

8900 SYSTEM SCHEDULE

COMPOSITE	FIRST PROTOTYPES	APPROVAL (1) SAMPLES	PILOT PROD. (2)	FULL PROD.
AY-3-8900	COMPLETE	10/27/78	12/8/78	1/26/79
AY-3-8915	8/16/78 COMPLETE	10/15/78	11/15/78	1/26/79
RA-3-9600	COMPLETE	9/15/78	11/15/78	1/26/78
CP-1610	COMPLETE	COMPLETE	COMPLETE	COMPLETE
RO-3-9500	COMPLETE	11/15/78 { 10/01/78 Exec 20m 11/15/78 Tape	12/8/78	1/26/79
RO-3-9502	COMPLETE	COMPLETE	12/8/78	1/26/79
RO-3-9503	COMPLETE	8/15/78	11/15/78	1/26/79
AY-3-8910	COMPLETE	COMPLETE (3)	NONE	10/15/78

- (1) SYSTEM WORKS TO G.I. SPECIFICATION - 25 PARTS DELIVERED
- (2) 2K SETS DELIVERED ON OR BEFORE DATE INDICATED.
- (3) CHIP BEING MODIFIED TO REDUCE SYSTEM COMPONENT COST - SAMPLES 9/12

SUBMIT TO FCC - 11/15/78

EXPECT FCC APPROVAL - 12/15/78



GENERAL INSTRUMENT CORPORATION  
MICROELECTRONICS  
600 WEST JOHN STREET, HICKSVILLE, N.Y. 11802  
(516) 733-3000

September 8, 1978

Mr. Jeff Rochlis  
Mattel, Inc.,  
5150 Rosecrans Avenue  
Hawthorne, CA 90250

Dear Jeff:

In response to your verbal request for changes in the specifications of the Mattel product (8900 System), we have analyzed the new design requirements, and listed below is a summary of the impact of these changes:

Changes in specifications requested by Mattel:

1. Change resident ROM program storage from 2K x 10 to 4K x 10 bits.
2. Change cartridge signal configuration to allow future expansion of the Mattel Product to include higher resolution alphanumeric, cable television adapter and/or audio cassette tape.

Changes resulting from above request:

1. An additional integrated circuit (P/N R03-9504) is required on the Logic Board.
2. The cartridge connector, Methode part number 186-413-00, must have 44 contacts (increased from 33).
3. The Cartridge Board must be double-sided, and may require plated-through holes.
4. The 128 x 8 scratchpad RAM has been eliminated from the system.

Implementation of the requested changes has altered the estimated date of task completion of item 2a in Exhibit A. The revised date is September 29, 1978.

Mr. Jeff Rochlis

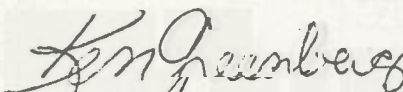
September 8, 1978

In order to avoid further confusion that might adversely affect this program, please file any future change requests in accordance with the Development Agreement. On page 4, part 5, paragraph (b) of the contract, the following procedure is stipulated:

"If Mattel desires to make changes in the specifications, it shall advise G.I. in writing of the changes requested. Within a reasonable time after receipt of the request, G.I. shall advise Mattel of the additional, or reduced cost and schedule improvement or delay, if any, resulting therefrom."

In addition, Jeff, the code for the graphics ROM (RO-3-9503) was due from Mattel on 8-11-78 - - we have not yet received this data. The code for the executive ROM's (RO-3-9502, RO-3-9504) and the first cartridge ROM's (2, RO-3-9504's) is due on 11-3-78.

Regards,

  
Ken Greenberg

KG/mk

cc: Mattel

G.I.

E. Krakauer	R. Norwood
H. Cohen	B. J. Rohrbacher
J. Denham	E. A. Sack
D. Chandler	
R. Chang	



GENERAL INSTRUMENT CORPORATION  
MICROELECTRONICS  
600 WEST JOHN STREET, HICKSVILLE, N.Y. 11802  
(516) 733-3000

September 12, 1978

Mr. David Chandler  
Mattel, Inc.  
5150 Rosecrans Avenue  
Hawthorne, California 90250

Dear Dave:

I have enclosed for your information, the following documents:

- |                                 |        |
|---------------------------------|--------|
| 1. Logic Board Schematic        | Rev. K |
| 2. Cartridge Board Schematic    | Rev. B |
| 3. Power Supply Board Schematic | Rev. D |
| 4. Memory Map                   | Rev. A |
| 5. Cartridge Connector          | Rev. A |
| 6. Parts Lists                  | Rev. A |

Regards,



Ken Greenberg

KG/lr

Encl.

MATTEL VIDEO GAME SYSTEM  
MEMORY MAP

0-63	STIC
512	
1K	SYSTEM RAM
2K	PSG
6K	EXEC ROM
12K	
14K	GROM
16K	GRAM
32K	USER RAM
36K	16K DYNAMIC
40K	TAPE RAM
44K	TAPE MONITOR
48K	CARTRIDGE ROM OR CABLE MONITOR
65K	CABLE RAM



MATTEL CARTRIDGE CONNECTOR

<u>SIGNAL</u>	<u>ORIGIN.</u>	<u>NO. OF LEADS</u>	<u>INPUT/OUTPUT</u>
DBO-DB9	CP1610	10	I/O
AD10-AD15	9502	6	0
* BUS CNTRL. OUT	CP1610	3	0
BUS CNTRL. IN	CART.	3	I
* SR1	8900	1	0
INTRIM	CART.	1	I
* SR2	8900	1	0
BUSRQ	CART.	1	I
* BUSAK	CP1600	1	0
SST	CART.	1	0
MSYNC	8900	1	0
MCLK	8915	1	0
AUDIO	CART.	1	I
VIDEO	CART.	1	I
CBLNK	8900	1	0
INTR	CART.	1	I
EN16/65	9502	1	0
R/ $\bar{W}$	9502	1	0
RESET	CART.	1	I
+5	P.S.	1	0
GND	P.S.	6	0

\* These signal pairs are looped through the ROM cartridge.



MICROELECTRONICS DIVISION  
GENERAL INSTRUMENT CORP.  
HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

SHEET /

REV.

A

MATTEL VIDEO GAME SYSTEM  
PARTS LIST

LOGIC BOARD:

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
IC1	CP 1610	Microprocessor	G. I.
IC2	RA-3-9600	RAM	G. I.
IC3	RO-3-9504	20K ROM	G. I.
IC4	AY-3-8900	STIC	G. I.
IC5	RO-3-9503	16K ROM	G. I.
IC6	AY-3-8910	PSG	G. I.
IC7, IC8	3539	256 & 8 RAM	EMM-Semi
IC9	RO-3-9502	20K ROM	G. I.
IC10	AY-3-8915	Color	G. I.
IC11	7406	Hex Inverter	
Q1, Q2	2N3904	Transistor	
D1	IN4001	Diode	
R1, R5, R12	1K	1/4 W Resistor	
R2	27 $\Omega$	1/4 W Resistor	
R3, R6, R15	TBD	1/4 W Resistor	
R19, R20, R21	TBD	1/4 W Resistor	
R22, R26, R27	TBD	1/4 W Resistor	
R4	330 $\Omega$	1/4 W Resistor	
R7, R8	3.3K	1/4 W Resistor	
R9	560 $\Omega$	1/4 W Resistor	
R10	10K		
R11	100 $\Omega$		
R13, R14, R23	10 $\Omega$		
R16	470 $\Omega$		
R17	2K		
R18	200K		
R24, R25, R28	TBD	Trim Potentiometer	
R29			
XTAL	3.579MHz	Crystal	
RFX	1085	Modulator	Astec
C1	20 pf	Capacitor	
C2	5.50 pf	Trim cap	
C4-C24	.1 $\mu$ F	Cap.	
C25	100 pf	Cap.	
C26, C3	1 $\mu$ f	Cap.	
C27, C28, C29,	10 $\mu$ f	Tant. Cap.	
C30			
S1	SPST	Switch	
S2	SPDT	Switch	
P1		Connector	
P2		Connector	
P3		Connector	
P4		Connector	
J1		Connector	
J2		Connector	
J3		Connector	

MATTEL VIDEO GAME SYSTEM  
PARTS LIST (con't)

POWER SUPPLY BOARD:

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
IC1	ua 7805	5V regulator	
IC2	ua 7812	12V regulator	
D1-D8	IN4001	Diode	
O9	IN746A	3.3V Fener. Diode	
C1	11000 uf	16V Cap.	
C2, C3	100 uf	25V Cap.	
C4, C5, C6	.1 uf	Cap.	
R1	220 $\Omega$	$\frac{1}{2}$ Watt Resistor	
T1		Transformer	

CARTRIDGE BOARD:

IC1, IC2	RO-3-9504	20K ROM	G. I.
C1	.1 uf	Cap.	





