Prototype Assembly Instructions for iMX8M_HMI_Platform

Version	1.0
Status	Baselined
Date	24-Oct-2018

CONTENTS

1 DOCUMENT DETAILS

1.1 Document History

Version	Author		Reviewer		Approver	
	Name	**Date (DD-MMM-YYYY)**	**Name**	**Date (DD-MMM-YYYY)**	**Name**	**Date (DD-MMM-YYYY)**
Draft 0.1	Richa Prajapati	24-Oct-2018	Anirudha Chougule	24-Oct-2018		
Draft 0.2	Richa Prajapati	24-Oct-2018	Anirudha Chougule	24-Oct-2018		
1.0	Richa Prajapati	24-Oct-2018			Anirudha Chougule	24-Oct-2018

Table 1: Document History

Version	Description of Change
Draft 0.1	Initial Draft Created
Draft 0.2	Internal review comments implemented
Version 1.0	Baselined

1.2 Definition, Acronyms and Abbreviations

Definition/ Acronym/ Abbreviation	Description
PCB	Printed Circuit Board
HMI	Human Machine Interface
MSL	Moisture Sensitivity Level
LPDDR	Low Power DDR

1.3 References

#	Document	Version	Remarks
1.	IPC/JEDECJ-STD-033.pdf	B.1	

2 INTRODUCTION

This document provides prototype-manufacturing instructions for iMX8M_HMI_Platform boards.

This document covers the instructions needed to be given to manufacturing personnel or vendor for PCB assembly.

3 PCB ASSEMBLY INSTRUCTIONS

This section consists of instructions for the assembly of components on printed circuit board(s) of iMX8M_HMI_Platform Board (17_00666_01).

3.1 iMX8M_HMI_Platform (17_00666_01)

3.1.1 Stencil Instructions

The following instructions need to be followed while preparing stencil for iMX8M_HMI_Platform board.

1. Use Top and Bottom Solder Paste layer from Gerber data for preparing the stencil.
2. Refer to the special instructions below while preparing the stencil.

3.1.2 Baking Instructions

3.1.2.1 Bare PCB Baking

Bare PCB needs to be baked for 24 hours at 90° Celsius.

3.1.2.2 Component Baking

Components need to be baked as per MSL Rating & JEDEC Standard Device Recommendation. If discrete components are not exposed to environment, then there is no need to bake these components.

Refer below table for MSL Rating & Baking Time of all the chipsets used in iMX8M_HMI Board:

Parts	MSL rating as per datasheet	Baking Time In Hrs.	Baking Temperature	Remarks
ADP1710AUJZ-R7 (U4,U49)	1	12h	60C	
CYUSB3304-68LTXI (U5)	3	9h	125C	Thickness <=1.4 mm
W25Q256JWPIQ (U11)	1	12h	60C	MSL Assumed
MT53B512M32D2NP-062 WT (U47)	3	9h	125C	
MIMX8MQ6CVAHZAA (U46)	3	43h	125C	Thickness >=2mm
KSZ9031RNXIC-TR (U58)	3	9h	125C	
ADV7535BCBZ-RL (U18)	3	9h	125C	Thickness <=1.4 mm
LBEE5HY1MW-TEMP(U6)	3	24h	125C	As per datasheet
LT8642SEV#PBF (U15,U57)	3	9h	125C	Thickness <=1.4 mm
FJX3014RTF (U1,U22,U23,U24,U27,U28)	1	12h	60C	
ECMF02-4CMX8 (U2,U30,U31)	1	12h	60C	
MC34PF4210A1ES(U7)	3	9h	125C	

