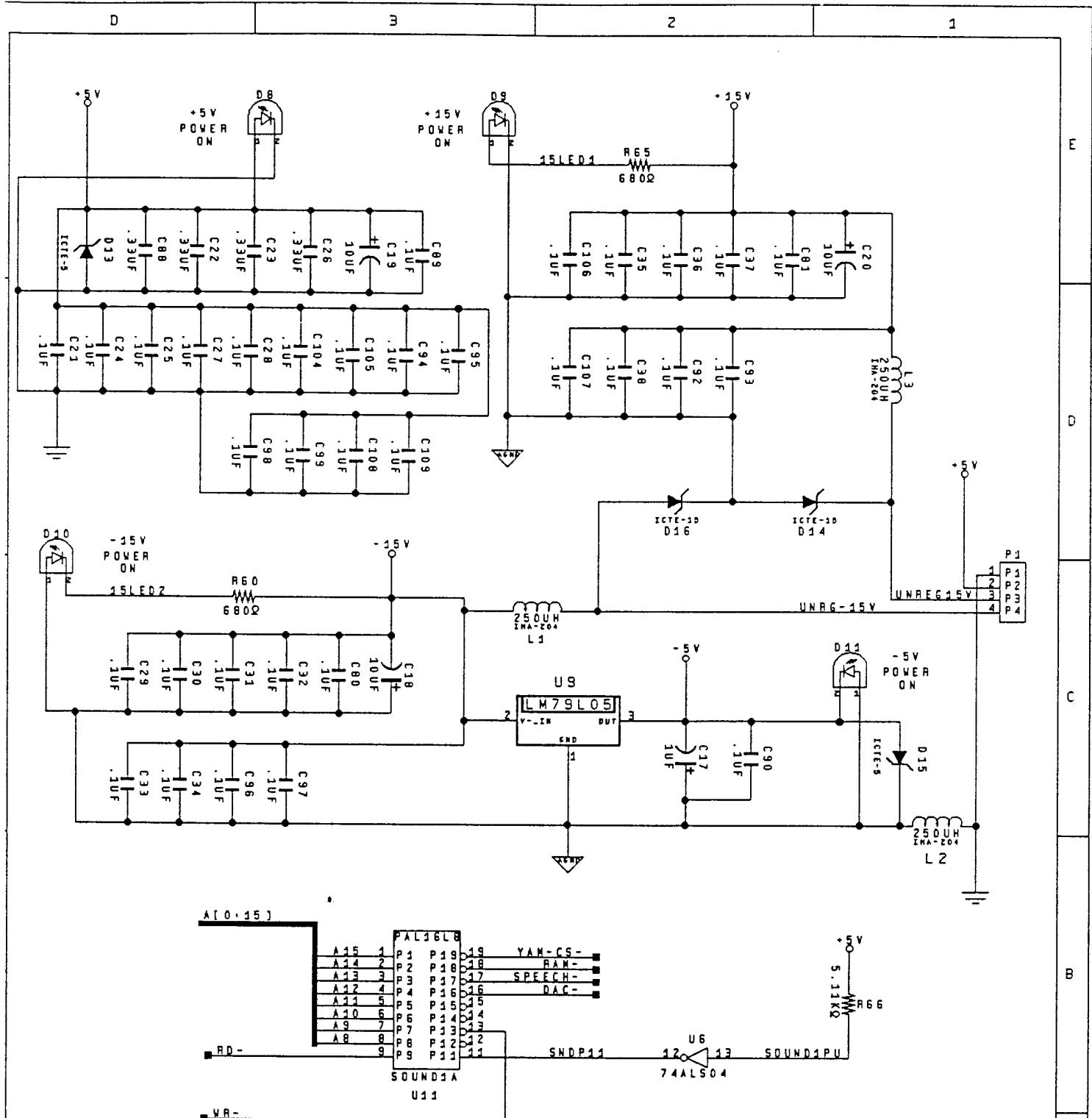


MICROPROSE GAMES

SOUND
PRINTED CIRCUIT
BOARD ASSEMBLY

COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION

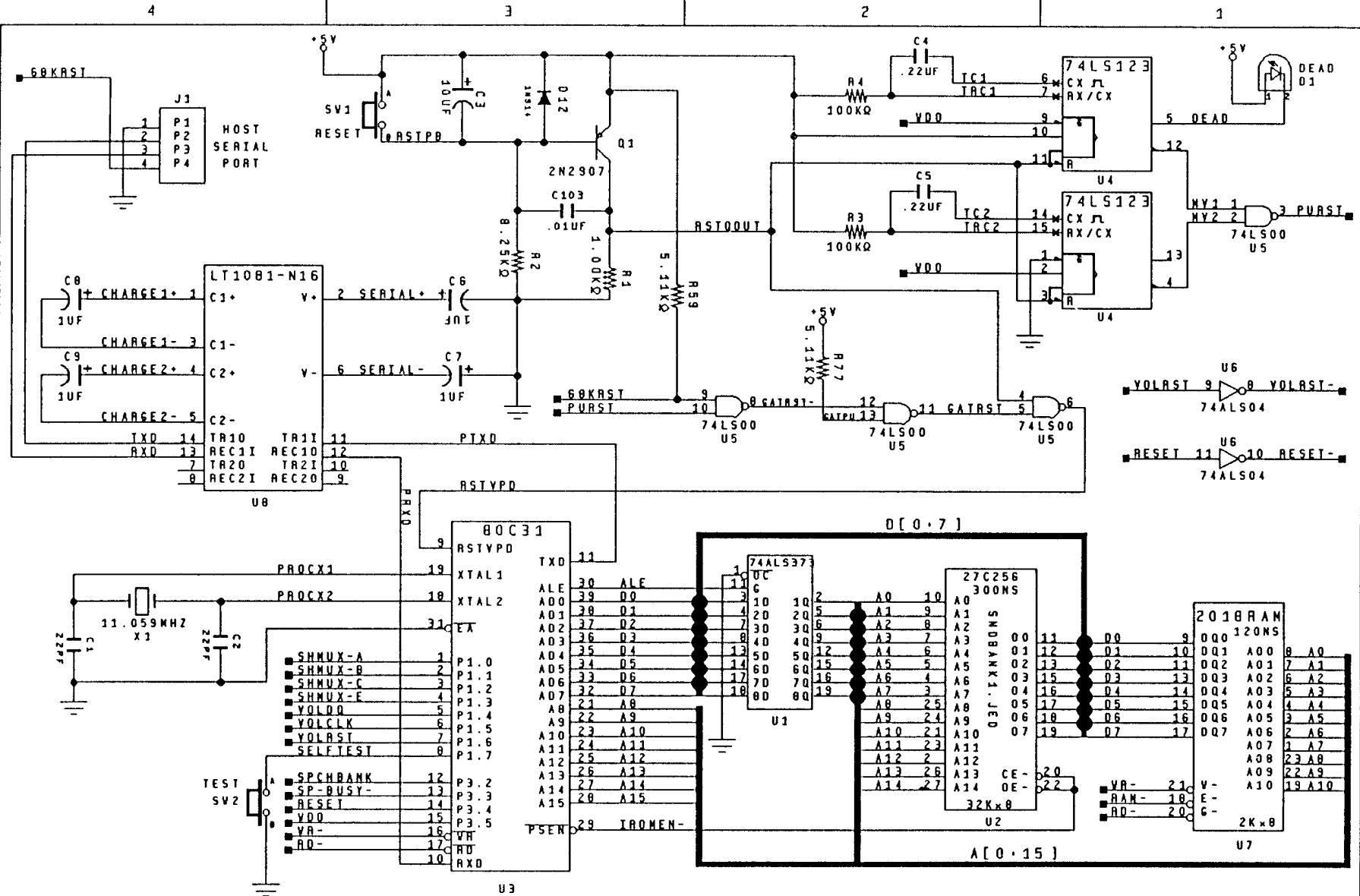
DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE			
<i>John Birch</i> ALLEN BLACK	DATE <i>5/24/90</i>	TITLE SOUND PRINT CIRCUIT BOARD ASSEMBLY		
APPROVAL	DATE	SIZE C	DRAWING NUMBER 0W-00011C-0018-01	
<i>John Birch</i>	DATE <i>5/24/90</i>		REV A	RELEASE
DATE 5-30-1990-10-21			SHEET 1 OF 9	



COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE			
DESIGNER <i>John W. Blanch</i> JIM McCONKEY	DATE 5/30/92	TITLE SOUND POWER CONNECTION/DECOPPLING		
APPROVAL	DATE	SIZE C	DRAWING NUMBER DW-000011C-0018-01	
APPROVED <i>John W. Blanch</i>	DATE 5/24/92		REV A	RELEASE
DATE 5-24-1992_12-13			SHEET 2 OF 9	



COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE
DAVID J. BELLAMY	
CHECKER	DATE
GARY GREEN	5/30/90
ENGINEER	DATE
John W. Mason	
APPROVAL	DATE
APPROVED	DATE

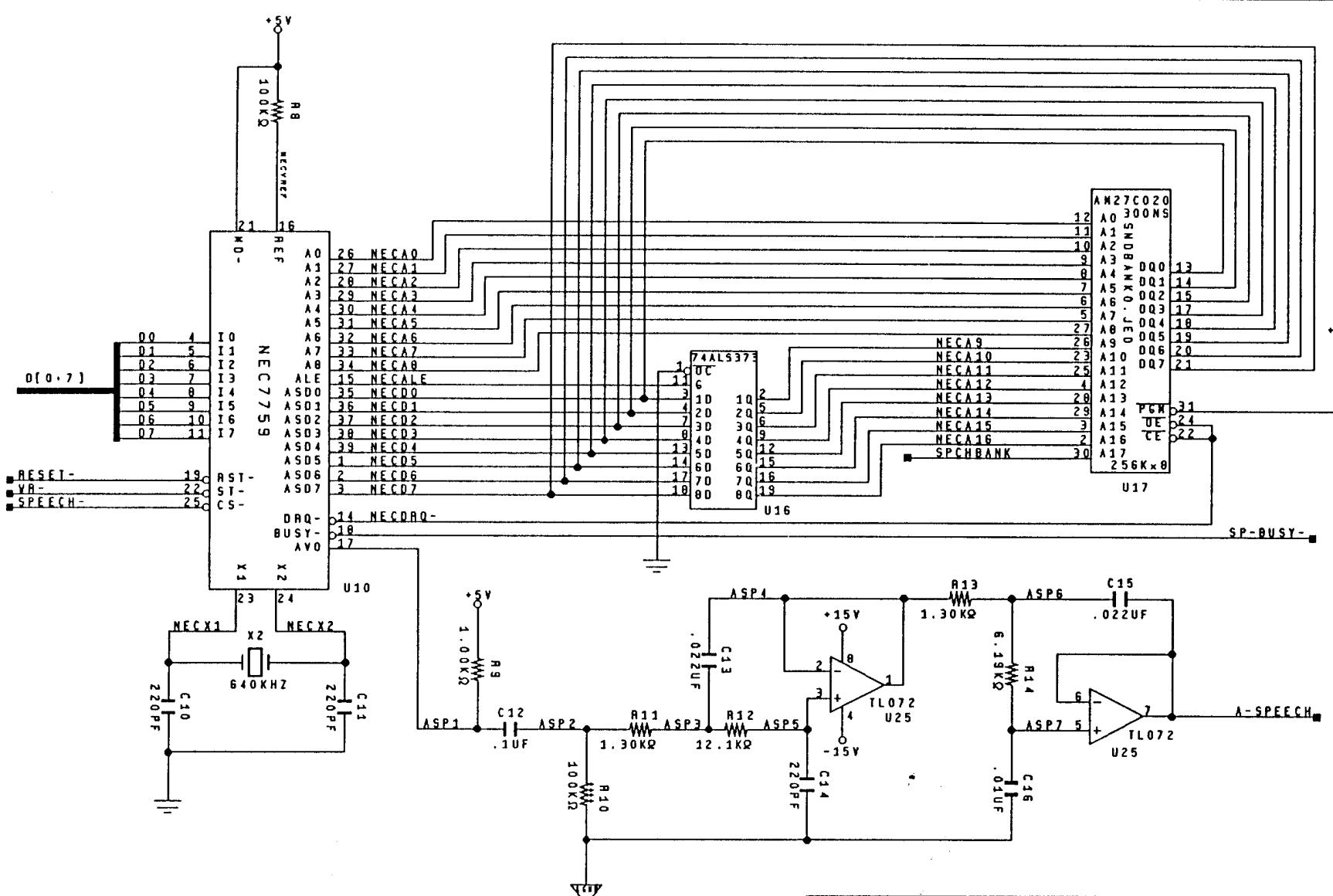
MICROPROSE GAMES
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

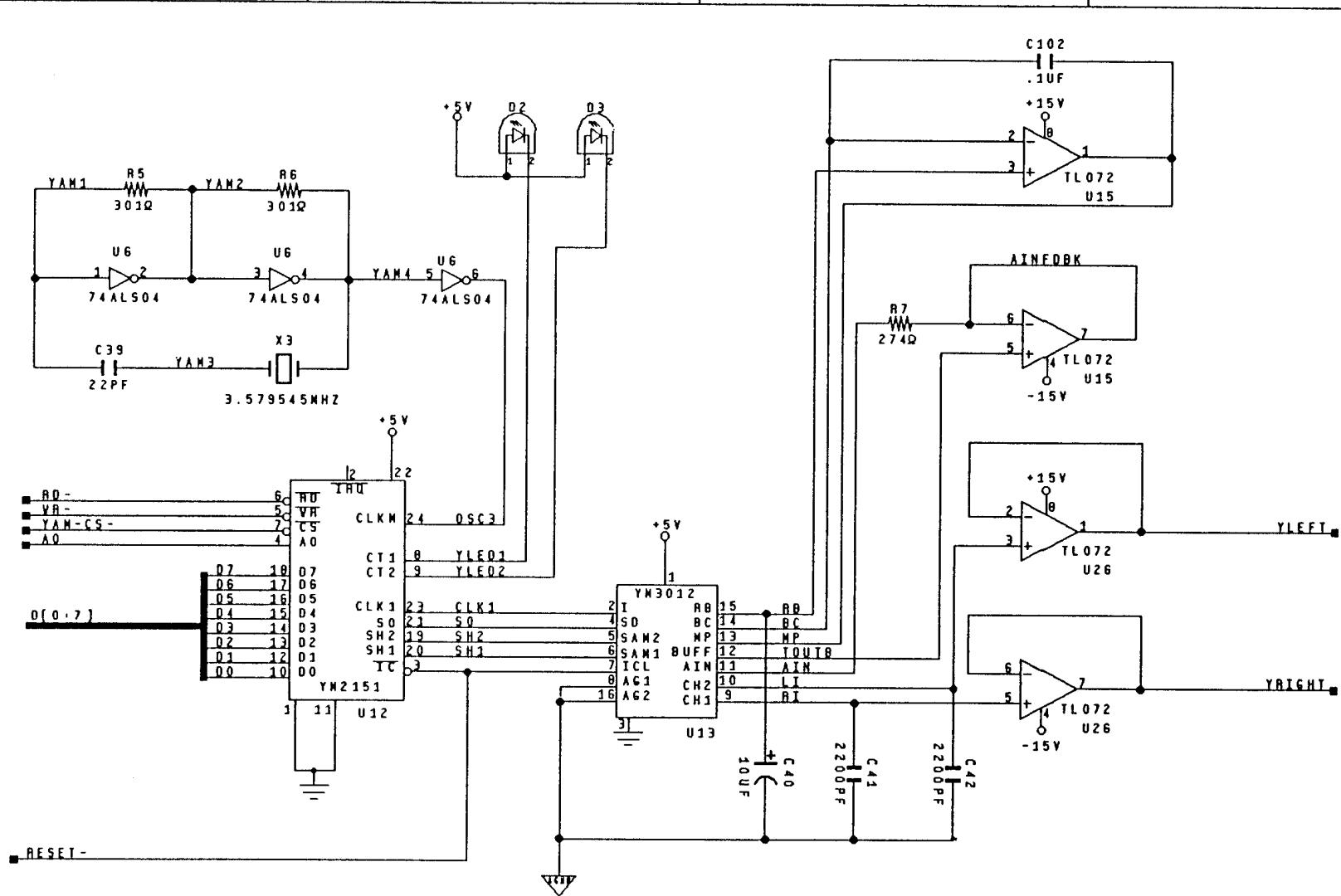
TITLE
SOUND
CPU, INSTRUCTION MEMORY, RESET
AND RS232 COMMUNICATIONS

SIZE C **DRAWING NUMBER** DW-00011C-001B-01

REV A **RELEASE**

DATE 5-30-1990-5-15 SHEET 3 OF 9





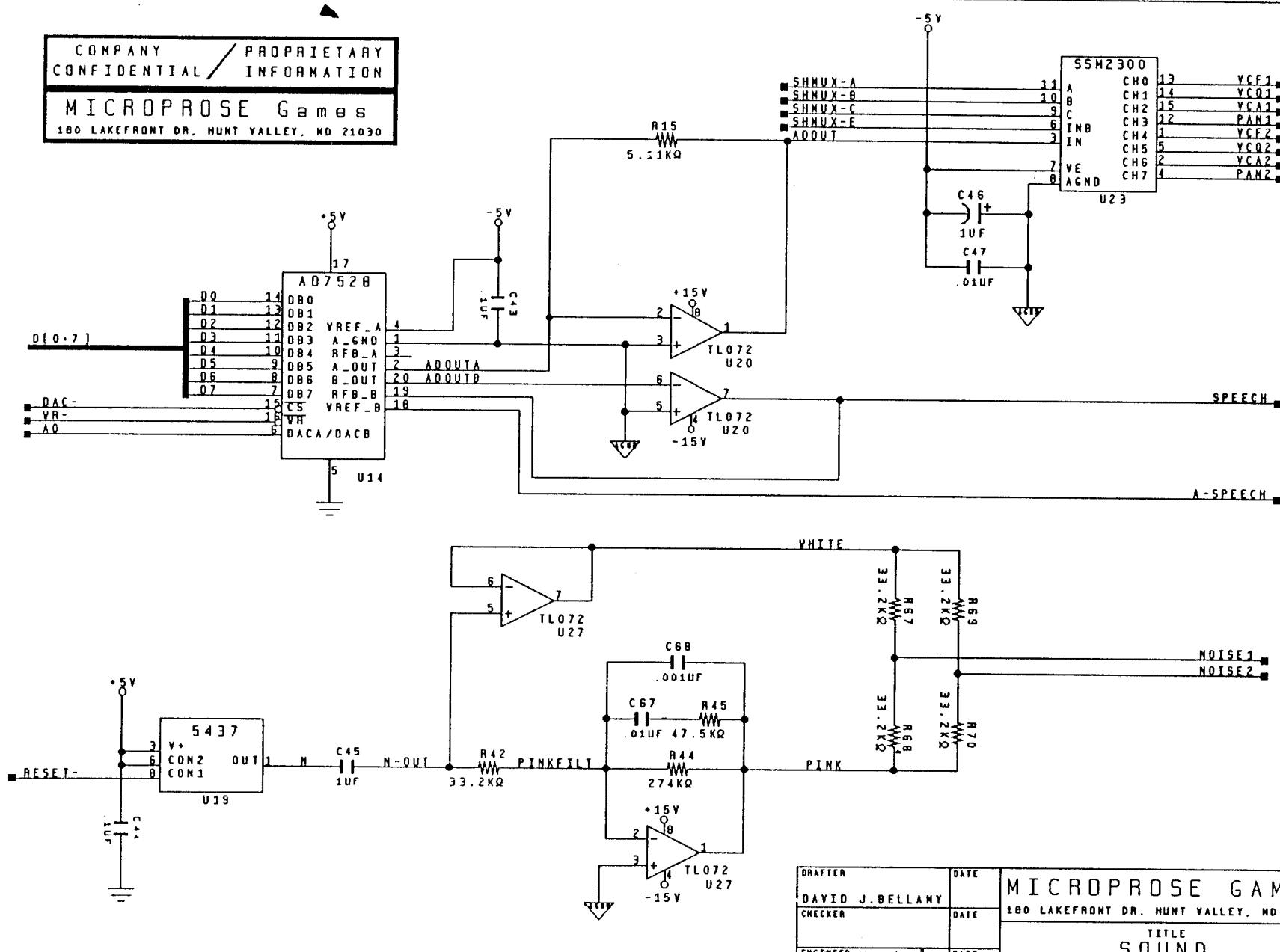
COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION

MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

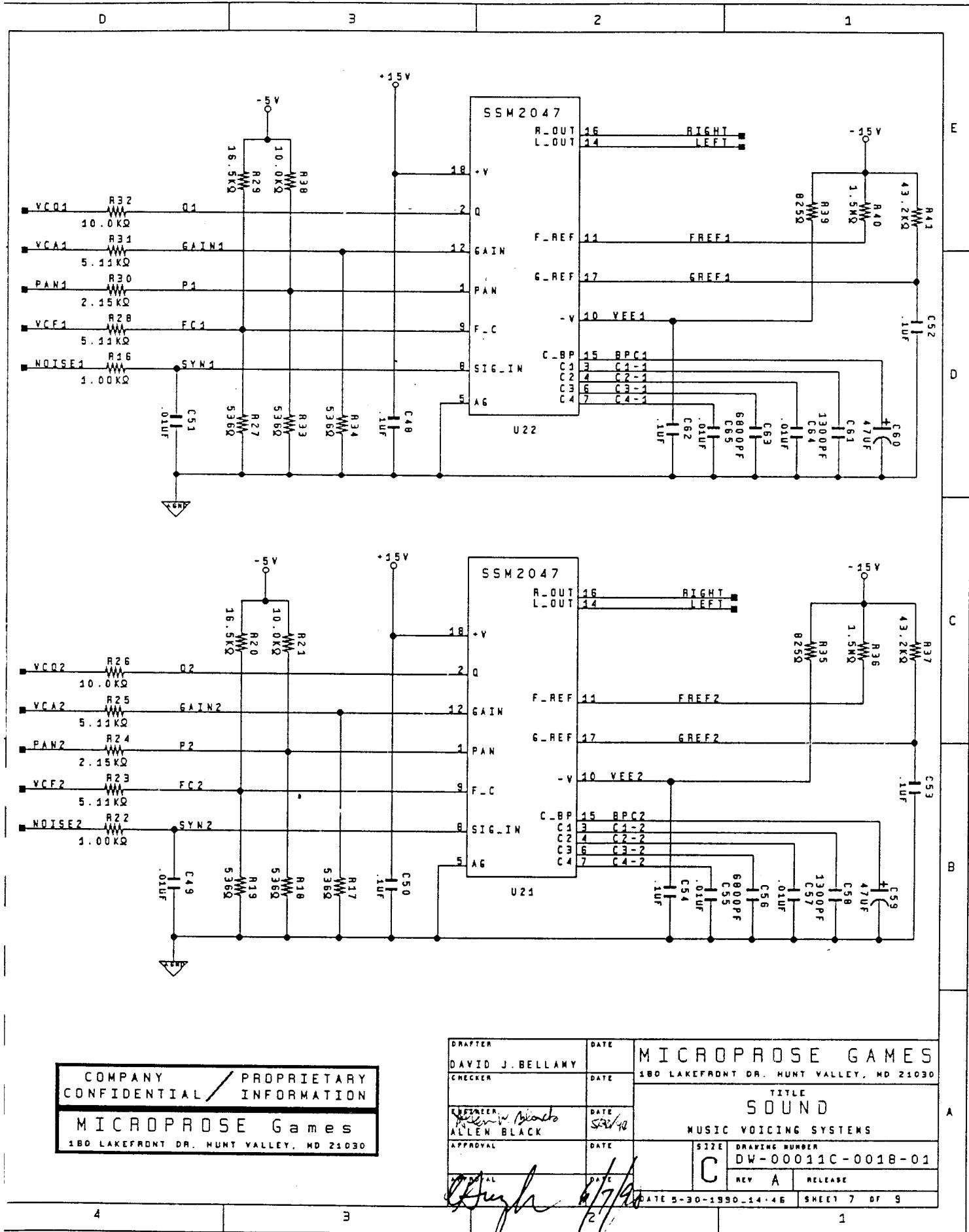
DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE	TITLE SOUND STEREO MUSIC SYNTHESIZER		
ENGR/EEF <i>Ken W. Black</i> ALLEN BLACK	DATE <i>5/20/90</i>			
APPROVAL	DATE	SIZE <i>G</i>	DRAWING NUMBER DW-00011C-0018-01	REV A RELEASE
APPROVAL	DATE <i>5/20/90</i>	DATE 5-30-1990 9:51		SHEET 5 OF 9

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

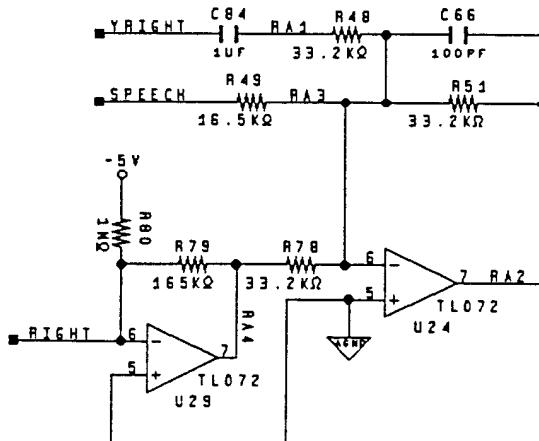


DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE	TITLE SOUND NOISE GENERATOR, A/D AND SPECIAL EFFECT S & H		
ENGINEER Allen W. Black ALLEN BLACK	DATE 5/30/90			
APPROVAL	DATE	SIZE C	DRAWING NUMBER DW-00011C-001B-01	
INSP'D BY	DATE 6/1/90		REV A	RELEASED
			DATE 5-30-1990 10-15 SHEET 6 OF 9	

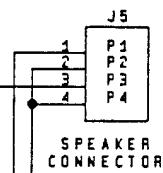
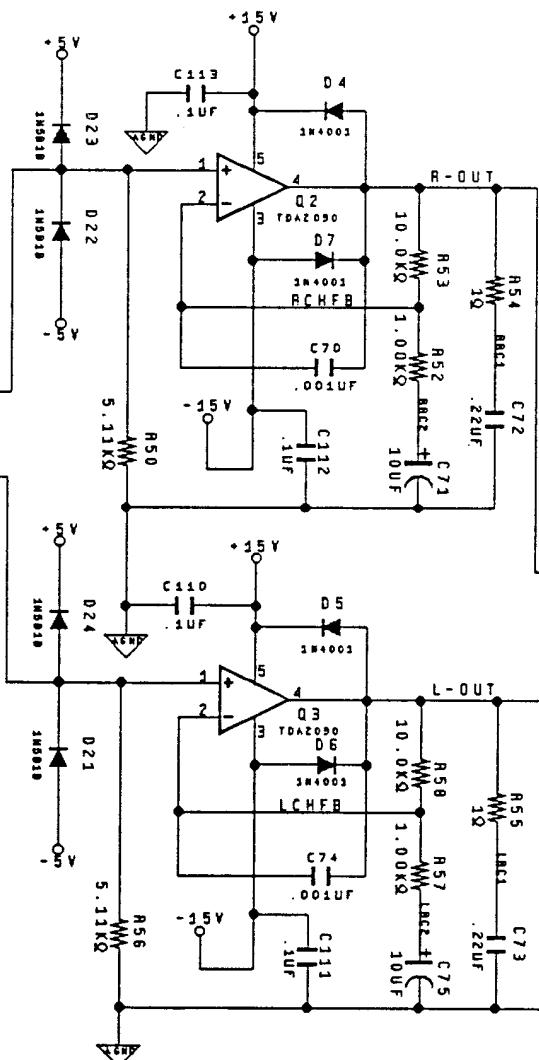
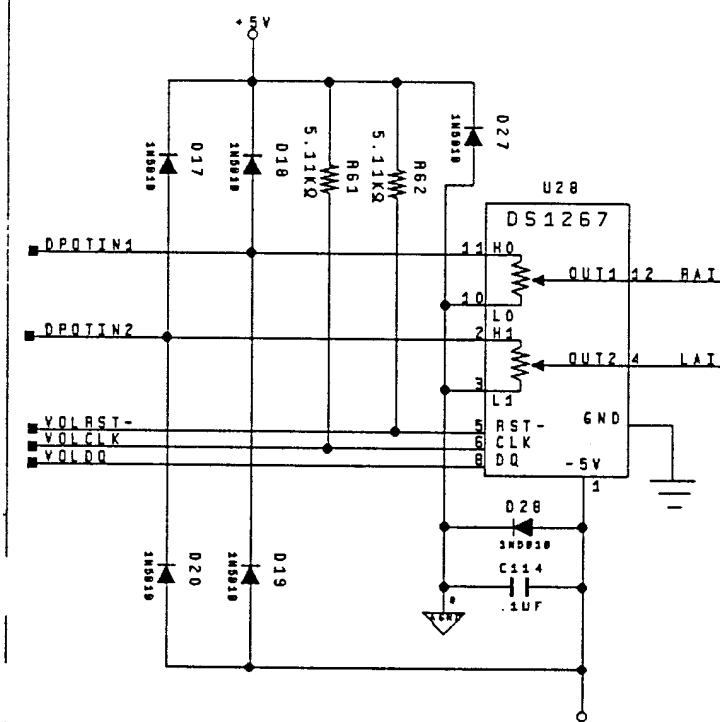
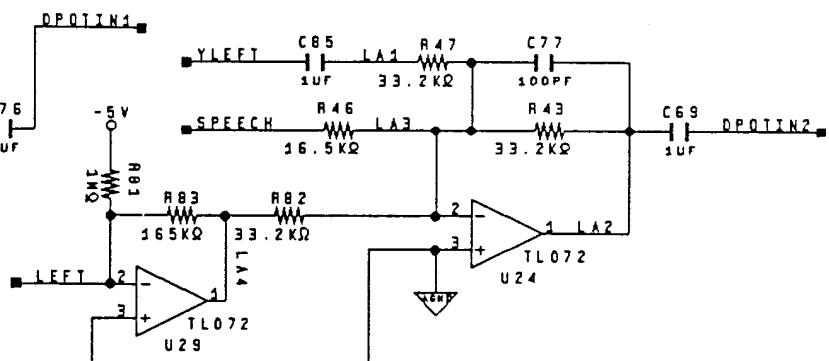


D E 1
3 2

RIGHT



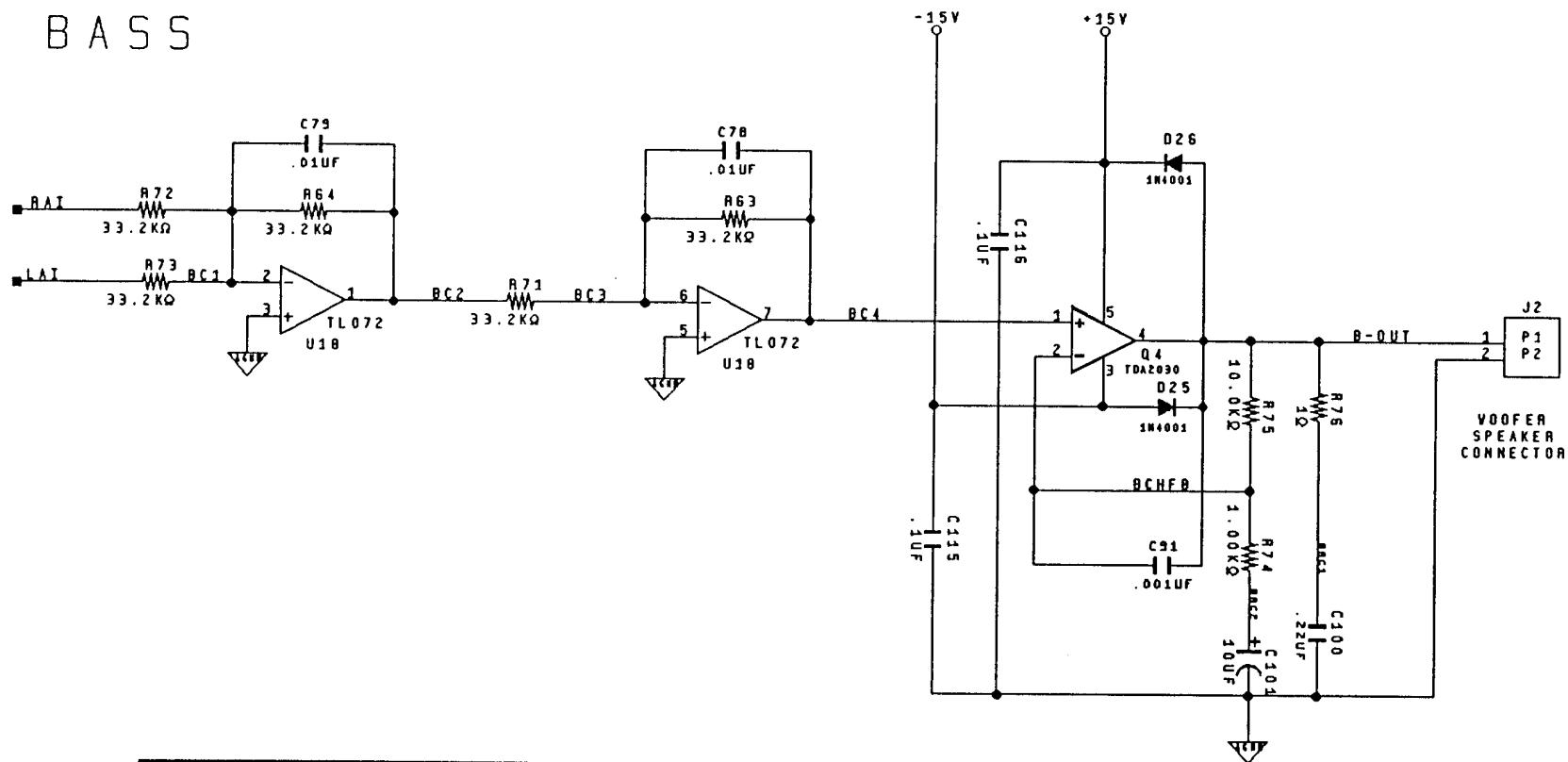
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COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
<i>Selma W. Bird</i> ALLEN BLACK	S/3/92	TITLE	
APPROVAL	DATE	SOUND	
<i>Allen Black</i>	1/1	LEFT AND RIGHT CHANNEL OUTPUT AUDIO AMPLIFIERS	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DH-00011C-0018-01
		REV A	RELEASE
		DATE 5-30-1990-14-50 SHEET 8 OF 9	

BASS



COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION

MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES		
CHECKER	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
ENGINEER <i>Allen W. Black</i> ALLEN BLACK	DATE <i>Setup</i>	TITLE SOUND BASS OUTPUT AUDIO AMPLIFIER		
APPROVAL	DATE	SIZE C	DRAWING NUMBER DW-00011C-0018-01	
ROUTE	DATE <i>5/30/90</i>		REV A	RELEASE
			DATE 5-30-1990-14-52 SHEET 9 OF 9	

MICROPROSE GAMES, 180 Lakefront Drive, Hunt Valley, Maryland 21030

PROJECT: SOUND BOARD DRWG NO: PL-00011A-00018-01 REV: C

DATE: Wed 1-Aug-1990

ITEM	QTY	VENDOR PART NUMBER REF. DES.	PART DESC	VALUE	MPG P/N
1	2	CCF-07 155J R40, R36	5PCMFRES	1.5MOHM	503-00005-155
2	1	CCF-50 2743F R44	1PCMFRES	274KOHM	503-00001-274
3	4	CCF-50 1003F R3, R4, R8, R10	1PCMFRES	100KOHM	503-00001-104
4	1	CCF-50 4752F R45	1PCMFRES	.47.5KOHM	503-00001-473
5	2	CCF-50 4322F R37, R41	1PCMFRES	43.2KOHM	503-00001-433
6	9	CCF-50 3322F [R73, R72, R71, R64, R63], R51, R48, R47, R43, R42, R78, R82, R68, R70	1PCMFRES	33.2KOHM	503-00001-333
7	4	CCF-50 1652F R20, R29, R46, R49	1PCMFRES	16.5KOHM	503-00001-163
8	1	CCF-50 1212F R12	1PCMFRES	12.1KOHM	503-00001-123
9	6	CCF-50 1002F R21, R26, R32, R38, R58, R53, [R75]	1PCMFRES	10.0KOHM	503-00001-103
10	1	CCF-50 8251F R2	1PCMFRES	8.25KOHM	503-00001-822
11	1	CCF-50 6191F R14	1PCMFRES	6.19KOHM	503-00001-612
12	12	CCF-50 5111F R62, R61, R56, R50, R23, R25, R31, R28, R15, R59, R66, R77	1PCMFRES	5.11KOHM	503-00001-512
13	2	CCF-50 2151F R24, R30	1PCMFRES	2.15KOHM	503-00001-212
14	2	CCF-50 1301F R13, R11	1PCMFRES	1.30KOHM	503-00001-132
15	6	CCF-50 1001F R1, R9, R16, R22, R52, R57, [R74]	1PCMFRES	1.00KOHM	503-00001-102
16	2	CCF-07 681G R60, R65	2PCMFRES	680 OHM	503-00002-681
17	6	CCF-50 5360F R34, R19, R18, R17, R33, R27	1PCMFRES	536 OHM	503-00001-541

ITEM	QTY	VENDOR PART NUMBER REF. DES.	PART DESC	VALUE	MPG P/N
18	2	CCF-50 3010F R6, R5	1PCMFRS	301 OHM	503-00001-301
19	1	CCF-50 2740F R7	1PCMFRS	274 OHM	503-00001-001
20	2	5053EM1R00J R55, R54, [R76]	5PCMFRS	1 OHM	503-00005-010
21					
22	2	513D108MC16DK4 C87, C86	RADTANTCAP	1000UF	410-00002-108
23	2	TAP476M020CRW C59, C60	RADTANT	.47UF	421-00020-476
24	7	173D106X0035X C3, C40, C71, C75, C18, C19, C20, [C101]	AXTANT	.10UF	422-00072-106
25	6	173D105X0035V C46, C17, C7, C6, C9, C8	AXTANTCAP	.1UF	422-00072-105
26	5	C340C105K5R5CA C85, C76, C69, C84, C45	RADCERCAP	.1UF	400-00281-105
27	4	C412C334M5U5CA C23, C22, C26, C88	AXCERCAP	.33UF	402-00382-334
28	36	C410C104M5U5CA C44, C43, C99, C98, C97, C96, C95, C94, C93, C92, C38, C37, C36, C35, C113 C34, C33, C32, C31, C30, C28, C27, C25, C24, C21, C29, C80, C81, C89, C90, C104, C105, C106, C107, C108, C109, [C114, C115, C116, C110, C111, C112]	AXCERCAP	.1UF	402-00382-104
29	4	C430C224J5R5CA C4, C5, C72, C73, [C100]	AXCERCAP	.22UF	402-00285-224
30	10	C412C104J5R5CA C83, C82, C48, C50, C53, C54, C52, C62, C12, C102	AXCERCAP	.1UF	402-00285-104
31	2	C410C223J5R5CA C15, C13	AXCERCAP	.022UF	402-00285-223
32	10	C410C103J5R5CA C51, C49, C55, C57, C64, C65, C67, C47, C16, C103, [C78, C79]	AXCERCAP	.01UF	402-00285-103
33	3	C410C102J1R5CA C68, C70, C74, [C91]	AXCERCAP	.001UF	402-00295-102
34	2	C410C222J1R5CA C42, C41	AXCERCAP	2200PF	402-00295-222
35	3	C410C221J1G5CA C10, C14, C11	AXCERCAP	220PF	402-00195-221

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
<u>REF. DES.</u>					
36	2	C410C101J1G5CA C66,C77	AXCERCAP	100PF	402-00195-101
37	3	C410C220J1G5CA C39,C2,C1	AXCERCAP	22PF	402-00195-220
38	2	SX268J C63,C56	POLYFILMCAP	6800PF	430-00002-682
39	2	SXM213H C61,C58	POLYFILMCAP	1300PF	430-00001-132
40	2	ICTE-15 D14,D16	ZENER	15V	300-00001-005
41	2	ICTE-5 D13,D15	ZENER	5V	300-00001-002
42	10	1N5818 D17,D18,D19,D20,D21,D22,D23,D24,D27,D28	SCHOTDIODE		302-00002-001
43	4	1N4001 D7,D6,D5,D4,[D25,D26]	DIODE,RECT		302-00001-001
44	1	1N914 D12	DIODE,SIGNAL		300-00002-003
45	7	HLMP3600 D8,D3,D2,D1,D9,D10,D11	LED	RED	305-00003-002
46	3	IHA-204 L1,L2,L3	INDUCTOR	250 UH	590-00001-001
47	1	NYP 111-20 X1	OSCILLATOR	11.06MHZ	290-00003-011
48	1	NYP035A-18 X3	SNDXTAL	3.58MHZ	290-00003-003
49	1	CSB640J X2	CERRESONATR	640KHZ	290-00005-640
50	1	15-24-4049 P1	4PINPWRCON	.200"	610-00300-004
51	2	22-23-2041 J1,J5	4PINMOLEX	.100"	610-00102-004
52	[0]	22-23-2021 [J2]	2PINMOLEX	.100"	610-00102-002
53	2	KSA1A211 SW2,SW1	PBSWITCH		625-00002-001

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
		<u>REF. DES.</u>			
54	1	2-644018-2 UX17	32PIN SOCKET	.600"	600-00003-632
55	1	ICO-628MTT UX2	28PIN SOCKET	.600"	600-00001-628
56	[0]	ICO-320MTT [UX11]	20PIN SOCKET	.300"	600-00001-320
57	[0]	2-641606-1 [UX3]	40PIN SOCKET	.600"	600-00003-640
58	2	7-0805G-5 TP1, TP2	TEST PIN		710-00001-001
59	2	7023BCLP	HEATSINK		790-00001-001
60	2	CLP201	CLIP, HEATSINK		790-00001-002
61	1	DS1267-50 U28	DUALDIGPOTS	50KOHM	282-01267-200
62	1	P80C31BH U3	MICROPROCESR	12MHZ	135-80C31-212
63	1	UPD7759CADPC U10	SPEECHGEN		282-07759-200
64	1	MM5437 U19	NOISEGENR		282-05437-200
65	1	YM2151 U12	MUSICSYNTH		282-02151-200
66	1	YM3012 U13	STEREODAC		282-03012-200
67	2	TDA2030V Q3, Q2, [Q4]	AUDIOAMP		282-02030-600
68	7	TL072ACP U24, U27, U20, U26, U15, U25, U29, [U18]	DUALOPAMP		282-00072-200
69	1	MC79L05ACZ U9	NEG5VREG		281-07905-001
70	1	TP2907 Q1	PNPTRANS		310-00001-001
71	1	PAL16L8-BCN U11	SOUND1A	15NS	120-00003-001
72	1	AM27C020-305DC U17	256Kx8EPROM SNDBANK0.JED	300NS	110-00003-001

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
		<u>REF. DES.</u>			
73	1	MCM2018AN45 U7	2Kx8SRAM	45NS	221-00004-245
74	1	D27C256-3 U2	32Kx8EPROM SNDBANK1.JED	300NS	110-00004-001
75	2	SSM-2047P U22,U21	MUSICVOICE		282-02047-200
76	1	SSM-2300P U23	8CHANS/HOLD		282-02300-200
77	1	AD7528JN U14	D/A CONVRTR		245-00003-200
78	1	LT1081CN U8	RS232DRV		235-00001-200
79	1	SN74ALS04BN U6	HEXINVERTRS		200-00004-200
80	1	SN74LS00N U5	QUAD2-IN'NAND'		202-00000-200
81	1	SN74LS123N U4	DUALONESHOT		202-00123-200
82	2	SN74ALS373N U16,U1	OCTDFLOPS		200-00373-200
83	2	CCF-07 105G R80,R81	2PCMFRES	1MOHM	503-00002-105
84	2	CCF-50 8250F R39,R35	1PCMFRES	8250HM	503-00001-831
85	2	CCF-50 1653F R79,R83	1PCMFRES	165KOHM	503-00001-174
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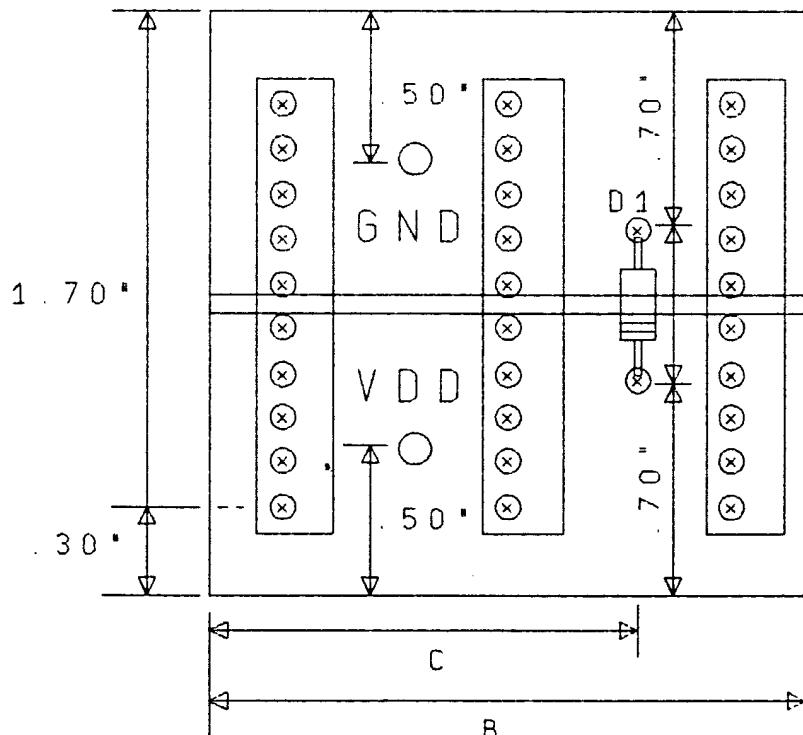
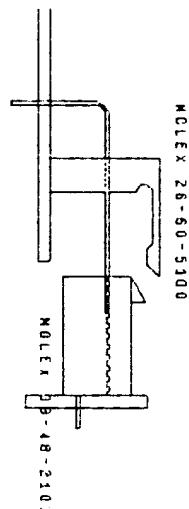
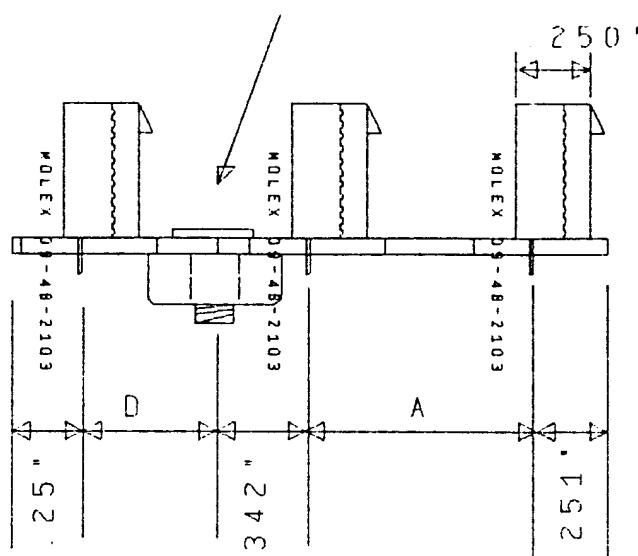
254

NOTES:

1. ITEMS WITH REFERENCE DESIGNATORS IN BRACKETS [] WILL NOT BE POPULATED FOR PRODUCTION.

#10 SCREW P E M.

P/N KFH-032-6



DRILL KEY:

(X) .0625"

(O) .1875"

DRAFTER JG MCKIBBIN	DATE
CHECKER	DATE
ENGINEER JG MCKIBBIN	DATE
APPROVAL	DATE
APPROVAL PWR .5	DATE

DIM.	REV -	REV A
A	.812"	.750"
B	.125"	.000"
C	.45"	.388"
D	.47"	.408"

MICROPROSE GAMES	
380 LAKEFRONT DRIVE HUNT VALLEY, MD 21030	
TITLE	
PWR	BACKPLANE
SIZE	DRAWING NUMBER
C	DW-00013A-0008-01
DATE	
	SHEET OF
	1

MICROPROSE GAMES, 180 Lakefront Drive, Hunt Valley, Maryland 21030
PROJECT: POWER BACKPLANE DRWG NO: PL-00011A-0008-01 REV:

DATE: Tue 15-Jan-1991

ITEM	QTY	VENDOR	PART NUMBER	PART DESC	VALUE	MPG P/N
			REF. DES.			
1	3	09-48-2103	J1,J2,J3	1x10FEMCON	.156"	610-10301-010
2	2	KFH-032-6	ST1,ST2	PEM STUDS	#10-32	721-00520-410
3	2		N1,N2	HEXNUTS	#10-32	721-00010-010
4	2		W1,W2	LOCKWASHERS	#10	720-00002-010
5	1	ICTE-5	D1	DIODE	5VDC	300-00001-002

— 10 —

MICROPROSE Games

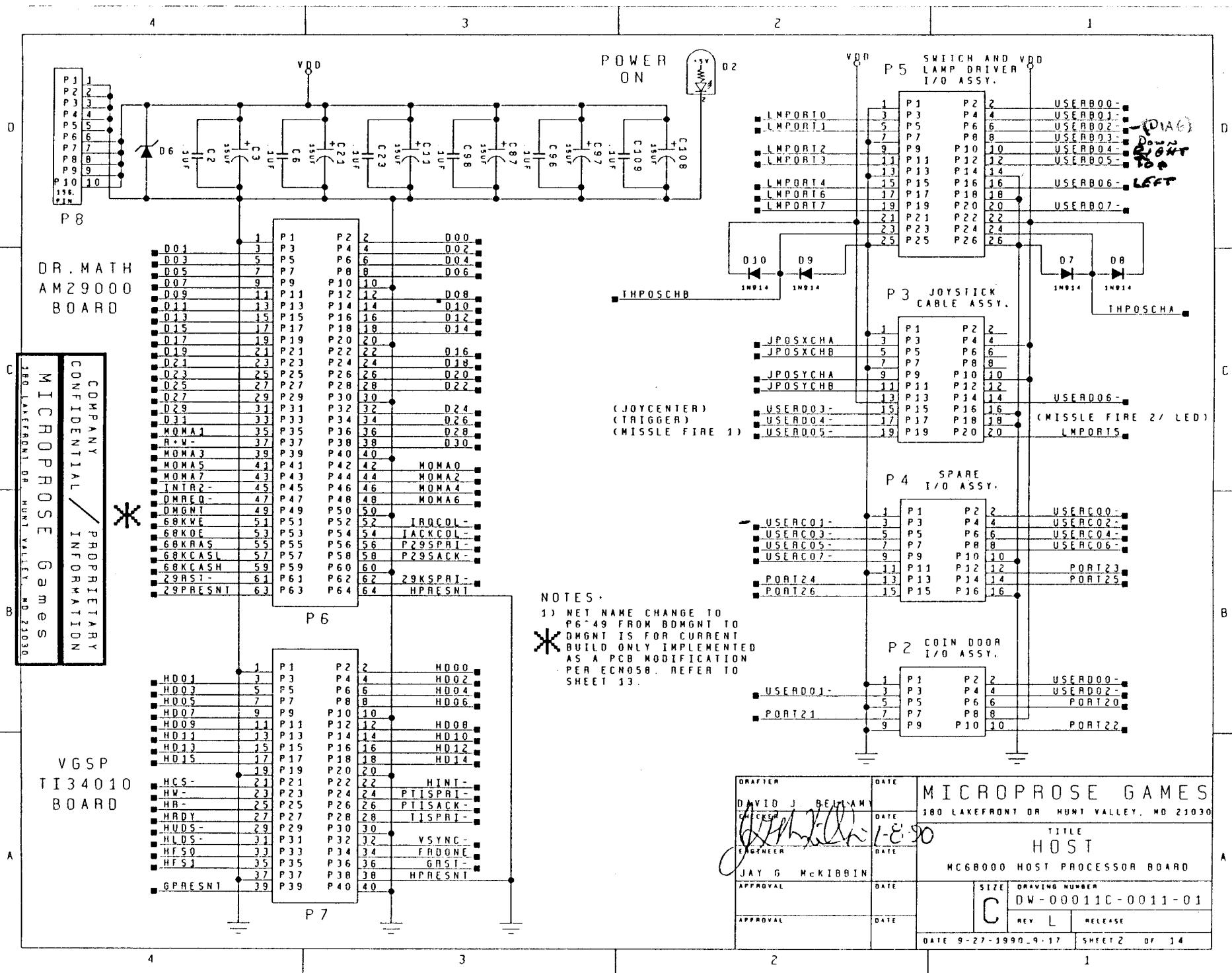
HOST PROCESSOR

PRINTED CIRCUIT BOARD ASSEMBLY

COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHEKED	DATE			
<i>DKM/1-14-91</i>	1-14-91			
ENGINEER	DATE	TITLE		
JAY G. MCKIBBIN		HOST		
APPROVAL	DATE	HOST PROCESSOR PCB SCHEMATIC DRAWING		
		SIZE C	DRAWING NUMBER	
			DW-00011C-0011-01	
APPROVAL	DATE	REV P	RELEASE	
		DATE 1-14-1991-16-05	SHEET 1 OF 14	



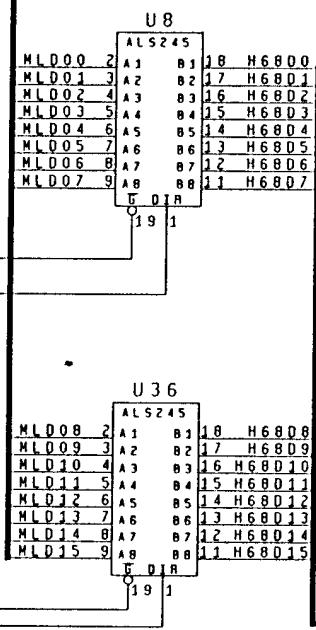
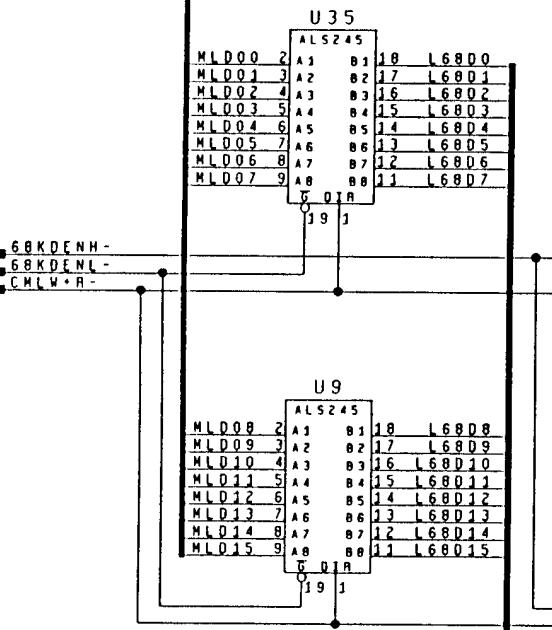
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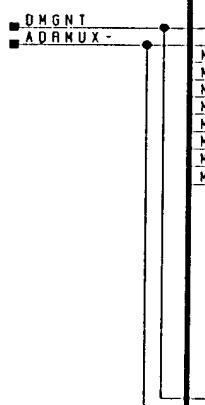
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MLD[00-15]



H680[0-15]
L680[0-15]

MLA[01-23]

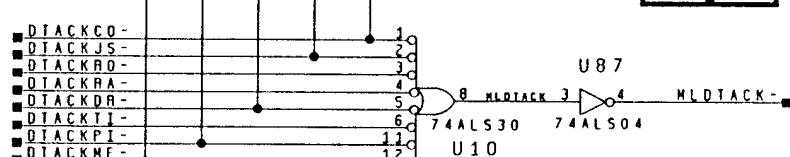
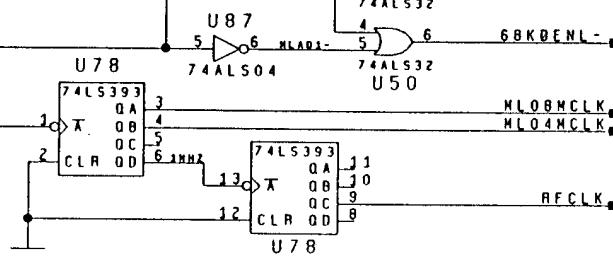


68KDENH-
68KDENL-
CMW+R-

NOTE ①
68BARBA
68000 RAM
ARBITRATOR

MLA01

ML16MCLK



NOTE.

