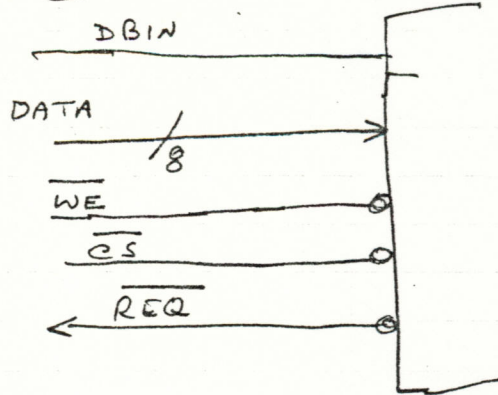


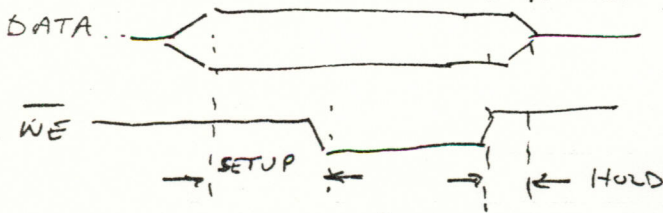
8 BIT μ P I/F



POWER SUPPLY SHOULD BE
 $+5V \pm 10\%$

LOGIC LEVELS — SAME AS LS TTL — \overline{REQ} / DATA BUS MSB
 \overline{WE} MIN PULSE WIDTH = 150 ns
 \overline{CS} " " " = 300 ns
 MUST SINK 4ma

DATA SET-UP BEFORE \overline{WE} LOW = 50 ns MIN
 DATA HOLD TIME AFTER \overline{WE} HIGH = 10 ns MAX
 DBIN TRUE BEFORE/AFTER \overline{CS} LOW



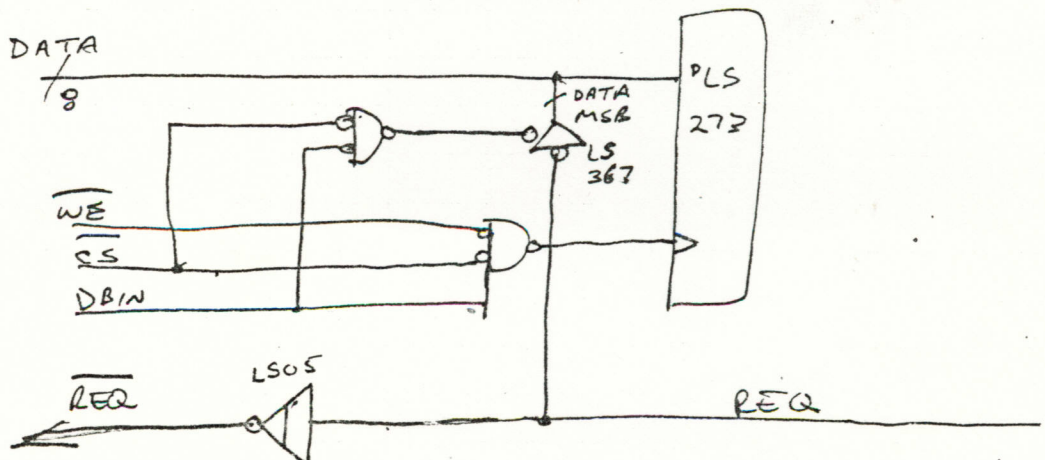
\overline{WE} / \overline{CS} timing

FOR WRITE ($DBIN = 0$)
 \overline{CS} TIMING SAME AS \overline{WE}

FOR READ ($DBIN = 1$), \overline{CS} MIN = 300 ns
 DATA TRUE 200 ns AFTER \overline{CS} LOW