74LVC2G125(U8)	1	12h	60C	
ADM1816-20ARTZ-RL7(U9,U50)	1	12h	60C	
A7101CHTK2/T0BC2VJ (U3)	1	12h	60C	
MCP6561T-E/LT(U10)	1	12h	60C	
FSA644UCX(U12)	1	12h	60C	
MGM111A256V2(U13)	3	27h	125C	Thickness ≤2.0 mm
NLSX5014MUTAG (U14,U52,U56,U60)	1	12h	60C	
ADG3308BCPZ-REEL7(U16)	3	9h	125C	Thickness <=1.4 mm
MCP2515T-I/ML(U17)	1	12h	60C	
TJA1052IT/2Y(U19)	3	48h	125C	Thickness ≤4.5 mm
SP5003-04TTG (U20,U21,U32,U33,U34,U35, U36,U37,U41,U42,U43,U44, U45)	1	12h	60C	
MIC2009YML-TR (U25,U26,U29)	1	12h	60C	
PCA9306FMUTCG(U40)	1	12h	60C	
CP2105-F01-GMR(U48)	1	12h	60C	
ADP5014ACPZ-R7(U51)	3	9h	125C	Thickness <=1.4 mm
ADM6315-26D3ARTZR7(U53)	1	12h	60C	
ADAU1361BCPZ-R7(U54)	3	9h	125C	Thickness <=1.4 mm
M24256-DFMC6TG(U55)	1	12h	60C	
ECMF04-4HSWM10 (U38,U39)	1	12h	60C	
ADUM5020-5BRWZ(U59)	3	48h	125C	Thickness ≤4.5 mm

3.1.3 X-Ray Inspection

X-ray Inspection should be done for all the BGA's in the board.

- X-Ray inspection should be used to verify good solder joint formation
- 2-D X-Ray is used to detect shorts, through top-down view

3.1.4 Manual Assembly

Refer below list of through-hole components used in iMX8M_HMI_Platform Board for Manual Assembly:

Mfg. Part#	Ref-des	Description
PJ-041H	J14	DC Jack Connector

10029449-111RLF	J2,J15	HDMI Connectors
2134536-2	J1	USB connector - micro AB 2.0
1932258-1	J3,J4	USB 3.0 Type A Connectors
20021111-00010T4LF	J9,J11	JTAG Header
87224-2	J12	Header
1-2301994-2	J13	Ethernet connector
440055-2	J16	CAN Connector
87224-1	J18	GND Header

3.1.5 Reflow Profile

3.1.5.1 Recommendation for Processor (U46)

MSL/PPT is a product characteristic. Freescale Semiconductor is determining the Moisture Sensitivity Level of the components using the Package Peak Temperature Profile (**Figure 2**) as measured with a thermo couple at the package top surface. This profile builds on J-STD-020C and reflects several customers' requirements and their production processes which were evaluated for standardization.