To: Ken Greenberg  
From: Dave Chandler  
Date: September 13, 1978

This will document Mattel's requests for changes to the specifications for the Mattel video system as originally defined in Exhibit B of the Development Agreement dated June 29, 1978. The requested changes are as follows:

1. Increase the resident ROM program storage from 2K x 10 to 4K x 10 bits..
2. Change cartridge signal configuration to allow future expansion of the Mattel Product to include high resolution alphanumerics (24 lines of 40 characters each), cable television adapter and/or audio cassette tape.
3. Increase the additional scratch pad RAM from 128 x 8 bits to 256 x 8 bits.
4. When reading from the additional scratch pad RAM, control the higher order 8 bits to be logical zeros.

MATTEL VIDEO GAME SYSTEM

PARTS LIST

LOGIC BOARD:

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
IC1	CP 1610	Microprocessor	G. I.
IC2	RA-3-9600	RAM	G. I.
IC3	RO-3-9504	20K ROM	G. I.
IC4	AY-3-8900	STIC	G. I.
IC5	RO-3-9503	16K ROM	G. I.
IC6	AY-3-8910	PSG	G. I.
IC7, IC8, IC12	3539	256 X 8 RAM	EMM-Semi
IC9	RO-3-9502	20K ROM	G. I.
IC10	AY-3-8915	Color	G. I.
IC11	7406	Hex Inverter	
Q1, Q2	2N3906	Transistor	
D1	IN4001	Diode	
R1, R5,	1K	$\frac{1}{4}$ W Resistor	10%
R2	47 $\Omega$	$\frac{1}{4}$ W Resistor	"
R3, R6, R15	TBD	$\frac{1}{4}$ W Resistor	"
R19, R20, R21	TBD	$\frac{1}{4}$ W Resistor	"
R22, R26, R27	TBD	$\frac{1}{4}$ W Resistor	"
R4	380 $\Omega$	$\frac{1}{4}$ W Resistor	"
R7, R8	3.3K	$\frac{1}{4}$ W Resistor	"
R9	560 $\Omega$	$\frac{1}{4}$ W Resistor	"
R10	10K	$\frac{1}{4}$ W Resistor	"
R11	100 $\Omega$	$\frac{1}{4}$ W Resistor	"
R13, R14, R23	10 $\Omega$	$\frac{1}{4}$ W Resistor	"
R16	470 $\Omega$	$\frac{1}{4}$ W Resistor	"
R17	2.2K	$\frac{1}{4}$ W Resistor	"
R18	200K	$\frac{1}{4}$ W Resistor	"
R24, R25, R28	TBD	Trim Potentiometer	
R29			
XTAL	3.579MHz	Crystal	
RFX	Um1285	Modulator	Astec
C1	20 pf	Capacitor	
C2	5.50 pf	Trim cap	
C4-C22, C24	.1 $\mu$ F	Cap.	
C25	100 pf	Cap.	
C26, C3	1 $\mu$ f	Cap.	
C27, C28, C30,	10 $\mu$ f	Tant. Cap.	
C31	.01 $\mu$ f	Cap.	
S1	SPST	Switch	
S2	SPDT	Switch	
P1		Connector	
P2		Connector	
P3		Connector	
P4		Connector	
J1		Connector	
J2		Connector	



MICROELECTRONICS DIVISION  
GENERAL INSTRUMENT CORP.  
HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

DRAWING NO. 39-147

REV.

SHEET 1 of 3

B

Form IE102

KG 9/22/78

LOGIC BOARD (con't)

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
IC 13	74LS08	Quad. and Gate	
IC 14, IC 15	74LS126	Quad. Tri-state buffer	
Q3	2N3904	Transistor	
R30	150	1/2 W resistor	



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 GENERAL INSTRUMENT CORP.  
 HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

REV.

SHEET 2 of 3

B

MATTEL VIDEO GAME SYSTEM  
PARTS LIST (con't)

POWER SUPPLY BOARD:

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
IC1	uA 7805	5V regulator	
IC2	uA 7812	12V regulator	
D1-D8	IN4001	Diode	
D9	IN746A	3.3V Zener Diode	
C1	11000 uf	16V Cap.	
C2	100 uf	5V Cap.	
C4, C5, C6	.1 uf	Cap.	
R1	220 $\Omega$	$\frac{1}{2}$ Watt Resistor	
C3	1000 uf	25V Cap.	
P2		Connector	
J3		ConneCtor	

CARTRIDGE BOARD:

IC1, IC2	RO-3-9504	20K ROM	G. I.
C1	.1 uf	Cap.	



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SPECIFICATION NO.

REV.

SHEET 3 of 3

B

KG 9/22/78

Form IE102

MATTEL CARTRIDGE CONNECTOR

<u>SIGNAL</u>	<u>ORIGIN</u>	<u>NO. OF LEADS</u>	<u>INPUT/OUTPUT</u>
DB0-DB 15	CP1610	10	I/O
* BUS CNTRL. OUT	CP1610	3	0
* BUS CNTRL. IN	CART.	3	I
* SR1	8900	1	0
* INTRIM	CART.	1	I
* SR2	8900	1	0
* BUSRQ	CART.	1	I
* BUSAK	CP1600	1	0
* SST	CART.	1	0
MSYNC	8900	1	0
MCLK	8915	1	0
AUDIO	CART.	1	I
VIDEO	CART.	1	I
CBLNK	8900	1	0
INTR	CART.	1	I
RESET	CART.	1	I
+5	P.S.	1	0
GND	P.S.	6	0

\* These signal pairs are looped through the ROM cartridge.



**MICROELECTRONICS DIVISION**  
**GENERAL INSTRUMENT CORP.**  
 HICKSVILLE, NEW YORK 11802

**SPECIFICATION NO.**

**DRAWING NO. 39-149**

**REV.**

**SHEET 1 of 1**

**B**

Form IE102  
 KG 9/26/78

MATTEL VIDEO GAME SYSTEM  
MEMORY MAP

0-63	STIC
512	
1K	SYSTEM RAM
1.5K	PSG
2K	SCRATCH PAD RAM
6K	EXEC ROM
12K	
14K	GROM
16K	GRAM
32K	USER RAM
36K	16K DYNAMIC
40K	TAPE RAM
44K	TAPE MONITOR
48K	CARTRIDGE ROM
	OR CABLE MONITOR
	CABLE RAM
65K	



MICROELECTRONICS DIVISION  
GENERAL INSTRUMENT CORP.  
HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

DRAWING NO. 39-148

REV.

SHEET 1 of 1 B

Form IE102

KG 9/26

MATTEL CARTRIDGE CONNECTOR

<u>SIGNAL</u>	<u>ORIGIN.</u>	<u>NO. OF LEADS</u>	<u>INPUT/OUTPUT</u>
DB0-DB9	CP1610	10	I/O
AD10-AD15	95D2	6	0
* BUS CNTRL. OUT	CP1610	3	0
BUS CNTRL. IN	CART.	3	I
* SR1	89D0	1	0
INTRIM	CART.	1	I
* SR2	8900	1	0
BUSRQ	CART.	1	I
* BUSAK	CP1600	1	0
SST	CART.	1	0
MSYNC	89D0	1	0
MCLK	8915	1	0
AUDIO	CART.	1	I
VIDEO	CART.	1	I
CBLNK	89D0	1	0
INTR	CART.	1	I
EN16/65	9502	1	0
R/W	9502	1	0
RESET	CART.	1	I
+5	P.S.	1	0
GND	P.S.	6	0

\* These signal pairs are looped through the ROM cartridge.

