CAL Document Change Notification

DCN No. 7650-DCN-0037-01

CHANGE TITLE: Update Calorimeter AFEE X and Y Boards Bill Of Materials from EM to FM

Internal **External**

ORIGINATOR: J. Ampe **DATE:** 13-Apr-04 **NEXT ASSY:**

DOC or DWG NUMBER	TITLE	AFFECTED REV.	NEW REV.
LAT-DS-01334	Calorimeter AFEE-X Board Parts List	01	02
LAT-DS-01337	Calorimeter AFEE-Y Board Parts List	01	02

CHANGE DESCRIPTION:

Update AFEE X and Y Board parts list used in Engineering Model to Flight Model.

REASON FOR CHANGE:

DISPOSITION OF HARDWARE:

No hardware affected

Serial numbers affected: **Effective date:**

	Use as is	Retest	Rework	Scrap	Other/Comment
Raw material					
Parts in process					
Assemblies					

APPROVALS		DATE	OTHER APPROVALS (specify):	DATE
ORIGINATOR:	*J. Ampe*	13-Apr-04	:	
SUBSYSTEM MANAGER:	*N. Johnson*	13-Apr-04	:	
PROJECT MANAGER:	*W.C. Raynor*	13-Apr-04	:	
QUAL ASSUR. MANAGER:	*N. Virmani*	13-Apr-04	:	
CONFIGURED AND RELEASED:	*P. Sandora*	13 Apr 2004		

GLAST LAT SPECIFICATION	Document # LAT-DS-01334-02 LAT-DS-01337-02	Date Effective 13 April 2004
	Prepared by(s) Jim Ampe	Supersedes None
	Subsystem/Office Calorimeter Subsystem	
Document Title **Calorimeter AFEE Board Bill of Materials**		

Gamma-ray Large Area Space Telescope (GLAST)

Large Area Telescope (LAT)

Calorimeter AFEE BOARD Bill of Materials

MASTER DOCUMENT
13 April 2004
GLAST-CAL CM FILE COPY

DOCUMENT APPROVAL

Prepared by:

J. Ampe *13 Apr 2004*

James Ampe
Naval Research Lab

Date

Approved by:

W.N. Johnson *13 Apr 2004*

W. Neil Johnson
CAL Subsystem Manager

Date

N. Virmani *13 Apr 2004*

Nick Virmani
CAL QA.

Date

CHANGE HISTORY LOG

Revision	Version	Effective Date	Description of Changes
	01	April 25, 2003	Initial Creation of individual X and Y Parts lists
	02	April 13, 2004	Update from EM to FM

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1 PURPOSE

This document describes the Bill of Materials (BOM) for the GLAST Large Area Telescope (LAT) Calorimeter Analog Front End Electronics (AFEE) boards. There are two AFEE board assemblies, AFEE-X and AFEE-Y, for the X and Y sides of the calorimeter.

2 SCOPE

This document describes the materials and components which comprise all the Calorimeter AFEE boards. While there are two distinct AFEE board assemblies, AFEE-X and AFEE-Y, they have identical schematics and bill of materials. This document has two numbers to reflect the reference documentation which specifies separate BOMs for the AFEE-X and AFEE-Y boards. The correspondance of numbers is as follows:

AFEE-X Bill of Materials	LAT-DS-01334-02
AFEE-Y Bill of Materials	LAT-DS-01337-02

3 DEFINITIONS

3.1 Acronyms

GLAST – Gamma-ray Large Area Space Telescope

GCFE – Glast Calorimeter Front-end Electronics

GCRC – Glast Calorimeter Readout Control electronics

AFEE – Analog Front-end Electronics

BOM – Bill of Materials

ADC – Analog to Digital Converter

DAC – Digital to Analog Converter

LAT – Large Area Telescope

CAL – Calorimeter Detector

TEM – Tower Electronics Module

4 APPLICABLE DOCUMENTS

Documents that are relevant to the AFEE printed circuit board are the following:

[1] LAT-DS-03344 AFEE-X Printed Wiring Board Artwork

[2] LAT-DS-03342 AFEE-X Schematic Diagram.

[3] LAT-DS-03345 AFEE-Y Printed Wiring Board Artwork.

