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MASTER

RADIAN REMOTE SAMPLING SYSTEM
DIGITAL PROCESSOR SYSTEM (D)
SOFTWARE DETAIL DOCUMENTATION
PITTSBURGH ENERGY RESEARCH CENTER

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Prepared By:
Radian Staff

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I. SYSTEM OVERVIEW

The sampling system is composed of two programs with their various subroutines and four kinds of data files.

Program INITS initializes the system and creates the four current data files.

Program RSAMP performs the sampling, monitors the keyboards, and checks for power failures. The program accomplishes this by starting two tasks (subprograms that run independently) at the appropriate time. RSAMP first initializes the common variables in accordance with the parameters on file SAMPSYS, which was created by INITS. RSAMP then starts tasks KEYIN and MODEM. These tasks wait for input from the console (KEYIN) or multiplexor (MODEM). If the input is acceptable, these tasks will call CHKEY, which will determine which action the operator wants and call the appropriate subroutine to accomplish it. The operator can change most system parameters via this method, and he may also print out the various data pertaining to the system. RSAMP checks the time repeatedly until it is time to sample and then calls subroutine SAMPL.

SAMPL will collect the data from the DART and set flag IAVTM when enough samples have been collected to average. RSAMP checks this flag and calls subroutine AVRGE when appropriate. RSAMP also checks flag IPFAR, which is set in case of a power fail, and will reset the system (without loss of data) if a power fail occurs. Finally, RSAMP compares the current time with the end time sampling parameters and stop sampling at that point, saving all data collected on the disk.

II. FILE STRUCTURES

The four data files are random access files. All I/O to the files is handled by FORTRAN calls to READR and WRITR.

FILE 1: Sampling System Parameters

File name is SAMPSYS. RSAMP keeps channel 4 open to the file. It contains 1 record of 64 words. I/O is from/to common area C17, array name ISYS. File layout:

<u>WORDS</u>	<u>USE</u>
1-5	initialization data file name
6-10	calibration data file name
11	time in seconds between samples
12	time in seconds between averages
13	last channel number used
14	number of samples per average
15	size of Average Data file in records
16	automatic print interval
17	number of channels in use
18-20	unused
21-24	average data file name
25-64	unused

FILE 2: Initialization Data File

File name is IDMMDDHH, where MM is the month, DD the day, and HH the hour when the data was last changed. File contains 256 records of 24 words. RSAMP keeps channel 1 open to the file. I/O is from/to common area C5, array names IDF, & XA.

File layout:

	<u>WORDS</u>	<u>USE</u>
IDF	1	channel number (same as record run)
	2-4	channel label ("OFF" if not assigned)
	5-7	channel units
	8	space
XA	1	channel type (-1 not assigned 0 regular 1 type 1 thermocouple 2 type 2 thermocouple)
	2	zero voltage value
	3	lower warning limit
	4	upper warning limit
	5	lower invalid limit
	6	upper invalid limit
	7	maximum change
	8	gain setting (1 10mv 2 100mv 3 1v 4 5v 5 10v)

FILE 3: Calibration Data File

File name is CDMDDHH, where MM is the month, DD the day, and HH the hour when the data was last changed. File contains 256 records of 8 words. RSAMP keeps channel 2 open to the file. I/O is from/to common area C7, array names ICF, & XB.

File layout:

	<u>WORDS</u>	<u>USE</u>
ICF	1	channel number
	2	month of calibration
	3	day of calibration
	4	time (HHMM) of calibration
XB	1	zero value
	2	span value

NOTE: The sampling system does not currently use this file.

FILE 4: Averaged Data

File name is ADMDD, where MM is the month, and DD the day the data was collected. File will contain many records of 778 words each. RSAMP keeps channel 3 open to the file. I/O is from/to common area C9, array names IDATA, IDATS, & AVG.

