Environment Canada Imaging Cover Page

Report N.: 

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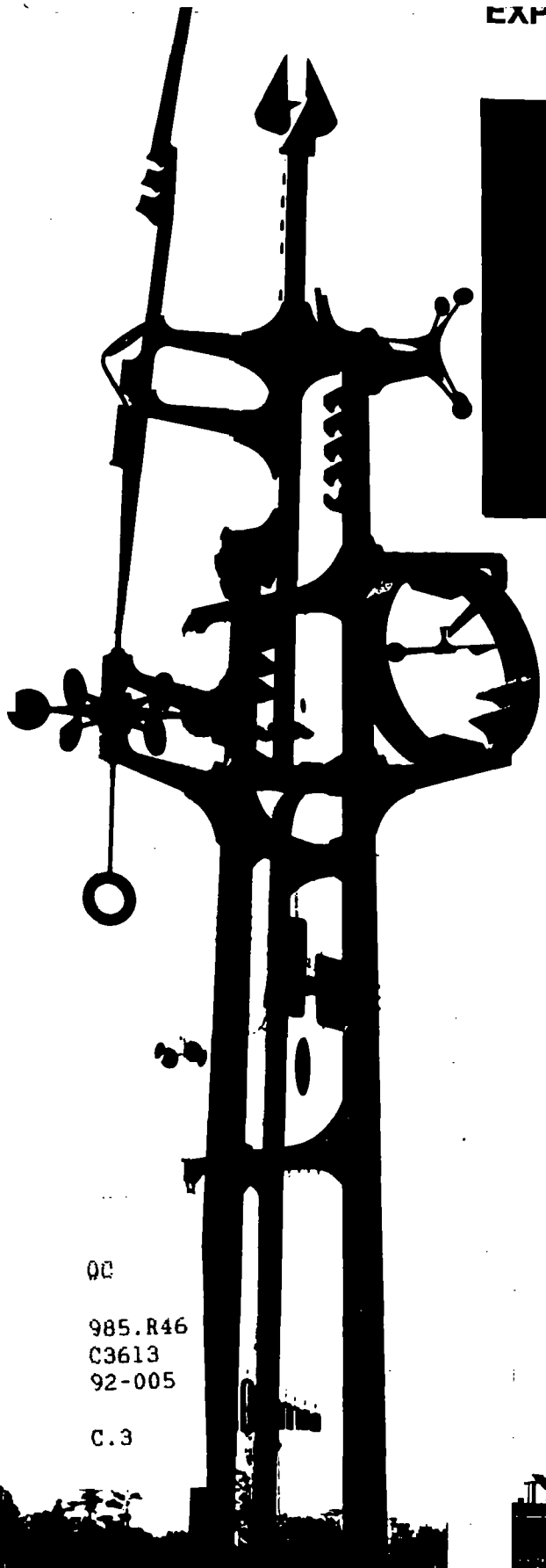
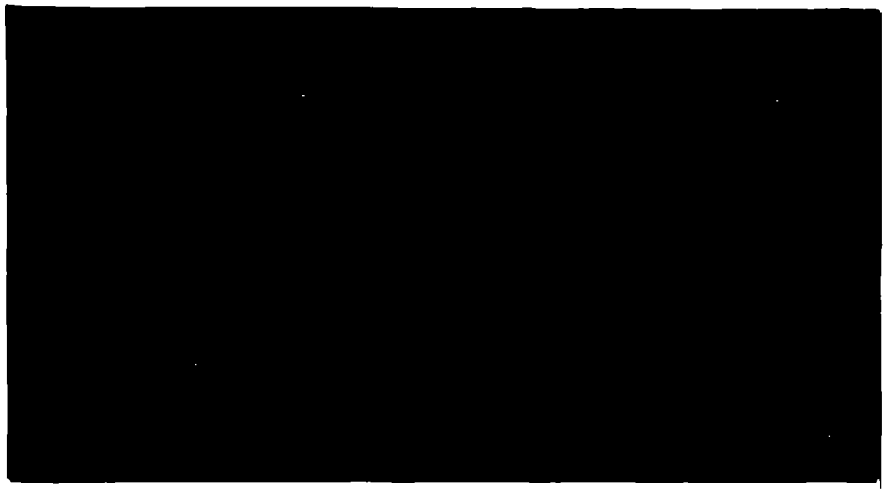
CENTRE DE RECHERCHE ATMOSPHÉRIQUE

EXPERIMENTS





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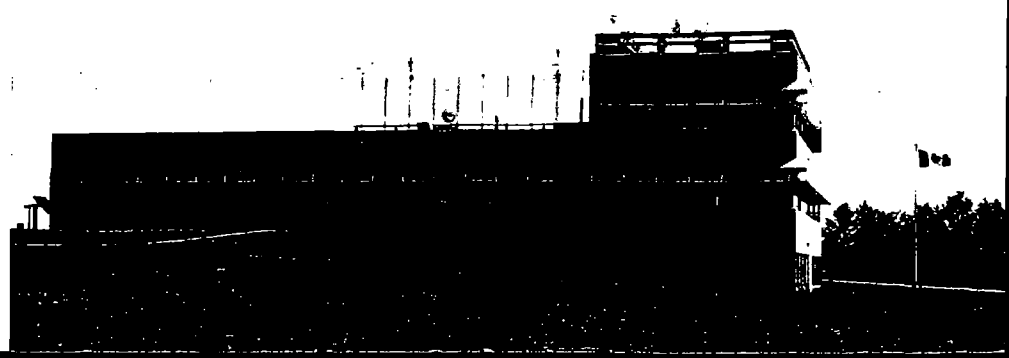
Atmospheric Environment Service / Service de l'environnement atmosphérique



ECSARCH

ELECTRONIC CLIMATE SYSTEM ARCHIVE

USER MANUAL

DAVID P PHILLIPS
CANADIAN CLIMATE CENTRE
ENVIRONMENT CANADA

Report No.
CCAD-92-005(CARE)

DECEMBER 1992

ECSARCH

ELECTRONIC CLIMATE SYSTEM ARCHIVE

TECHNICAL MANUAL

D. PHILLIPS
Bioclimate Adaptation Division
Adaptation Branch
Canadian Climate Centre
Atmospheric Environment Service

For additional copies contact:

Mr. D.C. MacIver
Bioclimate Adaptation Division
Canadian Climate Centre
4905 Dufferin Street
Donsview, Ont., Canada
M3H 5T4

Phone: (416) 739-4391
Fax: (416) 739-4297

Mr. D.W. McNichol
Bioclimate Adaptation Division
Canadian Climate Centre
CARE RR#1
Egbert, Ont., Canada
L0L 1N0

Phone: (705) 458-3321
Fax: (705) 458-3301

ACKNOWLEDGEMENT

The author wishes to express his gratitude towards the opportunities that exist at the Centre for Atmospheric Research Experiments (CARE) for the development of creative and original products. The guidance and assistance of Mr. D.C. MacIver, Mr. D.W. McNichol, Mr. T. Smith and Mr. K. Singh was greatly appreciated in producing this product.