[4] LAT-DS-03343 AFEE-Y Schematic Diagram

5 INTRODUCTION

Each calorimeter module is comprised of two “X” boards and two “Y” boards. The “X” (LAT-DS-03344) and “Y” (LAT-DS-03345) boards have the same parts list and same component numbering, thus share the schematic and same Bill Of Materials (BOM).

The basic function of the AFEE is to process the small analog charge signals produced in the PIN photodiodes and send the resulting digital information to the Tower Electronics Module (TEM). Each AFEE board contains quantity 48 GCFE mixed-signal ASICs, quantity 4 GCRC digital ASICs, quantity 48 commercial ADCs, quantity 4 commercial DACs, quantity 4 voltage references and associated resistors and capacitors.

6 AFEE Board Bill of Materials

Table 1. AFEE-X and AFEE-Y Board Bill of Materials.

ITEM	QTY	Flight Component	Manufacturer	PACKAGE	VALUE	PCB REFERENCE DESIGNATOR
1	96	1210B563K251YHTM	NovaCap	1210	56NF	C00_1, C00_4, C0A_1, C0A_4, C0B_1, C0B_4, C01_1, C01_4, C1A_1, C1A_4, C1B_1, C1B_4, C02_1, C02_4, C2A_1, C2A_4, C2B_1, C2B_4, C03_1, C03_4, C3A_1, C3A_4, C3B_1, C3B_4, C04_1, C04_4, C05_1, C05_4, C06_1, C06_4, C07_1, C07_4, C08_1, C08_4, C09_1, C09_4, C10_1, C10_4, C11_1, C11_4, C12_1, C12_4, C13_1, C13_4, C14_1, C14_4, C15_1, C15_4, C16_1, C16_4, C17_1, C17_4, C18_1, C18_4, C19_1, C19_4, C20_1, C20_4, C21_1, C21_4, C22_1, C22_4, C23_1, C23_4, C24_1, C24_4, C25_1, C25_4, C26_1, C26_4, C27_1, C27_4, C28_1, C28_4, C29_1, C29_4, C30_1, C30_4, C31_1, C31_4, C32_1, C32_4, C33_1, C33_4, C34_1, C34_4, C35_1, C35_4, C36_1, C36_4, C37_1, C37_4, C38_1, C38_4, C39_1, C39_4
2	228	CDR31BX472BKUS	AVX	0805	4.7NF	C0A_2, C0A_7, C0A_8, C0A_9, C0B_2, C0B_7, C0B_8, C0B_9, C0_2, C00_2, C0_4, C00_7, C00_8, C00_9, C1A_2, C1A_7, C1A_8, C1A_9, C1B_2, C1B_7, C1B_8, C1B_9, C1_2, C01_2, C1_4, C01_7, C01_8, C01_9, C2A_2, C2A_7, C2A_8, C2A_9, C2B_2, C2B_7, C2B_8, C2B_9, C2_2, C02_2, C2_4, C02_7, C02_8, C02_9, C3A_2, C3A_7, C3A_8, C3A_9, C3B_2, C3B_7, C3B_8, C3B_9, C03_2, C3_2, C3_4, C03_7, C03_8, C03_9, C04_2, C04_7, C04_8, C04_9, C05