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Ref: 89-2

March 30, 1962

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Subj: Request for Proposal in accordance with Specification No. 62-A-1140-A for Digital Display Unit DR-1: Submission of quotation in response to

Gentlemen:

Thank you for providing our company with the opportunity to submit a proposal for subject request. Our proposal is as follows:

1. Price

Our company can furnish Items 1 thru 7 under Phase I and Items 1 thru 11 under Phase II as stated on the last page to Specification No. 62-A-1140-A at a unit price of $1,517.00 or a total of $151,700.00. Enclosed please find Cost and Price Analysis Form DD 633 depicting the cost breakdown. This price is based upon our company being awarded a fixed price type of contract. Our terms are net 30 days FOB

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2. Delivery

Our company will deliver 5 months after receipt of contract, Items 1 thru 7 of Phase I. The following is the schedule for items under Phase II:

Items 1, 2, 3, 4 & 6	4 ea.	6 months after receipt of order
	4 "	7 " " " " "
	5 "	8 " " " " "
	8 "	Per month thereafter until completion
Item 5	12 "	6 months after receipt of order
	12 "	7 " " " " "
	15 "	8 " " " " "
	25 "	Per month thereafter until completion
Item 7	2 "	Will be furnished with each Item 1
Item 8	-	Will be completed 8 months after receipt of order
Items 9, 10 & 11	-	Will be furnished upon delivery of last unit of Item 1

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3. Technical Proposal

Enclosed please find two copies of our technical proposal entitled "Visual Readout Device DR-1".

4. Progress Payments

Our company requires in any contract resulting herefrom progress payments in accordance with applicable regulations.

5. ALTERNATE PROPOSALS

Alternate Proposal #1

Our company offers for your consideration as Alternate Proposal #1 the following:

In lieu of furnishing miniature lamps we propose to furnish the ML202A Mity Lite as supplied by Sylvania in this equipment. In lieu of 11 miniature lamps we will incorporate 21 of the Mity Lites. These lights will accord more reliability and will provide additional space within the subject equipment for ease of assembly and maintenance. The price for Alternate Proposal #1 is $1,462.00 or a total of $146,200.00.

Alternate Proposal #2

Under this proposal our company will employ the use of a 2N799 Transistor in lieu of the present employed Raytheon CK4. This unit is the latest version, is more reliable and smaller in size. [redacted] offers Alternate Proposal #2 at a unit price increase of $45.00 over and above prices quoted on basic proposal and Alternate Proposal #1. 25X1

6. Enclosed please find as requested, your letter of 2 March 1962, 2 copies of Specification No. 62-A-1140-A, 1 copy of Preliminary Parts Lists and 1 set of blueline drawings.

7. Our company is in a position to assign engineering talent immediately for the task to be performed hereunder.

We trust that the preceding meets with your approval and is attractive enough to warrant your awarding our company a contract for this desirable business.

Yours truly,

[redacted] 25X1

TJL:pf

Enc: 2 cys Technical Proposal
2 cys Form DD 633

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ANALYSIS OF TOTAL ESTIMATED COST OF SPECIAL TOOLING

COST ELEMENTS	ESTIMATED COST
26. DIRECT MATERIAL:	
PURCHASED PARTS 4/	
SUBCONTRACTED ITEMS 8/	
OTHER 5/	
27. DIRECT MFG LABOR (Hours)	
28. BURDEN % OF 27	
29. DIRECT ENG LABOR (Hours)	
30. BURDEN % OF 29	
31. OTHER FACTORS: 9/	
32.	
33.	
34. TOTAL ESTIMATED COST	
35. AVERAGE COST PER UNIT	

FOOTNOTES

1/ No tooling costs should be included in Items 1 through 23.

2/ Enter in this column all costs estimated to be incurred under the contract prior to starting production, and other estimated nonrecurring costs (usually referred to as "starting load" cost). Preproduction costs include, but are not limited to, such estimated costs as preproduction engineering, special plant rearrangement, training program, etc. Nonrecurring costs include, but are not limited to estimates of initial rework, spoilage, pilot runs, etc.

3/ Enter in this column all estimated costs to be incurred under the contract other than costs entered under preproduction.

4/ Parts or assemblies purchased for the procurement item, other than (i) subcontracted items as described in footnote 8/, (ii) Government-furnished property or (iii) parts fabricated by the prime contractor.

5/ Ordinarily includes (i) basic commodities and raw materials, acquired for the contract in a form or state which requires further processing and (ii) other basic commodities and raw materials and parts which are procured or manufactured for general usage in the normal course of the contractor's business. DESCRIBE METHOD OF COSTING OF SUPPLIES UNDER (ii).