1) PCB MODIFICATION. ADD C200 BETWEEN
U59~5 AND U59~12 ON BOTTOM OF PCB.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. REILLY	10-10-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
JAY G. MCKIBBIN	10-10-90		
EDIFIER	DATE	TITLE	
JAY G. MCKIBBIN	10-10-90	HOST	
APPROVAL	DATE	68000 PROGRAM RAM BUFFERS	
		AND CONTROL LOGIC	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-000011C-0011-01
APPROVAL	DATE	REV	RELEASE
		0	
DATE 10-1-1990-10-29			
SHEET 4 OF 14			

180 LAKEFRONT DR. HUNT VALLEY, MD 21030
MICROPROSE GAMES
INFORMATION CONFIDENTIAL PROPRIETARY COMPANY

4

3

2

1

4

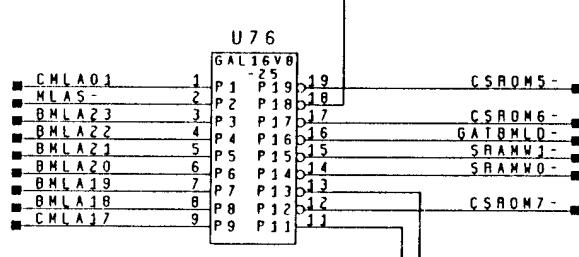
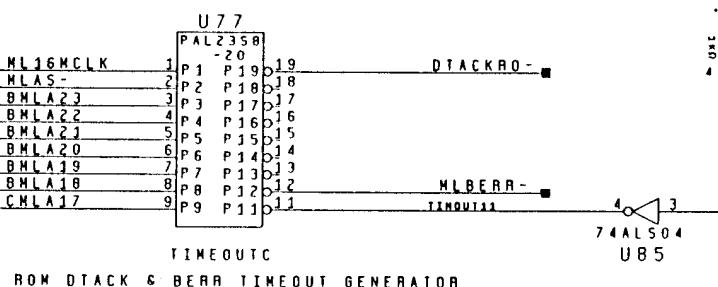
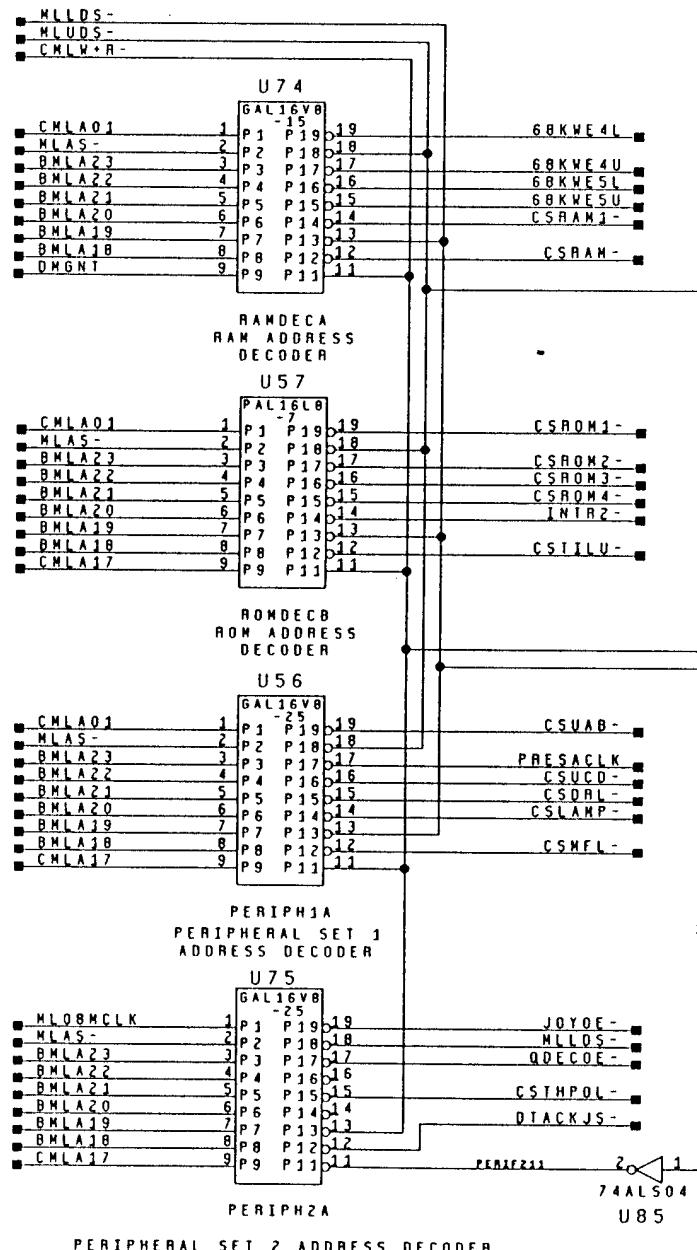
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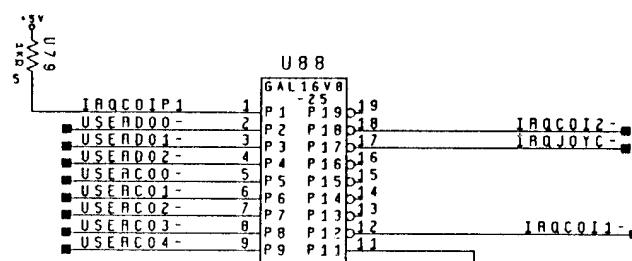
1

D

D



SPARE RHA
ADDRESS GENERATOR



IRQCOINA
COIN
DETECT/INTERRUPT
GENERATOR

DRAFTER	DATE
DAVID J. BELLAMY	1-14-91
CHECKER	DATE
V. K. H.	1-14-91
ENGINEER	DATE
JAY G. MCKIBBIN	1-14-91
APPROVAL	DATE
APPROVAL	DATE

MICROPROSE GAMES
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

TITLE
HOST

**ADDRESS DECODING/
COIN INTERRUPT**

SIZE	DRAWING NUMBER
C	DW-00011C-0011-01
REV P	RELEASE
DATE 10-25-1990 14-42	
SHEET 5 OF 14	

COMPANY PROPRIETARY
CONFIDENTIAL INFORMATION
MICROPROSE GAMES
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

4

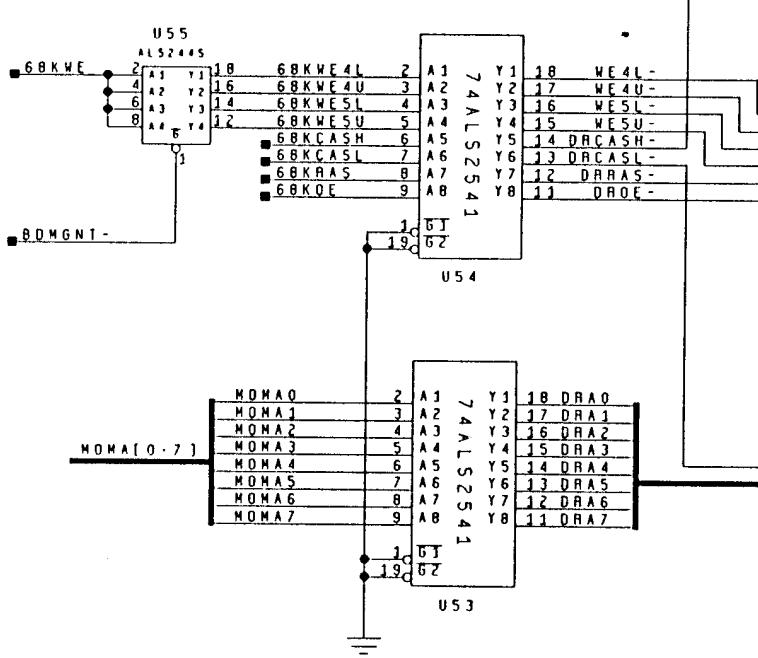
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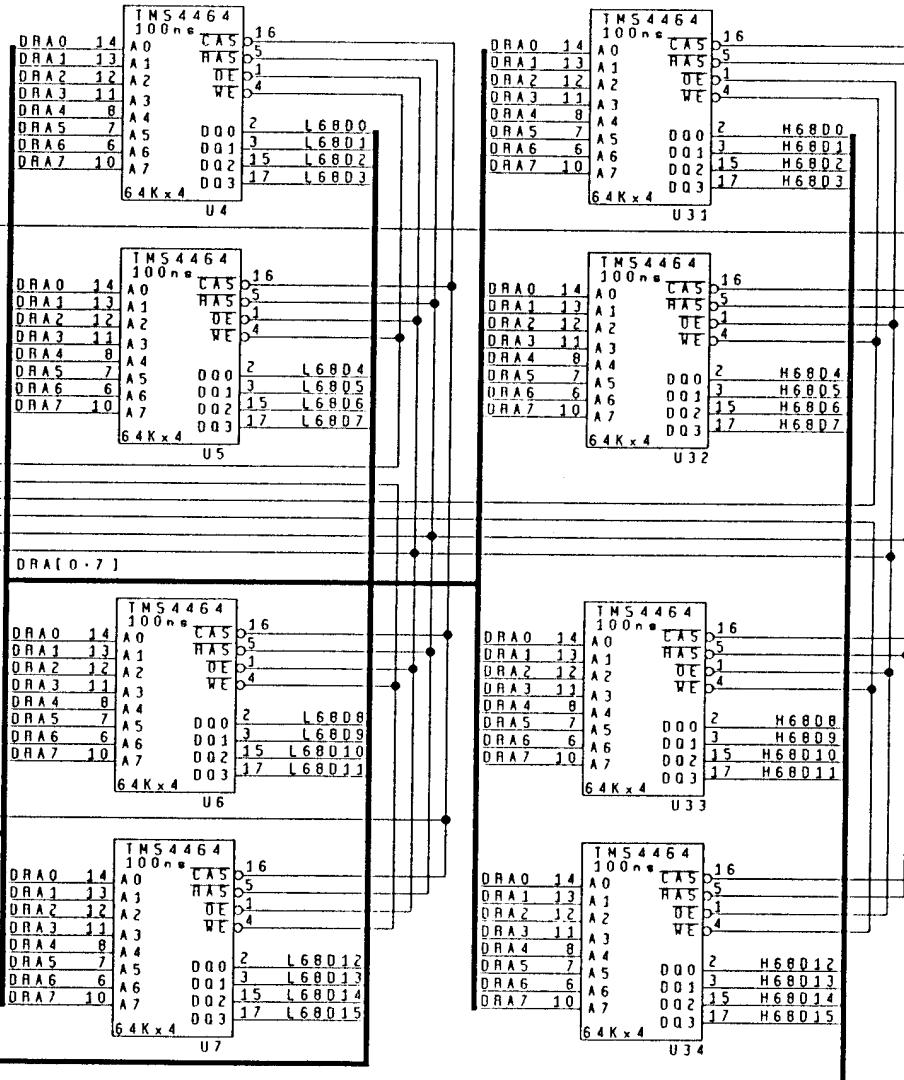
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COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



L680[0-15]
H680[0-15]



DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BEHN	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKED	9-26-90			
ENGINEER	DATE			
MICHAEL WILLIAMS	DATE			
APPROVAL	DATE			
		SIZE	DRAWING NUMBER	
		C	DW-00011C-0011-01	
APPROVAL	DATE	REV	K	RELEASE
		DATE 5-7-1990, 12-42 SHEET 6 OF 14		

4

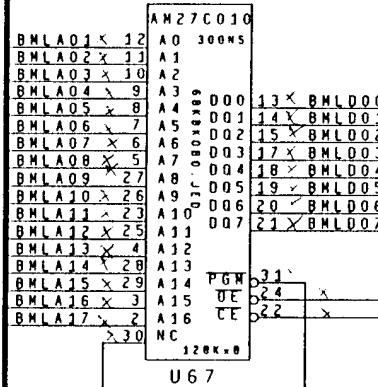
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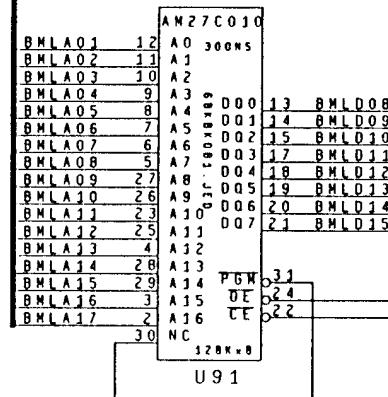
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BMLA[01-17]

COMPANY PROPRIETARY
CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



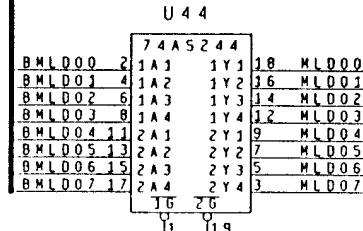
- CSROM1 -
- CSROM2 -
- CSROM3 -



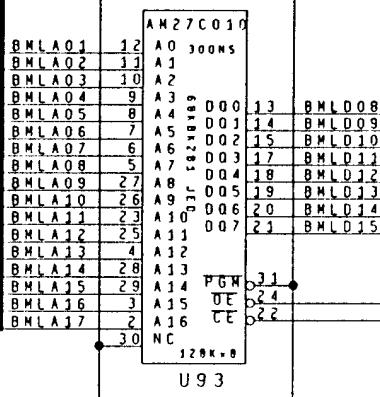
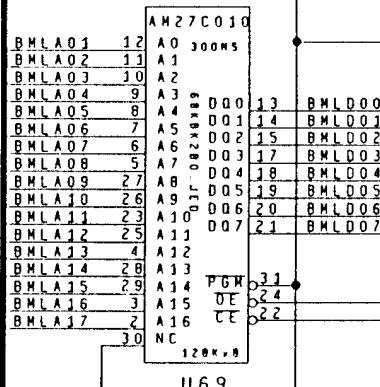
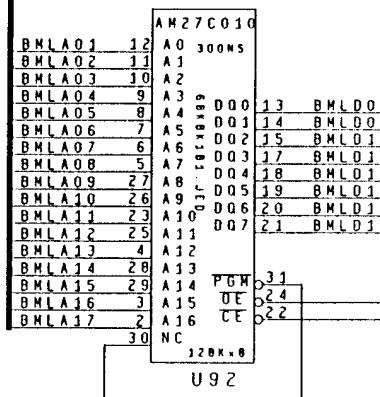
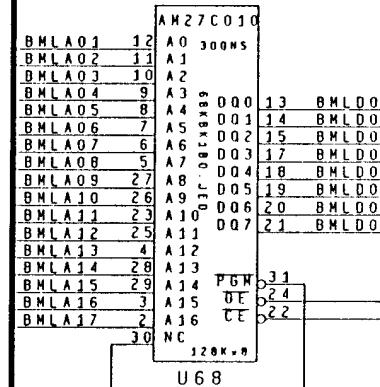
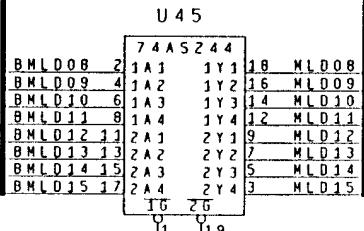
■ BMLW-R -

BMLD[00-15]

MLD[00-15]



■ GATBMLD -



NOTE:
U67, U68, U69, U91, U92, U93 INSTALLED
IN SOCKET (CMPG P/N 600-00002-632)

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BEILBY	9-26-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
JAY G. MCKIBBIN	DATE	HOST	
ENGINEER	DATE	64K INSTRUCTION EPROM	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0011-01
APPROVAL	DATE	REV	N RELEASE
		DATE 9-17-1990-17-32 SHEET 7 OF 14	

4

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1

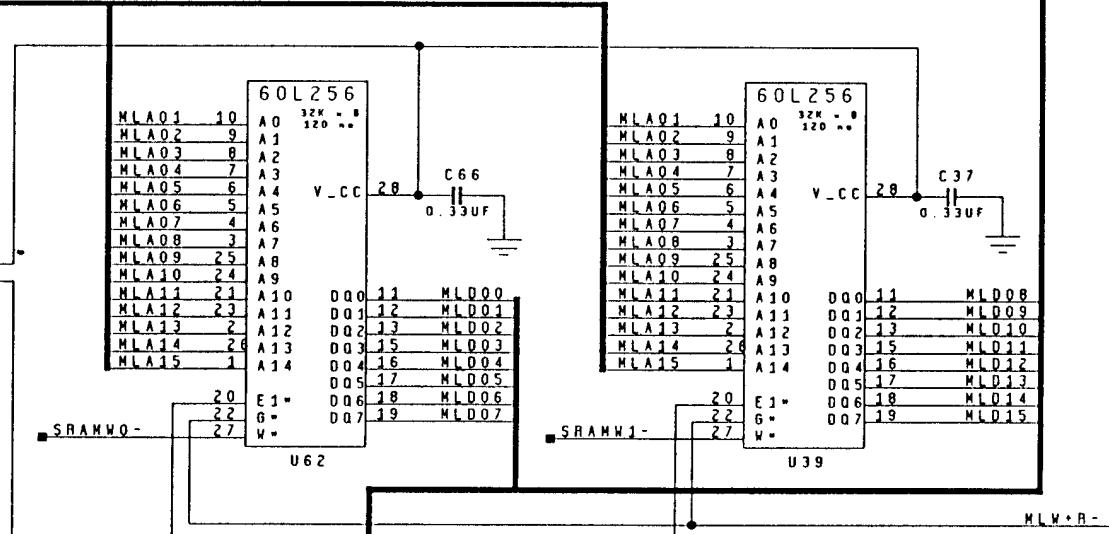
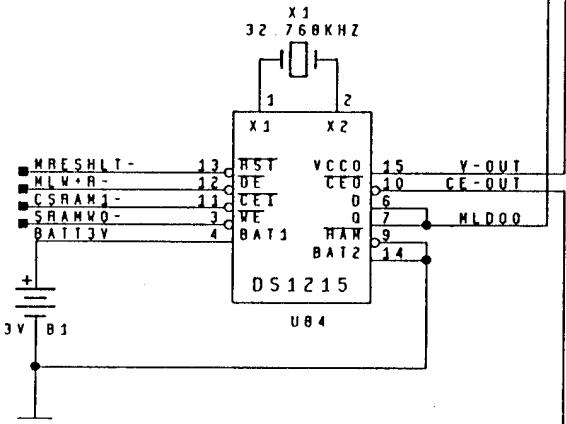
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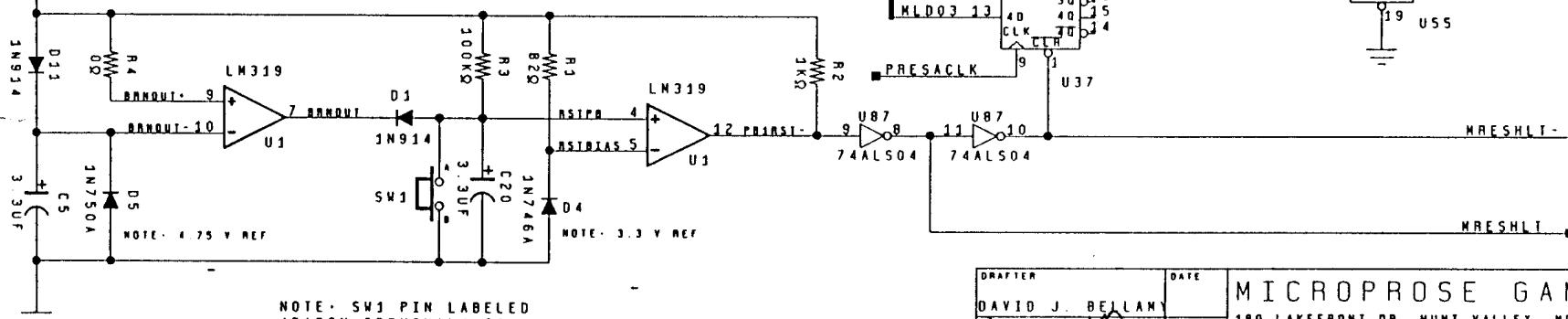
7

MLD[00·15]

MLA 101 · 15



REF ID: A12345



NOTE - SW1 PIN LABELED
'EARTH TERMINAL' IS A
NO CONNECT. USE FOR
COMPONENT ORIENTATION
ONLY.

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

DRAFTER DAVID J. BELLAMY	DATE <i>Q.M.H.D.</i>	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER <i>Q.M.H.D.</i>	DATE 1-14	-91 TITLE HOST		
ENGINEER JAY G. MCKIBBIN	DATE	WATCHDOG/RESET CIRCUIT AND BATTERY BACKUP STATIC RAM		
APPROVAL	DATE	SIZE C	DRAWING NUMBER DW-00011C-0011-01	
APPROVAL	DATE		REV N	RELEASE
DATE 9-17-1990 15-25			SHEET 8 OF 14	

4

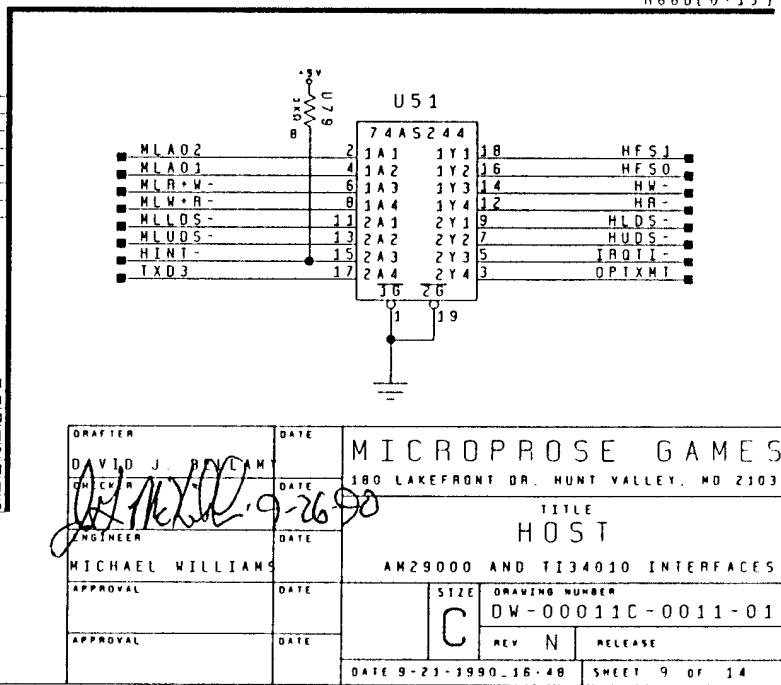
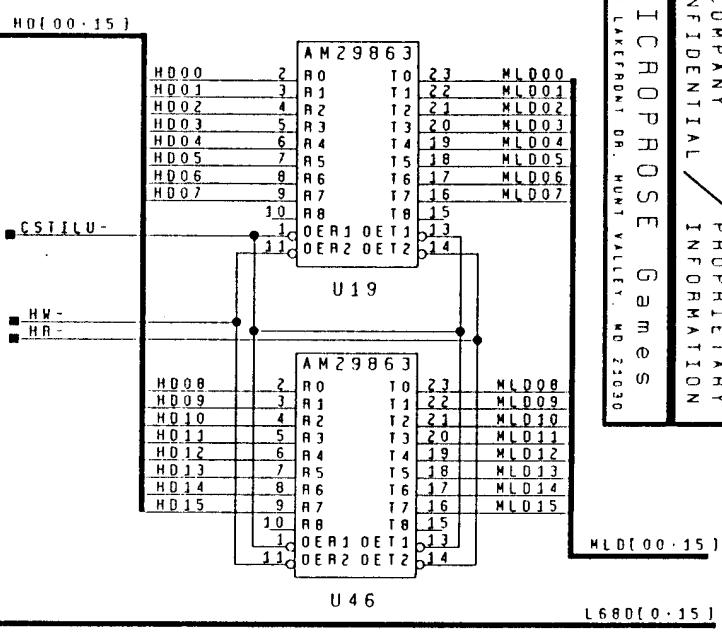
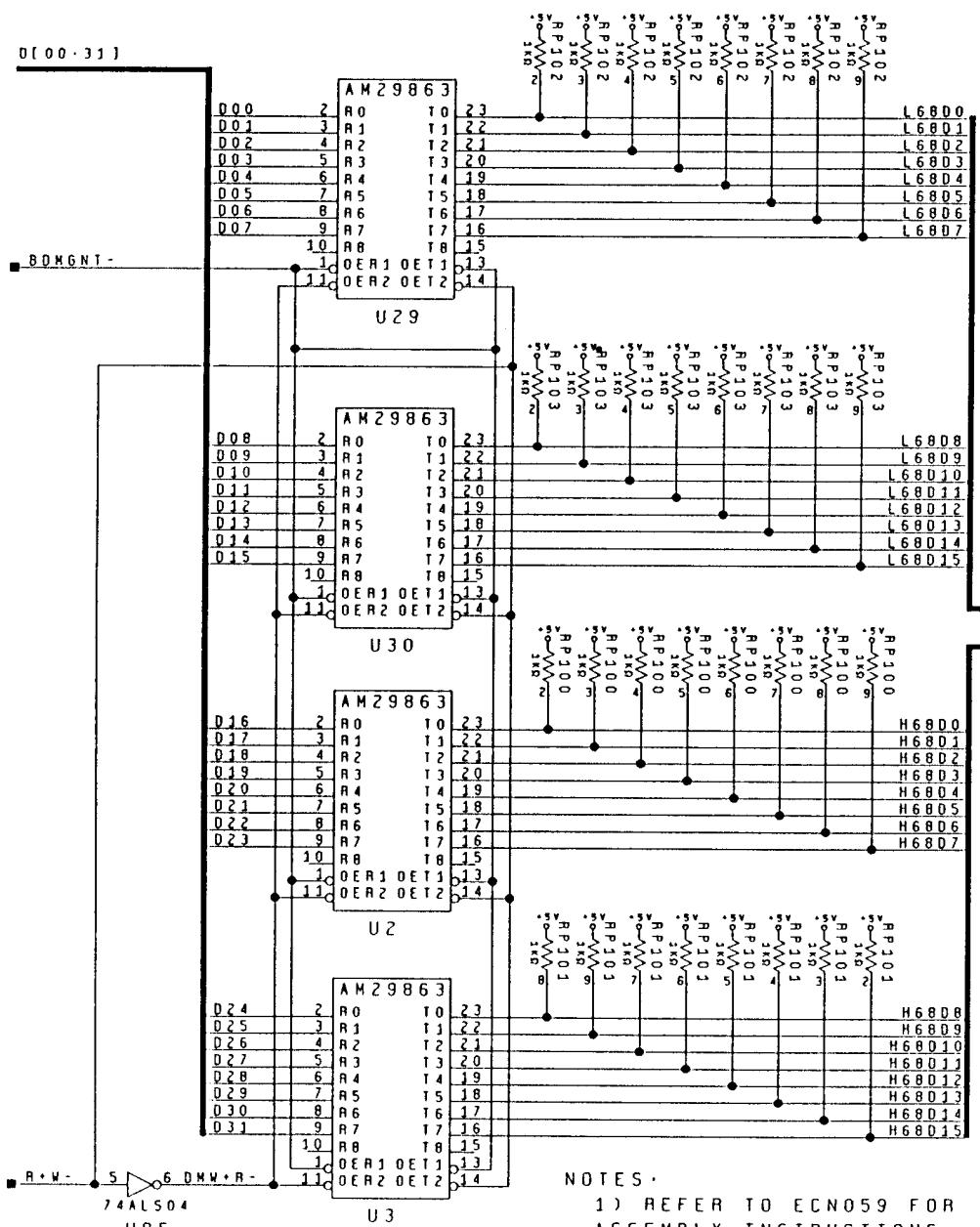
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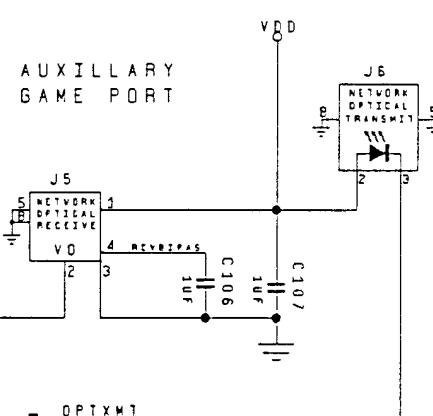
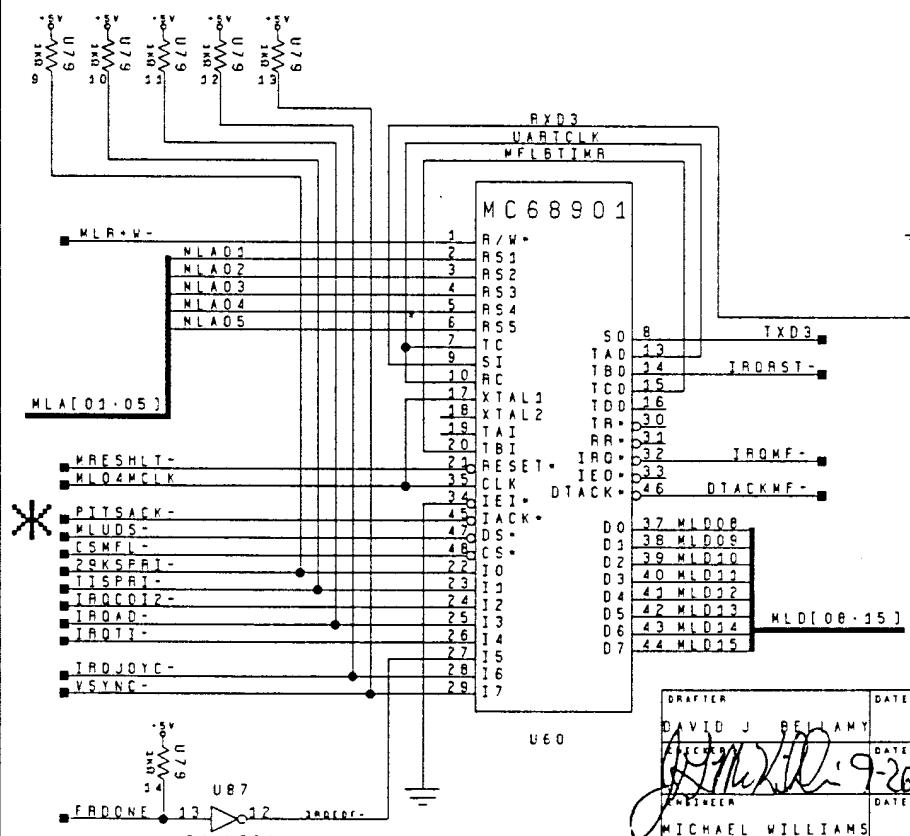
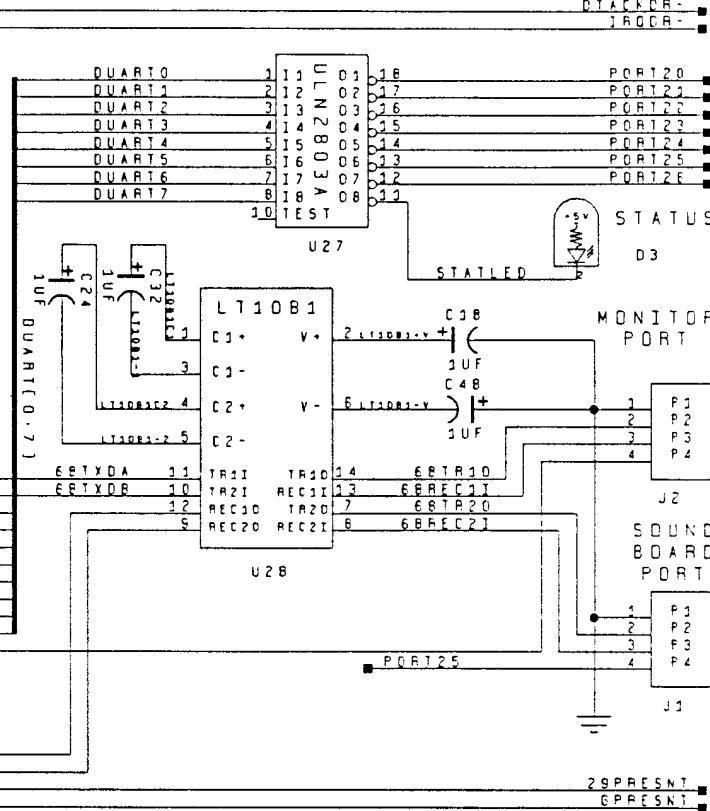
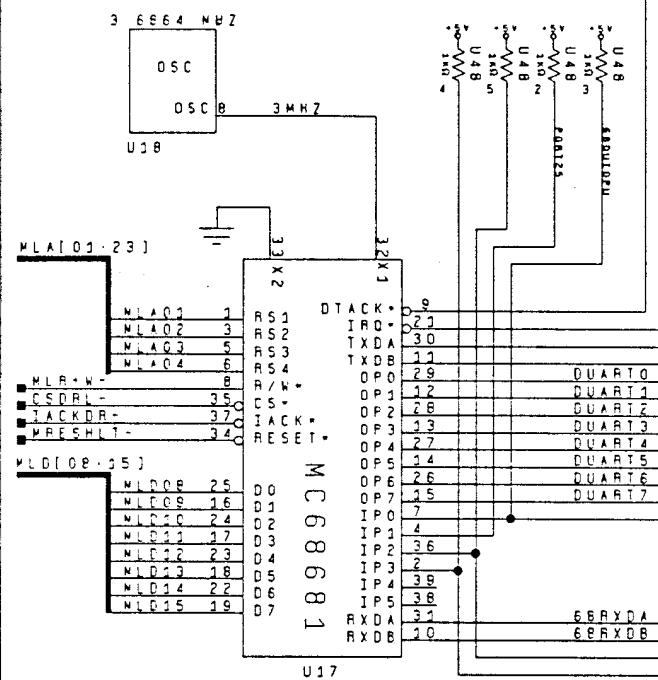
COMPANY CONFIDENTIAL / PROPRIETARY INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
380 LAKEFRONT DR. HUNT VALLEY, MD 21030



NOTES:

1) NET NAME CHANGE TO U60^45 FROM IACKMF- TO PITSACK- IS FOR CURRENT BUILD ONLY IMPLEMENTED AS A PCB MODIFICATION PER ECN058. REFER TO SHEET 3.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY	9-26-90	280 LAKEFRONT DR. HUNT VALLEY, MD 21030	
REVIEWER	DATE	TITLE	
MICHAEL WILLIAMS		HOST	
APPROVAL	DATE	DUART, MULTI-FUNCTION PERIPHERAL AND RS-232 PORTS	
		SIZE	DRAWING NUMBER
		C	DW-000110-0011-01
APPROVAL	DATE	REV M	RELEASE
DATE 9-23-1990-17-09		SHEET 10 OF 14	

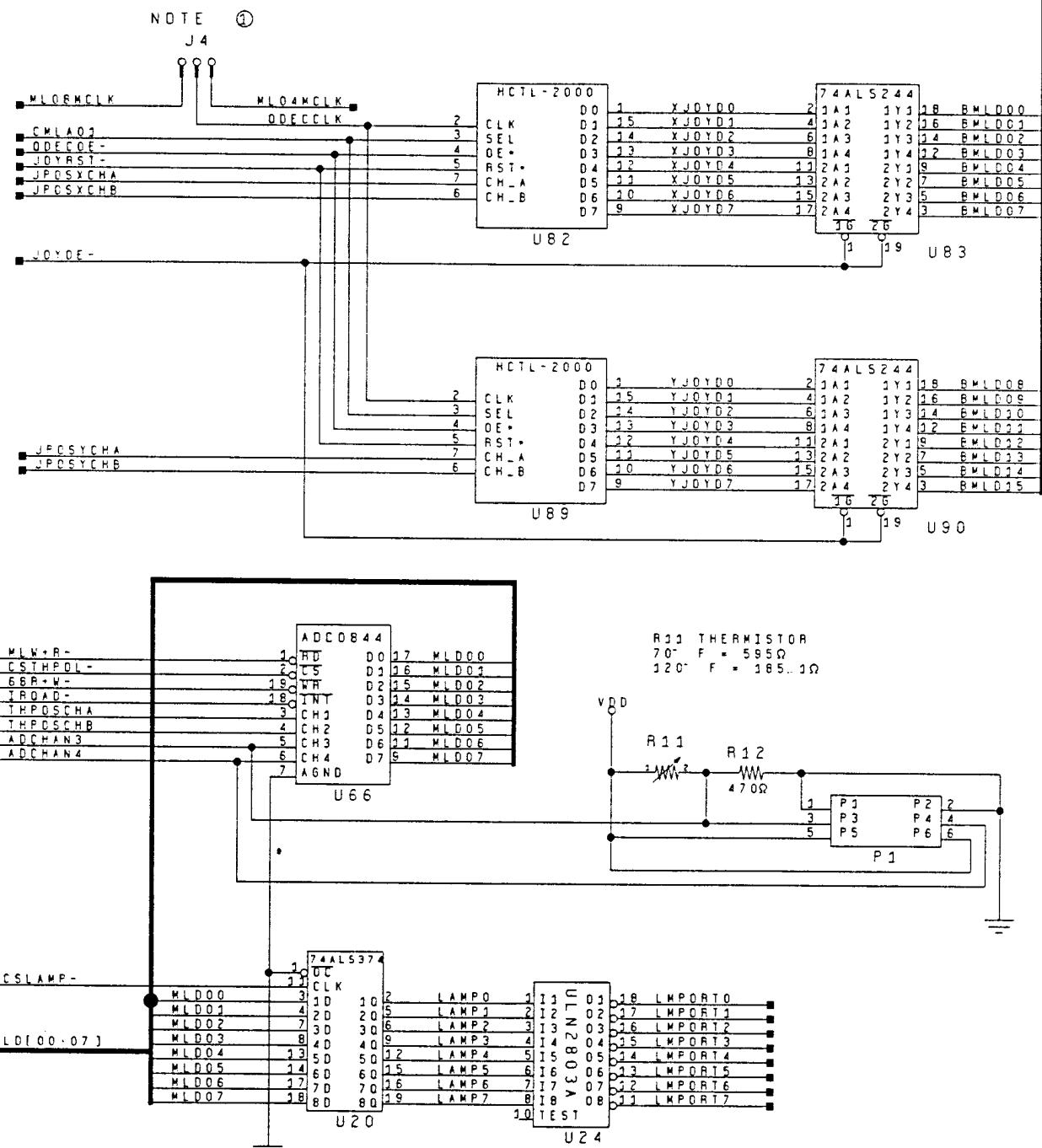
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84100-35



NOTE.

- 1) REF ECN059. INSTALL
WIRE STAPLE BETWEEN
J4-2 AND J4-3.

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

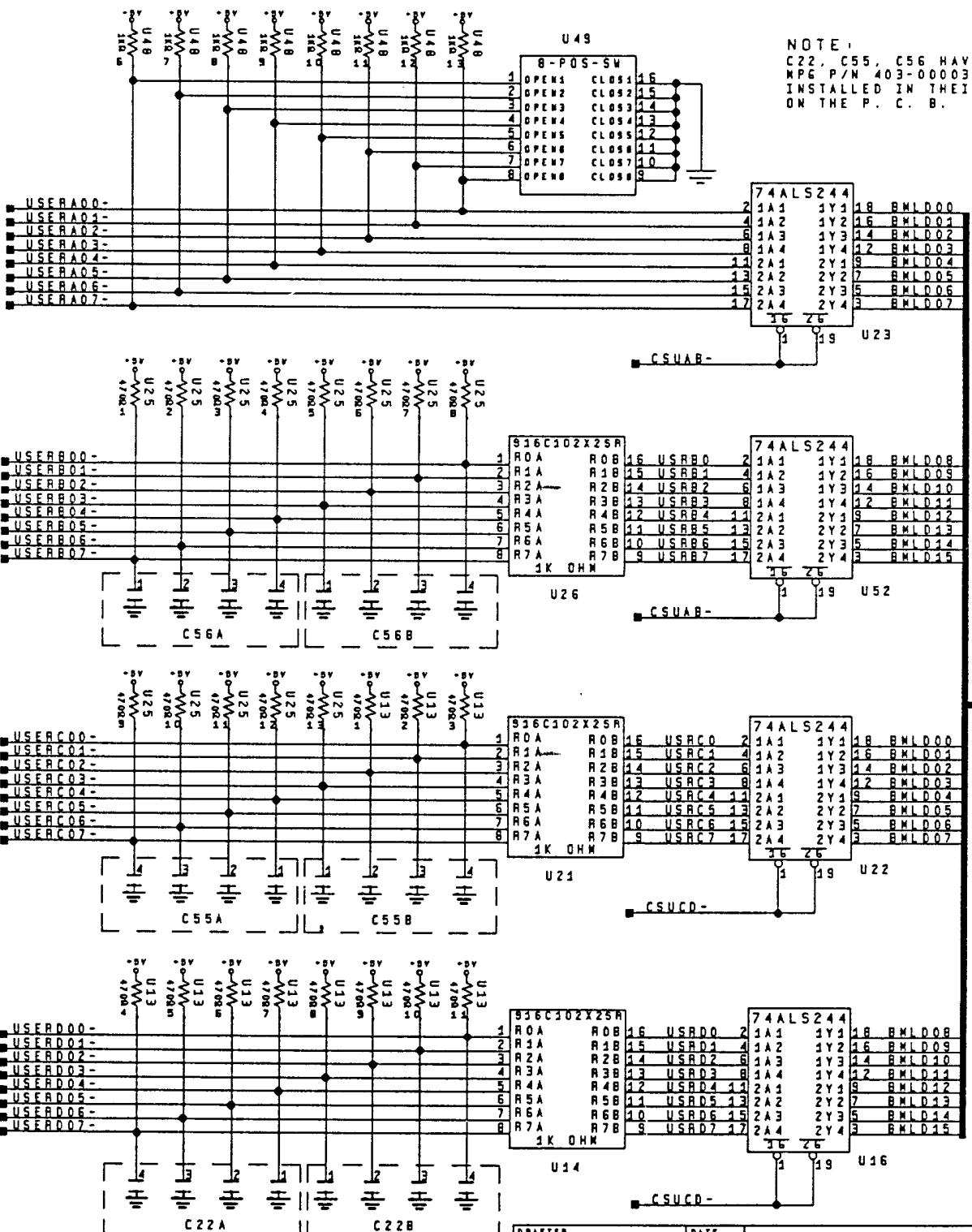
DRAFTER <i>David J. Belanay</i>	DATE 9-25-90	MICROPROSE GAMES 380 LAKEFRONT DR HUNT VALLEY, MD 21030		
CHECKER <i>John W. D.</i>	DATE	TITLE HOST		
ENGINEER <i>Michael Williams</i>	DATE	10 INTERFACE AND LAMP DRIVERS		
APPROVAL	DATE	SIZE C	DRAWING NUMBER DW-00011C-0011-01	
APPROVAL	DATE		REV N	RELEASE
DATE 9-21-1990 17:38			SHEET 33 OF 34	

D

E

2

1



DRAFTER

DAVID J. BELLAMY

5/1/00

DATE

MICROPROSE GAMES

180 LAKEFRONT DR. HUNT VALLEY, MD 21030

TITLE

HOST USER SWITCH INPUT INTERFACE

ENGINEER

MICHAEL WILLIAMS

APPROVAL

DATE

SIZE

DRAWING NUMBER

DW-00011C-0011-01

C

REV H RELEASE

DATE 5-1-1990-13-30

SHEET 12 OF 14

COMPANY CONFIDENTIAL / PROPRIETARY INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

4

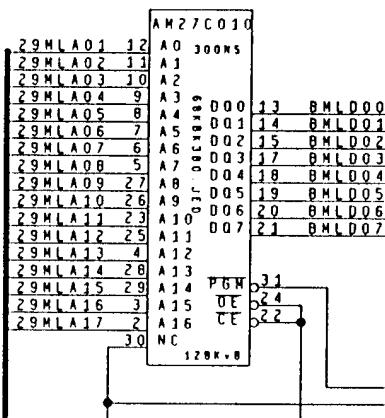
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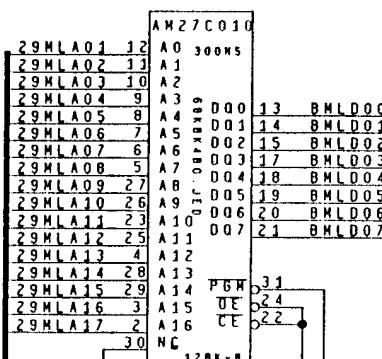
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BMLD[00-15]

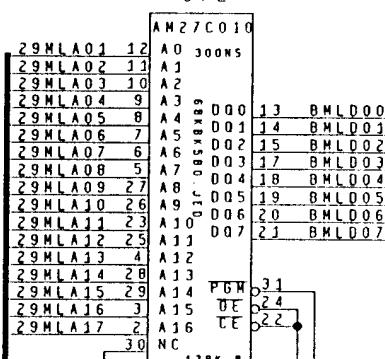
U70



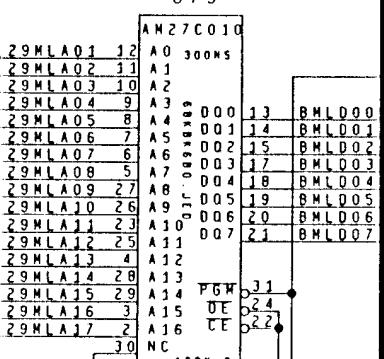
U71



U72



U73



VDD
WW
R9
JKQ
R10
ROMPROMU
J10
J11
J12
J13
J14

CONFIDENTIAL / PROPRIETARY INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

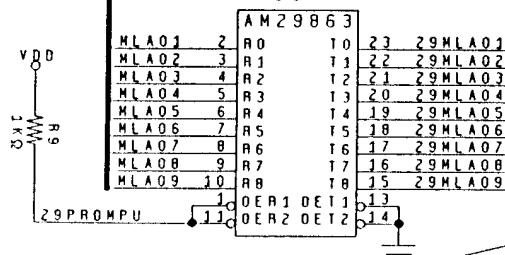
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C

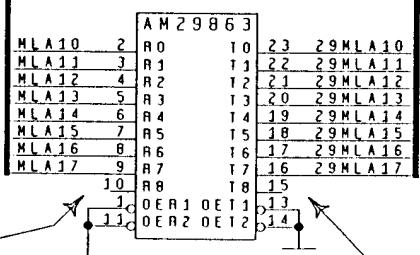
B

MLA[01-17]

U64



U81



NOTE ②

NOTE
1) U70, U71, U72, U73, U94, U95, U96
AND U97 INSTALLED IN SOCKET
(MPG P/N 600-00002-632)

2) PBC MODIFICATION. CUT AND REMOVE
PINS 10 AND 15 OF U81. INSERT
JUMPER WIRE IN BETWEEN PCB PADS
U81-10 AND U81-15.

DRAFTER	DATE
DAVID J. BENALLY	DATE
CHECKED	DATE
JAY G. MCKIBBIN	DATE
ENGINEER	DATE
APPROVAL	DATE
APPROVAL	DATE

MICROPROSE GAMES
180 LAKEFRONT DR. HUNT VALLEY, MD 21030
TITLE
HOST
DR. MATH INSTRUCTION EPROM

SIZE	DRAWING NUMBER
C	DW-00011C-0011-01
REV L	RELEASE
DATE 9-24-1990-14-05 SHEET 13 OF 14	

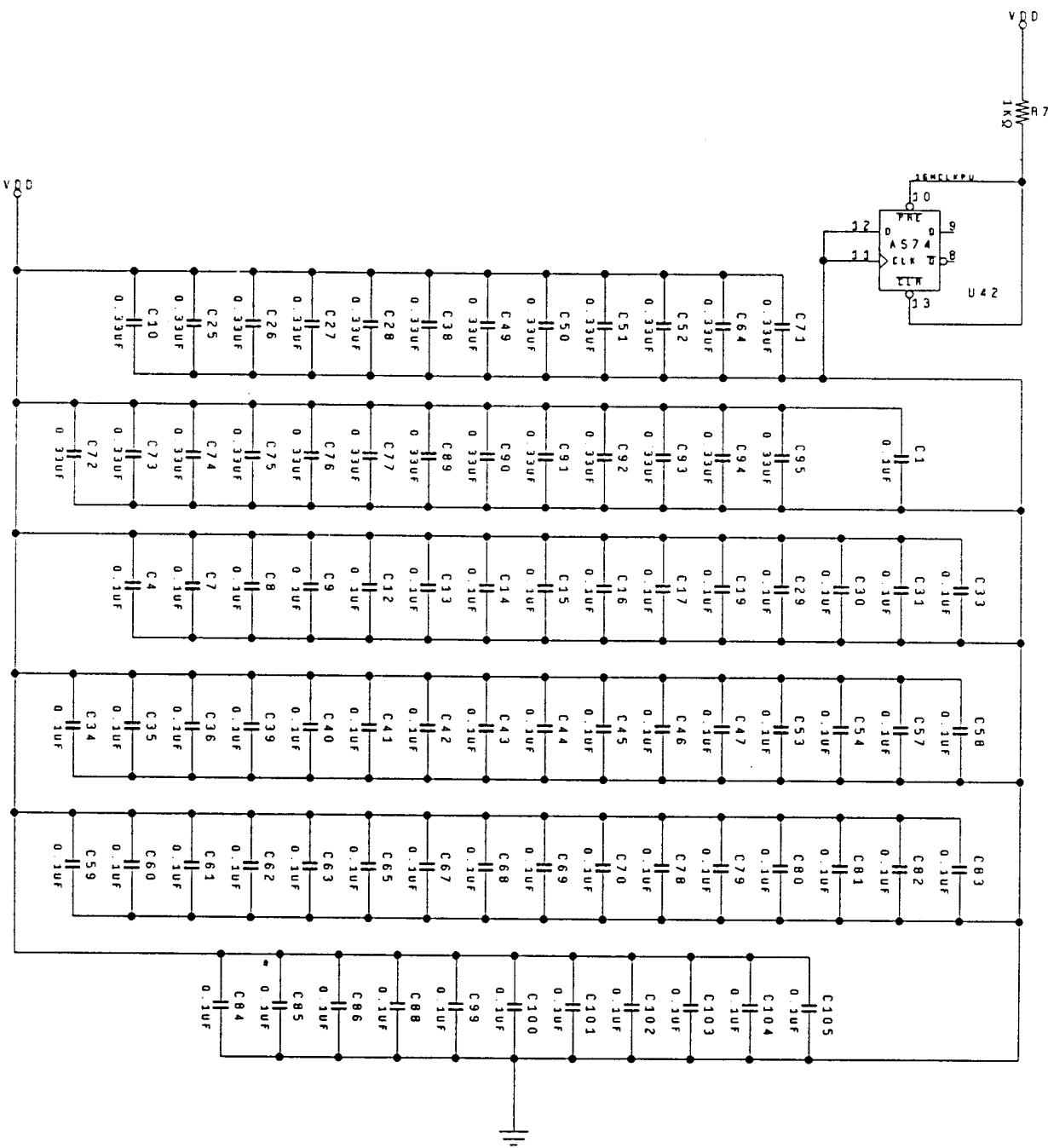
A

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1



COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER <i>DAVID J. BELLEVILLE</i>	DATE <i>1-14-91</i>	MICROPROSE GAMES	
DESIGNER <i>JAY G. MCKIBBIN</i>	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
ENGINEER	DATE	TITLE HOST	
APPROVAL	DATE	POWER DECOUPLING	
APPROVAL	DATE	SIZE <i>C</i>	DRAWING NUMBER DW-00011C-0011-01
		REV D	RELEASE
		DATE 3-22-1990-17-18 SHEET 14 OF 34	

B I L L O F M A T E R I A L S
H O S T P R O C E S S O R P . C . B .
A S S E M B L Y : A 1 0 - 0 0 0 0 1 - 0 0 1

DATE	ECN	REV	SHEET NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	ECN	A	A					A	A																		
	ECN	B	B				B																				
	ECN	C	C					C																			
3-21-90	ECN	D	D	D	D	D	D	D	D																		
5-01-90	ECN017	E	E						E																		
5-01-90	ECN018	F	F	F																							
5-01-90	ECN020	G	G	G																							
5-01-90	ECN021	H	H	H																							
5-07-90	ECN016	K	K			K																					
9-11-90	ECN059	L	L	L	L	L	L	L	L																		
5-07-90	ECN080	M	M					M																			
9-21-90	ECN089	N	N	N																							
9-21-90	ECN109	O	O					O																			
10-08-90	ECN113	P	P				P																				
10-23-90	ECN122	R	R		R			R																			
10-25-90	ECN123	S	S					S																			
1-08-91	ECN150	T	T					T	T																		

COMPANY CONFIDENTIAL /
PROPRIETARY INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES		
CHECKER <i>John S.</i>	DATE 1-14-91	180 LAKEFRONT DRIVE, HUNT VALLEY, MD 21030		
ENGINEER JAY G. MCKIBBIN	DATE	TITLE	DWG NO	REV
APPROVAL	DATE	BILL OF MATERIALS		
APPROVAL	DATE	HOST PROC. P.C.B. A10-00001-001		
		DATE 1-14-1991-11-29		A
		SHEET 1 OF 7		

MICROPROSE GAMES, 180 Lakefront Drive, Hunt Valley, Maryland 21030
 PROJECT NAME: HOST PROCESSOR DRWG. NO.: PL-00011A-0011-01 REV: T

DATE: Wed 5-Oct-1990

ITEM QTY PART NUMBER PART DESCRIPT VALUE MPG P/N

		<u>REF. DES.</u>			
1	2	914C471X2PE U13, U25	PULRESPAK	4700OHM	501-00022-471
2	1	90B08S U49	8POS DIPSW		625-00001-208
3	3	916C102X2SR U14, U21, U26	ISORESPAK	1K	501-00031-102
4	6	929CZ5U104Z050B C22A, C22B, C55A, C55B, C56A, C56B	DIPCAPX4	.1 UF	403-00003-104
5	1	SN74ALS374N U20	OCTALDFLOPS		200-00374-200
6	7	SN74ALS244AN U16, U22, U23, U52, U55, U83, U90	OCTBUFFR		200-00244-200
7	1	ADC0844CCN U66	A/DCONVERTR		246-00001-200
8	2	HCTL-2000 U82, U89	QUADDECODER		246-00002-200
9	2	ULN2803A U24, U27	LAMPDRIVER		279-00001-200
10	67	C410C104M5U5CA C4, C1, C33, C7, C8, C14, C13, C12, C9, C31, C30, C29, C19, C17, C15, C16, C45, C44, C46, C47, C53, C54, C57, C58, C40, C41, C42, C43, C39, C36, C34, C35, C70, C69, C78, C79, C80, C81, C82, C83, C63, C65, C67, C68, C62, C61, C59, C60, C85, C84, C86, C88, C102, C101, C100, C99, C105, C103, C104, C107, C106, C109, C96, C98, C23, C6, C2	AXCERCAP	0.1UF	402-00382-104
11	[0]	68001-503 [J4]	3PINJUMPR	.100"	610-00002-003
12	0	92915-R-HS-1 J5	FIBROPTRCV		240-00004-001
13	0	92915-T-DD J6	FIBROPTXMT		240-00005-001
14	1	X0-53B-3.6864 U18	DIOSCILATR	3.6864M	290-00002-003
15	*	MC68681-P U17	DUART		240-00003-200
16	1	LT1081CN U28	RS232DRV		235-00001-200

ITEM QTY	PART NUMBER REF. DES.	PART DESCRIPT	VALUE	MPG P/N
17	4 173D105X0035V C18,C24,C32,C48	AXTANTCAP	1UF	422-00072-105
18 D*	1 MC68901-P U60	MFPERIPHERL		130-68901-204
19	8 AM29C863PC U2,U3,U19,U29,U30,U46,U64,U81	9BIBUSDRV		235-00005-200
20	2 22-05-7048 J1,J2	MOLEX4PIN	.100"	610-00601-004
21	5 1N914 D1,D7,D8,D9,D10,D11	DIODE		300-00002-003
22	5 CCF-07 102G R2,R7,R8,R9,R10	2%MFRES	1K	503-00002-102
23	2 173D335X0020V C5,C20	AXTANTCAP	3.3UF	422-00062-335
24	1 SA101A221JAA C200	AXCERCAP	220PF	402-00195-221
25	1 CCF-07 104G R3	2%MFRES	100K	503-00002-104
26	1 1N746A D4	ZENER		301-00002-033
27	1 WX-32.768KHZ X1	CRYSTAL	32KHZ	290-00004-32K
28	1 KSA1A211 SW1	PBSWITCH		625-00002-001
29	1 LM319N U1	VOLTCOMPAR	14DIP	280-00003-200
30	1 DS1215 U84	R/TCLK		291-01215-200
31	27 C412C334M5U5CA C52,C51,C50,C49,C38,C28,C27,C26,C25,C10,C91,C90,C72,C73, C74,C75,C89,C77,C76,C95,C94,C93,C92,C64,C71,C37,C66	AXCERCAP	0.33UF	402-00382-334
32	1 15-51-04-410-000 B1	LITHBATT	3VOLT	390-00001-001
33 *	2 MCM60L256AP12 U39,U62	32Kx8SRAM	120NS	221-00003-212
34	1 SN74ALS175N U37	QUADDFLOPS		200-00175-200

<u>ITEM QTY</u>	<u>PART NUMBER REF. DES.</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
35				
36	2 SN74ALS2541N U53, U54	OCTINVDRVR		200-02541-200
37	* 8 TMS4464-10NL U4, U5, U6, U7, U31, U32, U33, U34	64Kx4DRAM	100NS	220-00001-210
38 A	1 AMPAL23S8-20PC U77	TIMEOUTC	25NS	<u>120-00001-206</u>
39 A	1 GAL16V8A-25P U75	PERIPH2A	25NS	120-00001-005
40 A	1 GAL16V8A-25P U15	VPA_GENA	25NS	120-00001-000
41 A	1 GAL16V8A-25P U74	RAMDECA	15NS	120-00001-002
42 B	1 GAL22V10-15P U59	68ARBA	15NS	120-00001-001
43	1 1N750A D5	ZENER		301-00002-047
44	1 SN74LS393N U78	QUADCOUNTR		202-00393-200
45	1 SN74ALS30AN U10	8INNAND		200-00030-200
46	1 SN74ALS32N U50	QUAD2INOR		200-00032-200
47	2 SN74ALS257N U38, U61	2:1MUX		200-00257-200
48	4 SN74ALS245AN U8, U9, U35, U36	OCTBIDBUFR		200-00245-200
49	1 SN74LS148N U12	8:3ENCODER		202-00148-200
50	1 SN74ALS138N U47	3:8DEMUX		200-00138-200
51	1 68001-502 J3	2PINJUMP	.100"	610-00002-002
52	1 X0-43D-32 U43	DIPOSCILATR	32MHZ	290-00001-032
53	1 SN74AS74N U42	DUALDFLOPS		201-00074-200

