

University of Michigan Space Physics Research Laboratory

TIDI Binning Table File Format	CAGE No. 0TK63 Drawing No. 055-3603C Project TIDI Contract No. NASW-5-5049 Page 1 of 6
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REVISION RECORD

Rev	Description	Date	Approval
C	Added table relating gain index to CCD Gain	6-Nov-2001	
B	Changed binning to re-locatable form, specifying only widths	18 May 1999	
A	Add validation criteria for bin start and end pixels Delete colons from control record keywords	29 June 1998	
	Initial Release	27 May 1998	

APPROVAL RECORD

Function	Name	Signature	Date
Originator	D. Gell		
Flight Software	S. Musko		
Instrument Scientist	W. Skinner		
Program Manager	C. Edmonson		
Systems Engineer			
R&QA	John Eder		

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1. References

1. Gell, D., "Measurement Sequence Specifications", SPRL File 055-3431, 3 September 1997
2. Musko, S., "TIDI Flight Software Requirements Specification", SPRL File 055-3320, 15 January 1997
3. Gell, D., "TIDI Instrument Command Language Compiler Specification and User's Guide", SPRL File 055-3564, 5 May 1998
4. Gell, D., "Scan Table File Format", SPRL File 055-3527A, 5 May 1998

2. Introduction

The operation of the TIDI instrument is controlled by the flight software, which executes an uploadable control program. The method of binning of CCD pixels into wavenumber bins is controlled by a table in the flight software called the CCD Binning Table. These tables are inputs to the control program compiler (reference 3). The CCD Binning Tables to be used during a scan are identified in the Scan Table File (reference 4)

This document specifies the format used for the CCD Binning Table files.

An example binning table file is included in Appendix A.

3. Record Definitions

A CCD Binning file consists of control records, bin definition records, and comments. The control record specifies global information such as the name and ID number of the binning table. Bin definitions specify the width of each wavenumber bin in pixels, the gain to be used for the bin and whether the bin is read or discarded. Comments are used to provide additional information to a user of the file.

3.1 Control Records

A control record is indicated by a period "." as the first non-whitespace character in the record. The record consists of a keyword—value pair, as shown in the example:

`<ws>.keyword<ws> value`

Where `<ws>` is any whitespace characters, "keyword" is any of the valid keywords as listed in Table 1, and `value` is a string containing an acceptable value for the keyword. Neither the keyword nor the value is case sensitive. Whitespace is not allowed between the period and the keyword.

Table 1, Control Record Keywords		
keyword	acceptable values	notes
name	a character string	A short descriptive name
id	an integer from 0 to 32767	The CCD Binning Table ID, reported in the telemetry
description	a character string	A description of the binning table
approved	a character string in the form dd-Mon-yyyy	The date that the scan was approved. Omitted until the scan table is approved

3.2 Comments

A comment record is indicated by a semi-colon, “;” as the first non-whitespace character in the record. Comments are ignored in any processing of the file.

3.3 Bin Definition Records

A bin definition record is any record that does not begin with either the period or semi-colon indicator characters. The record consists of whitespace separated fields, as listed in Table 2.

Table 2, Bin Definition Record Fields			
field number	field name	valid values	description
1	bwidth	an integer between 1 and 255, inclusive	The width of the bin in pixels.
2	gain	1, 2, 3, 4	The gain level to be used in the bin
3	dispose	Read Discard	The disposition of the bin. If Read, the bin is read and included in the instrument TM. If Discard, the bin is discarded and not included in the instrument TM.

Field 1 specifies the width of the wavenumber bin in pixels. No bin may be larger than 255 pixels. Field 2 specifies the gain for the bin. Sensitivity increases with increasing gain level, i.e. gain 4 is the highest sensitivity and gain 1 is the lowest. The actual CCD gains in counts per electron, the inverse of sensitivity, are listed in Table 1.

Table 3, CCD Gain Definitions	
gain level	CCD Gain
1	160 e ⁻ /count
2	40 e ⁻ /count
3	10 e ⁻ /count
4	5 e ⁻ /count

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Bins are listed in the file in the order that they will be read out, i.e. the first entry in the table is bin 0, and the last entry is bin N. The binning pattern location on the chip is governed by two CCD controller parameters, CCD_V_DUMP and CCD_H_DUMP_2, which specify the location of the upper left corner of the region to be read out.

4. File Organization

A template for a scan table file is located on the TIDI ground segment computer system at `/tidi/flt_tic1/bins/000template.btab`. Control records are collected at the beginning of the file, followed by comments amplifying the measurement objective given in the purpose control record. Following these two sections are comments containing the change history. The final section of the file is a header for the data records, listing the field names, followed by all of the data records.

5. File Locations and Naming

All approved scan tables are to be placed in the `/tidi/flt_tic1/bins` directory. The file names should consist of the value used in the name control record with `.btab` appended.

Appendix A. Example CCD Binning Table

```
.name mltDw1
.id 9000
.description example binning table fragment
.approved
;
; bwidth gain dispose
;
    4      1    read
    4      1    read
    4      2    read
    20     1    discard
    4      4    read
    4      4    read
```