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1) SYSTEM DESIGN PHILOSOPHY

The system design philosophy was developed around a data format for the archive. The archive data format was developed so that access to the data would be as flexible as possible and at the same time be able to identify erroneous data values. The eventual data format that was developed you can see in section 6 of this document.

Why the development of archive data format is in its current form is because the data had to be accessed on any combinations of time, codes, and data values. Because the data had to accessed on any sequence of parameters; all programs had to rely on data files containing the code values, meanings of codes, and related data for processing. The data files which held the key meanings of the codes in the archive format are arr_def.dbf, sensor.dbf, height.dbf, obspgm.dbf, sta_id.dbf, derived.dbf, and errpgm.dbf.

The arr_def.dbf file holds the key "ARR_CODE" and describes the record header of the input data and when the data should be expected.

The sensor.dbf file holds the keys "SEN_CODE" and "MAKE_CODE" and also holds most of the quality control parameters.

The height.dbf file holds the key "HT_CODE" and describes the height levels at which data is measured.

The obspgm.dbf file holds the key "OBS_CODE" and describes the method of observation used for the time period. The time period of the obspgm.dbf and the time period in the file arr_def.dbf are cross checked in the quality control programs to make sure that the data is always clearly defined.

The sta_id.dbf file holds the key "STA_ID" , describes the location, and the environment of the towers that have the sensors.

The derived.dbf file holds the key "DERIVED" and is used to define data that is derived from datalogger processed data and may not require quality control measures.

The errpgm.dbf file holds the key "ERR_CODE" ,describes the error codes, and describes where they are used.

2) SYSTEM REQUIREMENTS

386 OR BETTER WITH 4 MEG. OR MORE OF MEMORY RECOMMENDED.
MINIMUM CONFIGURATION IS 286 WITH 1 MEG MEMORY.
DOS 3.3 OR GREATER OR OS 2.0 OR GREATER.
MEMORY MANAGER AND / OR VIRTUAL DISK.
SPACE REQUIREMENTS 3 MEG.

INSTALLATION REQUIREMENTS

CURRENTLY REQUIRES DBASE4 INSTALLED OR FULLY COMPATIBLE SYSTEM

VIRTUAL DISK(IF USED) IDENTIFIED IN AUTOEXEC FOR "VDISK" EQUAL TO THE DRIVE LETTER (SEE DOS MANUALS FOR SETTING ENVIRONMENT PARAMETERS, AND FOR SETTING UP A VIRTUAL DISK)

SPACE ALLOCATED FOR VIRTUAL DISK MUST BE GREATER THAN 1 MEG.

3) STARTING UP THE PROGRAMS

To automate the archive data a communications program must be used to make the communications link to get the data and put it into a file called "C:\ARCHIVE\ALLDATA.TXT" and makes the following batch calls.
"cd\dbase" (any where you have the program dbase.exe)
"DBASE AUTO" ("AUTO" being anywhere you have the programs and archive files)

To access the menu driven archive and display system the user must get into the database and typing "DO AES_SYS" or while in the database directory type "DBASE AES_SYS"

4) TECHNICAL TERMS

B.B.S. -- ELECTRONIC CLIMATE SYSTEM
BULLETIN BOARD SERVICE
OUTPUT DATA FORMAT

DATALOGGER -- DEVICE FOR GATHERING DATA FROM ELECTRONIC SENSORS FOR LATER RETRIEVAL

5) LIST OF PUBLIC PARAMETERS AND WHAT THEY ARE USED FOR

PARAMETERS FOR COLOURS ON THE SCREEN

```
c_normal = colour for background
c_pop    = colour for popup menu
c_frame  = colour for menu frames
red      = colour red
blue     = colour blue
lt_blue  = colour light blue
```

PARAMETERS FOR PROGRAM LOOP CONTROL

```
mstrloop = loop condition for application system
mloop    = loop condition for a program
finished = termination condition for a program
```

PARAMETERS FOR MENU POSITION CONTROL

```
ls  = left side final position
ls1 = left side intermediate position
rs  = right side final position
rs1 = right side intermediate position
tp  = top of menu
bt  = bottom of menu
cnt = general counter
pos = alpha numeric of first character in each line of the menu
      list
max = field width
fldname[75,4] = storage of menu display line,value1,value2,value3
level[12]     = storage of ls at each menu displayed
```

PARAMETERS FOR SELECTION CONTROL OF DATA

```
sta1      = station code
arr1      = array type code
sen1      = sensor type code
mak1      = sensor make code
ht1       = sensor height code
obs1      = observation type code
der1      = derived field type
num1      = indicator for a hour range limit test
hr1       = lower time value
hr2       = upper time value
num2      = indicator for a date range limit test
stime     = start date
etime     = end date
num3      = indicator for a error range limit test
err1      = lower error code
err2      = upper error code
num4      = indicator for a value range limit test
val1      = lower value
val2      = upper value
valu_sel  = indicator of a replacement value
value     = replacement value
err_sel   = indicator of a replacement error code
error     = replacement error code
```