<u>ITEM QTY</u>	<u>PART NUMBER</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
	<u>REF. DES.</u>			
54	7 SN74AS244N U44,U45,U51,U58,U63,U65,U80	OCTBUFFR		201-00244-200
55	1 SN74AS1004AN U41	HEXINERTR		201-01004-200
56	1 SN74ALS11AN U86	TRI3INAND		200-00011-200
57	2 SN74ALS04BN U85,U87	HEXINVERTR		200-00004-200
58	1 CCF-07 180G R6	2%MFRES	180OHM	503-00002-180
59	3 916C102X2PE U11,U48,U79	PULLRESPAK	1KOHM	501-00032-102
60 E*	1 MC68000-P12F U40	MICROPROCESR	16MHZ	135-68000-216
61	2 HLMP3600 D2,D3	LEDW/RES	RED	305-00003-002
62	6 173D156X0015W C3,C11,C21,C87,C97,C108	AXTANTCAP	15UF	422-00052-156
63	1 ICTE-5 D6	ZENER	5V	300-00001-002
64	1 71922-016 P4	2x8HEADER	.100"	610-00800-016
65	1 71922-020 P3	2x10HEADER	.100"	610-00800-020
66	1 71922-026 P5	2x13HEADER	.100"	610-00800-026
67	1 26-60-5100 P8	MOLEX10PIN	.156"	610-00601-010
68	1 71922-140 P7	2x20HEADER	.100"	610-00900-040
69	1 533249-1 P6	2x32HEADER	.100"	6 - -064
70				
71 A	1 GAL16V8A-25P U76	SPARMEMA	25NS	120-00001-007

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
		<u>REF. DES.</u>			
72	A 1	GAL16V8A-25P U56	PERIPH1A	25NS	120-00001-004
73	A 1	TIBPAL16L8-7CN U57	ROMDECB	7.5NS	120-00001-103
74	A 1	GAL16V8A-25P U88	IRQCOINA	25NS	120-00001-008
75	1	71922-006 P1	2x3HEADER	.100"	610-00800-006
76	1	71922-010 P2	2x5HEADER	.100"	610-00800-010
77	1	68786-102 J3	SHUNT		715-00001-001
78	[0]	SRS8-12-01	SPACER	.75 "	700-00001-003
79	5	7-0805G-5 TP1,TP2,TP3,TP4,TP5	TEST PIN		710-00001-001
80	1	7-22870-5 TP6	TEST PIN		710-00001-002
81	C* 1	AM27C010-305DC U67	128Kx8EPROM 68KBK0B0.001	300NS	110-00001-100
82	C* 1	AM27C010-305DC U91	128Kx8EPROM 68KBK0B1.001	300NS	110-00001-101
83	C* 1	AM27C010-305DC U68	128Kx8EPROM 68KBK1B0.001	300NS	110-00001-102
84	C* 1	AM27C010-305DC U92	128Kx8EPROM 68KBK1B1.001	300NS	110-00001-103
85	C* 1	AM27C010-305DC U69	128Kx8EPROM 68KBK2B0	300NS	110-00001-004
86	C* 1	AM27C010-305DC U93	128Kx8EPROM 68KBK2B1	300NS	110-00001-005
87	C* 1	AM27C010-305DC U70	128Kx8EPROM 68KBK3B0	300NS	110-00001-006
88	C* 1	AM27C010-305DC U94	128Kx8EPROM 68KBK3B1	300NS	110-00001-007
89	C* 1	AM27C010-305DC U71	128Kx8EPROM 68KBK4B0	300NS	110-00001-008
90	C* 1	AM27C010-305DC U95	128Kx8EPROM 68KBK4B1	300NS	110-00001-009

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u> <u>REF. DES.</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
91	C*	[0] AM27C010-305DC [U72]	128Kx8EPROM 68KBK5B0	300NS	110-00001-010
92	C*	[0] AM27C010-305DC [U96]	128Kx8EPROM 68KBK5B1	300NS	110-00001-011
93	C*	[0] AM27C010-305DC [U73]	128Kx8EPROM 68KBK6B0	300NS	110-00001-012
94	C*	[0] AM27C010-305DC [U97]	128Kx8EPROM 68KBK6B1	300NS	110-00001-013
95	A	2 ICO-320MTT UX77, UX88 [UX15, UX56, UX57, UX74, UX75, UX76]	SOCKET		600-00001-320
96	B	[0] ICO-324MTT [UX59]	SOCKET		600-00001-324
97	C	10 2-644018-2 UX67, UX68, UX69, UX70, UX71, UX91, UX92, UX93, UX94, UX95, [UX72, UX73, UX96, UX97]	SOCKET		600-00002-632
98	D	[0] 1848-AG111D [UX60]	SOCKET		600-00001-648
99	E	1 110-91-964-41-001 UX40	SOCKET		600-00001-964
100		1 RL2003-289-95-D1 R11	TEMPSENSOR	5000OHM	508-00001-501
101		1 CCF-07 471G R12	2PCMFRES	4700OHM	503-00002-471
102		1 CCF-07 820G R1	2PCMFRES	82 OHM	503-00002-820
103		1 FRJ-50 R4	JUMPRES	0 OHM	503-00001-000
104		4 CSC09A01102G RP100, RP101, RP102, RP103	8RESSIPPAK	1 KOHM	501-10008-102

		270			

NOTES:

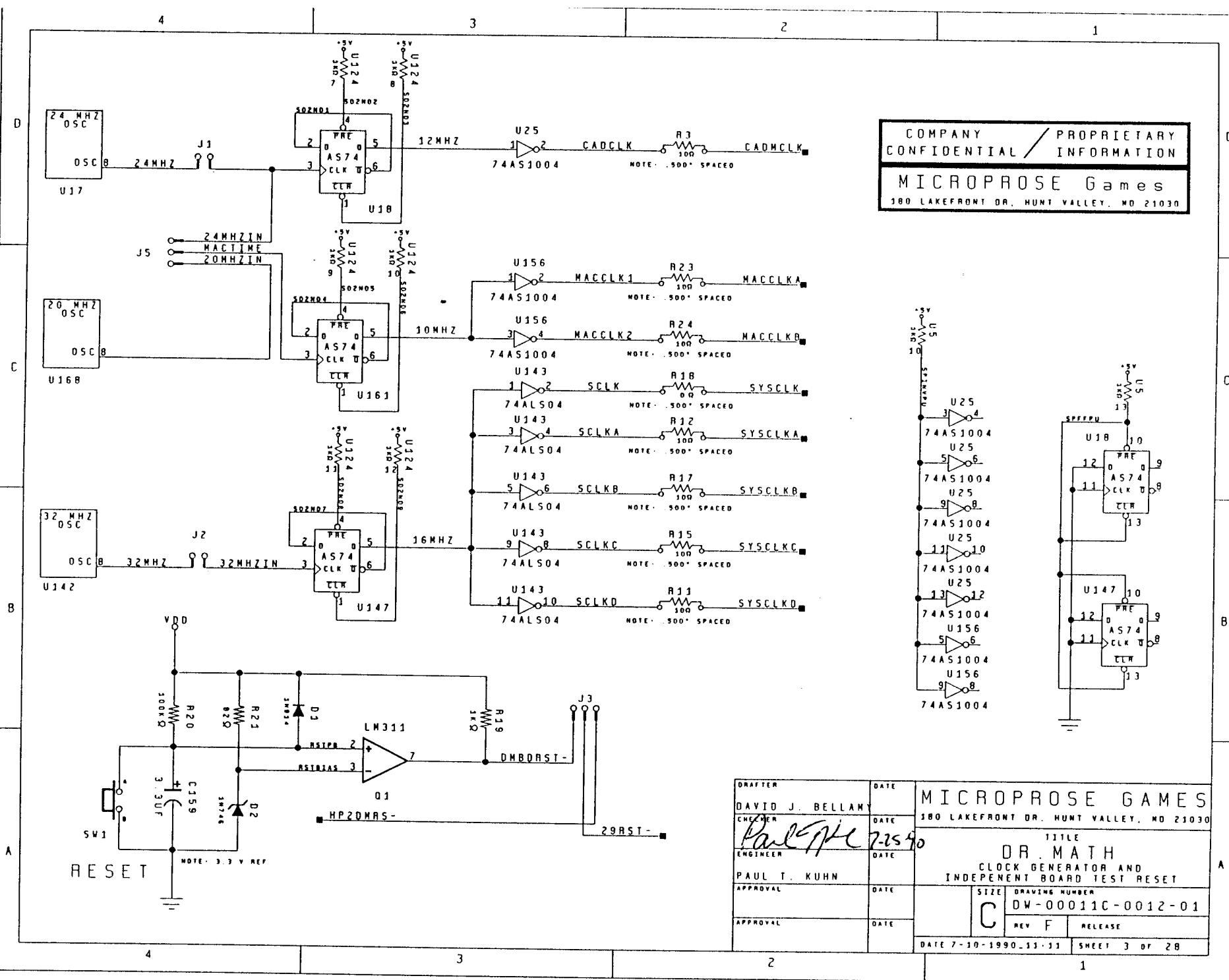
- (1) PARTS REQUIRING 0.33UF DECOUPLING CAPS ARE MARKED (*) IN BETWEEN ITEM NO. AND QTY. COLUMNS.
- (2) PARTS REQUIRING SOCKETS ARE MARKED WITH A LETTER TO CORRESPOND WITH SOCKETS WITH THE SAME LETTER.
- (3) PARTS WITH REFERENCE DESIGNATORS IN BRACKETS [] ARE WILL NOT BE POPULATED DURING PRODUCTION.

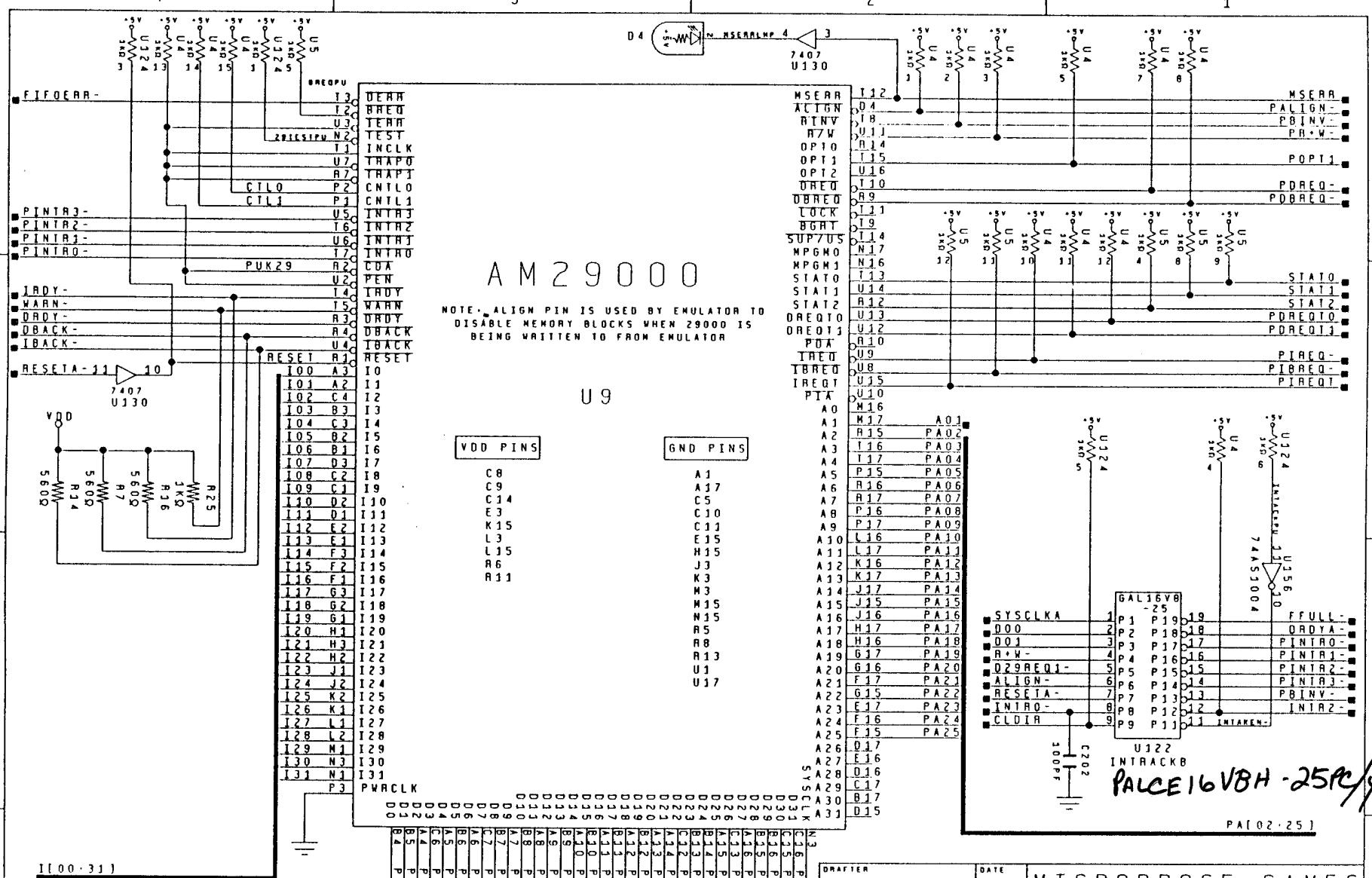
MICROPROSE Games

DR. MATH P.C.B. ASSEMBLY

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

DRAFTER DAVID J. BELLAMY	DATE <i>Paul J. Bellamy 11-8-90</i>	MICROPROSE GAMES 180 LAKEFRONT DR., HUNT VALLEY, MD 21030		
CHEKER <i>Paul J. Bellamy</i>	DATE	TITLE DR. MATH DR. MATH PCB ASSEMBLY		
ENGINEER PAUL T. KUHN	DATE		SIZE DW	DRAWING NUMBER 000011C-0012-01
APPROVAL	DATE		C	REV M
APPROVAL	DATE	DATE 11-8-1990 10:54		SHEET 3 OF 28





COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR, HUNT VALLEY, MD 21030

4

3

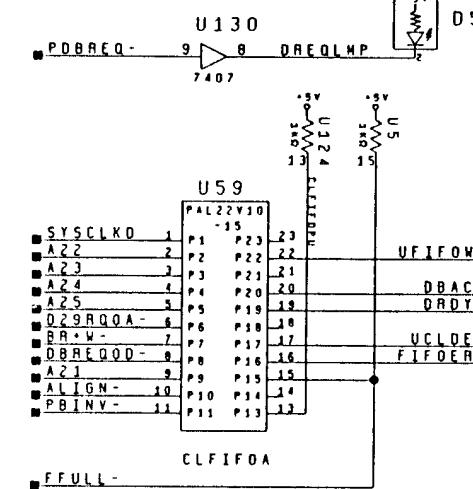
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1

PD[00 - 31]

D[00 - 31]

D



3

U 4 3	
P D 0 0 1 8	8 1 A 1 2 D 0 0
P D 0 0 1 7	8 2 A 2 3 D 0 1
P D 0 2 1 6	8 3 A 3 4 D 0 2
P D 0 3 1 5	8 4 A 4 5 D 0 3
P D 0 4 1 4	8 5 A 5 6 D 0 4
P D 0 5 1 3	8 6 A 6 7 D 0 5
P D 0 6 1 2	8 7 A 7 8 D 0 6
P D 0 7 1 1	8 8 A 8 9 D 0 7

U 5 2	
P D 0 0 8 1 8	8 1 A 1 2 D 0 8
P D 0 9 1 7	8 2 A 2 3 D 0 9
P D 1 0 1 6	8 3 A 3 4 D 1 0
P D 1 1 1 5	8 4 A 4 5 D 1 1
P D 1 2 1 4	8 5 A 5 6 D 1 2
P D 1 3 1 3	8 6 A 6 7 D 1 3
P D 1 4 1 2	8 7 A 7 8 D 1 4
P D 1 5 1 1	8 8 A 8 9 D 1 5

U 5 3	
P D 1 6 1 8	8 1 A 1 2 D 1 6
P D 1 7 1 7	8 2 A 2 3 D 1 7
P D 1 8 1 6	8 3 A 3 4 D 1 8
P D 1 9 1 5	8 4 A 4 5 D 1 9
P D 2 0 1 4	8 5 A 5 6 D 2 0
P D 2 1 1 3	8 6 A 6 7 D 2 1
P D 2 2 1 2	8 7 A 7 8 D 2 2
P D 2 3 1 1	8 8 A 8 9 D 2 3

U 4 4	
P D 2 4 1 8	8 1 A 1 2 D 2 4
P D 2 5 1 7	8 2 A 2 3 D 2 5
P D 2 6 1 6	8 3 A 3 4 D 2 6
P D 2 7 1 5	8 4 A 4 5 D 2 7
P D 2 8 1 4	8 5 A 5 6 D 2 8
P D 2 9 1 3	8 6 A 6 7 D 2 9
P D 3 0 1 2	8 7 A 7 8 D 3 0
P D 3 1 1 1	8 8 A 8 9 D 3 1

A[02 - 25]

U 3 1	
P A 2 4	2 A 1 Y 1 18 A 2 4
P A 2 5	4 A 2 Y 2 16 A 2 5
P A 0 2	6 A 3 Y 3 14 A 0 2
P A 0 3	8 A 4 Y 4 12 A 0 3
P A 0 4	1 A 1 Y 1 9 A 0 4
P A 0 5	3 A 2 Y 2 7 A 0 5
P A 0 6	5 A 3 Y 3 5 A 0 6
P A 0 7	7 A 4 Y 4 3 A 0 7

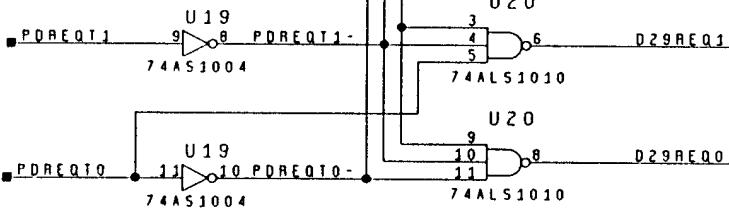
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P A 0 8	2 A 1 Y 1 18 A 0 8
P A 0 9	4 A 2 Y 2 16 A 0 9
P A 1 0	6 A 3 Y 3 14 A 1 0
P A 1 1	8 A 4 Y 4 12 A 1 1
P A 1 2	1 A 1 Y 1 9 A 1 2
P A 1 3	3 A 2 Y 2 7 A 1 3
P A 1 4	5 A 3 Y 3 5 A 1 4
P A 1 5	7 A 4 Y 4 3 A 1 5

U 5 4	
P A 1 6	2 A 1 Y 1 18 A 1 6
P A 1 7	4 A 2 Y 2 16 A 1 7
P A 1 8	6 A 3 Y 3 14 A 1 8
P A 1 9	8 A 4 Y 4 12 A 1 9
P A 2 0	1 A 1 Y 1 9 A 2 0
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P A 2 3	7 A 4 Y 4 3 A 2 3

C



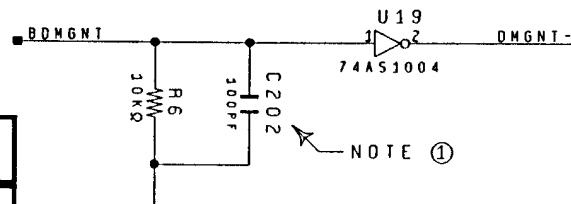
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NOTE.
1) PCB MODIFICATION. C202 ADDED
BETWEEN U19^1 AND U18^7.

A

COMPANY / PROPRIETARY INFORMATION
CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



DRAFTER: DAVID J. BELLAMY DATE: 11-7-90
CHECKER: DATE:
ENGINEER: PAUL T. KUHN DATE:
APPROVAL: DATE:
APPROVAL: DATE:
SIZE: C DRAWING NUMBER: DW-00011C-0012-0-1
REV: L RELEASE:
DATE 11-7-1990 11-52 SHEET 5 OF 28

D

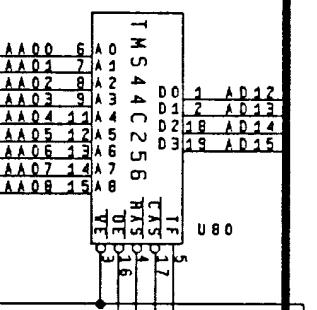
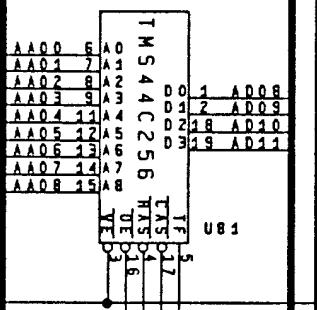
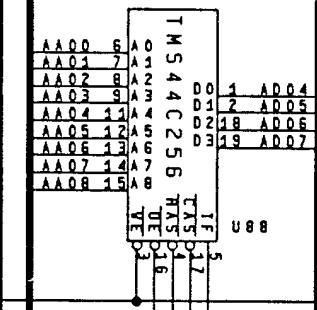
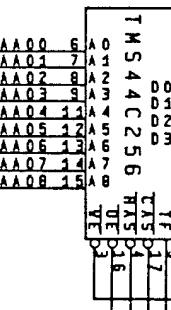
E

2

1

AA[00-08]

AD[00-31]

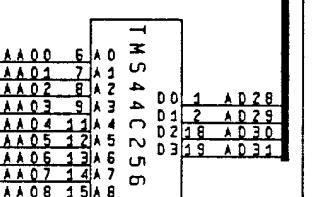
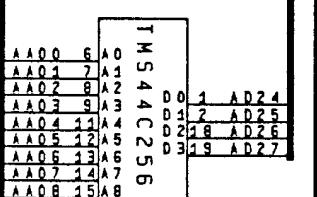
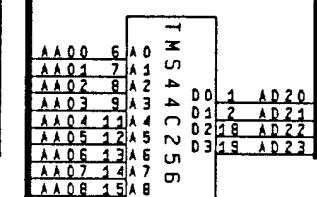
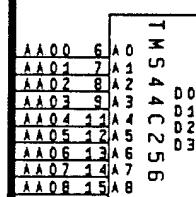


U91

U88

U81

U80



U90

U89

U99

U98

DRAMAW-

29ENWA-

29RASA-

29CASA-

AD[00-31]

D[00-31]

74AS244	
A000	2 1A1 1Y1 18 D00
A001	4 1A2 1Y2 16 D01
A002	6 1A3 1Y3 14 D02
A003	8 1A4 1Y4 12 D03
A004	11 2A1 2Y1 9 D04
A005	12 2A2 2Y2 7 D05
A006	15 2A3 2Y3 5 D06
A007	17 2A4 2Y4 3 D07
	16 Z6

74AS244	
A008	2 1A1 1Y1 18 D08
A009	4 1A2 1Y2 16 D09
A010	6 1A3 1Y3 14 D10
A011	8 1A4 1Y4 12 D11
A012	11 2A1 2Y1 9 D12
A013	12 2A2 2Y2 7 D13
A014	15 2A3 2Y3 5 D14
A015	17 2A4 2Y4 3 D15
	16 Z6

74AS244	
A016	2 1A1 1Y1 18 D16
A017	4 1A2 1Y2 16 D17
A018	6 1A3 1Y3 14 D18
A019	8 1A4 1Y4 12 D19
A020	11 2A1 2Y1 9 D20
A021	12 2A2 2Y2 7 D21
A022	15 2A3 2Y3 5 D22
A023	17 2A4 2Y4 3 D23
	16 Z6

74AS244	
AD24	2 1A1 1Y1 18 D24
AD25	4 1A2 1Y2 16 D25
AD26	6 1A3 1Y3 14 D26
AD27	8 1A4 1Y4 12 D27
AD28	11 2A1 2Y1 9 D28
AD29	12 2A2 2Y2 7 D29
AD30	15 2A3 2Y3 5 D30
AD31	17 2A4 2Y4 3 D31
	16 Z6

74AS244	
U73	1 19
U65	1 19
U50	1 19
U41	1 19

ENRAMAD-

D

E

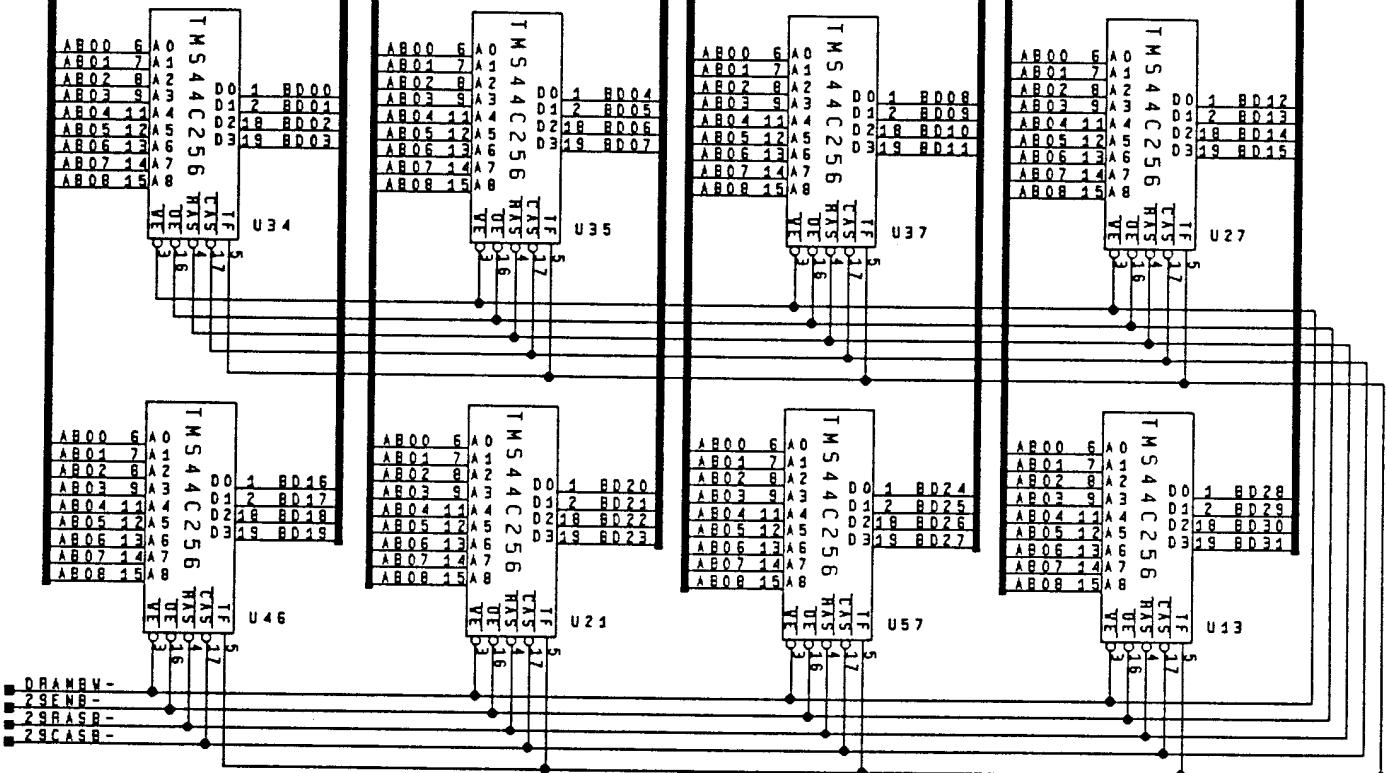
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1

AB[00-08]

BD[00-31]

E



BD[00-31]

D[00-31]

C

ENHANCED-

BD[00-31]

I[00-31]

B

ENHANCED-

COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
<i>Paul T. Kuhn</i>	3-23-94		
ENGINEER	DATE	TITLE	
PAUL T. KUHN		DR. MATH	
APPROVAL	DATE	'B' BANK - 256K X 32 DRAW ARRAY	
<i>Paul T. Kuhn</i>		DW-00011C-0012-01	
DATE		SIZE	DRAWING NUMBER
<i>Paul T. Kuhn</i>		C	REV C RELEASE
DATE 3-21-1990-0-47		SHEET 7 OF 28	

D[00-31]

- BDR+W-
- BDEN-
- BDW+R-
- Z9RAS
- Z9CASA
- Z9CASB

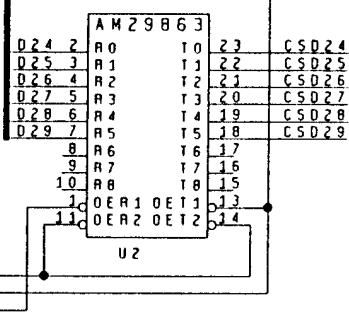
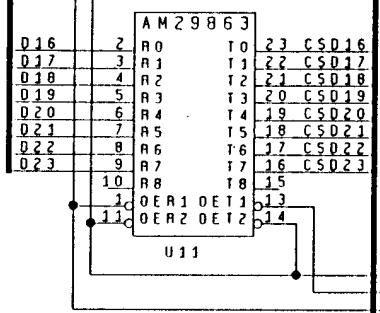
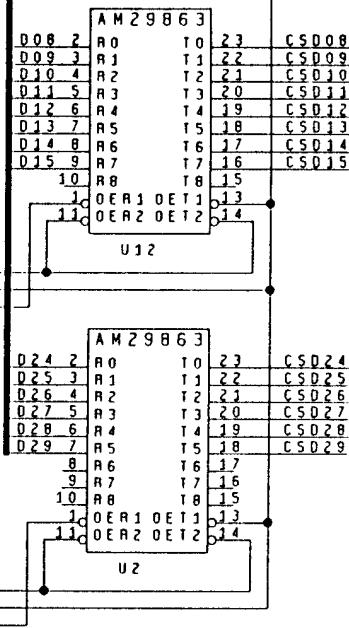
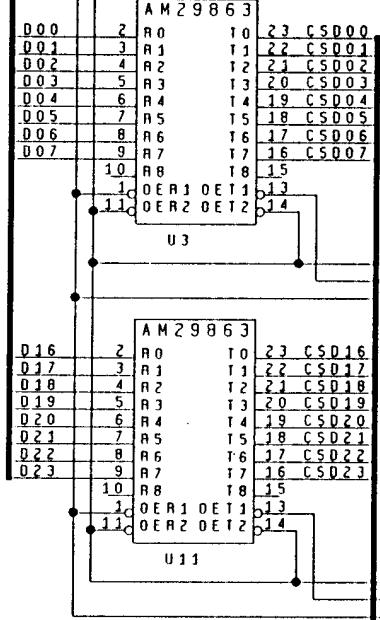
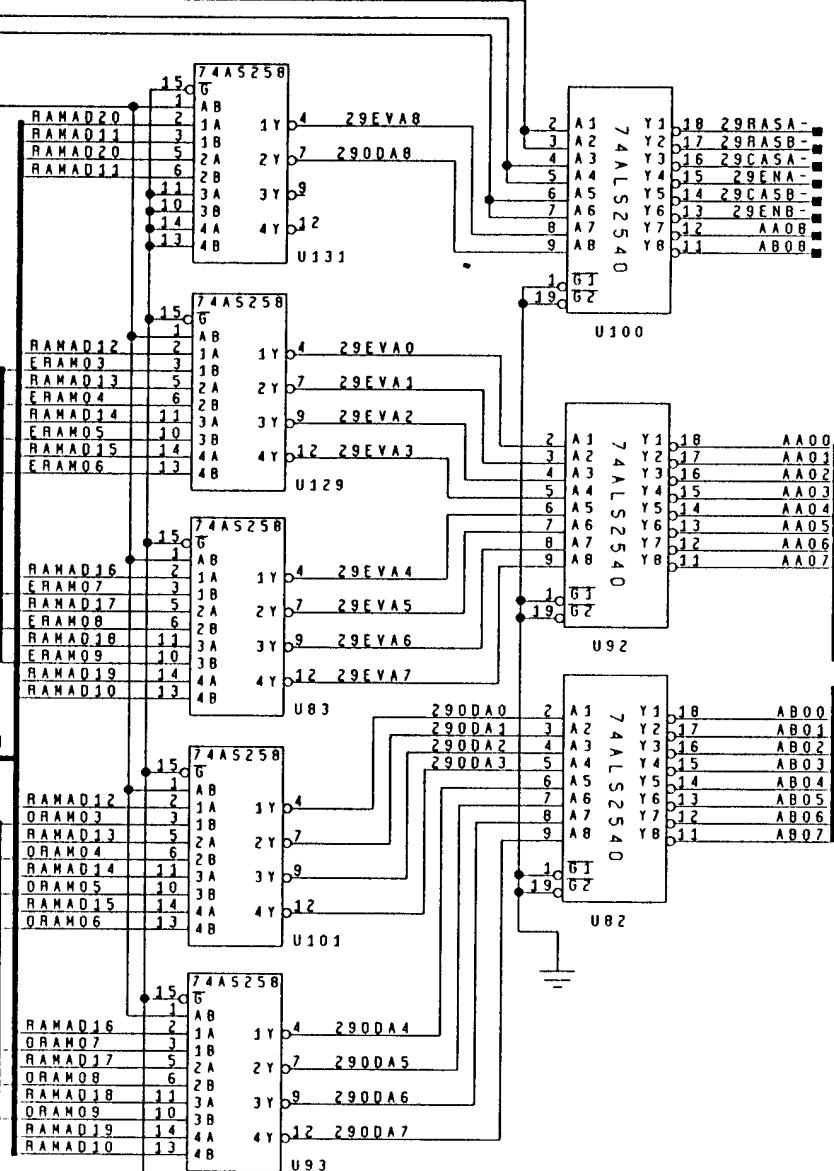
- ADRMUX

CONFIDENTIAL / PROPRIETARY INFORMATION
MICROPROSE Games
 180 LAKEFRONT DR. HUNT VALLEY, MD 21030

ERAM[03-09]

RAMAD[10-20]

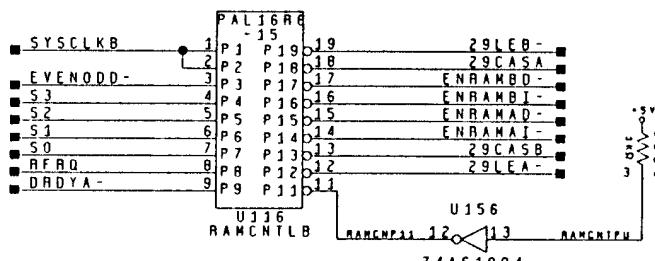
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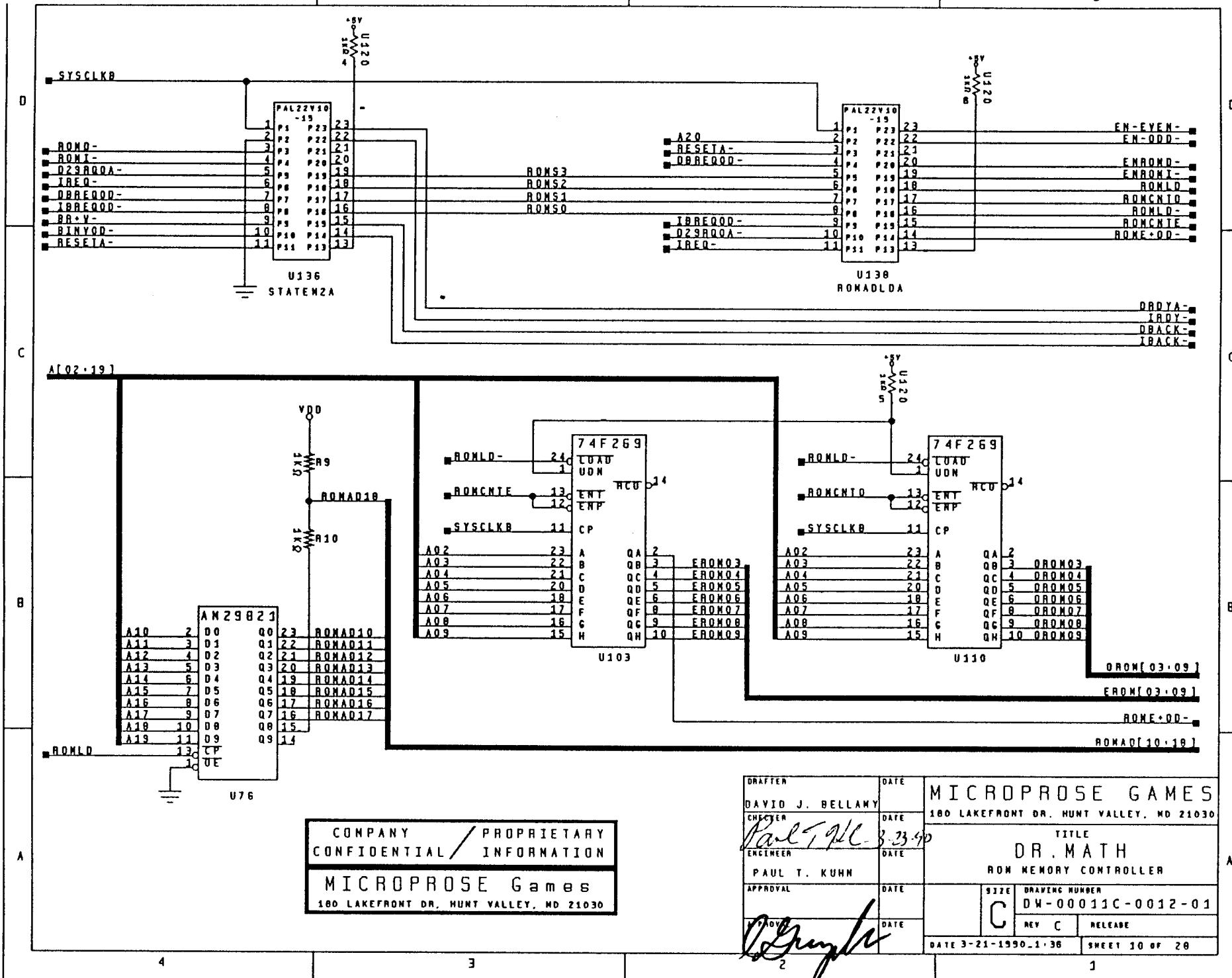
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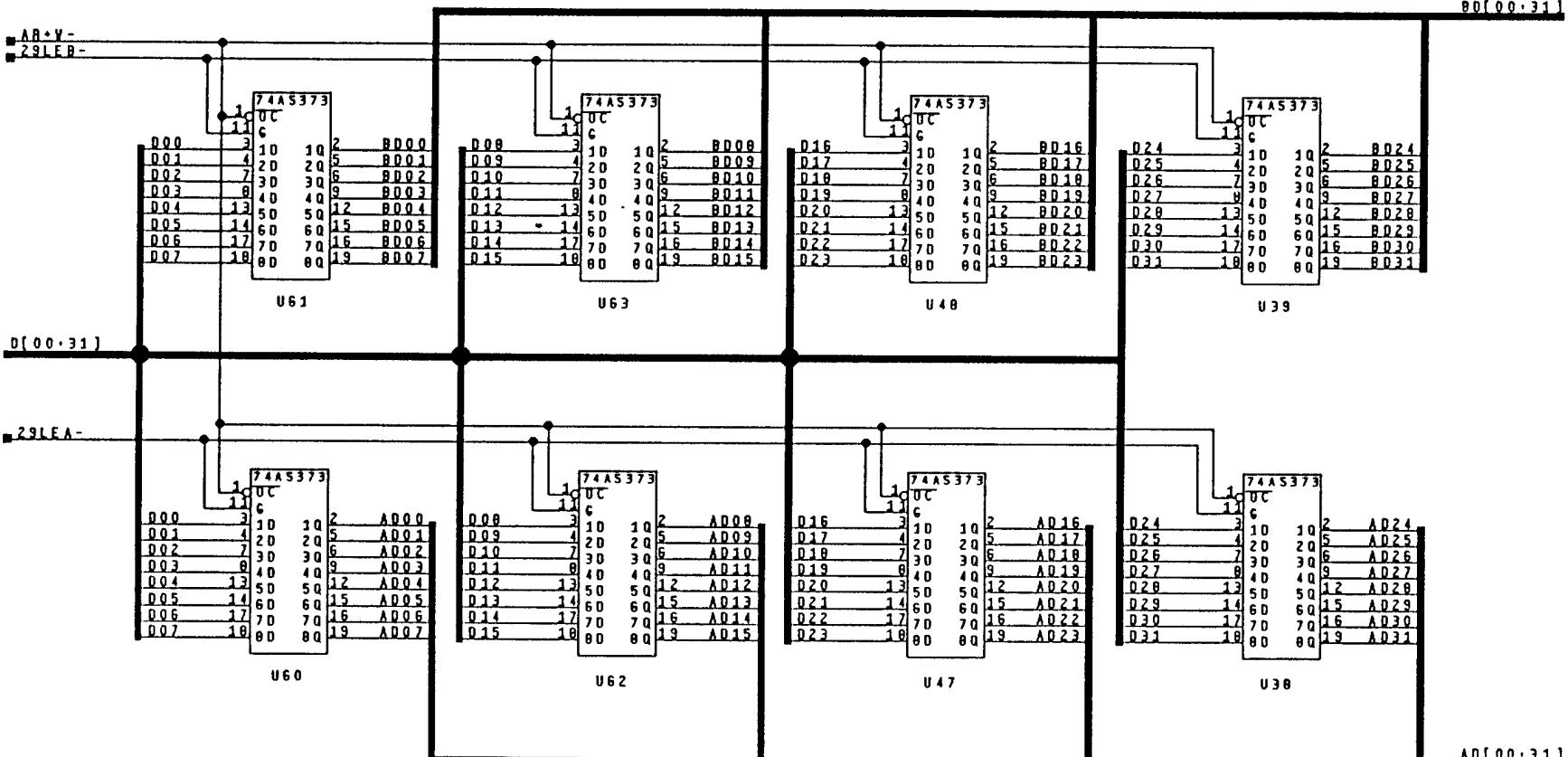
AA[00-07]

AB[00-07]



drafter	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
checker	DATE		
<i>Paul T. Kuhn</i>	8-15-90		
engineer	DATE	TITLE	
PAUL T. KUHN		Dr. MATH	
approval	DATE	ADDR MUX & WRITE LATCHES	
		AND DATA BUFFERS	
approval	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0012-01
rev	H	RELEASE	
		DATE 8-15-1990-11-21 SHEET 9 OF 28	





COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER: DAVID J. BELLAMY DATE: 180 LAKEFRONT DR. HUNT VALLEY, MD 21030
Paul T. Kuhn 3-23-90 TITLE: DR. MATH
 CHECKER: DATE
 ENGINEER: DATE
 APPROVAL: DATE
 DRAWING NUMBER: DW-00011C-0012-01
 SIZE: C REV: C RELEASE:
 DATE: 3-21-1990-1-37 SHEET 11 OF 28

ROMD[00-31]

D

D

U30

74AS244							
ROMD00	2	1A1	1Y1	18	I00		
ROMD01	4	1A2	1Y2	16	I01		
ROMD02	6	1A3	1Y3	14	I02		
ROMD03	8	1A4	1Y4	12	I03		
ROMD04	10	2A1	2Y1	9	I04		
ROMD05	12	2A2	2Y2	7	I05		
ROMD06	14	2A3	2Y3	5	I06		
ROMD07	16	2A4	2Y4	3	I07		
		TG	ZG				
		1	19				

U16

74AS244							
ROMD16	2	1A1	1Y1	18	I16		
ROMD17	4	1A2	1Y2	16	I17		
ROMD18	6	1A3	1Y3	14	I18		
ROMD19	8	1A4	1Y4	12	I19		
ROMD20	10	2A1	2Y1	9	I20		
ROMD21	12	2A2	2Y2	7	I21		
ROMD22	14	2A3	2Y3	5	I22		
ROMD23	16	2A4	2Y4	3	I23		
		TG	ZG				
		1	19				

U74

74AS244							
ROMD00	2	1A1	1Y1	18	D00		
ROMD01	4	1A2	1Y2	16	D01		
ROMD02	6	1A3	1Y3	14	D02		
ROMD03	8	1A4	1Y4	12	D03		
ROMD04	10	2A1	2Y1	9	D04		
ROMD05	12	2A2	2Y2	7	D05		
ROMD06	14	2A3	2Y3	5	D06		
ROMD07	16	2A4	2Y4	3	D07		
		TG	ZG				
		1	19				

U51

74AS244							
ROMD16	2	1A1	1Y1	18	D16		
ROMD17	4	1A2	1Y2	16	D17		
ROMD18	6	1A3	1Y3	14	D18		
ROMD19	8	1A4	1Y4	12	D19		
ROMD20	10	2A1	2Y1	9	D20		
ROMD21	12	2A2	2Y2	7	D21		
ROMD22	14	2A3	2Y3	5	D22		
ROMD23	16	2A4	2Y4	3	D23		
		TG	ZG				
		1	19				

U24

74AS244							
ROMD08	2	1A1	1Y1	18	I08		
ROMD09	4	1A2	1Y2	16	I09		
ROMD10	6	1A3	1Y3	14	I10		
ROMD11	8	1A4	1Y4	12	I11		
ROMD12	10	2A1	2Y1	9	I12		
ROMD13	12	2A2	2Y2	7	I13		
ROMD14	14	2A3	2Y3	5	I14		
ROMD15	16	2A4	2Y4	3	I15		
		TG	ZG				
		1	19				

U8

74AS244							
ROMD24	2	1A1	1Y1	18	I24		
ROMD25	4	1A2	1Y2	16	I25		
ROMD26	6	1A3	1Y3	14	I26		
ROMD27	8	1A4	1Y4	12	I27		
ROMD28	10	2A1	2Y1	9	I28		
ROMD29	12	2A2	2Y2	7	I29		
ROMD30	14	2A3	2Y3	5	I30		
ROMD31	16	2A4	2Y4	3	I31		
		TG	ZG				
		1	19				

U66

74AS244							
ROMD08	2	1A1	1Y1	18	D08		
ROMD09	4	1A2	1Y2	16	D09		
ROMD10	6	1A3	1Y3	14	D10		
ROMD11	8	1A4	1Y4	12	D11		
ROMD12	10	2A1	2Y1	9	D12		
ROMD13	12	2A2	2Y2	7	D13		
ROMD14	14	2A3	2Y3	5	D14		
ROMD15	16	2A4	2Y4	3	D15		
		TG	ZG				
		1	19				

U42

74AS244							
ROMD24	2	1A1	1Y1	18	D24		
ROMD25	4	1A2	1Y2	16	D25		
ROMD26	6	1A3	1Y3	14	D26		
ROMD27	8	1A4	1Y4	12	D27		
ROMD28	10	2A1	2Y1	9	D28		
ROMD29	12	2A2	2Y2	7	D29		
ROMD30	14	2A3	2Y3	5	D30		
ROMD31	16	2A4	2Y4	3	D31		
		TG	ZG				
		1	19				

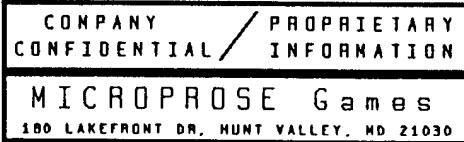
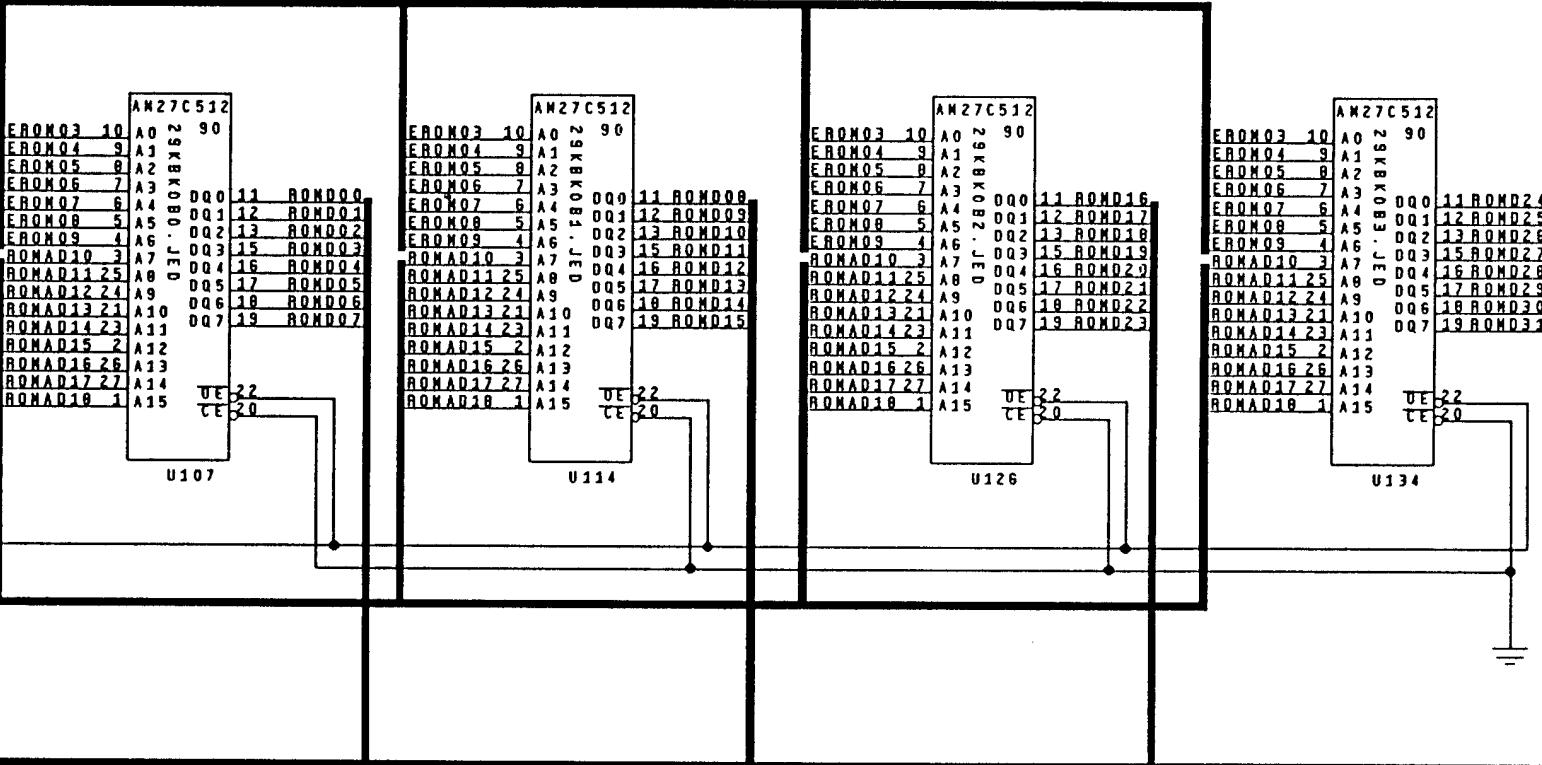
I[00-31]

D[00-31]

COMPANY
CONFIDENTIAL / PROPRIETARY INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY DATE
 CHECKER *Paul T. Kuhn* 3-23-90 TITLE
 ENGINEER PAUL T. KUHN 29K
 APPROVAL *John* DATE SIZE DRAWING NUMBER
 RELEASE *C* DATE DW-00011C-0012-01
 SIGNATURE DATE 3-21-1990-1-37 SHEET 12 OF 28

EROM[03-09]



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHEKER	DATE	TITLE	
<i>Paul T. Kuhn</i>	3-23-90	DR. MATH	
ENGINEER	DATE	EVEN INSTRUCTION EPROM	
PAUL T. KUHN		SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00011C-0012-01
<i>David J. Bellamy</i>		REV C	RELEASE
DATE 3-23-1990 1-139		SHEET 13 OF 28	

0 ROM[03-09]

AM27C512		
OROM03	10	A0 ~ 90
OROM04	9	A1 S
OROM05	8	A2 B
OROM06	7	A3 X
OROM07	6	A4 D Q0
OROM08	5	A5 B Q1
OROM09	4	A6 C Q2
ROMAD10	3	A7 E Q4
ROMAD11	25	A8 F Q4
ROMAD12	24	A9 G Q5
ROMAD13	21	A10 H Q6
ROMAD14	23	A11 I Q7
ROMAD15	2	A12 J
ROMAD16	26	A13 K
ROMAD17	27	A14 L
ROMAD18	1	A15 M
		UE 22 CE 30

U108

AM27C512		
OROM03	10	A0 ~ 90
OROM04	9	A1 S
OROM05	8	A2 B
OROM06	7	A3 X
OROM07	6	A4 B Q0
OROM08	5	A5 C Q1
OROM09	4	A6 D Q2
ROMAD10	3	A7 E Q3
ROMAD11	25	A8 F Q4
ROMAD12	24	A9 G Q5
ROMAD13	21	A10 H Q6
ROMAD14	23	A11 I Q7
ROMAD15	2	A12 J
ROMAD16	26	A13 K
ROMAD17	27	A14 L
ROMAD18	1	A15 M
		UE 22 CE 30

U115

AM27C512		
OROM03	10	A0 ~ 90
OROM04	9	A1 S
OROM05	8	A2 B
OROM06	7	A3 X
OROM07	6	A4 B Q0
OROM08	5	A5 C Q1
OROM09	4	A6 D Q2
ROMAD10	3	A7 E Q3
ROMAD11	25	A8 F Q4
ROMAD12	24	A9 G Q5
ROMAD13	21	A10 H Q6
ROMAD14	23	A11 I Q7
ROMAD15	2	A12 J
ROMAD16	26	A13 K
ROMAD17	27	A14 L
ROMAD18	1	A15 M
		UE 22 CE 30

U127

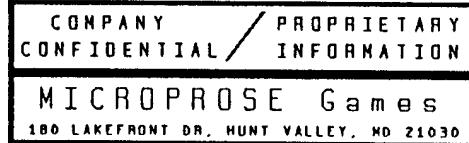
AM27C512		
OROM03	10	A0 ~ 90
OROM04	9	A1 S
OROM05	8	A2 B
OROM06	7	A3 X
OROM07	6	A4 B Q0
OROM08	5	A5 C Q1
OROM09	4	A6 D Q2
ROMAD10	3	A7 E Q3
ROMAD11	25	A8 F Q4
ROMAD12	24	A9 G Q5
ROMAD13	21	A10 H Q6
ROMAD14	23	A11 I Q7
ROMAD15	2	A12 J
ROMAD16	26	A13 K
ROMAD17	27	A14 L
ROMAD18	1	A15 M
		UE 22 CE 30

U135

-EN-000-

ROMAD[10-18]

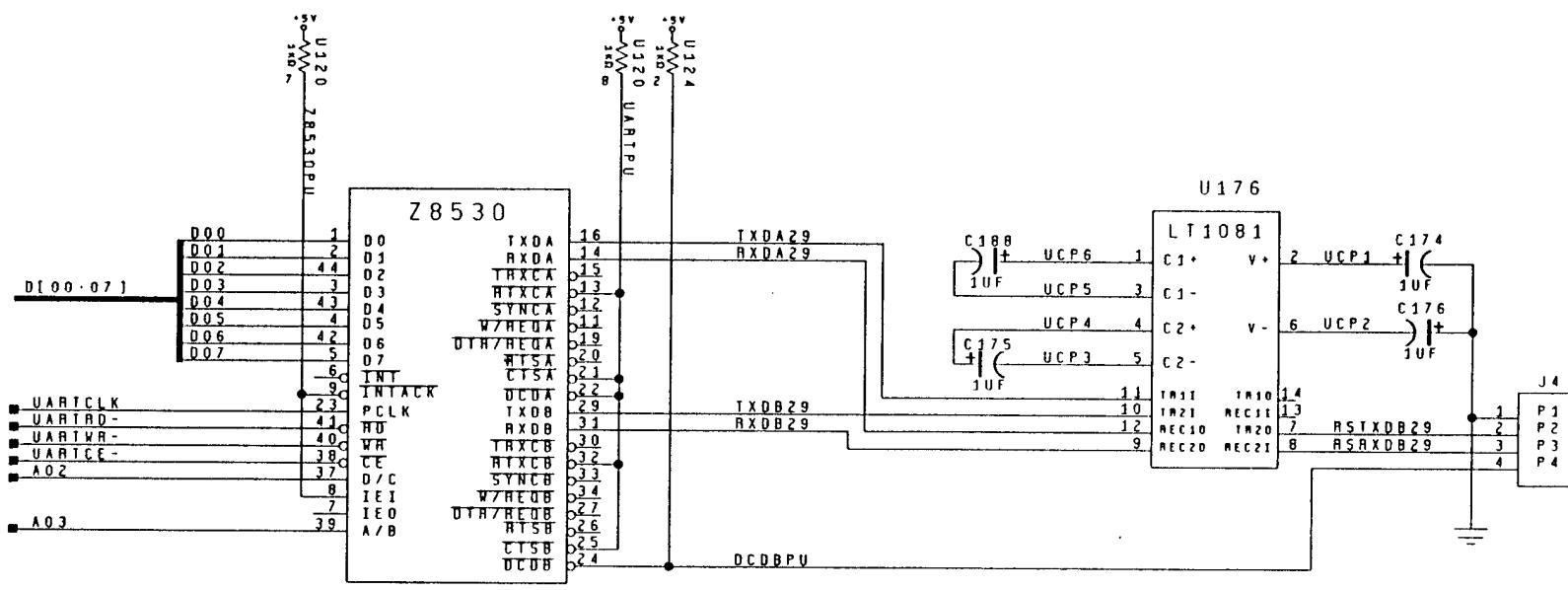
ROMD[00-31]



