



COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

1 C 0078-001-H905 (SCALE)

DRAWING NO. 41285377-001-02

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2 C

3 C

4 C

5 C COMPUTER: H316, DDP-516

6 C

7 C

8 C PROGRAM CATEGORY: INPUT/OUTPUT

9 C

10 C

11 C PROGRAM TITLE: SCALE

12 C TO FIT AN ARRAY OF DATA OVER THE AXIS RANGE ON THE
13 C DIGITAL PLOTTER

14 C

15 C

16 C

17 C

18 C

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20 C

21 C

22 C

23 C

24 C

APPROVAL

DATE

25 C

26 C

27 C

28 C

PROG--*H. A. Dimer*-----*23 Sep 70*

29 C

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31 C

SUPR--*N. G. Dwyer*-----*23 Sep 70*

32 C

33 C

34 C

QUAL--*[Signature]*-----*24 Sep 70*

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38 C
39 C
40 C AUTHOR
41 C
42 C HONEYWELL - COMPUTER CONTROL DIVISION (EUROPE)
43 C
44 C
45 C PURPOSE
46 C
47 C TO EXAMINE AN ARRAY OF DATA AND PROVIDE A MINIMUM POINT AND AN AXIS
48 C SCALE FACTOR SUCH THAT, WHEN THE ARRAY IS PLOTTED, THE PLOT WILL
49 C EXTEND SUITABLY OVER THE RANGE OF AXIS AVAILABLE
50 C
51 C
52 C RESTRICTIONS
53 C
54 C THIS ROUTINE WILL WORK ON AN H316 OR DDP-516 COMPUTER WITH A
55 C DIGITAL PLOTTER
56 C
57 C
58 C STORAGE
59 C
60 C 722 (OCTAL)
61 C 466 (DECIMAL)
62 C
63 C
64 C USE
65 C
66 C FIT A DATA ARRAY TO AN AXIS SCALE
67 C
68 C CALL SCALE (X,S,N,K,DV)
69 C
70 C OR
71 C
72 C CALL SCALE FIT A DATA ARRAY TO AN AXIS SCALE
73 C DAC X THE ARRAY OF DATA TO BE SCANNED
74 C DAC S THE MAXIMUM LENGTH OF AXIS AVAILABLE



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75 C DAC N THE NUMBER OFF DATA POINTS AVAILABLE
76 C DAC K THE REPEAT CYCLE OF A MIXED ARRAY,
77 C I.E. THE FREQUENCY AT WHICH POINTS ARE
78 C SELECTED FOR PLOTTING WITHIN THE ARRAY,
79 C K NORMALLY BEING 1.
80 C DAC DV THE NUMBER OF DIVISIONS PER UNIT OF PAPER
81 C OCT 0 END OF PARAMETER LIST
82 C NORMAL RETURN
83 C
84 C NOTE-AN ADJUSTED MINIMUM VALUE WILL BE STORED IN X(N*K+1) AND AN
85 C ADJUSTED DX (INCREMENTS/UNIT) WILL BE STORED IN X(N*K+K+1).
86 C
87 C HENCE THE ARRAY X SHOULD BE DIMENSIONED SO AS TO INCLUDE THESE
88 C PARAMETERS.
89 C
90 C DV IS THE NUMBER OF DIVISIONS (AS PLOTTED) PER INCH. IT DEFINES
91 C THE DISTANCE BETWEEN THE TRANSVERSE MARKINGS ON THE AXES. THE
92 C WORKING RANGE IS 1.0 TO 25.4, VALUES OUTSIDE THIS RANGE ARE EQUATED
93 C TO 10.0. DV HAS TWO PURPOSES:
94 C
95 C A. IT CAN BE USED FOR INCH INCREMENT PLOTTERS
96 C TO PLOT METRIC AXES (DV=25.4).
97 C
98 C B. IT IS US TO INCREASE OR DECREASE THE NUMBER
99 C OF AXIS MARKERS PER UNIT USED.
100 C
101 C NORMALLY DV WILL BE 10.0.
102 C
103 C METHOD
104 C
105 C THE ARRAY OF DATA IS SORTED FOR MAXIMUM AND MINIMUM VALUES. USING
106 C THE DIFFERENCE BETWEEN THESE TWO VALUES AS THE TOTAL AXIS LENGTH,
107 C THE NUMBER OF DIVISIONS ALONG THE AXIS IS CALCULATED. THIS IS THEN
108 C SCALED TO FIT AN AXIS RANGE BETWEEN 1.0 AND 10.0 UNITS. THE
109 C PROGRAM RETURNS TO THE CALLER WITH THE AXIS LIMITS AND A SCALED
110 C NUMBER OF DIVISIONS PER UNIT.
111 C



