

REVISIONS

Letter	ECO No.	Description	Checked	Approved	Date
A		INITIAL RELEASE	WFM		

	NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH			
Drawn:	BRIANKLATT	12/18/90	FABRICATION DOCUMENTATION			
Checked:	W.F. MAYER	4/24/91				
Approved:						
Released:						
			Size	Code Identification No.	Drawing No.	Rev.
			T	80230	99-03001	A
			Scale: NONE		Sheet: 1 of 24	

FABRICATION DOCUMENTATION

1.0 SCOPE

This Procedure is a collection of the fabrication forms and documentation which are used on Sponsored Research Projects in the Center for Space Research (CSR) at the Massachusetts Institute of Technology (MIT).

2.0 APPLICABLE DOCUMENTS

NONE

3.0 REQUIREMENTS

The forms and documentation included herein are imposed as a requirement by this specification. The forms contained herein, document parts, materials, processes, procedures, assembly steps, and configuration of hardware fabricated for the CSR project.

4.0 CONTENTS

Forms and documentation included in this specification are as follows:

- Assembly Work Order Documentation Package - including:

 - Instruction for Assembly Work Order (AWO)

 - Assembly Work Order (AWO)

 - Assembly Work Order (AWO) - Continuation Sheet

 - Assembly Work Order (AWO) - Revision Sheet

 - Instructions for Mechanical Work Order

 - Mechanical Work Order

 - Instruction for Assembly Fault Log

 - Assembly Fault Log

 - Instructions for Kit Tag

 - Conformal Coat Assembly Work Order

 - Materials Process Mixing Record

 - Solder Connector Assembly Work Order

 - Crimp Connector Assembly Work Order

 - Kit Tag

 - Potting Log

 - Configuration Traceability List

 - Material Status Tag

Assembly Work Order (AWO) - Final Check List
Reject Tag
Connector Mate/Demate Log

4.1 Assembly Work Order Documentation Package

The Assembly Work Order Documentation Package includes the following:

Assembly Work Order. This includes:

Assembly Steps

Inspection Checkpoints. These include:

Fabrication Inspections

Quality Assurance Inspections

Government Source Inspections (GSI)

Other Mandatory Inspection Points (MIPs)

AWO Continuation Sheet. Self Explanatory

AWO Revision Sheet. This includes:

unanticipated assembly steps

unanticipated inspection steps

ECO number

revision letter

inspections

tests

Mechanical Work Order. This includes:

Shop traveller

machining operations

insert installation

inspections

4.1 Assembly Work Order Documentation Package (continued)

AWO Final Check List

Provides a checklist to be used during final review of electronic assemblies. The object of this document is to ensure that consistent tests and inspections are applied to all assemblies prior to moving the hardware to the next assembly level.

Included are:

- visual inspections
- parts location and orientation
- revision check
- assembly drawing note check
- I/O connector Quality check
- I/O connector ring-in
- electrical tests at present level
- photographic record

Fault Log. This includes:

- physical discrepancies
- electrical discrepancies
- rework sign-offs
- reinspection sign-offs

Potting Log. This includes:

- potting compounds
- conformal coatings
- spot bonding materials
- epoxies
- material manufacturer
- material manufacturer's part number
- lot or date code
- date of manufacture
- date of expiration

weight ratios (if not pre-packaged)

4.1 Assembly Work Order Documentation Package (continued)

Configuration Traceability List. This includes:

- individual part identification
- part number
- part description
- part purchase order number
- part serial number
- part lot-date code

Kit Tag. The kit tag becomes the temporary nameplate for the subassembly during fabrication. It includes:

- Assembly drawing number
- Assembly serial number
- Individual preparing the kit
- Individual inspecting the assembly
- Individual fabricating the assembly
- Individual testing the assembly
- Individual accepting the assembly performance

Material Status Tag. This includes:

- Material or Part Name
- Material Manufacturer
- Material Distributor
- Manufacturer's Part Number
- Lot Number
- Purchase Order Number