6/ For research and development and other projects under which it is impracticable to show unit prices, the data should be presented on a total contract price basis.

7/ Exclude any preproduction or other nonrecurring costs. If previous contract is not completed, use best estimate.

8/ Parts, assemblies, or services produced or performed by other than the prime contractor in accordance with designs, specifications, or directions of the prime contractor, and applicable only to the prime contract. ATTACH LIST OF PRINCIPAL PARTS, ITEMS, OR SERVICES INDICATING SOURCE & UNIT PRICE.

9/ Should include, for example, such things as:
(i) "Packaging and Packing", if special to the contract, of significant dollar value, or separately accounted for; or as an alternate procedure, use a supporting schedule; and
(ii) "Material Handling", if separately accounted for.

10/ If the total on line 19 is in excess of $250, on a separate schedule furnish the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers or other basis on which the royalty is payable; brief description, including any part or model numbers of each item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of each item; number of units; and total dollar amount of royalties. If specifically requested by the contracting officer prior to execution of the contract, a copy of the current license agreement and identification of applicable claims of specific patents shall be furnished.

11/ EXPLAIN FULLY, ATTACHING LIST OF ITEMS AND AMOUNTS.

12/ Selling price must include any applicable excise tax on finished articles.

13/ Price is F.O.B. [X] origin or [ ] destination. If the latter, indicate transportation cost $ _____

36. IS THE ESTIMATE FOR DIRECT LABOR BASED ON WAGE RATES CURRENTLY PREVAILING IN YOUR PLANT? *(If not, explain difference on separate sheet)* [X] YES [ ] NO

37. WHAT MONTHLY RATE OF PRODUCTION IS CONTEMPLATED IN CALCULATING YOUR PRICE PROPOSAL? *(Units)*
NO. OF HOURS OF OPERATION REQUIRED PER WEEK: _____

38. IF CURRENTLY PRODUCING THE SAME OR SIMILAR ITEMS, WHAT MONTHLY RATE OF PRODUCTION PREVAILS? *(Units)*
NO. OF HOURS OF OPERATION REQUIRED PER WEEK: _____

39. a. EXPLAIN METHOD OF COMPUTING ANY DEPRECIATION CHARGE INCLUDED IN YOUR PROPOSAL

b. HAVE YOU INCLUDED ANY CHARGE FOR FULLY DEPRECIATED FACILITIES OR EQUIPMENT? *(If yes, explain)* [ ] YES [ ] NO

40. THE COMPANY, CORPORATION, OR FIRM SUBMITTING THIS ANALYSIS REPRESENTS THAT:

a. The prices shown on this form do not include (i) any charge for cost of facilities *(including tools, jigs, dies, and other equipment)* which duplicates any charge against any other prior or current Government contract or subcontract, (ii) any depreciation on facilities or equipment owned by the Government or any Government agency, or (iii) any rental or use charge on facilities or equipment owned by the Government, or any Government agency, if such facilities or equipment have been provided free of charge;

b. The prices shown on this form are based on the understanding that the following facilities *(including tools, jigs, dies, and other equipment)*, material, and services will be furnished by the Government:

c. It [X] Does [ ] Does not require Government financial assistance in the form of
[ ] Advance Payments, [X] Progress Payments, or [ ] Guaranteed Loans;

d. Bases used in computation of burden rates do not include allowance for overtime compensation;

e. It (i) [X] Has [ ] Has not employed or retained any company or person *(other than a full-time bona fide employee working solely for the bidder (contractor))* to solicit or secure this contract, and (ii) [X] Has [ ] Has not paid or agreed to pay to any company or person *(other than a full-time bona fide employee working solely for the bidder (contractor))* any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating thereto as requested by the contracting office; and

f. Prices shown do not include any cost of acquisition of facilities.

ANY EXCEPTIONS TO ITEM 40 SHOULD BE FULLY EXPLAINED ON SEPARATE SHEETS

CERTIFICATION—THIS IS TO CERTIFY THAT THE INFORMATION CONTAINED IN THIS PROPOSAL HAS BEEN BASED UPON OR COMPILED FROM THE BOOKS AND RECORDS OF THIS COMPANY AND IS ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE: March 30, 1962

FIRM NAME:

25X1

TITLE: Vice President

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Technical Proposal

25X1

VISUAL READOUT DEVICE DR-1

Prepared to Meet
Required Performance Specification
No. 62-A-1140-A

2 April 1962

25X1

SECTION I

INTRODUCTION

[redacted] is pleased to submit this proposal for the fabrication of the miniature Visual Readout Device DR-1. This program will result in the production of 100 display units, associated cabling and manuals. The units will be built in compliance with specification 62-A-1140-A.