File layout:

	<u>WORDS</u>	<u>USE</u>
IDATA	1	record number
	2	ID file month/day
	3	ID file time
	4	CD file month/day
	5	CD file time
	6	last channel in use
	7	number of channels in use
	8	time of sample
	9	spare } was previously used
	10	spare } for DART status bits

	<u>WORDS</u>	<u>USE</u>
IDATS	0-255	status word for each channel -1 not sampled 0 OK 1 less than lower warning 2 greater than upper warning 3 less than lower invalid 4 greater than upper invalid 5 maximum change exceeded
AVG	0-255	average for each channel

III. SYSTEM NOTES

1. Since this is running on a minicomputer, space is important. In particular, long character strings can take up lots of space. Therefore, we have tried to use subroutines to minimize error messages. (E.G. RDIDF, IFERR)
2. Subroutine calls have a lot of overhead associated with them; in particular, it is more efficient (time-wise) to say: IF (IERR.NE.1) call IFERR (message, IERR) than to say: CALL IFERR (message, IERR). Both of these will work the same since the first statement of IFERR is IF (IERR.EQ.1) return. However, the first way takes up more space while the second way takes longer. Thus, we have compromised by using version 1 in the more time critical areas (such as reading the disk file while sampling) while using version 2 other places (such as opening files, etc.).
3. Subroutine OVRLY is very system dependent. It is used because it saves a large amount of program space. Be sure that the first two arguments to OVRLY are declared EXTERNAL in the calling module.

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NAME: AVRGE

FUNCTION: Average the A/D channels in the DART

CALLING SEQUENCE: Call AVRGE

SUBPROGRAMS CALLED: OPNAV, WRDAT

COMMON INPUT: 16/Error msg/IERRM
17/SAMPSYS/ISYS(13)
22/DART status/IDSTS(4)

OUTPUT: C5/ID file/IDF
C9/AD file/IDAT
C10/time/ITM
C12/sampling param/IAVGS, LAVGS
DISK: C21/printing param/IPRIN

OUTPUT: WRDAT

SPECIAL CONSIDERATIONS/RESTRICTIONS: KEYIN, MODEM tasks not active
while in AVRGE Channel 10 must be open to your output
device in case of a print interval.

NAME: CCHST

FUNCTION: Change channel status

CALLING SEQUENCE: Call CCHST (IOUT, ICHG)

WHERE: IOUT is the channel to direct output to
ICHG is the new channel status

SUBPROGRAMS USED: INTRD

COMMON INPUT: C3 - System parameters
LCHN - last channel #

OUTPUT: C13 - channel information
ICHST (IC) - channel status

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device opened on
FORTRAN channel IOUT, input device on channel IOUT+1

FC = Channel #
ICHG = New status

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NAME: CHAPI

FUNCTION: Change automatic print interval

CALLING SEQUENCE: CALL CHAPI (IOUT)

WHERE: IOUT is the channel to direct outputs to

SUBPROGRAMS USED: INTRD

COMMON OUTPUT: C17 - SAMPSYS

ISYS(16) - auto print interval

C21 - printing parameters

IHAV, IPRIN - auto print interval

DISK OUTPUT: SAMPSYS update of core image

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device open as
FORTRAN Channel IOUT, input device open as IOUT + 1.

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NAME: CHAT

FUNCTION: Change system averaging time

CALLING SEQUENCE: Call CHAT (IOUT, IFLAG)

WHERE: IOUT is the channel to direct output to
IFLAG = 3 print averaging time, don't change
<> 3 allow user to change

SUBPROGRAMS USED: INTRD, STORE

COMMON INPUT: C17/SAMPSYS/ISYS(11) Sampling time (sec)

OUTPUT: C3/SYSPARAM/IAVGT System averaging time
C5/ID FILE/IDF (12) averaging time
C12/SAMP PARA/NSAMP # of samples per average
C17/SAMPSYS/ISYS(12) averaging time,
ISYS(14)=no. of samples per average