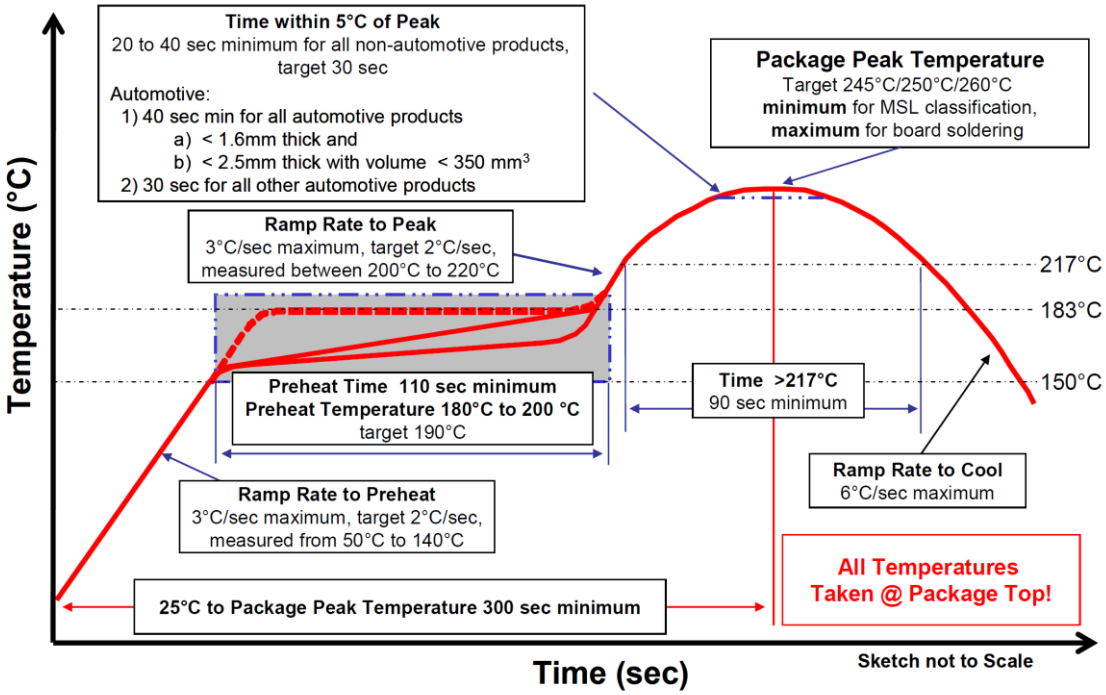


Figure 2: Package Peak Temperature (PPT) characterization for determination of components' Moisture Sensitivity Level (MSL) and the parts' processability per J-STD-020 and including customer board soldering requirements. This is not a soldering profile showing the solder joint temperature!