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112 C
113 CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
114 C
115 C
116     SUBROUTINE SCALE (X,S,N,K,DV)
117 C
118 C
119     DIMENSION X(2)
120 C
121 C NUMBER OF SCALE DIVISIONS MUST LIE BETWEEN 1.0 AND 25.4
122     DIV=DV
123     IF (DV.LT.1.0.OR.DV.GT.25.4) DIV=10.0
124 C
125 C SET UP SORT CALCULATION PARAMETERS
126     NP=N*K
127     L=NP+1
128     J=NP+K+1
129     XMAX=X(1)
130     X(L)=X(1)
131 C
132 C SORT DATA FOR LARGEST AND SMALLEST VALUES
133     DO 10 I=1,NP,K
134     IF (XMAX-X(I))5,6,6
135 C
136 C XMAX IS THE MAXIMUM VALUE IN THE DATA ARRAY
137     5 XMAX=X(I)
138     6 IF (X(L)-X(I)) 10,10,7
139 C
140 C XA IS THE MINIMUM VALUE IN THE DATA ARRAY
141     7 X(L)=X(I)
142     10 CONTINUE
143 C
144 C CALCULATE THE NUMBER OF DIVISIONS BETWEEN MAXIMUM AND MINIMUM DATA
145 C POINTS
146     DX=(XMAX-X(L))/S*10.0/DIV
147     IF (DX) 31,31,30
148     31 X(J)=1.0
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149      X(L)=X(L)-0.5
150      RETURN
151 C
152 C SCALE THE INCREMENTS TO FIT THE ALLOWABLE AXIS LENGTH
153      30 IDX=ALOG10 (DX)
154      IXMN=X(L)*10.0**(-IDX)
155      IF (IXMN.EQ.0) IXMN=SIGN (1.1,X(L))
156 C
157 C CHECK MINIMUM VALUE DOES NOT FALL BELOW ALLOWABLE RANGE
158      IF (X(L)) 32,33,34
159      32 IXMN=X(L)*10.0**(-IDX)-0.99
160      34 X(L)=IXMN
161      X(L)=X(L)*10.0**IDX
162 C
163 C CALCULATE THE SCALED NUMBER OF DIVISIONS BETWEEN MAXIMUM AND MINIMUM
164 C DATA POINTS
165      33 DX=ALOG10 ((XMAX-X(L))/S*10.0/DIV)
166      IDX=DX
167      XMAX=IDX
168      DX=10.0** (DX-XMAX)
169 C
170 C ROUND OFF THE END OF AXIS TO THE NEAREST INTEGER ABOVE THE MAXIMUM
171 C DATA POINT
172      XMAX=1.0
173      41 IF (DX-1.0) 40,20,11
174      40 DX=DX*10.0
175      IDX=IDX-1
176      GO TO 41
177      11 XMAX=2.0
178      IF (DX-2.0) 20,20,12
179      12 XMAX=4.0
180      IF (DX-4.0) 20,20,13
181      13 XMAX=5.0
182      IF (DX-5.0) 20,20,14
183      14 XMAX=8.0
184      IF (DX-8.0) 20,20,15
185      15 XMAX=10.0
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186 C
187 C STORE THE FINAL VALUE OF THE DIVISIONS/UNIT IN X(J)
188     20 X(J)=XMAX*10.0**IDX*DIV/10.0
189     RETURN
190 C
191 C END OF SCALE 15.JUL.70 HAD
192     END
```