FRONT COVER

Mattel Electronics®

INTELLIVISION™ Intelligent Television

Keyboard Component

S E R V I C E

M A N U A L

(LEGAL COPY)

No. 1149-0380

December 22,1981

To: Dave Chandler
From: Dave Hostetler

Subj: Dear Santa, for Christmas please bring us a uP design
project complete with micro-code and writeable control
store...Thanks,   GI Design Staff...PS If it also does
graphics our management and customers will be happy too.

...A Critique of the GI Advanced Video Processor DOS

The following is a personal evaluation of the recently
received Design Objective Specification for GI's AY-3-89000
Advanced Video Processor.   I had expected this document to
be a specific and detailed solution to the specific problem
of Intellivision II graphics. Through the summer and early
fall we had a number of two day meetings with members of the
GI and APH technical staffs to discuss directions, problems
and ideas relating to this development.   I knew that we
would have differences with the document, but hoped that it
would form a base to change and improve to arrive at an
early 1982 definition to build the remaining hardware and
software around.

My expectations and hopes have not been meet. The solution
is general; GI is trying to kill several birds with one
stone.   The DOS is not detailed; the proposed IC is very
large and complicated (part of being general) and it will
take some time to fully think out and define the details.

GI has a number of fingers in the future pie. They are
working with Jerrold to develop a Home Cable Terminal that
would do videotex type applications over the two way cable
systems that are coming.   They are working with others
(Plessy I believe) to develop terminals to work with Prestel
and its variations both here and abroad. What makes it
possible to have one IC that does all this and games as
well? A uP of course!

GI has tried from the beginning to convince us that a
special, custom uP would be desirable for our project. The
idea was evaluated by Mattel and in discussions GI became
convinced of our resolve to use a standard uP. It came as a
bit of a surprise to see the DOS presenting a 24-bit uP as
the base of the graphic interface IC. To me it appears that
someone at GI is looking for a good excuse to design an
advanced uP.   It is hard to blame them; they have designed

SYM	DATE	CN	SHT	DESCRIPTION	BY	CH	APP

DESIGN OBJECTIVE SPECIFICATION

AY-3-89000

ADVANCED VIDEO PROCESSOR

SHEET														
LAST REV														

SHEET														
LAST REV														

DISTRIBUTION LIST

SUPERSEDES

SUPERSEDED BY

GENERAL INSTRUMENT | MICROELECTRONICS GROUP

PLANT

MODULE

TITLE DESIGN OBJECTIVE SPECIFICATION FOR
AY-3-89000 ADVANCED VIDEO PROCESSOR

OPERATION

	WRITTEN	APPROVED
BY		
DATE		12/3/81

SHEET 1 OF

SPEC. NO. REV

GENERAL INSTRUMENT

MICROELECTRONICS GROUP

ADVANCED VIDEO PROCESSOR

AY-3-89000

J. WALLACE ADAIR
(202) 383-7088

August 4, 1982

Confidential

Timothy P. Reames
Vice President - General Counsel
Mattel, Inc.
5150 Rosecrans Avenue
Hawthorne, California   90250

Dear Tim:

Your secretary has confirmed the reservation for me at
the Four Seasons for the nights of August 17 and 18 and I have
confirmed a meeting with Dave Newman at 1:30 p.m. on August 18.
I will be flying in on the evening of August 17.

I have reviewed each of the documents which you left with
me in detail and I am returning your copy with this letter.

As you know, the Federal Trade Commission for many years
before the recent amendments to the FTC Act, has taken the posi-
tion that restitution may be available to parties damaged as a
result of deception by a vendor. Where a vendor advertises
representations with regard to a product or a tied product, a
responsibility to the purchaser occurs. There may be certain
defences such as the financial failure of the vendor and inability
to follow through, the true value of the original is charged the
customer with no substantial increase in the purchase price being
incurred as a result of the value of the promised future product,
or the lack of any substantial profit to the vendor.

The FTC has taken the position for a number of years,
when false representations have been made to induce a customer to
buy, that the refusal to return money or property to consumers may
be an unfair trade practice. One of the questions that has arisen
in the past is whether the sale is "complete" until all commit-
ments in the offer by the vendor have been tendered to the
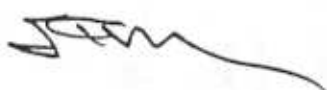purchaser.

The FTC's enforcement efforts regarding representations
as to the availability of future benefits in the last several
years has been concentrated in its land fraud cases. It brought
a number of actions, most of which have been settled against land
promoters who sold lots representing that they would make available
utilities, roads, clubhouses, etc. within a period of time after

TO: Distribution

FROM: Kent Wall

DATE: May 10, 1978

SUBJECT: Sales Meeting and CES – June 7-15

This is to outline the schedule for both the Sales Meeting and
the Consumer Electronics Show (CES) in Chicago. I have included
a list of as many of the coordinating details as can be defined
at this time. Please review the attached as it affects your
specific area of responsibility and get back to me with any
questions and/or problems.

Information on hotel accommodations, etc. will be coordinated
directly by Sylvia Meza (Ext. 1852).

SKW:slm

Distribution:

    A. Adler
    D. Bogart
    A. Carlson
    D. Chandler
    R. Chang
    H. Cohen
    J. Dickerman
    J. Kingsbury
    E. Krakauer
    M. Kuhn
    F. Murnane
    S. Platt
    H. Reekie
    J. Rochlis
    J. Rubenstein
    P. Towne
    S. Verduzco

cc: Steve Goldstein
       Jeff Heimbuck
       Gus Lizzi
       Missy Powell

C O N F I D E N T I A L

VIDEO GAME SPECIFICATIONS FOR GENERAL INSTRUMENTS

Dr. David P. Chandler

1. GENERAL *Objectives*

The objective of ~~the systems engineering task is to develop~~ *underlying* *this specification is* a programmable video game which is attractive, versatile, offers sophisticated game play and captivating visual and sound effects, and meets F.C.C. and UL requirements -- all at the minimum cost consistent with these ~~objectives~~ *Characteristics*.

2. GENERAL INSTRUMENTS RESPONSIBILITIES

The portions of this engineering task for which General Instruments is responsible are:

A. Circuit development and design, except for the controllers, which are Mattel responsibility. The circuit design is to be separated into three printed circuit boards:

   (1) Logic board
   (2) Power supply board
   (3) Cartridge board

B. Development of test procedures and equipment to perform:

   (1) 100% testing of parts delivered by General Instruments to Magnavox.
   (2) Sampled receiving inspection at Magnavox of General Instrument integrated circuits tested as sets.
   (3) 100% go-no-go testing of assembled systems for use as final inspection at Magnavox and as sampled receiving inspection by Mattel.

C. Management of preparation for and obtaining F.C.C. approval.

3. FUNCTIONAL CHARACTERISTICS

The electrical functional characteristics are most accurately defined

MEETING BETWEEN MATTEL AND INTEL

August 6, 1982

9:30 a.m. - 1:30 p.m.