DRAFTER <i>David J. Bellamy</i>	DATE
CHECKER <i>Paul T. Kuhn</i>	DATE 3-23-90
ENGINEER <i>Paul T. Kuhn</i>	DATE
APPROVAL <i>John G. Grayson</i>	DATE
MICROPROSE GAMES 180 LAKEFRONT DR, HUNT VALLEY, MD 21030	
TITLE DR. MATH	
000 INSTRUCTION EPROM	
SIZE C	DRAWING NUMBER DW-00011C-0012-01
REV C	RELEASE
DATE 3-21-1990 1:39 SHEET 14 OF 28	

D

0

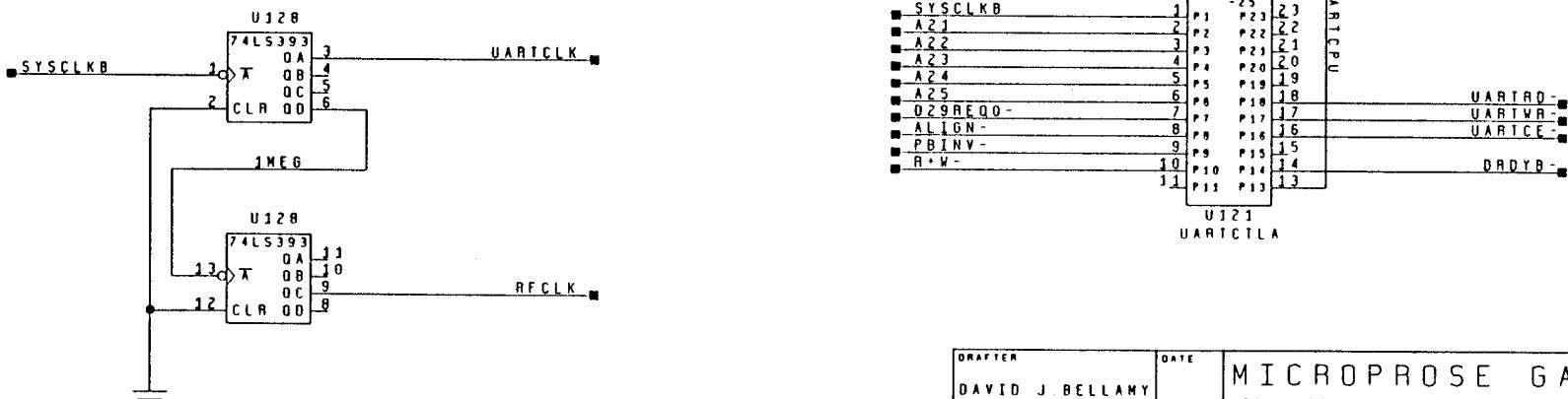


C

C

B

B



RNY[00-31]

X[00-31]

U12	PX0
U9	PX1
R6	PX2
U1	PX3
X00	U15
X01	X0
X02	T15
X03	X1
X04	R14
X05	X2
X06	T14
X07	X3
X08	U14
X09	X4
X10	T13
X11	X5
X12	U13
X13	X6
X14	R13
X15	X7
X16	T12
X17	X8
X18	R12
X19	X9
X20	T11
X21	X10
X22	U10
X23	X11
X24	T11
X25	X12
X26	U11
X27	X13
X28	T10
X29	X14
X30	U10
X31	X15

ENXA-
ENXB-
XSEL
HIMAC

U16
ENXA

T16
ENXB

U17
XSEL

R16
TCX

F15
FTX

A M 2 9 C 3 2 3

U 1 4 9

[VDD PINS] A4,A6,A13,B9,E17,G3,L15,L16,L17,M17,R7
 [GND PINS] A2,A6,A10,C7,C17,C15,C16,C17,J17,L3,R1,R11,U3
 [NC PINS] A3,A9,A14,B2,B9,C3,C4,C14,D4,D17

PY0	M2
PY1	J2
PY2	E2
PY3	A1
Y0	R2
P3	RNY00
Y1	P3
P2	RNY01
Y2	P2
P1	RNY02
Y3	P1
M2	RNY03
M1	RNY04
Y5	M1
M3	RNY05
Y6	M3
M1	RNY06
Y7	M1
M3	RNY07
Y8	M3
L2	RNY08
K1	RNY09
L1	RNY10
K2	RNY11
K3	RNY12
J3	RNY13
J1	RNY14
H2	RNY15
H3	RNY16
H1	RNY17
G2	RNY18
H1	RNY19
G1	RNY20
F2	RNY21
F3	RNY22
F1	RNY23
E1	RNY24
E3	RNY25
D1	RNY26
D2	RNY27
D3	RNY28
C2	RNY29
C1	RNY30
B1	RNY31

ENYA-
ENYB-
YSEL
TCY
FTY

U1
O1
O2
I17
P15
R3

P[00-31]

HACCLKA
ENPI-
NRML-

U119	
1	2
74AS1004	

ACTL

COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR, HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR, HUNT VALLEY, MD 21030	
CHIEF ENGINEER	DATE	TITLE	
PAUL T. KUHN		DR. MATH	
APPROVAL	DATE	MULTIPLY ACCUMULATOR	
DATE	SIZE	DRAWING NUMBER	
3-23-93	C	DW-00011C-0012-01	
	REV	C	RELEASE
DATE 3-21-1990-1-40		SHEET 16 OF 28	

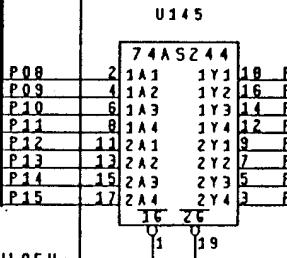
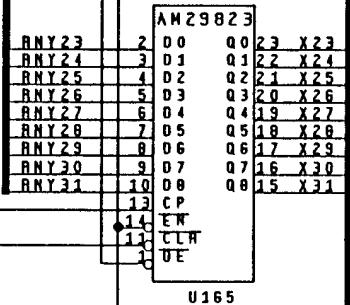
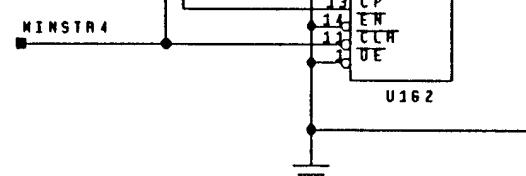
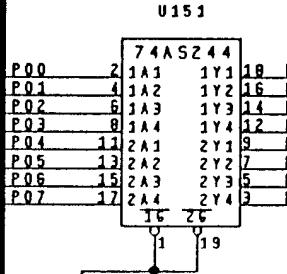
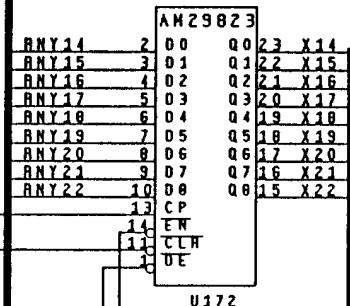
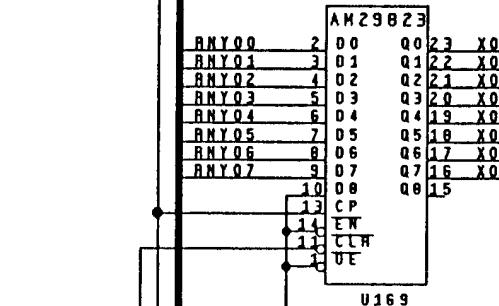
Boyle

P[00 : 31]

 MACCLKB
 RESETC-
 MACCLKA

RNY[00 : 31]

D



HULDEU-

X[00 : 31]

RNY[00 : 31]

COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
<i>Bob G.</i>	3-23-90	DR. MATH	
ENGINEER	DATE	MAC AND SRAM BUFFERS	
PAUL T. KUHN		SIZE DRAWING NUMBER	
APPROVAL	DATE	DW-00011C-0012-01	
APPROV'D	DATE	C	REV C
		RELEASE	
		DATE 3-21-1990-1-41 SHEET 17 OF 28	

O'Boyle

MACCLKB
 MACCLKA
 NRML-
 RESETC-
 MULDEN-
 P[00-31]

RNY[00-31]

		AM29827		
P14	2	00	Y0	23 RNY00
P15	3	01	Y1	22 RNY01
P16	4	02	Y2	21 RNY02
P17	5	03	Y3	20 RNY03
P18	6	04	Y4	19 RNY04
P19	7	05	Y5	18 RNY05
P20	8	06	Y6	17 RNY06
P21	9	07	Y7	16 RNY07
P22	10	08	Y8	15 RNY08
	11	09	Y9	14
	12	UE1		
	13	UE2		

U157

		AM29823		
P00	2	00	Q0	23 RNY10
P01	3	01	Q1	22 RNY19
P02	4	02	Q2	21 RNY20
P03	5	03	Q3	20 RNY21
P04	6	04	Q4	19 RNY22
P05	7	05	Q5	18 RNY23
P06	8	06	Q6	17 RNY24
P07	9	07	Q7	16 RNY25
	10	08	Q8	15
	11	CP		
	12	EN		
	13	CLR		
	14	UE		

U146

		AM29827		
P23	2	00	Y0	23 RNY09
P24	3	01	Y1	22 RNY10
P25	4	02	Y2	21 RNY11
P26	5	03	Y3	20 RNY12
P27	6	04	Y4	19 RNY13
P28	7	05	Y5	18 RNY14
P29	8	06	Y6	17 RNY15
P30	9	07	Y7	16 RNY16
P31	10	08	Y8	15 RNY17
	11	09	Y9	14
	12	UE1		
	13	UE2		

U155

		AM29823		
P08	2	00	Q0	23 RNY26
P09	3	01	Q1	22 RNY27
P10	4	02	Q2	21 RNY28
P11	5	03	Q3	20 RNY29
P12	6	04	Q4	19 RNY30
P13	7	05	Q5	18 RNY31
	8	06	Q6	17
	9	07	Q7	16
	10	08	Q8	15
	11	CP		
	12	EN		
	13	CLR		
	14	UE		

U137

COMPANY CONFIDENTIAL	/ PROPRIETARY INFORMATION
MICROPROSE Games 180 LAKEFRONT DR. HUNT VALLEY, MD 21030	

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
<i>Janet Gil</i>	3-23-90	DR. MATH	
ENGINEER	DATE	DOT PRODUCT NORMALIZATION	
PAUL T. KUHN			
APPROVAL	DATE	SIZE	DRAWING NUMBER
<i>Bobay</i>		C	0W-00011C-0012-01
PROVAC	DATE	REV C	RELEASE
		DATE 3-21-1990-20-37 SHEET 18 OF 28	

VDD

D

D

AM27C010	
YPA00_12	A0 ~ 150
YPA01_13	A1 ~ 150
YPA02_10	A2 ~ 150
YPA03_9	A3 ~ 150
YPA04_8	A4 ~ 150
YPA05_7	A5 ~ 150
YPA06_6	A6 ~ 150
YPA07_5	A7 ~ 150
YPA08_27	A8 ~ 150
YPA09_26	A9 ~ 150
YPA10_23	A10 ~ 150
YPA11_25	A11 ~ 150
YPA12_4	A12 ~ 150
YPA13_28	A13 ~ 150
YPA14_29	A14 ~ 150
YPA15_3	A15 ~ 150
YPA16_2	A16 ~ 150
30 NC	30 NC

U153

R22

AM27C010	
YPA00_12	A0 ~ 150
YPA01_13	A1 ~ 150
YPA02_10	A2 ~ 150
YPA03_9	A3 ~ 150
YPA04_8	A4 ~ 150
YPA05_7	A5 ~ 150
YPA06_6	A6 ~ 150
YPA07_5	A7 ~ 150
YPA08_27	A8 ~ 150
YPA09_26	A9 ~ 150
YPA10_23	A10 ~ 150
YPA11_25	A11 ~ 150
YPA12_4	A12 ~ 150
YPA13_28	A13 ~ 150
YPA14_29	A14 ~ 150
YPA15_3	A15 ~ 150
YPA16_2	A16 ~ 150
30 NC	30 NC

U154

AM27C010	
YPA00_12	A0 ~ 150
YPA01_13	A1 ~ 150
YPA02_10	A2 ~ 150
YPA03_9	A3 ~ 150
YPA04_8	A4 ~ 150
YPA05_7	A5 ~ 150
YPA06_6	A6 ~ 150
YPA07_5	A7 ~ 150
YPA08_27	A8 ~ 150
YPA09_26	A9 ~ 150
YPA10_23	A10 ~ 150
YPA11_25	A11 ~ 150
YPA12_4	A12 ~ 150
YPA13_28	A13 ~ 150
YPA14_29	A14 ~ 150
YPA15_3	A15 ~ 150
YPA16_2	A16 ~ 150
30 NC	30 NC

U167

AM27C010	
YPA00_12	A0 ~ 150
YPA01_13	A1 ~ 150
YPA02_10	A2 ~ 150
YPA03_9	A3 ~ 150
YPA04_8	A4 ~ 150
YPA05_7	A5 ~ 150
YPA06_6	A6 ~ 150
YPA07_5	A7 ~ 150
YPA08_27	A8 ~ 150
YPA09_26	A9 ~ 150
YPA10_23	A10 ~ 150
YPA11_25	A11 ~ 150
YPA12_4	A12 ~ 150
YPA13_28	A13 ~ 150
YPA14_29	A14 ~ 150
YPA15_3	A15 ~ 150
YPA16_2	A16 ~ 150
30 NC	30 NC

U160

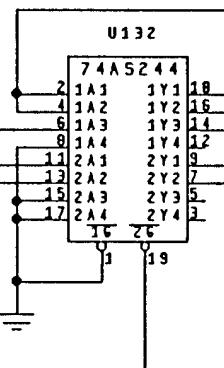
YPA17-

74AS1004
U119

X[00 - 31]

MINSTR4

YPA17



4

3

2

1

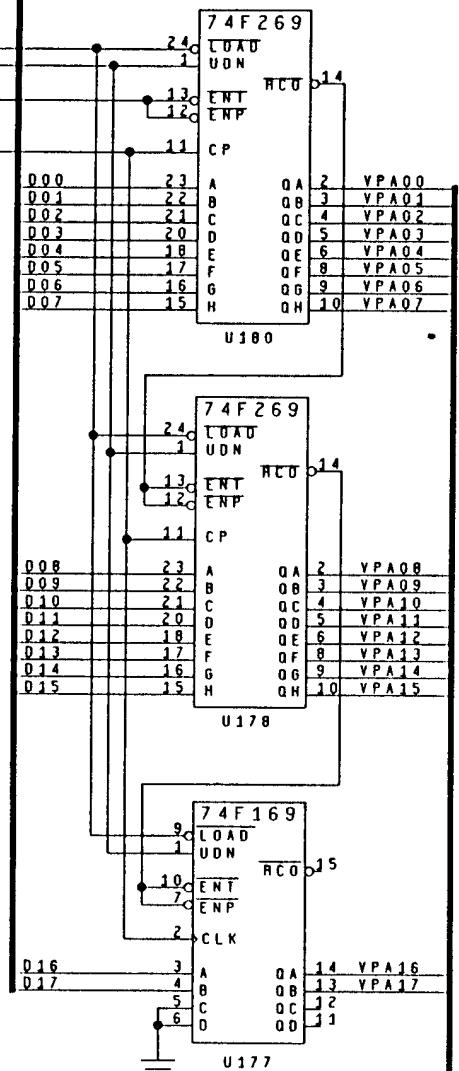
COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

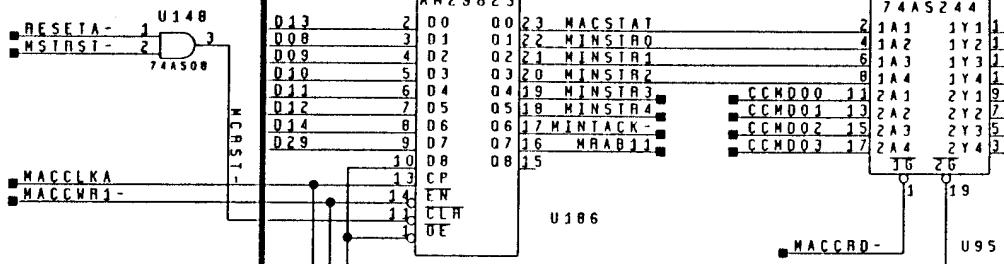
DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
<i>[Signature]</i>	3-23-90	DR. MATH	
ENGINEER	DATE	MAC OBJECT DATA EEPROM	
PAUL T. KUHN			
APPROVAL	DATE	SIZE	DRAWING NUMBER
<i>[Signature]</i>		C	DW-00011C-0012-01
RELEASE			
		NEY C	
		RELEASE	
		DATE 3-21-1990 1:42 SHEET 19 OF 28	

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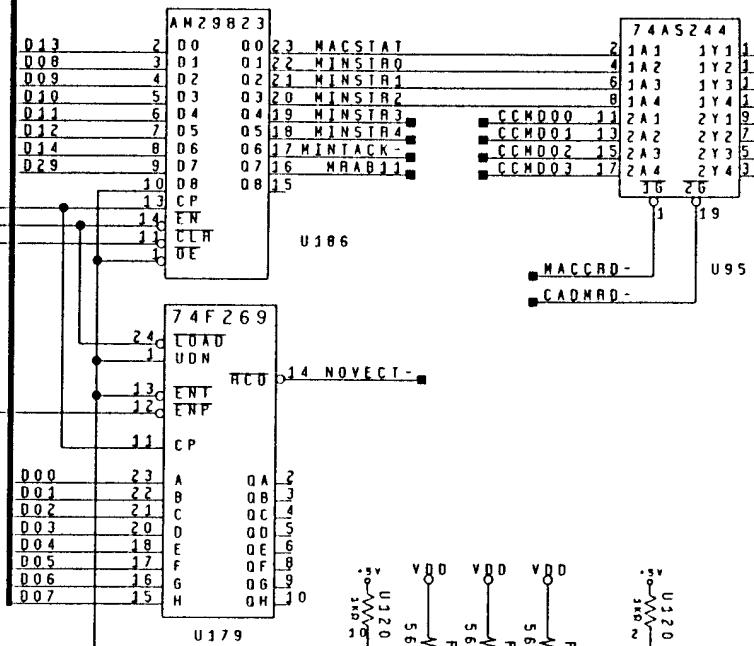
■ MACCWR0-
■ VPAUDN
■ VPACEN-
■ MACCLKA



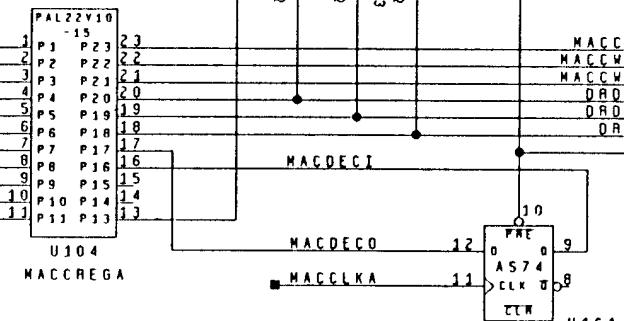
VPA[00-17]



DECVEC-



SYSCLKC
■ A02
■ A21
■ A22
■ A23
■ A24
■ A25
■ D29REQ-
■ ALIGN-
■ R+H-
■ PBINV-



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
<i>Paul T. Kuhn</i>	7-25-90	DR. MATH	
ENGINEER	DATE	VERTEX POOL ADDRESS AND CONTROL REG	
PAUL T. KUHN			
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0012-01
APPROVAL	DATE	REV F	RELEASE
		DATE 7-6-1990-10-31 SHEET 20 OF 28	

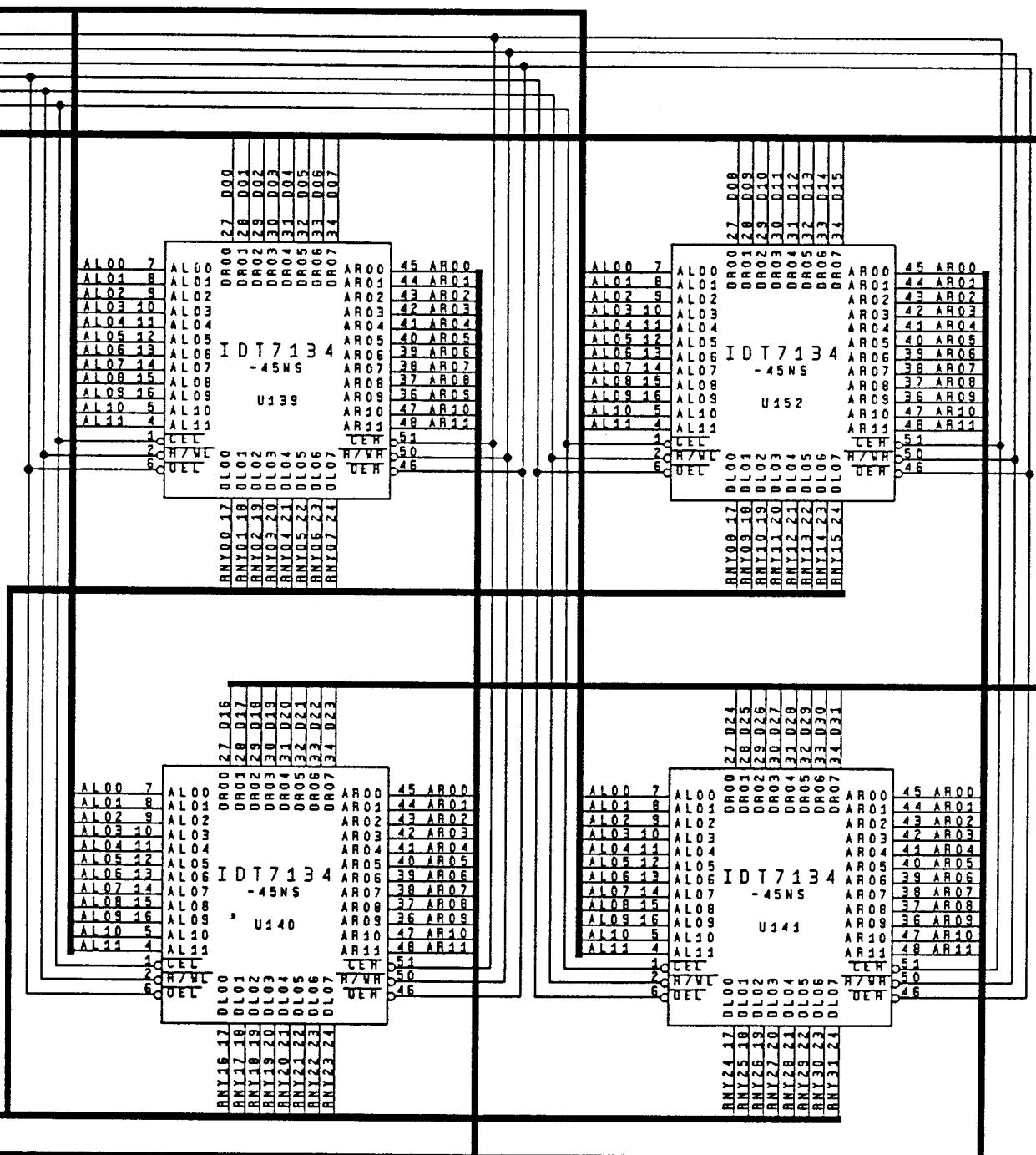
COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

AL [00·11]

CER-
R+WR-
W+R-
DEL-
R+WL-
CEL-

D[00·31]



COMPANY PROPRIETARY
CONFIDENTIAL / INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

BARTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHIEF	DATE			
<i>Paul T. Kuhn</i>	3-21-90			
ENGINEER	DATE			
PAUL T. KUHN				
APPROVAL	DATE	SIZE C	DRAWING NUMBER	
			DW-00011C-0012-01	
MATERIAL	DATE		REV C	
<i>Okamura</i>				
DATE 3-21-1990 1:45			SHEET 21 OF 28	

D

D

C

C

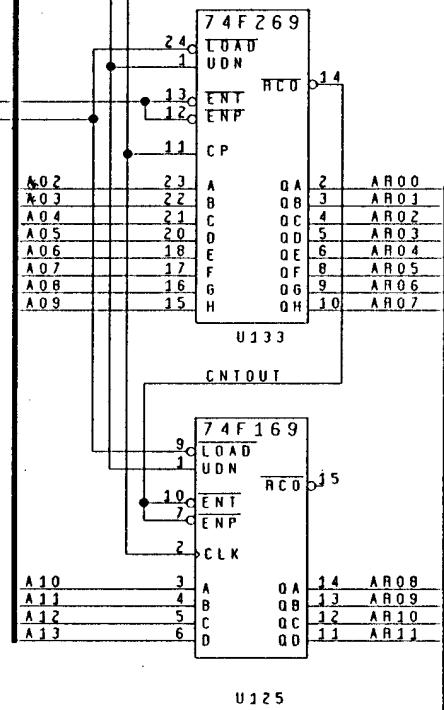
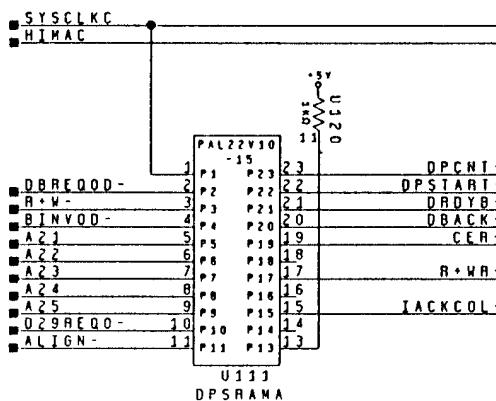
B

B

A

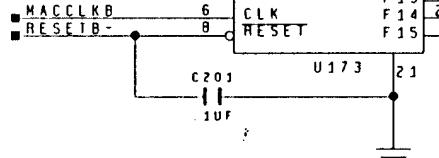
A

A[00-31]



EPS 448	
I0	MINSTR0
I1	MINSTR1
I2	MINSTR2
I3	MINSTR3
I4	MINSTR4
I5	MINIACK-
I6	NOVECT-
I7	MACSTAT
F00	13 XSEL
F01	14 YSEL
F02	15 ENPT-
F03	16 ACIL
F04	17 NRML-
F05	18 MULDEN-
F06	19 MULDEU-
F07	20 MRAZ-
F08	22 DECVEC-
F09	23 MSTRST-
F10	24 INTRO-
F11	25
F12	26
F13	27
F14	28
F15	1

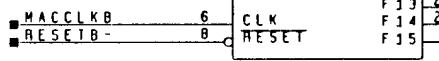
MAC JD1



EPS 448

EPS 448	
I0	MINSTR0
I1	MINSTR1
I2	MINSTR2
I3	MINSTR3
I4	MINSTR4
I5	MINIACK-
I6	NOVECT-
I7	MACSTAT
F00	13 ENXA-
F01	14 ENXB-
F02	15 ENYA-
F03	16 ENYB-
F04	17 VPACEN-
F05	18 VPAUDN
F06	19 MRAQNT-
F07	20 MRAQUD
F08	22 MWADCNT-
F09	23 MWADUD
F10	24 R+WL-
F11	25 CEL-
F12	26 OEL-
F13	27 ASELO
F14	28 ASELI
F15	1

MAC JD2



AR[00-11]



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
<i>Ron J. Kuhn</i>	1-8-90	TITLE	
CHEWER	DATE	DR. MATH	
PAUL T. KUHN		DUAL PORT SRAM AND MAC CONTROL	
ENGINEER	DATE	SIZE	DRAWING NUMBER
APPROVAL	DATE		
APPROVAL	DATE	C	DW-00011C-0012-01
		M	RELEASE
DATE 11-8-1990-10-48		SHEET 22 OF 28	

MRAA[00-11]

MVA[00-11]

YPA[00-11]

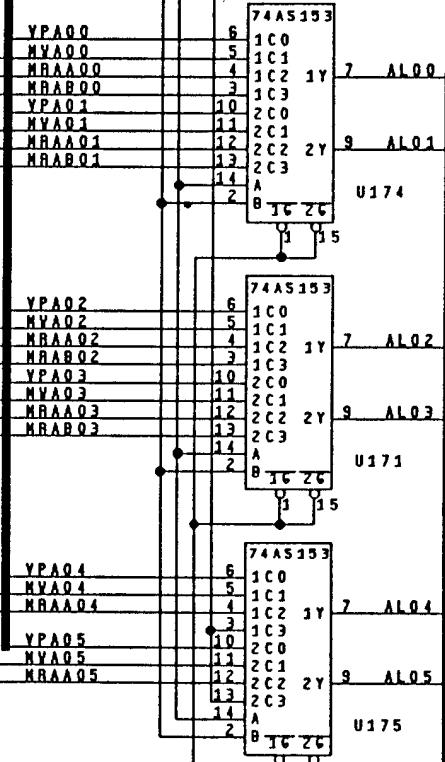
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■ ASE1

■ ASE0

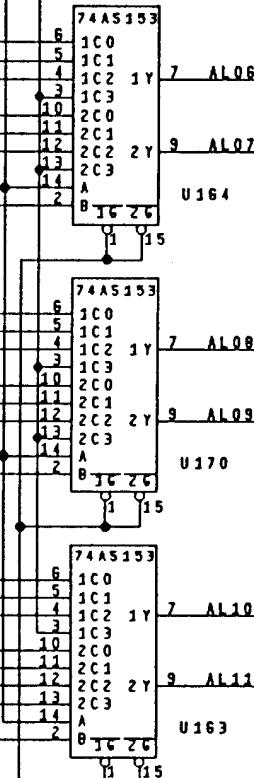
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COMPANY PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



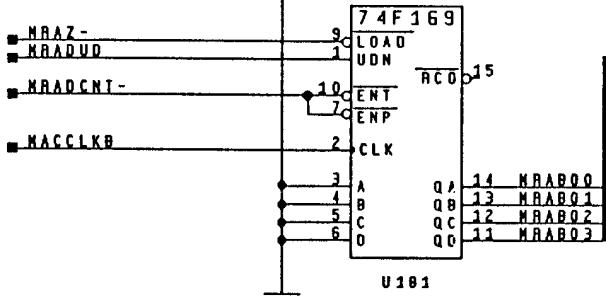
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+5V
GND
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AL[00-11]

MRAB[00-03]



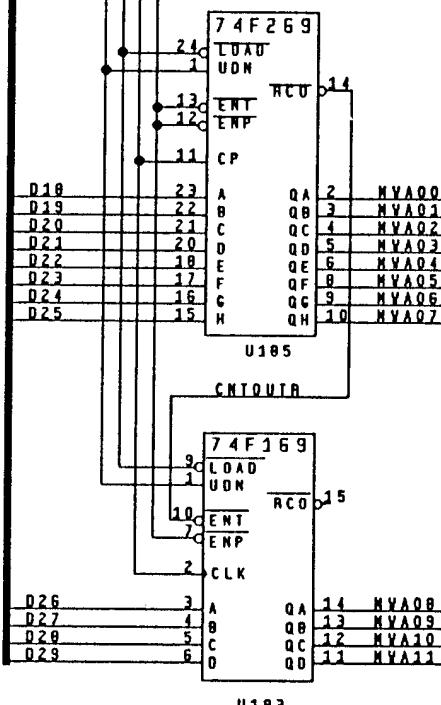
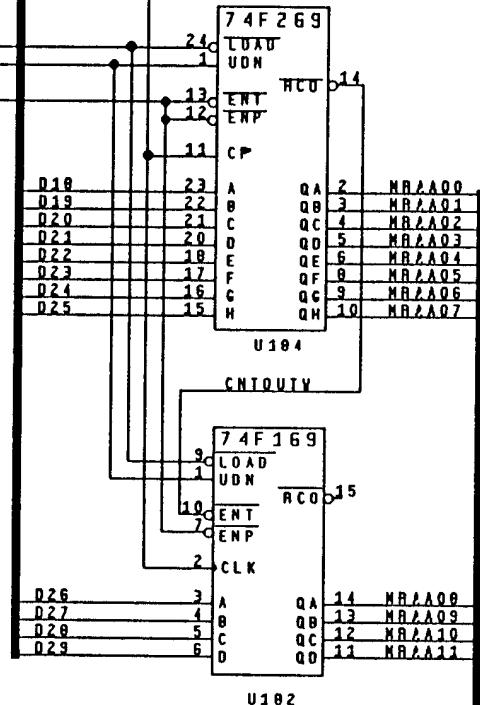
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DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHEKER	DATE	TITLE	
<i>[Signature]</i>	6-337	DR. MATH	
ENGINEER	DATE	MAC SRAM ADDRESS MUXES	
PAUL T. KUHN	DATE	APPROVAL	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0012-01
OWNER	DATE	REV	C
			RELEASE
DATE 3-21-1990_1-47		SHEET 23 OF 28	

MVADCNT-
MACCLKB
MACCYR0-
MVADUD

D[00-31]

MACCVB1-
MRADUD
MRADCNY-

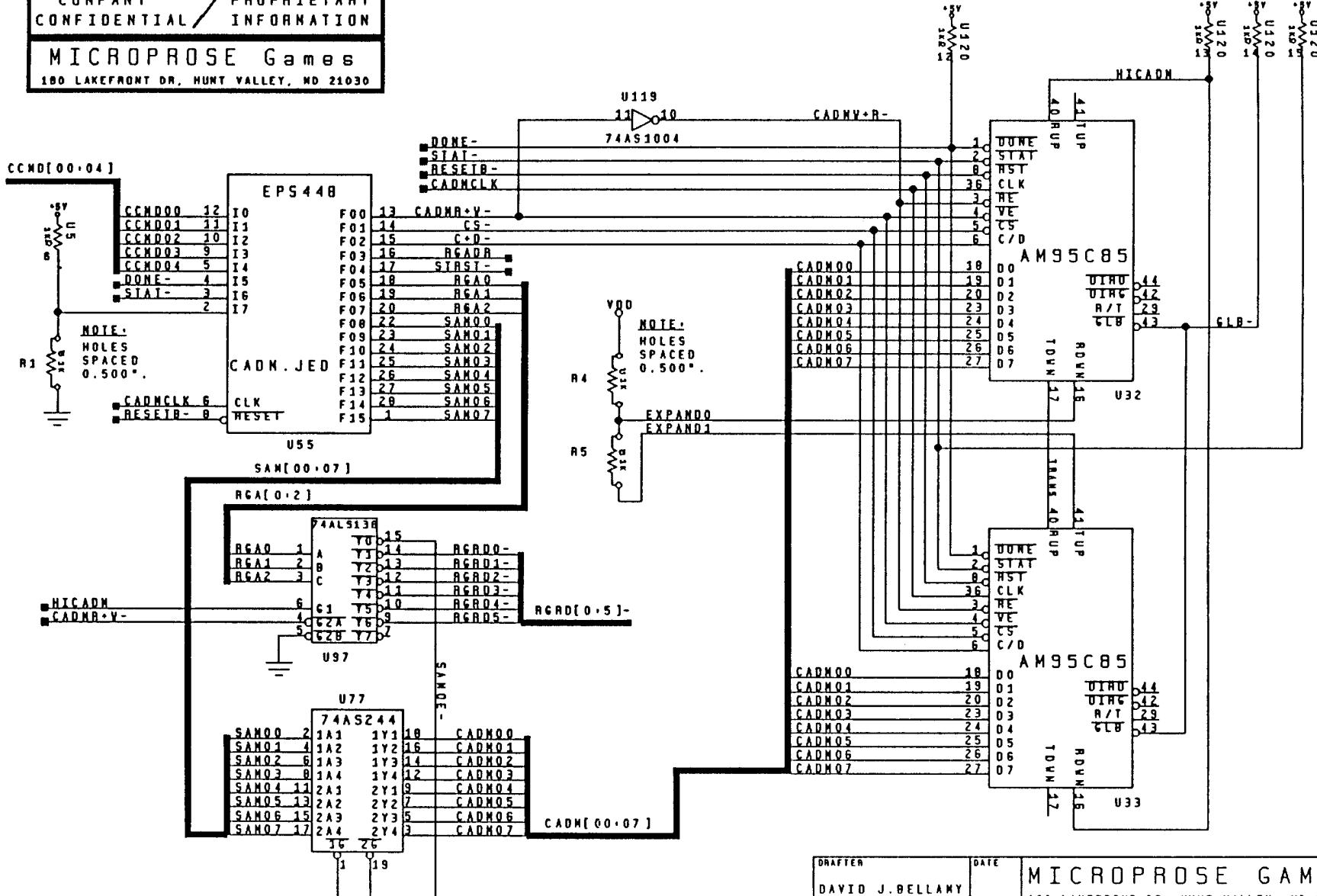


MVA[00-11]
MRAA[00-11]

COMPANY PROPRIETARY
CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
Paul T. Kuhn	3-23-90		
ENGINEER	DATE	TITLE	
PAUL T. KUHN		DR. MATH	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-000311C-0012-03
APPROVAL	DATE	REV C	RELEASE
		DATE 3-21-1990-1-48 SHEET 24 OF 28	

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHEKED	DATE	TITLE	
<i>Paul, Bell</i>	5-23-90	DR. MATH	
ENGINEER	DATE	CADM AND CADW CONTROL	
PAUL T. KUHN		SIZE DRAWING NUMBER	
APPROVAL	DATE	C	DW-00011C-0012-01
APPROVED	DATE	REV C	RELEASE
		DATE 3-21-1990 1-49 SHEET 25 OF 28	

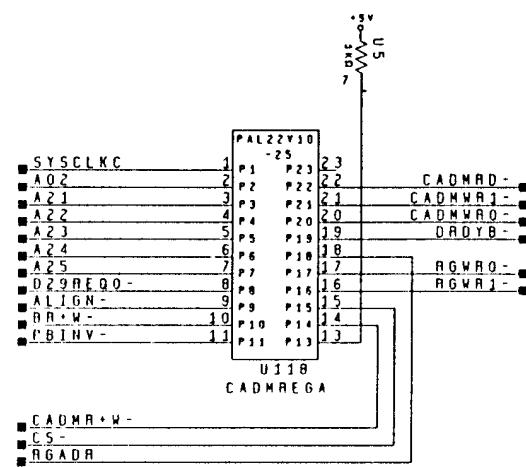
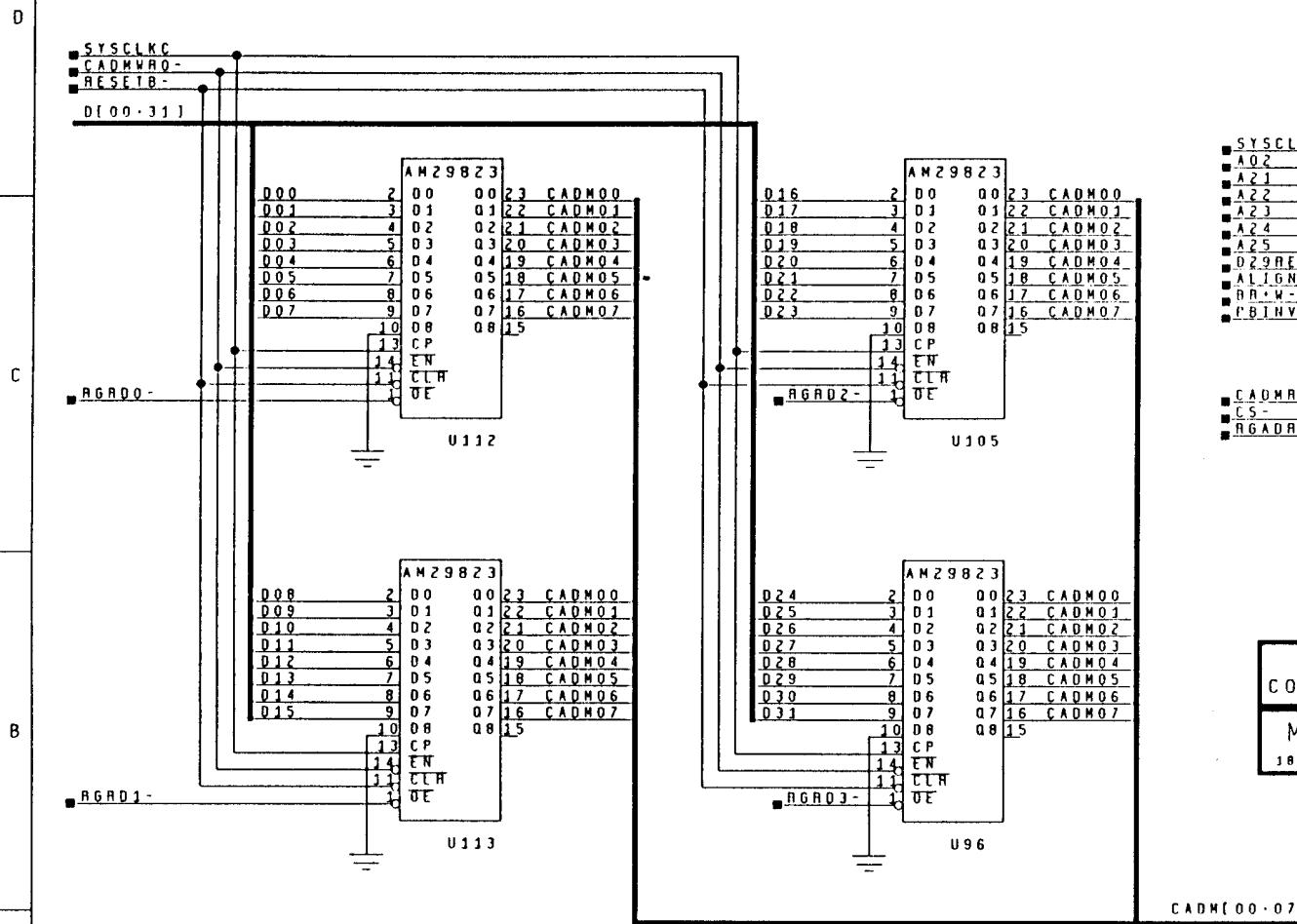
O'Gorman

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COMPANY PROPRIETARY
CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

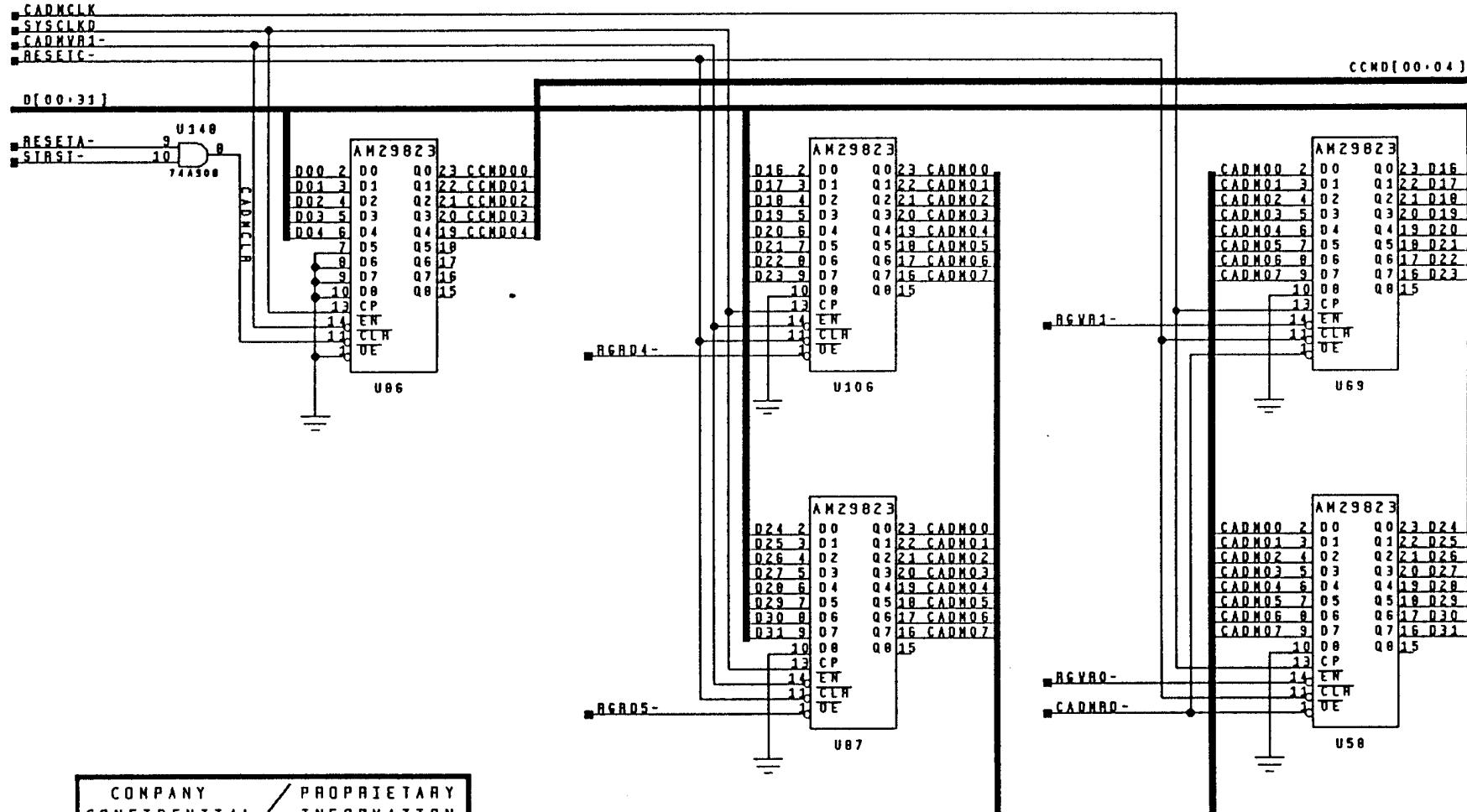
DRAFTER	DATE	MICROPROSE GAMES	
PAUL T. KUHN		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
Paul T. Kuhn	7-25-90	DR. MATH	
ENGINEER	DATE	CADM DATA REGISTERS	
PAUL T. KUHN		DW-00011C-0012-01	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	REV F RELEASE
APPROVAL	DATE		
DATE 7-6-1990, 10:44		SHEET 26 OF 28	

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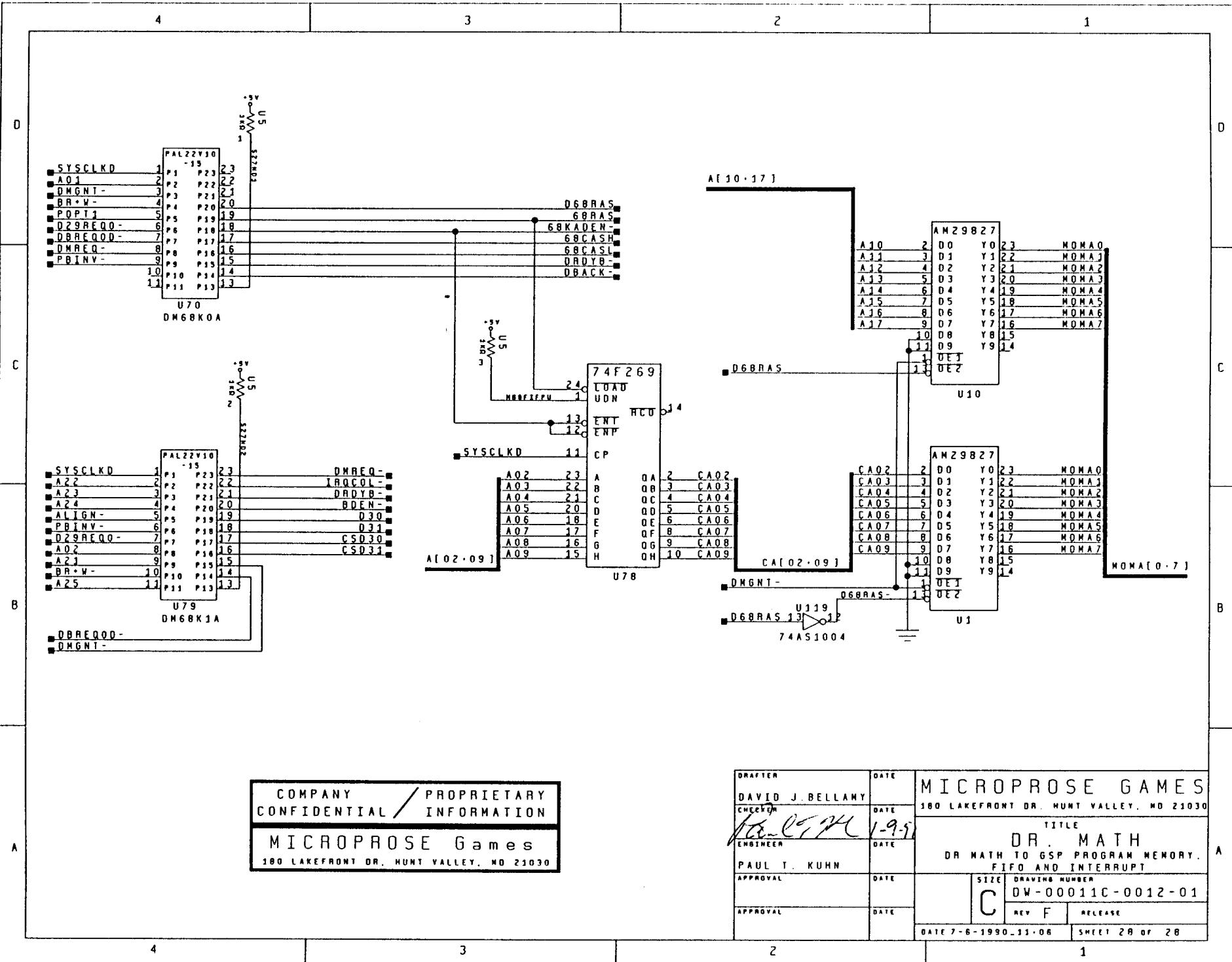


COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
<i>Pat Bellamy</i>	3-23-90			
CHIEF ENGINEER	DATE	TITLE		
PAUL T. KUHN		DR. MATH		
ENGINEER	DATE	CADM DATA REGISTERS		
APPROVAL	DATE	SIZE	DRAWING NUMBER	
<i>Paul Kuhn</i>		C	DW-00011C-0012-01	
REVISION	DATE	REV	C	RELEASE
DATE 3-23-1990-1-30		SHEET 27 OF 28		

Pat Bellamy



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BILL OF MATERIALS

D R . M A T H P . C . B .