Figure 1: Reflow Profile of Processor

3.1.5.2 Recommendation for LPDDR4 memory (U47)

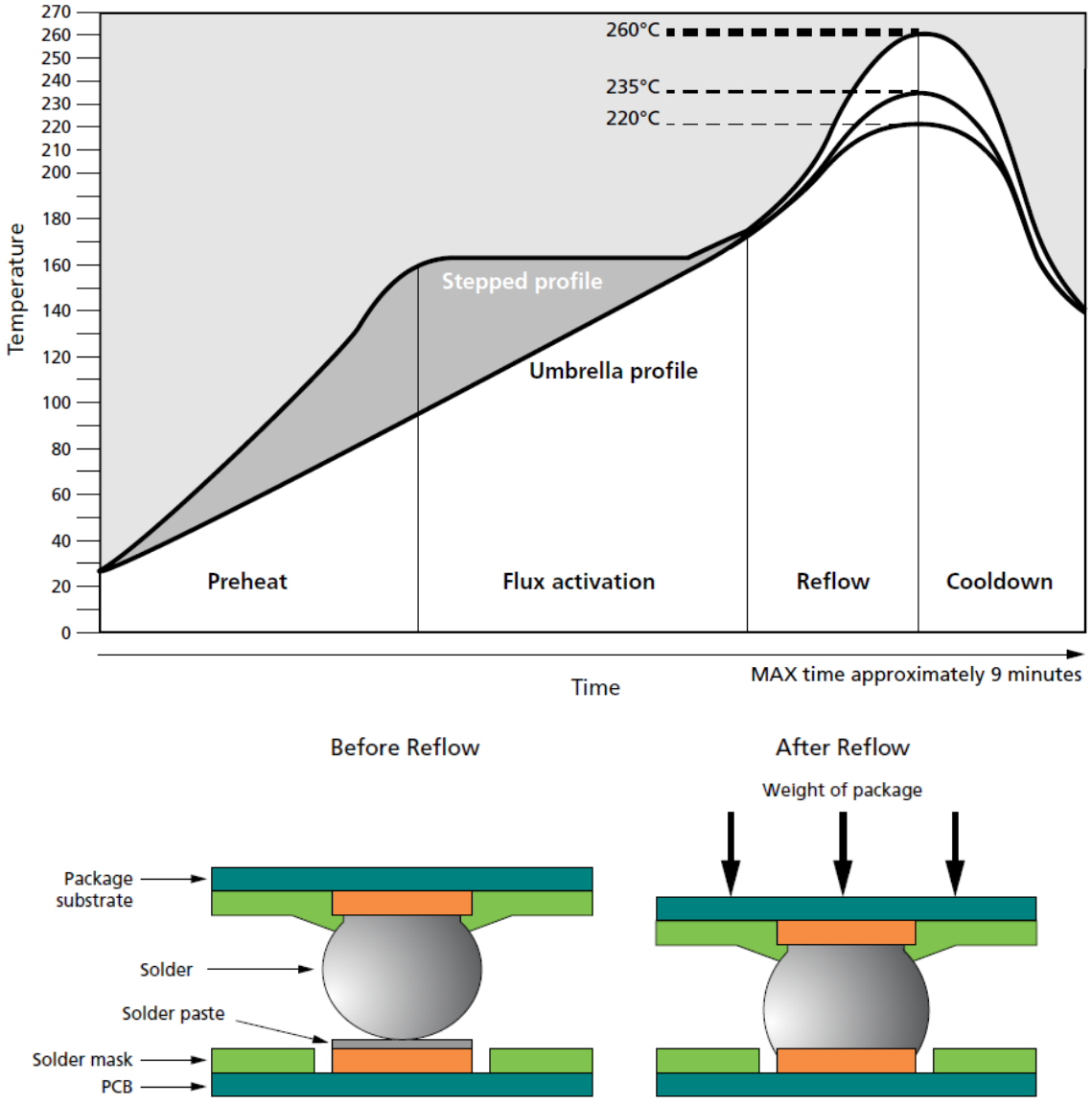


Figure 2: Reflow Profile of Memory

Reflow Process Guidelines

The reflow temperature profile is one of the most important factors in surface mount and must be fine tuned to establish a robust process for solder joint formation. The actual temperature of the board or components will be different from the reflow oven setting and is dependent on several factors, including board size, thermal mass, component density, oven type, solder type, reflow oven, and so on. The other reflow parameters such as heating ramp rate, dwell time, and cooling rate should be selected depending on the flux activity/chemistry being used and should closely follow the paste manufacturer's recommendations. It is the responsibility of the user to properly measure the temperature at different locations on the PCB and components to ensure the desired temperature is reached at all locations for complete reflow of solder joint. Typical examples of reflow profile are shown in the Table 6 with peak temperatures of 260°C, 235°C, and 220°C, depending on the application and solder paste type. Refer to Micron's technical note TN-00-15 for additional soldering and surface mount recommendations.

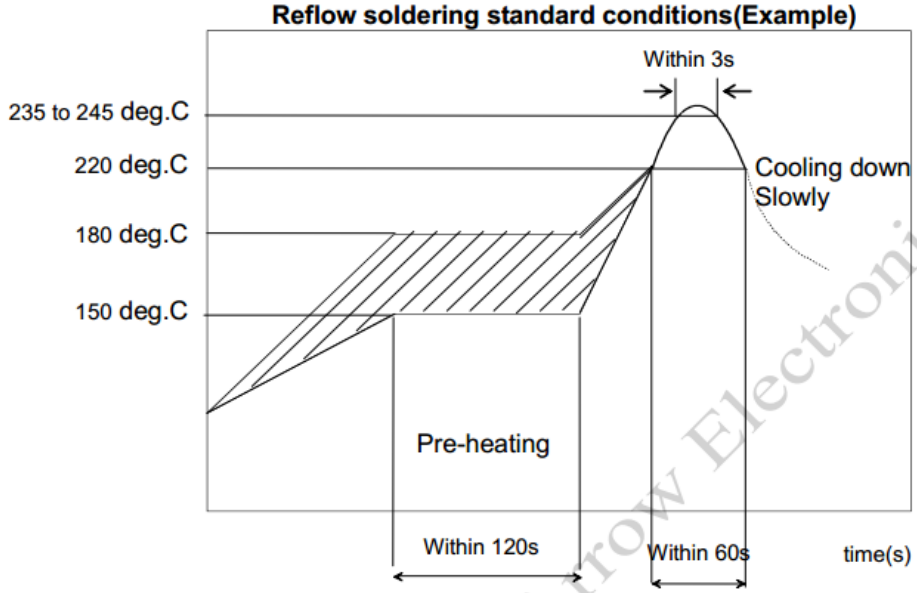
3.1.5.3 Recommendation for Wi-Fi BT Module (U6)

