



Methode Electronics, Inc.

1700 HICKS ROAD
ROLLING MEADOWS, ILLINOIS 60008 USA
TWX 910 687-0760
PHONE: 312-392-3500

March 15, 1978

Mr. Jerry Hicks
R. H. McDonald & Associates
18121 Napa Avenue
Northridge, CA 91325

Dear Jerry:

In response to your memorandum of February 9, 1978 concerning the edge connector for Mattel Corp., I have enclosed our preliminary design drawing.

For 75,000 pieces the "ballpark" price would be 31 cents each. We would need \$8,000 and approximately 8 weeks to modify one of our current dies to produce the contact required. In addition, we would also need mold tooling. I have provided several alternatives below:

2-Cavity Expandable Divisible	-	\$32,500
1-Cavity Expandable Divisible	-	\$23,400
2 Solid Cavities	-	\$23,500
1 Solid Cavity	-	\$16,900

I quoted expandable divisible tooling in case at any time in the future they would want a part that would be shorter than 22 positions. The solid cavities quoted would only be capable of producing a part 22 positions long. Each cavity quoted above would be capable of producing approximately 1,000 pieces per 8 hour shift. (For your information, we normally run our mold room 24 hours a day, 5 days a week.)

We could also provide a 1-cavity prototype mold for minimum production to get them started for about \$3,500. Delivery on this mold would be approximately 4 weeks.

If you need any further information, please feel free to contact me.

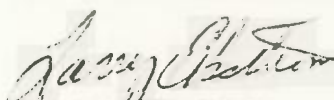
RECEIVED

MAR 20 1978

R. H. McDONALD & ASSOC.

Best regards,

METHODE ELECTRONICS, INC.


Larry Ekstrom
General Manager

LE:mw

Encl.

cc: C.Kozel



Methode Electronics, Inc.

1700 HICKS ROAD
ROLLING MEADOWS, ILLINOIS 60008 USA
TWX 910-687-0760
PHONE: 312-392-3500

March 31, 1978

Mr. Jerry Hicks
R.H. McDonald & Associates
18121 Napa Avenue
Northridge, CA 91325

Dear Jerry: 

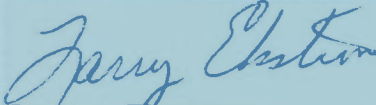
In response to your phone conversations with Chuck Kozel, I have enclosed copies of prints and a sample for the 22-position edge connector for MATTEL. I understand that Chuck has briefed you thoroughly on the differences between the sample and what the part will actually look like.

The piece part price will be approximately 35 cents for this connector because there is quite a bit more plastic in the molded part and the contact is also quite a bit longer. The tooling remains the same as I quoted in my letter of March 15, 1978.

If you need any further information, please feel free to contact me.

Best Regards,

METHODE ELECTRONICS, INC.

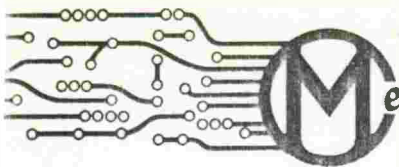

Larry Ekstrom
General Manager

LE:mw
Encl.

R E C E I V E D
APR 03 1978

R. H. McDONALD & ASSOC.

312-867-9600



Methode Electronics, Inc.

INTER-OFFICE MEMORANDUM

To: Jerry Hicks
c/o McDonald Associates

Date: April 24, 1978

Subject: MATTEL INC.

We have reviewed the project that Rolling Meadows has been working on regarding their cassette connector, and we wish to offer our alternative for their review.

Our approach would be basically a modification of our standard .100 connector. Enclosed is a sample connector and a print covering the details. The notes essentially answer the questions they have raised, except for the board plating. They could use bare copper or solder plate since we are using the W.E. Alloy 725 for the contact material.

In regards to their time frame, we can have their prototypes by 5/15/78 and production by 6/15/78.

Our pricing would be as follows:

75,000 Pieces	\$.93 each
200,000 "	\$.86 each

Non-recurring tooling and engineering charge would be \$3,600. to cover special mold inserts, forming dies, and assembly fixturing.

M. G. Andre

MGA:beb
Enclosure

METHODE ELECTRONICS, INC.