*DB 10-15*

*— means 10 bit max memories*

*+5 not returned*



October 3, 1978

Ken Greenberg  
General Instruments Corporation  
Microelectronics Division  
600 West John Street  
Hicksville, New York 11802

Dear Ken:

Enclosed is a copy of your most recent parts list marked up to reflect parts Sylvania is to obtain for the first 50 systems. Attached to this list is a sketch showing the interconnections with plug and jack designations. This sketch should serve as a working tool until such time as a formal drawing gets generated.

Also enclosed is a spec sheet on the CTS cricket switch proposed for the reset switch.

For shielding design, we need answers on percentage of surface that can be holes, any restrictions on the nature (such as size) of the holes, acceptability of connecting shields to logic board by means of a series of clips around the edges which clamp flanges on the shields against the ground plane on the p.c. board, and whether a foil covered cardboard type shielding material is acceptable. In any event, the board layout should be done in such a way that the edges of the shields can be straight lines, permitting fabrication of the shields by stamping and folding. Notches out of corners or sides can be handled o.k. in general. It would help if the bottom shield could be at a uniform height such that it will cover the modulator (the highest part on the logic board except the handle of the channel selector switch?).

Sincerely,

Dave Chandler

DC/lw  
Encl.



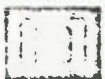
\* DESIGNATES PARTS TO BE OBTAINED BY  
 PENNSYLVANIA FOR FIRST 50 SYSTEMS  
 MATTEL VIDEO GAME SYSTEM

10-2-78

PARTS LIST

LOGIC BOARD:

DESIGNATION	P/N	DESCRIPTION	SOURCE
IC1	CP 1610	Microprocessor	G.I.
IC2	RA-3-9600	RAM	G.I.
IC3	RO-3-9504	20K ROM	G.I.
IC4	AY-3-8900	STIC	G.I.
IC5	RO-3-9503	16K ROM	G.I.
IC6	AY-3-8910	PSG	G.I.
* IC7, IC8, IC12	3539	256 X 8 RAM	EMM-Semi
IC9	RO-3-9502	20K ROM	G.I.
IC10	AY-3-8915	Color	G.I.
* IC11	7406	Hex Inverter	
Q1, Q2	2N3906	Transistor	
D1	IN4001	Diode	
R1, R5,	1K	1/4 W Resistor	10%
R2	47 $\Omega$	1/4 W Resistor	"
R3, R6, R15	TBD	1/4 W Resistor	"
R19, R20, R21	TBD	1/4 W Resistor	"
R22, R26, R27	TBD	1/4 W Resistor	"
R4	300 $\Omega$	1/4 W Resistor	"
R7, R8	3.3K	1/4 W Resistor	"
R9	560 $\Omega$	1/4 W Resistor	"
R10	10K	1/4 W Resistor	"
R11	100 $\Omega$	1/4 W Resistor	"
R13, R14, R23	10 $\Omega$	1/4 W Resistor	"
R16	470 $\Omega$	1/4 W Resistor	"
R17	2.2K	1/4 W Resistor	"
R18	200K	1/4 W Resistor	"
R24, R25, R28	TBD	Trim Potentiometer	
R29			
XTAL	3.579MHz	Crystal	
RFX	Um1285	Modulator	Astec
C1	20 pf	Capacitor	
C2	5-50 pf	Trim cap	
C4-C22, C24	.1 $\mu$ F	Cap.	
C25	100 pf	Cap.	
C26, C3	1 $\mu$ F	Cap.	
C27, C28, C30,	10 $\mu$ F	Tant. Cap.	
C31	.01 $\mu$ F	Cap.	
S1	SPST - C1690A	Switch	CTS of Elkhart
S2	SPOT	Switch	
P1		Connector	
<del>P2</del> P7		Connector	
<del>P3</del> P4Q } EDGE FINGERS OF		Connector	
* P4b } AMP 640999-9		Connector	
J1	186-413-01	Connector	AMP
* <del>J2</del> J3	640428-6	Connector	METHODE AMP



MICROELECTRONICS DIVISION  
 GENERAL INSTRUMENT CORP.  
 HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

DRAWING NO. 39-147

SHEET 1 of 3

REV.

B

LOGIC BOARD (con't)

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
* IC 13	74LS08	Quad. and Gate	
IC 14, IC 15	74LS126	Quad. Tri-state buffer	
Q3	2N3904	Transistor	
* R30	150	1/4 W resistor	



MICROELECTRONICS DIVISION  
 GENERAL INSTRUMENT CORP.  
 HICKSVILLE, NEW YORK 11802

SPECIFICATION NO.

REV.

SHEET 2 of 3

B

MATTEL VIDEO GAME SYSTEM  
PARTS LIST (con't)

POWER SUPPLY BOARD:

<u>DESIGNATION</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>
* J3	SW432-S.D-LO-S-81-JK	SWITCH	UID/AMF
IC1	uA 7805	5V regulator	
IC2	uA 7812	12V regulator	
D1-D8	IN4001	Diode	
D9	IN746A	3.3V Zener Diode	
C1	10000 uf	16V Cap.	
C2	100 uf	5V Cap.	NICHICON
C4, C5, C6	.1 uf	Cap.	
R1	220 $\Omega$	1/2 Watt Resistor	
C3	1000 uf	25V Cap.	
P2	640383-5	Connector	AMP
* P3	640383-6	Connector	AMP

CARTRIDGE BOARD:

* IC1, IC2	RO-3-9504	2DK ROM	G.I.
* C1	.1 uf	Cap.	

TRANSFORMER ASSY:

* J2	640428-5	CONNECTOR	AMP
------	----------	-----------	-----

HAND CONTROLLER: (2 PER SYSTEM)

* J4	10 PIN EDGE OR AMP 640443-9	CONNECTOR	AMP
------	--------------------------------	-----------	-----

FAN ASSY:

* J7		CONNECTOR	
------	--	-----------	--

\* ANTENNA CABLE

\* ANTENNA SWITCH



MICROELECTRONICS DIVISION  
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SPECIFICATION NO.

REV.

