C-Ming Technology Co., Ltd.

Product Definition

☑ C-Ming Product ☐ OEM/ODM Product
☐ Semi-finished Product ☐ Component

IPM-1DX

1 to 8 e-MMC/eMCP Duplicator
For Manual Production Line
手動產線用
1對8 e-MMC/eMCP拷貝機

Specifications for Approval
規 格 承 認 書

Approval	Manager	Issued By

Revision History

Revision	Date	Description	PM
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Index

1 Introduction 介紹

IPM-1DX e-MMC/eMCP Duplicator is designed to meet e-MMC/eMCP device content duplication/verification manufacturing needs on manual production line.
IPM-1DX e-MMC/eMCP拷貝機，乃是特地針對手動產線在生產過程中，對於e-MMC/eMCP的內容複製與內容驗證之需求而設計。

IPM-1DX features high-performance and independently operating e-MMC/eMCP device sockets by 1 master source and 8 target sockets, which support mainstream e-MMC/eMCP devices with various form factors.
IPM-1DX具有高效能獨立運作的 e-MMC/eMCP插槽：資料來源 1 槽，目標卡 8 槽。可支援各種不同尺寸與規格的主流e-MMC/eMCP存儲卡。

IPM-1DX is equipped with unique software and offers Partition, Auto, Mirror, File, User, and AutoScan mode of both Copy and Verify operations suitable for various applications.
IPM-1DX提供各種不同的拷貝/驗證操作模式，包括 Partition/Auto/Mirror/File/User/AutoScan 等模式，以因應各種不同的應用需求。

- All product photos in this document are for reference only; the actual product may be slightly different. 文件中所有產品圖片僅供參考，實際產品可能略有不同。

2 Overview 概觀

2.1 Features 特點

- 1x Master + 8x Target Independent e-MMC/eMCP sockets.
  1 個資料來源插槽 + 8 個獨立運作的目標 e-MMC/eMCP 插槽。
- Supports e-MMC BOOT-1/2, General Purpose-1/2/3/4, and User Data Area Partitions as well as EXT_CSD register settings copy and verify operation.
  支援 e-MMC 的 BOOT-1/2，General Purpose-1/2/3/4，User Data Area 分割區和 EXT_CSD 參數設定的拷貝與驗證功能。
- Supports MMCA 5.0 compatible e-MMC/eMCP devices.
  支援 MMCA 5.0 相容的 e-MMC/eMCP 存儲卡。
- Supports e-MMC 8-bit mode working.
  支援 e-MMC 8-bit 運作模式。
- Supports SDR50 bus speed.
  支援 SDR50 匯流排速度。
- Copy/Verification operation in Partition / Auto / File / Mirror / User / AutoScan mode.
  具備 Partition/Auto/File/Mirror/User/AutoScan 等拷貝/驗證操作模式。
- On-the-fly checksum generation during verify operation.
  可於驗證過程中直接快速產生檢查碼。
- Provides EXT_CSD setting checksum info.
  可提供 EXT_CSD 設定的檢查碼資訊。
- Supports enabling SANITIZE register setting function for MMCA 4.5 e-MMC.
  支援啟動 MMCA 4.5 的 e-MMC 之 SANITIZE 參數設定功能。
- Supports boot re-size function with e-MMC equipped with boot re-size function.
  針對具備 boot 區重定尺寸功能的 e-MMC(僅 MMCA 4.41)，可支援 boot 區重定尺寸功能。

- Supports “User Data Only” function; allows mix-up e-MMC operation when valid data is located only in user data area.
  支援“User Data Only”功能；當有效資料僅存在於 user data area 時，可容許 e-MMC 混合使用作業。
- 2x RS232 interface for industrial platform connection.
  具備 2 個 RS232 介面，以便工業平台之連結。
- Replaceable e-MMC / eMCP device socket module is available.
  可替換的 e-MMC/eMCP 插槽模組。
- Equipped with 1 MicroSD card socket module for firmware update requirement.
  配備 1 個 MicroSD 卡插槽模組以供韌體更新之需求。
- Special designed and strong mechanical jig tool for long time working and easy opening/closing all sockets simultaneously.
  特殊設計且堅固的治具結構，可長期作業且可輕易的同時開關所有插槽。

2.2 Specifications 規格

- Power Requirements 電力需求: AC 100-240V，50 / 60Hz，0.5A
- Card Slots 卡槽: MMCA, 5.0 compatible ; Master x 1, Target x 8
  相容 MMCA, 5.0； 來源槽 x 1, 目標槽 x 8
  SD 3.0 compatible ; Firmware Update Use x 1
  相容 SD 3.0； 韌體更新專用 x 1
- Dimensions 尺寸: L 420mm x W 283mm x H 81.2mm
- Weight 重量: ≒7785 g
- Display 顯示: 16x2 Backlit LCD 背光 LCD
- Interface 介面: RS232 DE9 Female x 1 (for connecting to controller unit 連接至控制端)
  RS232 DE9 Male x 1 (for connecting to controlled unit 連接至被控制端)
  USB 3.0 Super-Speed Type A Female x 1
  (Reserved for future function upgrade 預留未來功能升級)
  USB 3.0 Super-Speed Type B Female x 1
  (Reserved for future function upgrade 預留未來功能升級)
  USB 3.0 High-Speed Type B Female x 1
  (Reserved for future function upgrade 預留未來功能升級)
  Power Connector 電源接頭 x 1
  Safety Ground Connector 接地接頭 x 1
  Fuse(0.5A) Connector 保險絲(0.5A)接頭 x 1

