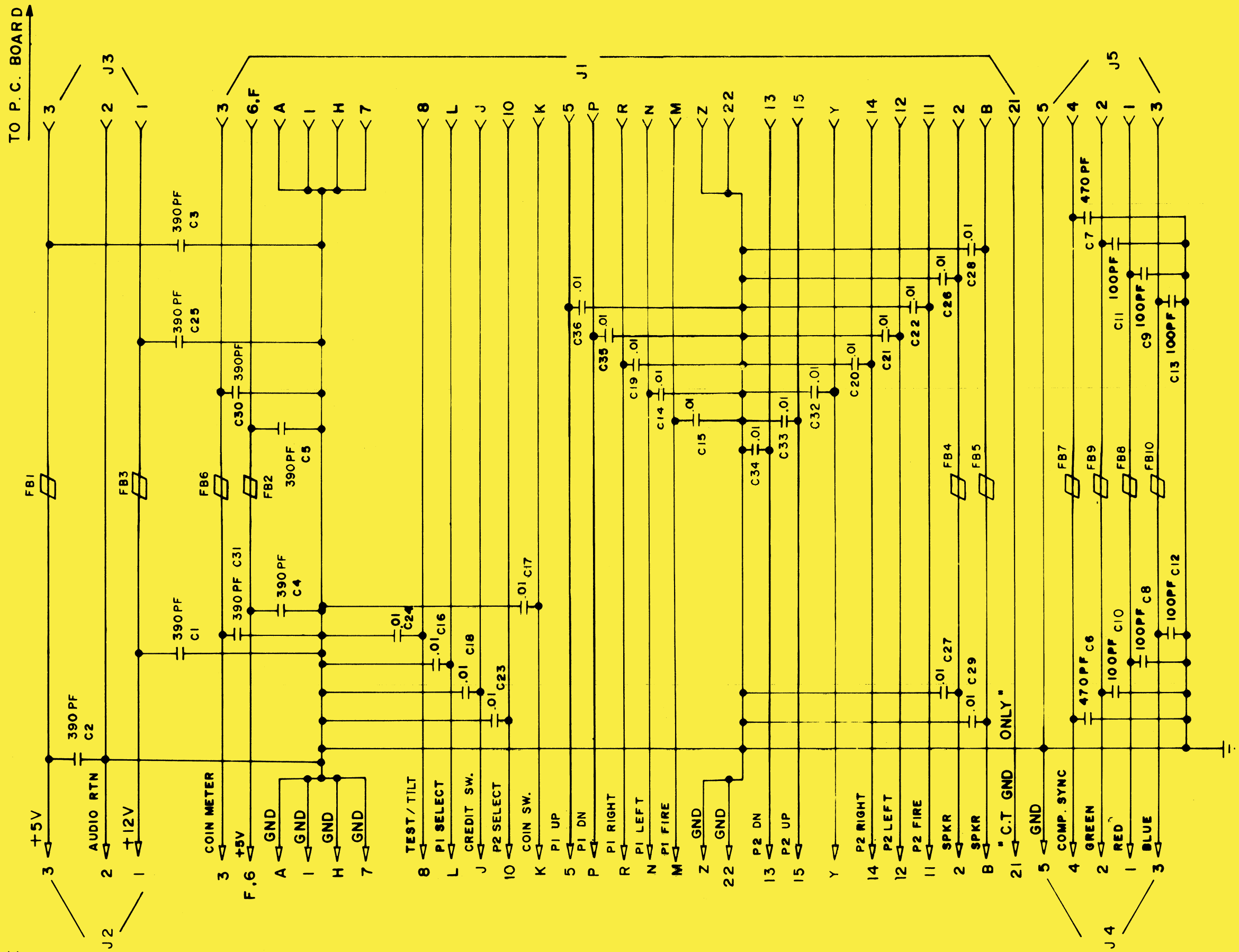
DESCRIPTION	Q'TY	DESIGNATION NO.	PART NO.
100pf 50V. AX. CER.	6	C8 - C13	0789-00800-1800
390pf " " "	8	C1 - C5, C25, C30, C31	0316-00800-0002
470pf " " "	2	C6, C7	0550-00800-0200
.01μf " " "	20	C14-C24, C26-C29, C32-C36	0550-00800-0300
FERRITE BEAD	10	FBI - FB10	0316-00804-0002
P.C. EDGE CONN	1	J1	0017-00021-0418
3 PIN HEADER	2	J2, J3	0017-00021-0443
6 PIN HEADER	2	J4, J5	0017-00021-0424
P.C. EDGE CONN. KEY	2	JIMH	0017-00021-0396
6-32 X 10 SLOT PAN SCREW	2	"	0017-00101-0574