C.R. 206

Attending for Mattel:

David Chandler
David Hostetler
Jaye Saha

Attending for Intel:

Alex George
Eric McLeod
Dave Mooring
John Palmer
Tom Riordan

AGENDA

9:30 a.m. - 9:45 a.m.	Introductions and Intel Overview	A. George
9:45 a.m. - 10:15 a.m.	Process Technology	E. McLeod
10:15 a.m. - 10:30 a.m.	80V1 Overview	J. Palmer
10:30 a.m. - 11:30 a.m.	80V1 Architecture	T. Riordan
11:30 a.m. - 12:00 p.m.	Open Discussion	
12:00 p.m. - 1:30 p.m.	Lunch	

INTELLIVISION

HISTORY AND PHILOSOPHY

PRELIMINARY

TARGET SPECIFICATION

INTELLIVISION' III

	WRITTEN	APPROVED		
BY				

MATTEL ELECTRONICS

NUMBER		DATE
3330-5979		18Mar82
REVISION		DATE

PRODUCT ASSURANCE SPECIFICATION

PREPARED BY	DATE
Thomas L. Randolph	18Mar82

SUBJECT	APPROVED BY	DATE
3330 Intellivoice Product Engineering Spec.		

INTELLIVOICE
VOICE SYNTHESIS MODULE

3330 - 5979

PRODUCT ENGINEERING SPECIFICATION

MTL-2533-A

EFFECTIVITY	AUTH.	LTR.	DESCRIPTION	DATE	APPROVED
		N/A	Initial Release	JUL 30 1982	

REV.																												
SHEET																												
REV. STATUS OF SHEETS	REV.																											
	SHEET	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		

MATTEL ELECTRONICS

MATTEL ELECTRONICS, a division of MATTEL, INC.

5150 ROSECRANS AVENUE, HAWTHORNE, CALIFORNIA 90250

CONTRACT NO.		
WRITTEN		6/15/82
CHECKED		
ENGR.	—	—
PROJ. ENGR. J. Randolph	7/28/82	
Q.A. J. RIVANI	7/19/82	

Specification – Speech Buffer, I.C., interface
for Voice Synthesizer

0086-0173

OTHER

IOVALS

Page 1 of 22

INTELLIPUTER STATUS

ACCOMPLISHMENTS

AREAS OF CONCENTRATION

THE PLAN

MAJOR PROBLEMS

RECOMMENDATIONS

October 3, 1979

Mr. Herbert F. Hanna
Director, Video Systems
Consumer Electronics & Appliances Group
ITT Industries International, SA
67/68 New Bond Street
London W1Y 9DF England

Dear Herbert:

We enjoyed meeting with you and hope that a working relationship
can be developed between our two companies. To confirm our
discussions, if ITT decides to market Intellivision as of
October, 1980, a decision will be required by March 1, 1980.
The six months lead time is necessary to meet chip and production
schedules.

As agreed, the following materials will be made available to help
you reach a decision:

MATERIAL	AVAILABILITY DATE - WEEK OF	RESPONSIBILITY
- 5 samples of PAL version of master component	12/3	Al Secor
- Keyboard demonstration model	12/3	Al Secor
- 5 samples of working keyboard (220 volt/50 cycles)	1/7	Al Secor
- 5 samples of available cartridges suitable for German market: Basketball, Backgammon, Armor Battle, Checkers, Math, Las Vegas Poker and Blackjack	12/3	Al Secor
- Translation of Las Vegas Poker and Blackjack cartridges to German (E PROM)	12/3	Dave Chandler

MATTEL ELECTRONICS

Intellivison Keyboard Quality

o Total in market   498 units

o Units sold Seattle market   45 units

o Total sold New Orleans   75 units

o Total sold to date   120 units

o Gross return rate   10.0%   (12 units)

   o Accessories return rate   5.00%   (6 units)

   o Software return rate   .83%   (1 units)

   o Non-Defectives   0%   (0 units)

o Keyboard return rate   4.16%   (5 units)

D. Bowen 11-23-81

MATTEL ELECTRONICS

KEYBOARD OVERVIEW FEBRUARY 8, 1982

1. Present Status

2. Cost Reduction Plan

3. Manufacturing Proposal

June 2, 1982

TO: Distribtuion

FORM: John H. Lishman   *JHL*

SUBJECT: KEYBOARD COMPONENT DRAWING LIST,
          1149-5892, Rev. "A", dated 6/01/82

Reference: 078/JHL/82

Attached is a copy of the Keyboard Component drawing list, updated as
of 6/01/82.

JHL/jk

Distribution - w/attachment

Ricardo Bailey	John Fairbanks	Diana Reichman
Bob Baird	Anita Hollensed	Dick Shaffer
Hugh Barnes	Frank Levine	Ward Spaniol
B. Bornina	Wilson Quan	Floyd Teter
Dave Danner	Mac McAlister	Ed Yee

REDUCED COST KEYBOARD

1. Plan

2. Goal

3. Planned Savings

4. Schedule

5. Requirements to meet Goal

Keyboard component address space:

$0000-$3FFF   Low 8 bits of dual port ram. Used for stack and zpage.

$4000-$41FF   Internal I/O space

$4000-$4007   Read only status bits (read in bit 7)
$4000   Data from Cassette
$4001   Watermark
$4002   End of Tape
$4003   Cassette Present
$4004   Cassette Record Gap
$4005   Dropout
$4006   Clock Interrupt
$4007   Tape Interrupt

$4020-$4027   Write only control bits to bit 0 (read will destroy bits)
$4040-$4047   All of these bits are set to zero by system reset.

$4020   Enable
$4021   Forward
$4022   Fast
$4023   Record 1
$4024   Mute 2   > Tape control bits
$4025   Mute 2
$4026   Mode
$4027   Erase

$4040   Data to Tape
$4041   Tape interrupt enable
$4042   External interrupt enable
$4043   Keyboard interrupt enable
$4044   Blank screen
$4045   Keyboard address bit 0
$4046   ::   1
$4047   ::   2
        ::   3

$4060   Read Keyboard (read only). The keyboard is read by setting up the address of the desired row in the address bits defined above, and then reading this location will provide the state of the 8 keys in that row. A zero read implies a depressed key.

$4080   Clear tape interrupt, any access to this location will clear the present tape interrupt.

$40A0   Clear clock interrupt, any access to this location will clear the present Clock interrupt

$40C0-$40CF   CRT controller chip.
$40C0   Control register 0, write only, gets $38
$40C1   Control register 1, write only, gets $23
$40C2   Control register 2, write only, gets $4A' ($53A)
$40C3   Control register 3, write only, gets $93' ($97)
$40C4   Control register 4, write only, gets $03
$40C5   Control register 5, write only, initially gets $3D' ($13, ($17?)
$40C6   Control register 6, write only, and defines the row
$40C7   Last Data register, write only, this is the scroll line, the last line of characters on the screen.
$40C8   Don't touch, address register, read only
$40C9   Cursor row address, read only
$40CA   Reset the timing chain

Description of the tape format for the Intellivision keyboard component

PHYSICAL TAPE FORMAT:

```
<tape>          ==> [<record>]
<record>        ==> <irg> <phase lock> <sync pattern> [<chunk>]
<irg>           ==> 1/3 inch of no data
<phase lock>    ==> 600 bits of $00
<sync pattern>  ==> $007E000 or $00BD00000000B0000000E7
<chunk>         ==> <sync><bits14><sync><bits13> ... <sync><bits0>
<sync>          ==> %11101
<bits0>         ==> bit zero of 32 consecutive correction words"
```