Reject Tag. This includes:

- Part Name
- Part Number

Reason for Rejection
Hardware Disposition

5.0 INSTRUCTIONS FOR COMPLETING THE ASSEMBLY WORK ORDER

- 5.1 **(Project)**. The abbreviated form of the project name, i.e., XTE, AXAF, SAS-C, MJS, HEAO-B, etc.
- 5.2 **Assembly Name**. Name of the assembly
- 5.3 **Page of** Page number and total number of pages in the AWO
- 5.4 **DWG NO.** The drawing used for the particular assembly work.
- 5.5 **Build to Rev.** The drawing revision used for the particular assembly work, at the time of AWO issue.
- 5.6 **Assembly Serial No.** The identifying number of the particular assembly.
- 5.7 **Special Instructions**. Particular instruction required to perform the assembly task but which may not be shown on the drawing (i.e. safety or handling instructions).
- 5.8 **Authorizing Engineer:** The particular engineer, as designated by the Project Manager, responsible for the particular assembly job.
- 5.9 **Build Data Package Approval**. As determined by the project production supervisor.
- 5.10 **Document Control**. The project Production Supervisor.
- 5.11 **R&QA**. Review and sign off of the assembly work order by the cognizant Q.A. representative.
- 5.12 **Build History/Changes Incorporated**. Changes incorporated after the initial work order is completed.
- 5.13 **Step No.** A procedural step number.
- 5.14 **Type**. Electrical, mechanical, LSE QA, Customer QA, Fabrication/Assembly, Inspection, or Test.
- 5.15 **Description**. Brief description of the step to be performed.
- 5.16 **Performed by**. The signature of the person performing the particular step.
- 5.17 **Final Acceptance:** Project Manager or his designee, signature.
- 5.18 **R&QA**. The Reliability and Quality Assurance Representative's signature.

6.0 INSTRUCTIONS FOR COMPLETING THE MECHANICAL WORK ORDER

- 6.1 **Project** Abbreviated form of the project name. i.e., XTE, AXAF, ASTRO-D, HEAO-B, etc.
- 6.2 **Originator.** The cognizant Mechanical Engineer requesting the work.
- 6.3 **Approval.** Program manager or production Supervisor.
- 6.4 **CPY No.** 3 copies are needed: one for originator, one for the production file, and one copy accompanies the work.
- 6.5 **Part No. and rev.** The drawing and revision number to which the part or assembly will be made.
- 6.6 **Part Description.** Part name.
- 6.7 **QTY/Pld.** Quantity per payload (gives an indication of spares).
- 6.8 **Req'd. By.** Date parts are required.
- 6.9 **Engineer.** The cognizant mechanical engineer.
- 6.10 **Description of Work.** (quantity) brief verbal description of the work order including the quantity.
- 6.11 **Operations.** Machine, plate, inspection polish, etc.
- 6.12 **Location.** Location where the job will be performed.
- 6.13 **Signature.** of the person performing the actual work.
- 6.14 **Remarks.** special instructions.
- 6.15 **Routing.** pertains to outside machine shops. Topics are self-explanatory.
- 6.16 **Close out.** date work order is completed.
- 6.17 **Comments.** on the job performance.

**7.0 INSTRUCTIONS FOR COMPLETING
THE ASSEMBLY FAULT LOG.**

- 7.1 Project.** The abbreviated form of the project name i.e., XTE, AXAF, SAS-C, MJS, HEAO-B, etc.
- 7.2 Assembly DWG NO.** The drawing used for the particular work order.
- 7.3 Ser. No.** The identifying number of the particular assembly.
- 7.4 Page ___ of ___.** Number of pages required for the Fault Log.
- 7.5 NO.** The item number (discrepancy).
- 7.6 Description.** A brief description of the problem.
- 7.7 Originator.** The person first noting the discrepancy.
- 7.8 MRB NO.** Where appropriate, the material review board action number.
- 7.9 ECO.** Engineer Change Order No. associated with the problem if appropriate.
- 7.10 Rework and Re-Inspection.** The person responsible for re-work and the person responsible for re-inspection.

