4. FILE STRUCTURE AND FORMAT

4.1 PDAS

To fully utilize the recording flexibility of the PDAS, the file structure and format must be understood. First, the file structure and naming conventions will be documented. Four types of files are created during recording: experiment file, status file, header file, and data file. The format of each type of file created by the PDAS-100 will then be documented.

4.1.1 File Structure and Naming for PDAS-100 RAM-DISK

This is the file structure of the PDAS SMM (RAM-DISK) all files are referenced to drive "C". In the future, with optional recording mediums or techniques the default drive may be different than "C".

C:\	Root directory for PDAS-100.
C:\COMMAND.COM	DOS command file.
C:\AUTOEXEC.BAT	Autoexec batch file.
C:\MSKERMIT.EXE	Kermit program.
C:\MSKERMIT.INI	Kermit initialization program
C:\PSLAVE2.EXE	Paranet program.
C:\PDAS100.BAT	PDAS program batch file.
C:\PDASINIT.EXE	PDAS hardware initialization program.
C:\CONFIG.SYS	DOS configuration file.
C:\DOS	Dos subdirectory.
C:\DOS\CHKDSK.COM	Check disk program.
C:\DOS\ATTRIB.EXE	Used to set up display file attributes.
C:\DOS\MODE.COM	Used for initializing communication ports.
C:\PDAS\	PDAS sub-directory.
C:\PDAS\WEXPFILE.EXE	Write Experiment File Program.
C:\PDAS\PDASX.EXE	Acquisition program.
C:\PDAS\PDASnnn.CMD	Command file for acquisition program.
C:\PDAS\DSPFG.LOD	Fixed gain DSP software.
C:\PDAS\DSPGR.LOD	Gain-ranged DSP software.
C:\PDAS\TIMESET.EXE	Time set program
C:\PDAS\COUNTER.HIS	File for last sequence created history.
C:\PDAS\PDASCTTY.EXE	Serial port initialization program.
C:\PDAS\STnnnRPT.doy	Status report created during acquisition. nnn - last three digits of PDAS-100 serial number doy - day of year acquisition begun
C:\PDAS\EXnnnFIL.doy	Experiment definition file created during acquisition
C:\PDAS\FInnnLOG.doy	List of files created during acquisition.
C:\PDAS\SHnnnRPT.doy	State-of-the-Health file (6 channel PDAS only).
C:\CHj	Channel j sub-directory. j - 0(AUX), 1, 2, 3 (4, 5, 6 for six ch.)

4.1.3 Experiment File

The experiment file is a listing of the contents of the command file used to set up the acquisition software. It is written in the PDAS subdirectory of the PDAS-100 RAM Disk. Its name has the following convention:

EXnnnFIL.doy nnn - last three digits of PDAS-100 serial number.
doy - day of year acquisition begun.