2.3 Applications 應用

- e-MMC / eMCP content duplication in the process of tablet / PAD manufacturing.
  製造平板電腦裝置過程中需要的 e-MMC / eMCP 內容複製
- e-MMC / eMCP content duplication in the process of smart phone manufacturing.
  製造智能手機裝置過程中需要的 e-MMC / eMCP 內容複製
- e-MMC content duplication in the process of smart TV/set-top box manufacturing.
  製造智能電視/機上盒裝置過程中需要的 e-MMC 內容複製

- Any requirement for e-MMC or e-MMC based eMCP content duplication.
  任何 e-MMC 或 e-MMC 為基底之 eMCP 內容複製的需求

3 Accessories 配件

- IPM-1DX Duplicator Unit x1
  IPM-1DX 拷貝機本體 x1
- AC Power Cord x1
  AC 電源線 x1
- OQC Report x1
  出貨報告 x1
- MicroSD Socket Module (Purchasable)
  MicroSD 插槽模組 (可選購)
- 12x16mm 169-ball e-MMC/eMCP Socket Module (Purchasable)
  12x16mm 169-ball e-MMC/eMCP 插槽模組 (可選購)
- 12x18mm 169-ball e-MMC/eMCP Socket Module (Purchasable)
  12x18mm 169-ball e-MMC/eMCP 插槽模組 (可選購)
- 14x18mm 169-ball e-MMC/eMCP Socket Module (Purchasable)
  14x18mm 169-ball e-MMC/eMCP 插槽模組 (可選購)
- 11.5x13mm 153-ball e-MMC/eMCP Socket Module (Purchasable)
  11.5x13mm 153-ball e-MMC/eMCP 插槽模組 (可選購)
- 14x18mm 100-ball e-MMC Socket Module (Purchasable)
  14x18mm 100-ball e-MMC 插槽模組 (可選購)
- 12x16mm 186-FBGA eMCP Socket Module (Purchasable)
  12x16mm 186-FBGA eMCP 插槽模組 (可選購)
- 11.5x13mm 162-FBGA eMCP Socket Module (Purchasable)
  11.5x13mm 162-FBGA eMCP 插槽模組 (可選購)

4 Functions 功能

4.1 LED Indicators 指示燈

Beneath each socket module there are two indicators indicating operation status.
每個插槽下方有 2 個指示燈以顯示作業狀態。

Indicator	Description
RED (lighting) **紅色(恆亮)**	***Error錯誤*** Indicate e-MMC/eMCP initialize error, read/copy timeout, data verify error, or insufficient target card capacity. e-MMC/eMCP初始化錯誤，讀寫逾時，資料驗證錯誤，或目標卡容量不足。
GREEN (lighting) **綠色(恆亮)**	***Operation successfully completes. 作業成功完成。***
GREEN **(Blinking in high frequency)** **綠色(高頻率閃爍)**	***Working in process. 作業中***
GREEN **(Blinking in low frequency)** **綠色(低頻率閃爍)**	***Waiting or holding in process. 等待或暫停中***

4.2 Operation Menu 操作目錄

Main Menu	Sub Menu / Option		Description	Default
COPY[*1]	PARTTN–MIRROR–USER–AUTO–FILE–ATSCAN (Press LEFT/RIGHT to switch按左/右切換)		Do copy operation in **Partition-Mirror-User-Auto-File-AutoScan** Mode. 以Partition-Mirror-User-Auto-File-AutoScan模式進行拷貝作業	***PARTTN***
VRFY[*1]	PARTTN–MIRROR–USER–AUTO–FILE–ATSCAN (Press LEFT/RIGHT to switch按左/右切換)		Do verify operation in **Partition-Mirror-User-Auto-File-AutoScan** Mode. 以Partition-Mirror-User-Auto-File-AutoScan模式進行驗證作業	***PARTTN***
ERASE[*4]			Completely clear all the data within the IC in target slots. 完整清除目標槽中IC內的資料	
SrcCksm[*2]	PARTTN–MIRROR–USER–AUTO–FILE–ATSCAN (Press LEFT/RIGHT to switch按左/右切換)		Generate source e-MMC checksum in **Partition-Mirror-User-Auto-File-AutoScan** Mode. 以Partition-Mirror-User-Auto-File-AutoScan模式產生來源IC檢查碼	***PARTTN***
SrcScan[*3]			Source scan function. Execute source e-MMC valid user data scan for the requirement of AutoScan mode operation. 來源掃描功能。執行來源e-MMC之有效user data掃描，以備執行AutoScan模式作業。	
Enter SETUP	**Verify**	*ON - OFF*	Verify content after copy. 拷貝後驗證內容	***ON***
	Operation Mode	*Partition*	Sector by sector copy/verify operation for the whole partitioned area. 在完整分割的儲存區中，進行磁區對磁區拷貝/驗證作業	***Partition***
		Mirror	Sector by sector copy/verify operation for the whole disk. 對於完整磁碟，進行磁區對磁區鏡射拷貝/驗證作業	
		User[*6]	User defined operation length as specified in UserSz option. 依據UserSz選項中指定數值定義操作長度	
		Auto[*5]	Automatic partition mapping copy/verify operation. 自動調整分割尺寸，重新格式化目標卡，並進行分割拷貝/驗證作業	
		File[*5]	File by file copy/verify operation. 自動調整分割尺寸，重新格式化目標卡，並進行檔案拷貝/驗證作業	
		AutoScan	Provides source slot scanning feature that automatically scan the entire user data area for valid user data that is not default erased value. 提供掃描來源插槽的功能，此功能會自動掃描完整的user data區以取得有效的，且非預設刪除之user data	
	Rewrite	*ON - OFF*	Try rewrite target area at verify error. 驗正錯誤時，複寫目標e-MMC	***ON***
	Erase	*ON - OFF*	Erase target before write data. 寫入資料前，清除目標e-MMC內容	***ON***
	RETRY CNT	*0 ~ 9*	Times of RETRY when verifying data error. 驗證資料錯誤時，重複嘗試次數	***5***