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SECTION II

DESIGN CONSIDERATIONS

A. GENERAL

[redacted] is very familiar with the problems associated with equipments employing high-density packaging techniques as a means of size reduction. As circuits using conventional miniature or subminiature components are compressed into smaller and smaller volumes, it becomes increasingly difficult to maintain the high degree of reliability expected of present day devices. Simultaneously serviceability approaches a point where only highly skilled personnel are able to replace defective components without virtually destroying the modules in the process. 25X1

B. METHOD OF ATTACK

An analysis of the circuits and packaging methods employed reveals the nature of the problems that will be encountered during the assembly of the Visual Readout Device. These problems will be mainly:

1. Difficult assembly procedures due to the close spacing of the components, .08" between hole centers.

2. Very small foil areas for soldering which may cause poor connections.

3. Large number of interconnecting leads between individual modules, which are vulnerable to breaking in handling and testing.

Improvements can be made in all of these areas and result in a unit with increased reliability and maintainability. The following paragraphs will explore the methods that can be undertaken.

The overall case size of 2 x 3 x 7/8 imposes an initial limit on the degree of flexibility of the proposed improvements.

a. The circuitry, consisting mainly of logic circuits lends itself very well to the application of micro-electronics, utilizing such building blocks such as Fairchild's Micrologic elements. The result would be an immediate gain in easy assembly, testing, servicing, and reliability combined with possibly a further reduction in size. The major draw-back to the use of these thin-film devices is their high cost combined with the necessary redesign of the circuitry. Their use will therefore not be considered economical for this procurement.

b. A somewhat similar approach can be undertaken with DOT components. While this method will not yield any significant size reduction, reliability and maintenance will show a considerable improvement. But as with the micro-circuits, the use of DOT components is coupled with much higher costs and requires substitution of the presently used components with equivalents or substitutes of the DOT variety. This then requires large scale environmental tests to prove the adequacy of the design.

It now becomes necessary to further investigate the areas of improvement possible with the packaging method presently employed.

c. The first approach would be the elimination of all the interconnecting wiring, which would be replaced by a printed circuit card. Improved reliability by elimination of lead breakage and wiring errors is advantageous but is gained at the expense of serviceability. A relatively minor amount of module repackaging has to be undertaken to fit the modules to the common circuit board.

d. Retaining the idea of a common connecting board and modifying the modules so that they could be plugged in, immediately improves both reliability and maintainability. The modules now become easily removable so that trouble shooting in the field can be limited to module replacement, with actual repair work performed elesewhere. The modules being small and containing relatively inexpensive components may also be considered throw-away items, thus eliminating any required repair facilities. Spare parts stocks would consist essentially of individual modules. Incorporation of these features within the present unit height limit of 7/8 inches would be extremely difficult. An increase in height to approximately 1-1/8 inches would be required so that the plug-in contacts may be designed with the necessary reliability.

C. CIRCUIT MODIFICATIONS

It is anticipated that the circuit design modifications will be held to a minimum, with the exception of the need to provide additional sensitivity to meet the specification requirement of .3V minimum input level. The additional gain can be provided either in a single stage audio amplifier incorporated into the input limiter or by investigating the gain characteristics of the filter-amplifiers and performing the necessary modifications there. The approach yielding the best results with a minimum of additional components will be chosen and incorporated.

A protection circuit to prevent unit failure due to incorrect battery polarity will be added and will consist of a transistor with the collector and base shorted together to assure minimum voltage drop and will be inserted in the B-lead. The transistor type will be determined during the packaging redesign, since the current capacity of 200 ma will be a deciding size factor.

D. PART SUBSTITUTION

The substitution of electrical parts presently listed in the Bill of Material will be made in only those cases where the substitution results in a size reduction, reliability increase, or significant cost savings.

E. MECHANICAL DESIGN

Special emphasis will be placed at the start of the program on the mechanical design of the case and battery holders. A special effort will be made to avoid the use of complex, hard to make subassemblies which cause slow delivery and have unnecessary additional cost.

Consideration shall be given to the use of aluminum alloys and brass in forming metal parts requiring improved ductility over stainless steel parts. Milling, brazing and resistance welding shall be minimized wherever possible. Battery polarity markings shall be "steel letter" stamped on the applicable battery carrier surfaces. All metal and plastic parts will be treated for resistance to corrosion and fungus growth as applicable.