SHEET 3 of 3

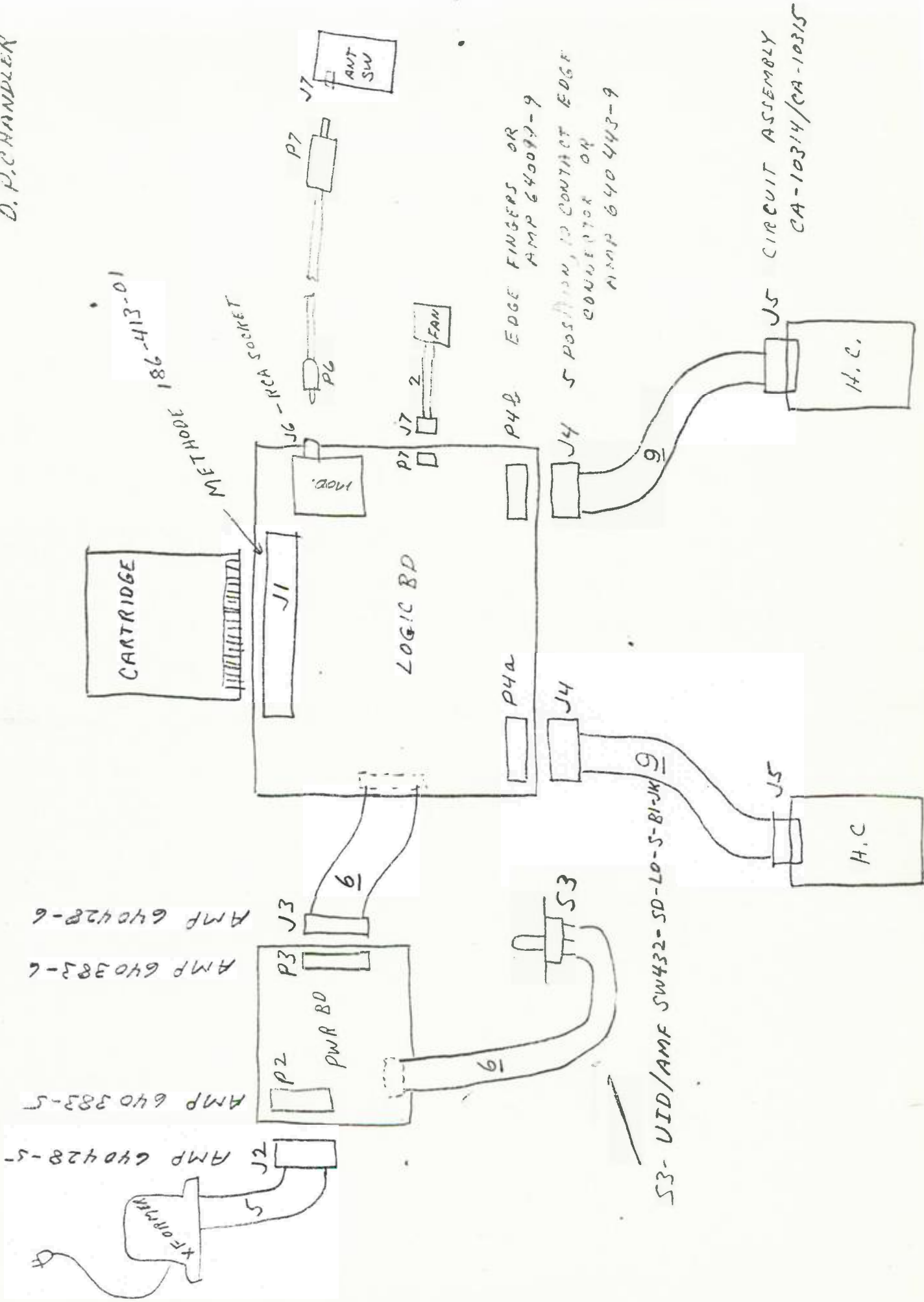
B

KG 9/22/78

Form IE102

10-2-78

D. P. CHANDLER



CTS OF ELKHART

004 Cricket Switch

Configuration: 11/32" square.

Material: .004" (0.102 mm) stainless steel.

Special Design Feature: Snap-in mounting (self holding) requires no tape, soldering, or special assembly equipment.

Electrical:

Contact resistance - 0.1 ohm initial; *IN CTS BOARD*  
.5 ohms after 500,000 cycles.  
Rating - 50 ma, 12 VDC

Mechanical:

Cycle Life - Minimum of 500,000 actuations.  
Operating Force - Variable from 6 to 12 ounces depending upon the tactile feel of the application.  
Physical Contact Pressure - Panel mounted switch shall withstand a force of 25 pounds pressure for one minute without any change to the contact physically or functionally.  
Load - Switch shall survive a load of 1 pound at the rate of 20 to 25 cycles per minute for 5,000 cycles.

REVISION	DATE	BY	E.C.
1	8-16-77	MP	
2	11-7-77	MP	
3	2-21-78	MLD	MP

THIS PRINT IS AND REMAINS THE PROPERTY OF CTS CORPORATION.

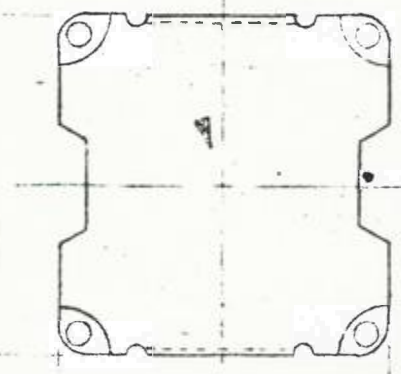
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**PRELIMINARY PRINT  
 VOID 30 DAYS AFTER**

GENERAL 10L  
 DEC.  $\pm .005$  (.39MM)  
 FRAC.  $\pm 1/64$

(8.75MM)

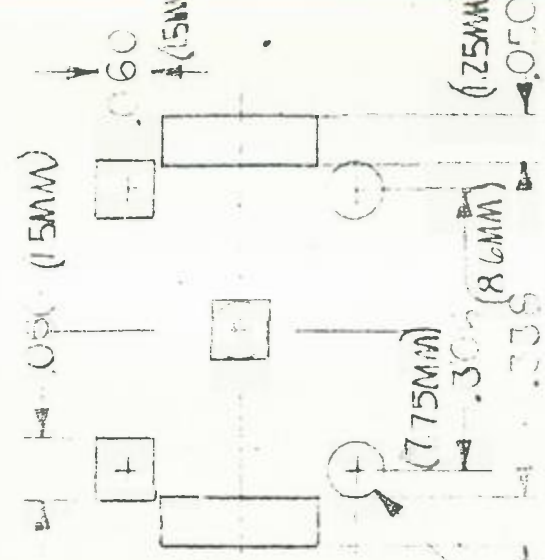
$\frac{11}{32}$



(8.75MM)  
 $\frac{11}{32}$

CONTACT CENTER  
 .005 DEEP (.001MM)  
 TRAVEL .017 (.439)  
 .296  
 (.45MM - 5MM)

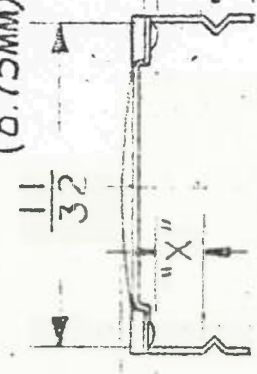
(7.5MM) A  
 .160  
 (.41MM)



(15MM) .060 D.  
 (1.25MM) .050

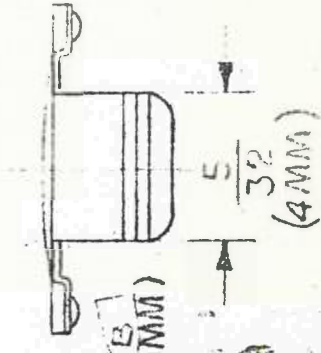
(8.75MM)  
 $\frac{11}{32}$

$\frac{1}{64}$  (.4MM)



(.80MM)  $\frac{1}{32}$

64 (2.8MM)



NOTED OPTIONS  
 .060 DIA. OR  
 .060 DIA. SQUARE

.062 (1.55MM)
.050 (1.25MM)
P.C. BOARD DIM. X



October 13, 1978

Ken Greenberg  
General Instruments Corporation  
Microelectronics Division  
600 West John Street  
Hicksville, New York 11802

Dear Ken:

Here is the slide of the Video System you wanted.

Sincerely,

Dave Chandler

DC/ldw  
Encl.



Jeffrey A. Rochlis  
Vice President, Mattel Toys  
and  
President, Mattel Electronics

October 27, 1978

Dr. Edgar A. Sack  
Vice President and General Manager  
Micro Electronics Group  
General Instrument Corporation  
600 West John Street  
Hicksville, New York 11802

Dear Ed:

This serves to summarize the agreed to next step actions emanating from our meeting of Tuesday, October 24. We very much appreciate your pulling the meeting together, particularly in light of the extenuating circumstances.

Mattel Purchase Order - General Instrument will draft a revised letter of agreement to be attached to the Mattel Purchase Order. Copies of this will be sent to Howard Cohen and myself. Assuming that this revised draft is consistent with our verbalized agreements, our respective attorneys can iron out specific wording. In the meantime, Dennis Bogart will forward you a clean copy of our standard Purchase Order so that you can read the terms and conditions printed on the back.

Exclusivity - Mattel will draft a separate letter of agreement that attempts to state the exclusivity aspects of our relationship.

Chip Consolidation

(1) 40 K Bit cartridge and executive ROMs - Dick Norwood will provide Mattel a delineation of the 40 K Bit cartridge and executive ROM development and product availability schedules.