_2, C05_7, C05_8, C05_9, C06_2, C06_7, C06_8, C06_9, C07_2, C07_7, C07_8, C07_9, C08_2, C08_7, C08_8, C08_9, C09_2, C09_7, C09_8, C09_9, C10_2, C10_7, C10_8, C10_9, C11_2, C11_7, C11_8, C11_9, C12_2, C12_7, C12_8, C12_9, C13_2, C13_7, C13_8, C13_9, C14_2, C14_7, C14_8, C14_9, C15_2, C15_7, C15_8, C15_9, C16_2, C16_7, C16_8, C16_9, C17_2, C17_7, C17_8, C17_9, C18_2, C18_7, C18_8, C18_9, C19_2, C19_7, C19_8, C19_9, C20_2, C20_7, C20_8, C20_9, C21_2, C21_7, C21_8, C21_9, C22_2, C22_7, C22_8, C22_9, C23_2, C23_7, C23_8, C23_9, C24_2, C24_7, C24_8, C24_9, C25_2, C25_7, C25_8, C25_9, C26_2, C26_7, C26_8, C26_9, C27_2, C27_7, C27_8, C27_9, C28_2, C28_7, C28_8, C28_9, C29_2, C29_7, C29_8, C29_9,C30_2, C30_7, C30_8, C30_9, C31_2, C31_7, C31_8, C31_9, C32_2, C32_7, C32_8, C32_9, C33_2, C33_7, C33_8, C33_9, C34_2, C34_7, C34_8, C34_9, C35_2, C35_7, C35_8, C35_9, C36_2, C36_7, C36_8, C36_9, C37_2, C37_7, C37_8, C37_9, C38_2, C38_7, C38_8, C38_9, C39_2, C39_7, C39_8, C39_9, C0_10, C0_11, C0_12, C0_13, C0_14, C0_15, C0_16, C1_10, C1_11, C1_12, C1_13, C1_14, C1_15, C1_16, C2_10, C2_11, C2_12, C2_13, C2_14, C2_15, C2_16, C3_10, C3_11, C3_12, C3_13, C3_14, C3_15, C3_16
3	52	CDR32BX153BKUS	AVX	1206	15NF	C0A_11, C0B_11, C00_11, C1A_11, C1B_11, C01_11, C2A_11, C2B_11, C02_11, C3A_11, C3B_11, C03_11, C04_11, C05_11, C06_11, C07_11, C08_11, C09_11, C10_11, C11_11, C12_11, C13_11, C14_11, C15_11, C16_11, C17_11, C18_11, C19_11, C20_11, C21_11, C22_11, C23_11, C24_11, C25_11, C26_11, C27_11, C28_11, C29_11, C30_11, C31_11, C32_11, C33_11, C34_11, C35_11, C36_11, C37_11, C38_11, C39_11, C_U0_1, C_U1_1, C_U2_1,C_U3_1
4	48	NOT INSTALLED		CDR31 / 0805	OPEN	C00_10, C0A_10, C0B_10, C01_10, C1A_10, C1B_10, C02_10, C2A_10, C2B_10, C03_10, C3A_10, C3B_10, C04_10, C05_10, C06_10, C07_10, C08_10, C09_10, C10_10, C11_10, C12_10, C13_10, C14_10, C15_10, C16_10, C17_10, C18_10, C19_10, C20_10, C21_10, C22_10, C23_10, C24_10, C25_10, C26_10, C27_10, C28_10, C29_10, C30_10, C31_10, C32_10, C33_10, C34_10, C35_10, C36_10, C37_10, C38_10, C39_10