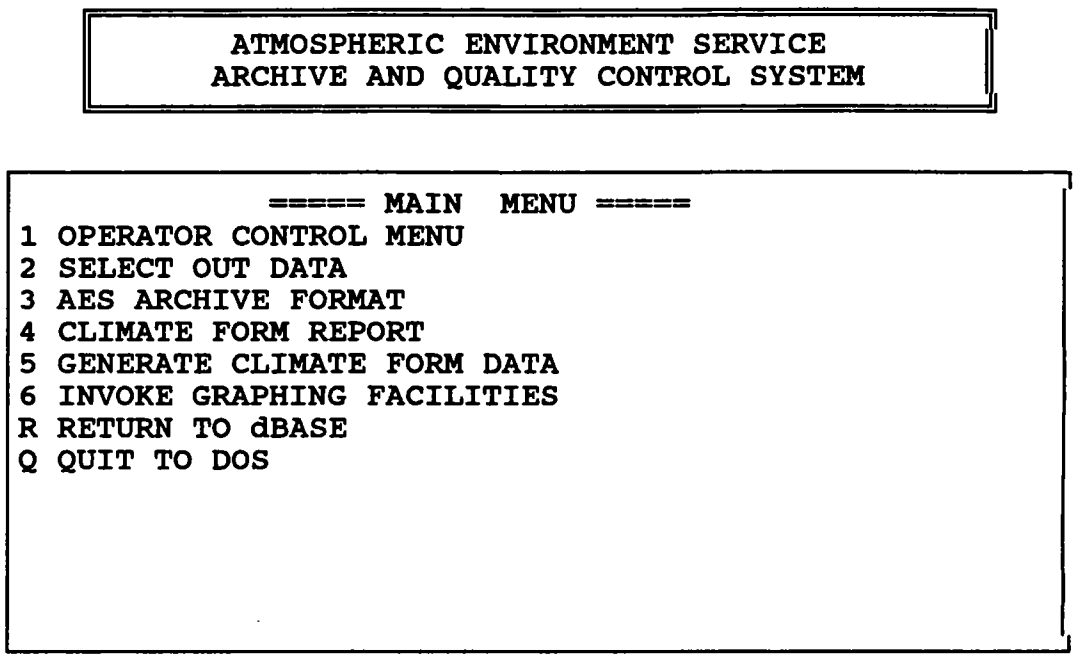
PARAMETERS FOR FILE ACCESS CONTROL

```
filein  = input file name of the master archive
fileout = output file name
pathin  = input file path
pathout = output file path
vdisk   = path of ramdisk if used or "0" if not used
file1a  = path and file name of an input file
file2a  = path and file name of an output file
```

6) ARCHIVE DATA FORMAT

FIELD	EXAMPLE	DESCRIPTION	USAGE
TIME	199223011	YEAR,JULIAN DAY,HOUR	TIME DATA RECORDED
STA_CODE	"1"	STATION CODE	CODE REPRESENTING THE TOWER LOCATION
ARR_CODE	"3"	ARRAY CODE	ARRAY TYPE I.E. HOURLY
SEN_CODE	"1"	SENSOR CODE	TYPE OF SENSOR I.E. TEMPERATURE
MAKE_CODE	"1"	MAKE CODE	MAKE OF SENSOR I.E. THERMAL COUPLE
OBS_CODE	"5"	OBSERVATION CODE	TYPE OBSERVATION OF THE DATA I.E. MAX VALUE OVER THE HOUR
HT_CODE	"7"	HEIGHT CODE	HEIGHT OF SENSOR I.E. 1.5 METERS
DERIVED	"y"	DERIVED CODE	DERIVED FIELD I.E. TIME OF MAX
DATA_VALUE	-9999.99	RECORDED VALUE	OBSERVED DATA VALUE
ERR_CODE	"1"	ERROR CODE	TYPE OF ERROR IN THE DATA THAT WAS DETECTED I.E. VALUE OUT OF SENSOR RANGE

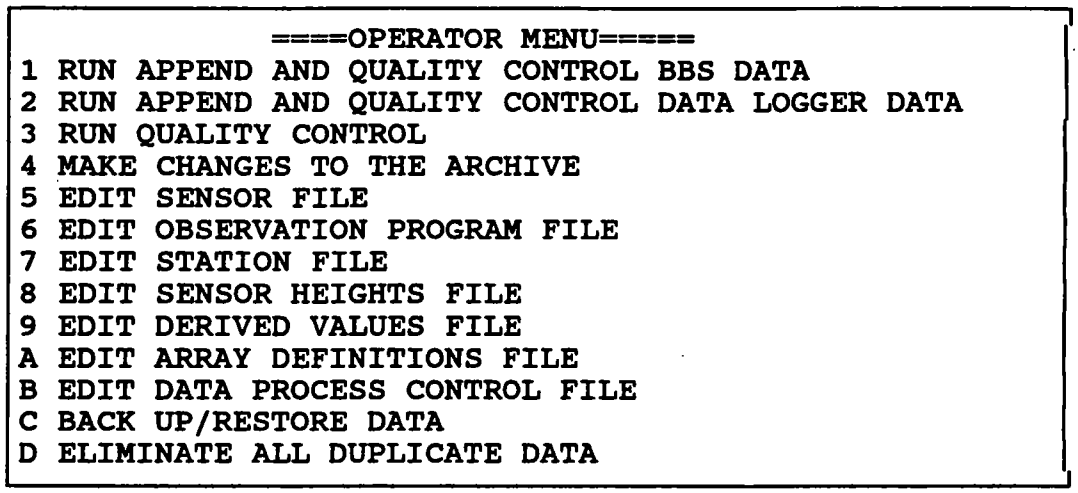
8) MAIN MENU DESCRIPTION



Press first number of menu choice, or highlight and press <Enter>

1) OPERATOR CONTROL- MENU WHICH HAS ALL THE MAINTENANCE PROGRAMS
2) SELECT OUT DATA - MENUS OF FOR THE COPYING OF DATA
3) AES ARCHIVE FORMAT- INACTIVE IN THIS VERSION
4) CLIMATE FORM REPORT - GENERATES A PRINT OUT OF THE A.E.S. DAILY CLIMATE FORM
5) GENERATE CLIMATE FORM DATA - SAME AS 4) EXCEPT THERE IS NO PRINT OUT
6) INVOKE GRAPHING FACILITIES - MENU WHICH HAS ALL THE GRAPHICS PROGRAMS

9) OPERATOR MENU DESCRIPTION



Press first number of menu choice, or highlight and press <Enter>

1) APPEND + QUALITY CONTROL BBS DATA - ADDING QUALITY CONTROLLED DATA TO THE ARCHIVE
2) APPEND + QUALITY CONTROL DATA LOGGER DATA - SEE 1)
3) QUALITY CONTROL - RECALCULATING THE QUALITY CONTROL ON THE ARCHIVE DATA
4) MAKE CHANGES TO THE ARCHIVE - MENU OF PROGRAMS THAT ARE EXECUTED IN A BATCH MODE
5) TO B) SEE DETAILS ON SETTING UP SYSTEM
C) BACK UP/RESTORE DATA - BACKING UP OR RESTORING THE ARCHIVE ON TO FLOPPY DISKS
D) ELIMINATE ALL DUPLICATE DATA - PROGRAM DESIGNED TO FIND ANY DUPLICATION OF DATA THAT MIGHT GET INTO THE ARCHIVE