Main Menu	Sub Menu / Option		Description	Default
	CDn Mode[*7]	*HOST*	Host preferred card detect mode. 主控端偏好e-MMC偵測模式	***HOST***
		OPRNT	Operation triggered card detect mode for target cards. 目標e-MMC啟動作業偵測模式	
	Format	*Quick - Full*	Select the method of erasing memory card at doing erase operation. 選擇清除資料的方式。若選擇Quick Format(且Erase為ON)，則在寫入檔案系統資料前，僅先清空系統資料區。若選擇Full Format(且Erase為ON)，則會先清除全部的儲存區域。	***Quick***
	UserSz	000.1 GB ~ 256.0 GB	Define operation length in User Mode 定義在User Mode中的操作長度	***000.5 GB***
	BottomSz[*8]	000 MB ~ 128 MB	Define bottom length in Partition and User Mode 定義在Partition Mode和User Mode 中的底部長度	***000 MB***
	IDCHK[*9]	*ON - OFF*	To disable or enable checking Manufacturer ID and OEM ID code of target card at initialization. 開啟或關閉檢查MFR/OEM ID碼的功能。此功能開啟時，目標槽中e-MMC的MFR/OEM ID碼必須與來源槽中的e-MMC相符。若關閉此功能，系統會忽略MFR/OEM ID碼	***OFF***
	MAXCLK[*10]	*50MHz - 25MHz*	To select the maximum allowed operation clock frequency. 選擇最大操作頻率	***50 MHz***
	O_CLK_SEL[*11]	*0 / 1 / 2 / 3*	Output clock phase select. To select output signal phase relative to output clock. 選擇與輸出頻率相關的輸出訊號相位	***0***
	CNTDISP	*ON - OFF*	Batch pass/fail count display. 選擇是否顯示pass/fail記數	***ON***
	PARTCHK[*12]	*ON - OFF*	Device partition check before operation. If enabled, partition completed e-MMC will be signaled as error. 作業前檢查裝置的分割區；如啟動，已完成分割之裝置將被標記為錯誤	***OFF***
	PWRCYL[*13]	*ON - OFF*	Temporarily power off the target slot after the copy operation is done, then power on the slot and begin the verify operation. 拷貝作業完成後，短暫切斷目標槽電源，之後重啟電源再開始驗證作業	***OFF***
	ERRRINT[*14]	*ON - OFF*	Press Enter to initialize the target card one more time after the first initialization at the beginning of operation. 在作業開始時第一次初始化目標卡後，按Enter可再一次初始化目標卡	***OFF***
	EXTCKSM	*ON - OFF*	Define whether EXT_CSD setting checksum be included in data checksum. 定義EXT_CSD參數設定之檢查碼是否加入資料檢查碼中	***OFF***
	SANITIZE	*ON - OFF*	Define run SANITIZE register setting or not. 定義是否執行SANITIZE參數設定功能	***OFF***
	UD_ONLY[*16]	*ON - OFF*	Define “User Data Area Only” setting. If ON, following functions will be canceled during operation: eMMC partition setting / programming and verifying for BT1-2 & GP 1-4 areas / programming and verifying for EXT_CSD settings. 定義 “User Data Area Only” 之設定。如開啟，在作業時將取消eMMC Partition設定、BT1-2/GP1-4分割區燒錄比對、EXT_CSD燒錄比對等功能	***OFF***

Main Menu	Sub Menu / Option		Description	Default
	AUTOIDLE	*ON - OFF*	If ON, the system will return to main menu in 10 seconds after the copy operation is done. If OFF, pressing Enter is required to return to the main menu after the copy operation is done. 設定ON時，拷貝作業完成後10秒，系統自動回復到主選單。設定OFF時，拷貝作業完成後，需按下Enter鍵，才會回到主選單。	***OFF***
	DEVSZCHK	*ON - OFF*	If ON, the system will predetermine the capacity of source and target IC when doing partition. If OFF, the system will not predetermine the capacity of source and target IC when doing partition. 設定ON時，設定PARTITION時會進行母片與子片容量預判。設定OFF時，設定PARTITION時不會進行母片與子片容量預判。	***ON***
	SKTUSELMT	*00 - 10*	Put limit on the using times of target socket modules. 00 for unlimited, and 01-10 for 1K to 10K using times. 為目標插槽模組加上使用次數限制，00為無限制，01-10為1K至10K次	***00***
	System Info[*15]	*SYSINFO*	Show serial no. and firmware image version info of the duplicator unit. (Press Enter to exit) 顯示拷貝機裝置的序號和韌體版本資訊 (按Enter跳出)	
		SLOT-0~9 INFO	Show serial no. and using history record info of card slot-0 to slot-9. (Press Enter to exit) 顯示slot-0~slot-9插槽模組的序號和使用歷史紀錄(按Enter跳出)	
	Reset Options		Reset all options to default setting. 重設所有選項至預設值	
	Exit SETUP		Exit to main menu. 跳回主目錄	

*1 : If you do not know which mode should be used, we recommend you do SrcScan (Source Scan) first and use ATSCAN (AutoScan) Mode. Another choice is Mirror Mode; it is the safest way to do the operation but the operation time would be longer. The other choice is PARTTN (Partition) Mode; it is faster then Mirror Mode and also safe but should notice that if there is any data in the Bottom area of e-MMC content.
如果您不知道該用何作業模式，我們建議先做 SrcScan(Source Scan)，再使用 ATSCAN(AutoScan)模式。另一個選擇是 Mirror Mode；這是較安全的作業模式，但是作業時間可能比較長。第三個選擇是 PARTTN (Partition) Mode，此模式比 Mirror Mode 快而且也安全，但須注意 e-MMC 內容的底部區域是否有資料。