When placing products on the PCB, products may be stressed and broken by uneven forces from a worn-out chucking locating claw or a suction nozzle. To prevent products from damages, be sure to follow the specifications for the maintenance of the chip placer being used. For the positioning of products on the PCB, be aware that mechanical chucking may damage products.

Soldering Conditions:

The recommendation conditions of soldering are as in the following figure.
When products are immersed in solvent after mounting, pay special attention to maintain the temperature difference within 100 °C. Soldering must be carried out by the above mentioned conditions to prevent products from damage. Set up the highest temperature of reflow within 260 °C.
Contact Murata before use if concerning other soldering conditions.

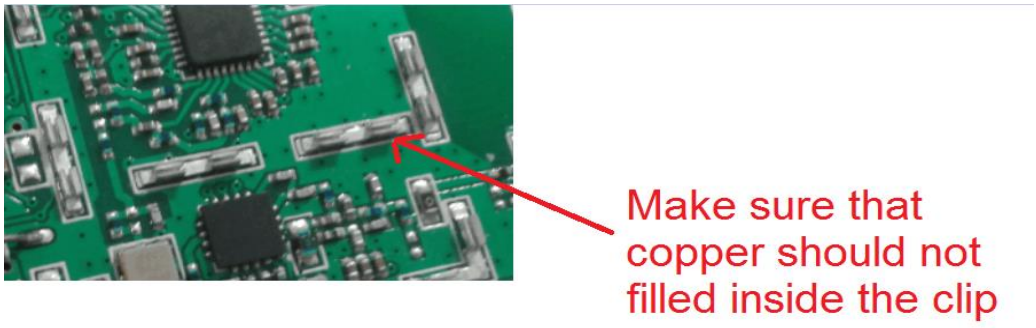
Reflow soldering standard conditions(Example)



Please use the reflow within 3 times.
Use rosin type flux or weakly active flux with a chlorine content of 0.2 wt % or less.

3.1.6 Shield Clips assembly guide

1. Kindly make sure that shield clips should not have copper filled inside
2. Mounting of Shield clips should be proper so that linear clips can be aligned



3.1.7 Impedance measurement Table

After assembly, kindly measure the impedance as per below table and provide the report with actual values of impedance measurement.

Power Supply Rail	Measurement Location	Expected Resistance Value (E= ohm, K= kilo ohm, M= mega ohm)
VCC_12V0	TP16 & J18	>1K
DCDC_3V3	TP34 & J18	>1K
VCC_5V	TP31 & J18	>1K
VDD_GPU_1V0	C214	>100E
VDD_VPU_1V0	C210	>100E
NVCC_DRAM_1V1	TP1 & J18	>100E
VDD_DRAM_1V0	TP17 & J18	>100E
VDD_1V8	C137	>1K
VCAM_1V5	R76 & J18	>1K
VDD_PHY_0V9	C125	>100E
VDD_PHY_1V8	C361	>1K
VDDA_1V8	C58	>1K
VDD_PHY_3V3	C27	>1K
VCAM_2V8	C26	>1K
VREFDDR	C33	>100E
VDD_SNVS_0V9	C392	>1K
VDD_SOC_0V9	TP26 & J18	>100E
VDD_ARM_1V0	TP24 & J18	>100E
VCC_1V8_EXT	TP33 & J18	>1K
VCC_1V2	TP32 & J18	>1K