The Health Care Financing Administration (HCFA) Data Center was required to provide schematic representations of the various existing and proposed communications networks for planning purposes. A survey of available in-house graphics software resulted in the decision to use a PC product named Diagram Master from Ashton Tate for its ease of use in creating schematics and for its pre-defined symbols.

As schematic development progressed, the need to produce graphics in a variety of sizes for presentations and publication arose. No appropriate devices were available for the PC. The Data Center's more versatile graphics devices are driven from the IBM mainframe. But the available mainframe graphics software does not provide the ease of drawing schematics that Diagram Master does.

Steve decided he could produce a viable translation from the ASCII data stored by Diagram Master on the PC into executable SAS code on the mainframe. On-Line Business Systems' Excellink is used to upload the Diagram Master file to the mainframe. On-Line Business Systems' WYLBUR, Release 8.0, execute processors perform process management functions and conversion of all internal data parameters and elementary functions to equivalent SAS statements. (WYLBUR was chosen because Steve is a wizard at using it.)

SAS annotate macros (%MOVE, %DRAW, %RECT, %LABEL) are used to reproduce most Diagram Master functions. Originally %SLICE was used to reproduce arcs and circles but proved ineffective when radius and centroid were outside the plotting area even though they were not to be plotted. SAS Technical Support suggested plotting arcs using multiple straight line draws. This is implemented using an in-house developed SAS macro named %ARC.

The conversion software does not include all Diagram Master capability due to the lack of SAS equivalents or reasonable solutions at this time given the resources and priorities. Missing are: windowed text on a hatched background, some hatching patterns, symbolic fonts, some line widths, and non-filled lines.

Applications: This process could be useful to anyone with a requirement to produce schematic-type drawings with no access to specialized CAD software/devices. We already have one member of our user community utilizing the process to produce wall-chart size flow charts on the Calcomp 1055.

Future plans: We plan to investigate using Proc GFONT to develop and store a SAS symbol library matching those we use in Diagram Master. We would hope that in the future PC SAS/GRAPH would be given the capability to do this type of development, using a mouse, with a direct upload of generated code to the mainframe for execution, thus eliminating any conversion process.

NOTE: Code developed for this application is available to the public under the rules of the Freedom of Information Act. All requests must be addressed to:

Chief, Freedom of Information Branch
Health Care Financing Administration
6325 Security Blvd.
Baltimore, Maryland 21207

Requests should reference SUGI 13 Graphics Competition entry developed by the Office of Computer Operations, Health Care Financing Administration Data Center.
IF OPER = 'POLY' THEN GOTO LPOLY;
IF OPER = 'DIAGRAM' THEN GOTO LDIAG;
RETURN;

LDIAG:
INPUT HEX $ LLY URX URX ANGLE;
\$SCALE (LLX,LLY,LLX,LLY,URX,URY,URY,URY,URY);
LLX = X+X;
URY = Y+Y;
RETURN;

LPOLY:
INPUT HEX $ LLY URX URX ANGLE;
\$SCALE (LLX,LLY,LLX,LLY,URX,URY,URY,URY,URY);
RETURN;
IF CI = 4 THEN COLOR = 'BLUE';

BIGA = (X2-X3)-(X3-X2)-(Y2-Y3)+(-Y3-Y2);
BIGB = (X3-X2)-(X2-X3)-(Y3-Y2)+(-Y2-Y3);
BIGC = ((Y2-Y3)*(X3-X2))-(((Y3-Y2)*(X2-X3)));
S2 = ((BIGA*(Y2-Y3))-(BIGA*(Y3-Y2)))/(2*BIGC);
S1 = ((BIGB*(X3-X2))-(BIGB*(X2-X3)))/(2*BIGC);

IF S1 > 0 THEN S1 = -S1;
IF S2 > 0 THEN S2 = -S2;

END;

IF CI = 4 THEN COLOR = 'BLUE';

BAIL:

