A VERSION OF THE KIOWA HISTOGRAMMING PROGRAM

FOR THE 360/44

Duane R. Edgington and Kirk T. McDonald

February 12, 1971

This report describes the modification of the KIOWA Histogramming Program for use on an IBM 360/44 computer. For basic information on the structure and use of KIOWA (in a 360/75 version) refer to CTSL Internal Report No. 53, "KIOWA – A Multipurpose Data Plotting Program" by Duane Edgington.

To squeeze KIOWA onto the 360/44 most of its exotic features have been deleted. What remains is the basic line-printer histogramming routine. An example of the histograms is shown in Figure 1, (as much as fits on an 8½ x 11 in. page). The coding for this version of KIOWA occupies about 72K bytes of core, to which the user's data input routine must be added, as discussed below. The subprograms comprising KIOWA are:

FORTRAN subprograms: MAIN PROGRAM, BLOCK DATA, LOGIC, SKPBLK, ERROR, HEAD, CRACK, RELATN, NUMBER, COCHIS, DIOG, PRESET, BUFOUT, BUFIN, DPLOT, HIST, PASS, ZERO, HISTOC, ARYOUT, VPRINT.

Assembler subprograms: AND, INDEX, LINK, CTOBIN.

INCIDENT PHOTON ENERGY

```
 120.
 117.                        X
 114.                        X
 111.                        X
 108.                        X2
 105.                        XX
 102.                        XX
  99.                        XX
  96.                       2XX
  93.                       XXX
  90.                       XXX
  87.                       XXX1
  84.                       XXXX
  81.                       XXXX
  78.                       XXXX
  75.                       XXXX  1
  72.                       XXXX  X
  69.                       XXXX2X
  66.                       XXXXXX
  63.                       XXXXXX1
  60.                       XXXXXXX
  57.                       XXXXXXX
  54.                       XXXXXXX
  51.                       1XXXXXXX
  48.                       XXXXXXXXX
  45.                       XXXXXXXXX1
  42.                       XXXXXXXXX X
  39.                       XXXXXXXXXX
  36.                       XXXXXXXXX X
  33.                       1XXXXXXXXXX
  30.                       XXXXXXXXXX X2
  27.                      XXXXXXXXXXX X2
  24.                      XXXXXXXXXXX XXX1
  21.                     2XXXXXXXXXXXX XXX  X
  18.                     XXXXXXXXXXXXX XXXX  X
  15.                     XXXXXXXXXXXXX XXX1X
  12.            1  2  XXXXXXXXXXXXXX XXXXXXX2
   9.             X1X  XXXXXXXXXXXXXX XXXXXXXX
   6.         2  2XXXX2XXXXXXXXXXXXXXXX XXXXXXXXX  1
   3.         X2XXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXX2222
       *.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*.....*

            11111111112222222222 333333333344444444445555555555566666666667
            12345678901234567890123456789012345678901234567890123456789012345678901234567890
LOWER  0000000000000000000000000000000 000000000000000000000000000000000000000000000000
 BIN   .............................................................................
EDGE   0000000000000000000000000000000 000000000000000000000000000000000000000000000000
       00000000000000000000000000000000 000000000000000000000000000000000000000000000000
       00000000000000000000000000000000 000000000000000000000000000000000000000000000000
       0011111111111111111111111111119999999999999999999999999999999999999999999999999
       *     *     *     *     *     *     *     *     *     *     *     *     *     *     *
                          11
              1  1  122349108676442221211
            000000000052560715807195775831839623121934222200000000000000000000000000000
NTENTS     ..............................................................................
            000000000000000000000000000000000 000000000000000000000000000000000000000000
LOWER LIMIT =    0.0          BIN WIDTH =    1.00000E 01      UPPER LIMIT =    1.00
TOTAL CONTENTS =   1.05100E 03 UNDERFLOW =    0.0          OVERFLOW =    0.0
```

Detailed Modifications of KIOWA for the 360/44

1. Main Program

The length of the data buffer has been reduced. "LSTOR" is now 1024 instead of 4096. Note that HZ, DH, NH, and IH must be dimensioned at least the number of histograms. Dimension HLAB (8, $\geq$ # of histograms). Other dimension requirements are given in the listing of the main program.