WHERE:

[...]   one or more of
$ hex
%   binary

EXPLANATION: A record is defined as an irg followed by data. In order to give the first data phase locked loop a chance to lock on to the incoming signal, the first data record is 600 zeros. Then, to ensure that the record drive is properly identified, the likely to occur +1 or random sync pattern which valid data. The +1 to occur +1 or a sync bit pattern can occur in either $007E, the $00BD00000000B0000000E7 in the sync pattern. Thus, given a 10ms (30 bit) dropout it can be detected as an index or first identify encoded so that the bit values are corrected using the index or word destroy by interleaving the first using the values are supposed. These 15 bit values the declaration schemes suppose because anywhere on the tape would be able to recover the data can destroy three words of data. Instead words since a 10ms dropout would be able to not written the first 32 words to 32 words are written at the high. So that 30 words to first to be data. A 10ms dropout, which is a group to recover the be lost from which the bit scheme is able to recover the original data. The worst algorithm is able to recover the

A bad 10ms dropout, however, is likely to destroy the loose or misinterpreted cycle which would cause a sync to cause the PLL to restore the data on the tape. Even there would still such a sync to 32 words between each group of 32 words, there words set would still cause the tape is preceded to avoid words, which would be 32 bits on the pattern of bits. This problem, each set can be uniquely determined preceded and only 64 bits can be the first set always, which can determine the patterns. lost even by a dropout, determined, and only 64 bits. Due to a recovery one precedes patterns. to this scheme uniquely one recovery, data can only be written on the tape in groups of overse error up on the Such a group tape as a decl.tes written chunk on the One chunk gets 32 bits of written data as a chunk: 15 sets in the tape. Due to this sync declares data is an image data written by 32 bits followed one bit from each word in the of (bits/sync pattern. chunk). the bits/sync pattern is 5 bits long.

March 25, 1980

TO: Ed Krakauer

FROM: Dave Chandler

SUBJECT: THOUGHTS ABOUT MACRO COSMOS' MICROTERMINAL

GENERAL THOUGHTS: My sensing is that:

1) home data communications is going to happen in a large
way. It is the next major revolution to affect the
American way of life.

2) contrary to some thinking, I believe it will happen
relatively quickly. I expect it to be widespread within
two to three years - maybe sooner.

3) because it is home centered and involves entertainment,
self-improvement, and the whole family, Mattel Electronics
should play a major role. The question is what role, and
what process to get there?

THE MICROTERMINAL: The MicroTerminal concept, as presented to us by Macro Cosmos,
offers two particular advantages. One is its portability; the other is the fact
that they provide a headstart on a standard system protocol. The standard system
protocol could be the basis for getting some standardization in this field, and in
that light could be extremely important. It could be used more widely than for just
the MicroTerminal. For instance, our Keyboard Component could become a terminal in
the same system and utilize the same protocol for accessing the data bases which
MicroTerminal is oriented toward. The portability of the MicroTerminal is gained at
the expense of some features which might be limiting in the in-home application.
Here again, the MicroTerminal could be one terminal in the system with something like
our Intellivision being another optional terminal. Intellivision would provide the
capability for full picture graphics as well as full page alphanumerics, whereas the
MicroTerminal would provide the ability to communicate in alphanumeric format only,
but in a portable fashion.

Unlike Viewdata, the MicroTerminal and its operating system is designed to
operate from the more common communication format that exists today in the United

Mattel MEMO

DATE: June 9, 1982

TO: Dave Chandler

FROM: Ronald M. Goldman

SUBJECT: Magnavox v. Mattel

You have been advised that the trial in which you are being called upon as an expert witnexx and fact witness will commence June 21 and may continue for 3-1/2 weeks, which, as you have noted, covers your long planned vacation.

Mattel will reimburse you for any deposits you may loose should you choose to cancel, or pay for the additional cost of travel, etc. should you choose to return on vacation on those days in which trial is not held. We will also reimburse your costs applicable to that portion of your vacation which you were not there present vacationing. Obviously, you will be entitled to retain any unused vacation time. We regret the inconvenience and appreciate your efforts and hope that you have an understanding spouse.

Regards,

RMG:ce

cc: Josh Denham
    Stav Prodromou
    Tim Reames

RECEIVED
JUN 10 1982
D. CHANDL

#224

September 3, 1982

TO: DISTRIBUTION

FROM: CHUCK RUDD *CvR*

SUBJECT: MASTER COMPONENT MEMORY MAP

Attached is the memory map as we discussed
on 8-25-82. If you have any corrections,
please return them to me by 9-10-82.

Please keep this information extremely
confidential, and limit its distribution
to those who have a need to know.

Distribution

Hugh Barnes
~~Dave Chandler~~
Jan Chodak
Bob DeCaro
Greg Goodnight
Glen Hightower (APH)
Wilson Quan
Ward Spaniol
Richard Tuthill

September 27, 1981

To: Dave Chandler
      Chuck Rudd

From: Dave Hostetler

Subj: IN SEARCH OF...A $25 MODEM

In keeping with my obsession that every ounce of
hardware be flogged to its limits, the following
proposal is presented. In a conventional modem we might
have a device that interfaces to the present Keyboard
Component bus, taking in and returning parallel data to
the bus.   It would handle the parallel-serial
conversion, modulation, demodulation, hybrid, line
coupling, ring detection and dialing.   In a simple
terminal application, the 1610 would put up a colored
background and doze-off; the 6502 would have a slightly
heavier load, having to occasionally deliver a character
from the keyboard to the modem or from the modem to the
screen. Tough work, really keeps them sweating!

Having decided that the processors are not very busy,
what can they do to reduce the modem hardware? Taking
the serial/parallel conversation is obvious.   Not so
obvious is using the sound generator in the Master
Component to generate the transmit tones (and Touch-Tone
when applicable) and using the 6502 to decide if the
mark or space frequency is currently being received. On
the transmit side the output level must be regulated to
keep the phone company and FCC happy; a little feedback
to the amplitude control section of the sound chip
handles this nicely.   Ring detect and dial tone detect
may well be combined to the same hardware with a little
software help.

The accompanying diagram is a very rough outline of a
circuit that should accomplish the above.   With the
exception of the switchable bandpass filter(which is
needed in any case), is very much simpler than anything
previously proposed. Maybe not $25, but close.

MATTEL ELECTRONICS

March 9, 1982

Mr. Gary Johnson
Vice President and General Manager
MOS Integrated Circuits Group
Motorola, Inc.
3501 Ed Blestein Blvd.
Austin, Texas   78721

Dear Gary:

I want to thank you for the opportunity to meet with your key marketing and technical people in Austin yesterday and for the courtesy extended to us by Motorola during our visit to your Austin facility.

Because you were unable to meet with us due to your prior commitments (and, believe me, I fully understand, having been in the same position many times), I wanted to take a moment to summarize our reactions to the discussions and also to pass on some of our concerns to you that I did not necessarily wish to vocalize before the "troops".