QUIT;
IF COS1 > 0 THEN DO;
   A0A = ARSIN(SIN1)*(360/(2*3.1415927));
   GOTO LLGOT01;
END;
A0A = ARCS(COS1)*(360/(2*3.1415927));
GOTO LLG0TC1;
LL01:
   SIGN OF SIN SIGN OF COSINE WHAT TO DO
   + - - LOOKUP USING SIN 1St
   - + + LOOKUP USING COSINE 2ND
IF COS1 < 0 THEN DO;
   A0A = 180-(ARSIN(SIN1)*(360/(2*3.1415927)));
   GOTO LLGOT01;
END;
A0A = -1*(ARCOS(COS1)*(360/(2*3.1415927)));
GOTO LLG0TC1;

IF COS2 > 0 THEN DO:
   A0A = ARSIN(SIN2)*(360/(2*3.1415927));
   GOTO LLGOT02;
END;
A0A = ARCOS(COS2)*(360/(2*3.1415927));
GOTO LLG0TC2;

IF COS2 < 0 THEN DO:
   A0A = 180-(ARSIN(SIN2)*(360/(2*3.1415927)));
   GOTO LLGOT02;
END;
A0A = -1*(ARCOS(COS2)*(360/(2*3.1415927)));
GOTO LLG0TC2;

FINAL SAS PROGRAM WHICH IS PUT TOGETHER BY ALL OTHER PROCESSES

/* JOB CLASS=F, MSGCLASS=Q */
/* HEN PARK SIMAFF=SYD0 */
/* HENUP CALCOMP DRAFT PAPER, CERAMIC TIP PENS (NEW PLEASE) */
/* STEPS EXEC SAS,REGION=4000X */
/* FT14001 ED SIGOUT=8,DEST=WR33 */
/* SYSTEM DO */

CALL055(OBRIEN,OCO,FOR SAS COMPETITION);
OPTIONS VSIZE-14 VPOS .. 10000 HSIZE .. 21000 HPOS .. 12000 NOCHARACTERS
DEVICE=CALC05K ASPECT .. 0.666 ROTATE;
DATA A;
   LENGTH TEXT $ 200;
   STYLE .. 'xxxxxxxx';
   COLOR .. 'XXXXXXXX';
   DROP ANG ROT A1
   MOVE(5000,0)
   LABEL(5009.687,9725.931, 'KEFA NETWORK', RED,0,0,312.499, XSWISS, B)
   RECT(4100, 7800,5500,9200, GREEN, 1, 10)
   LABEL(809.574,6367.166, 'PCC', BLUE,0,0,315.547, XSWISS, B)
   RECT (8600,6100,9600,6900, GREEN, 1, 1);
   LABEL(9109.874,6367.166, 'NCC', BLUE,0,0,315.547, XSWISS, B)
   RECT(6600,6100, 7400,6900,GREEN,1,1);
   LABEL(7003. 944,6533.742, 'NTI', BLUE,0,0,127.22S,XSWISS, B);
   LABEL(7003.944,6361.559, 'SWITCH', BLUE,0,0,127.22S,XSWISS, B)
   ARC(7800,5000+( (5700-5000) /2) ,90,180,
   IF TYPE = 1 THEN GOTO ARCOUT;
   IF TYPE = 2 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   IF TYPE = 3 THEN GOTO ARCOUT;
   IF TYPE = 4 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   IF TYPE = 5 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   IF TYPE = 6 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   If TYPE = 7 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   IF TYPE = 8 THEN DO;
      TYPE = 9;
      GOTO ARCOUT;
   END;
   ARCOUT:
   H .. -1;
   PCT LINO 025, ".ARC('XO +X', 'YO +Y', 'THETA +T', 'RADIUS +R', 'COLOR +C', 'TYPE +T', 'WIDTH +W');
RETURN;
/* SAS.ARC ED ...,DCA=1XLSIZE=60 */