(2) Master Console Chip Set - it was agreed that we will not undertake consolidation of the basic console chip set. Rather, (a) we will apply resources to the development of a second generation system, planning for which should commence following the January CES, (b) pass onto Mattel, savings in the basic chip set cost attributable to actual improvement in current yield projections, if any, and

cont'd...



(c) G.I. will provide Mattel with additional costs breaks for volume beyond the currently quoted 250,000 chip set unit level.

PAL System - G.I. will provide Mattel a PAL system development timetable and product availability schedule to support Mattel's introduction of same into the European markets during 1979.

Basic Console Schedule - Due to slippages encountered in bringing the basic console chip set to a state of reality, G.I. will develop a special test program ROM that can be utilized, if necessary, for submission to the FCC, Zenith and Sears. Dave Chandler will confirm with Zenith and Sears as to whether this will be an acceptable substitute to actual cartridge ROMs. Work on the cartridge ROMs is to proceed, however, with the same degree of urgency.

Add-On Module - A meeting has been set up on Long Island between representatives of Mattel, APH, Mattel's custom chip house and G.I. for Friday, November 3 and Saturday, November 4. Hotel and meeting room reservations are to be made by G.I.

Standardization - Lew Solomon, Ed Krakauer and Jeff Rochlis will meet during the week of November 6 to conduct additional discussion on near and long term domestic as well as international standardization. Lew Solomon is to confirm the date, time and meeting place for same.

Cable TV Venture - It was agreed that Ed Krakauer or Jeff Rochlis will contact Colin O'Brien to receive a status report on (a) the development of the appropriate cable tv hardware, (b) Jerrold's comments to Mattel's proposed contract, and (c) the projected completion date of the business plan.

Ed, should any questions arise, please do not hesitate to call. Thank you again.

Best regards,

  
Jeffrey A. Rochlis

ewj

cc: Ken Greenberg (General Instrument)	Ed Krakauer (Mattel)
Dick Norwood " "	Jim Kingsbury "
Lew Solomon " "	Dennis Bogart "
Colin O'Brien (Jerrold)	Dave Chandler "
	Howard Cohen "

November 13, 1978

TO: JEFF ROCHLIS  
FROM: ED KRAKAUER *Ed*  
SUBJECT: VIDEO SYSTEM FCC SUBMISSION

Currently, my understanding is that the most likely date for FCC submission of the Video System is December 15, 1978, with the earliest possible date being December 7, 1978.

Again, it is imperative that the System be submitted prior to the Las Vegas Consumer Electronics Show.

This project should become everyone's top priority. Any further delays will have a serious impact on 1979 performance.

EMK/nlh

cc: Dave Chandler  
Ken Greenberg - General Instruments  
Ed Sack - General Instruments

INTEL VISION  
VIDEO

DEVELOPMENT AGREEMENT, dated June 29, 1978, by and between the Microelectronics Division of GENERAL INSTRUMENT CORPORATION, a Delaware corporation, with a place of business at 600 West John Street, Hicksville, New York 11802 (hereinafter referred to as "GI") and MATTEL ELECTRONICS, a division of MATTEL, INC., a Delaware corporation, with a place of business at 5150 Rosecrans Avenue, Hawthorne, California 90250 (hereinafter referred to as "Mattel").

Mattel wishes to develop, manufacture and sell to consumers an advanced form of video entertainment product (referred to herein as the "Mattel Product") which will incorporate a large-scale integrated circuit microelectronic chip set and interconnections thereof developed by GI for sale to the general public (such chip set and interconnections have been designated by GI as the "8900"). GI has been selected by Mattel to design three (3) printed circuit boards (the PCB's") for the Mattel Product which incorporates the 8900. In addition, Mattel has selected GI to contract with Dash-Straus Associates, or another consulting firm if approved or requested by Mattel (Dash-Straus Associates or such other consulting firm is hereinafter referred to as the "Consultant") for consulting services relating to the submission of the Mattel Product for approval by the Federal Communications Commission ("FCC"), to be covered under a separate purchase order. By this Agreement, GI and Mattel wish to set forth the terms under which GI will undertake the design of the PCB and will contract with the Consultant for submission of the PCB for FCC approval.

NOW, THEREFORE, in consideration of the premises and of the mutual covenants hereinafter set forth, the parties hereto agree as follows:

1. Work Statement. The Work Statement appearing as Exhibit A hereto shall constitute the work to be performed hereunder by GI and is incorporated herein by reference. GI shall not be required to furnish to Mattel any services or products other than those expressly set forth in this Agreement.

2. Pricing and Payment Schedule.

(a) Mattel shall pay to GI for its services relating to the electrical design

of the PCB, set forth in Exhibit A hereto, the sum of \$65,000, payable as follows:

- (i) \$10,000 within 30 days of the execution of this Agreement;
- (ii) \$10,000 upon acceptance by Mattel of the electrical schematic and bill of materials for the PCB, referred to in part (1) of Exhibit A;
- (iii) \$10,000 upon acceptance by Mattel of the layout for the PCB, referred to in part (2a) of Exhibit A;
- (iv) \$30,000 upon delivery of the five prototype PCBs, referred to in part (3a) of Exhibit A; and
- (v) \$5,000 upon acceptance by Mattel of the test specifications for the PCB, referred to in part (4) of Exhibit A.

*Invoice  
# 02-FC-74  
8/1/75*

(b) In addition to the foregoing, GI shall invoice to Mattel and Mattel shall pay GI for all travel, lodging, room and board expenses of their employees if such expenses or costs are incurred in connection with Mattel approved travel to or with the selected consultant. Such expenses shall be at a rate, and payable to GI by Mattel in the same manner as, GI reimburses its employees for such expenses.

3. Reasonable Efforts of GI; No Warranty. Mattel acknowledges that the development of the PCB and submission of the Mattel Product for FCC qualification might entail changes in its specifications, delays and unforeseen difficulties, and said development may be impossible due to technological problems, a shortage of time, or for reasons beyond the reasonable control of GI. GI shall be obligated to use its reasonable efforts in good faith toward the fulfillment of its obligations hereunder. The payments due to GI may not be delayed or withheld by Mattel for any reason so long as GI has used reasonable efforts in good faith required by this Section 3. GI makes no warranty either express or implied, in respect of the performance of the PCB and the Mattel Product, including, without limitation, their merchantability, their fitness for their intended use, against patent infringement (except as detailed in Section 4), or in respect of the tooling which Mattel will purchase and use in connection with the

manufacture of the Mattel Product. GI expressly disclaims any responsibility for (a) the selection or performance in any manner of the assembler of the Mattel Product, (b) the tooling used to manufacture the Mattel Product, and in particular, changes in such tooling necessitated by revisions in the design of the Mattel Product required for FCC approval, and (c) the design and performance of each of the components of the Mattel Product, including, without limitation, Underwriters Laboratories' approval problems and internal temperature problems within the Mattel Product caused by the incorporation of the power transformer within the plastic housing of the Mattel Product. GI does acknowledge, however, that the logic PCB, with components, should function properly over an ambient temperature range (inside of the case) of 0 to 40 degrees C. If GI is unable, with reasonable effort, to obtain appropriate system performance, GI shall notify Mattel in writing. In this event, both parties agree to attempt to develop an alternate or appropriate course of action to rectify the problem.

4. Patent Indemnity. GI shall defend any suit or proceeding brought against Mattel insofar as such suit or proceeding is based on a claim that the 8900 uncombined with any items not furnished by GI directly infringes U.S. letters patent owned by others, provided GI is notified promptly in writing and given authority, information and assistance necessary for the defense of such action. In case the 8900 is held in such suit or proceeding to constitute an infringement of a duly issued patent and if Mattel's use of the 8900 is enjoined, GI shall, at its own expense and option, procure for Mattel the right to continue using the 8900, modify the same so that it becomes noninfringing, or refund the amounts paid to GI by Mattel hereunder; provided, however, that GI will not be liable in any matter to the extent that the alleged infringement arises out of drawings, designs, detailed process specifications or specified particular circuits which originate with Mattel, and Mattel shall indemnify and hold GI harmless from and against any infringement claims arising out of compliance with or use by GI of such items which are furnished by Mattel. The foregoing provisions of this Section 4 state the entire liability of the parties for patent infringement.