DESCRIPTION	Q'TY	DESIGNATION NO.	PART NO.
WSH. 6 145-.250-.032	2	JIMH	0017-00104-0002
BRKT. - CONN. FIN.	1	"	0866 00118-00XF
INSULATED GND. STRAP	1	-	3000-17143-0700
8-32 X 5 SLOT PAN SCREW	1	-	0017-00101-0595
8-32 NUT HEX	1	-	0017-00103-0008
F.C.C. FILTER BD. SUPER PAC-MAN	1	A080-91476-A316	A080-91476-A316

REVISIONS

PROJECT ENG: L. DEKKER		USED ON SUPER PAC-MAN		Bally / MIDWAY MFG. CO. FRANKLIN, PA.	
DO NOT SCALE	HEAT TREAT	SCALE FULL	NO REVISIONS PER		
DIM. TOLERANCES UNLESS SPECIFIED	DRM. RLW	MAT'L	ASSEMBLY DRAWING		PART NO
	CKD.	FINISH	F.C.C. FILTER BD SUPER PAC-MAN		M051 - 00316 - A026
	DATE 02/08/83		A084 - 91476 - A316		

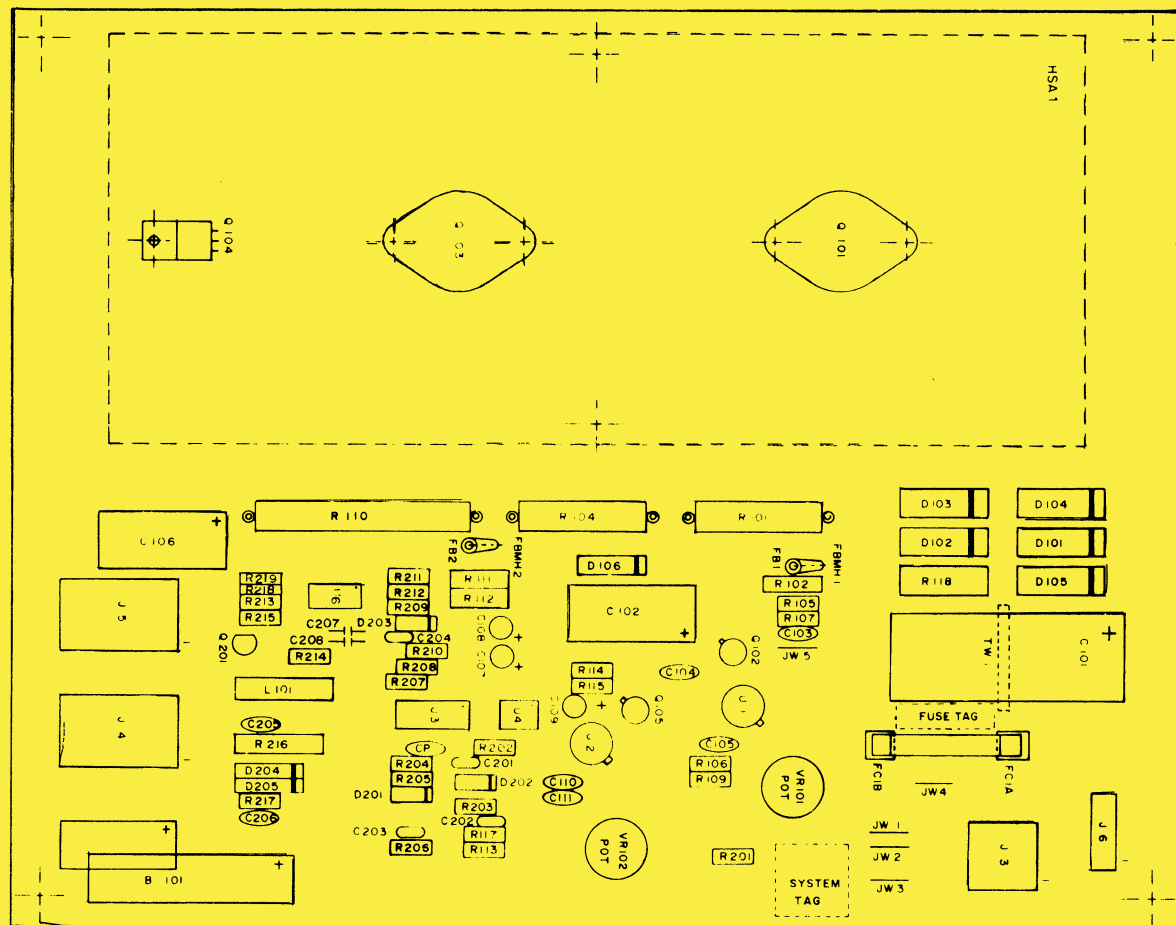
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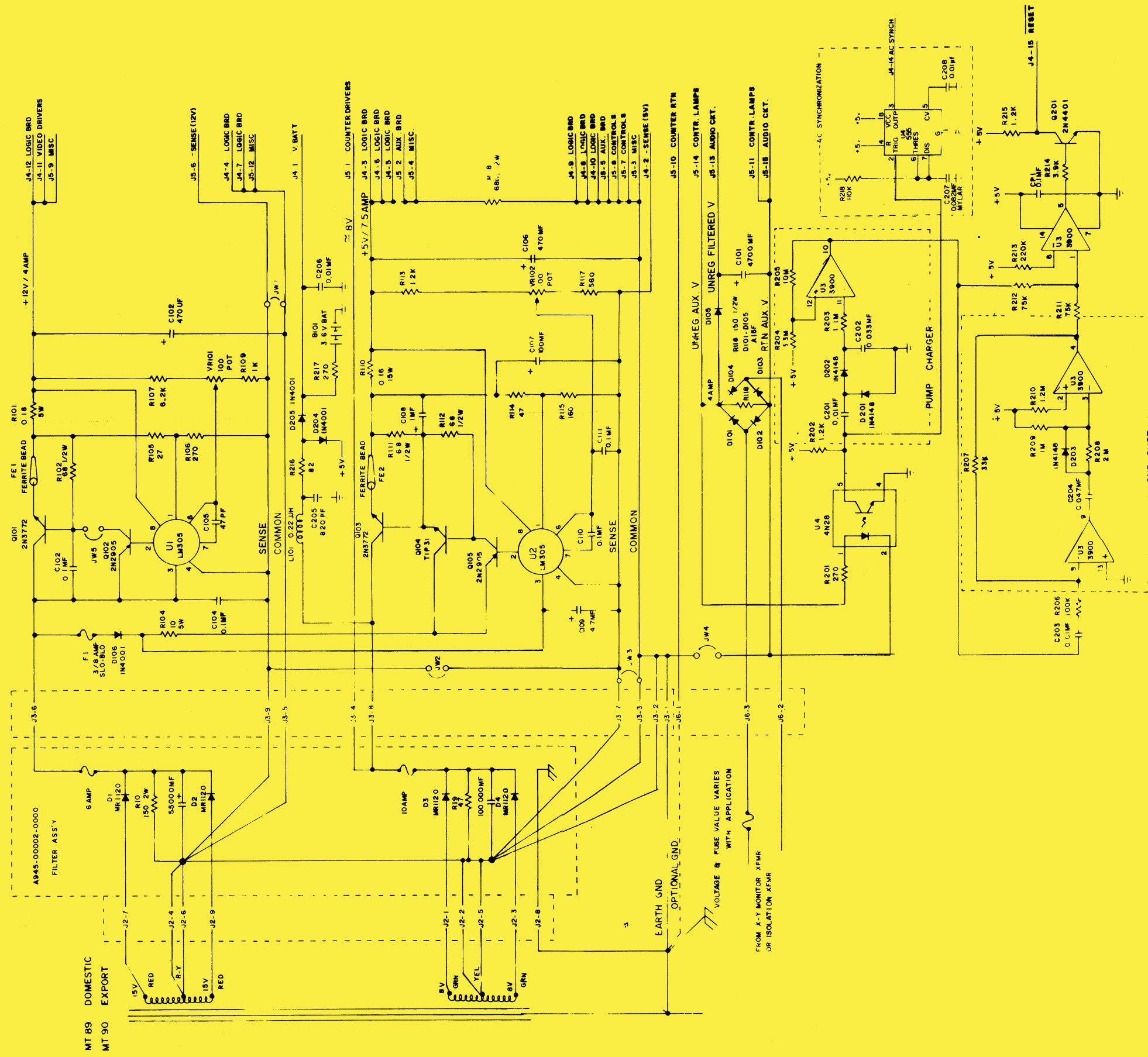
NOTE:
 ALL .01 CAPS ARE MF
 ALL CAPS AX. CER. UNLESS
 NOTED OTHERWISE
 FB = FERRITE BEAD