Gary, it is the mutually held belief of Mattel and Motorola that there is a tremendous potential for a long range relationship between our companies that can mean several hundred million dollars of revenues for Motorola during the '80s. I believe that as a result of what we learned in Austin, there is a grave risk that all of that potential may not materialize if Motorola does not "belly up to the bar" relative to Mattel's needs. Allow me to elaborate on the reasons for my concerns.

First, let me summarize our position relative to the development of the key devices in our second generation product. We believe that the interface between the microprocessor and the MAGIC video chip is so intimate as to make it essential that the microprocessor supplier design the MAGIC chip; or at a minimum, to take the responsibility for its design in a "systems integrator" role. Also, we wish the MAGIC chip design to be proprietary to and exclusively produced for Mattel. Finally, we wish to have control of the MAGIC chip tooling so that we can establish second (and if required, more) sources of supply.

I believe none of the facts in the above paragraph are news to you, in that they have been discussed at many previous Mattel/Motorola meetings.

Second, let me summarize some of the key events and communications of the past week that set a background for the Austin meeting. Late last Monday night, March 1, Tom Gunter called Dave Chandler at home to indicate that Motorola had selected the Project Leader for the MAGIC chip design -- an individual intimately familiar with the 68000, who had just led a

Interstate 40 and Straw Plains Pike P.O. Box 6950, Knoxville, TN 37914 Tel. (615) 521-4316

March 25, 1983

Dr. David P. Chandler,
Chief Scientist and Vice President
Strategic Development
Mattel Electronics
5150 Rosecrans Avenue
Hawthorne, CA. 90250

Dear Dr. Chandler:

Please consider the attached copies of information which we discussed
at our meeting March 9, 1983, as confidential within the terms of our
agreement. The subject matter covers system architecture and inter-
faces of Odyssey 4 and proprietary information regarding Motorola's
RMS (Raster Memory System).

As we mentioned to you during the meeting, we had obtained from
Motorola their permission to discuss some of the parameters of the
RMS with you on the condition that it would not be disseminated
further.

Thank you for your hospitality during our visit. I look forward to
our next meeting.

Regards,

N.A.P. CONSUMER ELECTRONICS CORP.

E. Lubchenko,
Vice President
New Products & Systems Engineering

RECEIVED
APR 4 1983
D. Chandler

/he

Attachment

cc: E. Goldstein - NAPC

October 26, 1983

TO: Deanna Xavier

FROM: Dave Chandler

SUBJECT: University of Oklahoma Research Program

Charlene Margaritas suggested that I send the enclosed letter directly
to you. I will also send copies of previous communications with University
of Oklahoma which will provide much more background on the program.
We have sent them 18 Intellivision Master Components for use in their
program and a number of cartridges from which they will select those
which they believe will be useful in their program. It is expected
that we will then supply them with enough of the cartridges they select
for them to use in their program.

As implied by Dr. Wolfson's most recent letter, when he and Mike Bressler
were out here on October 6th, we indicated that Mattel Electronics would
not likely be in a position to supply any financial support to their
program even though their program looks like it should be valuable and
of interest to us.

If you have additional questions about this feel free to contact me
or Charlene.

cc: Charlene Margaritas

October 19, 1981

To: Dave Chandler
From: Dave Hostetler
Subj: The Telephone Connection

Interfacing Intellivision to the phone line has applications
in data communication, electronic mail, security and home
PBX.

Data communication includes data base access, banking, and
videotex.   These features require a 300 baud modem with auto
dial and, for videotex, 1200/75 baud capability. Pulse
dialing is required and DTMF (push button) dialing is a
desirable option.

Electronic mail adds auto answer to the above requirements.
As an option, 1200 baud transmit would greatly enhance this
application.

Security would use the phone to report alarms and allow the
control of lights and appliances remotely.   These
applications would use auto dial, auto answer, voice
synthesis (if available), and DTMF receive. Voice synthesis
could announce the alarm condition to the phone line and
DTMF receive would allow acknowledgement of alarms and
remote control of lights, etc.   Voice recognition could
replace DTMF in most cases.

The home PBX feature would allow speed dialing, dial
intercom, phone answering, and speakerphone applications.
The speed dialing and dial intercom would be simular to
existing office electronic phone systems. Phone answering
would use speech synthesis to announce and a the cassette to
record calls.   The intercom function should be a part of
Intellinet and, assuming a full duplex audio link, a
speakerphone function would be simple to support--including
telephone through the TV a la Zenith.

In summary the phone connection should have:
    300 baud full duplex modem
    1200/75 baud receive/transmit modem
    Auto dial
    Auto answer
    DTMF receive and transmit
    1200 baud transmit
    Link to voice synthesis/recognition
    Link to Intellinet
    Link to cassette play/record

MATTEL ELECTRONICS

January 17, 1980

Philips Engineering
% Mr. Ken Scott
Radofin Electronics

Dear Sir:

Enclosed are documents that specify the requirements of a PAL color circuit for the Mattel Electronics Intellivision Master Component. It is my understanding that Mr. Scott has already discussed the possibility of Philips developing a color circuit to meet these requirements. If the enclosed information is not sufficient please call me or send a telex indicating the type of information you need. My phone and telex numbers are below.

Sincerely,

Brian P Dougherty

Brian Dougherty
Design Engineer
Ext. 1262

BD/lw

enclosures

RAINDROP

MATTEL ELECTRONICS
NEW VENTURE ACTIVITY

TRANS-STRATEGIC INVESTIGATION

PRESENTATION BOOKLET

Prepared For:

MATTEL ELECTRONICS

NOVEMBER, 1982

lookout

September 21, 1979

TO: RICHARD HOAG & JEFF ROCHLIS

FROM: ED KRAKAUER   *Ed*

SUBJECT: SEARS

I had a telephone conversation with Jerry Coll of Sears this week regarding the testing of Intellivision. Jerry had not yet received the complete results. However, he indicated that Mattel performed reasonably well in the tests.

I have arranged to make a complete Intellivision presentation to Jerry and the others involved in the decision making process (Bob Ingold, Ken Eldridge and Bob Jandeska) at 9:00 am on October 30th at Sears.

They are interested specifically, that the presentation address the technical aspects of the system; the availability of the master component, keyboard and other peripheral hardware developments; the complete range of software planned and the scheduled availability of each cartridge and cassette. The entire morning has been set aside. It will be necessary for whatever equipment is needed to be set up the previous evening.

By copy of this memo I would ask that Richard Hoag contact Jerry Coll on his return from Japan in three weeks to make the necessary logistical arrangements.

If you have any questions, let me know.

EK:jj

cc: Dave Chandler
      Al Secor
      Ray Wagner

August 23, 1982

TO: Dave Chandler

FROM: Jerry Comisar
         Jason Soo

SUBJECT: USE OF AN ID ROM TO PROTECT DECADE DISKETTES

In designing a disk operating system (DOS) for the Decade expansion module,
we have an opportunity to enhance the security of the system against
software piracy. The idea is to write a secret number in nonvolatile
memory within each expansion module. A newly purchased diskette would
come with a "Zero" serial number buried in each record header. The
DOS would look for the diskette serial number.   If it were "Zero"
the unique serial number for that machine would be written into
each record header; if it were neither "Zero" nor its own serial
number the diskette would be erased. Thereafter the DOS would always
look for the proper serial number. Thus the user could make
as many backup diskettes as he needed, but they could only be used
on his machine.