CHICAGO, ILLINOIS 60656

TEST REPORT

PART NO. 141-1620		PART NAME CONNECTOR, RECEPTACLE, ELECTRICAL			REPORT NO. 051078-09	
PROJECT NO.	REQUESTED BY M. ANDRE	SPECIFICATION MIL-C-21097	DATE REC'D 4/28/78	DATE COMP'D 4/28/78	TESTED BY T.P.	
TEST CONTACT RESISTANCE AND DURABILITY.					APPROVED BY	
					ENGINEERING	
					QUALITY CONTROL	
					ACCEPTANCE *	

REQUIREMENTS:

THE CONTACT RESISTANCE EXPRESSED IN MILLIVOLTS SHALL NOT BE GREATER THAN 30 MILLIVOLTS WHEN MEASURED AT 5 AMPERES D.C., NOR SHALL IT BE GREATER THAN 5 MILLIVOLTS WHEN MEASURED AT ONE AMPERE BEFORE AND AFTER DURABILITY CYCLING WITH A 0.070 THICK FLAT STEEL BLADE.

PROCEDURE:

SIXTY (60) CONTACTS, METHODE P/N 141-1620, DIVIDED EVENLY INTO TWO GROUPS OF THIRTY (30) CONTACTS SHALL BE SUBJECT TO A CONTACT RESISTANCE AND DURABILITY TEST. GROUP I CONSISTS OF 30 SELECTIVE GOLD PLATING CONTACTS AND GROUP II CONSISTS OF BARE CDA 725 CONTACTS. THE CONTACTS SEGREGATED SHALL BE LOADED INTO THE SAME INSULATOR.

- I. A PRINTED CIRCUIT BOARD (P.C.B.) 0.066 THICK SHALL BE MATED INTO THE CONNECTOR. A TEST CURRENT OF ONE AMPERE SHALL BE APPLIED TO THE INDIVIDUAL CONTACT TAILS TO THE FINGER PADS OF THE P.C.B. USING A MILLIVOLTMETER, THE CONTACT RESISTANCE SHALL BE MEASURED ON A POINT ON THE CONTACT TAIL NEAR THE INSULATOR, TO A POINT ON THE P.C.B. NEAR THE INSULATOR. THE CONTACT RESISTANCE SHALL BE REPEATED AT 5 AMPERES.
- II. UPON COMPLETION OF TAKING THE INITIAL CONTACT RESISTANCE, THE INSULATOR SHALL BE PLACED ON A CYCLING MACHINE. A FLAT STEEL BLADE 0.070 INCH THICK SHALL BE PROPERLY ALIGNED WITH THE CARD SLOT. AT A RATE OF APPROXIMATELY 5 INCHES PER MINUTE, THE CONNECTOR SHALL BE CYCLED 500 TIMES. UPON COMPLETION OF CYCLING, THE CONNECTOR SHALL BE VISUALLY EXAMINED FOR ANY EVIDENCE OF DAMAGED CONTACTS AND THE CONTACT RESISTANCE SHALL BE RE-MEASURED.

INSTRUMENTATION:

<u>INSTRUMENT OR EQUIPMENT</u>	<u>MANUFACTURER</u>	<u>MODEL NO.</u>	<u>SERIAL NO.</u>
D.C. POWER SUPPLY	ELECTRO	H	CD150
AMMETER	SIMPSON	9	CD178
MILLIVOLTMETER	KEITHLEY	150B	57374
CYCLING MACHINE	METHODE	CD188	5195

RESULTS:

I. ALL CONTACTS PASSED THE CONTACT RESISTANCE TEST BEFORE AND AFTER THE DURABILITY CYCLING TEST. NO INDIVIDUAL CONTACT MEASURED GREATER THAN 30 MILLIVOLTS AT FIVE (5) AMPERES OR 5 MILLIVOLTS AT ONE AMPERE.

THE AVERAGE READINGS WERE AS FOLLOWS:

	<u>30 SELECTIVE GOLD</u>		<u>BARE CDA 725</u>	
	<u>INITIAL M.V.</u>	<u>AFTER CYCLING M.V.</u>	<u>INITIAL M.V.</u>	<u>AFTER CYCLING M.V.</u>
5 AMP	9.8	9.7	18.9	20.8
1 AMP	1.95	1.90	3.6	5.0

INDIVIDUAL READINGS MAY BE FOUND ON THE FOLLOWING PAGES.

