SPECTRUMASTRO

GLAST Mission
Interface Change Notice (ICN)

ICN No. 001

SHEET 1 OF 2

ORIGINATOR:	Tim Morse	**PHONE:**	480-892-8200	**DATE:** 6-2-03
CHANGE TITLE:	LAT-SC PRU Power Allocation Change			**ORG:** Spectrum Astro

DOCUMENT NUMBER	TITLE	VERSION
1196-EI-Y46311-000	LAT-SC ICD	A

REASON FOR CHANGE:

Recent change to LAT_SC IRD (CCR 433-0099 R1) flowed down to LAT-SC ICD to be captured by subsystems.

PROPOSED CHANGE:

See attached page with track changes.

INSTRUMENT IMPACT ☐ Cost ☐ Schedule	
SPACECRAFT IMPACT ☐ Cost ☐ Schedule	No SC Impact

ORIGINATOR SIGNATURE:

APPROVAL SIGNATURES:

Spectrum Instrument Interface Lead – Tim Morse	Spectrum Program Manager – Chris Clark
Instrument Systems Engineer	Instrument Program Manager

6.3.1.3 Peak Power

The LAT shall consume no more than 758 W for less than a total of 10 minutes per orbit. This may take place at any time during an orbit, may take place in any number of intervals, and includes regulated and unregulated power in any combination.

The SIU shall not exceed a maximum of ~~28~~ 32 W.

The DAQ shall not exceed a maximum of ~~672~~ 668 W.

The VCHP reservoir heaters shall not exceed a maximum of 58 W.

The unregulated passive survival heater power shall not exceed a maximum of 560 W.

6.3.2.1 Regulated Feeds

The SC feeds shall be sized such that they support the following loads for at least 10 minutes per orbit:

a. Feed 1 - ~~28W~~ 32W for the primary SIU.

b. Feed 2 - ~~28W~~ 32W for the redundant SIU.

c. Feed 3 - ~~672W~~ 668W for the primary DAQ.

d. Feed 4 - ~~672W~~ 668W for the redundant DAQ.

e. Feed 5 - 58W for the primary VCHP Reservoir Heaters.

f. Feed 6 - 58W for the redundant VCHP Reservoir Heaters.

Table 16-1. Verification Matrix

6.3.1.3	The LAT shall consume no more than 758 W for less than a total of 10 minutes per orbit. The SIU shall not exceed a maximum of ~~28~~ 32 W. The DAQ shall not exceed a maximum of ~~672~~ 668 W. The VCHP reservoir heaters shall not exceed a maximum of 58 W. The passive survival heater power shall not exceed a maximum of 560 W.								

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GLAST Mission
Interface Change Notice (ICN)

ICN No. 002

SHEET 1 OF 2

ORIGINATOR:	Tim Morse	**PHONE:**	480-892-8200	**DATE:** 6-16-03
CHANGE TITLE:	ICN Change Process Inclusion for LAT			**ORG:** Spectrum Astro

DOCUMENT NUMBER	TITLE	VERSION
1196-EI-Y46311-000	LAT-SC ICD	A

REASON FOR CHANGE:

Incorporation of process for ICN changes which were omitted in original release of document.

PROPOSED CHANGE:

See attached pages.

INSTRUMENT IMPACT ☐ Cost ☐ Schedule	
SPACECRAFT IMPACT ☐ Cost ☐ Schedule	No SC Impact

ORIGINATOR SIGNATURE:

APPROVAL SIGNATURES:

Spectrum Instrument Interface Lead – Tim Morse	Spectrum Program Manager – Chris Clark
RA Heuser Instrument Systems Engineer	RA Heuser for Instrument Program Manager

1.3 ICD Revision

1.3.1 ICD Change Requests

Requests for revisions to this ICD shall be transmitted in writing between the GLAST Program Office (GPO), LAT instrument provider and Spectrum Astro using a GLAST Mission ICD Interface Change Notice (ICN) form (0000-EN-Q27524) provided by Spectrum Astro. Requests shall include:

a. Name of initiating engineer/manager/scientist

b. Description of change

c. Date by which change is needed

d. Justification for change

e. Relationship to previously submitted changes, if any

1.3.2 ICD Change Approval

The Spectrum Astro Instrument Interface Lead shall assign a unique number to each ICN submitted for consideration. The Spectrum Instrument Interface Lead shall review and negotiate the change with the appropriate engineers, scientists, and managers from the GPO, LAT instrument provider and Spectrum Astro. Changes shall be approved and signed by authorized representatives of the LAT instrument provider and Spectrum Astro, Inc. Upon completion of the signature cycle, the Spectrum Instrument Interface Lead shall check the appropriate box at the bottom of the ICN form to indicate whether the ICN has been accepted or rejected. If accepted, the changes shall become effective immediately.

1.3.3 ICD Change Incorporation

The Spectrum Astro Instrument Interface Lead shall be responsible for updating the ICD to reflect revisions and maintain documentation of all requests for revision, whether approved or disapproved. The approved changes to the basic document shall be reflected in the form of the ICN and distributed to all participants. At the Spectrum Astro Instrument Interface Lead's discretion, approved ICN changes shall be incorporated into the ICD raising the revision level of the ICD. A Spectrum Astro memo shall be used and submitted to Spectrum Astro Configuration/Data Control in accordance with Document No. 0000-WI-D07007, with the relevant ICNs attached for ICN accountability and record retention. The ICD shall be modified to reflect the ICN changes and the newly revised ICD shall be routed for signatures. Upon completion of the signature cycle, the Spectrum Astro Instrument Interface Lead shall distribute copies of the revised ICD to all signatories.