DIM TOLERANCES UNLESS OTHERWISE SPEC CONCENTRICITY TIR .002 FRACTIONAL ± .164 DECIMAL ± .005 HOLE DIA ± .002 .000 ANGLE ± 12° DO NOT SCALE DWG		PROJECT ENG: L. DEKKER THIS DWG IS CONFIDENTIAL & PROPERTY OF MIDWAY MFG CO SUPER PAC-MAN RLV 06/19/8 FULL ME: [] VA: [] ECF: [] FINSH: []		MIDWAY MFG. CO. FRANKLIN PK., ILL. 60131 A BALLY CO.		6/20 CORRECTED SCHEMATIC ERROR REVISIONS PART NO M051-00316-A027	
SCHEMATIC F.C.C. FILTER BD. SUPER PAC-MAN A084-91476-A316							

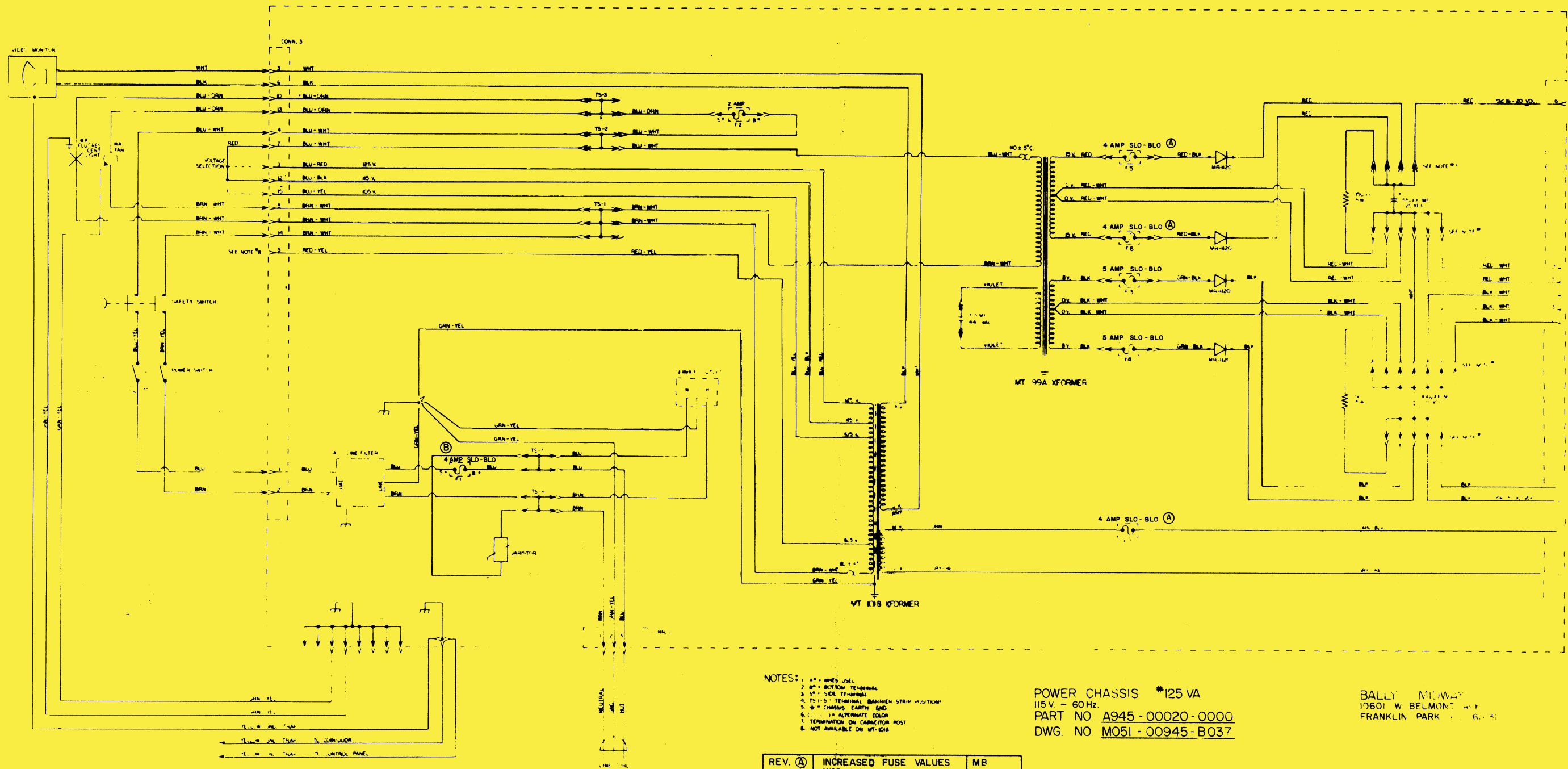
DESIGNATION #	DESCRIPTION	DESIGNATION #	DESCRIPTION	DESIGNATION #	DESCRIPTION	Q'ty	DESIGNATION #	PART #	DESCRIPTION	Q'ty	DESIGNATION #	PART #
C101	4700uf AX. ELECT.	R117	560ohm 1/4W 5%	U1	LM305 REG.	1	C105	0945-00811-0100	LM305 REG.	2	U1,2	0945-00813-0100
C102	470uf AX. ELECT.	R118	150ohm 2W	U2	LM305 REG.	1	C205	0945-00816-0400	555	1	U6	0929-00810-4500
C103	.1uf AX. CER.	R201	270ohm 1/4W 5%	U3	LM3900	2	C206,208	0945-00816-0100	LM3900	1	U3	0945-00813-0200
C104	.1uf AX. CER.	R202	1.2K 1/4W 5%	U4	4N28	2	C201,203	0945-00816-0200	4N28	1	U4	0945-00813-0300
C105	47pf AX. CER.	R203	1.1M 1/4W 5%	U6	555	1	C202	0945-00816-0500				
C106	470uf AX. ELECT.	R204	3.3M 1/4W 5%	L101	22uH INDUCTOR	1	C204	0945-00816-0300				
C107	100uf RD. TANT.	R205	10M 1/4W 5%	B101	BATTERY 3.6VDC 60DEG C	1	C207	0945-00816-1900	A15F RECTIFIER	5	D101,105	0945-00804-0200
C108	1uf RD. TANT.	R206	100K 1/4W 5%				C103,104,110,111,CP1	0945-00811-0200				