ASSEMBLY : A 10 - 00002 - 001

COMPANY CONFIDENTIAL /
PROPRIETARY INFORMATION

MICROPROSE Games
LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES		
CHECKER <i>Park T. 9/1</i>	DATE 1-14-91	180 LAKEFRONT DRIVE, HUNT VALLEY, MD 21030		
ENGINEER PAUL T. KUHN	DATE	TITLE BILL OF MATERIALS	DWG NO PL-00011A-0012-01	REV R
APPROVAL	DATE	DR. MATH P.C.B. A 10-00002-001	DATE 1-14-1991-9-45	
APPROVAL	DATE	SHEET 1 OF 7		A

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MICROPROSE games, 180 Lakefront Drive, Hunt Valley, Maryland, 21030					
PROJECT: DR. MATH PCB			DRWG NO: PL-0011A-0012-01		REV: R
DATE: Mon 14-Jan-1991					
ITEM	QTY	VENDOR PART NUMBER	PART DESCRIPT	VALUE	MPG P/N
		REF. DES.			
1	B 1	GAL22V10-15P U79	DM68K1A	15NS	120-00001-009
2	B 1	GAL22V10-15P U70	DM68K0A	15NS	120-00001-010
3	B [0]	GAL22V10-25P [U118]	CADMREGA	25NS	120-00001-011
4	[0]	SN74ALS138N [U97]	3:8DEMUX		200-00138-200
5	1	68001-502 [J1],J2	2PINJUMPER	.100"	610-00002-002
6	* [0]	AM95C85-12JC [U32,U33]	SMT CADM		130-95C85-412
7	6	SN74AS153N U175,U174,U163,U164,U171,U170	4:1DATAMUX		201-00153-200
8	B 1	GAL22V10-15P U111	DPSRAMA	15NS	120-00001-014
9	C* [0]	EPS448-3P [U55]	CADM SAM	20MHZ	115-00001-003
10	* 4	IDT7134-S45J U139,U140,U141,U152	4Kx8DPRAM SMT	45NS	222-00003-445
11	5	F74F169PC U125,U177,U181,U182,U183	4BITU/DCNTR		203-00169-200
12	1	SN74ALS04BN U143	HEXINVERTR		200-00004-200
13	1	SN74AS08N U148	QUAD2INAND		201-00008-200
14	B 1	GAL22V10-15P U104	MACCREGA	15NS	120-00001-015
15	E* 1	AM27C010-155DC U153	128Kx8EPROM 29KBK2B0	150NS	110-00001-014
16	E* 1	AM27C010-155DC U154	128Kx8EPROM 29KBK2B1	150NS	110-00001-015
17	E* 1	AM27C010-155DC U167	128Kx8EPROM 29KBK3B0	150NS	110-00001-016
18	E* 1	AM27C010-155DC U160	128Kx8EPROM 29KBK3B1	150NS	110-00001-017

<u>ITEM QTY</u>	<u>PART NUMBER REF. DES.</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
19 4	AM29C827APC U1,U10,U155,U157	10BITBUFFER		235-00006-200
20 7	AM29C823ASC [U58,U69,U86,U87,U96,U105,U106,U112,U113],U137,U162, U165,U169,U172,U186,U146	SMT9BITBUSREG		235-00004-100
21 F* 1	AM29C323GC U149	MAC IC	10MHZ	130-00323-510
22 4	173D105X0035V C174,C175,C176,C188	AXTANTCAP	1UF	422-00072-105
23 1	LT1081-CN U176	RS232DRV		235-00001-200
24 1	SN74LS393N U128	DUAL4BITCNTR		202-00393-200
25 1	22-05-7048 J4	4PINMOLEX	.100"	610-00601-004
26 B 1	GAL22V10-25P U121	UARTCTLA	25NS	120-00001-021
27 1	Z85C30-10JC U159	SMT UART		240-00001-400
28 D* 1	AM27C256-95DC U135	32Kx8EPROM 29KBK1B3.001	90NS	110-00001-118
29 D* 1	AM27C256-95DC U115	32Kx8EPROM 29KBK1B1.001	90NS	110-00001-119
30 D* 1	AM27C256-95DC U108	32Kx8EPROM 29KBK1B0.001	90NS	110-00001-120
31 D* 1	AM27C256-95DC U127	32Kx8EPROM 29KBK1B2.001	90NS	110-00001-121
32 D* 1	AM27C256-95DC U134	32Kx8EPROM 29KBK0B3.001	90NS	110-00001-122
33 D* 1	AM27C256-95DC U114	32Kx8EPROM 29KBK0B1.001	90NS	110-00001-123
34 D* 1	AM27C256-95DC U107	32Kx8EPROM 29KBK0B0.001	90NS	110-00001-124
35 D* 1	AM27C256-95DC U126	32Kx8EPROM 29KBK0B2.001	90NS	110-00001-125
36 8	SN74AS373DW U38,U39,U47,U48,U60,U61,U62,U63	SMT OCTD-LATCHES		201-00373-100

ITEM	QTY	PART NUMBER REF. DES.	PART DESCRIPT	VALUE	MPG P/N
37	B 1	GAL22V10-15P U138	ROMADLDA	15NS	120-00001-016
38	B 1	GAL22V10-15P U136	STATEM2A	15NS	120-00001-017
39	4	AM29C863APC U2,U3,U11,U12	9BIBUSDRV		235-00005-200
40	3	SN74ALS2540N U82,U92,U100	OCTINVDRV		200-02540-200
41	A 1	GAL16V8A-15P U116	RAMCNTLB	15NS	120-00001-123
42	5	SN74AS258N U83,U93,U101,U129,U131	QUAD2:1MUX		201-00258-200
43	2	AM29C821APC U75,U76	10BITREGISTER		235-00003-200
44	1	SN74AS175N U84	QUADDFLOPS		201-00175-200
45	11	74F269SC U68,U78,U85,U103,U110,U133,U178,U179,U180,U184,U185	SMTDECADEU/DCNTR		203-00269-100
46	B 1	GAL22V10-15P U109	RAMADLDA	15NS	120-00001-018
47	B 1	GAL22V10-15P U102	STATEMB	15NS	120-00001-119
48	A 1	GAL16V8A-15P U67	29DECODA	15NS	120-00001-024
49	* 16	TMS44C256-12NL U13,U21,U27,U34,U35,U37,U46,U57,U80,U81,U88,U89,U90,U91,U98,U99	256Kx4DRAM	120NS	220-00002-212
50	4	SN74AS245DW U43,U44,U52,U53	SMTOCTBIBUFFER		201-00245-100
51	1	SA101A221JAA C203	AXCERCAP	220PF	402-00195-221
52	1	SN74ALS1010N U20	TRI3INNAND		200-01010-200
53	35	SN74AS244DW U6,U7,U8,U14,U15,U16,U22,U23,U24,U28,U29,U30,U31,U36, U40,U41,U42,U45,U49,U50,U51,U54,U56,U64,U65,U66,U72,U73, U74,U95,U132,U144,U145,U150,U151,[U77]	SMTOCTBUFFERS		201-00244-100

<u>ITEM QTY</u>	<u>PART NUMBER REF. DES.</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
54 B 1	GAL22V10-15P U59	CLFIFOA	15NS	120-00001-020
55 F* 1	AM29000-16GC U9	MICROPROCESOR	16MHZ	135-29000-516
56				
57 1	SN7407N U130	HEXOCDRIVERS		206-00007-200
58 A 1	GAL16V8A-25P U122	INTRACKB	25NS	120-00001-026
59				
60				
61 6	CCF-07 561G R2,R7,R8,R13,R14,R16	2%MFRES	5600HM	503-00002-561
62 2	SN74AS74N [U18],U147,U161	DUALDFLOPS		201-00074-200
63 [0]	X0-43D-24 [U17]	OSCILLATOR	24MHZ	290-00001-024
64 4	836C102X2PE U4,U5,U120,U124	SMTPULRESPAK	1KOHM	502-00001-102
65 6	CCF-07 100G [R3],R11,R12,R15,R17,R23,R24	2%MFRES	100HM	503-00002-100
66 1	68001-503 [J3],J5	3PINJUMPER	.100"	610-00002-003
67 4	CCF-07 102G [R1,R4,R5],R9,R10,R19,R25	2%MFRES	1KOHM	503-00002-102
68 2	CCF-07 103G R6 ,R22	2%MFRES	10KOHM	503-00002-103
69 1	CCF-07 104G R20	2%MFRES	100KOHM	503-00002-104
70 1	1N914 D1	DIODE		300-00002-003
71 1	1N746A D2	ZENER	3 .3V	301-00002-033
72 1	LM311N Q1	VOLTCOMPAR		280-00002-200

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
		<u>REF. DES.</u>			
73	1	KSA1A211 SW1	PBSWITCH		625-00002-001
74	1	173D335X0020V C159	AXTANTCAP	3.3UF	422-00062-335
75	1	XO-43D-20 U168	OSCILLATOR	20MHZ	290-00001-020
76	1	XO-43D-32 U142	OSCILLATOR	32MHZ	290-00001-032
77	3	SN74AS1C04AN [U25], U19, U119, U156	HEXINVDRIVRS		201-01004-200
78	3	HLMP3600 D3, D4, D5	LED	RED	305-00003-002
79	1	ICTE-5 D6	ZENER		300-00001-002
80	10	7-0805G-5 TP5, TP4, TP3, TP2, TP1, TP6, TP7, TP8, TP9, TP10	TESTPIN		710-00001-001
81	1	26-64-5100 09-52-3101 P3	MOLEX10PIN MOLEX10PIN	.156" .156"	610-00601-010 610-10600-010
82	8	TAJC156M010R C5, C51, C59, C102, C124, C187, C199, C200	SMTTANTCAP	15UF	420-00002-156
83	41	11C1210Z5U334M050NT C112, C113, C185, C104, C177, C173, C164, C161, C160, C156, C153, C146, C145, C144, C141, C140, C132, C131, C125, C123, C96, C95, C94, C93, C86, C85, C53, C49, C39, C34, C33, C31, C27, C23, C18, C14, C10, C105, C28, C32, C50	SMTCERCAP	0.33UF	401-02000-334
84	146	11C1206Z5U104M050NT C11, C16, C193, C128, C183, C150, C118, C90, C67, C9, C8, C7, C6, C4, C3, C2, C1, C41, C12, C13, C15, C194, C195, C196, C197, C198, C163, C184, C186, C189, C190, C191, C192, C99, C89, C88, C87, C84, C83, C82, C81, C80, C182, C181, C180, C179, C178, C172, C171, C170, C169, C168, C167, C166, C165, C162, C158, C157, C155, C154, C152, C151, C149, C148, C147, C143, C142, C138, C137, C136, C135, C134, C133, C130, C129, C127, C126, C122, C121, C120, C119, C117, C116, C115, C114, C111, C110, C109, C108, C107, C106, C103, C101, C98, C97, C92, C91, C79, C78, C77, C76, C75, C74, C72, C71, C70, C69, C68, C66, C65, C64, C63, C62, C61, C60, C58, C57, C56, C55, C52, C54, C48, C47, C46, C45, C44, C43, C42, C40, C38, C37, C36, C35, C30, C29, C26, C25, C24, C22, C21, C20, C19, C17, C73, C139, C100	SMTCERCAP	0.1UF	401-01000-104
85	1	92984-2-01-20-30 P2	2x20HEADER	.100"	610-10100-040

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER REF. DES.</u>	<u>PART DESCRIPT</u>	<u>VALUE</u>	<u>MPG P/N</u>
86	1	92984-2-01-32-30 P1	2x32HEADER	.100"	610-10100-064
87 A	[0]	ICO-320-MTT [UX67,UX116,UX117,UX122]	.3x20PIN SOCKET		600-00001-320
88 B	[0]	ICO-324-MTT [UX59,UX70,UX79,UX102,UX104,UX109,UX111,UX118,UX121, UX136,UX138]	.3x24PIN SOCKET		600-00001-324
89 C	[0]	110-13-328-41-001 [UX55,UX166,UX173]	.3x28PIN SOCKET		600-00001-328
90 D	8	ICO-628-MTT UX107,UX108,UX114,UX115,UX126,UX127,UX134,UX135	.6x28PIN SOCKET		600-00001-628
91 E	4	2-644018-2 UX153,UX154,UX160,UX167	.6x32PIN SOCKET		600-00003-632
92 F	1	CPAS-169-ZSTT UX9,[UX149]	169PINPGASOCKET		601-00002-169
93	[0]	SRS8-12-01	SPACER	.750"	700-00001-003
94	2	68786-102	SHUNT		715-00001-001
95	1	CCF-07 820G R21	2PCMFRS	820HM	503-00002-820
96	1	FRJ-50 R18	JUMPRES	00HM	503-00001-000
96	1	C410C104M5U5CA C201	AXCERCAP	.1UF	402-00382-104
97 C*	1	EPS448-3P U166	MAC.2 SAM	20MHZ	115-00001-002
98 C*	1	EPS448-3P U173	MAC.1 SAM	20MHZ	115-00001-001
99	1	C410C101J1R5CA C202	AXCERCAP	100PF	402-00195-101

		425			

NOTES:

1. PARTS REQUIRING 0.33UF DECOUPLING CAPACITORS ARE DESIGNATED WITH AN ASTERISK (*) BETWEEN ITEM AND QTY COLUMNS.
2. PARTS REQUIRING SOCKETS ARE MARKED WITH A LETTER CORRESPONDING TO THE SOCKETS (SOCKETS ARE ITEMS 87 - 92).
3. PARTS WITH REFERENCE DESIGNATORS IN BRACKETS [] WILL NOT BE POPULATED DURING PRODUCTION.

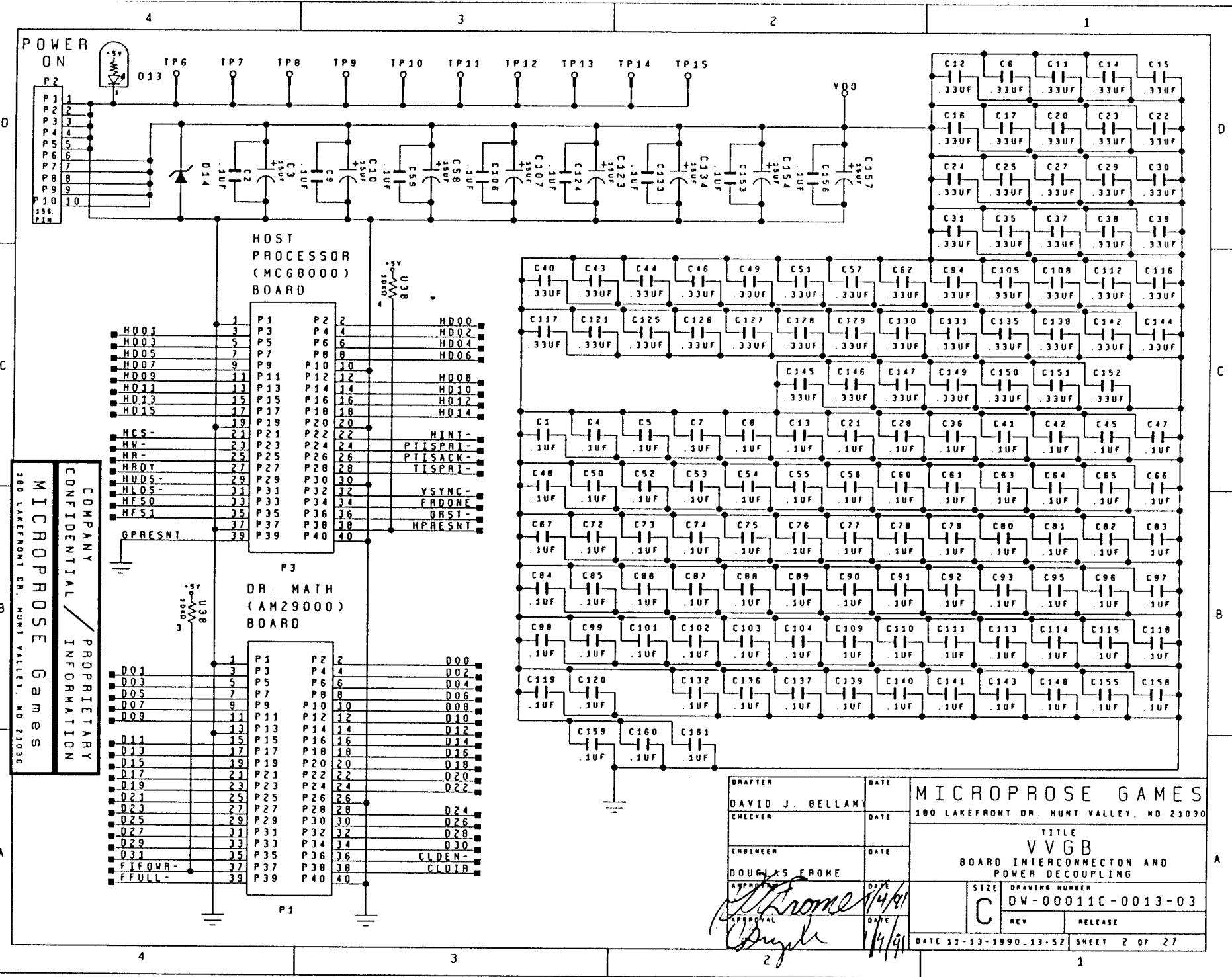
MICROPROSE GAMES

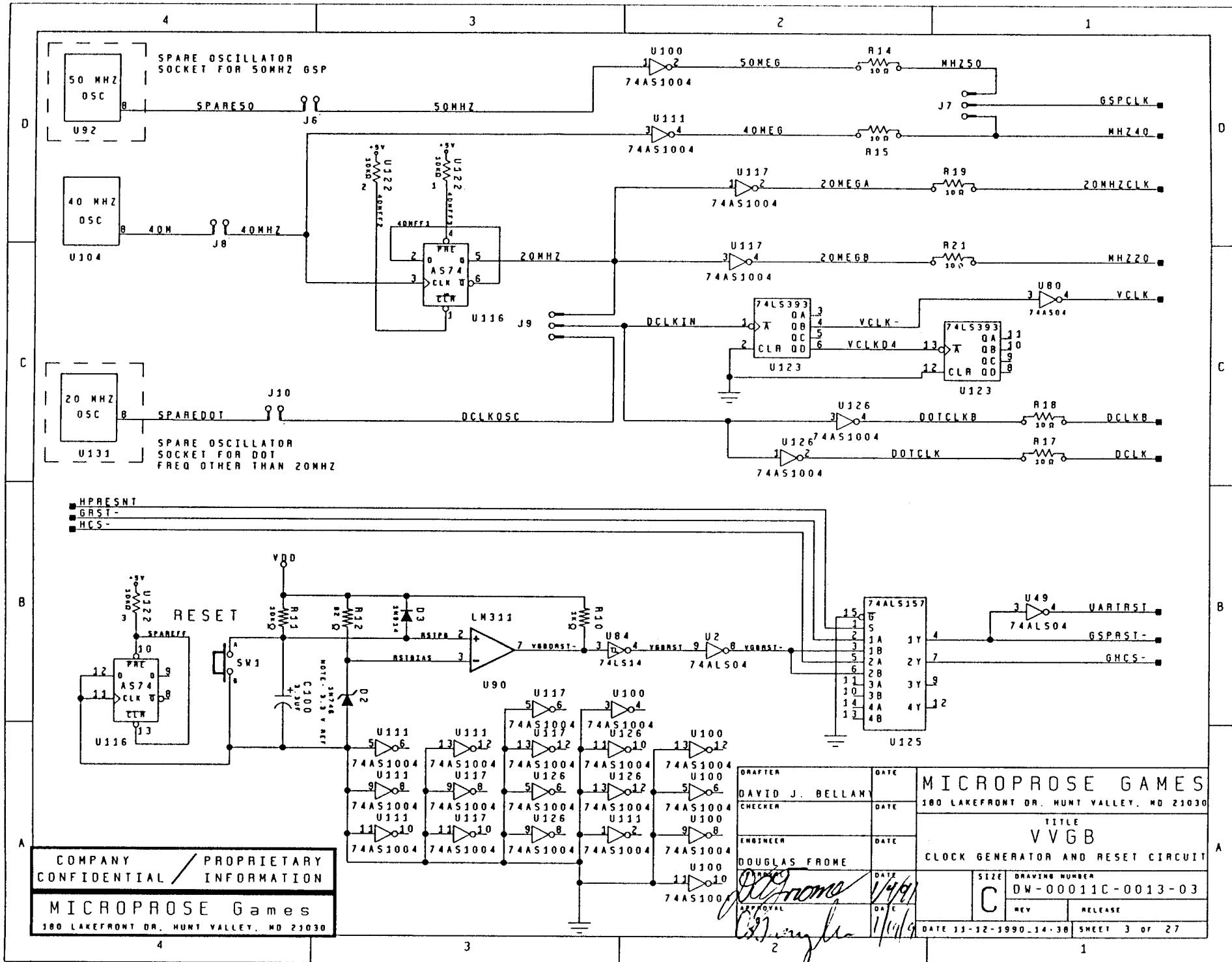
VIDEO GRAPHICS
PRINTED CIRCUIT
BOARD ASSEMBLY
(with VCLIPPERS)

COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION

MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE			
ENGINEER	DATE			
DOUGLAS FROOME		TITLE V V G B		
APPRENTICE	DATE	PRINT CIRCUIT BOARD ASSEMBLY		
<i>D. Froome</i>	1/4/91	SIZE	DRAWING NUMBER	
APPROVAL	DATE	C	REV A	RELEASE
<i>E. Doyle</i>	1/15/91	DATE 13-28-1990-13-08		SHEET 1 OF 27
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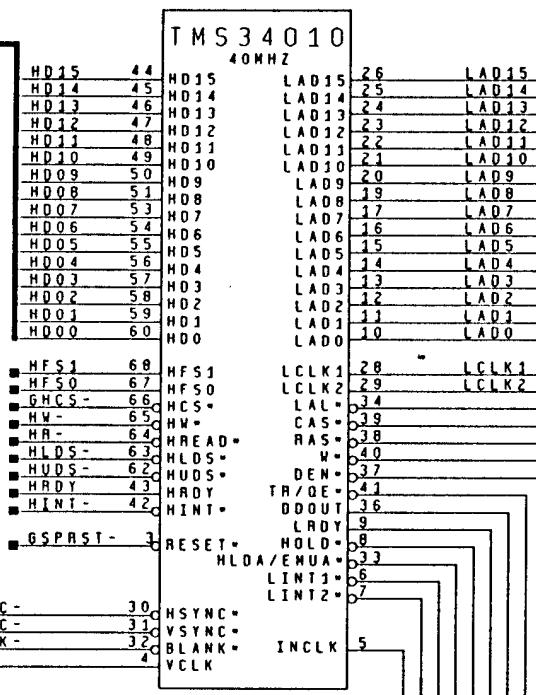
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U115

LAD[0-15]

HD[00-15]



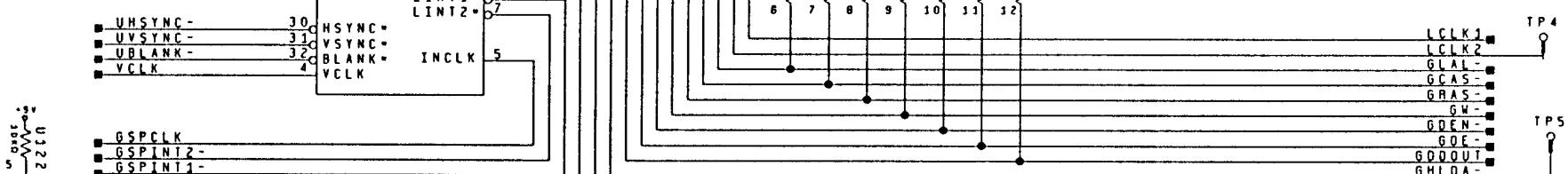
- GSPCLK
- GSPINT2-
- GSPINT1-
- GHOLD-
- GRDY-
- CLRINT-

- UARTINT-
- UHSYNC-
- INT2PU

- INT2PU

- FRDONE
- TISPAI-
- INT1PU

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COMPANY
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INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

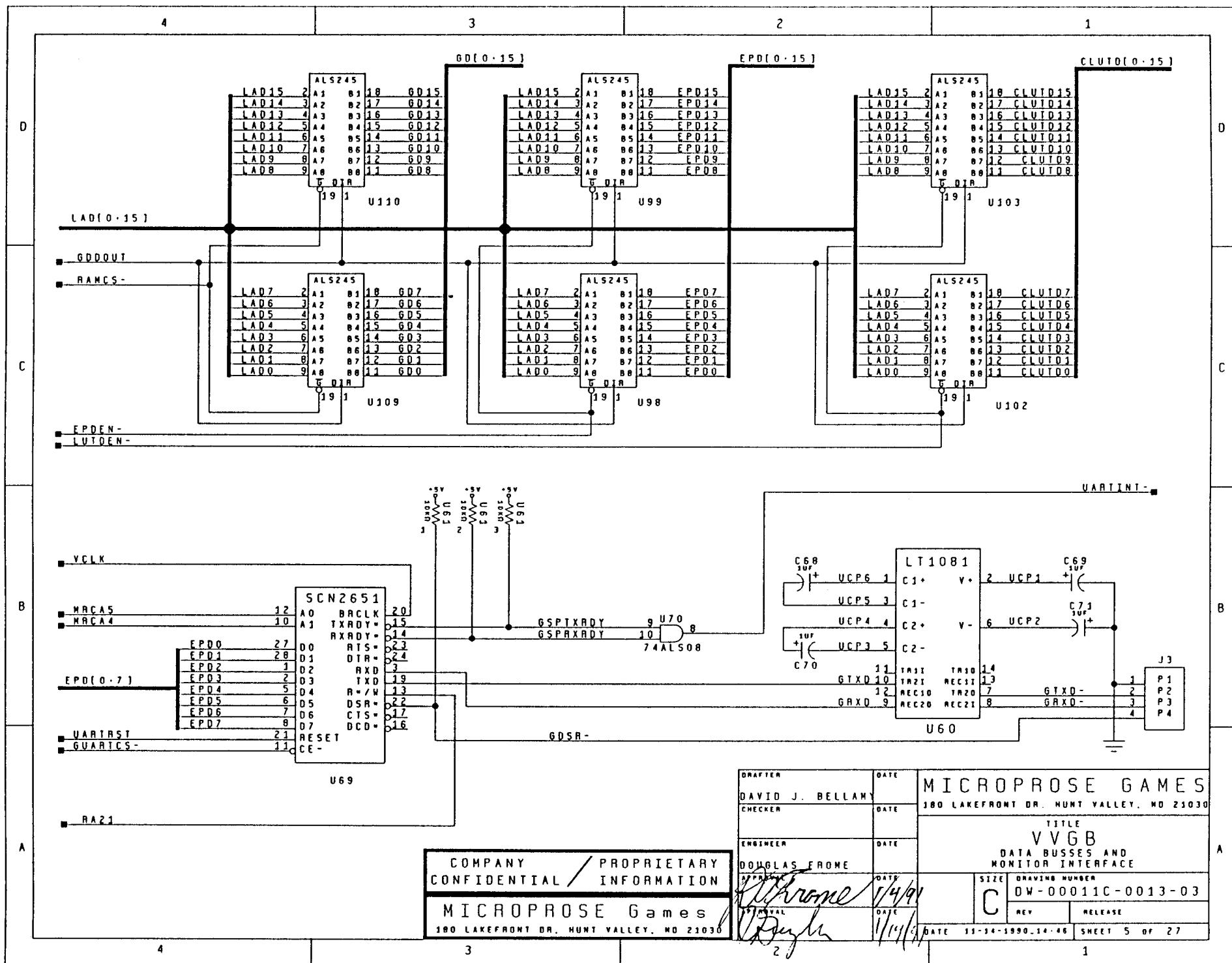
DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROME	DATE	TITLE VVGB	
APPROVED	DATE	TMS34010 GRAPHICS SIGNAL PROCESSOR	
RELEASER	DATE	DW - 00011C-0013-03	
REVISION	DATE	SIZE	
		C	DRAWING NUMBER
			REV
			RELEASE
1/14/91			
DATE 13-13-1990-14-25 SHEET 4 OF 27			

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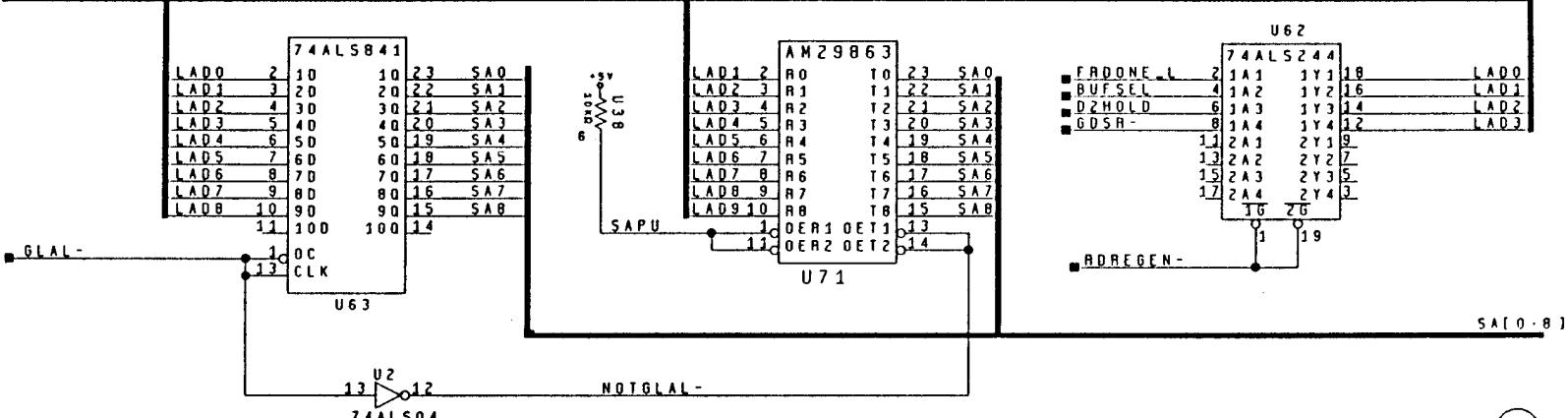
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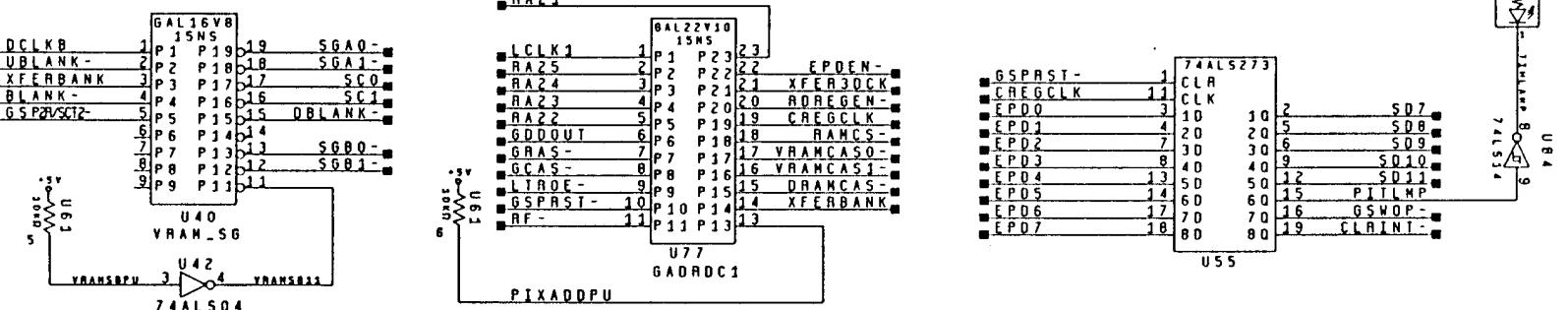
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LAD[0..9]

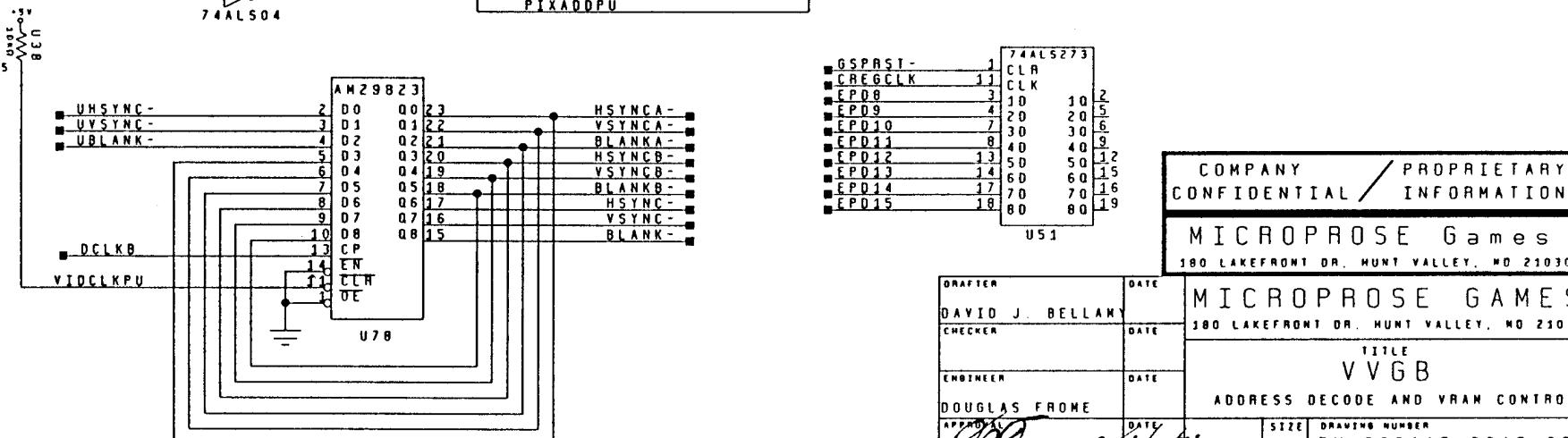


SA[0..8]

D



C



COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROOME			
APPROVAL	DATE	SIZE	DRAWING NUMBER
DOUGLAS FROOME	1/4/91	C	DW-00011C-0013-03
INITIALS	DATE	KEY	RELEASE
DOUGLAS FROOME	1/4/91		
DATE 31-13-1990-15-01		SHEET 7 OF 27	

4

3

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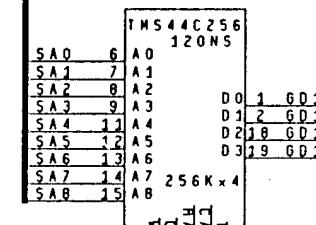
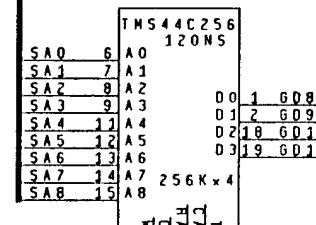
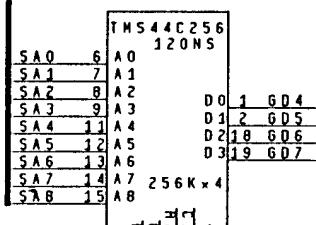
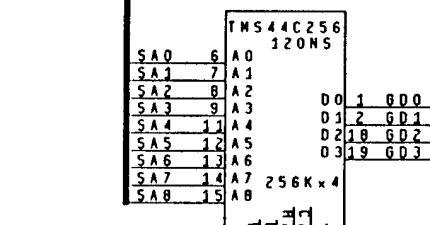
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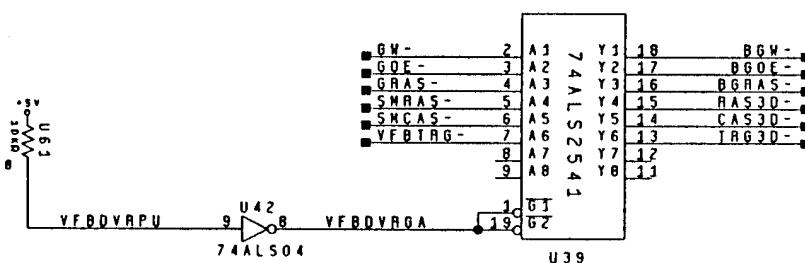
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SA[0..8]

G0[0..15]



- BGW-
- BGOE-
- BGRAS-
- DRAMCAS-



COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	GSP DRAM BANK	
DOUGLAS FROME		SIZE	DRAWING NUMBER
<i>Fromez</i>	1/1/91	C	DW-00011C-0013-03
APPROVAL	DATE	REV	RELEASE
<i>Fromez</i>	1/1/91		
DATE 11-13-1990-15-03 SHEET 8 OF 27			

4

3

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1

D

0

C

C

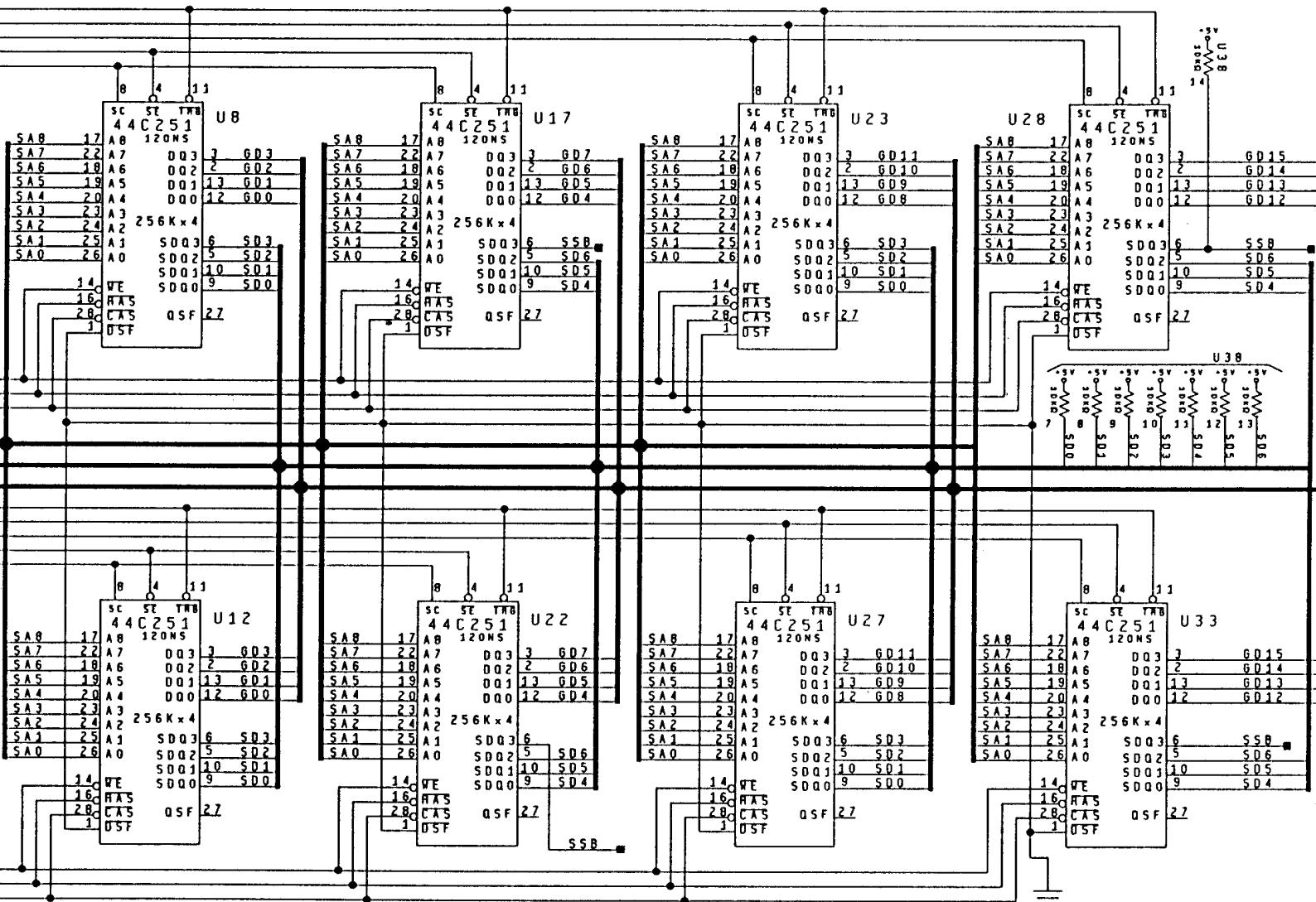
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B

A

A

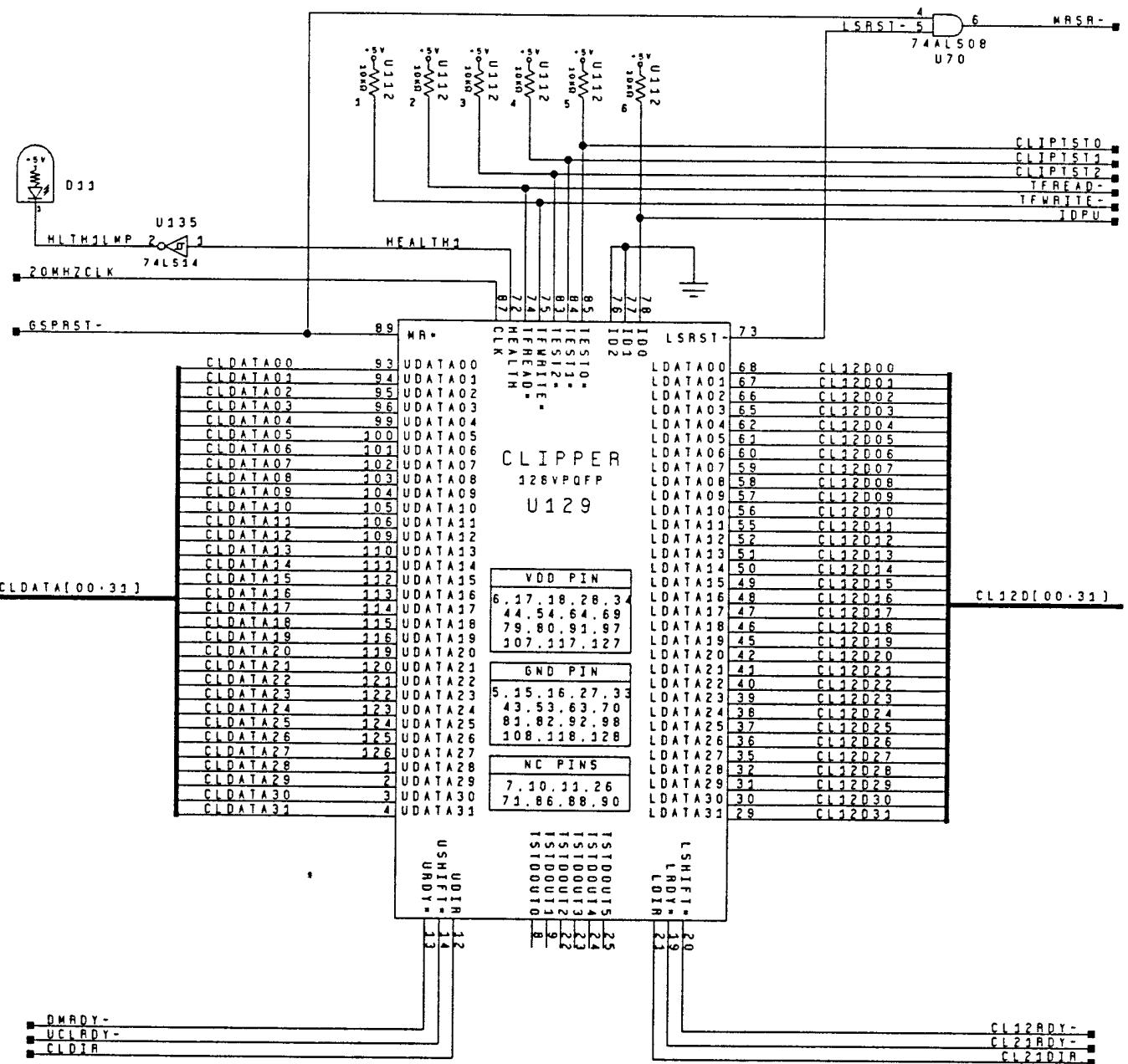
■ BGOF-
 ■ SGA1-
 ■ SC1
 ■ SGA0-
 ■ SCO



COMPANY / PROPRIETARY
 CONFIDENTIAL / INFORMATION

MICROPROSE Games
 180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE			
ENGINEER	DATE			
DOUGLAS FRONE				
APPROVAL	DATE	SIZE	GSP SPRITE MEMORY	
<i>D. Frone 1/14/91</i>		C	DW-00011C-0013-03	
APPROVAL	DATE	REV	RELEASE	
<i>D. Frone 1/14/91</i>		C		
DATE 11-13-1990-15-04 SHEET 9 OF 27				



COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

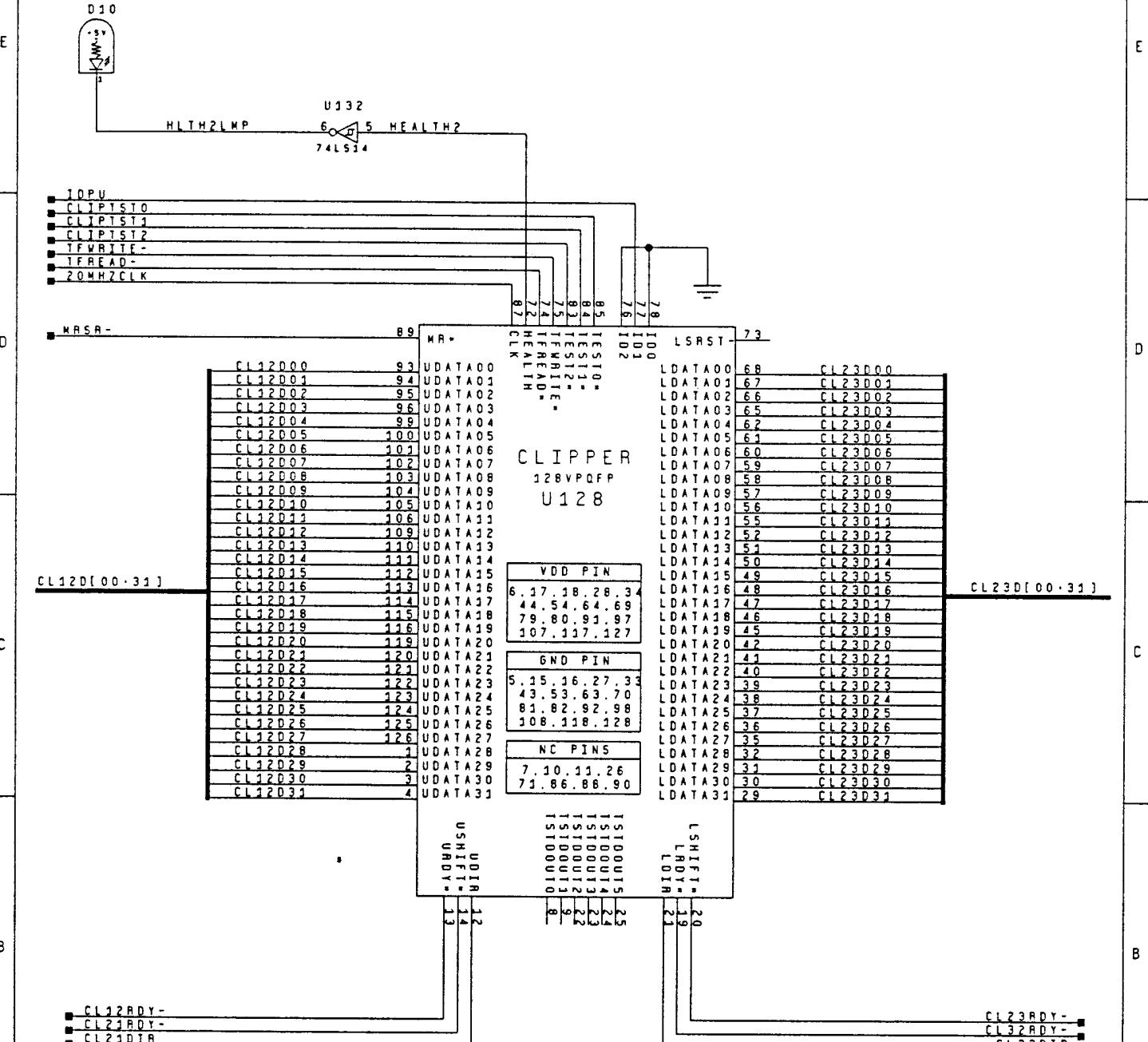
DRAFTER DAVID J. BELLAMY	DATE <i>10/14/91</i>	MICROPROSE GAMES 380 LAKEFRONT DR., HUNT VALLEY, MD 21030		
CHECKER	DATE			
ENGINEER	DATE			
DOUGLAS FROOME				
APPROVAL <i>D. Froome 10/14/91</i>	DATE <i>10/14/91</i>	SIZE C	DRAWING NUMBER DW-00011C-0013-03	REV RELEASE
APPROVAL <i>D. Froome 10/14/91</i>	DATE <i>10/14/91</i>	DATE 11-15-1990-12-09 SHEET 30 OF 27		

D

3

2

1



COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
380 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		380 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROOME		TITLE	
		VVGB	
		CLIPPER ASIC 2	
APPROVAL	DATE	SIZE	DRAWING NUMBER
<i>D. Froome</i>	1/14/91	C	DW-00011C-0013-03
REVISION	REV	RELEASE	
		DATE 12-17-1990.9-10 SHEET 11 OF 27	

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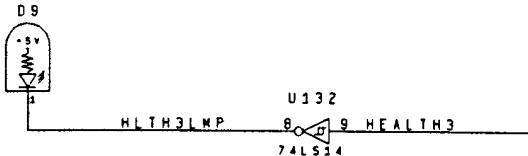
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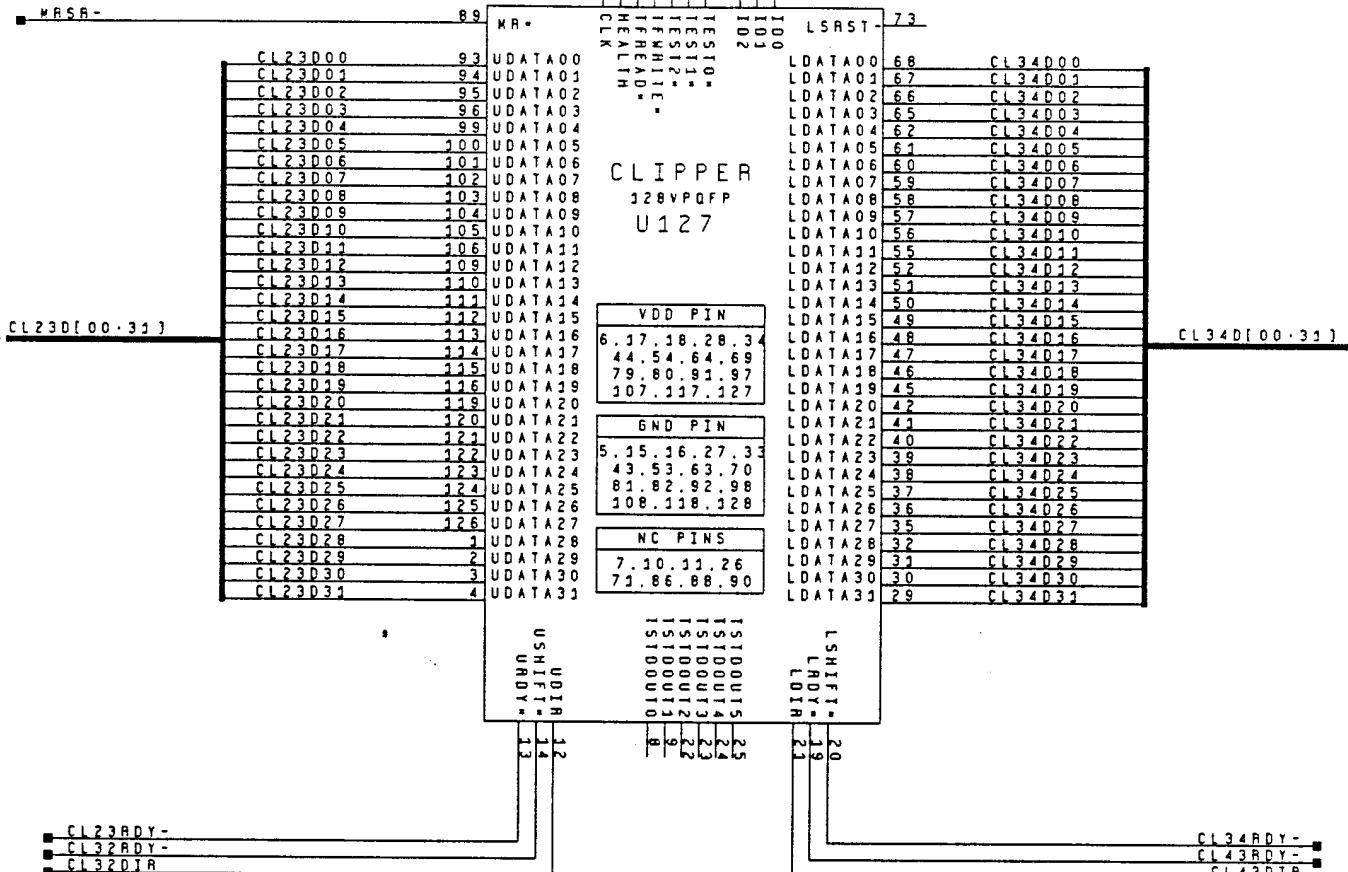
E

E



- TOPU
- CLIPST0
- CLIPST1
- CLIPST2
- TFWRITE-
- TFREAD-
- 20MHzCLK

MRSF -



D

D

C

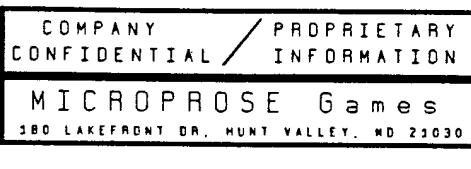
C

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B

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A



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROOME		TITLE	
Froome 1/4/91		VVGB	
APPROVAL	DATE	CLIPPER ASIC 3	
Froome 1/4/91		VS Y MAX	
C		SIZE	DRAWING NUMBER
		DW-00011C-0013-03	
		REV	RELEASE
DATE 12-17-1990 9:33 SHEET 32 OF 27			

E

E



U132
HLTH4LMP 10 11 HEALTH4
74LS14

IDPU
CLIPST0
CLIPST1
CLIPST2
TFWRITE-
TFREAD-
20MHzCLK

MRSA-

B9 MR* CLK LSR51 73

CL34000	93	UDATA00
CL34001	94	UDATA01
CL34002	95	UDATA02
CL34003	96	UDATA03
CL34004	99	UDATA04
CL34005	100	UDATA05
CL34006	101	UDATA06
CL34007	102	UDATA07
CL34008	103	UDATA08
CL34009	104	UDATA09
CL34010	105	UDATA10
CL34011	106	UDATA11
CL34012	109	UDATA12
CL34013	110	UDATA13
CL34014	111	UDATA14
CL34015	112	UDATA15
CL34016	113	UDATA16
CL34017	114	UDATA17
CL34018	115	UDATA18
CL34019	116	UDATA19
CL34020	119	UDATA20
CL34021	120	UDATA21
CL34022	121	UDATA22
CL34023	122	UDATA23
CL34024	123	UDATA24
CL34025	124	UDATA25
CL34026	125	UDATA26
CL34027	126	UDATA27
CL34028	1	UDATA28
CL34029	2	UDATA29
CL34030	3	UDATA30
CL34031	4	UDATA31

CLIPPER
U118

VDD PIN

6.17	18	26	34
44	54	64	69
79	80	91	97
107	117	127	

GND PIN

5.	15.	16.	27.	33
43.	53.	63.	70	
81.	82.	92.	98	
108.	118.	128		

NC PINS

7.	10.	11.	26
71.	86.	88.	90

USHTA

UDIR

UDRY

J1

J2

J3

J4

J5

J6

J7

J8

J9

J10

J11

J12

J13

J14

J15

J16

J17

J18

J19

J20

J21

J22

J23

J24

J25

J26

J27

J28

J29

J30

J31

LSHIFT

LDRY

LDIA

J1

J2

J3

J4

J5

J6

J7

J8

J9

J10

J11

J12

J13

J14

J15

J16

J17

J18

J19

J20

J21

J22

J23

J24

J25

J26

J27

J28

J29

J30

J31

CL45D[00-31]

CL45RDY-
CLS4RDY-
CLS4DIR-

CL34RDY-
CL43RDY-
CL43DIR

COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		380 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROOME			
APPROVAL	DATE	TITLE	
		VVGB	
		CLIPPER ASIC 4	
		X	X MIN
		DRAWING NUMBER	
		C DW-00011C-0013-03	
APPROVAL	DATE	REV	RELEASE
DATE 12-17-1990.9-31 SHEET 13 OF 27			

D

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E

E



U132
HLTH5LMP 12 13 HEALTH5
74LS14

TOPU
CLIPPTST0
CLIPPTST1
CLIPPTST2
TFWRITE-
TFREAD-
20MHzCLK

MRSR-

B9

MR*

CLK

LSRST

73

CLIPPER
32BVQFP
U119

CL45D[00-31]

CL45D00	93	UDATA00
CL45D01	94	UDATA01
CL45D02	95	UDATA02
CL45D03	96	UDATA03
CL45D04	99	UDATA04
CL45D05	100	UDATA05
CL45D06	101	UDATA06
CL45D07	102	UDATA07
CL45D08	103	UDATA08
CL45D09	104	UDATA09
CL45D10	105	UDATA10
CL45D11	106	UDATA11
CL45D12	109	UDATA12
CL45D13	110	UDATA13
CL45D14	111	UDATA14
CL45D15	112	UDATA15
CL45D16	113	UDATA16
CL45D17	114	UDATA17
CL45D18	115	UDATA18
CL45D19	116	UDATA19
CL45D20	119	UDATA20
CL45D21	120	UDATA21
CL45D22	121	UDATA22
CL45D23	122	UDATA23
CL45D24	123	UDATA24
CL45D25	124	UDATA25
CL45D26	125	UDATA26
CL45D27	126	UDATA27
CL45D28	1	UDATA28
CL45D29	2	UDATA29
CL45D30	3	UDATA30
CL45D31	4	UDATA31

VDD PIN

6	17	18	28	34
44	54	64	69	
79	80	91	97	
107	117	127		

GND PIN

5	15	16	27	33
43	53	63	70	
81	82	92	98	
108	118	128		

NC PINS

7	10	11	26	
71	86	88	90	

USHTF
UDIA
UDRY

15100014
15100013
15100012
15100011
15100010
15100009
15100008

L SHIFT
L RDY
L OIA
L OIR
L 20
L 19
L 21

CL56RDY-
CL65RDY-
CL65DIR

CL45RDY-
CL54RDY-
CL54DIR

COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
380 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		380 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	CLIPPER ASIC 5	
DOUGLAS FROKE		X	XNAR
APPROV.	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0013-03
INITIALS	DATE	REV	RELEASE
J. Home	10/14/91		
O. Grayson	10/14/91		
DATE 12-17-1990-9-32 SHEET 14 OF 27			

D

3

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1

E



U132
HLTH6LMP 4 3 HEALTH6
74LS14

IDPU
CLIPTS0
CLIPTS1
CLIPTS2
TFWRITE-
TFREAD-
20MHZCLK

MASR-

	BS	MR*	LSRST	7.3
CL56D00	9.3	UDATA00	L DATA00	6.8 D1DATA00
CL56D01	9.4	UDATA01	L DATA01	6.7 D1DATA01
CL56D02	9.5	UDATA02	L DATA02	6.6 D1DATA02
CL56D03	9.6	UDATA03	L DATA03	6.5 D1DATA03
CL56D04	9.9	UDATA04	L DATA04	6.2 D1DATA04
CL56D05	10.0	UDATA05	L DATA05	6.1 D1DATA05
CL56D06	10.1	UDATA06	L DATA06	6.0 D1DATA06
CL56D07	10.2	UDATA07	L DATA07	5.9 D1DATA07
CL56D08	10.3	UDATA08	L DATA08	5.8 D1DATA08
CL56D09	10.4	UDATA09	L DATA09	5.7 D1DATA09
CL56D10	10.5	UDATA10	L DATA10	5.6 D1DATA10
CL56D11	10.6	UDATA11	L DATA11	5.5 D1DATA11
CL56D12	10.9	UDATA12	L DATA12	5.2 D1DATA12
CL56D13	11.0	UDATA13	L DATA13	5.1 D1DATA13
CL56D14	11.1	UDATA14	L DATA14	5.0 D1DATA14
CL56D15	11.2	UDATA15	L DATA15	4.9 D1DATA15
CL56D16	11.3	UDATA16	L DATA16	4.8 D1DATA16
CL56D17	11.4	UDATA17	L DATA17	4.7 D1DATA17
CL56D18	11.5	UDATA18	L DATA18	4.6 D1DATA18
CL56D19	11.6	UDATA19	L DATA19	4.5 D1DATA19
CL56D20	11.9	UDATA20	L DATA20	4.2 D1DATA20
CL56D21	12.0	UDATA21	L DATA21	4.1 D1DATA21
CL56D22	12.1	UDATA22	L DATA22	4.0 D1DATA22
CL56D23	12.2	UDATA23	L DATA23	3.9 D1DATA23
CL56D24	12.3	UDATA24	L DATA24	3.8 D1DATA24
CL56D25	12.4	UDATA25	L DATA25	3.7 D1DATA25
CL56D26	12.5	UDATA26	L DATA26	3.6 D1DATA26
CL56D27	12.6	UDATA27	L DATA27	3.5 D1DATA27
CL56D28	1	UDATA28	L DATA28	3.2 D1DATA28
CL56D29	2	UDATA29	L DATA29	3.1 D1DATA29
CL56D30	3	UDATA30	L DATA30	3.0 D1DATA30
CL56D31	4	UDATA31	L DATA31	2.9 D1DATA31

CL56D[00-31]

CLIPPER
128VPQFP
U120

VDD PIN
6. 17. 18. 28. 34

44. 54. 64. 69

79. 80. 91. 97

107. 117. 127

GND PIN
5. 15. 16. 27. 33

43. 53. 63. 70

81. 82. 92. 98

108. 118. 128

NC PINS

7. 10. 11. 26

71. 86. 88. 90

UDATA28
UDATA29
UDATA30
UDATA31

UDATA32
UDATA33

UDATA34
UDATA35

UDATA36
UDATA37

UDATA38
UDATA39

UDATA40
UDATA41

UDATA42
UDATA43

UDATA44
UDATA45

UDATA46
UDATA47

UDATA48
UDATA49

UDATA50
UDATA51

UDATA52
UDATA53

UDATA54
UDATA55

UDATA56
UDATA57

UDATA58
UDATA59

UDATA60
UDATA61

UDATA62
UDATA63

UDATA64
UDATA65

UDATA66
UDATA67

UDATA68
UDATA69

UDATA70
UDATA71

UDATA72
UDATA73

CL56RDY-
CL65RDY-
CL65DIR

D1RDY-
LCLRDY-
D1DTR

COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHEKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	CLIPPER ASIC 6	
DOUGLAS FROOME		Y ≥ 1MIN	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		DW-00011C-0013-03	
REV	RELEASE		
DATE 12-17-1990-9-13 SHEET 15 OF 27			

D

3

2

1



D1HLAMP U132 D1HEALTH
74LS34

MHZ20
MRSR-

D1DATA[00-31]