5. Changes in Specifications.

(a) The performance of the obligations of GI hereunder is subject to the specifications initially furnished by Mattel to GI and attached hereto as Exhibit B. Such performance, in terms of price and delivery, is deemed waived by Mattel upon material changes in such specifications.

(b) If Mattel desires to make changes in the specifications, it shall advise GI in writing of the changes requested. Within a reasonable time after receipt of the request, GI shall advise Mattel of the additional, or reduced cost and schedule improvement or delay, if any, resulting therefrom.

(c) GI shall have the right to make changes in the specifications of the PCB, in the event such changes are required by the development thereof. GI shall advise Mattel in writing of any changes and thereafter GI and Mattel shall negotiate in good faith any changes in the price resulting therefrom.

6. Delays. Mattel acknowledges that due to the inherent difficulties in the design and development of microelectronic circuitry as is required by GI under this Agreement, the Dates of Task Completion set forth in the Work Statement appearing as Exhibit A are estimates only and shall not be binding on GI, and GI shall have no liability to Mattel in the event it is unable to design the PCB at all or in accordance with the Dates of Task Completion appearing in the Work Statement so long as GI uses reasonable efforts in good faith to design the PCB.

7. Damages. In the event Mattel asserts a claim against GI for damages relating to this Agreement, such damages and GI's liability, if any, shall be limited to those sums actually paid by Mattel to GI under this Agreement, and in no event shall GI be liable for any other direct, consequential, indirect, incidental or special damages hereunder.

8. Proprietary and Patent Rights. Mattel shall at all times have full right and title to (a) FCC approval of the Mattel Product and (b) the artwork, negatives and assembly drawings of the PCB furnished pursuant to Part 2 of the Work Statement annexed as Exhibit A hereto. Except as set forth in the preceding sentence, GI shall have full worldwide, irrevocable, royalty-free rights to patent, use, sell, license or otherwise exploit all information, knowhow, drawings, specifications, designs, patterns and the rights thereto, including patent rights, which are designed, developed, created or made or used by GI in the performance of this Agreement, including but not limited to general knowledge learned in the course of the design of the PCB, whether or not the PCB is successfully developed hereunder, and GI shall have no obligation to Mattel in connection with any such use or exploitation of such rights. The 8900 chip set is not exclusive to Mattel.

9. Confidential Information. Both parties acknowledge that certain of the information provided or to be provided in connection with the performance of this Agreement is confidential, secret and/or proprietary information. Both parties will take appropriate action to restrict access to any confidential information furnished to them by the other to those of its employees and agents and the personnel of assemblers and subassemblers of the Mattel Product who have an actual need for such access in the course of their duties. In the case of agents, assemblers and subassemblers of the Mattel Product or any other third party to which Mattel discloses confidential information of GI, Mattel shall obtain written agreements obligating such persons to honor and protect the confidentiality of such information. The provisions of this Section 9 shall survive any termination or completion of this Agreement, and either party shall, without limitation of any other remedies at law available to it, be

entitled to seek appropriate equitable or injunctive relief in respect of a breach of this Section, without the necessity of proving damages.

10. Approval of Product. Upon approval by Mattel of the PCB layouts and test specifications and procedures referred to in Exhibit B, GI shall have no further liability to Mattel under this Agreement.

11. Termination. In the event GI is unable to complete the design of the PCB and arrange for submission of the Mattel Product to the FCC, by <sup>March 31, 1979</sup> ~~January 1, 1980~~, anything herein to the contrary notwithstanding, either party shall have the right to terminate this Agreement by written notice to the other party. Upon such termination, no party shall have any further liability hereunder except with regard to confidentiality obligations under Sec. 9.

12. Force Majeure. The obligations of either party hereto shall be suspended upon the occurrence of events not within the control of such party including, but not limited to, failure to act or disapproval by the FCC, fire, flood, war, embargo, strike, riot, the intervention of any government authority, or unforeseeable technical problems, provided that the party whose performance hereunder is affected by such event immediately notifies the other party hereto. If such event causes a party to be unable to perform its obligations for a continuous period of not less than 45 days, then the other party hereto may terminate this Agreement. If GI terminates this Agreement pursuant to this Section 12, it shall be entitled to payment of any sums then due and payable by Mattel hereunder.

13. Other Divisions. The parties recognize that their obligations hereunder may be performed by divisions of each party other than those signatory hereto, and agree that such obligations may be satisfied by such other divisions so long as notice thereof is given to the other parties hereto.

14. Integration and Modification. This Agreement includes the entire agreement of the parties hereto with respect to the subject matter hereof, supersedes all prior purchase orders, requests for quotation, acknowledgements and agreements, whether

HHC



written or oral relating thereto, and may not be modified or amended except by a writing signed by the parties hereto.

15. Notice. Notices to be given under this Agreement shall be effected by the deposit of same in a receptacle for the receipt of United States mail, addressed to the parties at their addresses set forth at the head of this Agreement, and, in the case of GI, a copy of any notice should be sent to Robert B. Shapiro, Esq., General Counsel, General Instrument Corporation, 1775 Broadway, New York, New York 10019, and in the case of Mattel, a copy of any notice is to be sent to its General Counsel at

16. Governing Law. This Agreement shall be governed and interpreted in accordance with the laws of the State of New York.

17. Assignment. The obligations and rights of the parties under this Agreement may only be assigned to other divisions of the parties hereto, but not to any third party.

IN WITNESS WHEREOF, the undersigned have executed and delivered this Agreement as of the date first above written.

GENERAL INSTRUMENT CORPORATION  
Microelectronics Division

By \_\_\_\_\_

MATTEL ELECTRONICS  
A division of Mattel, Inc.

By Raymond P. Wagner

EXHIBIT A

WORK STATEMENT

<u>Estimated Date of Task Completion</u>	<u>Task</u>
July 21, 1978	1. Design complete electrical schematic of the PCB in accordance with a specification supplied by Mattel to GI and attached hereto as Exhibit B, with a bill of materials by component type for the schematic.
Aug. 15, 1978	2.a Design and preparation of a layout for the PCB in accordance with dimensional specifications provided by Mattel and as defined in Exhibit B. 2.b Schedule materials and FCC submission via the consultant.
November 15, 1978	3.a Provide five tested prototype PCBs to Mattel. 3.b Via the consultant, submit one prototype to the FCC.
December 15, 1978	4. Design of the PCB test specifications and procedures, in accordance with Mattel requirements attached hereto as Exhibit B.

## EXHIBIT B

### I. SCOPE

This specification applies to those portions of the Mattel system for which General Instrument (GI) has design and development responsibilities as outlined in this Agreement. The portions involved are essentially contained on the three printed circuit boards. They are the logic board, the power supply board, and the cartridge board. In addition, the requirements for test procedures are specified.

### II. FUNCTIONAL CHARACTERISTICS, PCB'S

The Mattel product shall consist of three printed circuit boards.

i. **Logic Board.** This circuit shall contain the 8900 chip set, which is a standard product of GI, configured as follows:

1. 2K x 8 bits graphics ROM.
2. 512 x 8 bits graphics RAM
3. 2K x 10 bits program ROM.
4. 128 x 8 bits additional scratchpad RAM

The circuit shall also contain any components necessary to insure that the 8900 chip set functions as GI has specified in the appropriate data sheets. The system shall be considered functional if it passes the Final Test specified in Part IV, Section 2 of Exhibit B.

In addition, the audio and video shall be modulated using an ASTEC 1285-1 module.

ii. **Power Supply.** This circuit shall contain components necessary to convert the low voltage AC supplied by the Mattel specified transformer to the DC power required by the Mattel product.

iii. **Cartridge Board.** This shall consist of two AY-3-9500 Program ROMs.