C109	1uf AX. CER.	R207	33K 1/4W 5%				C108	0945-00811-0300	1N4001	3	D106,204,205	0945-00804-0300
C110	.1uf AX. CER.	R208	2M 1/4W 5%				C109	0945-00811-0400	1N4148	3	D201-203	0945-00804-0500
C111	.1uf MYLAR	R209	1M 1/4W 5%				C107	0945-00811-0500				
C201	0.33uf MYLAR	R210	1.2M 1/4W 5%				C102,106	0945-00816-0600	2N2905	2	Q102,105	0945-00808-0300
C202	0.1uf MYLAR	R211	75K 1/4W 5%				C101	0945-00811-0700	2N4401	1	Q201	0945-00804-0400
C203	0.47uf MYLAR	R212	75K 1/4W 5%									
C204	820pf AX. CER.	R213	220K 1/4W 5%	F1	3 RA S BLO FUSE	1						
C205	.01uf AX. CER.	R214	3.9K 1/4W 5%	FC1A,1B	FUSE CLIP	1	R110	0945-00815-0100	BATTERY 3.6VDC 60DEG C	1	B101	0017-00003-0377
C206, C208	0.082uf MYLAR	R215	1.2K 1/4W 5%				R101	0945-00815-0200	FUSE 3/8A S BLO	1	F1	0945-00808-0400
C207		R216	820ohm 1W 10%				R104	0062-04703-1XXX	FUSE CLIP	2	FC1A,1B	0017-00003-0214
		R217	270ohm 1/4W 5%	FE1,2	FERRITE BEAD	1	R104	0945-00812-0100	TIE WRAP	1	TW1	0945-00814-0300
		R218	110K 1/4W 5%				R105	0062-06883-1XXX	FERRITE BEAD	2	FB1,2	0017-00009-0225
		R219	68ohm 1/2W 5%				R114	0062-086B3-1XXX	FERRITE MOUNTING HDW	2	FBMH1,2	0017-00033-0139
		VR101,102	100ohm POT	TW1	TIE WRAP	3	R102,112,219	0062-098D3-1XXX				
							R216	0062-104F5-1XXX				
CP1	.1uf AX. CER.			J3	9PIN P.C. MOUNT CONN(MALE)	1	R118	0945-00812-0200	22uH INDUCTOR	1	L101	0945-00814-0200
		D101	A15F	J4	15PIN P.C. MOUNT CONN(FEMALE)	3	R115	0062-124B3-1XXX	FUSE TAG	1		
R101	18ohm 5W W/RES SPACER	D102	A15F	J5	15PIN P.C. MOUNT CONN(MALE)	1	R106,201,217	0062-138B3-1XXX	SYSTEM TAG	1		