F. ENVIRONMENTAL TESTS

Environmental tests will be performed in accordance with the requirements of specification 62-A-1140-A. A total of 5 units will be subjected to these tests; one will be selected from the Phase I units, the remainder will be

selected at random from the Phase II devices. This will assure that all units perform reliably under all environmental conditions. In general, the tests will be conducted following applicable procedures of MIL-STD-202A or MIL-E-5272. The units will be subjected to a relative humidity of at least 95% for a duration sufficient to prove their operational reliability. This test may be conducted as part of the temperature-altitude test.

G. ALTERNATE PROPOSAL NO. 1

The high packaging density dictated by the size limitation is always associated with a much higher failure probability rate during the production phase. This can be improved by using a less congested module construction, which necessarily requires more space. The lamp assembly at present occupies an area of approximately 1.5 inches wide by .75 inches deep, which is dictated primarily by the CM8641 lamps. Sylvania is presently offering a micro-miniature incandescent lamp, the Mite-T-Lite, Type ML-202A which could be used very advantageously in this application. While the feature of easy bulb replacement is normally highly desirable, it is felt that the use of the Mite-T-Lite with its lower current consumption 10-20 ma at 1.2V, longer life (2000 hours vs. 500 hours) and space saving size, .050" thick by .156" long, easily offsets the inconvenience of having to unsolder a defective bulb or remove the entire bulb assembly. The lamp assembly in its anticipated design would use two parallelled Mite-T-Lites for each number, to obtain a total light intensity of 40 m lumens, the apparent redundancy with two bulbs in each position has the further advantage, that, in the event of a bulb failure, the message would not be lost, since the second lamp would remain operative. All bulbs are mounted to a common board, Figure 2-1. Interconnections are made through printed circuits on the back side which will plug in directly to the proposed module connecting card. The maximum thickness of the assembly will be less than $\frac{1}{4}$ inch, thereby making an additional .5 inch of depth available for the expansion of the modules. Although the total light output is less than that obtainable from the CM8641, the close proximity of the bulbs to the front plate will result in a readability equal to that of the original lamp.

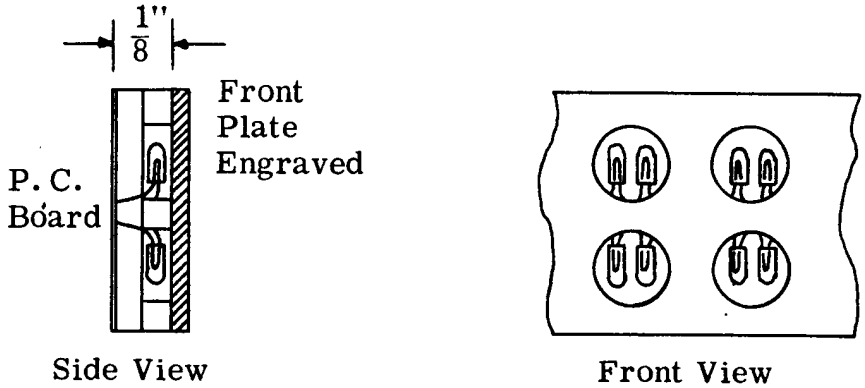

Figure 2-1. Lamp Module

H. ALTERNATE PROPOSAL NO. 2

It is recommended that the CK-4 transistor be replaced with the Raytheon 2N799 which has identical characteristics but smaller size and a welded seal, rather than the solder seal of the CK-4. The 2N799 has also been previously used on the KE-8 Keyer Package.

SECTION III

SUMMARY

After a review of the proposed methods (detailed in Section II), that will result in an improved, more reliable Digital Display Unit DR-1, [redacted] 25X1
[redacted] feels that the approach using the common module connecting 25X1
board B-3 combined with the Mite-T-Lite lamp assembly B-5 will yield optimum results in both reliability, fabrication, and cost. While this approach does not improve the serviceability, it at this time appears extremely unlikely that the module plug-in feature of B-4 could be incorporated within the absolute height limitation of 1 inch with the degree of contact reliability needed.

The proposed delivery schedule is shown in Figure 3-1. It is anticipated that the Phase I units will be delivered 5 months after award of contract. After acceptance of the Phase I units, the items of Phase II will be delivered according to the schedule shown, following a gradually increasing rate.

SCHEDULE

MONTHS	PHASE I					PHASE III									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
REDESIGN & REPACKAGING	←	→													
PROTOTYPE PARTS PROCUREMENT		←	—	→											
PROTOTYPES ASSEMBLY & TEST				5 ←	→										
ENVIRONMENTAL TESTS - PROTOTYPES					←										
DELIVERY PHASE I ITEMS					→										
PHASE II PARTS PROCUREMENT			←	—	—	—	—	—	→						
ASSEMBLY & TEST PHASE II UNITS						←				95					→
PRODUCTION RATE						4	6	8	10	10	10	12	12	12	12

Figure 3-1.