ITEM	QTY	Flight Component	Manufacturer	PACKAGE	VALUE	PCB REFERENCE DESIGNATOR
5	64	CRW11FH685KC	Kemet	3528	6.8UF	C0_0, C1_0, C0_6, C0_7, C0_8, C0_9, C00_14, C01_14, C02_14, C04_13, C04_14, C04_15, C04_16, C04_17, C04_18, C04_19, C04_20, C04_3, C04_5, C04_6, C07_14, C07_15, C08_14, C0A_14, C1_1, C1_6, C1_7, C1_8, C1_9, C10_14, C11_14, C11_15, C13_14, C13_15, C14_14, C15_14, C1A_14, C2_0, C2_1, C2_6, C2_7, C2_8, C2_9, C21_14, C22_14, C22_15, C23_14, C24_14, C25_14, C26_14, C3_0, C3_6, C3_7, C3_8, C3_9, C30_14, C31_14, C32_14, C32_15, C33_14, C34_14, C35_14, C38_14, C_U10_1
6	32	CWR11FH156KC	Kemet	6032	15.6UF	C0A_3, C0A_5, C0A_6, C0A_13, C0A_15, C0A_16, C0A_17, C0A_18, C0A_19, C0A_20, C0B_15, C1A_15, C1B_15, C2A_15, C3A_15, C04_21, C05_15, C08_15, C09_15, C10_15, C15_15, C19_15, C21_15, C23_15, C24_15, C25_15, C27_15, C31_15, C33_15, C38_15, C39_15, C_J3B_1
7	12	NOT USED		PICO266 Axial Fuse	0, Shorted By PCB Trace.	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
8	48	Pads for PIN Diode Wire Connections		DIODE_CONNECTION		J00_1, J0A_1, J0B_1, J01_1, J1A_1, J1B_1, J02_1, J2A_1, J2B_1, J03_1, J3A_1, J3B_1, J04_1, J05_1, J06_1, J07_1, J08_1, J09_1, J10_1, J11_1, J12_1, J13_1, J14_1, J15_1, J16_1, J17_1, J18_1, J19_1, J20_1, J21_1, J22_1, J23_1, J24_1, J25_1, J26_1, J27_1, J28_1, J29_1, J30_1, J31_1, J32_1, J33_1, J34_1, J35_1, J36_1, J37_1, J38_1, J39_1
9	2	NK-2F2-037-435-TH00	Airborn	37 Contact Nano Right Angle Throughole Connector		J1, J2
10	192	H1206CPX506J10	State of the Art	1206	50M	R00_1, R00_2, R00_3, R00_4, R0A_1, R0A_2, R0A_3, R0A_4, R0B_1, R0B_2, R0B_3, R0B_4, R01_1, R01_2, R01_3, R01_4, R1A_1, R1A_2, R1A_3, R1A_4, R1B_1, R1B_2, R1B_3, R1B_4, R02_1, R02_2, R02_3, R02_4, R2A_1, R2A_2, R2A_3, R2A_4, R2B_1, R2B_2, R2B_3, R2B_4, R03_1, R03_2, R03_3, R03_4, R3A_1, R3A_2, R3A_3, R3A_4, R3B_1, R3B_2, R3B_3, R3B_4, R04_1, R04_2, R04_3, R04_4, R05_1, R05_2, R05_3, R05_4, R06_1, R06_2, R06_3, R06_4, R07_1, R07_2, R07_3, R07_4, R08_1, R08_2, R08_3, R08_4, R09_1, R09_2, R09_3, R09_4, R10_1, R10_2, R10_3, R10_4, R11_1, R11_2, R11_3, R11_4, R12_1, R12_2, R12_3, R12_4, R13_1, R13_2, R13_3, R13_4, R14_1, R14_2, R14_3, R14_4, R15_1, R15_2, R15_3, R15_4, R16_1, R16_2, R16_3, R16_4, R17_1, R17_2, R17_3, R17_4, R18_1, R18_2, R18_3, R18_4, R19_1, R19_2, R19_3, R19_4, R20_1, R20_2, R20_3, R20_4, R21_1, R21_2, R21_3, R21_4, R22_1, R22_2, R22_3, R22_4, R23_1, R23_2, R23_3, R23_4, R24_1, R24_2, R24_3, R24_4, R25_1, R25_2, R25_3, R25_4, R26_1, R26_2, R26_3, R26_4, R27_1, R27_2, R27_3, R27_4, R28_1, R28_2, R28_3, R28_4, R29_1, R29_2, R29_3, R29_4, R30_1, R30_2, R30_3, R30_4, R31_1, R31_2, R31_3, R31_4, R32_1, R32_2, R32_3, R32_4, R33_1, R33_2, R33_3, R33_4, R34_1, R34_2, R34_3, R34_4, R35_1, R35_2, R35_3, R35_4, R36_1, R36_2, R36_3, R36_4, R37_1, R37_2, R37_3, R37_4, R38_1, R38_2, R38_3, R38_4, R39_1, R39_2, R39_3, R39_4