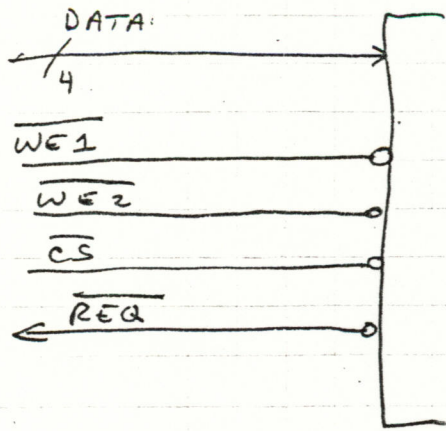
LOGIC MODEL

\overline{REQ} CAN BE READ ON
 DATA MSB FOR POLLED OPERATION



BR 3/29/79

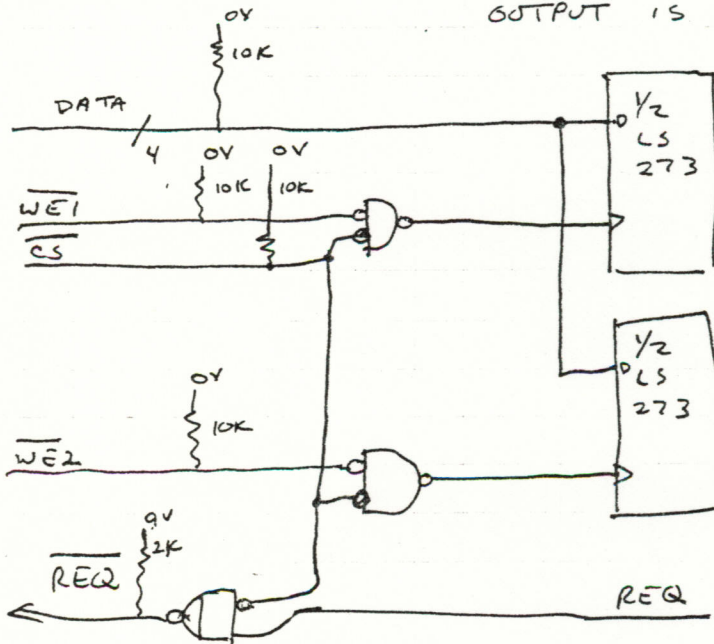
4 BIT MC I/F



POWER SUPPLY
 SHOULD BE
 9/0 - MIN 7, MAX 10

LOGIC MODEL

ALL INPUTS HAVE PULL-DOWNS
 TO GND -
 OUTPUT IS O.C. WITH PULL-UP

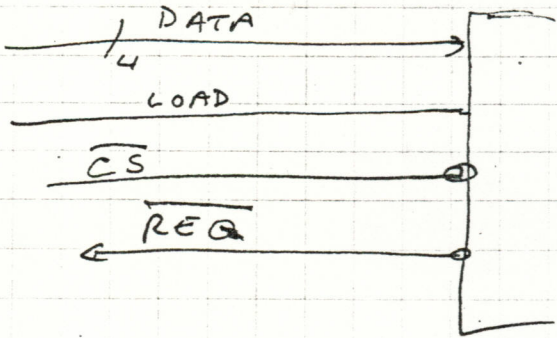


$\overline{WE1}/\overline{WE2}/\overline{CS}$ TIMING NOT CRITICAL

\overline{CS} EN LE FOR \overline{REQ} ALLOWS \overline{REQ} TO BE A
 SCANNED INPUT.