The idea of an ID ROM has been proposed before as a security measure.*
In our case, we can build the protection right into the basic
system architecture. In particular we suggest:

1) DOS read-write logic be put in ROM to avoid re-booting.

2) DOS utilities be performed only in the supervisor mode, while game
   software only be executed in user mode. Hence the user is
   shut out of the operating system.

3) All supervisor calls be vectored out of a hardware protected
   RAM page. This can be accomplished by nand-ing together the
   address lines A8-A19, the address strobe AS, and the CPU
   supervisor pin FC2, via the decoding logic inside the expansion
   box, to generate a BERR exception. This denies the user the
   ability to re-write any system vectors.

*See Chris Morgan, "How Can We Stop Software Piracy," BYTE, May 1981,
 Page 6.

D. Chandler

SONY CORPORATION

Revised Outline of Proposed Business Arrangement

Dated January 18, 1983

Resulting from separate discussions with Josh Denham and Dr.
Chandler on January 17 and 18, 1983, set forth below is an
outline of a revised proposal to be discussed with Stav Prodromou
and ultimately presented to Sony as somewhat of a "final"
position by Mattel Electronics.

NOTE: References herein to "M.E. Proposal" paragraph
numbers correspond to the items set forth in our last written
proposal to Sony, dated December 16, 1982, a copy of which is
attached hereto. Also NOTE, that references to comments
contained in the "Sony Proposal", refer to specific points raised
in their communication to us dated December 29, 1982.

PROPOSAL:

I.   Hardware - Intellivision II ("I2")
     To remain the same as set forth in Paragraphs A, B and C of
     the M.E. Proposal.

-1-

March 5, 1980

SUBJECT: Intellivision Peripherals

BY: Dave Chandler

40-COLUMN PRINTER

The peripheral that is planned for the Intellivision system is a low cost
40-column printer. It is intended to be used for the purpose of documenting
either the information that is on the screen from any programs being used
on the Keyboard Component or it can be used to print out information which
is stored internally in the system.

It will also have the capability of printing out graphics pictures in that
it will be a DOT matrix printer and, therefore, can print out any picture
which has been created on the screen. It will, of course, be black and white
only so any color content from the screen would be lost.

It is expected that this printer will be in the price range of $100 A for the
US market and will be a 1981 product.

The print mechanism will be purchased from a supplier - probably Olivetti.
The rest of the system either we will engineer and assemble or get a sub-
contractor to assemble or, depending on how negotiations turn out, we might
well have the supplier of the mechanism also build the custom designed unit
for us. It will have to be a custom unit to some extent in that it will need
the logic and circuitry to interface with the expansion terminal for the
Intellivision system. The housing designed for the system will be done by
Mattel in order to have it match aesthetically the Intellivision system and
obviously be a part of the component system.

PHONE MODEM

One of the very important peripherals for Intellivision is the phone modem.
This will provide the interface between Intellivision and the telephone line
which in turn provides access to such things as central computer systems,
viewdata, central data bank, electronic banking, electronic purchasing, etc.
It is envisioned that the modem for Intellivision will be of a configuration
to tie directly to the telephone line and will not include an accoustic coupler.
This will permit the system not only to be simpler and more reliable but at
a lower cost. It is envisioned that the normal interconnection will be to the
new modular type telephone systems within the United States which will permit
unplugging a cable to a modular telephone and plugging it in to the modem and
in turn plugging the cable from the modem into the telephone set. This would
permit the telephone to be used on line for applications in which that was
desirable and also provides a very simple means of coupling the modem to the
telephone system. This would result in a very small unit which plugs into the
expansion port of Intellivision and will contain a socket into which the modular
telephone cable plugs and will have a telephone type cable extending from it
which can plug into the telephone receiver. The box will be something on the
order of 4 inches x 4 inches x 2 inches thick and will have a minimum of
controls built into it (probably one or two push buttons for activation or
turning the power ON and OFF).

ADP

ADP-MATTEL HOME BANKING PRODUCT COMPONENTS

A. VIDEOTEX PERIPHERAL

    -   PLUG INTO ROM-CARTRIDGE SLOT OF MASTER UNIT
    -   300 BAUD INTEGRAL TO VIDEOTEX PERIPHERAL
    -   AUTODIAL FROM KEYBOARD

B. MASTER UNIT (INTELLIVISION II)

    -   HOME BANKING AND COMMUNICATIONS SOFTWARE IN REMOVABLE ROM PACK

    -   VIDEOTEX AND KEYBOARD PERIPHERALS REQUIRED FOR BANKING

    -   ALTERNATIVE BANKING SERVICE WITH CONTROLLER

C. SYSTEM PACKAGING

    -   1 POWER PLUG
    -   1 TELEPHONE JACK
    -   1 WIRE TO TV
    -   ATTRACTIVE STYLING

D. KEYBOARD CHARACTERISTICS

    -   FULL ALPHANUMERIC SET IN STANDARD LAYOUT

    -   RAISED KEYCAPS FOR POSITIVE TOUCH

    -   CONVENIENT TO USE CURSOR CONTROL KEYS

    -   PROGRAMMABLE FUNCTION KEYS, PREDESIGNATED KEYS FOR SPECIAL
        OPERATIONS (AUTODIAL, HELP, ETC.)

E. DISPLAY CHARACTERISTICS

    -   40 CHARACTER WIDTH
    -   20 ROWS MINIMUM
    -   ADDRESSABLE CURSOR
    -   CHARACTER BACKGROUND/FOREGROUND COLOR SELECTABLE
    -   HOME TV DISPLAY
    -   SPECIAL GRAPHICS

April 25, 1983
Dave Chandler

VIDEOTEX PERIPHERAL SPECIFICATION

Description:

A peripheral unit designed to plug into the cartridge port of
Intellivision I or II or Lucky with a new cartridge port. All
normal cartridges should play through the unit with no effect
from the unit. Videotex application cartridges plug into
the unit making it adaptable to specific applications such
as home banking and software downloading.

Contains:

Modem - Programmable 300 Baud full duplex; 1200 Baud receive,
        75,150, or 300 send for US or European standards.
        WITH AUTO DIAL AND AUSWER

Hi Resolution Alphanumeric Display - 40 characters/line, 24 lines

Serial Interface for Keyboard

    4 Wire modular telephone jack (power, ground, signal, line
    reserved for future use).

    Suitable for:

        Cable connected keyboard
        RF receiver plug in unit for wireless keyboard

2K bytes static RAM with battery back-up and low battery indication
on tv screen.

PC board and interface for 16K (32K?) decles dynamic RAM

Provision for an on board ROM may be needed

Perhaps an interface for high volume data storage

Physical design must be functionally compatible with Intellivision I
and II and Lucky.

Esthetically the design should be as acceptable as possible with both
Intellivision I and II.

In addition to provision for connecting a keyboard, the software

    should provide a "soft keyboard" option permitting limited
    alphabetic character entry using the hand controlelr.