*2 : Please be noted that different mode leads to different checksum.
請注意不同的作業模式會產生不同的檢查碼。

*3 : The time costs by the SrcScan (Source Scan) operation depends on the content size of source e-MMC; same volume e-MMC with more content and the scan speed will be faster, e.g. the Source Scan time of a 8g e-MMC with 4g content will be much shorter than which of a 8g e-MMC with only 1g content.
SrcScan(Source Scan)所需要的時間，取決於來源 e-MMC 的內容大小。相同容量的 e-MMC，含有越多內容的，掃描速度越快。例: 內含 4GB 內容的 8GB e-MMC，其掃描時間將遠遠短於僅含 1GB 內容的 8GB e-MMC。

*4 : It's recommended to use ERASE function before copy operation, if target ICs are not brand new e-MMCs but been copied before.
如果目標槽中的 IC 不是全新的 e-MMC，而是先前曾拷貝過的 e-MMC，建議在拷貝作業前，先使用 ERASE 功能進行資料清除作業。

*5 : Not suitable for e-MMC operation.
不適合 e-MMC 作業。

*6 : To use User Mode, operaton length in option UserSz and BottomSz should be defined first.
如要使用 User Mode，需先於 UserSz 和 BottomSz 選項中定義作業長度。

*7 : If the duplicator is manually operated, please set this option to OPRNT. If the duplicator is automatically operated, e.g. the duplicator is placed on an automatic platform or is connected to a HMI controller, please set this option to HOST.
如果拷貝機是以手動操作，請將選項設為 OPRNT。如果是使用自動操作，如放置於自動化機台或以 HMI 控制，請設為 HOST。

*8 : Please be noted that certain end-point device platform may request certain data to be placed in the bottom area of the e-MMC. To find out if there's data in the bottom area, you can use SrcCksm function - define BottomSz to 000MB, then run SrcCksm PARTTN and get the first checksum; then define BottomSz to 001MB and run SrcCksm PARTTN to get the second checksum. If these two checksums are different, it means there's data located in the bottom area. At this time please check with the source e-MMC provider to get more info about the size of bottom area.
請注意某些終端裝置平台會要求 e-MMC 的底部區域須放置特定的資料。要找出底部區域是否有資料，可使用 SrcCksm 功能 – 將 BottomSz 定義為 000MB，執行 SrcCksm PARTTN 以取得第一個檢查碼；然後將 BottomSz 定義為 001MB，再執行 SrcCksm PARTTN 以取得第二個檢查碼。如果兩個檢查碼不同，就代表底部區域有資料存在。此時，請與來源 e-MMC 的提供者確認底部區域的長度資訊。

*9 : When IDCHK is set to ON, MFR_ID (Manufacturer ID) and OEM_ID of cards in target slots must be match with the ID of card in source slot at card initialization. If the target e-MMCs are mixed up with ICs of different MFR_ID and OEM_ID that not qualified with the source IC, you can set this option to ON to filter them out.
當 IDCHK 設為 ON，在初始化目標槽卡片時，系統會檢查 MFR_ID (Manufacturer ID)和 OEM_ID 是否和來源槽的母片相同。如果目標槽的 e-MMC 混雜有和母片不同的 MFR_ID 和 OEM_ID，您可以將此選項設為 ON 以篩選出這些 e-MMC。

*10 : If the fail rate of copy operation is high, you can consider setting this option to 25MHz to decrease the copy speed to get more stability.
如果拷貝作業的失敗率很高，您可以考慮設此選項為 25MHz 以減低拷貝的速率，以換取較高的穩定性。

*11 : Please always leave this option to **0**; unless the duplicator always hangs in the process of operation, then try setting this option to 1/2/3.
請永遠將此選項設為 0；除非拷貝機總是在作業中當機，那可以試著設為 1/2/3。

*12 : Please be noted that partition for e-MMC is an OTP operation; once the e-MMC has been partitioned, it cannot be partitioned any more. In the same way, once the e-MMC had been copied and used before, there is a very big chance that it had been partitioned; therefore if you want to make this e-MMC to be copied again with another source e-MMC, even their MFR_ID and OEM_ID are the same and the copy/verify operation shows no error, eventually the target e-MMC still may not work as the source e-MMC; because their partition structure are not the same. To avoid this situation, please always use new e-MMC on target slot; if the target e-MMCs are mixed up with used ICs, you can set this option to ON to filter those partitioned ICs out.
請注意 e-MMC 磁區分割是一次性的作業，一旦 e-MMC 被分割過，以後就再也不能重新分割。相同的狀況，一旦 e-MMC 曾被拷貝與使用，就有非常大的機會該 e-MMC 已經被分割過了；所以，如果想要拷貝其他母片的內容到該 e-MMC，即便他們的 MFR_ID 和 OEM_ID 都相同，拷貝/驗證作業也沒顯示錯誤；最後該目標 e-MMC 仍可能無法像母片一樣工作；這就是因為他們的磁區分割結構不同。要避免此狀況的發生，請永遠在目標槽使用全新的 e-MMC；如果目標 e-MMC 中混雜有使用過的 e-MMC，您可以將此選項設為 ON，以篩選出這些被分割過的 IC。

*13 : This function will only temporarily power off the target slot but not the whole duplicator, after copy operation is done and before verify operation starts.
此功能僅是在拷貝作業結束後，至驗證作業開始前之間，短暫的將目標槽斷電，而非關閉整個拷貝機電源。