D1DATA00	124
D1DATA01	125
D1DATA02	126
D1DATA03	127
D1DATA04	3
D1DATA05	4
D1DATA06	5
D1DATA07	6
D1DATA08	7
D1DATA09	8
D1DATA10	9
D1DATA11	10
D1DATA12	11
D1DATA13	12
D1DATA14	13
D1DATA15	14
D1DATA16	15
D1DATA17	16
D1DATA18	17
D1DATA19	18
D1DATA20	19
D1DATA21	20
D1DATA22	21
D1DATA23	22
D1DATA24	23
D1DATA25	24
D1DATA26	25
D1DATA27	26
D1DATA28	27
D1DATA29	28
D1DATA30	29
D1DATA31	30
	31
	32
	33
	34
	35
	36
	37

MPGDRAW1
ASIC
U107

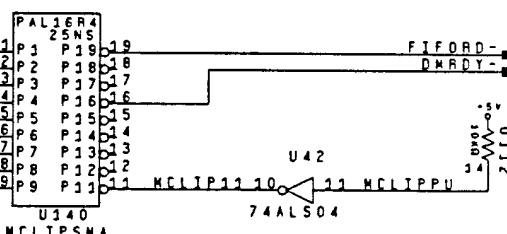
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13 21 31 38 49	
55 64 65 76 88	
95 107 114 122	
GND PINS -	2
12 22 32 33 37	
50 54 66 75 87	
96 97 108 113	

FLD23	57
FLD22	58
FLD21	59
FLD20	60
FLD19	61
FLD18	62
FLD17	63
FLD16	67
FLD15	68
FLD14	69
FLD13	70
FLD12	71
FLD11	72
FLD10	73
FLD9	74
FLD8	77
FLD7	78
FLD6	79
FLD5	80
FLD4	81
FLD3	82
FLD2	83
FLD1	84
FLD0	87
FLRD-	104
FLWR-	105
FLRDY-	103
FLRDY1	53
FLDONE	54
FLBSEL	66

FLA8	91
FLA7	92
FLA6	93
FLA5	94
FLA4	95
FLA3	99
FLA2	100
FLA1	101
FLA0	102
D1A[00-08]	

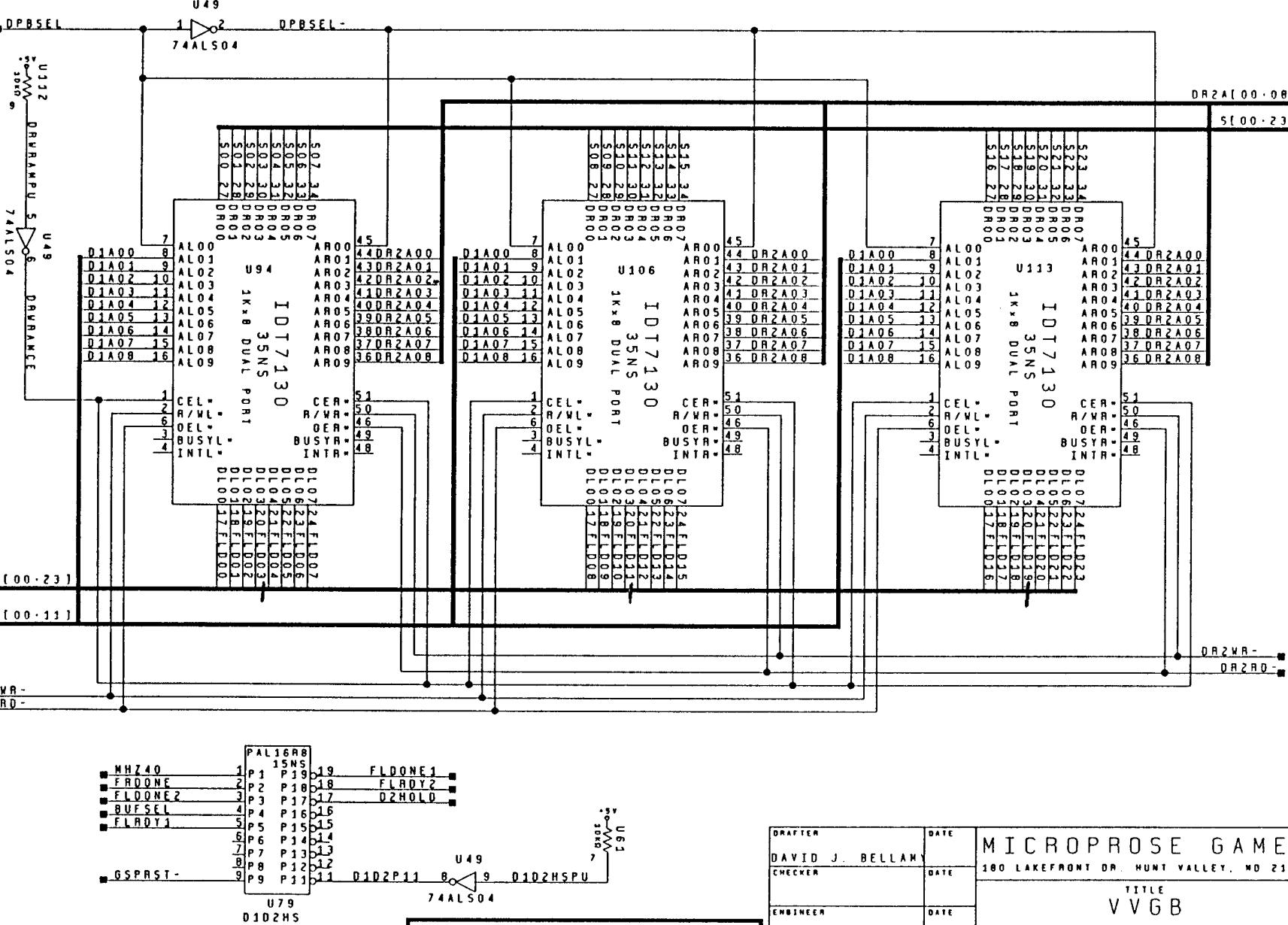
D1DIR
D1BDY-
LCLRDY-
FLSILENT

MHZ20
UCLRDY-
CLOTR
FEMPTY-
CLOEN-



COMPANY CONFIDENTIAL	PROPRIETARY INFORMATION
MICROPROSE Games 180 LAKEFRONT DR. HUNT VALLEY, MD 21030	

DRAFTER DAVID J. BELLAMY	DATE
CHECKER	DATE
ENGINEER DOUGLAS FEROME	DATE
APPROVAL <i>Doyle Ferome</i>	DATE
TITLE VVGB	
DRAW ONE ASIC	
SIZE C	DRAWING NUMBER DW-00011C-0013-03
REV	RELEASE
DATE 12-17-1990-10-05 SHEET 16 OF 27	



COMPANY / PROPRIETARY
CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR., HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR., HUNT VALLEY, MD 21030	
CHECKER	DATE		
DOUGLAS FROME	DATE		
ENGINEER	DATE		
APPROV.	DATE		
SIZE	DRAWING NUMBER		
C	DW-00011C-0013-03		
REV	RELEASE		
DATE 12-17-1990-10-05 SHEET 17 OF 27			

[Handwritten signatures and initials over the form]

1

3

2

1

E

5

MHZ 40
MRSR -

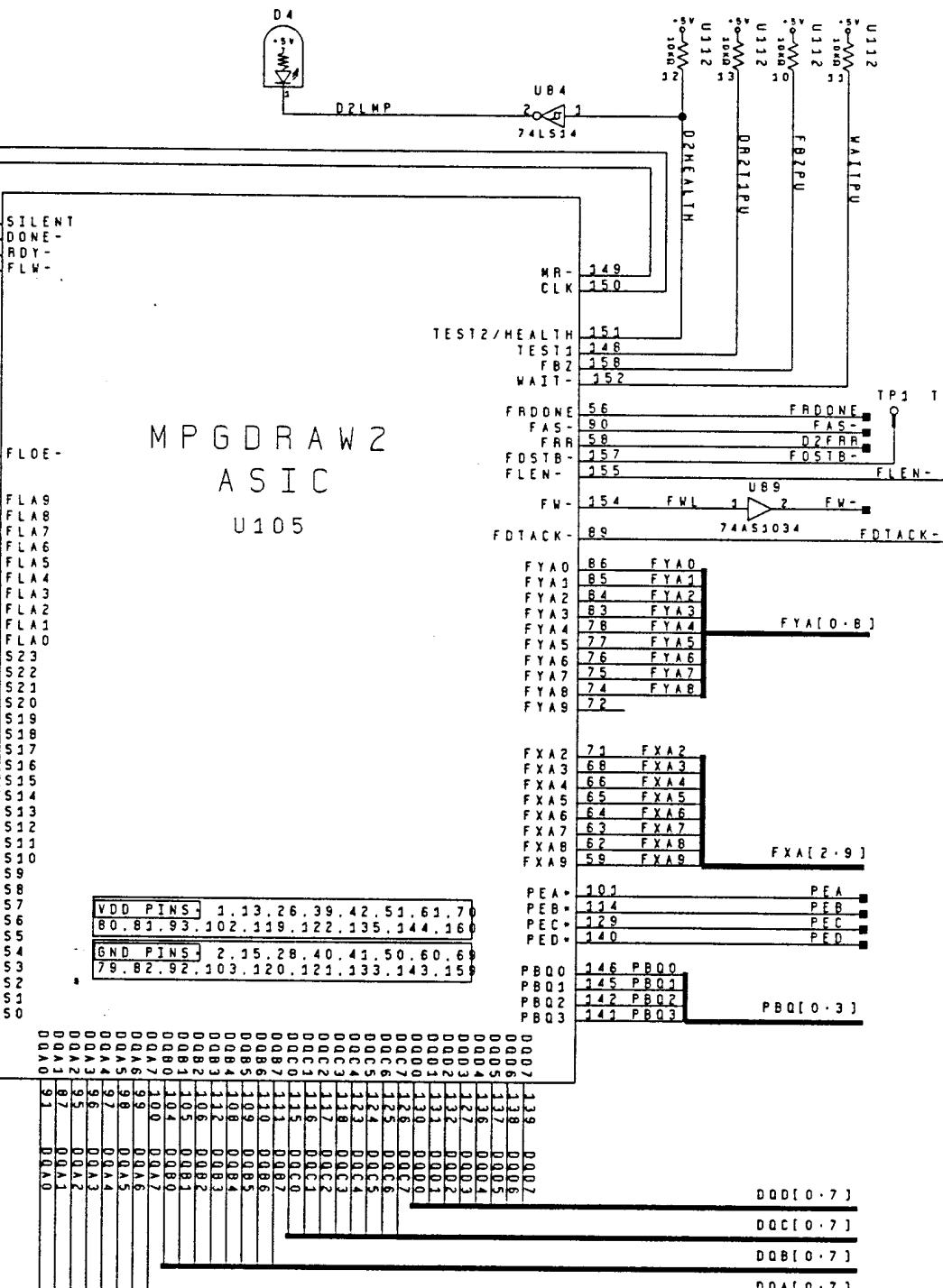
FL SILENT	57	SILENT
FL DONE 2	156	DONE-
FL RDY 2	55	RDY-
FL 2 WR-	37	FL W-

DA 2 AD - 3 FLOE -

DR2A[00-08]	38	F L A 9
DR2A08	43	F L A 8
DR2A07	44	F L A 7
DR2A06	45	F L A 6
DR2A05	46	F L A 5
DR2A04	47	F L A 4
DR2A03	36	F L A 3
DR2A02	49	F L A 2
DR2A01	52	F L A 1
DR2A00	53	F L A 0
S23	34	S23
S22	32	S22
S21	31	S21
S20	30	S20
S19	29	S19
S18	35	S18
S17	25	S17
S16	24	S16
S15	23	S15
S14	22	S14
S13	21	S13
S12	20	S12
S11	19	S11
S10	18	S10
S09	17	S9
S08	16	S8
S07	7	S7
S06	12	S6
S05	11	S5
S04	10	S4
S03	9	S3
S02	6	S2
S01	5	S1
500	4	S0

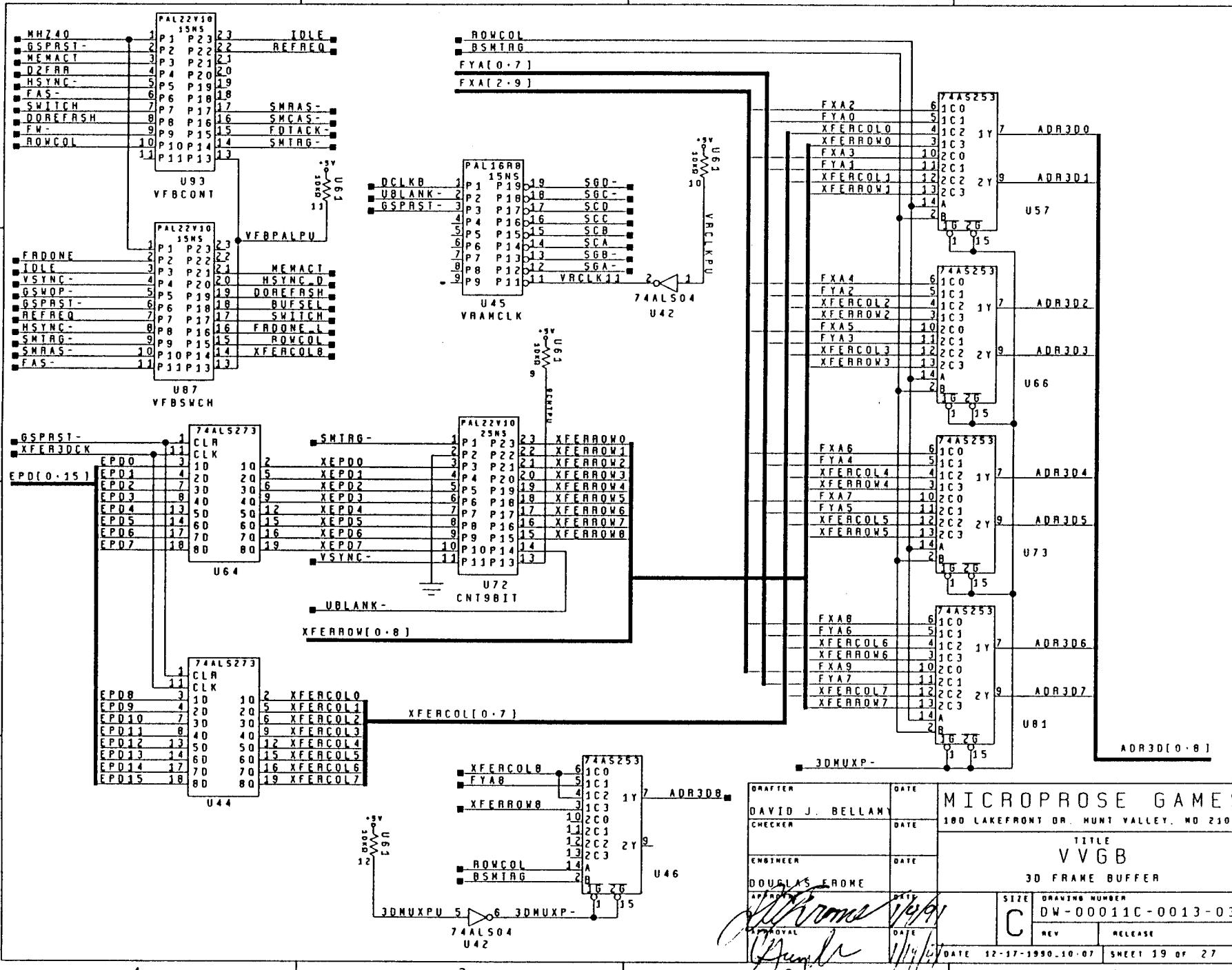
M P G D R A W 2
A S I C

U105



COMPANY / PROPRIETARY
CONFIDENTIAL INFORMATION

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
CHECKER	DATE	TITLE VVGB DRAW2 ASIC		
ENGINEER DOUGLAS FROME	DATE			
APPROVAL <i>Frrome</i>	DATE <i>1/16/91</i>	SIZE <i>C</i>	DRAWING NUMBER DW-00011C-0013-03	
APPROVAL <i>Frrome</i>	DATE <i>1/16/91</i>	REV	RELEASE	
DATE 12-17-1990-10-06			SHEET 18 OF 27	



DRAFTER	DATE
DAVID J. BELLAMY	
CHECKER	DATE
ENGINEER	DATE
DOUGLAS FROOME	
APPROVAL	DATE
Froome	1/14
APPROVAL	DATE
(Froome)	1/14

MICROPROSE GAMES		
180 LAKEFRONT DR., HUNT VALLEY, MD 21030		
TITLE		
VVGB		
3D FRAME BUFFER		
	SIZE	DRAWING NUMBER
	C	DW-00011C-0013-03
	REV	RELEASE
DATE	12-17-1990-10-07	
	SHEET 19 OF 27	

DQ[0-7]

DOB[0-7]

DOA[0-7]

U83							
DQA0	2	1A1	1Y1	18	BDOA0		
DQA1	4	1A2	1Y2	16	BDOA1		
DQA2	6	1A3	1Y3	14	BDOA2		
DQA3	8	1A4	1Y4	12	BDOA3		
DQA4	10	2A1	2Y1	9	BDOA4		
DQA5	12	2A2	2Y2	7	BDOA5		
DQA6	14	2A3	2Y3	5	BDOA6		
DQA7	16	2A4	2Y4	3	BDOA7		
	16	ZG					
	1		19				

U75							
DQB0	2	1A1	1Y1	18	BDOB0		
DQB1	4	1A2	1Y2	16	BDOB1		
DQB2	6	1A3	1Y3	14	BDOB2		
DQB3	8	1A4	1Y4	12	BDOB3		
DQB4	10	2A1	2Y1	9	BDOB4		
DQB5	12	2A2	2Y2	7	BDOB5		
DQB6	14	2A3	2Y3	5	BDOB6		
DQB7	16	2A4	2Y4	3	BDOB7		
	16	ZG					
	1		19				

U68							
DOC0	2	1A1	1Y1	18	BDOC0		
DOC1	4	1A2	1Y2	16	BDOC1		
DOC2	6	1A3	1Y3	14	BDOC2		
DOC3	8	1A4	1Y4	12	BDOC3		
DOC4	10	2A1	2Y1	9	BDOC4		
DOC5	12	2A2	2Y2	7	BDOC5		
DOC6	14	2A3	2Y3	5	BDOC6		
DOC7	16	2A4	2Y4	3	BDOC7		
	16	ZG					
	1		19				

B00C[0-7]

B00B[0-7]

B00A[0-7]

PBQ[0-3]

DOQ[0-7]

U59							
DQD0	2	1A1	1Y1	18	BQD00		
DQD1	4	1A2	1Y2	16	BQD01		
DQD2	6	1A3	1Y3	14	BQD02		
DQD3	8	1A4	1Y4	12	BQD03		
DQD4	10	2A1	2Y1	9	BQD04		
DQD5	12	2A2	2Y2	7	BQD05		
DQD6	14	2A3	2Y3	5	BQD06		
DQD7	16	2A4	2Y4	3	BQD07		
	16	ZG					
	1		19				

U47							
BQ00	2	1A1	1Y1	18	PBQ0		
BQ01	4	1A2	1Y2	16	PBQ1		
BQ02	6	1A3	1Y3	14	PBQ2		
BQ03	8	1A4	1Y4	12	PBQ3		
BQ04	10	2A1	2Y1	9	PBQ4		
BQ05	12	2A2	2Y2	7	PBQ5		
BQ06	14	2A3	2Y3	5	PBQ6		
BQ07	16	2A4	2Y4	3	PBQ7		
	16	ZG					
	1		19				

B00[0-3]

B00D[0-7]

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MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

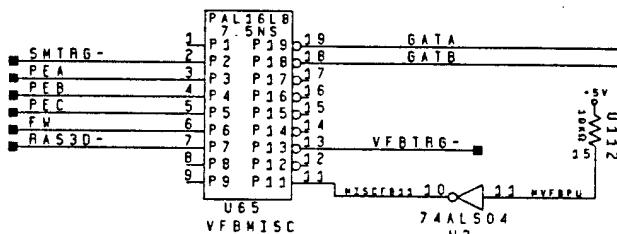
DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	3D FRAME DATA BUS BUFFERS	
DOUGLAS FROOME		APPROVAL	
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-00011C-0013-03
APPROVAL	DATE	REV	RELEASE
DATE 12-17-1990_10-07 SHEET 20 OF 27			

[Handwritten signatures and initials over the approver section]

E

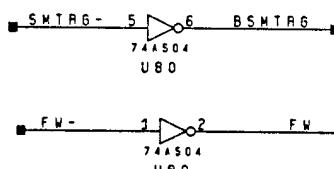
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BDOA[0-7]
 BDDB[0-7]
 BDCC[0-7]
 BDOD[0-7]



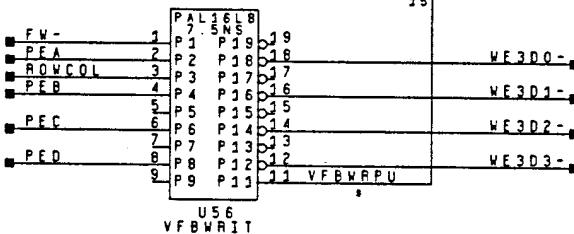
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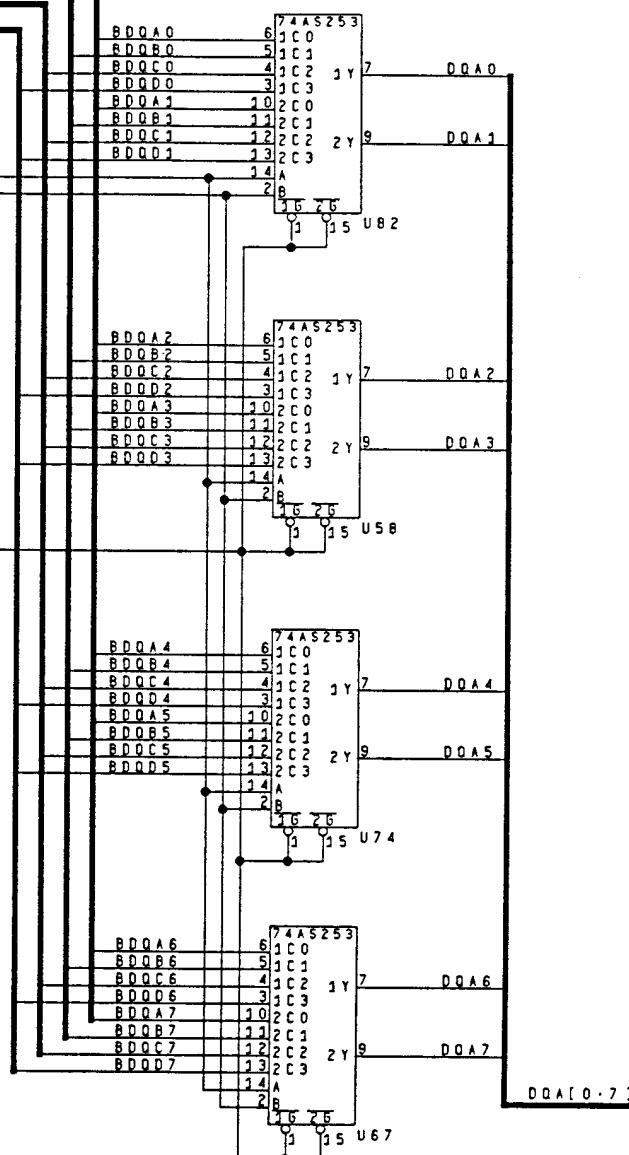
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B

B



COMPANY	PROPRIETARY
CONFIDENTIAL	INFORMATION
MICROPROSE Games	
180 LAKEFRONT DR. HUNT VALLEY, MD 21030	

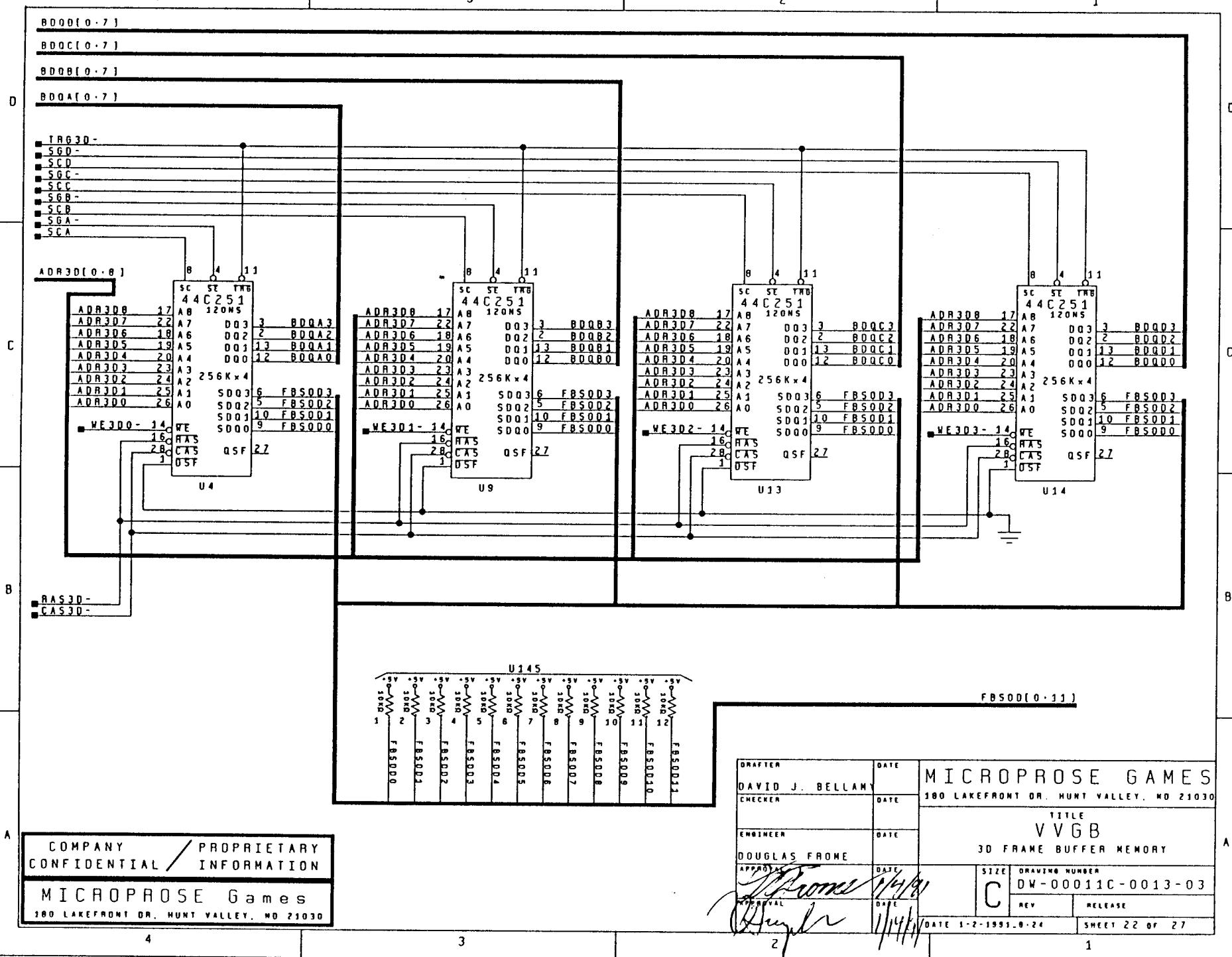
DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE		
ENGINEER	DATE		
DOUGLAS FROOME			
APPROVAL	DATE	SIZE	DRAWING NUMBER
<i>Broome 12/14/91</i>		C	DW-00011C-0013-03
APPROVAL	DATE	REV	RELEASE
<i>Broome 12/14/91</i>			
		DATE 12-17-1990 10-09 SHEET 21 OF 27	

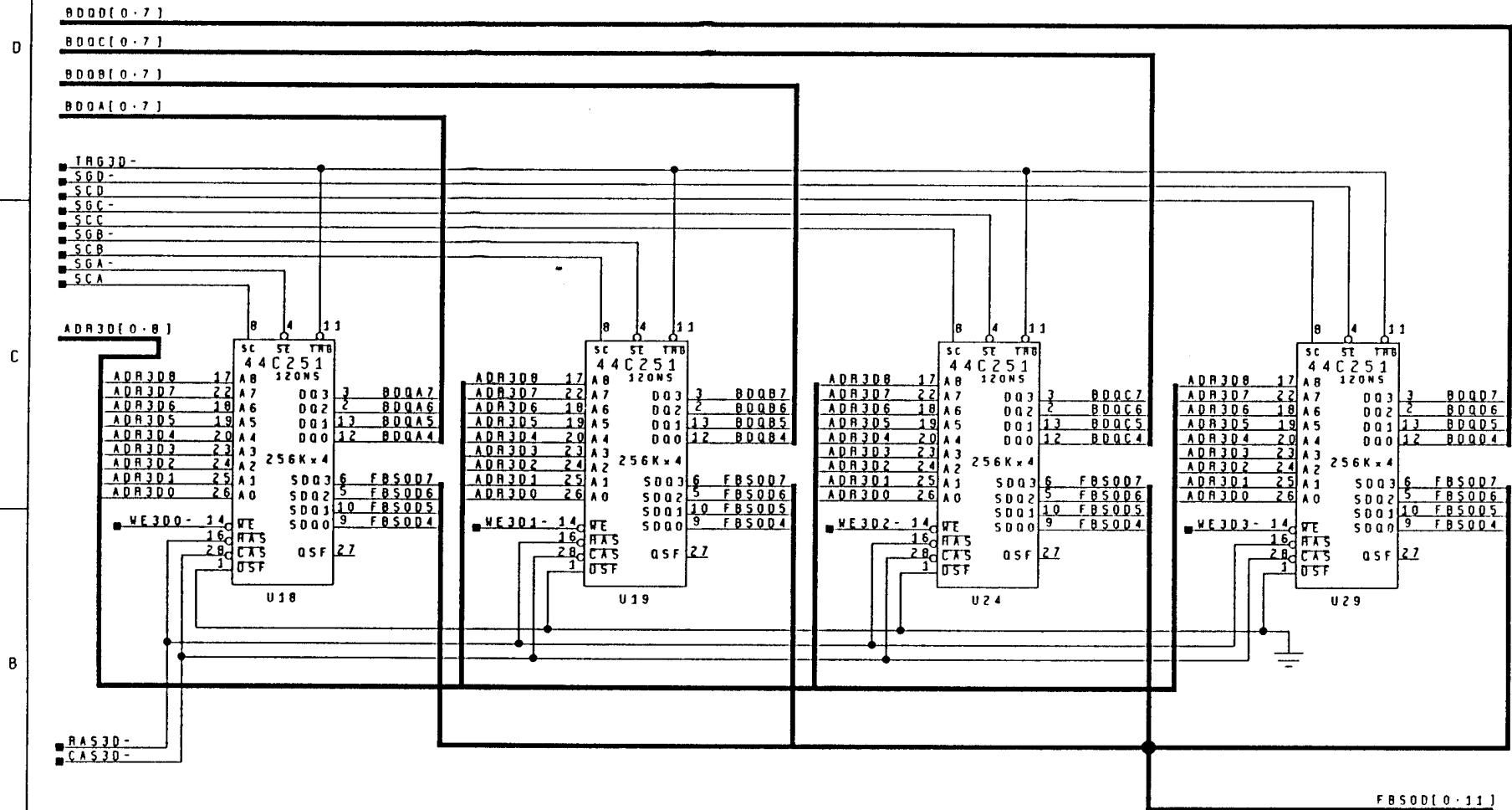
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MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	3D FRAME BUFFER MEMORY	
DOUGLAS FROME		SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00011C-0013-03
INITIAL	DATE	REV	RELEASE
DRAFTED 1/4/91 D. Frome		DATE 1-2-1991-8-33 SHEET 23 OF 27	

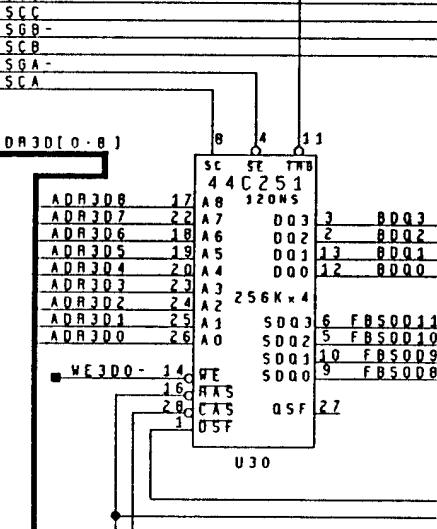
**COMPANY
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INFORMATION**
MICROPROSE Games
 180 LAKEFRONT DR. HUNT VALLEY, MD 21030

B00[0 - 3]

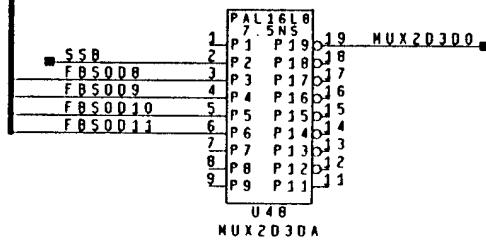
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- SGD -
- SCD -
- SGC -
- SCC -
- SGB -
- SCB -
- SGA -
- SCA -

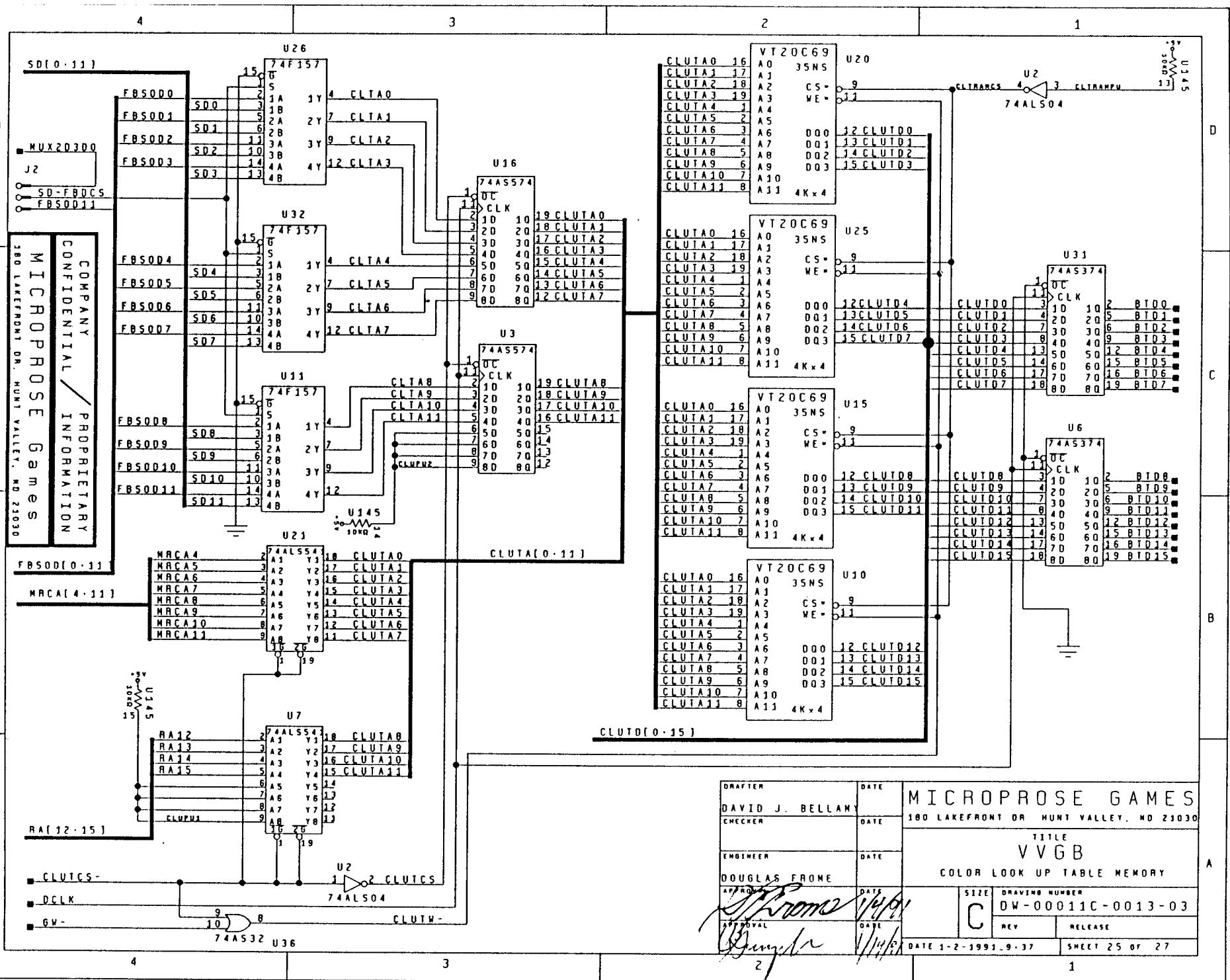
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FB500[0 - 11]



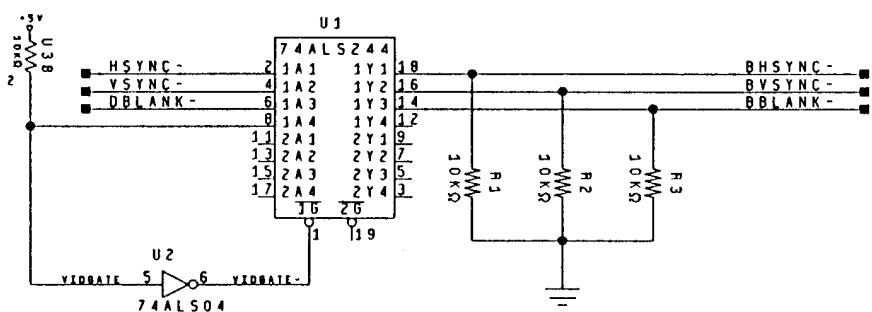
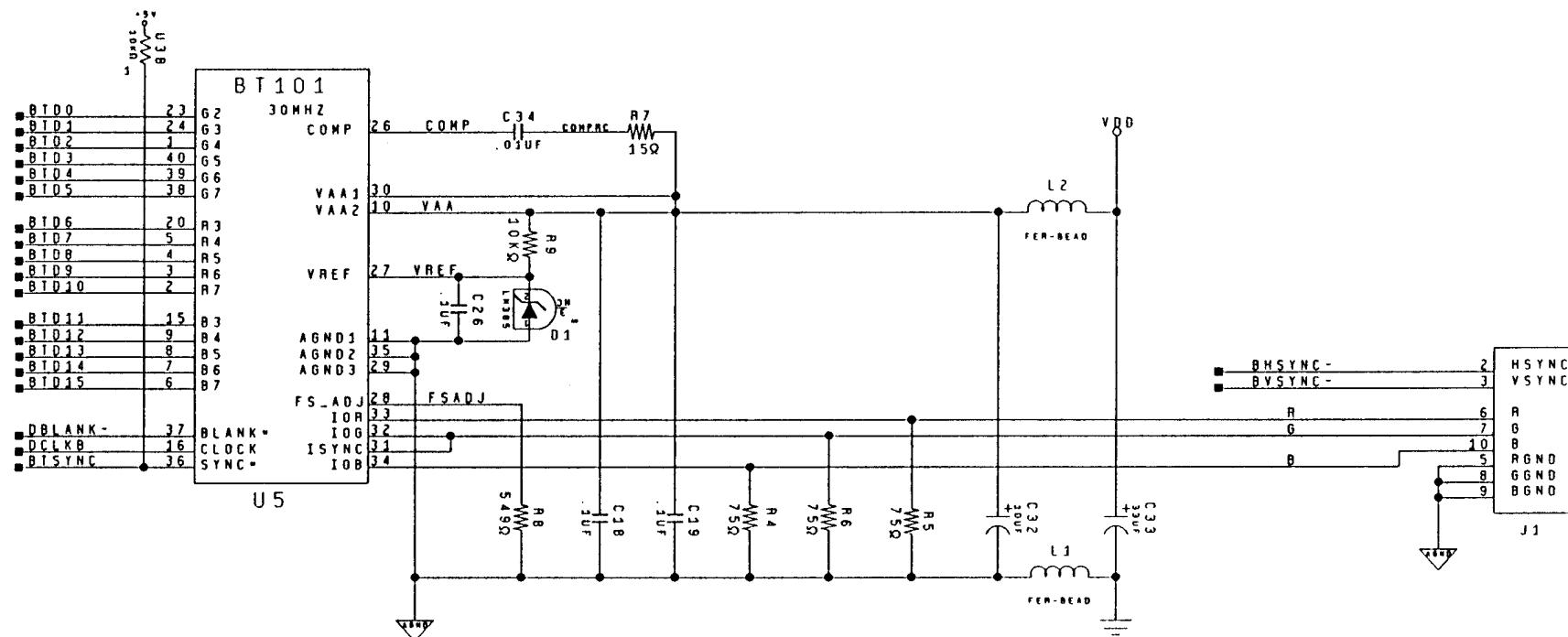
DRAFTER		DATE	MICROPROSE GAMES	
CHECKER		DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
ENGINEER		DATE	TITLE	
APPROVAL		DATE	V V G B	
APPROVAL		DATE	SIZE	
APPROVAL		DATE	DRAWING NUMBER	
APPROVAL		DATE	DW - 00011C - 0013 - 03	
APPROVAL		DATE	REV	
APPROVAL		DATE	RELEASE	
APPROVAL		DATE	DATE 11-13-1990-17-49 SHEET 24 OF 27	



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CONFIDENTIAL INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

drafter	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
checker	DATE		
engineer	DATE		
DOUGLAS FROME			
APPROVAL	DATE	SIZE	DRAWING NUMBER
DOUGLAS FROME	3/4/91	C	DW-00011C-0013-03
APPROVAL	DATE	REV	A RELEASE
DOUGLAS FROME	3/4/91	i/14/	
DATE 1-2-1991-9-38		SHEET 26 OF 27	

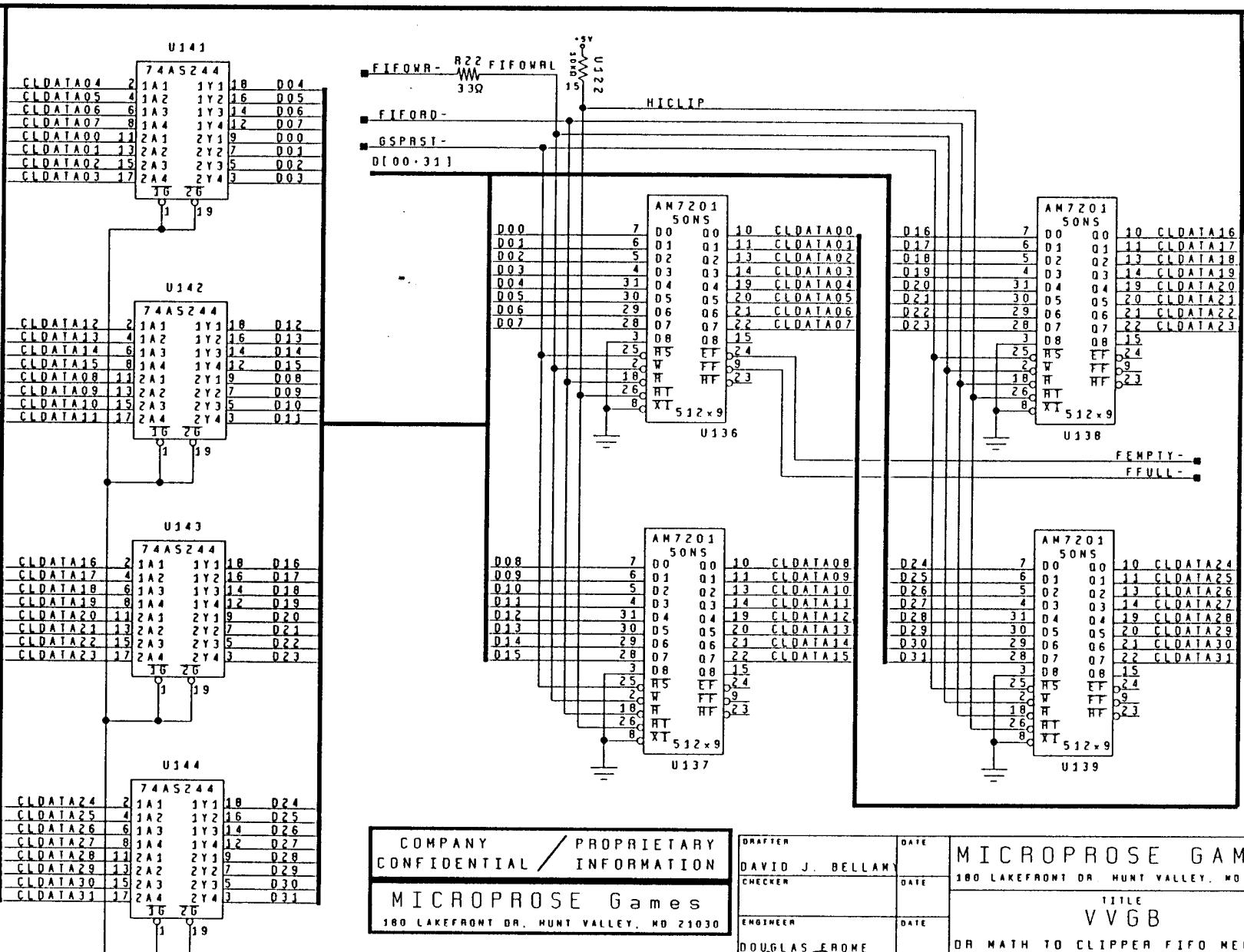
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CLDATA[00-31]



CONFIDENTIAL / INFORMATION
MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		VVGB	
ENGINEER	DATE	OR MATH TO CLIPPER FIFO MEMORY	
DOUGLAS FROME		APPROVAL DATE	
<i>Douglas Frome 1/14/91</i>		SIZE GRAVING NUMBER	
		C DW-00011C-0013-03	
APPROVAL	DATE	REV	RELEASE
<i>Jayler 1/14/91</i>			
DATE 1-2-1991-9-53		SHEET 27 OF 27	

BILL OF MATERIALS
VIDEO GRAPHICS P.C.B.
ASSEMBLY: A10-00003-003

COMPANY CONFIDENTIAL /
PROPRIETARY INFORMATION

MICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

DRAFTER DAVID J. BELLAMY	DATE	MICROPROSE GAMES		
CHECKER	DATE	180 LAKEFRONT DRIVE, HUNT VALLEY, MD 21030		
ENGINEER DOUGLAS FROME	DATE	BILL OF MATERIALS	DWG NO PL-00011A-0013-03	REV B
APPROVAL <i>Frone 1/15/91</i>	DATE	VIDEO GRAPHICS P.C.B. WITH VLSI CLIPPERS A 10-00003-003	DATE 1-15-1991-14-17	A
APPROVAL	DATE	SHEET 1 OF 8		

MICROPROSE GAMES, 180 Lakefront Drive, Hunt Valley, Maryland 21030
 PROJECT: Video Graphics PCB DRWG NO: PL-00011A-0013-003 REV:B
 DATE: Wed 19-Dec-1990

ITEM	QTY	VENDOR	PART NUMBER REF. DES.	PART DESC	VALUE	MPG P/N
1	*	4	AM7201-50JC U136,U137,U138,U139	512x9FIFO	50NS	222-00004-450
2		1	71922-010 J1	2X5HEADER	.100"	610-00800-010
3		3	11C1210X7R104K050NT C18,C19,C26	SMTCERCAP	0.1UF	401-02002-104
4		1	LM385BZ-1.2 D1	ZENER	1.2V	301-00001-012
5		1	11C1210X7R103K050NT C34	SMTCERCAP	0.01UF	401-02002-103
6		1	293D336X9016D2T C33	SMTTANTCAP	33UF	420-00163-336
7		1	BT101KC30 U5	VIDEODAC	30MHZ	245-00001-230
8		2	2743019446 L2,L1	FERRITEBD	75 OHM	595-00001-100
9		1	293D106X9016C2T C32	SMTTANTCAP	10UF	420-00162-106
10		1	CCF-50 15R0F R7	1%MFRES	15 OHM	503-00001-150
11		1	CCF-50 5490F R8	1%MFRES	549 OHM	503-00001-551
12		3	CCF-50 75R0F R6,R5,R4	1%MFRES	75 OHM	503-00001-750
13		4	CCF-50 1002F R9,R3,R2,R1	1%MFRES	10KOHM	503-00001-103
14		2	SN74ALS541N U7,U21	OCTDRVRS		200-00541-200
15		3	MC74F157AN U11,U26,U32	QUAD2:1MUX		203-00157-200
16		1	GAL16V8-15LP U65	VFBMISCA	15 NS	120-00002-010
17		2	SN74AS374N U6,U31	OCTREGISTER		201-00374-200

ITEM	QTY	VENDOR PART NUMBER REF. DES.	PART DESC	VALUE	MPG P/N
18	2	SN74AS574N U3 , U16	OCTREGISTER		201-00574-200
19	*	4 VT20C69-35PC U10 , U15 , U20 , U25	4Kx4SRAM	35NS	221-00002-235
20					
21	1	AmPAL16L8-7CN U56	VFBWRITC	7.5 NS	120-00002-211
22	1	SN74AS32N U36	HEX2-IN'OR'		201-00032-200
23	9	SN74AS244DW U47 , U59 , U68 , U75 , U83 , U141 , U143 , U144 , U142	SMTOCTBUFFERS		201-00244-100
24	1	GAL16V8-15LP U45	VRAMCLKA	15NS	120-00002-001
25	1	GAL22V10-15LP U93	VFBCONTA	15NS	120-00002-002
26	1	GAL22V10-15LP U87	VFBSWCHA	15NS	120-00002-003
27	9	SN74AS253DW U46 , U57 , U58 , U67 , U66 , U73 , U74 , U81 , U82	SMTDUAL4:1MUX		201-00253-100
28	1	GAL22V10-25LP U72	CNT9BITA	25NS	120-00002-004
29	*	1 MPGDRAW2 U105	DRAW2ASIC	40MHZ	100-TB001-340
30	1	SN74AS1034AN U89	HEXDIVER		201-01034-200
31	*	3 IDT7130SA-35J U94 , U106 , U113	1Kx8DPSRAM	35NS	222-00002-435
32	1	GAL16V8-15LP U79	D1D2HSA	15NS	120-00002-005
33	1	GAL16V8-25LP U140	MCLIPSMA	25NS	120-00002-006
34	*	1 MPGDRAW1 U107	DRAW1ASIC	20MHZ	100-PK001-320
35	*	6 MPGCLIPPER U118 , U119 , U120 , U127 , U128 , U129	CLIPPERASIC	20MHZ	100-MW001-320

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
<u>REF. DES.</u>					
36	*	20 HM534251ZP-12 U4, U8, U9, U12, U13, U14, U17, U18, U19, U22, U23, U25, U27, U28, U29, U30, U33, U34, U35, U41	256Kx4VRAM	120NS	222-00006-612
37	1	SN74ALS2541N U39	OCTDRVRW/SERRES		200-02541-200
38	*	4 TMS44C256-12N U37, U43, U50, U54	256Kx4DRAM	120NS	220-00002-212
39	1	AM29C863PC U71	9BITXCVR		235-00005-200
40	2	SN74ALS244ADW U1, U62	SMT OCTBUFFERS		200-00244-100
41	1	AM29C823ASC U78	SMT 9BITLATCH		235-00004-100
42	1	GAL16V8-15LP U40	VRAM_SGA	15NS	120-00002-007
43	4	SN74ALS273N U44, U51, U55, U64	OCTREGISTERS		200-00273-200
44	1	GAL22V10-15LP U77	GADRDC1A	15NS	120-00002-008
45	1	AM29841APC U63	10BITLATCHES		235-00008-100
46	1	GAL22V10-25LP U86	GADRDC0A	25NS	120-00002-009
47					
48	1	LT1081-CN U60	RS232DRV		235-00001-200
49	1	22-05-7048 J3	MOLEX4PIN	.100"	610-00601-004
50	4	293D105X0016A2T C68, C69, C70, C71	SMT TANTCAP	1UF	420-00060-105
51					
52	*	1 SCN2651CC1N28 U69	UART		240-00002-200
53	6	SN74ALS245ADW U98, U99, U102, U103, U109, U110	SMT OCTXCVR		200-00245-100

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
		<u>REF. DES.</u>			
54	D*	1 TMS34010FNL-40 U115	68PLCCGSP	40MHZ	135-34010-440
55		1 SN74ALS74N U53	DUAL DFLOPS		200-00074-200
56		1 SN74ALS08N U70	HEX2-IN'AND'		200-00008-200
57		3 SN74ALS373N U76, U85, U91	OCTLATCHES		200-00373-200
58		1 68001-502 J8, [J6, J10]	2PINJUMPER	.100"	610-00002-002
59	0	68001-503 [J2, J4, J5, J7, J9]	3PINJUMPER	.100"	610-00002-003
60		1 SN74AS04N U80	HEXINVERTER		201-00004-200
61		1 SN74LS393N U123	DUAL4BITBICNTR		202-00393-200
62		1 SN74AS74N U116	DUALDFLOPS		201-00074-200
63	6	CCF-07 100G R14, R15, R17, R18, R19, R21	2%MFRESISTOR	10 OHM	503-00002-100
64	1	X0-43D-40 U104	OSCILLATOR	40MHZ	290-00001-040
65	1	1N746A D2	ZENER	3.3V	301-00002-033
66	1	KSA1A211 SW1	PBSWITCH		625-00002-001
67	1	CCF-07 102G R10	2%MFRESISTOR	1KOHM	503-00002-102
68	1	CCF-07 820G R12	2%MFRESISTOR	82 OHM	503-00002-820
69	4	CCF-07 103G R11, R13, R16, R20	2%MFRESISTOR	10KOHM	503-00002-103
70	1	1N914 D3	DIODE		300-00002-003
71	1	LM311N U90	VOLTCOMP		280-00002-200

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u> <u>REF. DES.</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
72	1	173D335X0020V C100	AXTANTCAP	3 .3UF	422-00062-335
73	3	SN74LS14N U84 , U132 , U135	HEXSTINVERT		202-00014-200
74	3	SN74ALS04BN U2 , U42 , U49	HEXINVERTERS		200-00004-200
75	1	SN74ALS157N U125	QUAD2:1MUX		200-00157-200
76	0	XO-43D-50 U92	OSCILLATOR	50MHZ	290-00001-050
77	0	XO-43B-20 U131	OSCILLATOR	20MHZ	290-00001-020
78	4	SN74AS1004AN U100 , U111 , U117 , U126	HEXINVDRVRS		201-01004-200
79	14	7-0805G-5 TP2 , TP1 , TP5 , TP4 , TP15 , TP14 , TP13 , TP12 , TP11 , TP10 , TP9 , TP8 , TP7 , TP6	TESTPIN		710-00001-001
80	5	836C103X2PE U38 , U61 , U112 , U122 , U145	SMTPULRESPAK	10KOHM	502-00001-103
81	1	ICTE-5 D14	ZENER	5 .0V	300-00001-002
82	1	26-60-5100 0 09-52-3102 P2	MOLEX10PIN	.156"	610-00601-010 610-10600-010
83	8	TAJC156M010CR C3 , C10 , C58 , C107 , C123 , C134 , C154 , C157	SMTTANTCAP	15UF	420-00002-156
84	88	11C1206Z5U104M050NT	SMTCERCAP	0 .1UF	401-01000-104
		C1 , C2 , C4 , C5 , C7 , C9 , C13 , C21 , C28 , C36 , C41 , C42 , C45 , C47 , C48 , C50 , C52 , C53 , C54 , C55 , C56 , C59 , C60 , C61 , C63 , C64 , C65 , C66 , C67 , C72 , C73 , C74 , C75 , C76 , C77 , C78 , C79 , C80 , C81 , C82 , C83 , C84 , C85 , C86 , C87 , C88 , C89 , C90 , C91 , C92 , C93 , C95 , C96 , C97 , C98 , C99 , C101 , C102 , C103 , C104 , C106 , C109 , C110 , C111 , C113 , C114 , C115 , C118 , C119 , C120 , C124 , C132 , C133 , C136 , C137 , C139 , C140 , C141 , C143 , C148 , C153 , C155 , C156 , C158 , C159 , C160 , C161			
85	10	HLMP3600 D4 , D5 , D6 , D7 , D8 , D9 , D10 , D11 , D12 , D13	LED	RED	305-00003-002
86	1	71922-140 P3	2x20RACONNECTR	.100"	610-00900-040

ITEM	QTY	VENDOR PART NUMBER REF. DES.	PART DESC	VALUE	MPG P/N
87	53	11C1206Z5U334M050NT	SMT CER CAP C6, C11, C12, C14, C15, C16, C17, C20, C22, C23, C24, C25, C27, C29, C30, C31, C35, C37, C38, C39, C40, C43, C44, C46, C49, C51, C57, C62, C94, C105, C108, C112, C116, C117, C121, C125, C126, C127, C128, C129, C130, C131, C135, C138, C142, C144, C145, C146, C147, C149, C150, C151, C152	0.33UF	401-02000-334
88 A*	1	AM27C010-155DC U101	128Kx8EPROM VGBK0BY0.001	150NS	110-00002-101
89 A*	1	AM27C010-155DC U108	128Kx8EPROM VGBK0BY1.001	150NS	110-00002-102
90 A*	1	AM27C010-155DC U114	128Kx8EPROM VGBK1BY0.001	150NS	110-00002-103
91 A*	1	AM27C010-155DC U97	128Kx8EPROM VGBK1BY1.001	150NS	110-00002-104
92 A*	1	AM27C010-305DC U124	128Kx8EPROM VGBK2BY0.001	300NS	110-00002-105
93 A*	1	AM27C010-305DC U121	128Kx8EPROM VGBK2BY1.001	300NS	110-00002-106
94 A*	1	AM27C010-305DC U130	128Kx8EPROM VGBK3BY0.001	300NS	110-00002-107
95 A*	1	AM27C010-305DC U133	128Kx8EPROM VGBK3BY1.001	300NS	110-00002-108
96 A	0	2-644018-2 [UX97, UX101, UX108, UX114, UX121, UX124, UX130, UX133]	32PIN SOCKET	.600"	600-00003-632
97 B	0	ICO-324MTT [UX72, UX77, UX86, UX87, UX93]	24PIN SOCKET	.300"	600-00001-324
98 C	5	ICO-320MTT UX40, UX45, UX65, UX79, UX140	20PIN SOCKET	.300"	600-00001-320
99 D	1	PLCC-68-P-T UX115	68PLCC SOCKET		602-00001-068
100	1	68686-102 FOR J8	SHUNT		715-00001-001
101	0	SRS8-12-01	SPACER	.750"	700-00001-031

<u>ITEM</u>	<u>QTY</u>	<u>VENDOR PART NUMBER</u>	<u>PART DESC</u>	<u>VALUE</u>	<u>MPG P/N</u>
<u>REF. DES.</u>					
102	1	ZS5-120-02-L-D-615 P1	2x20CONNECTOR	.100"	610-00004-040
103	1	CCF-07 330G R22	2%MFRESISTOR	33 OHM	503-00002-330
104 ** 0		AmPAL16L8-7CN U49	MUX2D3DA	7.5NS	120-00002-012

398					

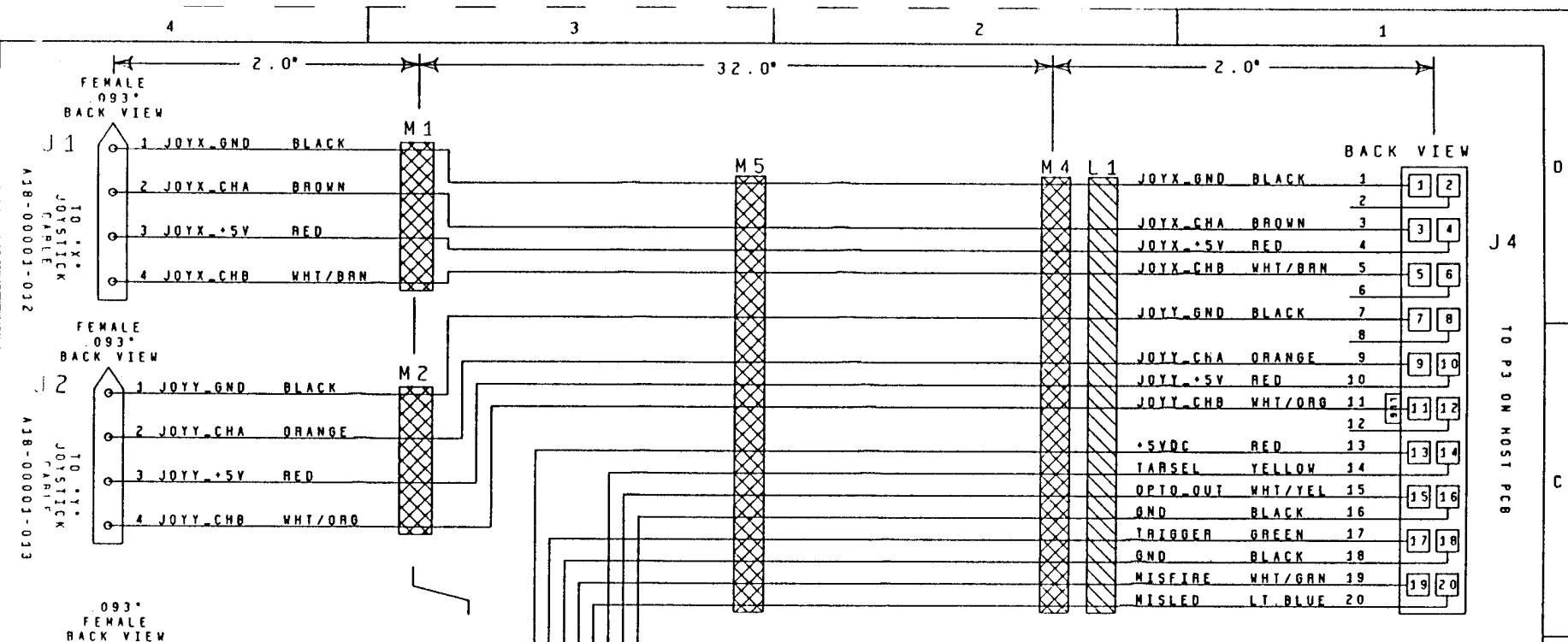
NOTES:

1. PARTS REQUIRING 0.33UF DECOUPLING CAPACITORS ARE DESIGNATED WITH AN ASTERISK (*) BETWEEN THE ITEM AND QTY COLUMNS.
2. PARTS REQUIRING SOCKETS ARE MARKED WITH A LETTER CORRESPONDING TO THE SOCKETS (SOCKETS ARE ITEMS 96 - 99).
3. ALL PARTS WITH A DOUBL ASTERISK (**) NEXT TO ITEM NUMBER ARE NOT POPULATED FOR THE CURRENT BUILD.