DISK OUTPUT: SAMPSYS update from core copy

SPECIAL CONSIDERATIONS/RESTRICTIONS: output device opened on
FORTRAN channel IOUT, input device on IOUT+1

NAME: CHCAL

FUNCTION: Change calibration parameters

CALLING SEQUENCE: Call CHCAL (IOUT)

WHERE: IOUT is the channel to direct output to

SUBPROGRAMS USED: INTRD, STORE, FPRD, NCODE

COMMON INPUT: C3/LCHN last channel #
C6/ML (month)

OUTPUT: C5/ID FILE/IDF(6-10) CD File name
C7/CD FILE/ICF(IC) channel =
C17/SAMPSYS/ISYS (6-10) CD File name

DISK OUTPUT: CDFILE
SAMPSYS

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be open
on FORTRAN channel IOUT, input on IOUT+1. Routine will
allow calibration changes on any number of channels -
enter A (up arrow) for channel # to quit

RADIAN

COOPERATION

NAME: CHCHN

FUNCTION: Change Channel Parameters

CALLING SEQUENCE: Call CHCHN (IOUT)

WHERE: IOUT is the channel to direct output to

SUBPROGRAMS USED: INTRD, STORE, FPRD, NCODE

COMMON INPUT: C3/Sys param/ISAMPT, IAVGT
C10/time/IDT, ITM

OUTPUT: C5/ID file/IDF
C17/SAMPSYS/ISYS(17)
ISYS(1-5)

DISK OUTPUT: IDMMDDHH Disk File
SAMPSYS

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device open on
Fortran Channel IOUT, Input on IOUT+1

NAME: CHKEY

FUNCTION: Call processing routine for each key-in

CALLING SEQUENCE: Call CHKEY (IOUT)

WHERE: IOUT is the channel to direct output to

SUBPROGRAMS USED: CHAT, CHST, CHCHN, CHCAL, PRIDE, PRCDF, PRNT,
STSMP, PRTCS, PQBCT, CCHST, CHAPI, RQSTS, PRSTD

COMMON INPUT: C8/KEY
CIO/TIME

OUTPUT: C24/ /IO

SPECIAL CONSIDERATIONS/RESTRICTIONS: Calls overlays.

The overlay file must be open on channel 8.

IOUT must be the output channel, IOUT+1 is for input.

NAME: CHST

FUNCTION: Change system sampling time

CALLING SEQUENCE: CALL CHST (IOUT, IFLAG)

WHERE: IOUT is the channel to direct output to
IFLAG = 3 print time, don't change
+ 3 allow change

COMMON OUTPUT: C3/SYS PARAM/ISAMPT sampling time
C5/IDFILE/IDF
C12/SAMPLING PARAM/NSAMP # of samples per average
C17/SAMPSYS/ISYS(), ISYS (14)

DISK INPUT:

OUTPUT: SAMPSYS

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be opened
on FORTRAN channel IOUT, input device on IOUT+1.

IOUT - the channel to direct output to
IFLAG - = 3 print time, don't change
 <> 3 allow change

NAME: CLK (Entry points GCLK, SCLK, RCLK)

FUNCTION: Interface to user clock

CALLING SEQUENCE: Call GCLK (ICLK)

WHERE: ICLK is clock flag

CALL RCLK

JSR SCLK

SPECIAL CONSIDERATIONS/RESTRICTIONS: GCLK and RCLK are FORTRAN-callable subroutines. SCLK is used by the clock interrupt processor to set the user clock flag.

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NAME: DARTTEST

FUNCTION: Test DART to make sure everything is functioning properly.

SUBPROGRAMS CALLED:

INTRD - integer read

RDART - read DART

RQBCT - request battery clock time

USE OF PROGRAM:

from the CLI (after the 'R' prompt), type in
DARTTEST
the program will respond with
ENTER - 1 for Clock
- 2 for Change Gain

CHANNEL NUMBER?