*14 : This function is designed for those manual operators; at manual working process, often the target slot shows error after initialization is just because the e-MMC is not correctly placed. Setting this option to ON will offer a chance to re-place the e-MMC after the first initialization.
此功能是針對手動操作者所設計；在手動作業流程中，目標槽在卡片初始化時，常因為 e-MMC 沒放好而顯示錯誤。將此選項設為 ON，則在第一次初始化 e-MMC 後，還有機會重新擺放 e-MMC。

*15 : SYSINFO contains serial no. of the duplicator and 5 firmware image version info. SLOT-0 ~ 9 INFO contains serial no. of the e-MMC module, USE record, PASS record, FAIL record, and PFREC record (the latest 32 times fail rate).
SYSINFO 含有拷貝機的序號和 5 個韌體影像版本的資訊。SLOT-0 ~ 9 INFO 含有 e-MMC 模組的序號，使用紀錄，成功紀錄，失敗紀錄，和 PFREC 紀錄(最近 32 次失敗率)。

*16 : “User Data Area Only” function is mainly for some operation may mix-up using e-MMC from different manufacturer or with different model; however to obtain a successful operation with this function, following rules should be noticed:
a. Target IC should be larger than or exactly the same with source IC.
b. All valid data locates only in User Data Area.
c. Operation with this function will completely ignore any register setting and any programming/verifying for BOOT1-2/GP1-4 area.
“User Data Area Only”功能，主要是針對某些作業可能會混用不同品牌，或不同型號的 e-MMC。要使用此功能成功完成作業，須注意下列條件:
a. 目標 IC 之容量需大於或等於來源 IC
b. 所有有效資料僅存於 User Data Area
c. 使用此功能之作業，完全不會進行任何暫存器設置，也不會進行 BOOT1-2/ GP1-4 區之燒錄和比對

4.3 Operation Mode 作業模式

PARTTN – Partition Mode

Partition Mode copy entire only partitioned area designated by MBR partition table entries in exact sector by sector, byte by byte mirroring manner.

In the case if only a portion of the source card is used while only the allocated areas are to be copied and verified, using Partition Mode can reduce the operation time and pertaining the exactness of copy required.

This allows source card with multiple partitions or partitions formatted to file system other than FAT16/32 to be copied and/or verified, provided that the partitions are made based on MBR and partition table entry.

The MS extended partition table entry format is also supported.

It is recommended to use Partition Mode when sector-by-sector, byte-by-byte exactness of new copies required and the MBR partition table allocated area is smaller than the card capacity.

Please be noted that if there's certain data in the bottom area of e-MMC, BottomSz should also be properly set.

Partition 模式是針對 MBR 分割表中指定的分割區域進行磁區對磁區 / 字元對字元的鏡射拷貝作業。

此模式適用於：如果來源 e-MMC 只有部分被使用，且只有此部分需要拷貝/驗證，此時使用此模式可縮短作業時間，且亦可維持拷貝所需的精確性。

此模式允許具備多重分割的來源卡,或來源卡的格式是 FAT16/32 以外的檔案系統，只要來源卡分割是依據 MBR 和分割表。

此模式亦支援 MS 延伸分割表格式。

當新的拷貝作業需要磁區對磁區/字元對字元的精准度，且 MBR 分割表的佔用區小於 e-MMC 的總容量時，建議使用 Partition 模式。

請注意，如果 e-MMC 的底部區域含有資料，則 BottomSz 選項亦需正確設定。

MIRROR – Mirror Mode

Mirror Mode copy entire source card content onto target cards in exact sector by sector, byte by byte mirroring manner.

This allows source card with multiple partitions or partitions formatted to file system other than FAT16/32 to be copied/verified.

It is recommended to use Mirror Mode, when sector-by-sector, byte-by-byte exactness of new copies is required.

Mirror Mode is the safest mode to do the operation, but the operation time will be longer.

Mirror 模式以鏡射的方式，磁區對磁區，字元對字元的將來源 e-MMC 的完整內容拷貝至目標卡。

此模式允許拷貝/驗證具備多重分割或是 FAT16/32 檔案系統以外的來源卡。

當拷貝作業需要磁區對磁區，字元對字元的的精確度時，建議使用 Mirror 模式。

Mirror 模式為作業模式中最安全的作業模式，但作業時間會較長。

AUTO – Auto Mode

(Not Recommended for e-MMC operation)(不建議 e-MMC 作業使用)

Auto Mode automatically scan source card and copy/verify only those space occupied by user data.

Use target card with the same labeled capacity as the source card in Auto Mode. The Auto Mode allows target cards with +/- 5% capacity variation from source cards.

In Auto Mode, the duplicator automatically adjusts partition size to fully utilize storage space of target card. At the meantime, the duplicator automatically identifies storage area that is occupied by user data in the source card. Only the storage area occupied by user data are copied and verified to reduce overall operation duration.

Only when the source card is formatted as FAT16/32 file system is supported by Auto Mode. It is recommended to use Auto Mode, when source and target cards are with the same labeled capacity and are formatted to FAT16/32 file systems.

Auto 模式會自動掃描來源卡，並自動拷貝/驗證只被使用者資料佔用的空間。

在 Auto 模式中使用標籤容量相同的目標卡和來源卡，Auto 模式可接受目標卡和來源卡的實際容量有+/- 5%的差異。

在 Auto 模式中，拷貝機會自動調整分割的尺寸，以完全利用目標卡的儲存空間。同時，拷貝機會自動辨識來源卡中被使用者資料佔用的儲存區域。

在此模式中，只有被使用者資料佔用的儲存區域會被拷貝/驗證，以減少整體作業的時程。

然而，Auto 模式僅支援以 FAT16/32 檔案系統格式化的來源卡。當來源卡與目標卡的標籤容量相同，而且是以 FAT16/32 檔案系統格式化時，建議可使用 Auto 模式。

FILE – File Mode

(Not Recommended for e-MMC operation) (不建議 e-MMC 作業使用)

File Mode browse source card root directories and subfolders and then copy/verify all file automatically.