8.0 INSTRUCTIONS FOR COMPLETING THE KIT TAG.

8.1 Project The abbreviated form of the particular project, i.e. XTE, AXAF, OSO-H, SAS-C, etc.

8.2 Assembly Drawing No. Self explanatory.

8.3 Assembly Ser. No. A unique number which identifies that particular subassembly or assembly from all other subassemblies of assembly of the same type.

8.4 Accepted by and Date. The signature of the Project Engineer or his designee; month, day, and year.

8.5 Inspected by and Date. The inspector's signature or mark; month, day, and year inspected.

8.6 Assembly Fabricated by and Date. The person who fabricates the assembly or subassembly.

Revision Sheet Assembly Work Order

Project: _____

Page: _____ of _____

Assembly Name:	Drawing Number:	Build To Rev.	Assembly Serial Number:
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Assembly Drawing No: _____

ECO NO.: _____ Revision Letter: _____ Performed by: _____

Parts Location and Orientation Check: _____

Visual Inspection

MIT Q.A.: _____

NASA Q.A.: _____

Photographic Record, if needed: _____

ECO Description: _____

Assembly Drawing No: _____

ECO NO.: _____ Revision Letter: _____ Performed by: _____

Parts Location and Orientation Check: _____

Visual Inspection

MIT Q.A.: _____

NASA Q.A.: _____

Photographic Record, if needed: _____

ECO Description: _____

Assembly Drawing No: _____

ECO NO.: _____ Revision Letter: _____ Performed by: _____

Parts Location and Orientation Check: _____

Visual Inspection

MIT Q.A.: _____

NASA Q.A.: _____

Photographic Record, if needed: _____

ECO Description: _____

Kit Tag

**Center for Space Research
Massachusetts Institute of Technology**

Project: _____

Assembly Dwg. No. _____

Assembly Ser. No. _____

Kit Prepared By: _____ Date: _____

Assembly Fabricated By: _____ Date: _____

Assembly Inspected By: _____ Date: _____

Assembly Tested By: _____ Date: _____

Performance Accepted By: _____ Date: _____

CONFORMAL COAT WORK SHEET

Assembly Work Order

Project:	Page: 1 of:
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Assembly Name:	Drawing Number:	Build To Rev.	Assembly Serial No.:
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SPECIAL INSTRUCTIONS:

-HANDLE PER M.I.T ANTI-STATIC HANDLING PROCEDURE

64-02017.2006

-REFERENCE DOCUMENTS

-NASA NHB 5300.4(3A-2)

-NASA NHB 5300.4(3J)

Step No.	Type	Description	Perf By:	Date
1	I	VERIFY CONFORMAL COAT LOT WITH TEST SAMPLE		
2	P	VERIFY ELECTRICAL TEST ACCEPTANCE		
3	P	VERIFY FINAL CHECKLIST SIGNED OFF		
4	A	CLEAN P.C. BOARD PER NHB 5300.4(3A-2)		
4		-CLEAN AND SOAK USING REAGENT GRADE XYLENE BLOW DRY WITH DRY NITROGEN		

Solder Connector Assembly Work Order

Project:

Page: of:

Assembly Name:	Drawing Number:	Build To Rev.	Assembly Serial Number:
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Build History/Changes Incorporated:

Step No.	Type	Description	Perf By:	Date
1		SOLDER WIRES IN CONNECTOR # PER SCHEMATIC:		
		-BLOW OUT SOLDER CUPS		
		-INSPECT SOLDER CUPS INSURE FREE OF DEBRIS AND THAT GOLD PLATING IS FREE OF FLAWS		
		-TIN CUPS AND REMOVE SOLDER (3X) -AVOID SPILLOVER		
		-INSTALL WIRES PER SCHEMATIC -CUT AND STRIP WIRES -INSPECT STRIPS -TIN WIRES -INSPECT TINNING		
		-SOLDER WIRES IN CUPS -CLEAN EACH SOLDER CONNECTION AFTER SOLDERING, USE ISOPROPANOL. -AFTER ALL CONNECTIONS MADE CLEAN CONNECTIONS USING XYLENE AND RINSE USING ISOPRPOANOL.		
		-INSPECT M.I.T. QA ONR		
		-SLEEVE CONNECTIONS USING SHRINK TUBING		