To: Mattel File

From: Stuart Krasney

Subject: MEETING HELD SEPTEMBER 10, 1982

Date: September 15, 1982

Copy to: SEE DISTRIBUTION

A meeting was held at Mattel Electronics on Friday, September 10, 1982. Attendees were:

EECO

Stuart Krasney, Director, Marketing Development
Bob Pargee, Division Fellow
Bill Neely, Manager, Engineering

Mattel Electronics

David Chandler, Chief Scientist, Vice President-Strategic Development
Hugh Barnes, Vice President, Engineering
Lee Ferguson, Design Engineer
Richard Schaffer, Director, Program Management

Objective: Define engineering and technical requirements and related staffing needs for Pictureware joint venture. The assumption was made that all schedules were related to a 10/1/82 joint venture start date. The meeting started with a review of the EECO schedules with the objectives of:

1. Identifying major milestones
2. Coordinating the intensive 6-month plan with the long range objectives

Key milestones identified were:

1. Written specification for the decoder by January 15, 1983 accompanied by a final design review.

2. Consumer market test plan by April 15, 1983.

PICTUREWARE DECODER/AUDIO COMPRESSION UNIT-4Q82

Assignment of the work to be done was divided between Mattel, EECO and Joint Venture. Staffing requirements were discussed as they relate to the Joint Venture and EECO's support was identified.

MATTEL ELECTRONICS
ENGINEERING DECISION MEMO: MTL-991-F

INSTRUCTIONS:
1. PRINT OR TYPE ONLY. PRINT TO BE AT LEAST 5/32".
2. USE ONE EDM NUMBER PER EACH DRAWING REVISED.

EDM NUMBER	NEW DRAWING LETTER
1149-269	5

TOY NAME: KEYBOARD COMPONENT
FINAL PACKOUT POINT (PLANT): DOMESTIC

PART/ASSEMBLY NAME: SEE BELOW
PART/ASSEMBLY NUMBER: SEE BELOW

EXISTING DWG LTR: R

REASON FOR EDM: (SPECIFY ONE OR MORE)

DESIGN IMPROVEMENT

- ☐ TRANS TEST IMPROVEMENT
- ☐ ERROR/OMISSION
- ☐ PARTS LIST RELEASE/REVISION
- ☐ NEW PART – ADD TO FINAL RELEASE
- ☐ NEW PART – ORIGINAL FINAL RELEASE
- ☐ INFORMATION ONLY
- ☐ RELEASE LEGAL INFORMATION
- ☐ OTHER: (BE SPECIFIC)

- ☒ FUNCTION
- ☐ APPEARANCE
- ☐ DURABILITY
- ☐ PIP
- ☐ MANUFACTURING
- ☐ MATERIAL/SAMPLING

ACTION TO BE TAKEN:

RELEASE FOR PRODUCTION

1149-9991 KEYBOARD COMPONENT SYSTEM
LEVEL PARTS LIST

1) UPDATED DRAWING REV LETTERS
2) ADDS COMPUTER III TO SYSTEM

FOR COMPUTER III DETAIL REFERENCE
1149-9809 PARTS LIST

COMMENTS:

FOR FUTURE PROCUREMENT
1149-9809 REPLACES
1149-9809 REV F
DOCUMENT CONTROL
REV R PARTS LIST IS
STILL ACTIVE, DO NOT
DESTROY!

SPECIAL DISTRIBUTION

DEPT.	NAME	M.S.	PLT.	COPIES
ELEC	BOB COWELL	126	1	1
ELEC	ALAN NASH	126	1	1
ELEC	JOHN LISHMAN	126	1	1
ELEC	CHUCK RUDD	126	1	1
ELEC	DAVE CHANDLER	124	1	1
ELEC	C. McALLISTER	126	1	1
ELEC	RICARDO BAILEY	126	1	1
ELEC	PACHITO MARKETING	126	1	1

HARD COST IMPACT:
- ☐ INCREASE ☐ NO EFFECT
- ☐ DECREASE

ESTIMATED AMT $

(SPECIFY ONE OR MORE)
- ☒ DRAWING RELEASED/REVISED
- ☒ MARKED PRINT REVISED
- ☐ UP-DATE PART (TOOL) TO PRINT
- ☐ UP-DATE PRINT TO PART (TOOL)
- ☐ UP-DATE/RELEASE PARTS LIST
- ☐ UP-DATE/RELEASE FLOW CHART
- ☐ PURCHASE PARTS
- ☐ NO ACTION REQUIRED-FOLLOW-UP COMPLETED
- ☐ OTHER (BE SPECIFIC)

DISPOSITION OF MATERIAL:
STOPS MATERIAL RELEASE ☐ YES ☐ NO

- ☐ NO EFFECT ESTIMATED COST $

COMMENTS:
1149-9809 REV F PARTS MAKE OK

TOOL COST:
COMPLETED BY TOOL ENGINEER
ESTIMATED COST $
ESTIMATED BY:

FOR ENGINEERING DOCUMENTATION ONLY

	CHARGE TO BUDGET	OR PURCHASING AGENT.	☐ NO EFFECT
	ECO ☐	ECO ☐	S & A ☐
	TCO ☐	TCO ☐	

INITIATOR/DATE	PROJECT ENGR/DATE	PROJECT MANAGER/DATE	DATE REC'D	DATE ISSUED	CODE
JOHN H LISHMAN	JHL 6/17/81	Charles Wheeler 6/19/81	JUN 25 1981	JUN 25 1981	1

June 21, 1982

Memo To: Distribution

From: Karen Meyers

Subject: Contract with General Instrument for Master Component
             Game Sets and Cartridge ROMS

In Reply Refer to: KLM-1664

At long last the General Instrument 1981/1982 contract has been
signed. Attached is a copy for your file. There are some
additional copies available in my department, however, we had to
send the contract out to be printed because of the thickness, so
please do not lose your copies. In addition to the contract as
originally signed, there is also a revised Exhibit C.

Please remember that the information contained in this contract is
considered "CONFIDENTIAL" and must not be given to anyone outside of
Mattel or left out where it could be available for visitors to see.

Distribution:

S. Prodromou
T. Scott
R. Rambeau
H. Barnes
D. Chandler
J. Fairbanks
H. Cohen
C. Lewis
J. Parker (MEL)
P. Lyons (MEL)
J. Bray (MEL)
J. Ballotti
D. Roberts
C. Akop
J. Tannikawa
S. Harris
J. Wilson

AGREEMENT OF SALE AND PURCHASE

AGREEMENT made as of the 1st day of November, 1981, by and
between GENERAL INSTRUMENT CORPORATION, Microelectronics Divi-
sion, a Delaware corporation, with a place of business at 600
West John Street, Hicksville, New York ("Seller") and MATTEL,
INC., Mattel Electronics Division, a Delaware corporation, with a
place of business at 5150 Rosecrans Avenue, Hawthorne, California
("Buyer").

W I T N E S S E T H :

WHEREAS, Seller desires to manufacture and sell certain mic-
roelectronic equipment (the "Products") to Buyer and Buyer de-
sires to purchase the Products from Seller;

WHEREAS, Seller and Buyer desire to establish the terms and
conditions of sale and purchase for the Products;

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

1. Formation of Contract.

Any term or condition of (a) Buyer's purchase order; (b) re-
leases pertaining thereto; (c) Seller's order acknowledgment; or
(d) any communication between Buyer and Seller which is in any
way inconsistent with the terms and conditions set forth herein
shall be deemed to be null and void and shall not be binding on
either party hereto, unless agreed to in writing in accordance
with the provisions of Paragraph 27.