10) GRAPHICS MENU DESCRIPTION

CLIMATE DATA
PROCESSING AND GRAPHING

```
          ===== GRAPHICS MENU =====
1 FOREST NURSERY DEGREE DAYS
2 CALCULATE HEATING/COOLING DAYS
3 CALCULATE CORN HEAT UNITS
4 CALCULATE DEGREE DAYS
5 24 HOUR QUALITY CONTROL GRAPHS
6 EXECUTE PC WINDROSE
7 WINDCHILL & HUMIDEX CONVERSIONS
8 SELECT DATA & INVOKE GRAPHING/STATISTICAL PRG
9 SOIL TEMPERATURE PROFILES
0 VERTICAL PROFILES
E EDIT PROGRAM SET-UP FILES
R RETURN TO ARCHIVE MAIN MENU
Q QUIT TO DOS
```

Press first number of menu choice, or highlight and press <Enter>

1) FOREST NURSERY DEGREE DAYS - GROWING DEGREE DAY CALCULATION WITH START UP CONDITIONS (ASCII TEXT FILE OUTPUT ONLY)
2) CALCULATE HEATING/COOLING DAYS - HEATING AND COOLING DEGREE DAYS (ASCII TEXT FILE OUTPUT ONLY)
3) CALCULATE CORN HEAT UNITS - (ASCII TEXT FILE OUTPUT ONLY)
4) CALCULATE DEGREE DAYS - (ASCII TEXT FILE OUTPUT ONLY)
5) 24 HOUR QUALITY CONTROL GRAPHS - GRAPHS OF THE LAST 24 HOURS OF DATA
6) PC WINDROSE - PROGRAM TO DISPLAY DATA RELATED TO WIND DIRECTION SEE USER MANUAL OF PC WINDROSE FOR FURTHER DETAILS
7) WINDCHILL & HUMIDEX CONVERSIONS - CALCULATIONS OF WINDCHILL AND HUMIDEX (ASCII TEXT FILE OUTPUT)
8) SELECT DATA AND INVOKE PROGRAM - SELECT OUT YOUR OWN DATA AND THEN RUN YOUR OWN ANALYSIS PROGRAM
9) SOIL TEMPERATURE PROFILES - CREATES A FILE CONTAINING
0) VERTICAL PROFILES - DISPLAYS HOURLY DATA BY TIME,HEIGHT,AND VALUE

E) EDIT PROGRAM SET-UP FILES - EDITS THE FILES CONTAINING THE INFORMATION ON THE DATA TO BE EXTRACTED IN THE ABOVE PROGRAMS AND IN THE CLIMATE FORM

11) BATCH CORRECTION MODE DESCRIPTION

```
ELECTRONIC CLIMATE SYSTEM
OPERATOR CORRECTION PROGRAMS
```

```
--- BATCH CORRECTION MODE --
1 SELECT OUT DATA
2 CHANGE DATA
3 DELETE DATA
4 END BATCH AND RUN CORRECTIONS
E RETURN TO OPERATOR MENU
Q QUIT TO DOS
```

Press first number of menu choice, or highlight and press <Enter>

1) SELECT OUT DATA - COPYING DATA TO ANOTHER FILE
2) CHANGE DATA - MAKING ANY NECESSARY CHANGES TO THE DATA VALUES AND/OR ERROR CODES
3) DELETE DATA - REMOVING DATA BASED ON THE CONTENTS OF ANY FIELDS IN THE ARCHIVE
4) END BATCH AND RUN CORRECTIONS - RUNNING THE BATCH OF PROGRAMS

12) PURPOSE OF ALL FILES

FILE_NAME	PURPOSE OF THE FILES
AES_OPS.PRG	menu for operator control set-up and corrections
AES_OUT.PRG	graphics main menu
AES_SYS.DBF	contains a list of files in aes_sys
AES_SYS.PRG	main menu
ALLDATA.TXT	input data for archive creation
ARCIVE.DBF	contains the permanent archive climate data
ARCIVE1.DBF	temp storage of archive climate data for processing
ARR.NDX	indexed on time code
ARR_DEF.DBF	contains the array code definitions
ARR_DEF.FMT	form for editing the file
ARR_DEF.MDX	main index for arr_def.dbf
ARR_DEF.SCR	used for screen modifications
ARY.NDX	indexed on station id and array code
AUTO.PRG	automatic archive program for use in a batch file execution
BACK_RES.PRG	back up and restore archive
CANOPY.PRG	canopy effect calculation
CHANGE.PRG	menu for changing data
CLOCK.PRG	advances time 1 hour
CORNHEAT.DBF	structured output file for cornheat.prg
CORNHEAT.PRG	calculates corn heat units
CORRECT.DBF	automatic archive data correction control parameters file
CURR.DBF	temporary storage area for file conversion
DATE_ENT.PRG	menu for the start and end dates wanted
DEGDAYS.DBF	structured output file for degdays.prg
DEGDAYS.PRG	calculates degree days
DELETE.PRG	menu for deleting data
DERIVED.DBF	contains the derived code definitions
DERIVED.FMT	form for editing the file
DERIVED.MDX	main index for derived.dbf
DERIVED.SCR	used for screen definition in modification procedures
DISTANCE.PRG	calculates the distance and bearing between 2 points
DTOJ.PRG	date to julian conversion
ERRFILE.DBF	file containing all data flagged with an error
ERRFORM.FRG	error data report form
ERRFORM.PRF	error data report form printer commands
ERRPGM.DBF	contains error code definitions
ERRPGM.MDX	main index for errpgm.dbf
ERR_COR.PRG	batch operator corrections menu
ERR_ENT.PRG	gets the error code value to be changed to
ERR_RPT.PRG	error data report
EXTDAT.DBF	set-up file
EXTPLOT.PRG	extracts data into a text file with time conversion optional
EXTPLOT1.PRG	extracts data into a text file with time conversion
EXTRACT1.PRG	extracts data for GRAPH4 **input necessary**
EXTROSE.PRG	extracts data for windrose.exe
FILEPROC.PRG	performs all I/O on the archive format files
FILE_EN1.PRG	file entry screen for entering bbs path
FILE_EN2.PRG	file entry screen for entering data logger path and file
FILE_EN3.PRG	file entry screen for a path and file name
FILE_ENT.PRG	menu for the output file name