Crimp Connector Assembly Work Order

Project:

Page: of:

Assembly Name:	Drawing Number:	Build To Rev.	Assembly Serial Number:
J#/P#	Connector	Contact	
Prepared By:	R&QA	Project	

Step No.	Type	Description	Perf By:	Date
1	A	PREPARE WIRES AND CRIMP CONTACTS PER NASA SPEC NHB 5300.4(3H)		
2	A	PREPARE WIRES FOR CRIMPING		
		-STRIP WIRES WITH MECHANICAL STRIPPER LABELLED PER WIRE GAUGE WIRE STRIPPER SET #		
		-CLEAN WIRES USING WIPES AND ISOPROPANOL		
3	A	PREPARE CONTACTS FOR CRIMPING		
		-BLOW OUT CONTACT BARREL USING COMPRESSED AIR		
		-VISUALLY INSPECT CRIMP CONTACTS INSURING NO DEBRIS IN CONTACT BARREL		
4	A	CRIMP TOOL QUALIFICATION		
		-CRIMP TOOLS USED		
		-TOOL: M22520/2-01 RECALIBRATION DATE		
		- TURRET: M22520/2-		
5	AI	TEST		
		-GO/NO GO TEST WITH TOOL M22520/3-01		
		-VERIFY PULL TEST PERFORMED PER "TENSILE TEST DAILY LOG"		
6	AI	CRIMP PINS/SOCKETS FOR CONNECTOR J#/P# PER SCHEMATIC DRAWING 64- REV		
		-CONNECTOR TYPE PER PARTS LIST 64-		
		-CONTACT TYPE		
		-USE TOOL SPECIFIED IN STEP 4		
		-CRIMP TOOL SETTING WIRE TYPE #1		
		-CRIMP TOOL SETTING WIRE TYPE #2		
		-CRIMP TOOL SETTING WIRE TYPE #3		
		-VISUAL INSPECTION M.I.T. Q.A.		
7	A	INSERT CONTACTS IN CONNECTOR PER ATTACHED WIRING LIST		
		-LABEL CONTACT PIN #'S ON WIRES		
8	AI	VERFIY PIN RETENTION M.I.T. Q.A.		
9	A	CLEAN, BAG, AND TAG HARNESS; INSTALL CONN COVERS		
10	A	STORE IN FLIGHT ASSEMBLY AREA FOR NEXT LEVEL OF ASSEMBLY		

Assembly Work Order

FINAL CHECK LIST

Project:

Page:

Of:

Assembly Name:	Drawing Number:	Build To Rev.	Assembly Serial Number:
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- A. Revision Check
 - Latest Revision Letter in ECO Book:_____
 - Latest Revision Letter performed per Revision Sheet:_____

- B. Parts location and orientation check per Assembly Drawing
 - Assembly Drawing No:_____ Revision Letter_____
 - Performed by:_____

- C. Assembly Drawing Note Check:
 - Performed by:_____

- D. I/O Connector Quality Check:
 - Sockets - Retention Check - Performed by:_____
 - Pins - Push Test - Performed by:_____

- E. I/O Connector Ring-in
 - Performed by:_____

- F. Visual Inspection
 - MIT Q.A.:_____
 - NASA Q.A.:_____

- G. Electrical Test
 - Performed by:_____

- H. Photographic Record_____

REJECT Tag

**CENTER FOR SPACE RESEARCH
Massachusetts Institute of Technology**

Project: _____ Date _____

Part Name: _____ Part No. _____

Reason for Rejection: _____

Disposition _____

Inspector: _____