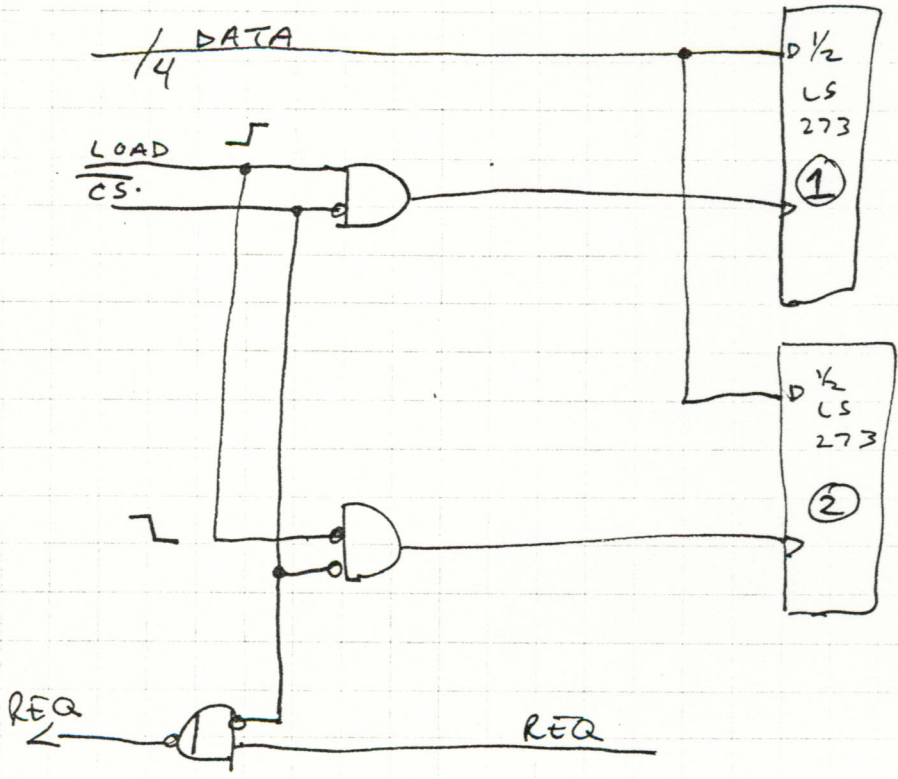
BR 3/29/79

4 BIT MC I/F
ALTERNATE #2



'LOAD' CAUSES DATA TO BE TRANSFERRED TO LATCH 1 OR LATCH 2 DEPENDING ON WHICH EDGE OCCURS - THIS MINIMIZES THE CODE REQUIRED TO DRIVE THE INTERFACE

LOGIC MODEL



B/C 3/30/79



Denis V. Bosley
Vice President, Preliminary Design

July 23, 1979

Dwain Chaffin
Texas Instruments
P.O. Box 84 MS800
Sherman, Texas

Dear Dwain:

SPEECH SYNTHESIS PROJECT

Sorry to be so long in documenting the points of our meeting in Sherman on June 25. I took a couple days vacation around the 4th July and didn't get our collective thoughts together beforehand.

Dwain, overall we were somewhat disappointed at the slow progress and in the quality of speech synthesis which we heard. These were our specific impressions:

1. Intelligability was quite variable from excellent for the word "six" to virtually unintelligible for several of the other numbers had they not been played in ascending sequence.
2. The voice was very monotonous - "Cylon-like" and was dominated by the voice oscillator frequency at the expense of unvoiced speech elements.
3. The female voice was particularly poor with the voice frequency being more dominant and monotonous.
4. We were concerned at the statement that a child's voice would probably be still more difficult to synthesise.

We all felt that voice pitch control during word generation was extremely important to "humanise" speech. This can be done off the chip if frequency tolerances can be loose. Ideally, we would like to see the pitch change as part of the data stored for pre-recorded phrases but would also like to have the possibility of user control of pitch and whether it be male, female or child.

The next review is to be around 9/1/79, at which time we will hear a demonstration of:

1. Final speech quality except for inflection (pitch change.)
2. Optimised phoneme generation.
3. Optimised filter parameters.
4. Full detail of all off-chip components with value ranges.

We can decide closer to the time whether this is best done by letter and tapes or by a visit.

Around 10/1/79, you will demonstrate the effect of external frequency injection to humanise the speech. This is very important to us and any improvement on this date would be appreciated.

During the next few days we will let you have:

1. Suitable speaker in an appropriate enclosure.
2. A tape of speech to be synthesised.

Dwain, I think we are all sensing that this project is a tough one to get the necessary quality at the \$5.00 price, as evidenced by the effort needed to get to this point. I am very anxious that Mattel be first to the market with products using this technology and will offer any assistance which can speed progress, particularly in the area of acoustics and inexpensive speaker systems. However, in view of the four months delay, I feel that there is no prospect for a 1980 product introduction and so would like to target for early '81. This would require chip deliveries in March of that year to support production start in April - May 1981.

The new circumstances necessitate date changes to the attachment to our P.O. #34512. I am asking your agreement to this by obtaining an authorised signature on the attached revision and returning it to us. If there are any questions or problems please call.