R102	68ohm 1/2W 5%	D103	A15F	J6	3PIN P.C. MOUNT CONN(MALE)	1	R117	0062-162B3-1XXX	P.C.B.	1		
R104	10ohm 5W W/RES SPACER	D104	A15F	LB1	FUSE TAG	1	R109	0062-179B3-1XXX				
R105	27ohm 1/4W 5%	D105	A15F	LB2	SYSTEM TAG	1	R113,202,215	0062-183B3-1XXX				
R106	270ohm 1/4W 5%	D106	1N4001	HSA1	HEAT SINK ASS'Y 1	1	R214	0062-207B3-1XXX				
R107	6.2K 1/4W 5%	D201	1N4148	MHSA1	MOUNTING HARD WARE(HEAT SINK)	1	R107	0062-217B3-1XXX	HEAT SINK ASS'Y (SEE HS ASS'Y DRAWING "X" NOTE")	1	HSA1	A945-00008-0000
		D202	1N4148				R207	0062-251B3-1XXX	4-40 X 10 SLT RND	2	MH HSA 1A, 2A.	0017-00101-00727
		D203	1N4148				R211,212	0062-269B3-1XXX	4-40 HEX NUT	2	MH HSA 1E, 2E.	0017-00103-0002
		D204	1N4001				R206	0062-275B3-1XXX	WSH 4-120-.250-018	4	MH HSA 1B, 1D MH HSA 2B, 2D	0017-00104-0071
		D205	1N4001				R213	0062-291B3-1XXX				
							R209	0062-323B3-1XXX	3PIN P.C. MOUNT CONN. (MALE)	1	J6	0017-00021-0443
R109	1K 1/4W 5%						R203	0062-325B3-1XXX	9PIN P.C. MOUNT CONN. (MALE)	1	J3	0017-00021-0425
R110	.16ohm 15W W/RES SPACER						R210	0062-327B3-1XXX	15PIN P.C. MOUNT CONN. (FEMALE)	1	J4	0017-00021-044
R111	6.8ohm 1/2W 5%	Q102	2N2905	JW1-5	JUMPER WIRE	1	R208	0062-337B3-1XXX	15PIN P.C. MOUNT CONN. (MALE)	1	J5	0017-00021-0440
R112	68ohm 1/2W 5%	Q105	2N2905				R204	0062-347B3-1XXX				
R113	1.2K 1/4W 5%	Q201	2N4401				R205	0062-371B3-1XXX				
R114	47ohm 1/4W 5%			FBMH1,2	FERRITE BEAD MOUNTING HARDWARE	2						
R115	160ohm 1/4W 5%											