You must enter -1 for the program to work. This will read the clock from the DART and print out both that value and the system clock value. It gives you the option to reset the system clock. You may reset it or not, as you please. The program then returns to

CHANNEL NUMBER?

You may now enter a channel number, in octal, of the channel you wish to test. The value as read from the DART will be printed on the keyboard, and the program returns to the CHANNEL NUMBER? question.

For some channels, you will need to reset the gain factor to a different value to get an accurate reading. The default value of the setting is 5, for a plus-or-minus 10 volt scale. To reset the gain, enter -2 as a channel number. The program will ask for the new gain setting. Enter a number from 1 to 5 to indicate the setting you want as follows:

- 1 = ± 10 mv
- 2 = ± 100 mv
- 3 = ± 1 v
- 4 = ± 5 v
- 5 = ± 10 v

The program will return to the CHANNEL NUMBER? question.

To terminate the program, use the CONTROL - A interrupt feature of the CLI.

POSSIBLE PROBLEMS:

If the DART is not functioning properly, you should not get any response when you ask for the clock. Check that all cables from the NOVA to the DART are connected and in good condition, and that the DART is 'powered up' and 'program load'ed.

If the DART responds to the clock but will not digitize 1 or more channels, something else is wrong. Check the A/D system busy/done and interrupt logic.

If you get a value back for a channel but it is incorrect, be sure that you are using the right gain factor. Reading +10V on a 1V scale will return +511 (overflow). If the problem still persists, check out the channel by feeding a known voltage source into the channel and testing to see if that is digitized properly. If it is, the problem is in the sensor or the cable from the sensor to the DART. If the channel is not digitized properly, the DART (or the connection to the NOVA) is at fault.

VARIABLE LIST

DTIDC DART input data control table

DTODC DART output data control table

These are required by the system when using a non-sysgened device. (In this case the DART). They are defined in SUBRS, and a write-up can be found in the FORTRAN IV user's manual, Part II, Chapter 2, under Device Control and User Interrupt Servicing

IGN Gain factor

IC Channel number

IVAL Value returned from the DART

NAME: DCODE

FUNCTION: Decode N characters from array IA into word IW

CALLING SEQUENCE: Call DCODE (IA, IW, N)

WHERE: IA is the input array
IW is the output word
N is the # of characters

SPECIAL CONSIDERATIONS/RESTRICTIONS: Opposite of NCODE. Used primarily in building filenames (CDMMDDHH). Input array must be only numbers (no -,., etc.)

IA: is the input array
IW: is the output word
N: is the # of characters

NAME: FPRD

FUNCTION: Read (input) a floating point number and check limits

CALLING SEQUENCE: Call FPRD (IOUT, XLOW, XUP, IERR, IDFLT)

WHERE: IOUT is the channel number
XLOW is the minimum input value
XUP is the maximum input value
IERR is the label to return to on an error
IDFLT is the label to return to if nothing
is input

SPECIAL CONSIDERATIONS/RESTRICTIONS: Does not handle exponential numbers. Maximum length of input is 10 characters. Alpha characters in the input are ignored. IOUT is the Fortran channel for output, IOUT+1 is for input.

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NAME: GOUTD

PURPOSE: Get output device

CALLING SEQUENCE: Call GOUTD (IOUT, IO)

WHERE: IOUT = channel to direct output to
IO = Output device channel #.

SUBPROGRAMS USED: INTRD

SPECIAL CONSIDERATIONS/RESTRICTIONS: IOUT: 0 = console
I = printer

IOUT - channel to direct output to
IO - output channel device #

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NAME: IFERR

PURPOSE: Check error flag

CALLING SEQUENCE: Call IFERR (MESS, IERR)

WHERE: MESS - error message

IERR - is error code in octal

SUBPROGRAMS USED: WTSTR

SPECIAL CONSIDERATIONS/RESTRICTIONS: IERR - is display in octal.