Warmest personal regards,


Denis V. Bosley

cc: Josh Denham
Richard Chang
~~Howard Cohen~~
George Klose

John Park
Mike Peters
Jeff Rochlis
Ray Wagner

Amendment to Attachment to P.O. No. 34512

The following numbered paragraphs of the attachment to Purchase Order No. 34512 are hereby amended to read as follows:

6. TI shall design, fabricate and deliver to Mattel on or about 1 October 1979 for Mattel's exclusive use a working demonstration system suitable for evaluation by Mattel and functionally equivalent to the ICs to be subsequently produced by TI. At this time, Mattel will be quoted unit pricing to produce the demonstrated quality.
7. Within one month after delivery of said demonstration system (on or about 1 November 1979) Mattel may elect either to approve said system and to proceed with this accelerated schedule (in which event the second, final phase payment of \$90,000 will then become due), or else to cancel this order (in which event both parties shall be relieved of any further obligations hereunder). Vendor will invoice Mattel for this payment, referencing the Purchase Order number.
9. On or about May 1, 1980, first iteration ICs are to be produced by TI; on or about July 1, 1980, second iteration, working pilot production samples of the ICs and firm quantity price quotations are to be delivered to Mattel.
10. TI shall give Mattel the first opportunity to purchase production quantities of the ICs designed by TI. Mattel shall have sixty (60) days from receipt of working pilot production samples of such ICs in which to place its initial production order for the ICs for delivery in March 81. If Mattel fails to place its production order within the above time, TI may thereafter solicit orders from any other customer of TI. As used herein "other customer" includes affiliates and divisions of TI other than TI's semiconductor group.
14. After TI has shipped all quantities on Mattel's said initial production order or one (1) year from the date of its first shipment, whichever is later, TI shall continue to supply Mattel's requirements for such ICs (up to one million units per year), giving Mattel at least as favorable price and delivery terms as may be offered to any other customer of TI.

MATTEL TOYS

By: _____

Title: _____

Date: _____

TEXAS INSTRUMENTS INCORPORATED

By: _____

Title: _____

Date: _____

Kevin P. DeLeon
V.P. Kevin DeLeon
July 23rd 1979



PURCHASE REQUEST
ENTRIES WITH RED CAPTIONS
FOR PURCHASING USE ONLY.

SEE ATTACHED
SEE ATTACHED
U/A

34512
PURCHASE ORDER NO.

PURCHASING
5150 ROSLCRANNS AVE
HAWTHORNE CALIF 90250
13060 TEMPLE AVE
CITY OF INDUSTRY CALIF 91746
5150 ROSLCRANNS AVE
HAWTHORNE CALIF 90250
15930 E VALLEY
CITY OF INDUSTRY CALIF 91744
1020 S WILMINGTON AVE
COMPTON CALIF 90220

SHIP TO:
 PLANT 1
 PLANT 4
 ADMIN. WHSE.
 PLANT 1
 DIST. CENTER
 PLANT 2 & 3
 COMPTON
 PLANT 6
 OTHER

TO TEXAS INSTRUMENTS INCORPORATED
831 South Douglas Street
El Segundo, CA 90245

BILL TO
MATTEL TOYS
P.O. BOX 821 AP
HAWTHORNE
CALIF 90250

34512
BILL TO

DATE: 7-8-77
98391
MATTTEL TOYS

ITEM NO.	DESCRIPTION - ONE ITEM PER ITEM NO.	UNIT OF MEAS.	QUANTITY	PRICE PER REQUESTER	CONFIRMED PRICE	DATE	QUANTITY	BALANCE	PACKING SLIP NUMBER	R.C. INIT	DUE DATE
1.	TI shall for Mattel's benefit accelerate TI's engineering schedule for the design and fabrication of an I 2 L integrated circuit for phonym-based speech synthesis (hereinafter "ICs") in accordance with the pre-printed terms and conditions hereof and the following additional terms and conditions: Upon Contract Execution, Check# 96880 Attached.		1	\$60,000.00	\$60,000.00						
2.	Upon Receiving and Mattel Approval Of Prototype Emulation Unit (See Paragraph 7 Of Attached Agreement.)		1	\$90,000.00	\$90,000.00						
3.	Detailed Electrical Specification		1	-0-	-0-						
	See Attached Terms And Additional Conditions										