PROJ. ENG.: L. DEKKER		DATE: 5/17/82		REVISED ON: SATAN'S HOLLOW		MIDWAY MFG. CO.	
DO NOT SCALE DWG		SCALE: FULL		NO. REVISED		FRANKLIN PARK, ILL.	
ASSEMBLY DRAWING 125VA PWRSPY				PART NO. MO51-00945-0006			
A082-90412-0000							



PROJECT ENG L DEKKER	DATE 5/3/82
FULL NAME M. M.	POWER SUPPLY 125VA W/CKT SUPPORT A082-90412-0000
DATE 5/3/82	MIDWAY MFG. CO. MO51-00945-0007



- NOTES:
1. * - OTHER USE.
 2. #* - BOTTOM TERMINAL.
 3. S* - SIDE TERMINAL.
 4. TS-1-3 - TERMINAL BANDED STRIP POSITION.
 5. # - CHASSIS EARTH GND.
 6. () - ALTERNATE COLOR.
 7. TERMINATION ON CAPACITOR POST.
 8. NOT AVAILABLE ON MT-108.

POWER CHASSIS *125 VA
 115V - 60Hz.
 PART NO. A945-00020-0000
 DWG. NO. M051-00945-B037

BALLY MIDWAY
 19601 W BELMONT AVE
 FRANKLIN PARK, ILL. 60131

REV. (A)	INCREASED FUSE VALUE WAS 3 AMP - NOW 4 AMP ADDED PART NO. (UL)	MB 3-15-83
REV. (B)	INCREASED FUSE VALUE WAS 3AMP - NOW 4 AMP	MB 3-24-83

BALLY/MIDWAY'S GAPLUS
U.R. #0A87
PROGRAMED PART NUMBERS

UNPROGRAMED LOGIC BD. A082-91741-BA87
PROGRAMED GAPLUS LOGIC BD. A084-91741-BA87

POS.	MIDWAY PART NUMBER
8N	0A87-00803-0003
3E	0A87-00803-0004
3F	0A87-00803-0005
1D	0A87-00803-0006
2D	0A87-00803-0007
1C	0A87-00803-0008
4F	0A87-00803-0009
8G	0A87-00803-0010
7B0	0A87-00803-0011
9C1	0A87-00803-0012
9D2	0A87-00803-0013
9E3	0A87-00803-0014
9L4	0A87-00803-0015
6N5	0A87-00803-0016
6M6	0A87-00803-0017
6L	0A87-00803-0018
5N	0A87-00803-0019
5L	0A87-00803-0020
5M	0A87-00803-0021
5K	0A87-00803-0022

PRELIMINARY

6/29/84	RELEASE FOR PRODUCTION	