MESS - ERROR MESSAGE.
IERR - IS ERROR CODE IN OCTAL.

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NAME: INTR

PURPOSE: Initialize system

CALLING SEQUENCE: Call INTR

SUBPROGRAMS USED: GCOUNT, IFERR, GCIN, FINDT, SPFFL.

COMMON INPUT: NSAMP, IFAUG, IAJTM, MDMAC

 OUTPUT: ML, IDT, ITM, ISHM, IEHM, ISMPS, IAUG, LAUGS

RADIAN

NAME: INITS

FUNCTION: Initialization of System

SUBPROGRAMS CALLED:

INTRD, CHST, CHAT, CHAPI, CHCHN, CHCAL, WTSYS

USE OF PROGRAM:

Enter INITS from the CLI (after the 'R' prompt). Program will prompt you for answers to the various sampling system parameters. A parameter may be left the same by entering a return.

Note: This program only needs to be run before initial set-up or if major changes to the channel assignments take place. All parameters are also changeable from the main sampling program RSAMP.

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VARIABLE LIST:

NEWFL Answer to question
 'KEEP OLD FILES (0) OR START NEW (1)'

NAME: INTRD

FUNCTION: Read an integer value and check limits

CALLING SEQUENCE: Call INTRD (IOUT, ILOW, IUP, IERR, IDFLT)

WHERE: IOUT is the channel to direct output to
ILOW is the minimum acceptable input
IUP is the maximum acceptable input
IERR is the Fortran label to return to
an error
IDFLT is the Fortran label to return to
if nothing is input

SPECIAL CONSIDERATIONS/RESTRICTIONS: IOUT must be open to output
device, IOUT+1 open to input device. Maximum 10
characters. Alpha characters are ignored. Returns
value = -1 if input of ^ (up arrow).

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NAME: KEYIN

FUNCTION: Accept key-ins (from console) and call appropriate subroutine

CALLING SEQUENCE: Call ITASK (KEYIN, 5, 10, IERR)

WHERE: 5 is KEYIN's task number

10 is task priority

SPECIAL CONSIDERATIONS/RESTRICTIONS: Console input on channel 11,
console output on channel 10. INPUT must be preceded by
ESC & return.

5 is KEYIN's task #

NAME: MODEM

FUNCTION: Accept commands from the modem port and call
appropriate subroutines

CALLING SEQUENCE: Call ITASK (MODEM, 10, 10, IERR)

WHERE: 1st 10 is the task ID

2nd 10 is the task priority

IERR is error flag

SUBPROGRAMS USED: LOADC, CHKEY

SPECIAL CONSIDERATIONS/RESTRICTIONS: The modem input port must
be open on FORTRAN channel 7 and output on channel 6.

10 - TASK # OF MODEM

NAME: NCODE.

PURPOSE: Encode N characters from word IW into array IA

CALLING SEQUENCE: Call NCODE (IW, IA, N)

WHERE: IW is the word to encode from

IA is the array to encode to

N is the number of chars

SPECIAL CONSIDERATIONS/RESTRICTIONS: Complement of decode used
mostly to bind file names (CDMMDDHH)

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NAME: OPNAV

FUNCTION: Open file for average data

CALLING SEQUENCE: Call OPNAV

SUBPROGRAMS USED: NCODE, DCODE

COMMON OUTPUT: C9/AVERAGE DATA/ IDATH
C17/SAMPSYS/ISYS

DISK OUTPUT: SAMPSYS
Open AD file

SPECIAL CONSIDERATIONS/RESTRICTIONS: Opens new average data file
on channel 3, with current month and day.

NAME: OVRLY

FUNCTION: Load appropriate overlay and call routine with arguments.