II. UPON COMPLETION OF CYCLING THERE WAS NO EVIDENCE OF DAMAGED CONTACTS OR EXCESSIVE WEAR.

30 SELECTIVE GOLD

	<u>INITIAL</u>		<u>AFTER CYCLING</u>			<u>INITIAL</u>		<u>AFTER CYCLING</u>	
	<u>5 AMP M.V.</u>	<u>1 AMP M.V.</u>	<u>5 AMP M.V.</u>	<u>1 AMP M.V.</u>		<u>5 AMP M.V.</u>	<u>1 AMP M.V.</u>	<u>5 AMP M.V.</u>	<u>1 AMP M.V.</u>
1	9.5	1.85	9.2	1.95	A	9.8	2.0	9.8	2.0
2	8.5	1.70	9.6	1.90	B	9.6	2.0	9.2	1.9
3	9.6	2.15	9.5	2.00	C	10.5	2.0	10.0	1.8
4	8.7	2.00	9.0	1.80	D	10.5	2.0	9.8	1.8
5	9.3	2.10	9.4	1.80	E	11.0	1.75	9.7	2.0
6	9.6	1.90	9.4	1.90	F	10.0	1.85	9.0	2.0
7	9.0	2.00	9.1	1.80	H	10.0	1.95	9.2	1.9
8	9.2	1.85	10.0	1.90	J	10.5	2.00	9.8	2.0
9	9.8	1.90	9.5	1.85	K	11.0	2.00	10.5	1.9
10	9.0	1.80	9.4	2.00	L	11.0	1.95	10.5	1.9
11	9.1	1.70	9.6	1.90	M	11.0	2.10	11.5	1.9
12	9.2	1.75	9.6	1.90	N	10.0	2.10	10.5	1.8
13	9.2	1.90	9.4	1.90	P	11.0	2.25	10.5	1.9
14	9.0	1.80	9.6	1.80	R	10.5	2.25	10.0	1.9
15	9.6	1.70	9.6	1.90	S	9.5	2.05	9.5	2.4

BARE CDA 725

	INITIAL		AFTER CYCLING			INITIAL		AFTER CYCLING	
	5 AMP M.V.	1 AMP M.V.	5 AMP M.V.	1 AMP M.V.		5 AMP M.V.	1 AMP M.V.	5 AMP M.V.	1 AMP M.V.
1	18.0	3.3	18.0	3.4	A	20.0	3.5	19.0	3.7
2	19.0	3.6	18.5	3.4	B	19.0	3.4	21.0	4.0
3	17.0	3.3	19.0	3.5	C	19.5	3.5	25.0	5.0
4	16.5	3.2	18.0	3.4	D	19.0	3.6	20.0	4.0
5	17.5	3.2	19.0	3.4	E	22.0	3.7	21.5	4.2
6	17.5	3.4	18.0	3.3	F	21.5	3.6	19.0	3.6
7	17.5	3.3	18.0	3.4	H	20.5	3.6	21.0	4.0
8	17.5	3.3	19.5	3.6	J	19.0	3.6	19.0	3.6
9	17.5	3.3	18.0	3.4	K	19.0	3.6	19.0	3.7
10	17.0	3.3	19.5	3.6	L	19.0	3.7	24.0	4.6
11	18.0	3.4	19.5	3.6	M	20.0	3.6	25.0	5.2
12	17.5	3.4	19.0	3.6	N	19.5	3.8	25.0	5.0
13	18.0	3.4	26.5	4.8	P	21.0	3.9	23.0	4.5
14	18.0	3.4	21.0	3.8	R	20.0	3.9	25.5	5.3
15	18.5	3.5	19.0	3.6	S	20.5	3.9	24.5	5.0

METHODE ELECTRONICS, INC.

CHICAGO, ILLINOIS 60656

TEST REPORT

PART NO. 141-1620		PART NAME CONNECTOR, RECEPTACLE, ELECTRICAL			REPORT NO. 050178-10	
PROJECT NO.	REQUESTED BY M. ANDRE	SPECIFICATION MIL-C-21097	DATE REC'D 5/1/78	DATE COMP'D 5/1/78	TESTED BY T.P.	
TEST LOW LEVEL CIRCUIT TEST					APPROVED BY	
					ENGINEERING	
					QUALITY CONTROL	
					ACCEPTANCE	

REQUIREMENTS:

THE CONTACT RESISTANCE SHALL NOT BE GREATER THAN SEVEN (7) MILLIOHMS USING A DIRECT TEST CURRENT OF 10 MILLIAMPERES.