FNDSTRT.PRG	finds the starting record position for a given time
FORFORMS.DBF	set-up file
FORM1.DBF	template of climate form
FORM1.FRG	print form file
FORM1.FRM	print form file
FORM1.FRO	print form file
FORM1.PRF	print form file
FORM2.DBF	temporary file containing climate form data for printing
FORSURF.DBF	file containing interpolated point data
FORSURF1.DBF	file containing extracted data
GDEG.PRG	calculates growing degree days
GETCHANG.PRG	gets the change to archive required
GETFILE.PRG	gets the allowable file names not protected in aes_sys.dbf
GRAFSU.TXT	set-up for graph4
GRAPH4.EXE	fortran program to graph temps,rh,precip,rad,batt,wind
GRAPH4.FOR	fortran code used to graph temps,rh,precip,rad,batt,wind
GROWING.DBF	structured output file for gdeg
HEATCOOL.PRG	calculates heating/cooling degrees
HEATING.DBF	structured output file for heatcool
HEIGHT.DBF	contains the height code definitions
HEIGHT.FMT	form for editing file
HEIGHT.MDX	main index for height.dbf
HEIGHT.SCR	used in screen modification
HORZDIFA.PRG	horizontal quality control for temporary archive
HORZDIFB.PRG	horizontal quality control for permanent archive
HOR_ARC.DBF	sorted file for horizontal comparisons
HOR_ARC1.DBF	temporary file
HOR_COMP.PRG	compares the stations to one station
HOR_WT.PRG	computes the weights of each station from one station
INTERC.DBF	intermediate file used for processing data
INTERMIT.DBF	intermediate file used for processing data
INTERPOL.PRG	prg to interpolate between soil temp gauges and output data
INTERPSU.DBF	set_up for interpol
LAST24.DBF	contains the last 24 hours of data necessary for graph4.exe
MISSFILE.DBF	stored contents of identified missing arrays
MISSFORM.FRG	missing data form
MISSFORM.PRF	printer control data
MISSING.DBF	stores what data arrays where found
MISSING.PRG	finds missing arrays of data in the archive
MISSING1.DBF	sorted contents of missing by array
NODUP.PRG	eliminates duplicate data in the input file before processing
OBSPGM.DBF	contains the observation code definition
OBSPGM.FMT	form for editing file
OBSPGM.MDX	main index for obspgm.dbf
OBSPGM.SCR	used in screen modifications
OPER_CON.DBF	storage file containing control data
OUTFORM1.PRG	creates file form1.dbf giving daily max,min for desired days
PERIOD.NDX	indexed on period observed
PROD1AA.PRG	generates data for the aes climate form
PROD1AB.PRG	break up climate form data into monthly blocks and prints it
PROD1C.PRG	determines max. and min for climate day (uses form1)
PUBCOLOR.PRG	colour of display parameters defined
PUBCONT.PRG	process control parameters defined

PUBFILE.PRG	file control parameters defined
PUBINIT.PRG	loop control parameters defined
PUBPOPUP.PRG	menu popup parameters defined
QUAL1A.PRG	takes the input data and puts it into the archive format
QUAL1AA.PRG	takes the input data and puts it into the archive format
QUAL1B.PRG	quality control with a user named file (data logger format)
QUAL2A.PRG	sets the relations between files and the temporary archive
QUAL2B.PRG	same as qual2a except using a sorted arcive file
QUAL2C.PRG	same as qual2a except using the archive file
QUAL3A.PRG	quality control programs on a temporary data file
QUAL3B.PRG	quality control programs on the archive file
RD_COR.PRG	reads control parameters
RESTVAL.PRG	automatic archive data correction
ROSESU.DBF	set-up for extrose
SEL1.DBF	temporary storage of data for climate form
SEL2.DBF	
SELEC.PRG	menu for selecting out data
SENSOR.DBF	contains the sensor code definitions
SENSOR.FMT	form for editing
SENSOR.MDX	main index for sensor.dbf
SEN_DATA.PRG	gets the information in the sensor.dbf file
SEN_MAKE.NDX	indexed on sensor code and make code
STA_CONT.DBF	contains structure info for archive generation
STA_FORM.DBF	used for climate form generation
STA_ID.DBF	contains the station code definitions
STA_ID.FMT	form for editing file
STA_ID.MDX	main index for sta_id.dbf
STA_ID.SCR	used for screen modifications
STORFIL.DBF	contains names of output files
TEMP24.DBF	contains all of the last 24 hours of data
TEMPDA.DBF	intermediate file for data conversion of logger data
TEMPDATA.DBF	intermediate file for data conversion of bbs data
TEMPROSE.DBF	contains output data
TEST0001.DBF	test file for path validity
TIME_ENT.PRG	input menu for the start and end times
TMP00001.DBF	temporary sort file on year,day,time,table id, and file name
TOEDIT.PRG	editor used for editing set-up files
TOEDITSC.PRG	editor used for editing sta_cont file
TOEDSU.DBF	set-up for toedit (cannot edit using toedit!)
VALU_ENT.PRG	input menu for the range of data values
VAL_ENT.PRG	gets the value to be changed to
VERTDIFA.PRG	vertical quality control of the temporary archive
VERTDIFB.PRG	vertical quality control of the archive
VERTEMP.DBF	storage of processing error check data
VERTGRAF.EXE	vertical display of data over time
VERTGRAF.FOR	source code for vertical display of data over time
VERTIC.DBF	data file with vertical data
VERTPROF.PRG	extracts and sorts data vertically
VERTSU.DBF	data file with the data parameters to use in program
VSORT.DBF	storage of data sorted vertically
WINDROSE.BAS	code for creation of a wind rose with directional data
WINDROSE.EXE	creates a wind rose with directional data