CALLING SEQUENCE: Call OVRLY(OVL, SUB, PAR1, PAR2)

WHERE: OVL is the overlay number

SUB is the subroutine name to call

PAR1 is the first argument

PAR2 is the second argument

SPECIAL CONSIDERATIONS/RESTRICTIONS: Always call this subroutine with the proper parameters. It does special processing to call the appropriate overlay with its arguments.

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NAME: PFARR

FUNCTION: Power failure/automatic restart routine

CALLING SEQUENCE: Call PFARR

SUBPROGRAMS USED: RQBCT, WRDAT

COMMON INPUT: C3/SYS PARAM/
C9/ID FILE/IDATA

OUTPUT: C10/TIME/ITM

DISK OUTPUT: WRDAT

NAME: PRCDF

FUNCTION: Print calibration data file

CALLING SEQUENCE: Call PRCDF (IOUT)

WHERE: IOUT is the channel to direct output to

SUBROUTINES USED: INTRD, STORE

COMMON INPUT: C17/SAMPSYS/ISYS

OUTPUT: C7/CDFILE/ICI

DISK INPUT: CDMMDH

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be
open on FORTRAN channel IOUT, input device on IOUT+1.
Line printer output goes to channel 12.

NAME: PRIDF

FUNCTION: Print initialization data file

CALLING SEQUENCE: Call PRIDF (IOUT)

WHERE: IOUT is the channel to direct output to

SUBROUTINES USED: INTRD, STORE

COMMON INPUT: C17/SAMPSYS/ISYS

OUTPUT: C5/ID file/IDF

DISK INPUT: IDMMDDHH

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be open
or Fortran channel IOUT, input device on IOUT+1. Line
printer output will go to Channel 12.

NAME: PRNT

FUNCTION: Print raw data and averages in memory

CALLING SEQUENCE: Call PRNT (IOUT, ITYPE)

WHERE: IOUT is the channel to direct output to
ITYPE = 1 for raw data, = 2 for averages,
= 3 for headings

COMMON INPUT: C5/ID FILE/IDF
C9/ ID /IDATA
C12/SAMPLING PARAM/
C13/CHANNEL INFO/

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be open
on channel IOUT.

NAME: PRSTD

FUNCTION: Print data stored on disk

CALLING SEQUENCE: Call PRSTD (IOUT, ISEG)

WHERE: IOUT is the channel to direct output to

ISEG = 0 for print without headings, = 1 for
initialization, = 2 for data print

SUBPROGRAMS CALLED: INTRD, STORE

COMMON OUTPUT: C23/average data/IDATA

C24/AD print/

DISK INPUT: ADMMDD

SPECIAL CONSIDERATIONS/RESTRICTIONS: the output device must be open
on FORTRAN channel IOUT, input device on IOUT + 1.

Line printer output will go to channel 12.

RADIAN

NAME: PRTCS

FUNCTION: Print command summary

CALLING SEQUENCE: Call PRTCS (IOUT)

WHERE: IOUT is the channel to direct output to

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be open
on FORTRAN channel IOUT.

RADIAN

NAME: RDART

FUNCTION: Read a data value from a DART channel

CALLING SEQUENCE: Call RDART (ICHN, IGN, IVAL)

WHERE: ICHN is the DART channel number

IGN is the index into the PGA table

IVAL is the value returned.

SUBPROGRAMS USED: WDART

COMMON INPUT: /D15/GNTBS

SPECIAL CONSIDERATIONS/RESTRICTIONS: DART program must be operational.

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NAME: RDIDF

FUNCTION: Read ID File

CALLING SEQUENCE: Call RDIDF (IREC)

WHERE: IREC is the record number

SUBPROGRAMS USED: IFERR

COMMON OUTPUT: /C5/IDF

DISK INPUT: ID File

SPECIAL CONSIDERATIONS/RESTRICTIONS: ID File is open on FORTRAN
channel 1.