This file is useful to keep track of the exact specifications of a given experiment. The Experiment File can be used to supplement the field notebook or to determine what may have been set wrong when the expected results were not achieved. This file can be up-loaded with the data files. An example of this text file is given below.

```
Number Secondary Windows:  2
Number Primary Windows:  8
Number Channels:  7
Serial Number:  19
Clock Type:  1
Drift Compensation:  12000 microseconds per day
Jam Set Limit:  10 microseconds
Minimum Correction:  10 microseconds
Time Constant For Average Time Difference:  1800 seconds
Telemetry Mode:  2
Auxiliary Memory Type:  1
Number of ASP Modules:  2
Latitude:  30x50'00.48"N
Longitude: 92x40'40.40"W
Elevation:  1200 meters
Comment:  Demonstration experiment configuration file
Acquisition Mode:  2
Recording Format Mode:  2
ADC Calibration Interleave Enabled?  N
Channel 0 Parameters
Enabled?  Y
Name:  AUX
Primary Sample Rate:  10.000000
Secondary Sample Rate:  0.000000
Preamp Gain:  1
Low Cut Filter Enabled?  N
Sensor Sensitivity:
Comment:
Channel 1 Parameters
Enabled?  Y
Name:  CH 1
Primary Sample Rate:  100.000000
Secondary Sample Rate: 5.000000
Preamp Gain:  10
Low Cut Filter Enabled?  N
Sensor Sensitivity:  629 V/M/S
Comment: SERIAL NUMBER 3456
```



```
Channel 2 Parameters
Enabled?  Y
Name:  CH 2
Primary Sample Rate:  100.000000
Secondary Sample Rate:  5.000000
Preamp Gain:  10
Low Cut Filter Enabled?  N
Sensor Sensitivity:  629 V/M/S
Comment:  SERIAL NUMBER 1123
Channel 3 Parameters
Enabled?  Y
Name:  CH 3
Primary Sample Rate:  100.000000
Secondary Sample Rate:  5.000000
Preamp Gain:  10
Low Cut Filter Enabled?  N
Sensor Sensitivity:  629 V/M/S
Comment:  SERIAL NUMBER 4552
Channel 4 Parameters
Enabled?  N
Name:  CH 4
Primary Sample Rate:  1.000000
Secondary Sample Rate:  0.000000
Preamp Gain:  100
Low Cut Filter Enabled?  Y
Sensor Sensitivity:
Comment:  TEMPERATURE
Channel 5 Parameters
Enabled?  N
Name:  CH 5
Primary Sample Rate:  10.000000
Secondary Sample Rate:  0.000000
Preamp Gain:  100
Low Cut Filter Enabled?  Y
Sensor Sensitivity:
Comment:  WIND SPEED
Channel 6 Parameters
Enabled?  N
Name:  CH 6
Primary Sample Rate:  50.000000
Secondary Sample Rate:  0.000000
Preamp Gain:  1
Low Cut Filter Enabled?  Y
Sensor Sensitivity:
Comment
Pre Event Length:  3.000000 seconds
Post Event Length: 7.000000 seconds
Maximum Event Length:  30.000000 seconds
Event Detector Recording Control: S
Internal Trigger Mode:  3
CH 1      Enabled?  Y
CH 2      Enabled?  Y
```

```
CH 3      Enabled?  Y
CH 4      Enabled?  N
CH 5      Enabled?  N
CH 6      Enabled?  N
External Triggers:
Trigger   0 Enabled?  N
Trigger   1 Enabled?  N
Trigger   2 Enabled?  N
Trigger   3 Enabled?  N
Trigger   4 Enabled?  N
Trigger   5 Enabled?  N
Trigger   6 Enabled?  N
Trigger   7 Enabled?  Y
Number for Event:  1
Trigger Delta:  1.000000 seconds
Detecting Channel:  CH 1
STA Time Constant:  1.000000
LTA Time Constant:  30.000000
Bandpass Lower Frequency:  0.500000 Hz
Bandpass Upper Frequency:  5.000000 Hz
Trigger Threshold (ratio):  8.000000
Detrigger Threshold (ratio):  2.000000
Detecting Channel:  CH 2
STA Time Constant:  1.000000
LTA Time Constant:  30.000000
Bandpass Lower Frequency:  0.500000 Hz
Bandpass Upper Frequency:  5.000000 Hz
Trigger Threshold (ratio):  8.000000
Detrigger Threshold (ratio):  2.000000
Detecting Channel:  CH 3
STA Time Constant:  1.000000
LTA Time Constant:  30.000000
Bandpass Lower Frequency:  0.500000 Hz
Bandpass Upper Frequency:  5.000000 Hz
Trigger Threshold (ratio):  8.000000
Detrigger Threshold (ratio):  2.000000
Primary Window # 1
Enabled?  Y
Start Time:  200/1988 00:00:00
Duration:  0:01:00
Number Repetitions:  100
Interval:  1:00:00
Calibration Type:  4
Frequency:  1.000000
Amplitude:  0
CH 1      Enabled?  N
CH 2      Enabled?  N
CH 3      Enabled?  N
CH 4      Enabled?  N
CH 5      Enabled?  N
CH 6      Enabled?  N
Primary Window # 2
Enabled?  E
```



```
Start Time:  202/1988 00:00:00
Duration:  0:10:00
Number Repetitions:  48
Interval:  1:00:00
Calibration Type:  4
Frequency:  1.000000
Amplitude:  0
CH 1      Enabled?  N
CH 2      Enabled?  N
CH 3      Enabled?  N
CH 4      Enabled?  N
CH 5      Enabled?  N
CH 6      Enabled?  N
Primary Window #  3
Enabled?  C
Start Time:  204/1988  09:00:00
Duration:  0:00:00
Number Repetitions:  1
Interval:  0:00:00
Calibration Type:  4
Frequency:  1.000000
Amplitude:  0
CH 1      Enabled?  N
CH 2      Enabled?  N
CH 3      Enabled?  N
CH 4      Enabled?  N
CH 5      Enabled?  N
CH 6      Enabled?  N
Primary Window #  4
Enabled?  N
Start Time:  203/1988  14:00:00
Duration:  0:10:00
Number Repetitions:  50
Interval:  24:00:00
Calibration Type:  4
Frequency:  1.000000
Amplitude:  0
CH 1      Enabled?  N
CH 2      Enabled?  N
CH 3      Enabled?  N
CH 4      Enabled?  N
CH 5      Enabled?  N
CH 6      Enabled?  N
Primary Window #  5
Enabled?  E
Start Time:  203/1988  00:00:00
Duration:  24:00:00
Number Repetitions:  9999
Interval:  24:00:00
Calibration Type:  4
Frequency:  1.000000
Amplitude:  0
```

```
CH 1     Enabled?  N
CH 2     Enabled?  N
CH 3     Enabled?  N
CH 4     Enabled?  N
CH 5     Enabled?  N
CH 6     Enabled?  N
Primary Window #  6
Enabled?  Y
Start Time:  200/1988  00:30:00
Duration:  0:00:05
Number Repetitions: 9999
Interval:  24:00:00
Calibration Type:  1
Frequency:  0.500000
Amplitude:  1000
CH 1     Enabled?  Y
CH 2     Enabled?  Y
CH 3     Enabled?  Y
CH 4     Enabled?  Y
CH 5     Enabled?  Y
CH 6     Enabled?  Y
Primary Window #  7
Enabled?  Y
Start Time:  200/1988  00:30:10
Duration:  0:00:05
Number Repetitions: 9999
Interval:  24:00:00
Calibration Type:  1
Frequency:  1.000000
Amplitude:  1000
CH 1     Enabled?  Y
CH 2     Enabled?  Y
CH 3     Enabled?  Y
CH 4     Enabled?  Y
CH 5     Enabled?  Y
CH 6     Enabled?  Y
Primary Window #  8
Enabled?  Y
Start Time:  200/1988  00:30:20
Duration:  0:00:05
Number Repetitions: 9999
Interval:  24:00:00
Calibration Type:  1
Frequency:  5.000000
Amplitude:  1000
CH 1     Enabled?  Y
CH 2     Enabled?  Y
CH 3     Enabled?  Y
CH 4     Enabled?  Y
CH 5     Enabled?  Y
CH 6     Enabled?  Y
```



```
Secondary Window #  1
Enabled?  C
Start Time:  200/1988  00:00:00
Duration:  0:00:00
Number Repetitions: 1
Interval:  0:00:00
Secondary Window #  2
Enabled?  N
Start Time:  202/1988  00:00:00
Duration:  0:10:00
Number Repetitions: 25
Interval:  1:00:00
```