ITEM	QTY	Flight Component	Manufacturer	PACKAGE	VALUE	PCB REFERENCE DESIGNATOR
11	152	NOT USED		0705	OPEN	R0A_7, R0A_9, R0A_10, R0B_7, R0B_9, R0B_10, R00_7, R00_9, R00_10, R0_27, R0_28, R1A_7, R1A_9, R1A_10, R1B_7, R1B_9, R1B_10, R01_7, R01_9, R01_10, R1_27, R1_28, R2A_7, R2A_9, R2A_10, R2B_7, R2B_9, R2B_10, R02_7, R02_9, R02_10, R2_27, R2_28, R3A_7, R3A_9, R3A_10, R3B_7, R3B_9, R3B_10, R03_7, R03_9, R03_10, R3_27, R3_28, R04_7, R04_9, R04_10, R05_7, R05_9, R05_10, R06_7, R06_9, R06_10, R07_7, R07_9, R07_10, R08_7, R08_9, R08_10, R09_7, R09_9, R09_10, R10_7, R10_9, R10_10, R11_7, R11_9, R11_10, R12_7, R12_9, R12_10, R13_7, R13_9, R13_10, R14_7, R14_9, R14_10, R15_7, R15_9, R15_10, R16_7, R16_9, R16_10, R17_7, R17_9, R17_10, R18_7, R18_9, R18_10, R19_7, R19_9, R19_10, R20_7, R20_9, R20_10, R21_7, R21_9, R21_10, R22_7, R22_9, R22_10, R23_7, R23_9, R23_10, R24_7, R24_9, R24_10, R25_7, R25_9, R25_10, R26_7, R26_9, R26_10, R27_7, R27_9, R27_10, R28_7, R28_9, R28_10, R29_7, R29_9, R29_10, R30_7, R30_9, R30_10, R31_7, R31_9, R31_10, R32_7, R32_9, R32_10, R33_7, R33_9, R33_10, R34_7, R34_9, R34_10, R35_7, R35_9, R35_10, R36_7, R36_9, R36_10, R37_7, R37_9, R37_10, R38_7, R38_9, R38_10, R39_7, R39_9, R39_10
12	48	M55342K06B15E0R	State of the Art	0705	15K	R00_6, R0A_6, R0B_6, R01_6, R1A_6, R1B_6, R02_6, R2A_6, R2B_6, R03_6, R3A_6, R3B_6, R04_6, R05_6, R06_6, R07_6, R08_6, R09_6, R10_6, R11_6, R12_6, R13_6, R14_6, R15_6, R16_6, R17_6, R18_6, R19_6, R20_6, R21_6, R22_6, R23_6, R24_6, R25_6, R26_6, R27_6, R28_6, R29_6, R30_6, R31_6, R32_6, R33_6, R34_6, R35_6, R36_6, R37_6, R38_6, R39_6
13	52	M55342K06B100ER	State of the Art	0705	100K	R0C_00, R0C_01, R0C_02, R0C_03, R0C_04, R0C_05, R0C_06, R0C_07, R0C_08, R0C_09, R0C_10, R0C_11, R0_3, R1C_00, R1C_01, R1C_02, R1C_03, R1C_04, R1C_05, R1C_06, R1C_07, R1C_08, R1C_09, R1C_10, R1C_11, R1_3, R2C_00, R2C_01, R2C_02, R2C_03, R2C_04, R2C_05, R2C_06, R2C_07, R2C_08, R2C_09, R2C_10, R2C_11, R2_3, R3C_00, R3C_01, R3C_02, R3C_03, R3C_04, R3C_05, R3C_06, R3C_07, R3C_08, R3C_09, R3C_10,R3C_11, R3_3
14	94	M55342K06B200DR	State of the Art	0705	200	R0_5, R0_6, R0_7, R0_8, R0_9, R0_10, R0_11, R0_12, R0_13, R0_14, R0_15, R0_16, R0_17, R0_18, R0_19, R0_20, R0_21, R0_22, R0_23, R0_24, R0_25, R0_26, R1, R1_5, R1_6, R1_7, R1_8, R1_9, R1_10, R1_11, R1_12, R1_13, R1_14, R1_15, R1_16, R1_17, R1_18, R1_19, R1_20, R1_21, R1_22, R1_23, R1_24, R1_25, R1_26, R2, R2_5, R2_6, R2_7, R2_8, R2_9, R2_10, R2_11, R2_12, R2_13, R2_14, R2_15, R2_16, R2_17, R2_18, R2_19, R2_20, R2_21, R2_22, R2_23, R2_24, R2_25, R2_26, R3, R3_5, R3_6, R3_7, R3_8, R3_9, R3_10, R3_11, R3_12, R3_13, R3_14, R3_15, R3_16, R3_17, R3_18, R3_19, R3_20, R3_21, R3_22, R3_23, R3_24, R3_25, R3_26, R4, R6, R7
15	4	M55342K06B402DR	State of the Art	0705	402	R0_31, R1_31, R2_31, R3_31
16	31	NOT USED		0705	0, Shorted By PCB Trace.	RT1, RT2, RT3, RT4, RT5, RT6, RT7, RT8, RT9, RT10, RT11, RT12, RT13, RT14, RT15, RT16, RT17, RT18, RT19, RT20, RT21, RT22, RT23, RT24, RT25, RT26, RT27, RT28, RT29, RT30, RT31
17	48	D55342K07B40D2R	State of the Art	1206	40.2	R0A_A, R0B_A, R00_A, R1A_A, R1B_A, R01_A, R2A_A, R2B_A, R02_A, R3A_A, R3B_A, R03_A, R04_A, R05_A, R06_A, R07_A, R08_A, R09_A, R10_A, R11_A, R12_A, R13_A, R14_A, R15_A, R16_A, R17_A, R18_A, R19_A, R20_A, R21_A, R22_A, R23_A, R24_A, R25_A, R26_A, R27_A, R28_A, R29_A, R30_A, R31_A, R32_A, R33_A, R34_A, R35_A, R36_A, R37_A, R38_A, R39_A,
18	8	D55342K07B15D0R	State of the Art	1206	15	R0_1, R0_29, R1_1, R1_29, R2_1, R2_29, R3_1, R3_29