### III. PHYSICAL CHARACTERISTICS, PCB'S

The physical constraints imposed on the various printed circuit boards are defined by the design of the console housing and the cartridge housing as represented by Mattel's drawings numbered 2609-2109, 2609-2149, 2609-2119, 2610-9529, which are hereby included in this specification by reference. Mattel drawings Layout (2609) and Layout P.C.B. (2609) and sketches of the cartridge and power supply boards are also available to clarify these constraints.

## EXHIBIT B

Page 3.

### 2. POWER SUPPLY BOARD

The power supply board is a single sided PC board which is mounted with the components side up. The length of the power supply board can be extended beyond that shown on the referenced drawings if the logic board is not made the maximum length. Note that enough space must be left between the two boards for controller connector access.

The power input to the power supply board comes from the transformer through a 5-pin connector (straight pin header, 0.045" square pins, 0.156" centers). One winding of the transformer provides a center-trapped 15.4 volt, rms, input to the power supply board capable of supplying 1.0 ampere average d.c. current with center-tapped rectification into a 10,000 microfarad capacitor. The other winding provides a 14.0 volt, rms, input capable of supplying 0.160 ampere average d.c. current with bridge rectification into a 1,000 microfarad capacitor. These voltages are at an input voltage of 115 volts, rms. The input voltage range for satisfactory operation is 105 to 130 volts, rms.

The power on-off switch operates on the secondary a.c. voltages. A three pole, single throw switch for this purpose is connected to the power supply board by a six-wire cable which is soldered into the power supply board. The output power from the power supply is connected to the logic board through a 5-wire cable soldered into the power supply board.

### 3. CARTRIDGE PRINTED CIRCUIT BOARD

The printed circuit board in the cartridge is a single sided board with edge fingers to mate with the bottom row of contacts in the 22 position connector on the logic board. It is designed to mount either one or two 28 pin ROMs. The circuit connections are those described in Section 5A above.

## IV. TEST PROCEDURES

Test procedures should be specified such that the following test stations may be designed:

1. Incoming material inspection - a go/no go test on the 8900 chip set supplied by GI.
2. Final test - a cartridge program that performs a go/no go test on the completed game.

EXHIBIT B  
Page 2.

1. LOGIC BOARD

The logic board contains all the 8900 system circuitry as described in Section III above except the cartridge ROM(s) and the power supply. It is a two-sided board with plated through holes, which is mounted with the components side down. The functional interfaces with this board are:

- A. Cartridge (I/O) -- 22 position edge connector, Methode part number 186-413-00, into which the cartridge PC board plugs. The logic PC board should undercut this connector by about 0.060" on the three sides other than the lead side in order to provide an effective chamber to help guide the cartridge housing around the connector and tongue of the logic board.

The 22 contacts farthest away from the logic board are used to interface the program ROMs. The signals on these contacts are DB0-DB15, 3 control lines, ground and two +5 volt lines. The +5 volt lines are the outermost lines and are used to connect power back to the logic board.

There are 11 contacts on the other side of this connector. The following signals are to be put on these contacts for future use: MCLR, 01, TCI, Interrupt In, Interrupt Out, and Sound In. In addition, it would be desirable to bring the five Branch External lines from the CPU to this connector.

- B. Controllers (Input) -- Two 9 pin connectors (right angle header 0.025" square pins on 0.100" centers). See layout P.C.B. drawings for desired location. On each connector, pin 1 is ground, pins 2-9 are 8-bit input character going to sound-I/O IC. Pin 2 is least significant bit. Controllers are 8 switches to the ground line with a maximum of 100 ohms series resistance per switch.
- C. Power (Input) -- 5 pin connector (right angle header, 0.045" square pins on 0.156 centers). See layout P.C.B. drawing for desired location. Pin designation left up to GI.
- D. Antenna Cable (Output) -- Phono socket on modulator. RF signal suitable for driving all properly operating T.V.'s through antenna cable and switch.
- E. Channel Select (Input) -- Slide switch mounted on PC board.
- F. Reset Switch (Input) -- Momentary, normally open contacts. These parts must be attached to circuitry side of P.C. board and may require special holes.



Howard L. Cohen  
Director of Purchasing

December 1, 1978

General Instrument  
600 West John Street  
Hicksville, New York 11802  
Attn: Mr. Ken Greenberg

Dear Ken,

Pursuant to our Contract, dated June 29, 1978, please incorporate the design change to Exhibit B as detailed below.

1. Move the address of the scratchpad RAM into the lowest 1K region of the memory map to reduce the program memory needed to address the scratchpad.
2. Bring the raw 8 (eight) volts d.c. on the power supply out as an output to drive the fan motor.
3. Move the cartridge ROM address to the region from 20K to 28K on the Memory Map. This change has no hardware impact except in the cartridge ROM programming.

It is my understanding that these design changes will not impact the costs detailed in the referenced contract. If you have any questions, please contact me.

Sincerely yours,

Howard L. Cohen

HLC/lac

cc: Ed Krakauer  
Jeff Rochlis  
Dave Chandler

*Dave Chandler*  
*M.S. 3161*

# MATTEL ELECTRONICS

December 4, 1978

Mr. Ken Greenberg  
General Instruments Corporation  
Microelectronics Division  
600 West John Street  
Hicksville, New York 11802

SUBJECT: Preparations for CES Back Up

Dear Ken:

This is to document our discussions relative to preparations for fallback positions in the event fully functioning systems are not available for CES.

## FIRST LEVEL FALLBACK--NO MASKED ROMS

We have been planning for sometime to have PROM boards to replace cartridge ROMS for some of the games. Because there is a likelihood that Executive ROMS will not be available in time, it is necessary to prepare for using PROMS for the Executive as well as the Game Programs. Steps we have agreed to:

1. GI will modify an existing PROM breadboard to prove out circuitry for a PROM board to handle both the Executive and Game PROMS.
2. As soon as possible GI will send to Mattel the schematic resulting from #1.
3. GI will build wire wrap boards based on TI 2716 PROMS suitable for use in the systems at CES (assuming the rest of the IC's are functional by then). Because an external power supply will be needed for this configuration, an acceptable option is to remove the power supply and transformer from the console and use that space for the wire wrap board. All power would then be supplied externally.



4. Mattel will pursue a more desirable but higher risk version of PROM board based on 2516 PROMS. Being a 5 volt PROM and having a power down feature, this version can work from the self contained power supply. The higher risk relates to delivery of parts which are on order and promised for December 8.

#### LAST DITCH APPROACH--STIC III EMULATORS

If all else fails, we will go to CES with the four existing STIC III emulators modified as described below. (The bread-board STIC II may be taken as backup, but it is of questionable quality.) GI will proceed with these modifications immediately in order to have this task out of the way as soon as possible. The modifications consist of:

1. Remove the I/O and control console boards to reduce noise and power drain.
2. Add up to 5 standard GIMINI PROM boards (4k x 16 using 5204 PROMS) to each emulator. One of these boards will contain the Executive program and each of the other boards will contain one game program. Board enable of the selected game will be accomplished (through cabling between the game console and the hidden emulator) by plugging the appropriate dummy cartridge into the console. Up to four different games can be selected from each console-emulator pair.
3. The emulator master clear circuitry and interrupt addressing will be modified and connected such that pushing the RESET button on the console will initialize whatever game is selected.
4. The power switch on the console will be cemented in the "ON" position. (It will do nothing.)
5. The controller circuits will be extended to the emulator and buffered to assure operation with the long cabling.

In support of GI, Mattel/APH will send GI one game and the Executive programs in 2708 PROMS for transfer by GI to their PROM boards. These will be used to check out the emulator modifications. At a later date the programs to be used at CES will be transmitted to GI for transfer to GIMINI PROM boards.