4.1.4 Status Report

The status report lists start times, stop times, possible error conditions which are time stamped, and logs commands which are issued through the PDAS operating screen during the acquisition process. This file operates as an appended file type, it will append operations which occur in a given day unless it has been erased. The file will be closed at midnight and a new file will be started for the next day. Its name has the following convention:

STnnnRPT.doy nnn - last three digits of PDAS-100 serial number
doy - day of year acquisition begun

This file is useful to track errors and restarts. When operations which affect internal timing occur, the type of operation and the time it occurred are recorded in this file so that the operator is flagged for possible data quality problems. An example of this text file is given below:

```
PDAS START at  321/1988  16:54:49
ADVANCE ONE SECOND  321/1988  17:07:53
Possible Data Error  321/1988  17:07:55.000 channel 1 Primary Rate
Possible Data Error  321/1988  17:07:55.000 channel 3 Primary Rate
Possible Data Error  321/1988  17:07:55.000 channel 2 Primary Rate
AVERAGE TIME DIFFERENCE CLEARED  321/1988  17:09:41
AVERAGE TIME DIFFERENCE  321/1988  17:09:51  133537 microseconds
ONE PPS ENABLED  321/1988  17:09:58
JAMSET RETARD  321/1988  17:10:18  133537 microseconds
Possible Data Error  321/1988  17:09:55.000 channel 0 Primary Rate
Possible Data Error  321/1988  17:10:20.000 channel 1 Secondary Rate
Possible Data Error  321/1988  17:10:20.000 channel 3 Secondary Rate
Possible Data Error  321/1988  17:10:20.000 channel 2 Secondary Rate
ONE PPS DISABLED  321/1988  17:11:29
AVERAGE TIME DIFFERENCE  321/1988  17:11:32 0 microseconds
PDAS STOP at 321/1988  17:30:37
```

As you can see, these time associated entries are primarily operator induced from the PDAS operating terminal. The exception would be a Jamset which the PDAS would do on its own if the situation warranted it.

