

SPIRE

SUBJECT: SPIRE Telemetry Data Rates

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Change Record

ISSUE	DATE	
Issue 1.0 Draft 1	16 th January	First Version
Issue 1.0	25 th January	<ul style="list-style-type: none">• Added RD02• Updated Spectrometry Scanning to remove SCU and DPU packets• Increased number of frames per packet for DCU to 4• Updated constraints to 25 packets per sec and 130kbps as shown in RD02

TABLE OF CONTENTS

<u>1.</u>	<u>INTRODUCTION</u>	6
<u>1.1</u>	<u>SCOPE</u>	6
<u>1.2</u>	<u>DOCUMENTS</u>	6
<u>1.2.1</u>	<u>Applicable Documents</u>	6
<u>1.2.2</u>	<u>Reference Documents</u>	6
<u>2.</u>	<u>DATA RATES FOR OBSERVATORY FUNCTIONS</u>	7
<u>2.1</u>	<u>PHOTOMETRIC CHOPPING FUNCTIONS</u>	7
<u>2.2</u>	<u>PHOTOMETRIC NON-CHOPPING FUNCTIONS</u>	8
<u>2.3</u>	<u>SPECTROMETRY SCANNING FUNCTIONS</u>	9
<u>2.4</u>	<u>SPECTROMETRY SET AND LOOK FUNCTIONS</u>	10

FIGURES**TABLES**

Glossary

FTS	Fourier Transform Spectrometer
POF	Photometry Observatory Function
SOF	Spectrometry Observatory Function
SPIRE	Spectral and Photometric Imaging Receiver

1. INTRODUCTION

This document provides estimates of the data rates expected from the different SPIRE observing modes described in the SPIRE Operating Modes document (AD01).

The data rates are based on the nominal detector and mechanism sampling rates described in AD01, combined with the science data formats described in the SPIRE Data ICD (RD01).

1.1 Scope

The data and packet rates in this document provide the maximum rate for data generated in the nominal operating mode. In practice the actual average data rate through an observation will be less than this due to science data not being collected during change of instrument and telescope configurations and other operations (e.g. re-pointing of the telescope during raster scans). This document does not address the estimation of actual data generated during an observation.

The estimated data rates are compared to the allowed data (and TM packet) rates given in RD02

Note: AD01 does not yet cover the SPIRE-PACS parallel mode of operation

1.2 Documents

1.2.1 Applicable Documents

AD01 Operating Modes for the SPIRE Instrument (SPIRE-Ral_PRJ-000320) Issue 3.0

1.2.2 Reference Documents

RD01 SPIRE Data ICD (SPIRE-Ral-DOC-1078) Issue 1.0 Draft 1

RD02 Instrument Data Rates (H-P-1-ASPI-TN-0204) Issue 1.0, 15th January 2002

2. DATA RATES FOR OBSERVATORY FUNCTIONS

Observatory functions can be split into 4 types:

- Photometry using the Beam Steering Mirror to chop the input beam between two pixels
- Photometry with no chopping, using the telescope movement to modulate the detector signals
- Spectrometry by continuously scanning the FTS mechanism
- Spectrometry chopping at a set of FTS mechanism fixed positions

The data generated for each of these four types are described below.

2.1 Photometric Chopping Functions

For all Photometric Observatory Functions employing chopping (POF1, POF2, POF3, POF4, POF6, POF7) the maximum data rate is determined primarily by the detector data sampling rate within the chop cycle.

Maximum Data Rate for Chopping Observatory Functions: POF1, POF2, POF3, POF4, POF6, POF7

DCU Science	Nominal	
Number of data channels	292	
Bits per channel	16	bits
Frame size	4672	bits
Frames per packet	1	
Packet size	4896	bits
Sampling rate	20	frames/sec
Packets per sec	20	

MCU Science	Nominal	
Number of data channels	10	Chop&Jiggle
Bits per channel	16	bits
Frame size	160	bits
Frames per packet	32	
Packet size	5344	bits
Sampling rate	64	frames/sec
Packets per sec	2	

SCU Science	Nominal	
Number of data channels	0	
Bits per channel	16	bits
Frame size	0	bits
Frames per packet	1	
Packet size	224	bits
Sampling rate	0	frames/sec
Packets per sec	0	

DPU Science	Nominal	
Number of data channels	8	TBC
Bits per channel	16	bits
Frame size	128	bits
Frames per packet	8	
Packet size	1248	bits
Sampling rate	4	frames/sec
Packets per sec	0.5	

Housekeeping	Nominal	
Parameter field length	480	Octets
Frame size	3856	bits
Frames per packet	1	
Packet size	4000	bits
Sampling rate	1	frames/sec
Packets per sec	1	

Total packet rate	23.50	
Total data rate	113232.00	

Maximum packet rate	25
Maximum total data rate	130000
Maximum packet data field size	8144
Overhead per packet	144

2.4 Spectrometry Step-and-Look Functions

Maximum Data Rate for Step-and-Look Observatory Functions: SOF3, SOF4

DCU Science	Nominal	
Number of data channels	70	
Bits per channel	16	bits
Frame size	1120	bits
Frames per packet	4	
Packet size	4704	bits
Sampling rate	16	frames/sec
Packets per sec	4	

MCU Science	Nominal	
Number of data channels	10	Chop
Bits per channel	16	bits
Frame size	160	bits
Frames per packet	32	
Packet size	5344	bits
Sampling rate	64	frames/sec
Packets per sec	2	

SCU Science	Nominal	
Number of data channels	0	
Bits per channel	16	bits
Frame size	0	bits
Frames per packet	1	
Packet size	224	bits
Sampling rate	0	frames/sec
Packets per sec	0	

DPU Science	Nominal	
Number of data channels	8	TBC
Bits per channel	16	bits
Frame size	128	bits
Frames per packet	8	
Packet size	1248	bits
Sampling rate	4	frames/sec
Packets per sec	0.5	

Housekeeping	Nominal	
Parameter field length	480	Octets
Frame size	3856	bits
Frames per packet	1	
Packet size	4000	bits
Sampling rate	1	frames/sec
Packets per sec	1	

Total packet rate	7.50
Total data rate	34128.00

Maximum packet rate 25
 Maximum total data rate 130000
 Maximum packet data field size 8144
 Overhead per packet 144