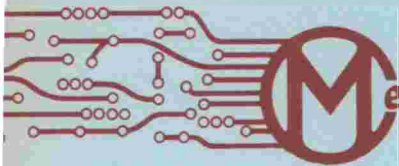
PROCEDURE:

THE CONTACT RESISTANCE SHALL BE MEASURED ON SIX (6) CONTACTS OF BARE CDA 725 AND 30 SELECTIVE GOLD. CONTACTS SHALL BE MATED WITH AN .059 THICK PRINTED CIRCUIT BOARD HAVING 60/40 TIN-LEAD PLATING AND ALSO WITH A PLAIN COPPER CLAD BOARD.

RESULTS:

ALL CONTACTS MEASURED LESS THAN 7 MILLIOHMS WHEN MEASURED USING A DIRECT TEST CURRENT OF 10 MILLIAMPERES.

<u>CONTACT POSITION</u>	<u>BARE CDA 725</u>		<u>SELECT 30 GOLD</u>	
	<u>TIN/LEAD</u>	<u>COPPER</u>	<u>TIN/LEAD</u>	<u>COPPER</u>
1	.072 M.V.	.042 M.V.	.037 M.V.	.024 M.V.
2	.070	.047	.030	.020
3	.060	.049	.028	.017
4	.050	.050	.028	.018
5	.056	.053	.031	.020
6	.052	.049	.031	.021
AVG.	6.0	4.8	3.1	2.0 MILLIOHMS



Methode Electronics, Inc.

RECEIVED
MAY 4 1978

R. H. McDONALD & ASSOC.

INTER-OFFICE MEMORANDUM

To: Jerry Hicks
c/o R. H. McDonald Assoc.

Date: May 2, 1978

Subject: MATTEL

In regard to our connector proposal, we have discussed the specifics with Dave Chandler, and the main points were:

1. Connector tails on the outer row need 45° bends and the card slot needs to be closed. We have made the changes required and prints are attached.
2. Contact wipe on position #1 and #22 where the trace is .090 above the board edge. Our connector has a .300 card slot with .200 contact wipe. On these two positions we will still maintain a .100 wipe.
3. Contact resistance and durability. We do not have in stock today the unplated CDA 725 contacts of the exact type we would use, so we ran comparative tests. The black connector sample attached has identical contacts; half with 30 selective gold, the other half CDA 725. Our Test Report No. 050178-09 (copy attached) covers the results of the testing done. The CDA 725 material essentially has readings twice as high as the gold, but within the specs.
4. Contact resistance with tin plated board fingers and plain copper clad board fingers. On the same sample connector we ran a low level circuit test using tin/lead board fingers and plain copper board fingers. Our Test Report No. 050178-10 (copy attached) covers the results.
5. Contact tail solderability with CDA 725. Attached is the data sheet on CDA 725 material which indicates good solderability, even after two years. We have enclosed a small board sample we ran with gold plated contacts and CDA 725 contacts. The CDA 725 contacts in the board sample are approximately one year old, and the solderability is fine.

cont'd...

SUBJECT: MATTEL

May 2, 1978

In general, the CDA 725 contact material with copper board fingers should work fine, especially in view of the 1000 cycle life requirements. There will not be any real wear problems that are inherent in tin plated contacts over many cycles.

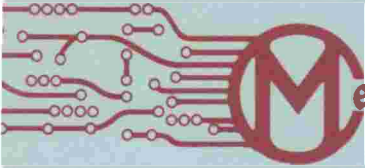
If there are any other specific tests we can run with their sample boards, etc., please let us know.

In regard to the original prices and tooling monies, they remain the same, the formed tail changes are not significant.



M. G. Andre

MGA:beb
Enclosure



Methode Electronics, Inc.

GENERAL OFFICES
7447 W. WILSON AVE. • CHICAGO, ILL. 60656
TWX 910-221-2468
TELEPHONE (312) 867-9600

August 17, 1978

Mattel
5150 Rosecrans Ave.
Hawthorne, Calif. 90250

Attention: Mr. Dave Chandler

Subject: Your P.O. No. 31184

Gentlemen:

Enclosed are eight (8) samples of the modified insulators you have requested.

The reason we did not modify the mold before shipping the 247 pieces, was that it could not have been completed in your time frame.

However, I feel that the samples are acceptable and hope the tooling invoice can be cleared for payment.

If any additional information is required, please do not hesitate to contact me.

Very truly yours,

METHODE ELECTRONICS, INC.

John Klimek
Sales Manager
Connector Division

JK:beb
Enclosure

cc: R. H. McDonald Assoc.