Mr. Ken Greenberg  
General Instruments Corporation  
December 4, 1978

Page 3

The memory map which will be mechanized into the revised emulators is as follows:

<u>FUNCTION</u>	<u>OCTAL ADDRESS</u>
STIC	0 - 77
SYSTEM RAM	1,000 - 1,777
PSG	2,000 - 2,377
SCRATCH PAD (256 x 16)	2,400 - 2,777
GROM	30,000 - 33,777
GRAM	34,000 - 37,777
EXEC PROM	40,000 - 47,777
CARTRIDGE PROM	50,000 - 57,777

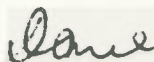
Mattel will also send GI an additional set of controllers for use in the checkout operation.

INTERMEDIATE BACKUP--EMULATE SYSTEM RAM ONLY

If, as is expected, the STIC chip is operational on a timely basis, a less drastic backup approach appears feasible. This approach will be pursued by Mattel/APH. It consists of building an emulator of just the system RAM chip. Because it consists largely of RAM, its emulation is more easily done in a reasonable amount of hardware. Because timing is particularly critical on this chip, fast RAMs and design care will be necessary but appear to be practical.

If successful, this approach would permit implementation of all 10 stations at the CES. The system logic board would be removed from the console and placed, along with the RAM emulator board and the PROM board (from the first level backup), in a compartment in the stand beneath the console. Outwardly, the system appearance and function would be the same as that with fully functional systems.

Best regards,



David Chandler, Manager  
Systems Products

DC:slm

Mr. Ken Greenberg  
General Instruments Corporation  
December 4, 1978

Page 4

cc: Richard Chang  
Howard Cohen  
Josh Denham  
Ed Krakauer  
Mal Kuhn  
Cliff Perry  
Jeff Rochlis  
Kent Wall

Dr. Ed Sack  
General Instruments Corporation  
Microelectronics Division  
600 West John Street  
Hicksville, New York 11802

Mr. Dick Norwood  
General Instruments Corporation  
Microelectronics Division  
600 West John Street  
Hicksville, New York 111802

Mr. Lewis Solomon  
General Instruments Corporation  
1775 Broadway  
New York, New York 10019

Mr. Glen Hightower  
APH Technology Consulting  
147 So. Grand Oaks  
Pasadena, California 91107



GENERAL INSTRUMENT CORPORATION  
MICROELECTRONICS  
600 WEST JOHN STREET, HICKSVILLE, N.Y. 11802  
(516) 733-3000

12/14/78  
Copies to:  
Jeff  
Frank  
Dase  
Richard  
F

December 14, 1978

Mr. E. Krakauer  
Mattel, Inc.  
5150 Rosecrans Avenue  
Hawthorne, Ca. 90250

Dear Ed:

This letter is written for the purpose of bringing to your attention concerns General Instrument has relative to the state of readiness of the Intellivision System, and putting on the record the present status from General Instrument's vantage point.

As you know, we have been keeping you updated every other day on the status of the chip development. The data control chip will need another revision; nevertheless, we expect to have completely working systems from a chip and hardware standpoint in time for showing at CES in January. We believe it is very unlikely that programs for cartridges can be converted in time for use with the finished systems. This simply reiterates conversations we have had over the last two to three weeks.

We have recommended that emulators be put in place as a backup position in the event that software cannot be finished for use in cartridges. We are now confident that the state of software preparation for the emulators casts doubt upon the likelihood of emulators being up and running in time for CES. This concern is brought about for the following reasons:

1. As recently as today a significant fault has been found in the program sent to us for check out on our in-house emulator. APH is sending a corrected program which hopefully will arrive here in time for us to get it up on the emulator over the weekend.
2. Had we received the listing of the program promised over a week ago, we would have understood the problem in the program several days earlier. This obviously leaves some doubt in my mind as to the certainty with which future programs will be forwarded, and the cumbersome communications involved in dealing through Mattel with APH.
3. We have as yet not received an executive program which is compatible with all your game programs, and conversation with APH in the last twenty-four hours indicates that they are quite a ways away from creating such an executive program.

Mattel, Inc.  
Pg. 2, Dec. 14, 1978

4. We believe the programs completed by APH use more RAM and wider words than are defined by the system. Although such programs are presently in the emulator, they will not truly represent the final game configuration.

*Is this true?*

Having now arrived at a point of virtual completion of the system, we believe that the final system is sufficiently close to the STIC II emulator that software conversion from the emulator to the final system will be a relatively minor effort if the emulator programs take into account the known and previously defined limitations of the system.



At this time we still expect with a high degree of confidence to have submitted a system to the FCC before CES. We will also prepare FCC style systems for your use at CES with one or two cartridges, which will not demonstrate the full system capability but which will demonstrate a working system.

I believe most of the above has been said to you over the phone, but I thought a written statement might eliminate any ambiguities that might exist.

Very truly yours,

*Rich*

Richard C. Norwood  
General Manager  
Consumer Business Unit

RCN/lr

- cc: J. Rochlis  
D. Chandler  
K. Greenberg  
E. Sack  
L. Solomon

December 20, 1978

TO: JEFF ROCHLIS  
FROM: ED KRAKAUER  
SUBJECT: PAL SYSTEM

In a discussion with Ken, the following tentative agreements have been reached regarding availability of the PAL system:

1. Stik chip for development for the PAL system will require two to three months, once the domestic stik chip is working.

General Instrument will have the development completed and it will be available by March 31, 1979.

2. With regard to color adaptation, needs will be met through the use of external circuitry. It will be necessary for Radofin to specify the required add-on components.

At a later date, General Instrument will modify the domestic color chip for European use. Approximately four to five months will be required; therefore, it is unlikely that a PAL color chip will be available prior to July 31st.

Development of the color chip should be regarded only as a cost savings device.

Based on the information above, it is required that Howard develop a firm schedule with Radofin for final development of the PAL system, set a date for availability of initial units, and develop a planned production schedule to a total of 50M units.

EMK/nlh

cc: General Instrument  
Ken Greenberg  
Dick Norwood

Radofin Electronics  
Larry Scott

Mattel  
Denny Bogart  
Dave Gardner  
Richard Chang  
Howard Cohen  
Jim Kingsbury  
Frank Murnane

mods to video logic board found by APH

1.  $\bar{C}NP$  on two sides of Board must be connected

2. Pin 15 on IC 10 should be connected to pin 15 IC 4.

(NOTE: there is no trace at all on IC 10 and the trace from IC 4 stops at a feed thru.)

3. Signals CBLWS & SDS are confused.

Remedy:

Cut trace leading to pin 19 IC 4

Cut trace leading to pin 4 IC 10

Jumpers pin 9 IC 4 to pin 4 IC 10

~~Jumpers~~  
Cut trace leading to pin 23 of IC 5  
(top of board under socket?)

Jumpers pin 23 of IC 5 to pin 21 of IC 4

NOTE: CBLNF & MCLR don't reach connectors!

4. Pin 7 of IC 10 not connected to pin 21 of IC 4  
as documented - needs jumper.

5. Pin 8 of IC 10 not connected to pin 22 of IC 4  
as documented - needs jumper

mounting holes for modulators too large

GENERAL INSTRUMENT CORPORATION  
INTER-OFFICE CORRESPONDENCE

September 26, 1978

FROM: K. Greenberg  
TO: ✓ D. Chandler (Mattel)  
J. Robertson (Sylvania)  
T. O'Brien (Jerrold)  
D. Harrower G.I.  
S. Maine G.I.

CC:  
(memo only)  
J. Rochlis (Mattel)  
H. Cohen (Mattel)  
D. McGuire (Sylvania)  
C. Dages (Jerrold)  
R. Norwood G.I.  
E. Sack G.I.

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The changes requested by Howard Cohen in his letter of September 20 necessitate modifications to the PCB's. The modifications are reflected in the enclosed drawings. This documentation package includes:

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>DATE</u>	<u>REV.</u>
Mattel Logic Board	39-133	9/26/78	L
Mattel Cartridge Board	39-121	9/8/78	B
Mattel Power Supply Board	39-125	9/26/78	E
Parts List	39-147	9/22/78	B
Memory Map	39-148	9/26/78	B
Cartridge Connector	39-149	9/26/78	B

  
Ken Greenberg

KG/lr  
Encl.