The array CARD stores the test card images. None of the other input data card images are kept. If you wish to print out the test card images at some other time than when they are read in, use COMMON/KARD/CARD....

2. Block Data and Scratch Disk

KIOWA needs a sequential scratch disk data set. The blocksize is 360 bytes and something less than 8000 blocks are necessary, depending on the number of histograms produced. At present this data set is assigned to unit 3 by the word NSCR defined in the block data program.

3. Number of Bins

The number of bins has been restricted to less than or equal to 100, assuming a 120 column line printer is used. If a 132 column printer is available, the number may be expanded to 120. This is done by changing the value of NBIN defined in routine LOGIC. The check on NBIN which appears in routine DIOG must be modified also.

4. Test Cards

As is true in all versions of KIOWA, the "test" cards must come before the "histogram" cards which use the tests.

5. Parameter Cards

The 360/44 does not have the NAMELIST facility used by KIOWA in altering the histogram parameters from their default values. The new procedure for altering XLOW, BIN, and NBIN is to follow the PARAMETER card with a card

containing the new parameters in format (2F10.5,I5). A new value for XLOW must be given if this option is used. However, if BIN and NBIN are left blank, the default values for these will be used.

6. User Supplied Input Routine

The user must supply a routine to read in the data he wishes to histogram. This routine is called (at present) INPUT and is called by routine COCHIS. In CTSL Internal Report No. 53 INPUT becomes USER and GETUM. The main purpose of this routine is to put all quantities to be histogrammed or tested into the array D and call routine DPLOT once for each event. Otherwise the user can do as much analysis as there is spare core to accommodate. Note that INPUT is called only once and hence must contain an internal loop to handle many events. If you wish to call INPUT once for each event, COCHIS must be modified accordingly.

Figure 2 shows the data cards for KIOWA for a sample job.

Figure 2 : Sample Data Cards for KIOWA

```
COMMENT VERSION FOR DEUTERONS IN THE MAGNET
TEST(1 ) D(31) GT 0.5 * EVENT RECONSTRUCTABLE
COMMENT TEST(2) IS FOR COPLANARITY - D(5)
TEST(2) D(31) GT 0.5
COMMENT TEST(3) IS FOR MISSING MASS - D(13)
TEST(3) D(31) GT 0.5
COMMENT TEST(4) IS FOR TOF - D(15)
TEST(4) D(31) GT 0.5
COMMENT TEST(5) IS FOR MS3 - D(16)
TEST(5) D(31) GT 0.5
TEST(6 ) D(34) LT 0.5 * MISSING MASS CALCULABLE
TEST(7 ) TEST(1 ) AND TEST(2 )
TEST(8 ) TEST(3 ) AND TEST(4 )
TEST(9) TEST(7) AND TEST(8)
TEST(10) TEST(5) AND TEST(9)
TEST(11) TEST(6) AND TEST(10)
NUMBER HISTOGRAMS 5
HISTOGRAM D(6 ) ON (1) IF TEST(10) TRUE
HISTOGRAM D(5 ) ON (2) IF TEST(10) TRUE
HISTOGRAM D(13) ON (3) IF TEST(11) TRUE
HISTOGRAM D(15) ON (4) IF TEST(10) TRUE
HISTOGRAM D(16) ON (5) IF TEST(10) TRUE
TITLE HISTOGRAM(1) INCIDENT PHOTON ENERGY
TITLE HISTOGRAM(2) COPLANARITY
TITLE HISTOGRAM(3) MISSING MASS
TITLE HISTOGRAM(4) TIME OF FLIGHT
TITLE HISTOGRAM(5) MS3 PULSE HEIGHT
PARAMETERS HISTOGRAM(1)
0.0          10.0
PARAMETERS HISTOGRAM(2)
-12.5        0.25
PARAMETERS HISTOGRAM(3)
-250.        5.0
PARAMETERS HISTOGRAM(4)
0.0          1.0
PARAMETERS HISTOGRAM(5)
  0.0          1.0
END
```