13) WHERE FILES ARE CALLED FROM

FILE_NAME	CALLING PROGRAMS
AES_OPS.PRG	AES_SYS.PRG
AES_OUT.PRG	AES_SYS.PRG
AES_SYS.DBF	GETFILE.PRG
AES_SYS.PRG	
ALLDATA.TXT	QUAL1A.PRG, QUAL1AA.PRG
ARCIVE.DBF	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, AUTO.PRG, HORZDIFB.PRG, QUAL3B.PRG
ARCIVE1.DBF	HORZDIFA.PRG, QUAL1A.PRG, QUAL1AA.PRG, QUAL1B.PRG, QUAL2A.PRG, QUAL3A.PRG
ARR.NDX	AES_OPS.PRG, CHANGE.PRG, DELETE.PRG, INTERPOL.PRG, SELEC.PRG, VERTPROF.PRG
ARR_DEF.DBF	ALL
ARR_DEF.FMT	AES_OPS.PRG
ARR_DEF.MDX	
ARR_DEF.SCR	
ARY.NDX	QUAL1A.PRG, QUAL1AA.PRG, QUAL1B.PRG
AUTO.PRG	
BACK_RES.PRG	AES_OPS.PRG
CANOPY.PRG	HORZDIFA.PRG, HORZDIFB.PRG
CHANGE.PRG	ERR_COR.PRG
CLOCK.PRG	MISSING.PRG
CORNHEAT.DBF	CORNHEAT.PRG
CORNHEAT.PRG	AES_OUT.PRG
CORRECT.DBF	RESTVAL.PRG
CURR.DBF	QUAL1A.PRG, QUAL1AA.PRG, QUAL1B.PRG
DATE_ENT.PRG	CHANGE.PRG, DELETE.PRG, EXTROSE.PRG, INTERPOL.PRG, OUTFORM1.PRG, PROD1AA.PRG, SELEC.PRG
DEGDAYS.DBF	DEGDAYS.PRG
DEGDAYS.PRG	AES_OUT.PRG
DELETE.PRG	ERR_COR.PRG
DERIVED.DBF	ALL
DERIVED.FMT	AES_OPS.PRG
DERIVED.MDX	
DERIVED.SCR	
DISTANCE.PRG	HOR_WT.PRG
DTOJ.PRG	DATE_ENT.PRG, EXTRACT1.PRG, OUTFORM1.PRG, PROD1AA.PRG, QUAL3A.PRG, QUAL3B.PRG, VERTPROF.PRG
ERRFILE.DBF	ERR_RPT.PRG
ERRFORM.FRG	ERR_RPT.PRG
ERRFORM.PRF	ERR_RPT.PRG
ERRPGM.DBF	ALL
ERRPGM.MDX	
ERR_COR.PRG	AES_OPS.PRG
ERR_ENT.PRG	GETCHANG.PRG
ERR_RPT.PRG	QUAL3A.PRG, QUAL3B.PRG
EXTDAT.DBF	EXTRACT1.PRG, TOEDIT.PRG
EXTPLOT.PRG	AES_OUT.PRG
EXTPLOT1.PRG	AES_OUT.PRG
EXTRACT1.PRG	AES_OUT.PRG

EXTROSE.PRG	AES_OUT.PRG
FILEPROC.PRG	AES_OUT.PRG, ERR_COR.PRG, INTERPOL.PRG, OUTFORM1.PRG, PROD1AA.PRG, RESTVAL.PRG
FILE_EN1.PRG	QUAL1A.PRG
FILE_EN2.PRG	QUAL1B.PRG
FILE_EN3.PRG	CHANGE.PRG, DELETE.PRG, EXTROSE.PRG, INTERPOL.PRG, OUTFORM1.PRG, PROD1AA.PRG, SELEC.PRG, VERTPROF.PRG
FILE_ENT.PRG	GETFILE.PRG
FNDSTRT.PRG	EXTROSE.PRG, FILEPROC.PRG
FORFORMS.DBF	OUTFORM1.PRG, PROD1AA.PRG, TOEDIT.PRG
FORM1.DBF	CORNHEAT.PRG, DEGDAYS.PRG, GDEG.PRG, HEATCOOL.PRG, OUTFORM1.PRG, PROD1AA.PRG, PROD1AB.PRG, PROD1C.PRG
FORM1.FRG	PROD1AB.PRG
FORM1.FRM	
FORM1.FRO	
FORM1.PRF	
FORM2.DBF	PROD1AB.PRG
FORSURF.DBF	INTERPOL.PRG
FORSURF1.DBF	INTERPOL.PRG
GDEG.PRG	AES_OUT.PRG
GETCHANG.PRG	CHANGE.PRG
GETFILE.PRG	EXTROSE.PRG, OUTFORM1.PRG, SELEC.PRG, VERTPROF.PRG
GRAFSU.TXT	EXTRACT1.PRG
GRAPH4.EXE	AES_OUT.PRG
GRAPH4.FOR	
GROWING.DBF	GDEG.PRG
HEATCOOL.PRG	AES_OUT.PRG
HEATING.DBF	HEATCOOL.PRG
HEIGHT.DBF	ALL
HEIGHT.FMT	AES_OPS.PRG
HEIGHT.MDX	
HEIGHT.SCR	
HORZDIFA.PRG	QUAL3A.PRG
HORZDIFB.PRG	QUAL3B.PRG
HOR_ARC.DBF	HORZDIFA.PRG, HORZDIFB.PRG
HOR_ARC1.DBF	HORZDIFA.PRG, HORZDIFB.PRG
HOR_COMP.PRG	HORZDIFA.PRG, HORZDIFB.PRG
HOR_WT.PRG	HORZDIFA.PRG, HORZDIFB.PRG
INTERC.DBF	GDEG.PRG
INTERMIT.DBF	DEGDAYS.PRG, HEATCOOL.PRG
INTERPOL.PRG	AES_OUT.PRG
INTERPSU.DBF	INTERPOL.PRG, TOEDIT.PRG
LAST24.DBF	EXTRACT1.PRG
MISSFILE.DBF	MISSING.PRG
MISSFORM.FRG	MISSING.PRG
MISSFORM.PRF	MISSING.PRG
MISSING.DBF	MISSING.PRG
MISSING.PRG	QUAL3A.PRG, QUAL3B.PRG
MISSING1.DBF	MISSING.PRG
NODUP.PRG	QUAL1A.PRG, QUAL1AA.PRG
OBSPGM.DBF	ALL
OBSPGM.FMT	AES_OPS.PRG
OBSPGM.MDX	