MATTEL VIDEO GAME SYSTEM
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	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	¼ W Resistor	
R2	27 Ω	¼ W Resistor	
R3, R6, R15	TBD	¼ W Resistor	
R19, R20, R21	TBD	¼ W Resistor	
R22, R26, R27	TBD	¼ W Resistor	
R4	330 Ω	¼ W Resistor	
R7, R8	3.3K	¼ W Resistor	
R9	560 Ω	¼ W Resistor	
R10	10K		
R11	100 Ω		
R13, R14, R23	10 Ω		
R16	470 Ω		
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 µF	Cap.	
C25	100 pf	Cap.	
C26, C3	1 µf	Cap.	
C27, C28, C29, C30	10 uf	Tant. Cap.	
S1	SPST	Switch	
S2	SPDT	Switch	
P1		Connector	
P2		Connector	
P3		Connector	
P4		Connector	
J1		Connector	
J2		Connector	
J3		Connector	

PRODUCT SPECIFICATION

MATTEL

T-090473-1C

PRODUCTS INCLUDED	"A" PRICE	RTNS RATE
#2609 VIDEO GAME	N/A	N/A

MANUFACTURING SOURCE N/A

REASON FOR REVISION

PRODUCT DESCRIPTION

In-home video game system which attaches to antenna hook-up of consumer's television set, utilizing the TV screen for display. System includes console deck; two hand-held control units; antenna switch and cable; and a football game cartridge. (Different game cartridges may also be purchased for use with the system).

By pressing control unit selector buttons, operator can pre-program plays into the system. During the course of a particular play, operator presses one of four action keys to excute the pre-programmed functions. Control unit also has a directional control disc.

Game cassettes plug into the side of the console deck. A channel selector (channel 3 or 4) switch is located on the bottom of the deck; power and reset switches on the top face. Deck has provision for storing the control units and power cord.

Antenna switch has selection switch for television or game modes.

SPECIAL NOTE:

ISSUE	DATE	WRITTEN BY	PROD. ENGRG	PROD. PLNG	MFG.	REL'Y
FINAL RELEASE		C. IRVING			////////	

TO: DIANE KISSELL

FROM: MARIE BUTLER-KNIGHT (X. 1948)

RE: REVISED EDITION OF <u>THE KEYBOARD COMPONENT OWNER'S BOOK</u>   (#1149)

DATE: AUGUST 7, 1980

<u>FRONT</u>

<u>Mattel Electronics</u>®

INTELLIVISION™

Intelligent Television

K E Y B O A R D   C O M P O N E N T

O W N E R ' S   B O O K

No. 1149-

December 11, 1978

TO: HOWARD COHEN

FROM: DAVE P. CHANDLER

SUBJECT: REVISIONS TO PLAN FOR FABRICATION OF FIRST 50 INTELLIVISION MASTER
            COMPONENTS

Because of the time pressure in preparation for CES, GI plans to build 5 systems
to satisfy FCC requirements and then build 10 more systems for CES. This is a
change from the 10 total that GI was going to build. In addition, we plan to
have Sylvania assemble logic boards and power supply boards for 10 systems as
quickly as possible and ship them to us for checkout and assembly into 10 more systems
for CES. We will also want parts for 2 more systems from Sylvania for use by APH
in building the first system using a RAM - emulator board. Sylvania would then
build the remaining 23 systems with help from GI on checkout of the boards and
systems.

This has been discussed with Sylvania. They are preparing to send 5 more sets
of parts to GI. They will also give us a schedule for fabrication of the 10
sets of boards for us. If we proceed on this plan, which I am assuming we will,
Sylvania will want documentation from you to this effect. The net cost result
should be downward as far as Sylvania is concerned because they will build
fewer systems. There may be some added expense associated with rushing the 10
sets of boards through. GI probably will invoice us for the additional cost of
building more systems.

GI will use the 10 CES systems they build for preparing the first back-up approach,
namely fully working chip systems with PROMS for Executive and Game Programs.
We (with APH) will use the 10 systems we check-out and assemble in preparing the
intermediate backup approach using an emulation board for the System RAM. If
either of these approaches is used at CES, all 20 systems will be available.
This will provide 10 spares of the basic systems.

cc: Denny Bogart
       Jeff Rochlis
       Ed Krakauer
       Clif Perry
       Chi Wang
       Frank Murname

DPC:mu

GTE SYLVANIA
INCORPORATED

Electronic Components Group
Circuit Module Operation
P.O. Box 360
Muncy, Penna. 17756
717 546-3191

SUB./DATE: MATTEL/SYLVANIA MEETING 11/1/78   November 1, 1978
REVIEW OF OUTSTANDING TECHNICAL MATTERS

TO: Attendees:

Mattel	Sylvania (CMO)	
Dave Chandler	Rusk Smith	Tom Gouldy
Cliff Perry	Joe Hunt	Bob Asplund
	Howard Sprankle	Granny Derr
	Leo Buries	Dave McGuire
	Vance Larka	John Bellotti

1. Mattel will change "Cassette" to "Cartridge".

2. Item 37 (Washer, Push-on) cannot define. Dave thinks it is a
   duplication. He will investigate and advise 11/2/78.

3. RF Shields - Mattel will not be able to define until after FCC
   testing. Logic Bd will have to be enclosed with connectors
   outside. FCC Consultant states that shields will have to be
   soldered to Board, Mattel feels they can be clipped on and are
   pushing for a clip arrangement.
   Shield will be metal.
   Dave will provide shield definition ASAP-preliminary shield
   definition by 11/15.
   Shields for 10 FCC units will be provided to G.I. by Mattel.
   Shields for 40 units will be provided by Mattel to CMO.
   There is a possibility that cartridges will have to be shielded.
   Mattel will assign part numbers for shields immediately.

4. Mattel will investigate if they will assign part number on paint
   and advise either a number or if we are to assign.

5. G.I. had advised the need for ferrite beads on the controller wires
   (1 per wire on each end). Dave does not think this is necessary
   and will check with G.I. on Thursday. CMO will be advised 11/2/78
   p.m. by phone.

6. Cable assembly must have ferrite beads on each end.
   Mattel will breakdown parts list for antenna cable assy.

7. Controller will have flat circuitry with a special piece of
   bubbled mylar added (Domed Ledgend Overlay) which will be added
   to parts list.

8. Mattel will assign part numbers for ferrite beads on controller
   P/L item 46.

9. Parts list item 64 will be changed to radial.

10. Item 63 - 15/16" is the maximum height that can be allowed on any
    component on the power supply board.

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 inter-
connections 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 coven-
ants hereinafter set forth, the parties hereto agree as follows:

1.   Work Statement.   The Work Statement appearing as Exhibit A hereto shall con-
stitute the work to be performed hereunder by GI and is incorporated herein by refer-
ence. 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

MATTEL ELECTRONICS

June 22, 1979

Mr. Ernest Finkbiner
MID WEST TRANSFORMER COMPANY
333 Barron Boulevard
Grayslake, Illinois 60030

Dear Ernest:

Attached are revised specifications dated 6/19/79 for the power transformer
to be used in our Keyboard Component product. Your representative, Ron Barrett,
was advised of the change on 6/22/79.