Source card must be formatted under FAT16/32 file system. In File Mode Copy operation, the target cards are first being re-formatted to the same file system as the source card while utilizing all storage space available. And then, the duplicator browses root directory and sub-folders and copy each file found onto the target cards. This allows the target cards with different capacities to be supported. (However, target card shall be supported by the source card formatted file system.)

In File Mode Verify operation, the duplicator browse root directory and sub-folders. Mark each file found and try to open file with the same file name within the same directory in the target cards. If the corresponding file is found file verify operation is performed and then continue to next file or directory until all files and directories are verified.

It is recommended to use File Mode, when source and target cards are with different labeled capacity and are formatted to FAT 16/32 file systems.

File 模式會流覽來源卡的根目錄和子資料夾後，自動拷貝 / 驗證所有檔案。此模式允許目標卡和來源卡的容量不相同。來源卡需以 FAT16/32 檔案系統格式化。

在 File 模式拷貝作業時，目標卡會先被格式化成和來源卡一樣的檔案系統，以利用所有可能的儲存空間。然後拷貝機會流覽來源卡的根目錄和子資料夾，之後拷貝每個找到的檔案至目標卡。此作業允許目標卡和來源卡的容量不同。(但是目標卡應支援來源卡使用的檔案系統。)

在 File 模式驗證作業時， 拷貝機會流覽根目錄和子資料夾，標記所有發現的檔案，並試著開啟目標卡中相同資料夾內的同名檔案。一旦發現相符合的檔案，驗證作業就完成，之後進行下一個檔案或資料夾的驗證，直到所有檔案與資料夾都驗證完成。

當來源卡與目標卡的標籤容量不同，而且都被格式化為 FAT16/32 檔案系統時，建議使用 File 模式。

USER – User Mode

User Mode offers user full control over operation length starting from LBA sector 0. Under user mode, source data are sector-by-sector copied and verified as Mirror Mode. But the operation length is user defined by the UserSz option in 0.1GB unit.

Please be noted that if there's certain data in the bottom area of e-MMC, BottomSz should also be properly set.

User 模式讓使用者可以全權控制從 LBA 分區 0 開始的操作長度。在 User 模式下，來源資料會像 Mirror 模式一樣的逐區複製與驗證。但是操作的長度(容量)是使用者在 UserSz 選項中自行定義的，以 100MB 為單位。

請注意，如果 e-MMC 的底部區域含有資料，則 BottomSz 選項亦需正確設定。

ATSCAN – AutoScan Mode
(Most Recommended for e-MMC operation)(e-MMC 作業最推薦)

The AutoScan mode allow users to search through entire user data area of master IC for valid user data and store the scan result back to master IC. Using AutoScan mode, users may safely expedite COPY/VERIFY operation disregarding the operating system, partitioning, or file system format being used and recorded in the source IC.
AutoScan 模式讓使用者可以完整搜尋來源 IC 中的 user data 區中有效的 user data，並將掃描結果回存入來源 IC。
使用 AutoScan 模式讓使用者可以安全地加速拷貝/驗證作業，無論來源 IC 中使用或燒錄了何種作業系統/分割設定/檔案系統。

To use the AutoScan feature, please follow below instructions:
欲使用 AutoScan 功能，請參照下列說明:

Procedure A - For NEW master IC with updated content:
程式 A – 使用新來源 IC，內含更新過的內容

1. Power ON the duplicator, and then place the master IC into source slot.
   開啟拷貝機電源，將來源 IC 放入來源插槽。
2. Scroll the menu to "SrcScan" and press ENTER.
   捲動選單至 “SrcScan” 然後按 ENTER。
3. The Source Scan operation begin. Wait until source scan operation complete, this may takes a while depends on the capacity of master IC and the size of recorded user data.
   來源掃描作業開始，請等候直到來源掃描作業完畢，此作業時間取決於來源 IC 的容量與 IC 中的 user data 的容量。
4. When the display indicates "Save ScanList Y"-
   If user intend to save scan result into master IC, please press ENTER.
   If user DO NOT intends to save scan result into master IC, please press LEFT/RIGHT key to switch the option to "Save ScanList N" and then press ENTER.
   當螢幕顯示 “Save ScanList Y”時，若使用者欲將掃描結果回存至來源 IC，請直接按 ENTER。
   若使用者不要將掃描結果回存至來源 IC，請按左/右鍵將顯示選項切換

至 “Save ScanList N”再按 ENTER。

Saving SrcScan result means saving the ScanList to master IC, which eliminate the needs to re-perform SrcScan again after powering off the duplicator.
The duplicator will automatically search through master IC for available empty space to save ScanList data. The ScanList data will not participate with Copy/Verify/SourceChecksum operations under AutoScan mode.
However, a master IC that contains saved ScanList data may result in variation of Copy/Verify/SourceChecksum operation under operation mode other than AutoScan mode.
If you do not want to put any data other than original content into the master IC, please do not save scanlist to master IC; at this condition please remember not to power off the duplicator, or the scanlist data will gone.
回存掃描結果即為將 ScanList 回存至來源 IC，此作業可讓拷貝機在重新開機後不用重新執行來源掃描(SrcScan)。
拷貝機會自動搜尋來源 IC 中的可用空白空間來存放 ScanList 數據。在使用 AutoScan 模式中的拷貝/驗證/檢查碼作業時，ScanList 資料會自動被忽略。
然而，針對已經含有先前存入 ScanList 資料的來源 IC，若使用 AutoScan 模式以外的模式來進行拷貝/驗證/檢查碼作業，可能導致目標資料變異。
如果不想在母片中放入任何原始內容以外的資料，請不要將 ScanList 資料存入來源 IC；在此狀況下請記得不要關閉拷貝機電源，否則 ScanList 資料會消失。