Dec 19, 1990

F15 CABLE AND HARNESS LIST

Drawing No.	Assembly No.	Name
DW-00014C-0002	A18-00001-002	JOYSTICK CABLE
DW-00014C-0003	A18-00001-003	PANEL CONTROL HARNESS
DW-00014C-0004	A18-00001-004	COIN DOOR
DW-00014C-0005	A18-00001-005	THROTTLE/PANEL
DW-00014C-0006	A18-00001-006	RS-232 CABLE
DW-00014C-0007	A18-00001-007	HOST TO VGB
DW-00014C-0008	A18-00001-008	LEFT SPEAKER CABLE
DW-00014C-0009	A18-00001-009	THROTTLE HARNESS
DW-00014C-0010	A18-00001-010	JOYSTICK HARNESS
DW-00014C-0011	A18-00001-011	RIGHT SPEAKER CABLE
DW-00014C-0012	A18-00002-001	DC POWER HARNESS
DW-00014C-0013		NOT USED
DW-00014C-0014	A18-00003-002	INPUT A.C. HARNESS
DW-00014C-0015	A18-00003-003	A.C. TRAY TO CABINET TOP
DW-00014C-0016	A18-00003-004	100 VOLT TRANSFORMER CABLE
DW-00014C-0017	A18-00003-005	120 VOLT TRANSFORMER CABLE
DW-00014C-0018	A18-00003-006	240 VOLT TRANSFORMER CABLE
DW-00014C-0019	A18-00003-007	TRANSFORMER ASSEMBLY
DW-00014C-0020	A18-00003-008	BILL ACCEPTOR CABLE
DW-00014C-0021		NOT USED
DW-00014C-0022		NOT USED
DW-00014C-0023	A18-00001-013	X JOYSTICK
DW-00014C-0024	A18-00001-012	Y JOYSTICK
DW-00014C-0025	A18-00003-010	DISPLAY CABLE
DW-00014C-0026	A18-00003-013	LOWER SHROUD HARNESS
DW-00014C-0027	A18-00002-002	D.C. FAN EXTENSION CABLE
DW-00014C-0028	A18-00003-014	MARQUEE A.C. LIGHT CONNECTOR
DW-00014C-0029	A18-00003-015	FLORESCENT LIGHT 'Y' CABLE
DW-00014C-0030	A18-00003-016	UPPER SHROUD HARNESS



A18-00001-012

A18-00001-013

A18-00001-010

- NOTES:
- 1) ALL 22 AWG SHALL MEET OR EXCEED UL1061.
 - 2) SECURE FERRITE BEAD L1 TO CABLE WITH A TIE WRAP.
 - 3) TWO WIRES ARE CRIMPED IN PIN J3-7.
 - 4) TWO WIRES ARE CRIMPED IN PIN J3-8.
 - 5) TIE WRAP AT 2" INTERVALS.
 - 6) ASSEMBLED CABLE IS MPG P/N A18-00001-002.

PART LIST

REF ID	MFG.	PART NO.	PIN NO.
J1	MOLEX	03-09-1042	02-09-5142
J2	MOLEX	03-09-1042	02-09-5142
J3	MOLEX	03-09-1126	02-09-5142
J4	MOLEX	14-57-1201	
L1	FAIR-RITE	2643665702	

MARKERS

A	REF ID	MFG.	PART NO.	LINE 1	TEXT	LINE 2	TEXT SIZE
M1	BRADY	HCPS.9-5008W	X JOY		.125"		
M2	BRADY	HCPS.9-5008W	Y JOY		.125"		
M3	BRADY	HCPS.9-8336W	JOYSTICK	SWITCHES	.125"		
M4	BRADY	HCPS.9-1008W	HOST PCB	P3	.125"		
M5	BRADY	HCPS.9-1008W	HOST TO JOYSTICK	DW-00014C-0002-02	.125"		

4

3

2

1

WIRE LIST (ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
JOYX_GND	J4-01	J1-01	BLACK	9921-10
JOYX_CHA	J4-03	J1-02	BROWN	9921-1
JOYX_+5V	J4-04	J1-03	RED	9921-2
JOYX_CHB	J4-05	J1-04	WHITE/BROWN	9921-19
JOYY_GND	J4-07	J2-01	BLACK	9921-10
JOYY_CHA	J4-09	J2-02	ORANGE	9921-3
JOYY_+5V	J4-10	J2-03	RED	9921-2
JOYY_CHB	J4-11	J2-04	WHITE/ORG	9921-20
+5V	J4-13	J3-03, 08	RED	9921-2
TARG_SEL	J4-14	J3-06	YELLOW	9921-4
OPTO_OUT	J4-15	J3-09	WHITE/YEL	9921-17
GND	J4-16	J3-10	BLACK	9921-10
TRIGGER	J4-17	J3-04	GREEN	9921-5
GND	J4-18	J3-01, 07	BLACK	9921-10
MISSILE	J4-19	J3-05	WHITE/GRN	9921-16
MISLED	J4-20	J3-02	L.T. BLUE	9921-6

MICROPROSE GAMES

180 LAKEFRONT DR. HUNT VALLEY, MD 21030

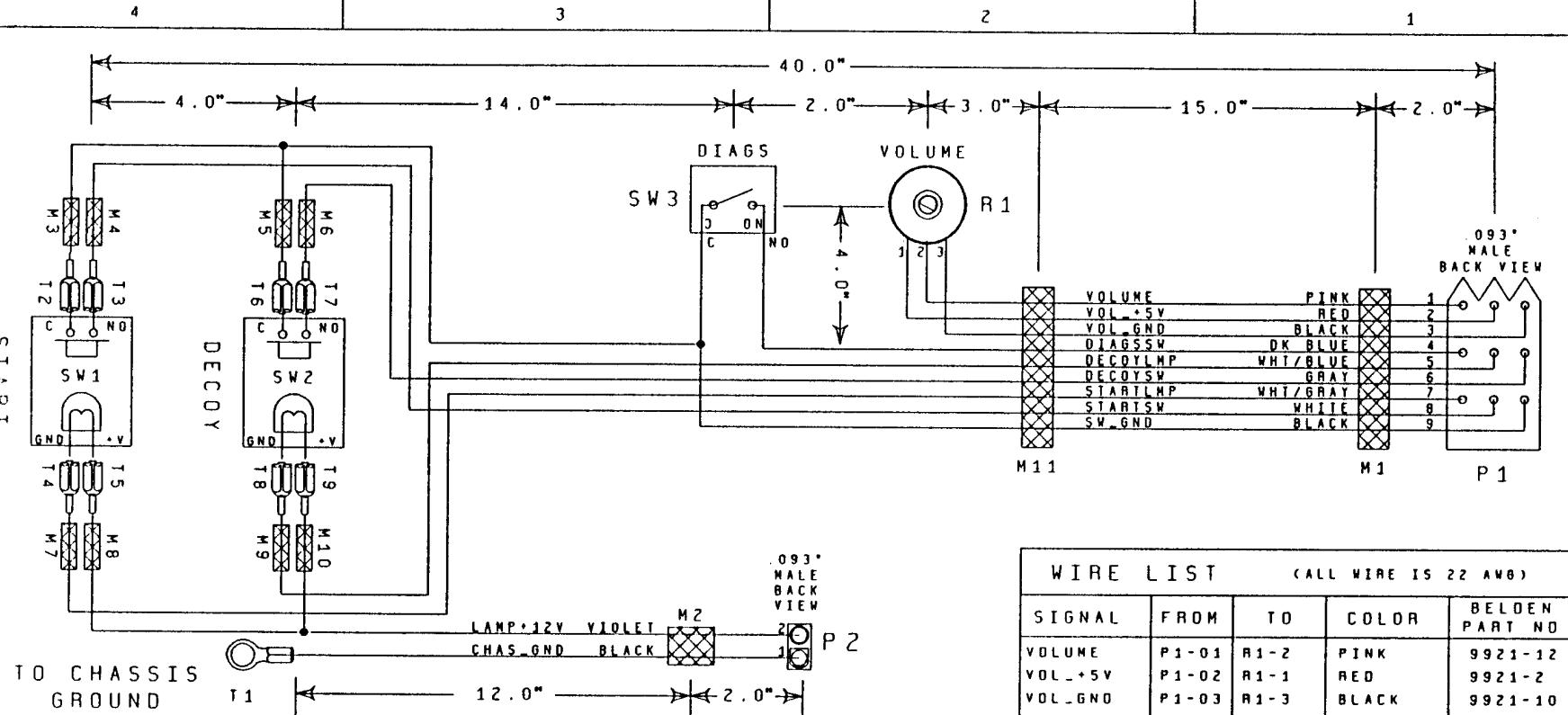
TITLE

JOYSTICK CABLE
HOST TO JOYSTICK

DRAFTER
DAVID J. BEALBY
CHECKER
DATE
12-17-90

ENGR/EE
JAY G. MCKIBBIN
APPROVAL
DATE
12-17-90

SIZE DRAWING NUMBER
C DW-00014C-0002
REV - 02 RELEASE CABLE 2
DATE 12-17-1990, 11-23 SHEET 1 OF 1



NOTES.

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) SW1 & SW2 ARE SHOWN FOR REFERENCE ONLY.
- 3) PLACE MARKERS M3 - M10 1" FROM PUSH-ON TERMINALS (T2 - T9).
- 4) TIE WRAP AT 4" INTERVALS.
- 5) MARKER M11 HAS TWO LINES OF TEXT
- 6) BREAKOUT DISTANCE FOR SW3 & R1 ARE THE SAME.
- 7) ASSEMBLED HARNESS IS MPG P/N A18-00001-003.

PARTS LIST

REF	DES	MFG	PART NO	PIN NO
P1		MOLEX	03-09-2092	02-09-6123
P2		MOLEX	19-09-2026	02-09-2118
T2 - T9		AMP	2-520184-4	
T1		AMP	2-520571-2	
R1		CLAROSTAT	RV4NAY5D502A	
SW1		SWITCHCRAFT	46202LR	

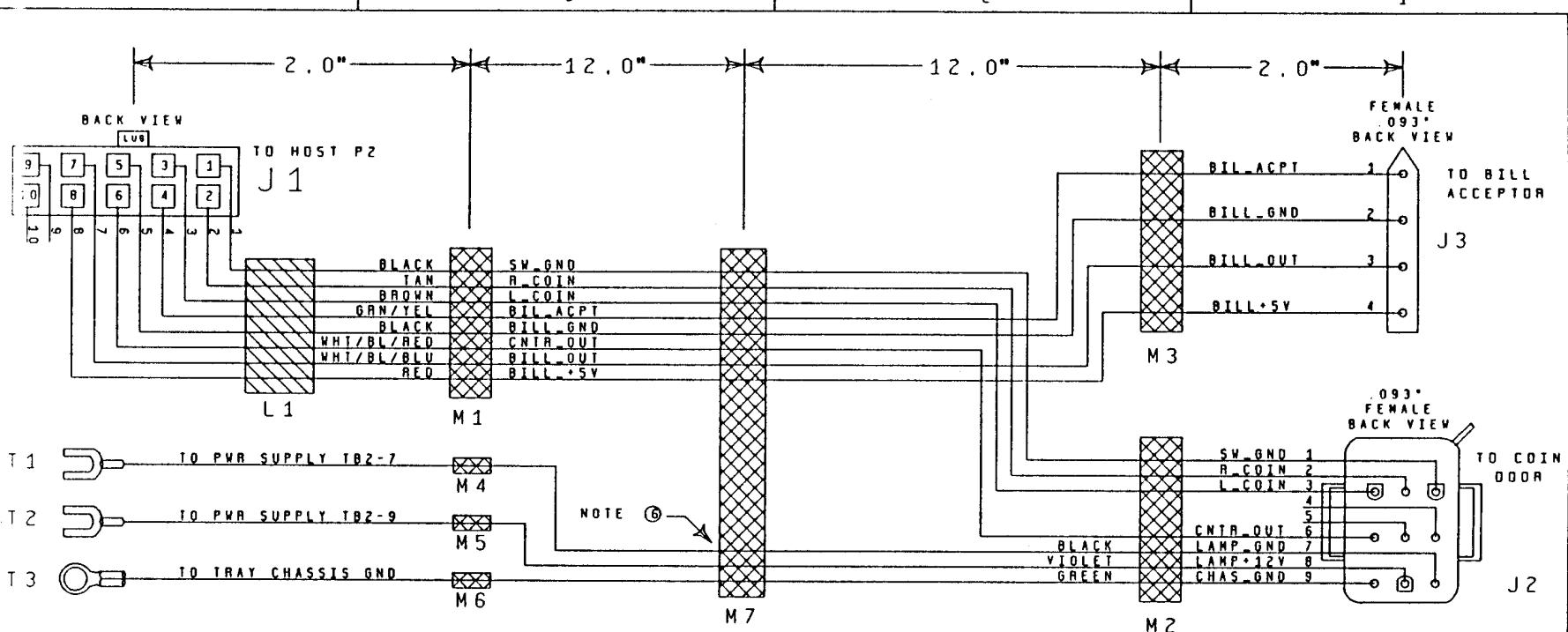
MARKER LIST

REF	DES	MFG	PART NO	TEXT SIZE	TEXT
M1		BRADY	HCPS.9-8336W	.125"	PANEL CONTROLS
M2		BRADY	HCPS.9-2508W	.125"	PWR SUPPLY
M3	M5	BRADY	HCPS.9-2508W	.125"	C
M4	M6	BRADY	HCPS.9-2508W	.125"	NO
M8	M10	BRADY	HCPS.9-2508W	.125"	12V
M7	M9	BRADY	HCPS.9-2508W	.125"	GND
M11		BRADY	HCPS1.9-8336W	.125"	(LINE 1) PANEL CONTROL HARNESS (LINE 2) DW-00014C-0003-02

WIRE LIST (CALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
VOLUME	P1-01	R1-2	PINK	9921-12
VOL_+5V	P1-02	R1-1	RED	9921-2
VOL_GND	P1-03	R1-3	BLACK	9921-10
DIAGSSW	P1-04	SW3-NO	DK BLUE	9921-13
DECOYLMP	P1-05	SW2-4	WHT/BLUE	9921-18
DECOYSW	P1-06	SW2-2	GRAY	9921-8
STARTLMP	P1-07	T4	WHT/GRAY	9921-21
STARTSW	P1-08	T3	WHITE	9921-9
SW_GND	P1-09	SW3-C	BLACK	9921-10
		T6	BLACK	9921-10
		T2	BLACK	9921-10
LAMP+12V	T5	T9	VIOLET	9921-7
		T9	VIOLET	9921-7
CHAS_GND	P2-1	T1	BLACK	9921-10

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BENNETT	12-12-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
JAY G. MCKIBBIN	DATE	PANEL CONTROL HARNESS	
ENGINEER	DATE	APPROVAL	
JAY G. MCKIBBIN	DATE	SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00014C-0003
APPROVAL	DATE	REV - 02	RELEASE CABLE .3
		DATE 12-13-1990 14:44 SHEET 1 OF 1	



NOTES :

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) PLACE MARKERS M4 - M6 ONE INCH FROM RING TERMINALS (T1 - T3).
- 3) TIE WRAP AT INTERVALS OF FOUR INCHES.
- 4) MARKER M7 HAS TWO LINES OF TEXT.
- 5) SECURE FERRITE BEAD (L1) TO CABLE WITH WIRE TIE.
- 6) BREAKOUT WIRES TO T1 - T3 AND TIE WRAP SEPERATELY FROM M7 TO POWER SUPPLY TERMINALS.
- 7) ASSEMBLED CABLE IS MPG P/N A18-00001-004.

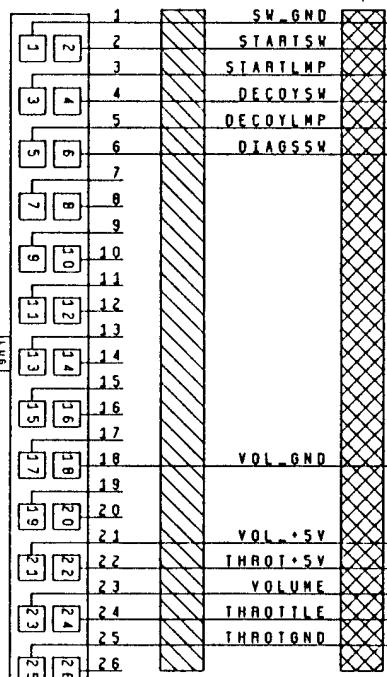
PARTS LIST			
REF DES	MFG	PART NO	PIN NO
J1	MOLEX	14-57-1101	
J2	AMP	1-480706-0	350851-1
J3	MOLEX	19-09-1046	02-09-1117
T1 - T3	MOLEX	AA-234-08X	
L1	FAIR-RITE	2643540002	

MARKER LIST

REF DES	MFG	PART NO	TEXT SIZE	TEXT
V1	BRADY	HCPS.9-1008W	.125"	HOST P2
V2	BRADY	HCPS.9-8336W	.125"	COIN DOOR
V3	BRADY	HCPS.9-5008W	.125"	BILL ACCEPTOR
V4	BRADY	HCPS.9-2508W	.125"	T82-7
V5	BRADY	HCPS.9-2508W	.125"	T82-9
V6	BRADY	HCPS.9-2508W	.125"	CHASSIS GND
V7	BRADY	HCPS1.9-1008W	.125"	(LINE 1) COIN DOOR CABLE (LINE 2) DW-00014C-0004-02

WIRE LIST (ALL WIRE IS 22 AWG)				
SIGNAL	FROM	TO	COLOR	BELDEN PART NO
SW_GND	J1-01	J2-1	BLACK	9921-10
R_COIN	J1-02	J2-2	TAN	9921-11
L_COIN	J1-03	J2-3	BROWN	9921-1
BILL_ACPT	J1-04	J3-1	GRN/YEL	9921-189
BILL_GND	J1-05	J3-1	BLACK	9921-10
CNTR_OUT	J1-06	J2-6	WHT/BL/RED	9921-23
BILL_OUT	J1-07	J3-3	WHT/BL/BLU	9921-26
BILL+5V	J1-08	J3-4	RED	9921-02
LAMP_GND	T1	J2-7	BLACK	9921-10
LAMP+12V	T2	J2-8	VIOLET	9921-7
CHAS_GND	T3	J2-9	GREEN	9921-5

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELKIN		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	12-02-90 TITLE	
JAY G. MCKIBBIN	DATE	COIN DOOR CABLE	
ENGINEER		APPROVAL DATE	
APPROVAL	DATE	SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00014C-0004
		REV - 02	RELEASE CABLE 4
		DATE 12-13-1990, 14-58 SHEET 4 OF 1	



B

L 1

M 1

BACK VIEW

4

3

2

1

30 . 0"

2 . 0"

13 . 0"

9 . 0"

4 . 0"

2 . 0"

D

D

J 1

HOST
15

C

TO
FRONT
PANEL
HARNESS

M 2

B

WIRE LIST

(ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
SW_GND	J1-01	J2-09	BLACK	9921-10
STARTSW	J1-02	J2-08	WHITE	9921-9
STARTLMP	J1-03	J2-07	WHT/GRAY	9921-21
DECOYSW	J1-04	J2-06	GRAY	9921-8
DECOYLMP	J1-05	J2-05	WHT/BLUE	9921-18
DIAGSSW	J1-06	J2-04	DK BLUE	9921-13
VOL_GND	J1-18	J2-03	BLACK	9921-10
VOL_+5V	J1-21	J2-02	RED	9921-2
THROTL_+5V	J1-22	J3-04	RED	9921-2
VOLUME	J1-23	J2-01	PINK	9921-12
THROTTLE	J1-24	J3-05	WHT/BL/YEL	9921-25
THROTGND	J1-25	J3-06	BLACK	9921-10

NOTES:

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) SECURE FERRITE BEAD L1 TO CABLE WITH WIRE TIE.
- 3) BREAKOUT WIRES TO J3 AS POSITION SHOWN.
- 4) TIE WRAP AT INTERVALS OF TWO INCHES.
- 5) MARKER M4 HAS TWO LINES OF TEXT.
- 6) ASSEMBLED HARNESS IS MPG P/N A18-00001-005.

4

3

2

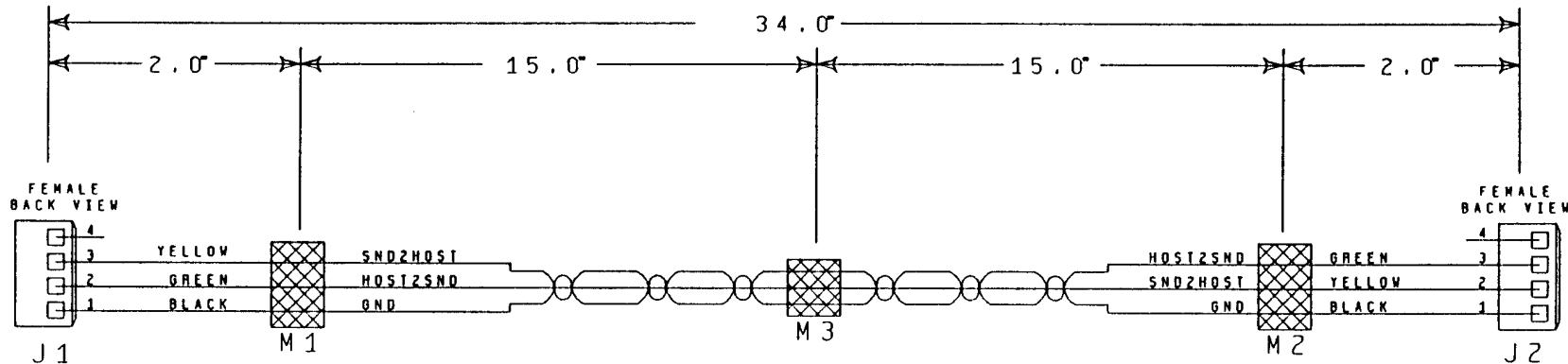
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MARKER LIST

REF DES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-1008W	.125"	HOST PS
M2	BRADY	HCPS.9-8336W	.125"	FRONT PANEL
M3	BRADY	HCPS.9-5008W	.125"	THROTTLE
M4	BRADY	HCPS1.9-1008W	.125"	(CLINE 2DW-00014C-0005-02) (CLINE 2DW-00014C-0005-02)

PARTS LIST

REF DES	MFG	PART NO	PIN NO
J1	MOLEX	14-57-3260	02-09-5142
J2	MOLEX	03-09-1094	02-09-5142
J3	MOLEX	03-09-1064	
L1	FAIR-RITE	2643665702	
DRAFTER	DAVID J. BELKNAY	DATE	
INSPECTOR		DATE	
ENGINEER		DATE	
JAY G. MCKIBBIN		DATE	
APPROVAL		DATE	
APPROVAL		DATE	
SIZE	C	DRAWING NUMBER	DW-00014C-0005
REV	-02	RELEASE	CABLE 5
DATE	12-13-1990	15-40	SHEET 1 OF 1



WIRE LIST (ALL WIRE IS 22 AWG)				
SIGNAL	FROM	TO	COLOR	BELDEN PART NO
GND	J1-01	J2-01	BLACK	9921-10
HOST2SND	J1-02	J2-03	GREEN	9921-5
SND2HOST	J1-03	J2-02	YELLOW	9921-4

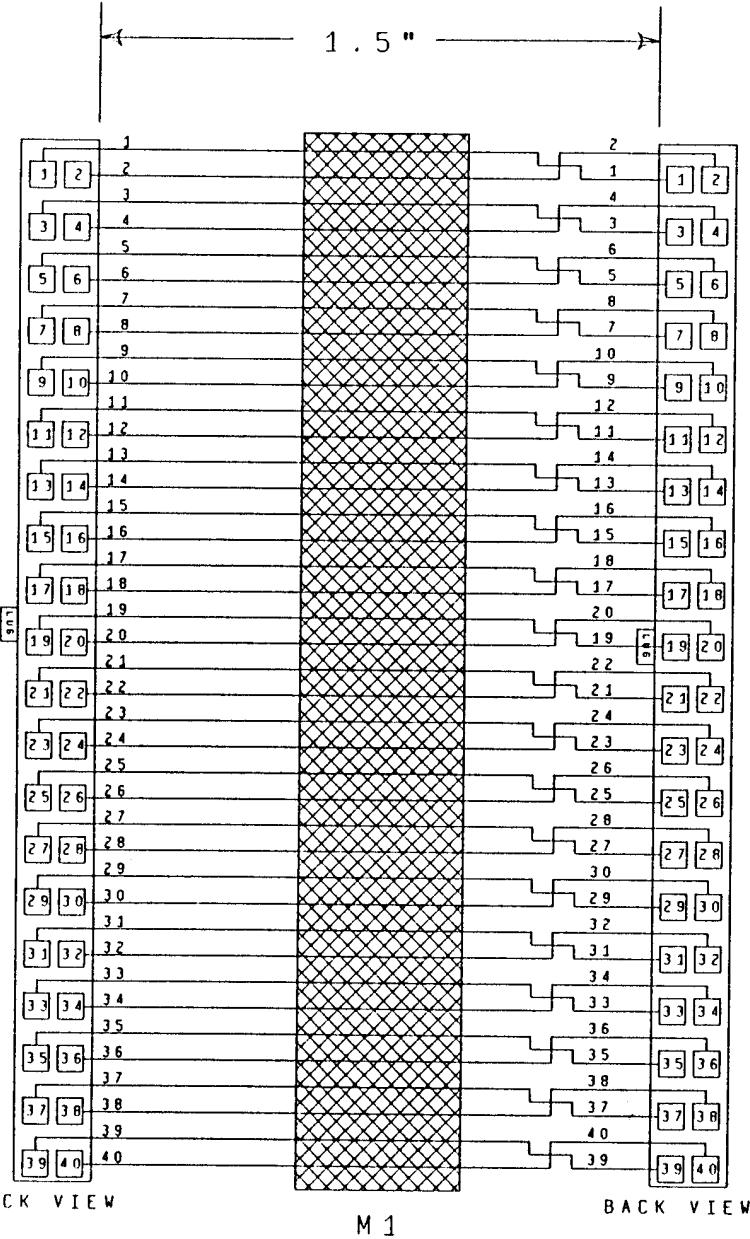
PARTS LIST			
REF DES	MFG	PART NO	PIN NO
J1	MOLEX	22-01-2041	08-50-0114
J2	MOLEX	22-01-2041	08-50-0114

MARKER LIST				
REF DES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-5008W	.125"	HOST J1
M2	BRADY	HCPS.9-5008W	.125"	SND BRD J1
M3	BRADY	HCPS1.9-5008W	.125"	LINE 3: RS-232 CABLE #1 LINE 2: DW-00014C-0006-02

NOTES

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M3 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED BETWEEN MARKERS M1 AND M2.
- 5) ASSEMBLED CABLE IS MPG P/N A18-00001-006.

DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BERKANY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
<i>[Signature]</i>	12-10-90	TITLE		
DESIGNER		RS-232 CABLE #1		
ENGINEER				
JAY G. MCKIBBIN				
APPROVAL	DATE	SIZE	DRAWING NUMBER	
<i>[Signature]</i>	12/14/90	C	DW-00014C-0006	
APPROVAL	DATE		REV	RELEASE CABLE
			-02	.6
DATE 12-31-1990-10-36		SHEET 1 OF 3		

**MARKER LIST**

REF DES	MFG	PART NO	TEXT SIZE	TEXT
M 1	BRADY	DAT-9-292	.125"	(LINE 1) HOST TO VGB (LINE 2) DW-00014C-0007-02

PARTS LIST

REF DES	MFG	PART NO	PIN NO
J 1	DUPONT	71602-040	
J 2	DUPONT	71602-040	
CABLE	3-M	3365/40	

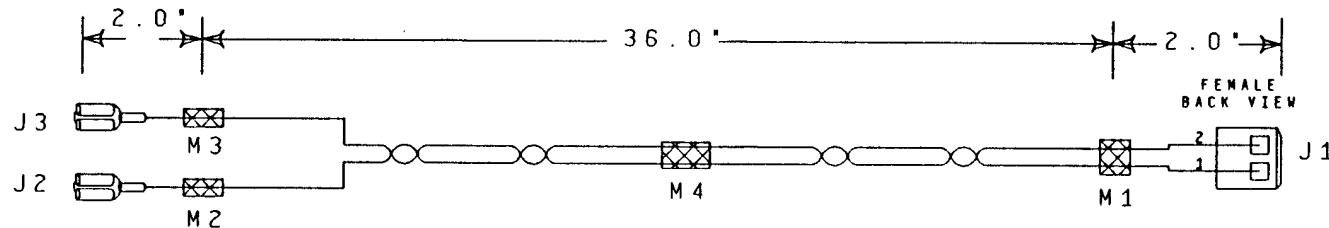
NOTES

- 1) ALL 28 AWG RIBBON CABLE SHALL MEET OR EXCEED UL2651.
- 2) MARKER M 1 HAS TWO LINES OF TEXT.
- 3) DISTANCE SPECIFIED BETWEEN J1 AND J2 IS MEASURED BETWEEN THE INSIDE EDGES OF J1 AND J2 AFTER ASSEMBLY.
- 4) ASSEMBLED CABLE IS MPG P/N A18-00001-007.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKER	DATE	TITLE	
		HOST TO VGB RIBBON CABLE A	
INSPECTOR	DATE		
JAY G. MCKIBBIN			
APPROVAL	DATE	SIZE	DRAWING NUMBER
		C	DW-00014C-0007
RE-APPROVAL	DATE	REV - 02	RELEASE CABLE .7
		DATE 11-27-1990 17-29 SHEET 7 OF 1	

D

D



C

C

WIRE LIST (ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
L AUDIO	J1-01	J2	WHT/RED	9921-15
GND	J1-02	J3	BLACK	9921-10

B

B

PARTS LIST

REF DES	MFG	PART NO	PIN NO
J1	MOLEX	22-01-2021	08-50-0114
J2, J3	AMP	Z-520181-4	

A

A

MARKER LIST

REF DES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-3758W	.125"	SOUND BD JS
M2	BRADY	HCPS.9-2508W	.125"	L SPKR +
M3	BRADY	HCPS.9-2508W	.125"	L SPKR -
M4	BRADY	HCPS1.9-3758W	.125"	(LINE 1) LEFT SPEAKER CABLE (LINE 2) DW-00014C-0008-02

NOTES:

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M4 HAS TWO LINES OF TEXT.
- 4) TWIST WIRE PAIR AND TIE WRAP AT 4° INTERVALS.
- 5) ASSEMBLED CABLE IS MPG P/N A18-00001-0008

DRAFTER	DATE
DAVID J. BELLMAN	12-10
CHECKED	DATE
	-70
ENCLOSURE	DATE
JAY G. MCKIBBIN	
APPROVAL	DATE
APPROVAL	DATE

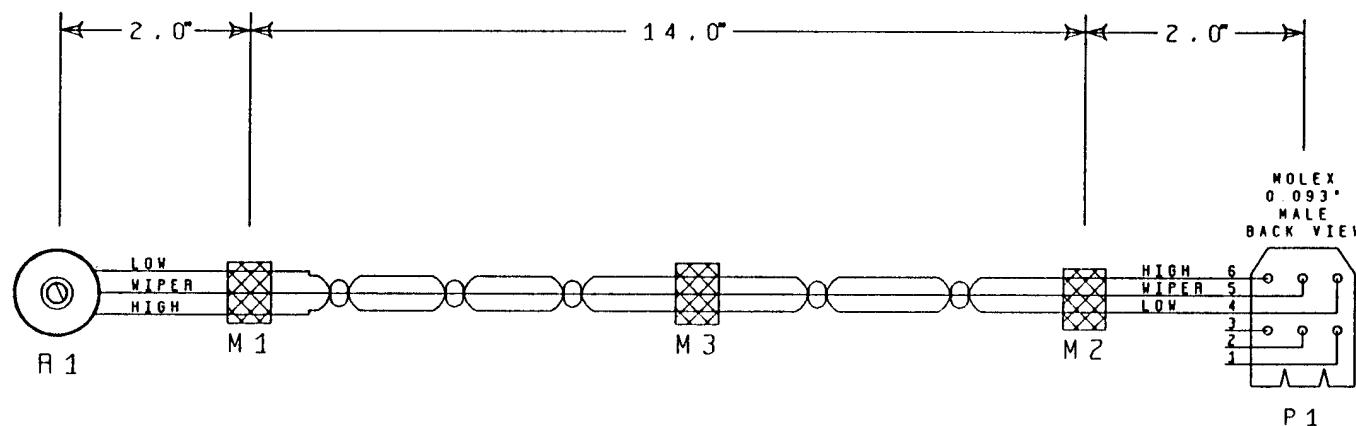
MICROPROSE GAMES
180 LAKEFRONT DR. HUNT VALLEY, MD 21030
TITLE
LEFT SPEAKER CABLE

SIZE	DRAWING NUMBER
C	DW-00014C-0008
REV - 02	RELEASE CABLE .8
DATE 12-31-1990.10-07 SHEET 1 OF 1	

1

1

6



WIRE LIST (ALL WIRES IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
LOW	R1-01	P1-04	BLACK	9921-10
WIPER	R1-02	P1-05	WHITE	9921-9
HIGH	R1-03	P1-06	RED	9921-2

PARTS LIST

REFDES	MFG	PART NO	PIN NO
P1	MOLEX	03-09-2064	02-09-2116
R1	CLAROSTAT	RV4NAYSD502A	

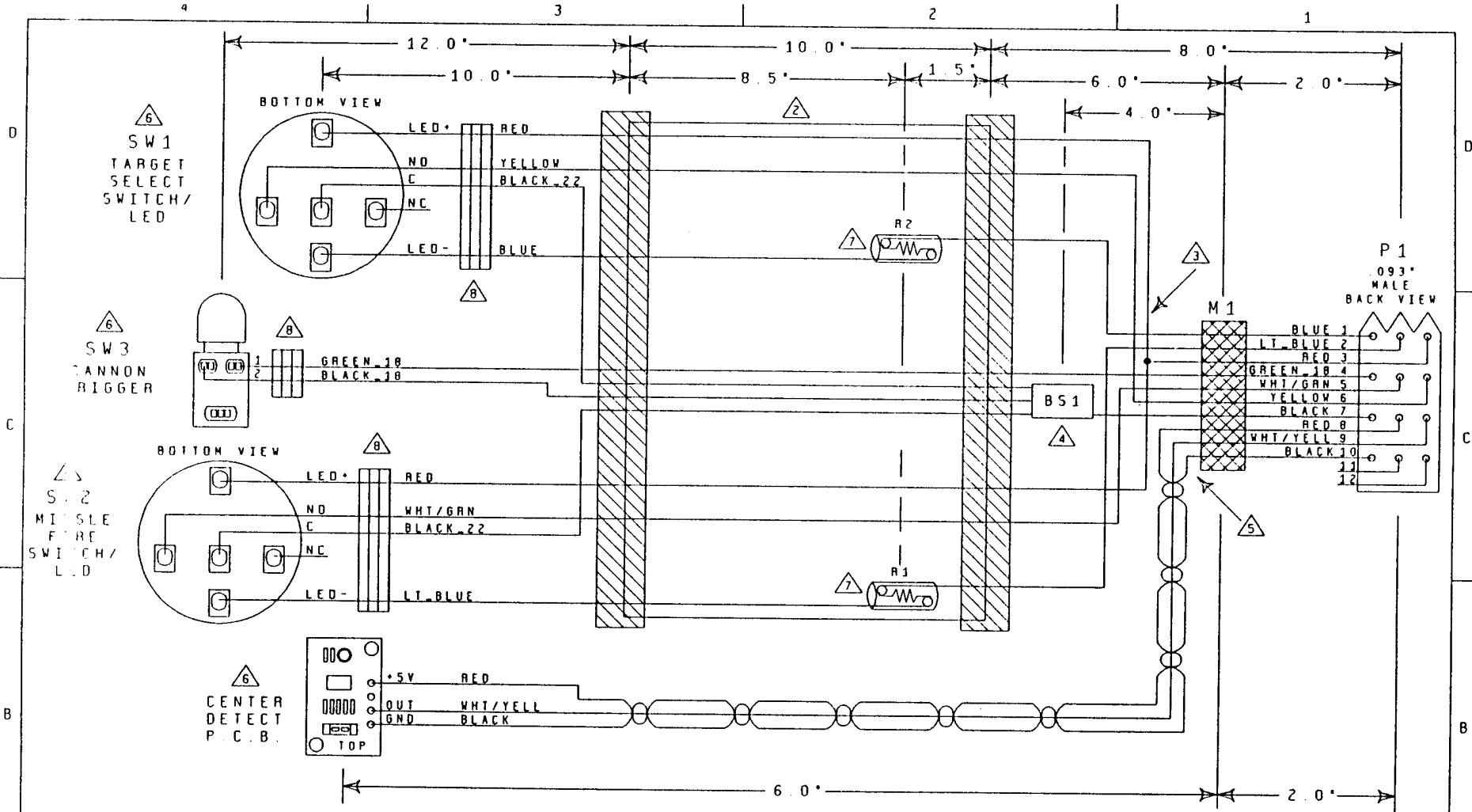
NOTES.

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
 - 2) TIE WRAP AT INTERVALS OF TWO INCHES.
 - 3) MARKER M3 HAS TWO LINES OF TEXT.
 - 4) WIRES ARE TWISTED BETWEEN MARKERS M1 AND M2.
 - 5) ASSEMBLED HARNESS IS MPG P/N A18-00001-009

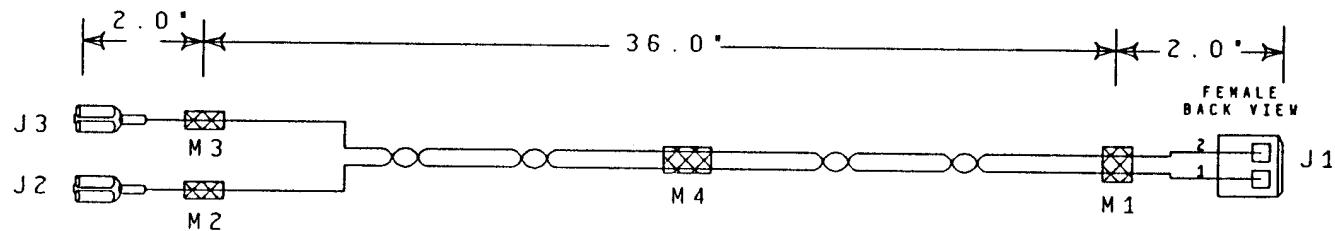
MARKER LIST

REFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS .9-5008W	.125"	THROTTLE
M2	BRADY	HCPS .9-5008W	.125"	THROTTLE Z HOST
M3	BRADY	HCPS1 .9-3758W	.125"	CLINE 2> THROTTLE HARNESS CLINE 2> DW-00014C-0009-02

DRAFTER DAVID J. BELKAHAN	DATE 12-12-90	MICROPROSE GAMES 180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHIEF ENGINEER JAY G. MCKIBBIN	DATE 12-12-90	TITLE THROTTLE HARNESS	
APPROVAL <i>Dugay Jr.</i>	DATE 12-13-90	SIZE C	DRAWING NUMBER DW-00014C-0009
APPROVAL <i>Dugay Jr.</i>	DATE	REV - 02	RELEASE CABLE 13
		DATE 12-12-1990 15:21 SHEET 1 OF 1	



DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
JAY G. MCKIBBIN		JOYSTICK HARNESS	
SUPERVISOR	DATE		
APPROVAL	DATE	SIZE	DRAWING NUMBER
JAY G. MCKIBBIN	3/17/90	C	DW-00014C-0010
APPROVAL	DATE	REV - 02 RELEASE JOYS.2	
DATE 12-10-1990 17-55		SHEET 2 OF 2	



WIRE LIST (ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
R AUDIO	J1-01	J2	WHT/BLK	9921-14
GND	J1-02	J3	BLACK	9921-10

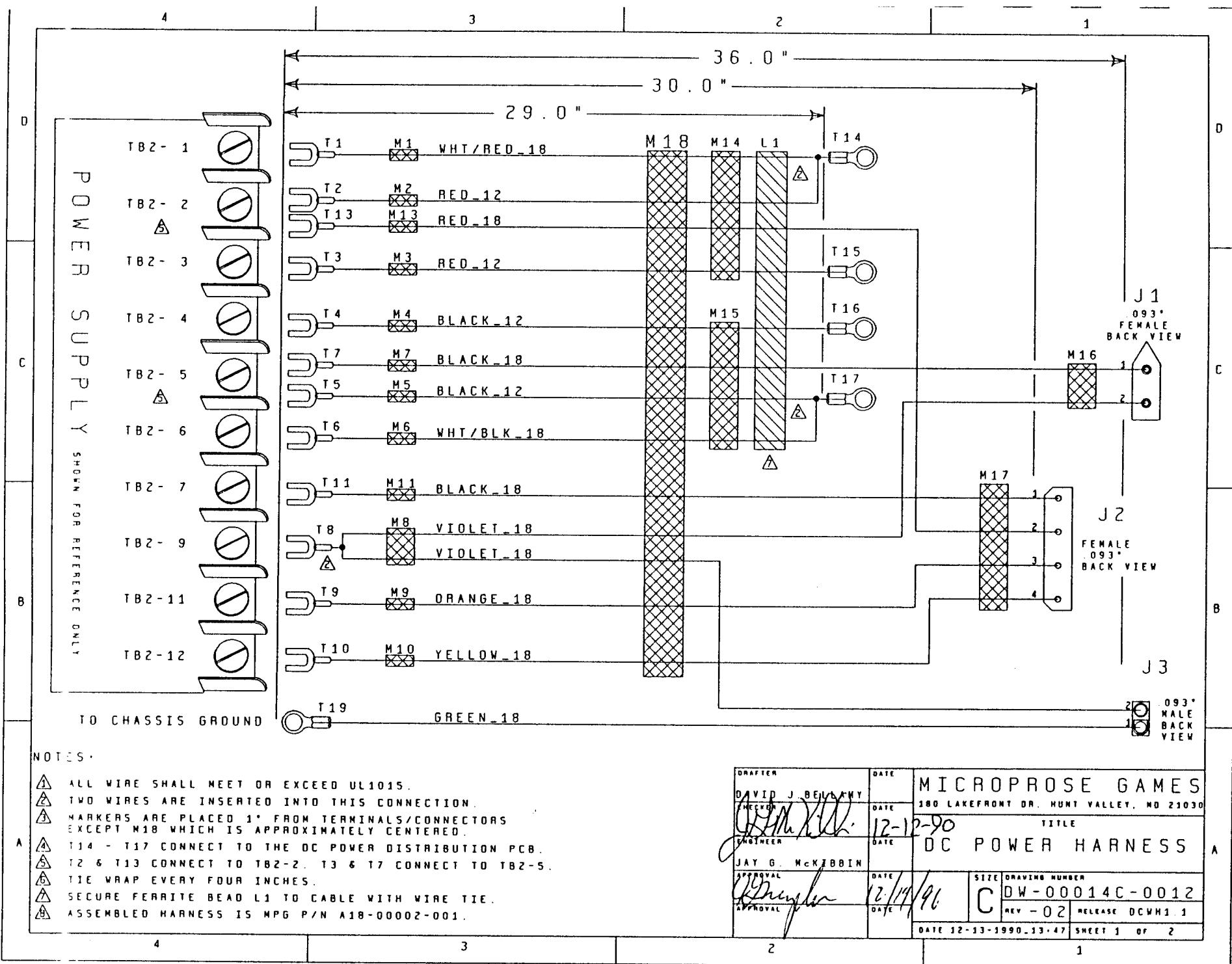
PARTS LIST			
REF DES	MFG	PART NO	PIN NO
J1	MOLEX	22-01-2021	08-50-0114
J2, J3	AMP	2-520181-4	

MARKER LIST				
REF DES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-3758W	.125"	SOUND BO JS
M2	BRADY	HCPS.9-2508W	.125"	R SPKR +
M3	BRADY	HCPS.9-2508W	.125"	R SPKR -
M4	BRADY	HCPS1.9-3758W	.125"	(LINE 1) RIGHT SPEAKER CABLE (LINE 2) DW-00014C-0011-02

NOTES

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M4 HAS TWO LINES OF TEXT.
- 4) TWIST WIRE PAIR AND TIE WRAP AT 4" INTERVALS.
- 5) ASSEMBLED CABLE IS MPG P/N A18-00001-0011

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELKNAY	12-10-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
		RIGHT SPEAKER CABLE	
ENGINEER	DATE	APPROVAL	
JAY G. MCKIBBIN	12-14-90	SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00014C-0011
		REV - 02	RELEASE CABLE.9
DATE 12-11-1990 10-12		SHEET 1 OF 1	



WIRE LIST

SIGNAL	FROM	TO	COLOR	AWG	BELDEN PART NO
+SENSE	T1	T14	WHT/RED	18	8918-15
BKPLN_V1	T2	T14	RED	12	9912-2
BKPLN_V1	T3	T15	RED	12	9912-2
BKPLNRTN	T4	T16	BLACK	12	9912-10
BKPLNRTN	T5	T17	BLACK	12	9912-10
-SENSE	T6	T17	WHT/BLK	18	8918-14
FAN_RTN	T7	J1-1	BLACK	18	8918-10
FAN_V2	T8	J1-2	VIOLET	18	8918-7
PANEL_V2	T8	J3-2	VIOLET	18	8918-7
SND_V3	T9	J2-3	ORANGE	18	8918-3
SND_V4	T10	J2-4	YELLOW	18	8918-4
SND_RTN	T11	J2-1	BLACK	18	8918-10
SND_V1	T13	J2-2	RED	18	8918-2
CHAS_GND	T19	J3-1	GREEN	18	8918-5

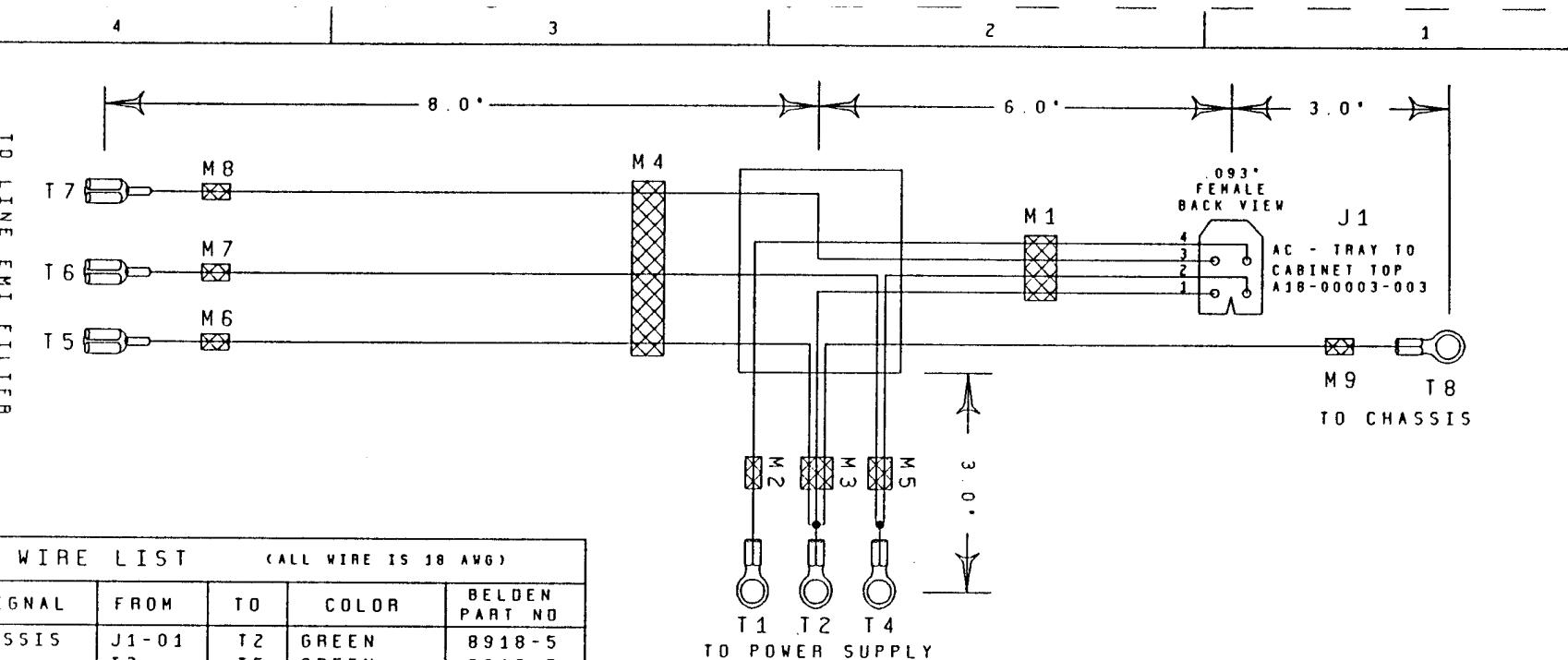
PARTS LIST

REFDES	MFG	PART NO	PIN NO
T1, T6, T7, T9, T10, T11, T13	MOLEX	AA-234-08X	
T2 - T5, T8	MOLEX	C-236-08X	
T14 - T17	MOLEX	D-656-10X	
T19	MOLEX	C-236-08X	
J1	MOLEX	03-06-1023	02-06-1101
J2	MOLEX	15-24-4048	02-08-1201
J3	MOLEX	19-09-1026	02-09-1117
L1	FAIR-RITE	2643164151	

MARKER LIST

REF DES	MFG	PART NO	TEXT SIZE	TEXT	
				LINE 1	LINE 2
M1	BRADY	HCPS.9-2508W	.125"	+SENSE	TB2-1
M2	BRADY	HCPS.9-3336W	.125"	V1	TB2-2
M3	BRADY	HCPS.9-3336W	.125"	V1	TB2-3
M4	BRADY	HCPS.9-3336W	.125"	RETURN	TB2-4
M5	BRADY	HCPS.9-2508W	.125"	RETURN	TB2-5
M6	BRADY	HCPS.9-3336W	.125"	-SENSE	TB2-6
M7	BRADY	HCPS.9-3336W	.125"	RETURN	TB2-5
M8	BRADY	HCPS.9-3336W	.125"	V2	TB2-9
M9	BRADY	HCPS.9-2508W	.125"	V3	TB2-11
M10	BRADY	HCPS.9-2508W	.125"	V4	TB2-12
M11	BRADY	HCPS.9-2508W	.125"	RETURN	TB2-7
M13	BRADY	HCPS.9-2508W	.125"	V1	TB2-2
M14	BRADY	HCPS.9-5008W	.125"	VDD	
M15	BRADY	HCPS.9-5008W	.125"	GND	
M16	BRADY	HCPS.9-3758W	.125"	FAN	
M17	BRADY	HCPS.9-5008W	.125"	SOUND BOARD	
M18	BRADY	HCPS1.9-1008W	.125"	DC POWER HARNESS	DW-00014C-0012-02

DRAFTER <i>DAVID J. BELLARY</i>	DATE 12/12/90	MICROPROSE GAMES	
ENGINEER <i>JAY G. MCKIBBIN</i>	DATE 12/12/90	380 LAKEFRONT DR. HUNT VALLEY, MD 21030	
APPROVAL <i>[Signature]</i>	DATE 12/12/90	TITLE DC POWER HARNESS	
INITIALS <i>[Initials]</i>	DATE 12/12/90	SIZE C	DRAWING NUMBER DW-00014C-0012
	DATE 12/12/90	REV. U/C	RELEASE DATE 12/13/90
			SHEET 2 OF 2



WIRE LIST (ALL WIRE IS 18 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
CHASSIS	J1-01	T2	GREEN	8918-5
	T2	T5	GREEN	8918-5
	T2	T8	GREEN	8918-5
COMMON	J1-02	T4	WHITE	8918-9
	T4	T6	WHITE	8918-9
U.S. SWLINE	J1-03	T7	WHT/BLK	8918-14
S.P. LINE	J1-04	T1	BLACK	8918-10

PARTS LIST

REFDES	MFG	PART NO	PIN NO
J1	MOLEX	03-09-1049	02-09-1117
1	MOLEX	AA-232-08X	RING TERM
2	MOLEX	C-236-08X	RING TERM
T4, T8	MOLEX	BB-223-08X	RING TERM
T5 - T7	MOLEX	AA-2201C	PUSH-ON

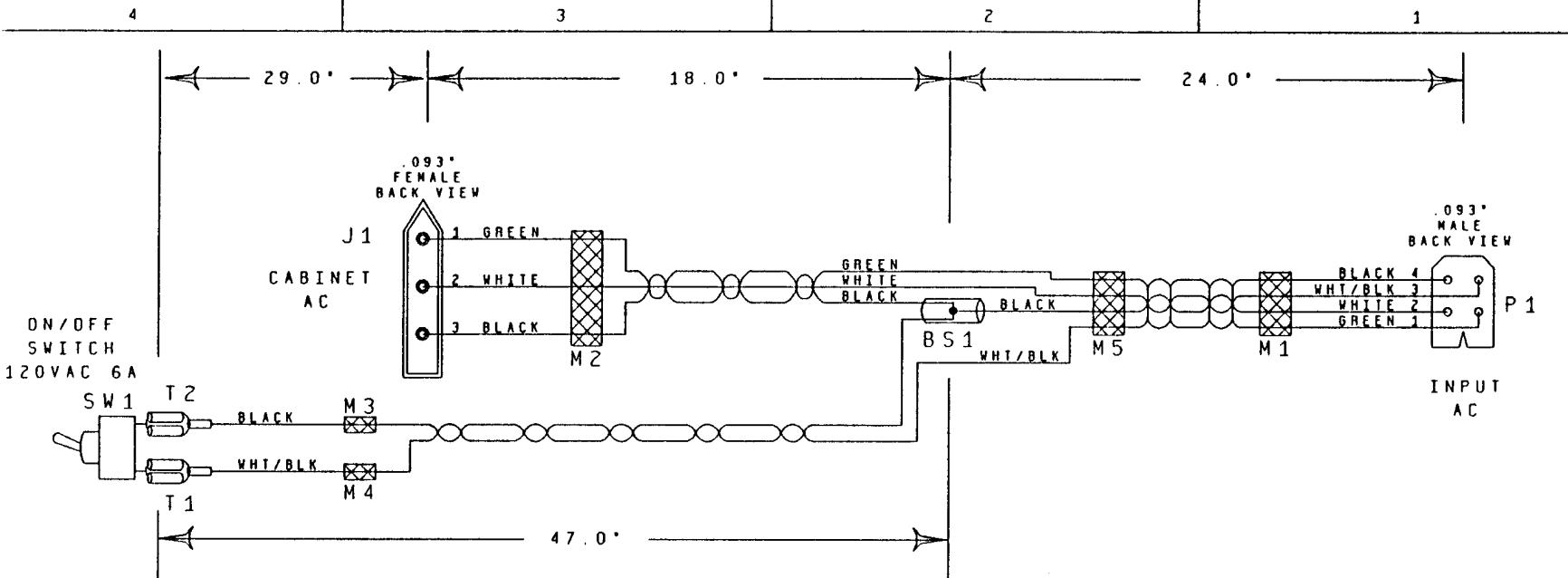
MARKER LIST

REFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-6258W	.125"	INPUT AC
M2	BRADY	HCPS.9-2508W	.125"	TB1-1
M3	BRADY	HCPS.9-5008W	.125"	TB1-3
M4	BRADY	HCPS1.9-6258W	.125"	(LINE 1) INPUT AC HARNESS (LINE 2) DW-00014C-0014-02
M5	BRADY	HCPS.9-3758W	.125"	TB1-2
M6	BRADY	HCPS.9-2508W	.125"	GND
M7	BRADY	HCPS.9-2508W	.125"	COMM
M8	BRADY	HCPS.9-2508W	.125"	LINE
M9	BRADY	HCPS.9-2508W	.125"	GND

NOTES :

- 1) ALL 18 AWG WIRE SHALL MEET OR EXCEED UL1015.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M4 HAS TWO LINES OF TEXT.
- 4) TERMINAL T2 HAS 3 WIRES IN CRIMP.
- 5) TERMINAL T4 HAS 2 WIRES IN CRIMP.
- 6) BREAKOUT WIRES TO T1, T2 & T4. SECURE WITH TIE WRAP.
- 7) PLACE MARKERS M2 - M3 & M5 - M9 1" FROM TERMINALS.
- 8) ASSEMBLED HARNESS IS MPG P/N A18-00003-002.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELL / MY CHECKED	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
ENGINEER	DATE	TITLE	
JAY G. MCKIBBIN	DATE	INPUT AC HARNESS	
REVIEWED	DATE	SIZE	DRAWING NUMBER
APPROVED	DATE	C	DW-00014A-0014
		REV - 02	RELEASE ACVH1.1
		DATE 12-12-1990-13-1 SHEET 1 OF 3	



WIRE LIST (ALL WIRE IS 18 AWG)

SIGNAL	FROM	TO	COLOR	BELODEN PART NO
CH SSIS	P1-01	J1-01	GREEN	8918-5
COMMON	P1-02	J1-02	WHITE	8918-9
UN-LINE	P1-03	T1	WHT/BLK	8918-14
SW-LINE	P1-04	T2	BLACK	8918-10
	J1-03	T2	BLACK	8918-10

PARTS LIST

REF DES	MFG	PART NO	PIN NO
J1	MOLEX	03-09-1032	02-09-1117
P1	MOLEX	03-09-2049	02-09-2116
T1	MOLEX	AA-2201C	PUSH-ON
T2	MOLEX	BB-2206C	PUSH-ON
BS1	T. B. D.	T. B. D.	

