



LAT Flight Software

GRB Manual

Type: User Manual
Version: V1-0-0
Author: S.Maldonado
Created: 28 February 2007
Updated: 21 May 2007
Printed: 21 May 2007

Manual for the GRB Interface Framework Package

Contents

0	Introduction	1
0.0	Overview.....	1
1	Package Description.....	2
1.0	Shareables	2
1.1	Dependencies.....	2
2	Implementation	3
2.0	GRB Framework.....	3
2.1	GRB Messages	3
2.2	GRB Packets	4
2.3	LAT Messaging Callbacks.....	4
2.4	GBM Messaging Callback	5
2.5	SIU GRB Callbacks	5
2.6	EPU GRB Callbacks.....	6
3	Configuration	7
3.0	GRB_DB Configuration	7
4	Command and Telemetry.....	8
4.0	Telecommands	8
4.1	Telemetry.....	8
4.1.0	Packet Descriptions.....	9

0 Introduction

The GRB package defines the interface used by a GRB framework and any number of detection algorithm for communication of burst detection status. The intended audience of this document is developers of GRB detection algorithm software.

0.0 Overview

The function of the GRB package is to define the interface for a framework in which to execute a GRB detection algorithm. There are several classes of routines that a GRB algorithm requires to report detection status, coordinate information, and event data summaries. A GRB algorithm processes GRB photon candidate events, as well as GBM burst alert telecommand data, and outputs burst detection status. The GRB framework allows for communication of control messages and detection status between an algorithm and a driver application.

1 Package Description

This section describes the CMX package layout for GRB.

1.0 Shareables

GRB exports no shareable libraries.

1.1 Dependencies

GRB is dependent on the following FSW packages:

Package	Description
PBS	Package basic OS services
PBI	Package basic OS inlines
VXW	Operating system

2 Implementation

This section provides an overview of the GRB software implementation.

2.0 GRB Framework

The GRB framework consists of a set of messaging protocols and function callbacks that allow for communications between a GRB algorithm and a driver application. In this instance, the driving application is LPA, the LAT physics acquisition software, which instantiates the framework.

2.1 GRB Messages

An EPU resident GRB event processor must construct message packets for delivery to an SIU resident GRB algorithm. The GRB package defines a template for construction and access to these GRB messages. A GRB message is generically defined as header and is used by the framework to construct new messages and insert them into a packet. Each algorithm instance can augment each GRB message with its own content.

See *GRB_msgdef.h* for complete routine signatures

Routine	Description
GRB__msgCompose	Compose a new GRB message
GRB__msgLength	Gets the message length
GRB__msgSequence	Gets the message sequence within the packet
GRB__msgNext	Gets the next message in the packet
GRB__msgAdvance	Advances to the requested message in the packet

2.2 GRB Packets

Any number of GRB messages are accumulated into GRB packets, which are delivered to the SIU GRB algorithm. The GRB package defines a template for construction and access to these GRB packets.

See *GRB_pktdef.h* for complete routine signatures

Routine	Description
GRB__pktConstruct	Construct a new GRB packet
GRB__pktMsgDeclare	Add a new message to a GRB packet
GRB__pktClose	Close the GRB packet
GRB__pktLength	Get the packet length
GRB__pktSequence	Get the packet's sequence number
GRB__pktSource	Get the source CPU of the packet
GRB__pktOpenReason	Get the open reason for the GRB packet
GRB__pktCloseReason	Get the close reason for the GRB packet
GRB__pktFirstMsg	Get a pointer to the first message in the packet
GRB__pktNext	Get the next packet in a packet buffer
GRB__pktAdvance	Advance to the requested packet in a packet buffer

2.3 LAT Messaging Callbacks

The GRB package defines a set of callback signatures that a GRB algorithm uses to communicate detection status. Any application implementing a GRB framework must create routines to handle the GRB detection data. The driver application creates these routines and at initialization, and provides them to each algorithm in a service block.