5. Now the duplicator is ready to perform operation under AutoScan Mode. Insert target e-MMC, scroll the menu to COPY ATSCAN / VRFY ATSCAN / SrcCksm ATSCAN and then press enter to start operation.
現在拷貝機已可以在 AutoScan 模式下進行作業。放入目標 e-MMC，將選單切換至 COPY ATSCAN / VRFY ATSCAN / SrcCksm ATSCAN 然後按 ENTER 以開始 AutoScan 模式的拷貝/驗證/檢查碼作業。

Procedure B - For master IC that performed SrcScan with saved ScanList data, and with content that has NOT been updated:
程式 B – 來源 IC 先前已經執行過 SrcScan 且內含 ScanList 資料，且內含未更新過的資料。

1. Power ON the duplicator and place the master IC into source slot.
   開啟拷貝機電源並將來源 IC 放入來源插槽。

2. Now the duplicator is ready to perform operation under AutoScan Mode. Insert target e-MMC, scroll the menu to COPY ATSCAN / VRFY ATSCAN / SrcCksm ATSCAN and then press enter to start operation.
   現在拷貝機已可以在 AutoScan 模式下進行作業。放入目標 e-MMC，將選單切換至 COPY ATSCAN / VRFY ATSCAN / SrcCksm ATSCAN 然後按 ENTER 以開始 AutoScan 模式的拷貝/驗證/檢查碼作業。

4.4 Operation Statistics 作業數據

Operation statistics is displayed after selected operation is finished.
Statistics includes:
在完成選定的作業後會顯示作業數據資料，包含下列資料 ：

Pass / Fail Quantity 作業成功/失敗數量
Indicate pass/fail card quantity during operation.
顯示作業完成後，作業成功/失敗的目標卡數量。

Copy / Verify Speed 拷貝/驗證速度
Indicate average user data copy/verify speed (in MB/sec).
顯示拷貝/驗證使用者資料的平均速度。(單位為 MB/sec)

Total Operation Time 作業總時間
Indicate period of time elapsed during selected operation (in second).
顯示選定作業執行時所經過的所有時間。(單位為秒)

Total Operation Data Capacity 作業總容量
Indicate total amount of data being copied/verified (in KB).
顯示拷貝/驗證的總數據量。(單位為 KB)

EXT_CSD Setting Checksum (EXT_CSD)設定檢查碼

Indicate source EXT_CSD setting checksum generated during VERIFY operation.

顯示在驗證過程中產生的來源片 EXT_CSD 設定的檢查碼。

Source Data Checksum (32 bits) 來源資料檢查碼 (32 位元)

Indicate source data checksum or source EXT_CSD setting + data checksum generated during VERIFY operation. (Checksum is displayed only after COPY+VERIFY or VERIFY operation.)

顯示在驗證過程中產生的來源片資料的檢查碼,或是 EXT_CSD 設定+資料的檢查碼。(唯有執行拷貝+驗證作業，或執行驗證作業後，才會顯示檢查碼)

4.5 Erase 資料清除

The Erase operation offers an easy way to completely purge the data in Target IC.

This independent operation is not the same with the Erase function within the copy operation. If target IC is not brand new e-MMC but has been copied earlier, it's recommended to do Erase operation before doing copy operation once again to prevent any invalid data been remain.

透過資料清除作業，可輕易的完整清除目標卡中的資料。

此獨立作業和拷貝作業附屬的清除功能不同；如果目標 IC 不是全新的 e-MMC，而是先前曾拷貝過的 e-MMC，建議於再度拷貝前，先進行此資料清除作業，以避免任何先前的無效資料殘留於 IC 中。

4.6 Test Mode 測試模式

A test utility is equipped in the duplicator for basic functionality test and ROM image update.
拷貝機具有測試工具，以便進行基礎功能測試與 ROM 影像更新作業。

Entering Test Mode 進入測試模式

1. Switch off the power of the duplicator.
   關閉拷貝機電源。

2. Press and hold the ENTER(middle) button; while holding ENTER button, switch on the power of the duplicator. Hold the ENTER button for a while and then the test menu will show.
   按住不放 ENTER 鈕，按住的同時開啟拷貝機電源，之後即進入測試模式目錄。

Test Mode Menu 測試模式目錄

MENU	DESCRIPTION
TEST: ALL	Do all tests for one time. Press enter to manually proceed to next test. 逐項進行一次所有的測試，按ENTER以前進到下一項測試
TEST: AUTO	Automatically do all tests for 1 cycle. 自動進行一回合所有測試
TEST: LOOPBACK	Automatically do all tests for unlimited cycles. Power off the duplicator to stop. 自動進行無限回合的所有測試；關閉電源才能停止
TEST: LCM	Test LCM display function. 測試LCM顯示功能
TEST: LED	Test LED indicator function. 測試LED指示燈功能
TEST: PushBTN	Test PUSH-BUTTON function. 測試按鍵功能
TEST: SDIF	Test slots interface signal connectivity. 測試插槽介面信號的連接能力
TEST: SDRAM	Test SDRAM memory. 測試SDRAM記憶體
TEST: RS232	Test RS232 ports. 測試RS232連接埠
TEST: SROM	Test security EEPROM. 測試安控EEPROM記憶體
IMAGE UPDATE	Perform ROM image update. 執行ROM影像更新
IMAGE VERSION	Display ROM image version information. 顯示ROM影像版本資訊

