

## *d\*TREK image file format*

J. W. Pflugrath  
Rigaku Americas Corporation  
9009 New Trails Drive,  
The Woodlands, TX77381



## History

- ImageMagick [www.imagick.org](http://www.imagick.org)  
– MIFF, Jon Cristy, Dupont
- 1980's: Marty Stanton, Brandeis
- 1980's: Jim Pflugrath, MADNES
- MIFF – machine independent file format



## Features

- ASCII header
- Binary image data



## Features

- ASCII header
  - Begin with {
  - End with } ^J ^L ^J
  - Keyword=Value(s);
  - Whitespace anywhere
  - Required keywords:
    - HEADER\_BYTES=....;
    - DIM = ; SIZE1= ; SIZE2= ; Data\_type= ; BYTE\_ORDER= ;
  - Extensible
- Later:
  - Minimum 512 bytes
  - Multiple of 512 bytes, pad with spaces



## Binary data

- Int, short int, long, float
  - Specified in the header
- Compression
  - Specified in the header by a keyword
- OK to have data after the image data



## Header keywords

- From EEC workshops in the late 1980's
- Vectorial description of experiment and hardware (David Thomas, MRC-LMB)
  - CRYSTAL\_GONIO\_VECTORS= 1 0 0 0 1 0 0 0 1;
  - SOURCE\_POLARZ= 0.5 1.0 0.0 0.0;



## Example

```
{
HEADER_BYTES= 4096;
BYTE_ORDER=little_endian;
CCD_DETECTOR_ADC_OFFSET= 0;
CCD_DETECTOR_DESCRIPTION=Saturn944 (2x2 bin mode);
CCD_DETECTOR_DIMENSIONS=1042 1042;
CCD_DETECTOR_IDENTIFICATION=MSC_REIT_Saturn944_SN86507538;
CCD_DETECTOR_OPTIONS=imagekind:2 dezingermode:off dezingertype:average subtractclosed:on transform:on
simulator:immediate_trigger:on;
CCD_DETECTOR_SIZE= 93.7800 93.7800;
CCD_DETECTOR_TEMPERATURE= -45.0 deg C;
CCD_DETECTOR_VECTORS=1 0 0 0 1 0;
CCD_FIELD_OF_VIEW=Square;
CCD_GAIN=High;
CCD_GONIO_COLLISION_OFFSET= 0.0 0.0 0.0 0.0 0.0 -9.18;
CCD_GONIO_DESCRIPTION=AFC12 (Right): 2theta arm;
CCD_GONIO_NAMES= RotAboutBeam 2Theta RotY XShift YShift Distance;
CCD_GONIO_NUM_VALUES=6;
CCD_GONIO_UNITS= deg deg deg mm mm mm;
CCD_GONIO_VALUES=0.0000 0.0000 0.0000 0.0000 0.0000 50.0000;
CCD_GONIO_VALUES_MAX= 0.0 5.0 0.0 0.0 0.0 144.18;
CCD_GONIO_VALUES_MIN= 0.0 -110.0 0.0 0.0 0.0 40;
CCD_GONIO_VECTORS=0.0000 0.0000 1.0000 1.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 -1.0000;
CCD_NONUNF_INFO=FirstScanImage;
}
```



## d\*TREK software toolkit

- C++ with classes for
  - Cimage\_header
  - Cimage
  - Cgoniometer
  - Csource
  - Ccrystal
  - Crefln
  - Creflnlist