See *GRB_latMsg.h* for complete routine signatures

Routine Type	Description
GRB__latSuspectRtn	Routine to handle GRB algorithm suspect data
GRB__latUpdateRtn	Routine to handle GRB algorithm update data
GRB__latConfirmRtn	Routine to handle GRB algorithm confirm data

Routine Type	Description
GRB__latCloseoutRtn	Routine to handle GRB algorithm closeout data

2.4 GBM Messaging Callback

Each GRB algorithm must provide the GRB framework with a series of callback routines to handle incoming GBM GRB telecommand messages. These routines are passed to the framework at algorithm initialization in the form of a services block.

See *GRB_gbmMsg.h* for complete routine signatures

Routine Type	Description
GRB_gbmIntRtn	Routine to handle GBM interrupt message
GRB_gbmCalcRtn	Routine to handle GBM calculated info message
GRB_gbmRptRtn	Routine to handle GBM repoint recommendation message
GRB_gbmCloseRtn	Routine to handle GBM closeout message

2.5 SIU GRB Callbacks

Each GRB algorithm executing on the SIU must provide the framework with routines to create a services block, and handle runtime messages. The SIU services block contains the routines needed to process GRB messages, and handle start and stop messages.

See *GRB_siu.h* for complete routine signatures

Routine Type	Description
GRB_siuSizeofRtn	Routine to return the size of a GRB algorithm control block size
GRB_siuServicesGetRtn	Routine to return the SIU services block
GRB_siuProcessRtn	Routine to handle a GRB message
GRB_siuStartRtn	Routine to handle a start run message
GRB_siuStopRtn	Routine to handle a stop run message

2.6 EPU GRB Callbacks

Each GRB algorithm executing on the EPU must provide the framework with routines to create a services block, and handle runtime messages. The EPU services block contains the callback routine for processing an event posted to the GRB output stream.

See GRB_epu.h for complete routine signatures

Routine Type	Description
GRB_epuSizeofRtn	Routine to return the size of a GRB algorithm control block size
GRB_epuServicesGetRtn	Routine to return the EPU services block
GRB_epuProcessRtn	Routine to handle a GRB message

3 Configuration

This section describes the process of configuration using the GRB_DB package.

3.0 GRB_DB Configuration

The GRB configuration schema contains the interface required for installing a GRB algorithm in the framework. Each GRB algorithm must export its own schema instance that contains a GRB_DB schema. Each algorithm schema can define its internal parameter space after the GRB_DB schema. Both the SIU and EPU algorithm schemas share the same GRB schema.

Please refer to GRB_DB_schema.h in the GRB_DB package for details.

Parameter	Description
sizeof	Routine to get the size of the GRB algorithm control block
get	Routines to get the GRB algorithm services block.

4 Command and Telemetry

This section covers the command and telemetry used with the GRB package.

4.0 Telecommands

A GRB algorithm generates command content defined for the GBM, and delivered by LPA. For details on structure and content of these packets, refer to the LAT Telecommand and Telemetry document, and the LAT GBM Interface Control document.

Command	APID	Function Code	Description
LFSWCALCINFO	0x660	1	GBM GRB Calculated Information
LFSWCREPREC	0x660	2	GBM GRB Candidate Repoint Recommendation
LFSWCLOSEOUT	0x660	3	GBM GRB Closeout
GFSWLATTRIGGER	0x6f1	1	LAT Detected GRB Alert
GFSWLATCLOSEOUT	0x6f1	3	LAT Detected GRB Closeout

4.1 Telemetry

This section describes the telemetry interface intended for use by a GRB framework package and algorithms. A GRB algorithm generates content for alert telemetry packets, which are delivered by LPA. For details on the size and structure of these packets, refer to the LAT Telecommand and Telemetry document, and the LAT GBM Interface Control document.

4.1.0 Packet Descriptions

Name	APID	Description
ALRTTRG	0x341	GRB Trigger Alert Telemetry
ALRTUPDATE	0x341	GRB Update Alert Telemetry
ALRTCLOSE	0x343	GRB Closeout Alert Telemetry