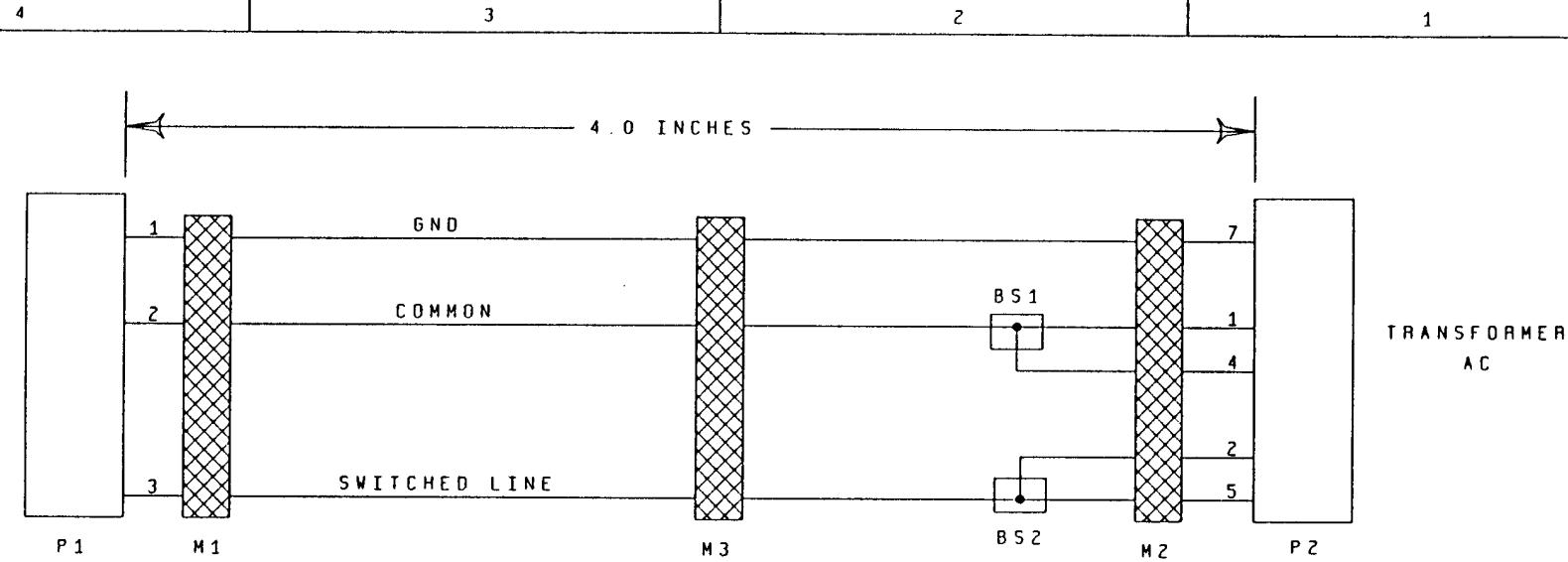
MARKER LIST

REF DES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-6258W	.125"	INPUT AC
M2	BRADY	HCPS.9-5008W	.125"	CABINET AC
M3	BRADY	HCPS.9-3758W	.125"	SW LINE
M4	BRADY	HCPS1.9-6258W	.125"	(LINE 1) AC-TRAY TO TOP HARN (LINE 2) DW-00014C-0015-02
M5	BRADY	HCPS.9-2508W	.125"	UNSW LINE

NOTES

- 1) ALL 18 AWG WIRE SHALL MEET OR EXCEED UL1015.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M5 HAS TWO LINES OF TEXT.
- 4) BUTT SPLICE BS1 HAS 3 WIRES IN CRIMP.
- 5) TWIST WIRES FROM P1 TO J1 AND FROM BS1 TO TERMINALS.
- 6) BREAKOUT WIRES AT BS1. SECURE WITH TIE WRAP.
- 7) SW1 IS SHOWN FOR REFERENCE ONLY.
- 8) ASSEMBLED HARNESS IS MPG P/N A18-00003-003.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAJY	12-13-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
REVIEWER	DATE	TITLE	
JAY G. McKITTRICK	12-13-90	AC - TRAY TO CABINET TOP	
ENGINEER	DATE	APPROVAL	
JAY G. McKITTRICK	12-13-90	SIZE	DRAWING NUMBER
APPROVAL	12-13-90	C	DW-00014A-0015
APPROVAL	12-13-90	REV - 02	RELEASE ACNH2.1
DATE 12-13-1990 13-28		SHEET 1 OF 1	



PARTS LIST

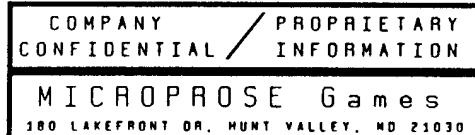
REFDES	DESCRIPTION	PART NO	PIN NO
P1	CONNECTOR, PLUG	MOLEX 03-09-2032	02-09-2116
P2	CONNECTOR, RECEPTICAL	MOLEX 03-09-1094	02-09-1117
BS1	16 AWG BUTT SPLICE	MOLEX C-246X	
BS2			

WIRE LIST

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
GROUND	P1-1	P2-7	GREEN	9918-5
COMMON	P1-2	BS1	WHITE/ORANGE	9918-20
COMMON	BS1	P2-1	WHITE/ORANGE	
COMMON	BS1	P2-4	WHITE/ORANGE	
SWITCHED LINE	P1-3	BS2	VIOLET	9918-7
SWITCHED LINE	BS2	P2-2	VIOLET	
SWITCHED LINE	BS2	P2-5	VIOLET	

MARKER LIST

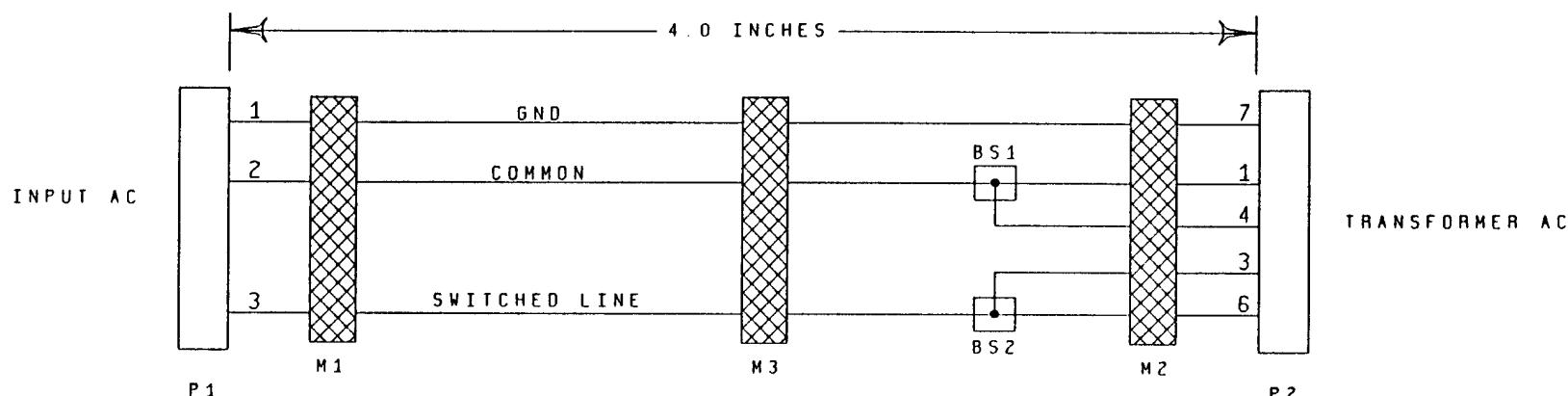
REFDES	TYPE SIZE	MFG	PART NO	TEXT	
				LINE 1	LINE 2
M1	.125"	BRADY	HCPS 9-8336W	100VAC	INPUT AC
M2	.125"	BRADY	HCPS 9-8336W	100VAC	XFORMER AC
M3	.125"	BRADY	HCPS 9-8336W	DW-00014A-0016-02	100VAC SELECT



drafter	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
checker	DATE	TITLE	
JAY G. MCKIBBIN	12-10-90	100V AC	
engineer	DATE	VOLTAGE SELECTION HARNESS	
JAY G. MCKIBBIN			
approval	DATE	SIZE	DRAWING NUMBER
JAY G. MCKIBBIN	12/13/90	C	DW-00014A-0016
APPROVAL	DATE	REV - 02	RELEASE ACWHS.1
		DATE 52-11-1990-10-31 SHEET 1 OF 1	

A NOTES: 1) ALL WIRE MUST MEET OR EXCEED UL1015.
2) LABEL MARKERS:

4 3 2 1



PARTS LIST

REFDES	DESCRIPTION	PART NO	PIN NO
P1	CONNECTOR, PLUG	MOLEX 03-09-2032	02-09-2116
P2	CONNECTOR, RECEPTICAL	MOLEX 03-09-1094	02-09-1117
BS1	16 AWG BUTT SPLICE	MOLEX C-246X	
BS2			

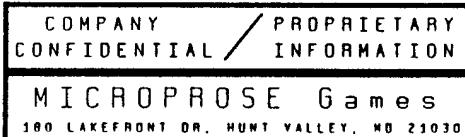
WIRE LIST

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
GROUND	P1-1	P2-7	GREEN	8918-5
COMMON	P1-2	BS1	WHITE	8918-9
COMMON	BS1	P2-1	WHITE	
COMMON	BS1	P2-4	WHITE	
SWITCHED LINE	P1-3	BS2	BLACK	8918-10
SWITCHED LINE	BS2	P2-3	BLACK	
SWITCHED LINE	BS2	P2-6	BLACK	

MARKER LIST

REFDES	TYPE SIZE	MFG	PART NO	TEXT	
				LINE 1	LINE 2
M1	.125"	BRADY	HCPS 9-8336W	120VAC	INPUT AC
M2	.125"	BRADY	HCPS 9-8336W	120VAC	XFORMER AC
M3	.125"	BRADY	HCPS 9-8336W	DW-00014A-0016-02	120VAC SELECT

NOTES: 1) ALL WIRE MUST MEET OR EXCEED UL1015.



DRAFTER	DAVID J BELANY	DATE	MICROPROSE GAMES	
CHECKED		DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
ENGINEER	JAY G. MCKIBBIN	DATE	TITLE 120VAC	
APPROVAL	JAY G. MCKIBBIN	DATE	VOLTAGE SELECTION HARNESS	
APPROVAL	12/12/90	SIZE	DRAWING NUMBER DW-00014A-0017	
APPROVAL	12/12/90	REV	02	RELEASE ACWH3.1
		DATE	12-12-1990-13-35 SHEET 1 OF 1	

4

3

2

1

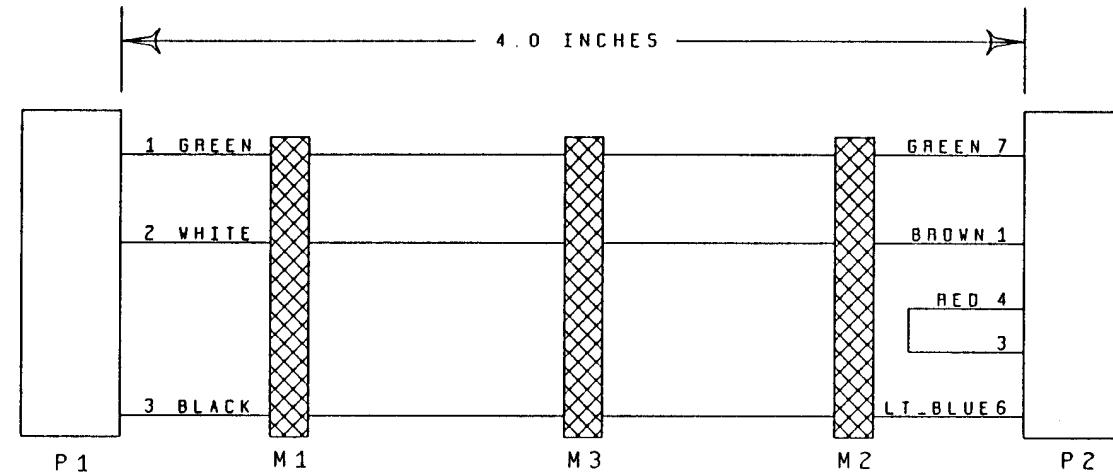
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D

INPUT
ACTRANSFORMER
AC

C

C



PARTS LIST

FEDFES	DESCRIPTION	PART NO	PIN NO
P1	CONNECTOR, PLUG	MOLEX 03-09-2032	02-09-2116
P2	CONNECTOR, RECEPTICAL	MOLEX 03-09-1094	02-09-1117

WIRE LIST

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
GROUND	P1-1	P2-7	GREEN	8918-5
COMMON	P1-2	P2-1	BROWN	8918-1
SWITCHED LINE	P1-3	P2-6	LT_BLUE	8918-6
SWITCHED LINE	P2-3	P2-4	RED	8918-2

MARKER LIST

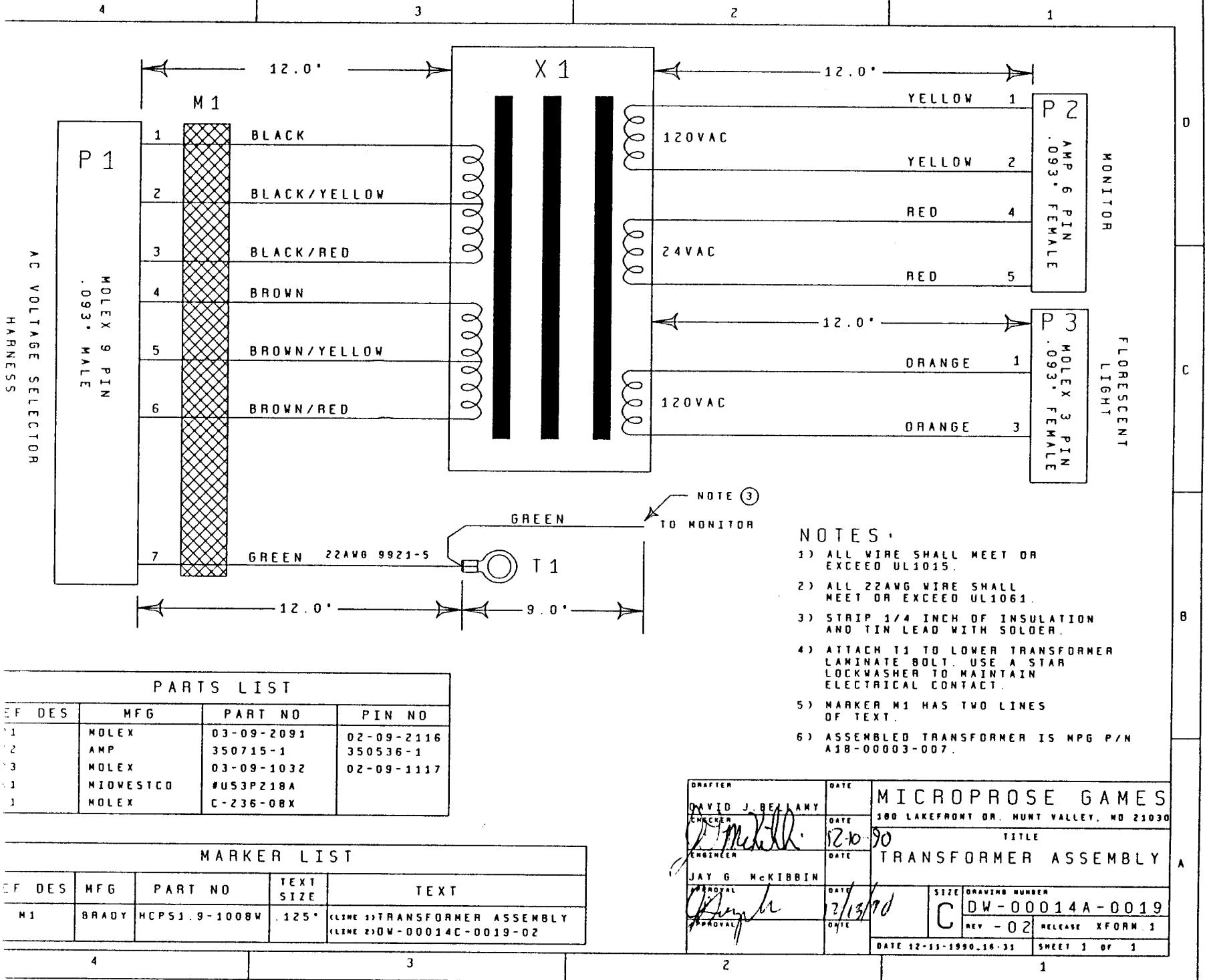
FEDFES	TYPE SIZE	MFG	PART NO	TEXT	
				LINE 1	LINE 2
M1	.125"	BRADY	HCPS 9-8336W	240VAC	INPUT AC
M2	.125"	BRADY	HCPS 9-8336W	240VAC	XFORMER AC
M3	.125"	BRADY	HCPS 9-8336W	DW-00014A-0016-02	240VAC SELECT

COMPANY
CONFIDENTIAL / PROPRIETARY
INFORMATIONMICROPROSE Games
180 LAKEFRONT DR. HUNT VALLEY, MD 21030

NOTES: 1). ALL WIRE MUST MEET OR EXCEED OF UL1015

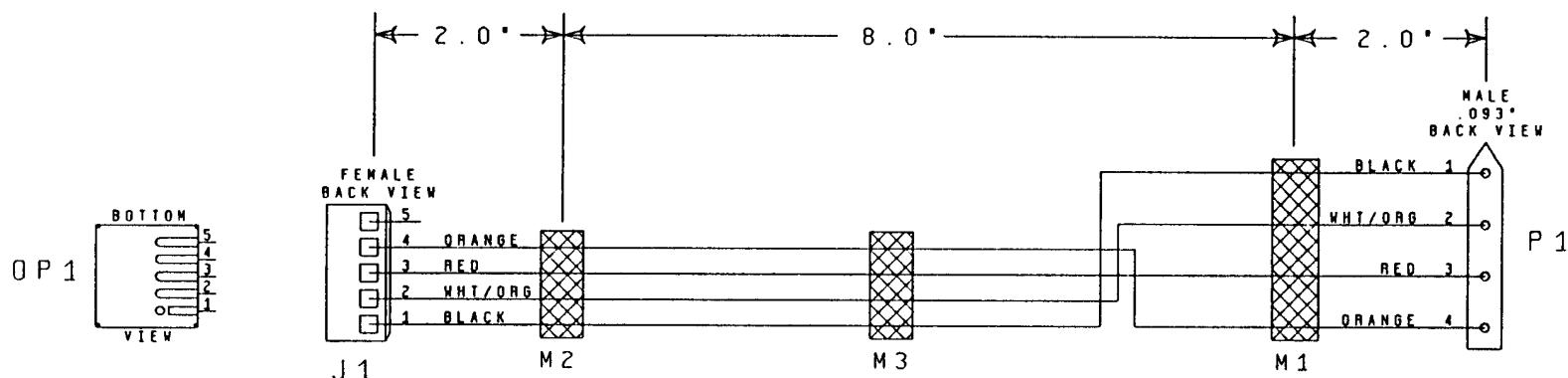
2). LABEL MARKERS:

DRAFTER <i>[Signature]</i>	DATE 12-18-90	MICROPROSE GAMES	
CHECKER <i>[Signature]</i>	DATE 12-18-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
TECHNICIAN <i>[Signature]</i>	DATE 12-18-90	TITLE 240 VAC	
JAY G. McKIBBIN APPROVAL <i>[Signature]</i>	DATE 12-18-90	VOLTAGE SELECTOR HARNESS	
APPROVAL <i>[Signature]</i>	DATE 12-18-90	SIZE C	DRAWING NUMBER DW-00014A-0018
	DATE 12-18-90	REV - 02	RELEASE ACWHA.1
		DATE 12-13-1990-14-12 SHEET 1 OF 1	



D

D



C

C

WIRE LIST (ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
XJOY_GND	P1-01	J1-01	BLACK	9921-10
XJOY_CHA	P1-02	J1-02	ORANGE	9921-3
XJOY_+5V	P1-03	J1-03	RED	9921-2
XJOY_CHB	P1-04	J1-04	WHT/ORG	9921-20

B

B

PARTS LIST

REFDES	MFG	PART NO	PIN NO
P1	MOLEX	03-09-2042	02-09-2118
J1	BERG	65039-032	
J1	MOLEX		02-09-2116
J1	BERG	KEY PLUG	65307-001

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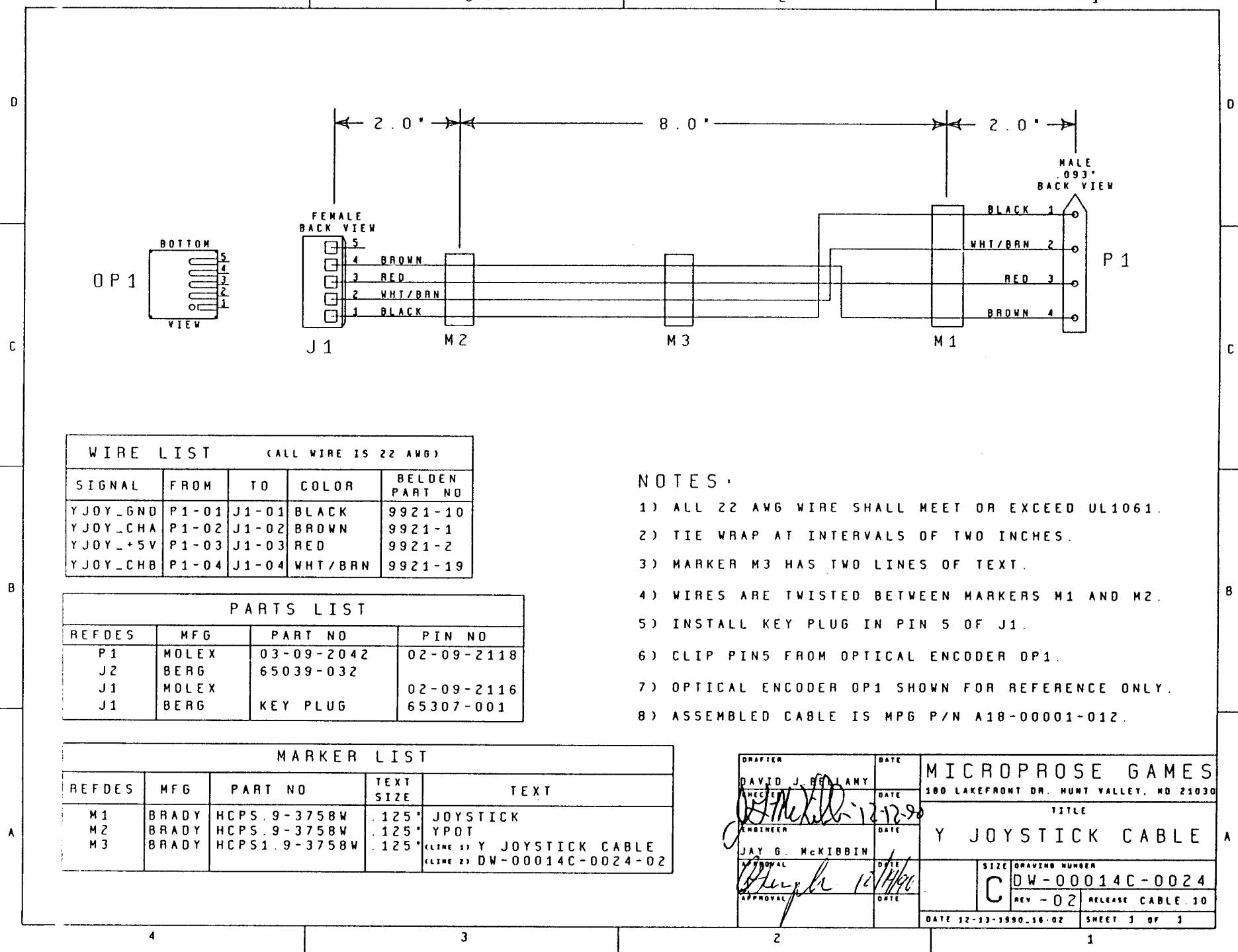
MARKER LIST

REFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-3758W	.125"	JOYSTICK
M2	BRADY	HCPS.9-3758W	.125"	XPOD
M3	BRADY	HCPS1.9-3758W	.125"	CLINE :> X JOYSTICK CABLE CLINE :> DW-00014C-0023-02

NOTES

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M3 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED BETWEEN MARKERS M1 AND M2.
- 5) INSTALL KEY PLUG IN PIN 5 OF J1.
- 6) CLIP PINS FROM OPTICAL ENCODER OP1.
- 7) OPTICAL ENCODER OP1 IS SHOWN FOR REFERENCE ONLY.
- 8) ASSEMBLED CABLE IS MPG P/N A18-00001-013.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BENECKY		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
REVIEWED	DATE	TITLE	
JAY G. Mc KIBBIN		X JOYSTICK CABLE	
ENGINEER	DATE	DRAWING NUMBER	
JAY G. Mc KIBBIN		DW-00014C-0023	
APPROVAL	DATE	SIZE	REV - 02
DAVID J. BENECKY		C	RELEASE CABLE 11
APPROVAL	DATE	DATE 12-13-1990-16-09	
		SHEET 1 OF 1	



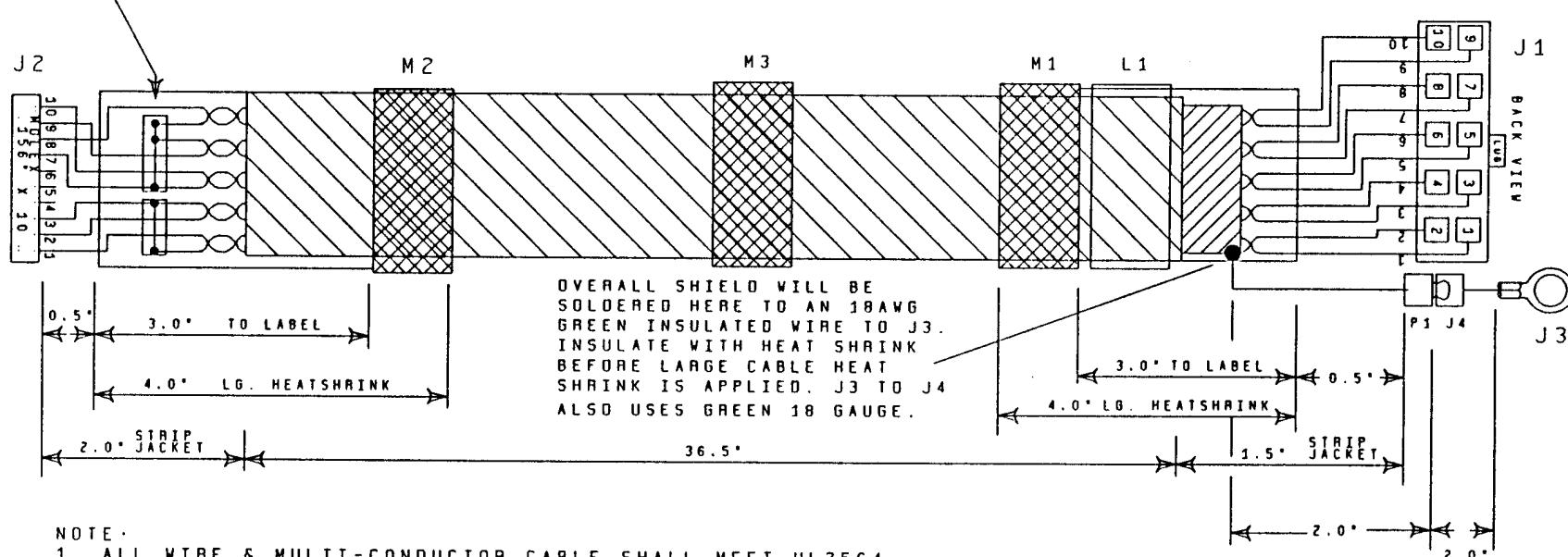
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SOLDER BLACK WIRES FROM ASSOCIATED TWISTED PAIR AS INDICATED. COVER WITH HEAT SHRINK AS SHOWN BEFORE LARGE CABLE HEAT SHRINK IS APPLIED.

WIRE LIST

SIGNAL	FROM	COLOR	TO	COLOR
DGND	J1-01	BLACK	J2-3	BLACK
H SYNC	J1-02	YELLOW	J2-1	YELLOW
V SYNC	J1-03	WHT/BLK	J2-2	WHT/BLK
DGND	J1-04	BLK/WHT	J2-3	WHT/BLK
AGND	J1-05	VIOLET	J2-7	
RED	J1-06	RED	J2-10	RED
GREEN	J1-07	GREEN	J2-9	GREEN
AGND	J1-08	ORANGE	J2-7	
AGND	J1-09	BROWN	J2-7	BROWN
BLUE	J1-10	BLUE	J2-8	BLUE

USE BELDEN CABLE. TRADE NO. 9505



NOTE:

- ALL WIRE & MULTI-CONDUCTOR CABLE SHALL MEET UL2564.
- CABLE WILL LOOP AROUND AND THRU L1.
- WIRES SOLDERED AND INSULATED WITH HEAT SHRINK.
- LABEL MARKERS.
- CABLE JACKET.
- OVERALL SHIELD.
- ASSEMBLED CABLE IS MPG P/N A18-00003-010.

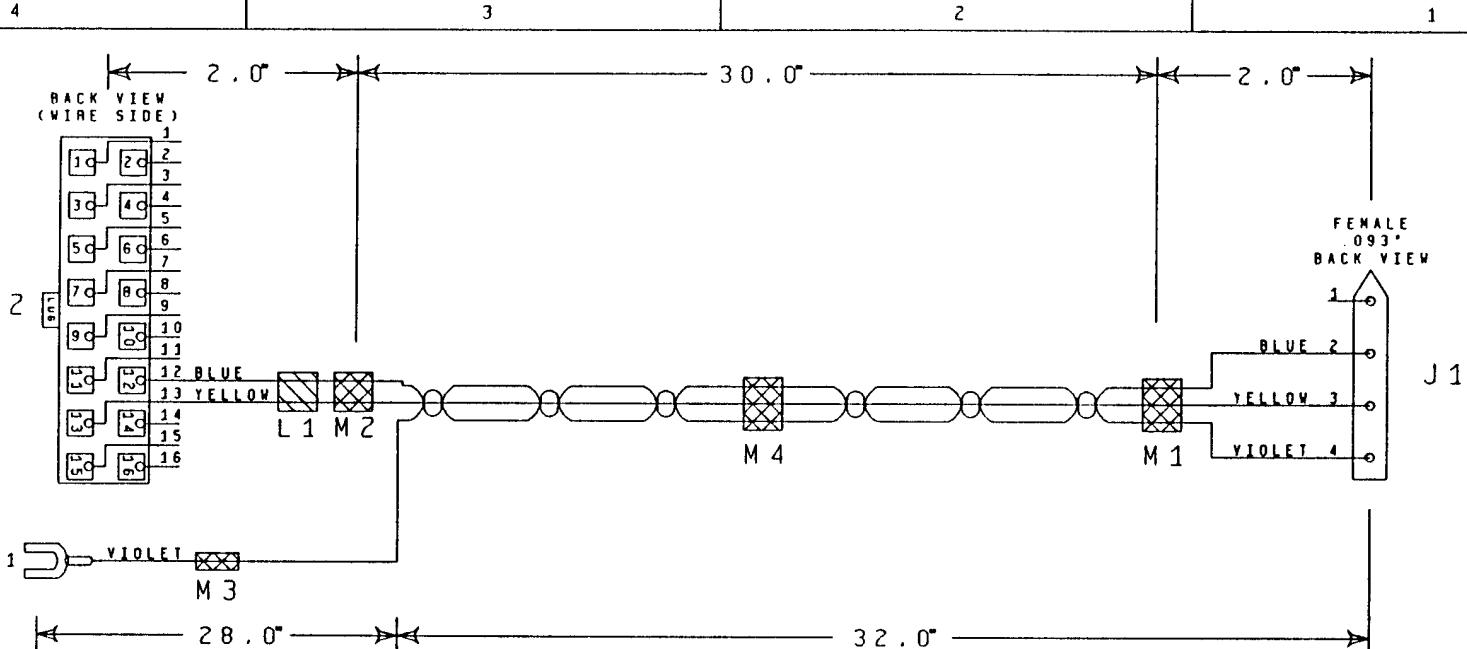
PART LISTS

REFDES	MFG.	PART NO.	PIN NO.
J1	DUPONT	65846-010	47389-000
J2	MOLEX	09-50-7101	08-55-0106
J3	MOLEX	C-236-08X	
J4	AMP	2-520183-2	
P1	AMP	2-520102-2	
L1	FAIR-RITE	2643802702	

MARKERS

REFDES	MFG.	PART NO.	SIZE	TEXT
				(LINE 2) DISPLAY CABLE
M1	BRADY	LAT-4-619-10	.125"	VGB J1
M2	BRADY	LAT-4-619-10	.125"	W-G MONITOR P200
M3	BRADY	LAT-6-619-10	.125"	(LINE 2) DW-00014C-0025-02

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BECKANY	12-18-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
JAY G. McKITTRICK	12-18-90	DISPLAY CABLE	
CHEESEMAN	DATE	MONCABLE	
JAY G. McKITTRICK	12-18-90	SIZE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00014C-0025
RENOVAL	DATE	REV - 02	RELEASE
DATE	SHEET 1 OF 1		



WIRE LIST (ALL WIRE IS 22 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
SH_YEL	J1-02	J2-12	DK BLUE	9921-13
SH_RED	J1-03	J2-13	YELLOW	9921-4
SH_12V	J1-04	T1	VIOLET	9921-7

PARTS LIST

REFDES	MFG	PART NO	PIN NO
J1	MOLEX	03-09-1042	02-09-5142
J2	MOLEX	14-57-1161	
L1	FAIR-RITE	2643164251	
T1	MOLEX	AA-234-08X	

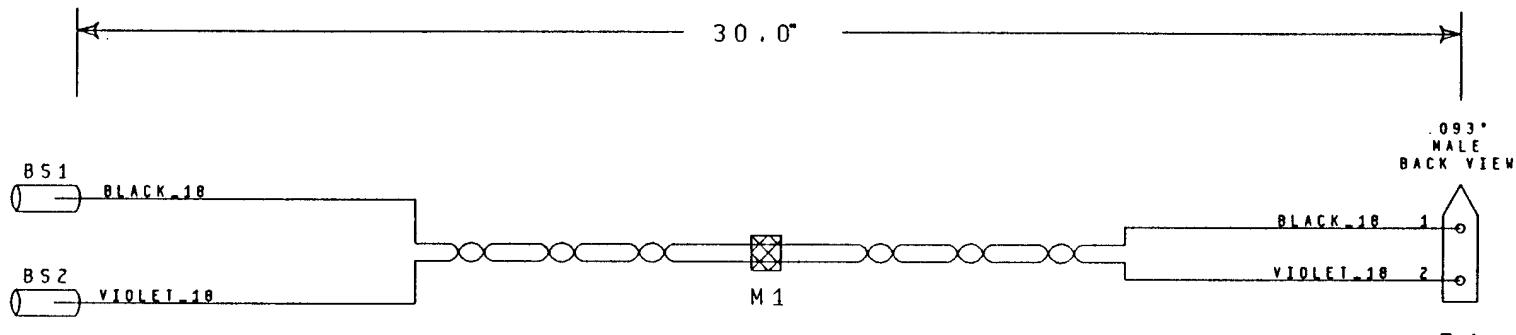
MARKER LIST

REFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS.9-3758W	.125"	HOST TO SHROUD
M2	BRADY	HCPS.9-3336W	.125"	HOST P4
M2	BRADY	HCPS.9-2508W	.125"	PWR SUP TBZ-9
M4	BRADY	HCPS1.9-3758W	.125"	(LINE 1) LOWER SHROUD HARNESS (LINE 2) DW-00014C-0026-02

NOTES :

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF FOUR INCHES.
- 3) MARKER M4 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED BETWEEN MARKERS M1 AND M2.
- 5) PINS 1, 2, 15 & 16 OF J2 MUST BE POPULATED.
- 6) SECURE L1 WITH ELECTRICAL TAPE.
- 7) ASSEMBLED HARNESS IS MPG P/N A18-00003-013.

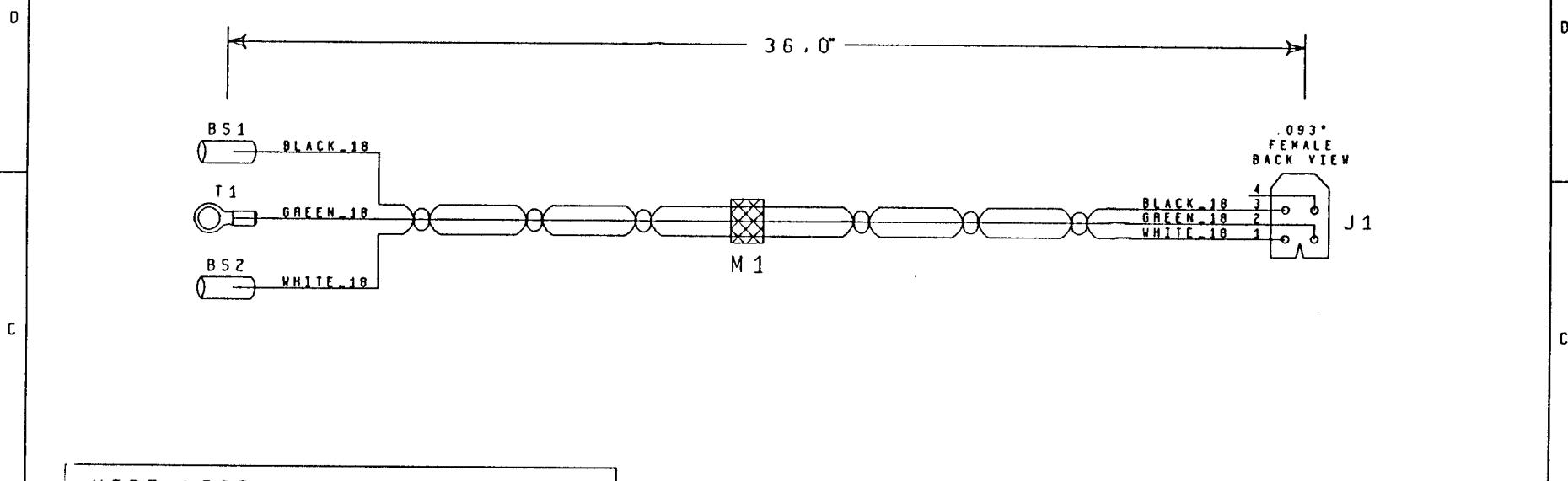
DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLAMY	12-17-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
JAY G. Mc KIBBIN	12-17-90	LOWER SHROUD HARNESS	
ENGINEER	DATE	APPROVAL	
JAY G. Mc KIBBIN	12-17-90	DATE	DRAWING NUMBER
APPROVAL	DATE	C	DW-00014C-0026
APPROVAL	DATE	REV - 02	RELEASE CABLE .12
DATE 12-13-1990-16-33		SHEET 1 OF 1	



NOTES:

- 1) ALL 18 AWG WIRE SHALL MEET OR EXCEED UL1015.
- 2) TIE WRAP AT INTERVALS OF FOUR INCHES.
- 3) MARKER M1 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED.
- 5) CRIMP ONE END ONLY OF BUTT SPLICES BS1 & BS2.

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BELLOWS	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
ENGINEER	DATE	TITLE	
JAY G. MCKIBBIN	DATE	DC FAN EXTENSION CABLE	
APPROVAL	DATE	SIZE	DRAWING NUMBER
J. Dugay	12/16/90	C	DW-00014A-0027
APPROVAL	DATE	REV	RELEASE CABLE .17
		02	
DATE 12-12-1990-14-38		SHEET 1 OF 1	


WIRE LIST (ALL WIRE IS 18 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
IEUTL	J1-01	BS2	WHITE	8918-10
CHASSIS	J1-02	T1	GREEN	8918-5
DOT	J1-03	BS1	BLACK	8918-9

NOTES :

- 1) ALL 18 AWG WIRE SHALL MEET OR EXCEED UL1015.
- 2) TIE WRAP AT INTERVALS OF FOUR INCHES.
- 3) MARKER M1 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED.
- 5) CRIMP ONLY ONE END OF BUTT SPLICES BS1 & BS2.
- 6) ASSEMBLED HARNESS IS MPG P/N A18-00003-014.

PARTS LIST

REFDES	MFG	PART NO	PIN NO
P1	MOLEX	03-09-2049	02-09-2116
T1	MOLEX	C-236-08X	

MARKER LIST

REFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS1.9-3758W	.125"	(LINE 1) AC-MARQUEE HARNESS (LINE 2) DW-00014C-0028-02

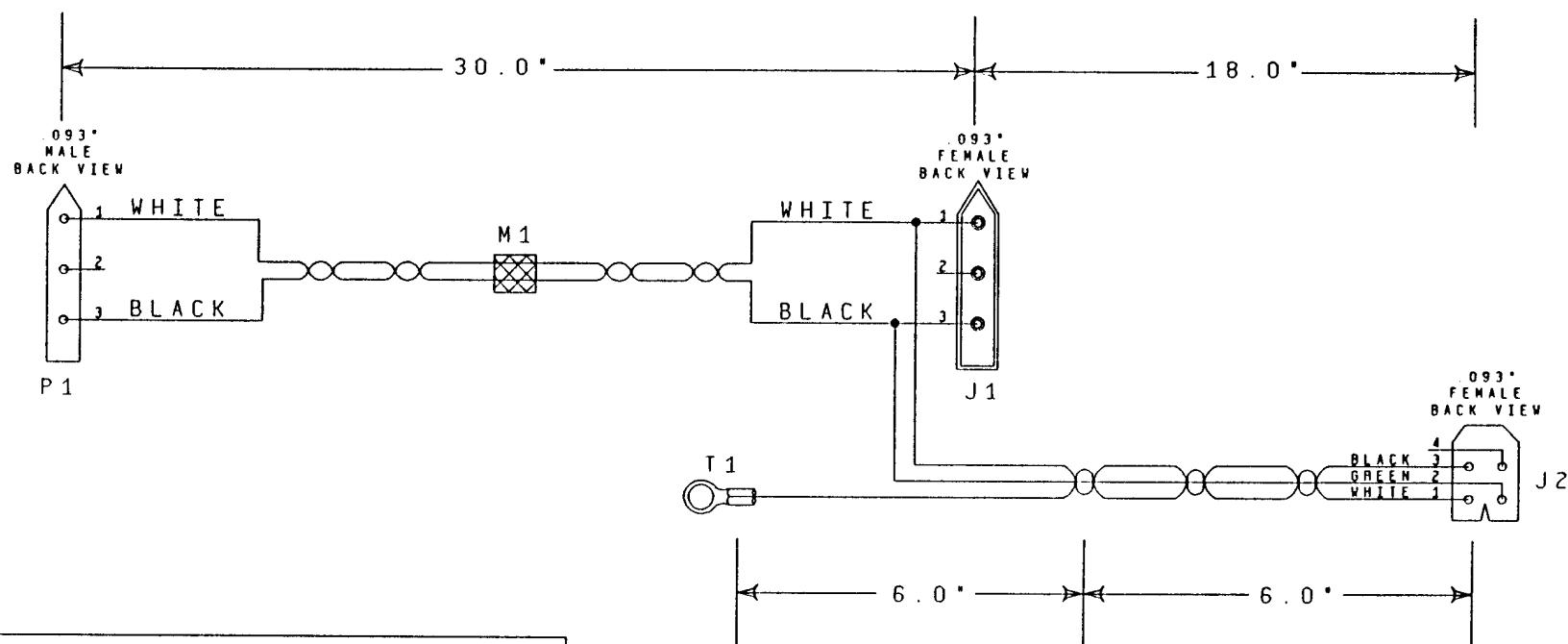
DRAFTER	DATE	MICROPROSE GAMES		
DAVID J. BELLAMY	12-12-90	180 LAKEFRONT DR. HUNT VALLEY, MD 21030		
REVISOR	DATE	TITLE		
JAY G. MCKIBBIN	12-12-90	AC - MARQUEE HARNESS		
APPROVAL	DATE	SIZE	DRAWING NUMBER	
O. Gray Jr.	12/14/90	C	DW-00014A-0028	
APPROVAL	DATE	REV	RELEASE CABLE	15
		02		
DATE 12-13-1990 14-25			SHEET 1 OF 1	

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WIRE LIST (ALL WIRE IS 18 AWG)

SIGNAL	FROM	TO	COLOR	BELDEN PART NO
X?PANCOM	P1-01	J1-01	WHITE	8918-9
X?PANHOT	P1-03	J1-03	BLACK	8918-10
P?MARCOM	J1-01	J2-01	WHITE	8918-9
P?MARHOT	J1-03	J2-03	BLACK	8918-10
CHASSIS	J2-02	T1	GREEN	8918-5

PARTS LIST

R/FDES	MFG	PART NO	PIN NO
P1	MOLEX	03-09-2032	02-09-2116
J1	MOLEX	03-09-1032	02-09-1117
J2	MOLEX	03-09-1049	02-09-1117
T1	MOLEX	C-236-08X	RING TERM

MARKER LIST

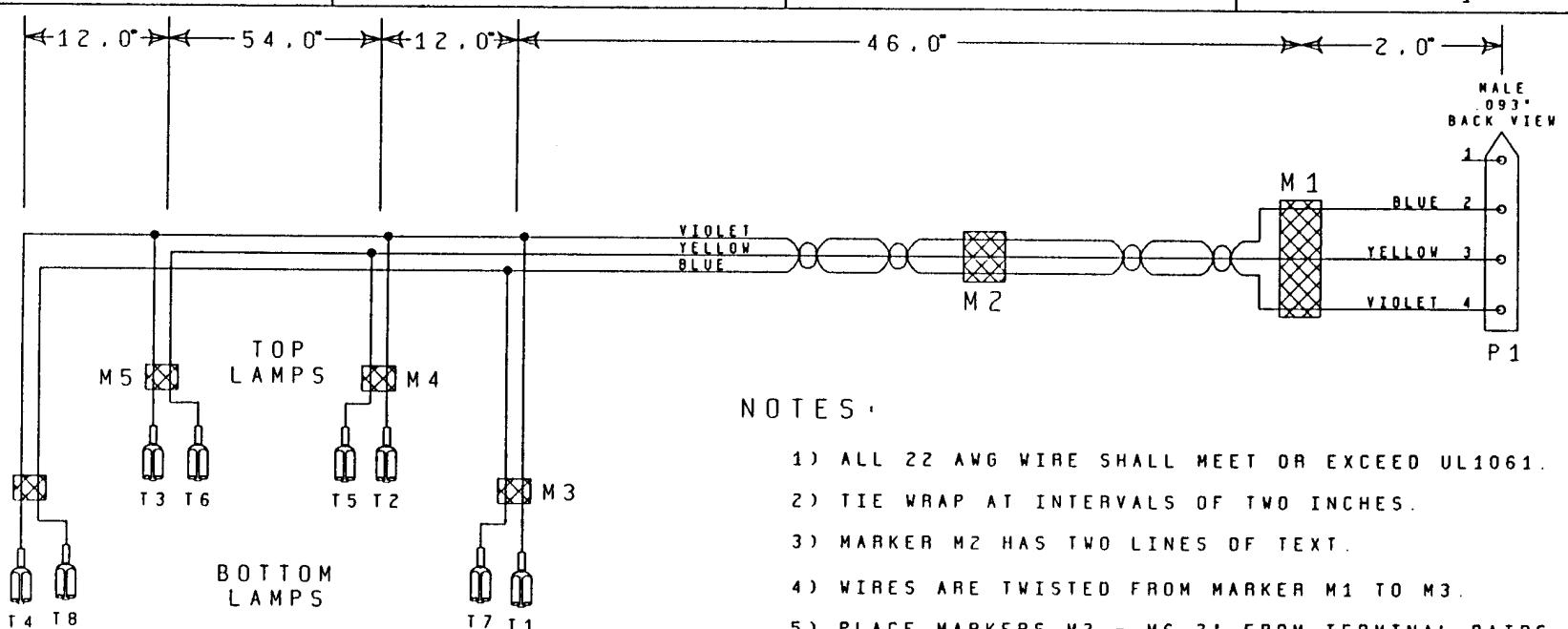
R/LFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS1.9-3758W	.125"	(LINE 1) FLUOR LITE Y CABLE (LINE 2) DW-00014C-0029-02

NOTES

- 1) ALL 18 AWG WIRE SHALL MEET OR EXCEED UL1015.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M1 HAS TWO LINES OF TEXT.
- 4) ASSEMBLED HARNESS IS MPG P/N A18-00003-015.

[Handwritten signatures and initials over the form]

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BEALAMY	DATE	180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
CHECKED	DATE	TITLE	
JAY G. MCKIBBIN	DATE	FLORESCENT LIGHT	
ENGINEER	DATE	'Y' CABLE	
APPROVAL	DATE	SIZE	DRAWING NUMBER
JAY G. MCKIBBIN	12/13/90	C	DW-00014A-0029
APPROVAL	DATE	REV - 02	RELEASE
		DATE 12-12-1990-16-56 SHEET 1 OF 1	



NOTES:

- 1) ALL 22 AWG WIRE SHALL MEET OR EXCEED UL1061.
- 2) TIE WRAP AT INTERVALS OF TWO INCHES.
- 3) MARKER M2 HAS TWO LINES OF TEXT.
- 4) WIRES ARE TWISTED FROM MARKER M1 TO M3.
- 5) PLACE MARKERS M3 - M6 2' FROM TERMINAL PAIRS.
- 6) TWO WIRES ARE CRIMPED IN T1 - T5 & T7.
- 7) ASSEMBLED HARNESS IS MPG P/N A18-00003-016.

PARTS LIST			
REFDES	MFG	PART NO	PIN NO
P1 1 - T8	MOLEX AMP	03-09-2042 2-520184-4	02-09-2118

EFDES	MFG	PART NO	TEXT SIZE	TEXT
M1	BRADY	HCPS .9-3758W	.125"	SHROUD LAMPS
M3	BRADY	HCPS .9-3758W	.125"	BOTTOM LAMP 1
M4	BRADY	HCPS .9-3758W	.125"	TOP LAMP 1
M5	BRADY	HCPS .9-3758W	.125"	TOP LAMP 2
M6	BRADY	HCPS .9-3758W	.125"	BOTTOM LAMP 2
M2	BRADY	HCPS1 .9-3758W	.125"	(LINE 1) UPPER SHROUD HARNESS (LINE 2) DW-00014C-0030-02

WIRE LIST (ALL WIRE IS 22 AWG)				
SIGNAL	FROM	TO	COLOR	BELDEN PART NO
SH_RED	P1-02	T7	DK BLUE	9921-13
	T7	T8	DK BLUE	9921-13
SH_YEL	P1-03	T5	YELLOW	9921-4
	T5	T6	YELLOW	9921-4
SH_12V	P1-04	T1	VIOLET	9921-7
	T1	T2	VIOLET	9921-7
	T2	T3	VIOLET	9921-7
	T3	T4	VIOLET	9921-7

DRAFTER	DATE	MICROPROSE GAMES	
DAVID J. BROWN		180 LAKEFRONT DR. HUNT VALLEY, MD 21030	
INSTRUMENT	DATE	TITLE	
JAY G. MCKIBBIN		UPPER SHROUD HARNESS	
APPROVAL	DATE	SIZE	DRAWING NUMBER
DAVID J. BROWN	12/10/90	C	DW-00014C-0030
INSTRUMENT	DATE	REV	RELEASE CABLE .18
JAY G. MCKIBBIN		02	
DATE 12-11-1990 18-36		SHEET 1 OF 1	