ITEM	QTY	Flight Component	Manufacturer	PACKAGE	VALUE	PCB REFERENCE DESIGNATOR
19	48	M55342K06B10E0R	State of the Art	0705	10K	R0A_8, R0B_8, R00_8, R1A_8, R1B_8, R01_8, R2A_8, R2B_8, R02_8, R3A_8, R3B_8, R03_8, R04_8, R05_8, R06_8, R07_8, R08_8, R09_8, R10_8, R11_8, R12_8, R13_8, R14_8, R15_8, R16_8, R17_8, R18_8, R19_8, R20_8, R21_8, R22_8, R23_8, R24_8, R25_8, R26_8, R27_8, R28_8, R29_8, R30_8, R31_8, R32_8, R33_8, R34_8, R35_8, R36_8, R37_8, R38_8, R39_8
20	4	M55342K06B4E75R	State of the Art	0705	4.75K	R0_2, R1_2, R2_2, R3_2
21	2	311P18-09S7R6	Yellow Springs Instruments	Thermistor, SMT Attach	30K	TH1, TH2
22	48	LAT-DS-03518-50 (GCFE9A)	SLAC	QFP44	GCFE9A	U00_1, U0A_1, U0B_1, U01_1, U1A_1, U1B_1, U02_1, U2A_1, U2B_1, U03_1, U3A_1, U3B_1, U04_1, U05_1, U06_1, U07_1, U08_1, U09_1, U10_1, U11_1, U12_1, U13_1, U14_1, U15_1, U16_1, U17_1, U18_1, U19_1, U20_1, U21_1, U22_1, U23_1, U24_1, U25_1, U26_1, U27_1, U28_1, U29_1, U30_1, U31_1, U32_1, U33_1, U34_1, U35_1, U36_1, U37_1, U38_1, U39_1
23	48	MAX145AEUA	Maxim	UMAX8	MAX145	U00_2, U0A_2, U0B_2, U01_2, U1A_2, U1B_2, U02_2, U2A_2, U2B_2, U03_2, U3A_2, U3B_2, U04_2, U05_2, U06_2, U07_2, U08_2, U09_2, U10_2, U11_2, U12_2, U13_2, U14_2, U15_2, U16_2, U17_2, U18_2, U19_2, U20_2, U21_2, U22_2, U23_2, U24_2, U25_2, U26_2, U27_2, U28_2, U29_2, U30_2, U31_2, U32_2, U33_2, U34_2, U35_2, U36_2, U37_2, U38_2, U39_2
24	4	LAT-DS-03519-50 (GCRC5)	SLAC	QFP80	GCRC5	U0_1, U1_1, U2_1, U3_1
25	4	MAX5121AEEE	Maxim	QSOP16	MAX5121	U0_2, U1_2, U2_2, U3_2
26	4	5962-8759406VXA	National Semiconductor	TO46 Throughole	LM185BYH 2.5	U0_3, U1_3, U2_3, U3_3
27	1	LAT-DS-03344-02	Sovereign Circuits		AFEE-X PCB	“X” Printed Circuit
28	1	LAT-DS-03345-02	Sovereign Circuits		AFEE-Y PCB	“Y” Printed Circuit
29	1	2151	Tra-Con			Staking Epoxy
30	1	5750	Uralane			Conformal Coating