OPER_CON.DBF	ERR_COR.PRG, WRT_COR.PRG
OUTFORM1.PRG	AES_OUT.PRG
PERIOD.NDX	AES_OPS.PRG, CHANGE.PRG, DELETE.PRG, INTERPOL.PRG, SELEC.PRG, VERTPROF.PRG
PROD1AA.PRG	AES_SYS.PRG
PROD1AB.PRG	AES_SYS.PRG
PROD1C.PRG	AES_OUT.PRG, AES_SYS.PRG
PUBCOLOR.PRG	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, AUTO.PRG, ERR_COR.PRG
PUBCONT.PRG	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, AUTO.PRG, ERR_COR.PRG
PUBFILE.PRG	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, AUTO.PRG, ERR_COR.PRG
PUBINIT.PRG	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, AUTO.PRG, ERR_COR.PRG
PUBPOPUP.PRG	AES_OPS.PRG, AES_OUT.PRG, AES_SYS.PRG, ERR_COR.PRG
QUAL1A.PRG	AES_OPS.PRG
QUAL1AA.PRG	AUTO.PRG
QUAL1B.PRG	AES_OPS.PRG
QUAL2A.PRG	AES_OPS.PRG, AUTO.PRG, VERTDIFA.PRG
QUAL2B.PRG	HORZDIFA.PRG, HORZDIFB.PRG
QUAL2C.PRG	AES_OPS.PRG, VERTDIFB.PRG
QUAL3A.PRG	AES_OPS.PRG, AUTO.PRG
QUAL3B.PRG	AES_OPS.PRG
RD_COR.PRG	ERR_COR.PRG, RESTVAL.PRG
RESTVAL.PRG	QUAL3A.PRG
ROSESU.DBF	EXTROSE.PRG, TOEDIT.PRG
SEL1.DBF	PROD1AA.PRG
SEL2.DBF	PROD1AA.PRG
SELEC.PRG	AES_OUT.PRG, AES_SYS.PRG, ERR_COR.PRG
SENSOR.DBF	ALL
SENSOR.FMT	AES_OPS.PRG
SENSOR.MDX	
SEN_DATA.PRG	HORZDIFA.PRG, HORZDIFB.PRG
SEN_MAKE.NDX	ALL
STA_CONT.DBF	QUAL1A.PRG, QUAL1AA.PRG, QUAL1B.PRG, TOEDITSC.PRG
STA_FORM.DBF	OUTFORM1.PRG, PROD1AA.PRG
STA_ID.DBF	ALL
STA_ID.FMT	AES_OPS.PRG
STA_ID.MDX	
STA_ID.SCR	
STORFIL.DBF	VERTPROF.PRG
TEMP24.DBF	EXTRACT1.PRG
TEMPDA.DBF	QUAL1B.PRG
TEMPDATA.DBF	NODUP.PRG, QUAL1A.PRG, QUAL1AA.PRG
TEMPROSE.DBF	EXTROSE.PRG
TEST0001.DBF	FILE_ENT.PRG
TIME_ENT.PRG	CHANGE.PRG, DELETE.PRG, INTERPOL.PRG, SELEC.PRG
TMP00001.DBF	QUAL1A.PRG, QUAL1AA.PRG, QUAL1B.PRG
TOEDIT.PRG	AES_OUT.PRG
TOEDITSC.PRG	AES_OPS.PRG
TOEDSU.DBF	TOEDIT.PRG
VALU_ENT.PRG	CHANGE.PRG, DELETE.PRG, INTERPOL.PRG, SELEC.PRG
VAL_ENT.PRG	GETCHANG.PRG
VERTDIFA.PRG	QUAL3A.PRG
VERTDIFB.PRG	QUAL3B.PRG, QUAL3B.PRG

VERTEMP.DBF	VERTDIFA.PRG, VERTDIFB.PRG
VERTGRAF.EXE	AES_OUT.PRG
VERTGRAF.FOR	
VERTIC.DBF	VERTPROF.PRG
VERTPROF.PRG	AES_OUT.PRG
VERTSU.DBF	TOEDIT.PRG, VERTPROF.PRG
VSORT.DBF	VERTDIFA.PRG, VERTDIFB.PRG
WINDROSE.BAS	
WINDROSE.EXE	AES_OUT.PRG
WRT_COR.PRG	ERR_COR.PRG

14) LIST OF PROGRAMS THAT CALL OTHER PROGRAMS

FILE_NAME	PROGRAMS CALLED
AES_OPS.PRG	PUBINIT.PRG PUBCOLOR.PRG PUBFILE.PRG PUBPOPUP.PRG PUBCONT.PRG QUAL1A.PRG QUAL2A.PRG QUAL3A.PRG QUAL1B.PRG QUAL2C.PRG QUAL3B.PRG TOEDITSC.PRG BACK_RES.PRG ERR_COR.PRG
AES_OUT.PRG	PUBINIT.PRG PUBCOLOR.PRG PUBFILE.PRG PUBPOPUP.PRG PUBCONT.PRG OUTFORM1.PRG PROD1C.PRG GDEG.PRG EXTPLOT1.PRG HEATCOOL.PRG CORNHEAT.PRG DEGDAYS.PRG GRAPH4.EXE WINDROSE.EXE SELEC.PRG FILEPROC.PRG EXTPLOT.PRG INTERPOL.PRG VERTPROF.PRG VERTGRAF.EXE TOEDIT.PRG EXTROSE.PRG EXTRACT1.PRG
AES_SYS.PRG	PUBINIT.PRG PUBCOLOR.PRG PUBFILE.PRG PUBPOPUP.PRG PUBCONT.PRG AES_OPS.PRG SELEC.PRG PROD1AA.PRG PROD1AB.PRG PROD1C.PRG AES_OUT.PRG
AUTO.PRG	PUBINIT.PRG PUBFILE.PRG PUBCONT.PRG PUBCOLOR.PRG QUAL1AA.PRG QUAL2A.PRG QUAL3A.PRG
CHANGE.PRG	FILE_EN3.PRG GETCHANG.PRG DATE_ENT.PRG TIME_ENT.PRG VALU_ENT.PRG
DATE_ENT.PRG	DTOJ.PRG
DELETE.PRG	FILE_EN3.PRG DATE_ENT.PRG TIME_ENT.PRG VALU_ENT.PRG
ERR_COR.PRG	PUBINIT.PRG PUBCOLOR.PRG PUBFILE.PRG PUBPOPUP.PRG PUBCONT.PRG WRT_COR.PRG RD_COR.PRG FILEPROC.PRG SELEC.PRG CHANGE.PRG DELETE.PRG
EXTRACT1.PRG	DTOJ.PRG
EXTROSE.PRG	FILE_EN3.PRG GETFILE.PRG DATE_ENT.PRG FNDSTRT.PRG
FILEPROC.PRG	FNDSTRT.PRG
GETCHANG.PRG	ERR_ENT.PRG VAL_ENT.PRG
GETFILE.PRG	FILE_ENT.PRG
HORZDIFA.PRG	QUAL2B.PRG CANOPY.PRG HOR_WT.PRG HOR_COMP.PRG SEN_DATA.PRG
HORZDIFB.PRG	QUAL2B.PRG CANOPY.PRG HOR_WT.PRG HOR_COMP.PRG SEN_DATA.PRG
HOR_WT.PRG	DISTANCE.PRG
INTERPOL.PRG	FILEPROC.PRG FILE_EN3.PRG DATE_ENT.PRG TIME_ENT.PRG VALU_ENT.PRG
MISSING.PRG	CLOCK.PRG
OUTFORM1.PRG	FILE_EN3.PRG GETFILE.PRG DATE_ENT.PRG FILEPROC.PRG DTOJ.PRG
PROD1AA.PRG	FILE_EN3.PRG DATE_ENT.PRG FILEPROC.PRG DTOJ.PRG
QUAL1A.PRG	NODUP.PRG FILE_EN1.PRG
QUAL1AA.PRG	NODUP.PRG
QUAL1B.PRG	FILE_EN2.PRG
QUAL3A.PRG	DTOJ.PRG RESTVAL.PRG ERR_RPT.PRG MISSING.PRG VERTDIFA.PRG HORZDIFA.PRG
QUAL3B.PRG	DTOJ.PRG VERTDIFB.PRG ERR_RPT.PRG MISSING.PRG VERTDIFB.PRG HORZDIFB.PRG
RESTVAL.PRG	RD_COR.PRG FILEPROC.PRG
SELEC.PRG	FILE_EN3.PRG GETFILE.PRG DATE_ENT.PRG TIME_ENT.PRG VALU_ENT.PRG
VERTDIFA.PRG	QUAL2A.PRG
VERTDIFB.PRG	QUAL2C.PRG
VERTPROF.PRG	FILE_EN3.PRG GETFILE.PRG DTOJ.PRG