NAME: REINT

FUNCTION: Re-initialize the system after a power failure

CALLING SEQUENCE: Call REINT

SUBPROGRAMS USED: IFERR, RDIDF, OPNAV

COMMON OUTPUT: /C17/ISYS
/C12/

DISK INPUT: SAMPSYS, ID FILE
CD FILE

SPECIAL CONSIDERATIONS/RESTRICTIONS: Disk files SAMPSYS, ID FILE,
and CD FILE are opened on FORTRAN channels 4, 1, and 2.
KEYIN and MODEM tasks are initialized.

RADIAN

NAME: RSAMP

FUNCTION: Main Program for Sampling System

SUBPROGRAMS CALLED: .REINT, SCLK, IFERR, PFARR, GCLK, RCLK,
SAMPL, AVRGE

USE OF PROGRAM:

RSAMP is the main sampling program. The program provides a control and timing structure for calling the appropriate subroutines at the appropriate times.

The user enters 'RSAMP' to the CLI. The sampling program takes control based upon the currently-configured system parameters. The keyboard (and the modem, if connected) are then treated as command devices to the program. The user must enter the sequence "ESC - return" to enter the command mode of RSAMP. The user may then enter any of the codes listed below to do the appropriate function.

BC - read and print battery clock

((

?? - print command summary

After performing the function indicated, the program will return to the point where the user will have to enter "ESC - return" again. This insures a minimal security to the system.

VARIABLE LIST:

JHM	Current time
NTICK	Number of ticks for sample loop
IST	Clock flag returned

RADIAN

NAME: SAMPL

FUNCTION: Print initialization data file

CALLING SEQUENCE: Call ITASK (SAMPL, 15, 10, IERR)

WHERE: 15 is the task # associated with SAMPL

SUBPROGRAMS CALLED: DART I, WDART, STORE

COMMON INPUT: C5/ID FILE/
 C17/SAMPSYS/

OUTPUT: C12/SAMPLING PARAM/
 C13/CHANNEL INFO/
 C20/DART COMMON/

SPECIAL CONSIDERATIONS/RESTRICTIONS: Assumes the DART program is
operational.

NAME: STSMP

FUNCTION: Set start and end sampling times

CALLING SEQUENCE: Call STSMP (IOUT, IFL)

WHERE: IOUT is the channel to direct output to

IFL = 1 for setting start time

= 2 for setting end time

SUBPROGRAMS CALLED: INTRD

COMMON INPUT: C11/MESSAGE/MSG

OUTPUT: C12/SAMPLING PARAM/ISH,ISM,IEH,IEM

SPECIAL CONSIDERATIONS/RESTRICTIONS: Output device must be open
on FORTRAN channel IOUT, input device on IOUT + 1.

NAME: WRDAT

FUNCTION: Write data block to disk and update system data file

CALLING SEQUENCE: Call WRDAT

COMMON OUTPUT: C9/AD FILE/IDATA
C17/SAMPSYS/ISYS(5)

DISK OUTPUT: ADMMDD Disk file
SAMPSYS

SPECIAL CONSIDERATIONS/RESTRICTIONS: Channel 3 must be open to
the AD file, channel 4 to SAMPSYS

NAME: WTIDF

FUNCTION: Write ID file to disk

CALLING SEQUENCE: Call WTIDF (IREC)

WHERE: IREC is the record number to which the ID file
is output

SUBPROGRAMS USED: IPERR

COMMON INPUT: /C5/IDF

DISK OUTPUT: ID file is updated

SPECIAL CONSIDERATIONS/RESTRICTIONS: output disk channel is open
on FORTRAN Channel 1.

NAME: WTSYS

FUNCTION: Write system parameter file to disk

CALLING SEQUENCE: Call WTSYS

SUBPROGRAMS USED: IFERR

COMMON INPUT: /C17/ISYS

DISK OUTPUT: SAMPSYS

SPECIAL CONSIDERATIONS/RESTRICTIONS: System sampling file SAMPSYS
is open to FORTRAN channel 4.