We would appreciate your best estimates of any changes in size, weight, or
cost over the transformer configuration sampled and bid to us on 5/25/79 per
our preliminary 4/2/79 specification.

We require at least 6 samples of the new configuration unit as soon as possible.
This request was made through Ron Barrett on 6/22/79.

We have received only one sample female receptacle for consideration (reference
Figure 2). While the size appears suitable, we query whether this receptacle
can be obtained molded to the pig tail much as the plug is molded to the line
cord.

Very truly yours,

John H. Lishman,
Engineering

JHL:sp

cc: T. Perez - Mattel
     D. Chandler - Mattel
     R. Barrett - Dresco Industries, Inc.

MATTEL Howard L. Cohen
Director of Purchasing

January 25, 1979

Circuit Assembly
3169 Red Hill Ave.
Costa Mesa, CA   92626
Attn: Bob Torres

Dear Bob,

Per our   recent conversation, this letter is Mattel Toy's
authorization for Circuit Assembly Corporation to sell
the custom 9-pin connector to our selected and designated
assembly vendor.

It is our intent to have our assembly vendor, GTE Sylvania,
CMO Division, of Muncy, Pennsylvania, purchase the said
connector on our behalf. Quantities. needed, scheduled
deliveries, and inspection will be set and performed by
GTE Sylvania and a Purchase Agreement between Circuit
Assembly and GTE Sylvania made.

If you have any questions,. please contact me. Thank you
for your cooperation.

Sincerely yours,

Howard L. Cohen

HLC/lac

cc: Dr. Dave Chandler (Mattel)
      Alan Secor (Mattel)
      John Robertson (GTE Sylvania)

February 27, 1980

Mr. Tony Perez
Mattel Electronics
Mattel Inc.
5150 Rosecrans Ave.
Hawthorne, CA   90250

Dear Tony:

Per our phone conversation between Messrs. Johnson, Edwards,
and Secore, the purpose of this letter is to document new schedules
for Basketball II (MA 6037) and Soccer II (MA6038). Development
milestones are shown below and production schedules are attached
as exibit A.

DEVELOPMENT MILESTONES
BASKETBALL II - MA6037

Prototype modules   3/12
Customer Approval   3/14
1st article - Lens   3/15
Release COPs to production 3/17
Release lens to production 4/11
Ship testers and programs to PH 4/16
Start PH production 5/5
(engineering run)
PH ship first 200 modules 5/16
PH begin module production 5/19

July 10, 1978

TO: RICHARD CHANG

FROM: DAVE CHANDLER

SUBJECT: BACK-UP VIDEO SYSTEM

It is clear that we should continue to strive to get our system completed
for the January C.E.S. based on the G.I. STIC chip set. However, in light
of the facts that the schedule for obtaining F.C.C. approval outlined by
G.I. is quite tight for January C.E.S., cost reductions in the forms of
40K ROMS and a consolidated chip set will not be available for 1979 pro-
duction, and the $40^{\circ}C$ temperature specification on the STIC chip set
promises to cause problems and expense, it seems wise to pursue a back-up
system.

An interesting candidate for a back-up system appears feasible based on a
combination of Signetics PVI chip set and MOS Technology's VIC chip. The
VIC provides better background capability than we now have, with higher
resolution and better alphanumerics. The PVI system provides more flex-
ible foreground capability, primarily because of the multiplexing capability.
All the chips exist now, functioning hardware can be put together right
away. The lowest temperature spec on any of these chips is $55^{\circ}C$. There
is the necessity to marry the two systems and while I have found no inherent
obstacles to such a marriage, there could still be some problems.

I am proposing a three stage approach to pursuing this back-up system:

1. Proceed as quickly as possible to breadboard a system which would
    incorporate 1 VIC chip and 4 PVI chips.

2. Assuming the breadboard looks good, design and build PC boards to fit
    into our present housing, again based on 1 VIC chip and 4 PVI's. This
    system could be put through F.C.C. for January C.E.S. and used for
    limited early production, if desired.

3. Fund Signetics to lift the portions from PVI which generate moving
    objects, expand them to 16 lines high and put 8 moving objects in one
    new chip for us (call it MOVI). Off-the-top-of-the-head estimates by
    Signetics are that this could be done in about 6 months. That could
    permit us to use this chip for the quantity production and would appear
    to give us a chip set cost comparable to the STIC set.

MATTEL ELECTRONICS

June 27, 1979

Mr. Al Secor
MATTEL ELECTRONICS
A Division of Mattel Inc.
5150 Rosecrans Avenue
Hawthorne, Calif. 90250

Dear Al:

Subject: Intellivision problem and status report as of 6-27-79.

1. GI chip sets - Sylvania has 125 sets less RAMs that were previously tested
    on prototype IMI tester with a known good RAM. The prototype tester only
    tested to nominal 5 and 12 volt supply lines.

    a. Testing of chip sets on new IMI tester with switchable $\pm$ 5% voltage on
        the 5 and 12 volt supply lines, results in some of the original chip
        sets now failing the test.

    b. 54 Rams were received Monday night 6-25. The first six tried, with what
        was believed to have been a good chip set, one that worked with another
        RAM, failed all six RAMs.

        (1) Changing the chip set to another group allowed all six previously
             failed RAMs to pass.

        (2) Changing the individual chips from the one that caused failure of
             the RAMs to the one that now passes the RAMs resulted in the stic
             chip from the original group as being the malfunctioning chip in
             the set.

    c. The previously tested 125 chip sets are to be retested on the new IMI
        tester as well as the new RAMs. This is the first attempt for us to
        test to the full voltage tolerance. We must establish complete integrity
        in this testing. Correlate Sylvania and GI results. I would like to
        have Nick Sramek assigned to handle the Sylvania on sight control and
        liaison with GI.

    d. IMI testers test integrity must be established. Since GI will not
        provide this service to Mattel, I have the assignment to approve the first
        completed tester built by Sylvania.

MATTEL

October 5, 1978

Lisa Rogers
Victor Electric Wire and Cable Corporation
618 Main Street
West Warwick, Rhode Island 02893

Dear Lisa:

Enclosed are two copies of our drawing number 2609-9569 showing the changes to the
grommet for our cable. Please note (1) the changed dimensions for the outer
portion of the grommet (necessary for the controller to fit into the console),
(2) the changed height of the inside portion of the grommet (previously discussed
with Victor people), (3) the lengthening of stripped portion of the cable inside
the controller (for ease in assembling to the connector), and (4) the orientation
of the grommet relative to the radius vector from the grommet to the center line of
the cable as shown in section A-A (necessary to have the cable positioned properly
in the tray of the console when the controller is placed back in the console).

We plan to assemble 50 systems (100 cables) before the year is out in addition to
engineering models of the controllers to check out the changes. Six of the 50
systems will be assembled about November 1.

Let me know what we need to do if anything to get these changes under way.

Sincerely,

Dave Chandler

DC/ldw
Encl.