15) MAINTENANCE OF THE FILE LISTS

A program called "ARCDOC.PRG" was developed to keep track of the cross reference listings of calling and both called programs and data files. To use the cross reference program fill in all the information in the file "ARCDOC.DBF", and then run the program "ARCDOC.PRG". After running the program fill use the file "AES_SYS.DBF" with the new files and supply the purpose for the new files. With these two files you can maintain a continuous record of all programs and data files. The source code and file format follows on the next pages.

```
*************************************************************************
* PROGRAM NAME:              ARCDOC.PRG                                 *
*                            PROGRAM MAINTENENCE PROGRAM                *
*                            HELPS MAINTAIN LIST OF PROGRAMS USED AND WHERE *
* LAST CHANGED:              12/03/92          12:13                    *
* WRITTEN BY:                DAVID P PHILLIPS
*
*************************************************************************
USE ARCDOC
SET SAFETY OFF
INDEX ON FILE_NAME TO ARCDOC
SET SAFETY ON
USE ARCDOC INDEX ARCDOC
REPLACE CALLEDFROM WITH " " ALL
GOTO TOP
X = 0
FND = .F.
DO WHILE .NOT. FND
   X = X + 1
   IF FIELD(X) = 'DAT_FILE01' && FINDS STARTING FIELD POSITION
      FND = .T.
   ENDIF
ENDDO
DO WHILE .NOT. EOF()
   CNT = 0
   REC = FILE_NAME
   DO WHILE .NOT. EOF()
      NAME1A = FIELD(X+CNT)
      LEN1 = LEN(RTRIM(LTRIM(NAME1A)))
      IF LEN1 = 0
      EXIT
      ENDIF
      NAME1 = &NAME1A
      LEN2 = LEN(RTRIM(LTRIM(NAME1)))
      IF LEN2 > 4
      SEEK(NAME1)
      IF .NOT. FOUND()
         APPEND BLANK
         REPLACE CALLEDFROM WITH REC
         REPLACE FILE_NAME WITH NAME1
      ELSE
         IF LTRIM(RTRIM(CALLEDFROM)) <> "ALL"
            IF LEN(LTRIM(CALLEDFROM)) < 2
            REPLACE CALLEDFROM WITH REC
            ELSE
            IF LEN(LTRIM(RTRIM(CALLEDFROM)) + ", " + REC) > 120
               REPLACE CALLEDFROM WITH "ALL"
            ELSE
               REPLACE CALLEDFROM WITH LTRIM(RTRIM(CALLEDFROM)) + ", " + REC
            ENDIF
            ENDIF
         ENDIF
```

```
      ENDIF
                                                                    PAGE 24
         SEEK(REC)
      ENDIF
      CNT = CNT + 1
   ENDDO
   SKIP
ENDDO
RETURN
********************** END OF ARCDOC.PRG ******************************
```

Structure for database: ARCDOC.DBF
Date of last update : 12/04/92

Field Name	Type	Width	USAGE
FILE_NAME	Character	12	STORES FILE NAME
CALLEDFROM	Character	122	STORES WHERE FILE NAME USED IN CALL
DAT_FILE01	Character	12	DATA FILES
DAT_FILE02	Character	12	
DAT_FILE03	Character	12	
DAT_FILE04	Character	12	
DAT_FILE05	Character	12	
DAT_FILE06	Character	12	
DAT_FILE07	Character	12	
DAT_FILE08	Character	12	
DAT_FILE09	Character	12	
DAT_FILE10	Character	12	
DAT_FILE11	Character	12	
DAT_FILE12	Character	12	
DAT_FILE13	Character	12	
DAT_FILE14	Character	12	
DAT_FILE15	Character	12	
INDEX_01	Character	12	INDEX FILES
INDEX_02	Character	12	
INDEX_03	Character	12	
INDEX_04	Character	12	
INDEX_05	Character	12	
OTHER01	Character	12	FORM OR SCREEN FILES
OTHER02	Character	12	
OTHER03	Character	12	
OTHER04	Character	12	
OTHER05	Character	12	
OTHER06	Character	12	
OTHER07	Character	12	
OTHER08	Character	12	
OTHER09	Character	12	
OTHER10	Character	12	
CALL_PGM01	Character	12	PROGRAM CALLS TO OTHER PROGRAMS
CALL_PGM02	Character	12	
CALL_PGM03	Character	12	
CALL_PGM04	Character	12	
CALL_PGM05	Character	12	
CALL_PGM06	Character	12	
CALL_PGM07	Character	12	
CALL_PGM08	Character	12	
CALL_PGM09	Character	12	
CALL_PGM10	Character	12	
CALL_PGM11	Character	12	
CALL_PGM12	Character	12	
CALL_PGM13	Character	12	
CALL_PGM14	Character	12	
CALL_PGM15	Character	12	
CALL_PGM16	Character	12	
CALL_PGM17	Character	12	

CALL_PGM18	Character	12
CALL_PGM19	Character	12
CALL_PGM20	Character	12
CALL_PGM21	Character	12
CALL_PGM22	Character	12
CALL_PGM23	Character	12
CALL_PGM24	Character	12
CALL_PGM25	Character	12

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