REPARTMENT: MATTEL ELECTRONICS **BUDGET CTR: 6060** **CHARGE TO ACCT NO: 613-LO11-1009**

RECEIVING CATEGORY: 3 **IS MATERIAL TO BE RESOLD? YES** **SEND INVOICE TO REQUESTER FOR APPROVAL** **RECEIVING INSTRUCTIONS: RECEIVING COMPLETE - IF PARTIAL PAYMENT, COMPLETE RECEIVING AREA AND FORWARD COPY TO ACCTS PAYABLE (ATTACH ALL DOCUMENTS REC'D)**

REQUESTER: Jeff Rochlis **DATE: 2603** **MAIL STOP: 1** **DATE REQUIRED: 150,000**

APPROVED BY: [Signature] **APPROVED BY: [Signature]** **APPROVED BY: [Signature]**

RECEIVED COMPLETE BY: [Signature] **DATE: [Signature]**

MATTEL, INC.

MAIL INVOICES TO P.O. BOX 871 AT HAWAIIAN ISLAND CENTER

DICE DATE INVOICE NO. #

.2-79

NET AMOUNT

\$60,000.00

GROSS AMOUNT

\$60,000.00

P. O. 34512

Recd. 2-2-79
[Signature]

CODE: 1 - YOUR INVOICE 3 - OUR DR. MEMO 5 - OUR CR. MEMO
2 - YOUR CR. MEMO 4 - OUR CR. MEMO 6 - OTHER

No. 96880

THIS CHECK TENDERED IN FULL PAYMENT OF INVOICES LISTED ABOVE

PART NO.

\$60,000.00

\$60,000.00

96880

"Additional Terms and Conditions"

4. Concurrent with delivery of this Purchase Order, Mattel shall pay TI a first, initial payment of \$60,000.
5. TI shall prepare and deliver to Mattel on or about March 1, 1979 a written set of design goals for this accelerated IC program. These Specifications to become part of this Agreement when mutually agreed upon.
6. TI shall design, fabricate and deliver to Mattel on or about 1 June 1979 for Mattel's exclusive use a working demonstration system suitable for evaluation by Mattel and functionally equivalent to the ICs to be subsequently produced by TI. At this time, Mattel will be quoted unit pricing to produce the demonstrated quality.
7. Within one month after delivery of said demonstration system (on or about 1 July 1979) Mattel may elect either to approve said system and to proceed with this accelerated schedule (in which event the second, final phase payment of \$90,000 will then become due), or else to cancel this order (in which event both parties shall be relieved of any further obligations hereunder). Vendor will invoice Mattel for this payment, referencing the Purchase Order number.
8. Within one month after Mattel's approval of the demonstration system and payment of the \$90,000, TI shall provide Mattel with a detailed electrical specification for the ICs.
9. On or about January 1, 1980 first iteration ICs are to be produced by TI; on or about March 1, 1980 second iteration, working pilot production samples of the ICs and firm quantity price quotations are to be delivered to Mattel.
10. TI shall give Mattel the first opportunity to purchase production quantities of the ICs designed by TI. Mattel shall have sixty (60) days from receipt of working pilot production samples of such ICs in which to place its initial production order for the ICs. If Mattel fails to place its production order within the above time, TI may thereafter solicit orders from any other customer of TI. As used herein "other customer" includes affiliates and divisions of TI other than TI's semiconductor group.
11. TI will accept Mattel's said initial production order for up to one million units of the ICs to be shipped up to 250,000 units per quarter. All quantities of such initial production order shall be scheduled for delivery within one (1) year from date of the order, provided, however, any units not actually delivered to Mattel as scheduled shall be offered

for sale to Mattel as promptly thereafter as possible on a right of first refusal basis.

Said order shall be in accordance with Mattel's standard P.O. terms and conditions:

12. After TI has commenced shipping production quantities of the ICs to Mattel, TI may sample other customers and accept orders for production quantities which request shipment after completions of shipments to Mattel under its initial production order.

13. TI will allow Mattel on a quarterly basis the first opportunity to purchase any additional quantity of ICs TI actually produces during the first year of actual IC production. In the event Mattel declines to purchase such additional quantities, TI shall be free to sell them to other customers.

14. After TI has shipped all quantities on Mattel's said initial production order or one (1) year from the date of such order, whichever is later, TI shall continue to supply Mattel's requirements for such ICs (up to one million units per year), giving Mattel at least as favorable price and delivery terms as may be offered to any other customer of TI.