4.1.5 File Log

The File Log is the list of files created during acquisition. This file operates as an appended file type, it will append operations which occur in a given day unless it has been erased. The file will be closed at mighnight and a new file will be started for the next day. Its name has the following convention:

FInnnlog.doy.doy nnn - last three digits of PDAS-100 serial number
doy - day of year acquisition begun

This file is useful to track all the files created during an experiment and to scan for event files. An example of this text file is given below.

```
DATASET \ch1\P1019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch3\P3019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch2\P2019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch0\P0019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch1\S1019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch3\S3019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch2\S2019001.200
DATE 7-18-88
TIME 00:00:00.000

DATASET \ch1\C1019002.200
DATE 7-18-88
TIME 00:30:00.000

DATASET \ch3\C3019002.200
DATE 7-18-88
TIME 00:30:00.000
```



```
DATASET \ch2\C2019002.200
DATE 7-18-88
TIME 00:30:00.000

DATASET \ch1\C1019003.200
DATE 7-18-88
TIME 00:30:10.000

DATASET \ch3\C3019003.200
DATE 7-18-88
TIME 00:30:10.000

DATASET \ch2\C2019003.200
DATE 7-18-88
TIME 00:30:10.000

DATASET \ch1\C1019004.200
DATE 7-18-88
TIME 00:30:20.000

DATASET \ch3\C3019004.200
DATE 7-18-88
TIME 00:30:20.000

DATASET \ch2\C2019004.200
DATE 7-18-88
TIME 00:30:20.000

EVENT DATE 7-20-88
EVENT TIME 00:09:02.530

DATASET \ch1\E1019001.202
DATE 7-20-88
TIME 00:08:52.530

DATASET \ch2\E2019001.202
DATE 7-20-88
TIME 00:08:52.530

DATASET \ch3\E3019001.202
DATE 7-20-88
TIME 00:08:52.530

DATASET \ch0\E0019001.202
DATE 7-20-88
TIME 00:08:52.500
```

Note that when an event tag is created it provides the specific time the event was declared. The event files, however, show that they started prior to the event by a period equal to the pre-event time set during experiment configuration.

Let v be volts.

Then: v = m / (32768 * p) high gain inputs
v = 20 * m / (32768 * p) low gain inputs

32-BIT DATA FORMAT

The four byte integer is also stored in two's complement format. To convert this count to voltage, use the following formula:

Let m be the digitized value in counts.
Let v be volts.

Then: v = m / 2147483648 high gain inputs
v = 20 * m / 2147483648 low gain inputs

14/2 GAIN RANGED FORMAT

The two byte gain ranged format uses a 14/2 gain range. The gain code is stored in the two least significant bits of the 16 bits, and the digitized value is in the upper 14 bits of the 16 bits.

Let g be the gain code from the lower two bits.
Let p be the preamp gain.
Let m be the value (two's complement) in upper 14.
Let v be volts.

Then: v = m * (8**(5-g)) / (268435456 * P) high gain inputs
v = 20 * (m * (8**(5-g))) / (268435456 * P) low gain inputs

The digitized samples are stored packed in the rest of the data file until the end of file is reached.

4.2 SETUP COMPUTER

4.2.1 File Structure and Naming Conventions

All data files exist within the framework of the MS-DOS file and directory conventions. The command files are built in the PDAS sub-directory on the setup computer.

c:\	ROOT directory for drive c (any drive)
.	
.	Other sub-directories
.	
c:\PDAS\	PDAS-100 setup sub-directory
.	
c:\PDAS\PSET.EXE	Command file build program.
c:\PDAS\ *.SCN	User input screen definition.

c:\PDAS\ *.HLP	Help files for fields within screens
c:\PDAS\ *.CMD	Output command files.
c:\PDAS\ *.BAT	Batch files
c:\PDAS\PDASnnn.CMD	nnn - Last three digits of target PDAS-100 serial number. Use 000 to build file that will run on any PDAS-100.
c:\KERM230\	Kermit sub-directory. Kermit is a public domain computer to computer communications software program which can enable a computer to act as a terminal or a basic file server.
c:\PARANET\	Paranet sub-directory. Paranet is a program that allows transfer of data between two microcomputers.
c:\DSP\	DADiSP sub-directory. DADiSP is a digital data analysis and signal processing software package.
c:\XTALK4\	Crosstalk MK4 sub-directory. Programs for modem base station operation. Only on systems with modems.
c:\PDASnnn\	Suggested sub-directory naming convention for locating data and status files from PDAS units.
c:\PDASnnn\chj\	Suggested sub-directory naming convention for locating PDAS data.
c:\PDASnnn\PDAS\	Suggested sub-directory naming convention for PDAS non-data files (status report, experiment file, etc.).