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GLAST Mission Interface Change Notice (ICN)

		ICN No. 004	
		SHEET 1 OF 2	
ORIGINATOR: Tim Morse	**PHONE:** 480-892-8200	**DATE:** 6-16-03	
CHANGE TITLE: LAT Instrument Interface Simulator Requirements		**ORG:** Spectrum Astro	

DOCUMENT NUMBER	TITLE	VERSION
1196-EI-Y46311-000	LAT-SC ICD	Rev A

REASON FOR CHANGE:

LAT Instrument Interface Simulator Requirements were never defined. Document needs to be updated to allow LAT to develop the interface simulator to support early electrical interface testing to the SC Hotbench.

PROPOSED CHANGE:

Was:

8.2 LAT Instrument to Spacecraft Interface Simulator

TBD (GLAST Project Office to Provide)

Proposed:

See attached page.

INSTRUMENT IMPACT ☐ Cost ☐ Schedule	
SPACECRAFT IMPACT ☐ Cost ☐ Schedule	No SC Impact.

ORIGINATOR SIGNATURE:

APPROVAL SIGNATURES:

Spectrum Instrument Interface Lead – Tim Morse	Spectrum Program Manager – Chris Clark
Instrument Systems Engineer	Instrument Program Manager

8.2 LAT Instrument to Spacecraft Interface Simulator

The LAT Instrument to Spacecraft Interface Simulator (ISIS) will be used to support the development of the Spacecraft C&DH and Power systems with early testing of the electrical interfaces. The ISIS provides for separately testing each side of the redundant Spacecraft systems with simulations of one side of the redundant LAT.

8.2.1 1553 Interface

The ISIS shall send simulated telemetry packets per the 1553 protocol document.

The ISIS shall receive telecommand packets per the 1553 protocol document. The ISIS shall indicate whether the command was successfully received.

8.2.2 Science Data Interface

The ISIS shall provide 1 clock, 8 data and 1 data_valid signals using the protocols in the ICD.

The ISIS shall receive one SC Ready signal.

The ISIS shall send representative (verifiable) data over the interface at rates defined by the instrument.

8.2.3 Pulse per Second

The ISIS is not required to receive the SC PPS signal.

8.2.4 Discrete Commands

The ISIS shall receive four discrete commands as defined in the ICD.

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The ISIS shall indicate successful reception of command signal.

8.2.5 Discrete Monitors

The ISIS shall send two simulated signals using the protocols defined in the ICD upon request.

8.2.6 Analog Temperatures

The ISIS shall provide sixty-four channels consisting of at least one (1) temperature sensor of each type as defined in the ICD and the rest that replicate the nominal resistance at room temperature of the thermistors (i.e. fixed resistors).

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8.2.7 Analog Voltages

The ISIS shall generate forty-eight voltage signals, sized to the expected magnitudes as defined in the ICD.

8.2.8 Power

The ISIS shall provide loads that replicate the instrument power demands.

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GLAST Mission
Interface Change Notice (ICN)

ICN No. 006

ORIGINATOR: Tim Morse	**PHONE:** 480-892-8200	**DATE:** 6-18-03
CHANGE TITLE: LVDS Standard for LAT-SC Interfaces		**ORG:** Spectrum Astro

DOCUMENT NUMBER	TITLE	VERSION
1196-EI-Y46311-000	LAT-SC ICD	Rev A

REASON FOR CHANGE:

Change LVDS standards to 1996 version to be consistent with procured components and IRD. Version 2000 includes multi-drop requirements that are not applicable to GLAST usage.

PROPOSED CHANGE:

See attached page.

INSTRUMENT IMPACT ☐ Cost ☐ Schedule	
SPACECRAFT IMPACT ☐ Cost ☐ Schedule	No SC Impact.

ORIGINATOR SIGNATURE:

APPROVAL SIGNATURES:

Spectrum Instrument Interface Lead – Tim Morse	Spectrum Program Manager – Chris Clark
Instrument Systems Engineer	Instrument Program Manager

CHANGE:

2.1.3 Reference Documents

The documents listed contain useful facts or are recommended for additional information.

x. ANSI/TIA/EIA 644-~~A 2000~~1996 Low Voltage Differential Signaling (LVDS) Standards

6.4.1 High Speed Serial Science Data

The LAT will send continuous science data to the SC for storage and downlink during ground contacts.

The SC shall treat all science data as raw bits for packetization and storage.

The LAT shall limit science data generation to no more than 26 gigabits in any single 24-hour period.

The maximum signal frequency of any one interface signal shall 8.25 MHz.

The LAT-SC interface shall have 1 clock signal, 8 data bits, and 1 data valid signal from the LAT to the SC.

The SC shall provide a SC-ready signal to the LAT.

The High Speed Serial Data interface transmitters and receivers shall use LVDS drivers and receivers compatible with Institute of Electrical and Electronic Engineering (IEEE) 1596.3SCI LVDS and be compatible with ANSI/TIA/EIA 644-~~A 2000~~1996 LVDS standards.