5 Basic Maintain 基礎維護

5.1 ROM Image Update 更新 ROM 影像

1. Prepare a MicroSD card and quick-format the card on PC with a MicroSD card reader. (Please make sure formatting the card with default settings and giving the MicroSD card a disk label name.)
準備一張 MicroSD 卡，並以 PC 上的讀卡器快速格式化該 SD 卡。(請務必確認使用預設值格式化該卡，並務必給予該卡磁碟區標籤名稱)

2. Copy the released ROM image file (IPM_1DX.BIN) to the root directory of the MicroSD card. (If the original image file name is in form of yyyymmdd IPM_1DX.BIN, please rename it to IPM_1DX.BIN.)
將取得的 ROM 影像檔案(IPM_1DX.BIN)複製到 MicroSD 卡的根目錄下。(如果 ROM 影像檔的原始名稱是 yyyymmdd IPM_1DX.BIN，請將檔案更名為 IPM_1DX.BIN)

4. Insert the MicroSD card with ROM image file to the MicroSD socket module on the duplicator.
將內含 ROM 影像檔的 MicorSD 放入拷貝機的 MicroSD 插槽模組。

5. Turn on the duplicator and enter test mode.
啟動拷貝機電源並進入測試模式。

6. Select IMAGE UPDATE and press Enter.
選擇 IMAGE UPDATE 並按 ENTER。

7. LCM displays confirmation page, press RIGHT to switch the option to Y, and then press ENTER to proceed image update.
LCM 螢幕顯示確認資訊，請按右鈕將選項切換為 Y，再按 ENTER 以確定執行 ROM 影像更新。

8. The duplicator will query MicroSD slot, search for ROM image file, and automatically complete the ROM image update.
拷貝機會查詢 MicroSD 插槽並搜索 ROM 影像檔案，之後會自動進行 ROM 影像更新。
If the system keeps on showing “Image File Missing”, please replace the MicroSD with another one.
如果系統持續顯示“Image File Missing”，請更換另一片 MicroSD 卡。

9. Wait until LCM display returns to IMAGE UPDATE page.
請等候至螢幕顯示回到 IMAGE UPDATE 選項。

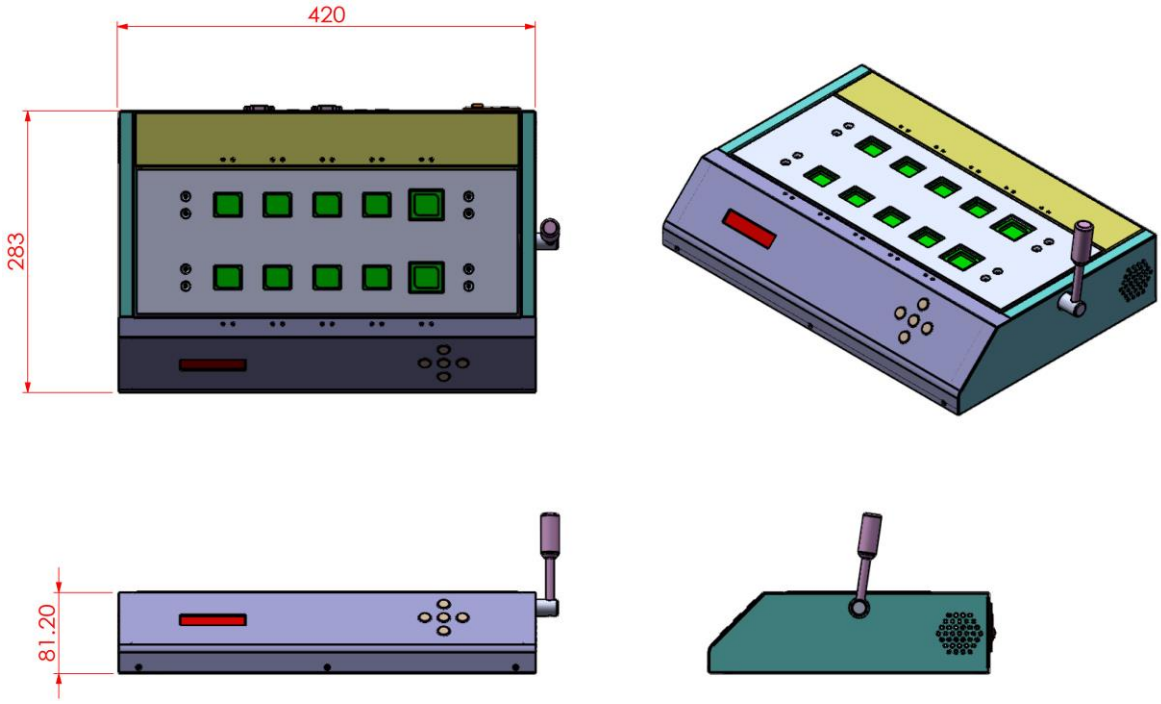
10. The ROM image update is now complete. Turn off the duplicator and then turn it on again for the changes taking effect.
    ROM 影像更新完成；請將拷貝機關機再重新開機，以讓變更生效。

11. To confirm a successful ROM image update, enter test mode again and select IMAGE VERSION to show current ROM image version; or use System Info function in the operation menu.
    如要確認 ROM 影像是否成功更新，請進入測試模式並選擇 IMAGE VERSION 功能，即可看到目前的 ROM 影像版本資訊。

5.2 IC Insertion Direction 置入 IC 的方向性

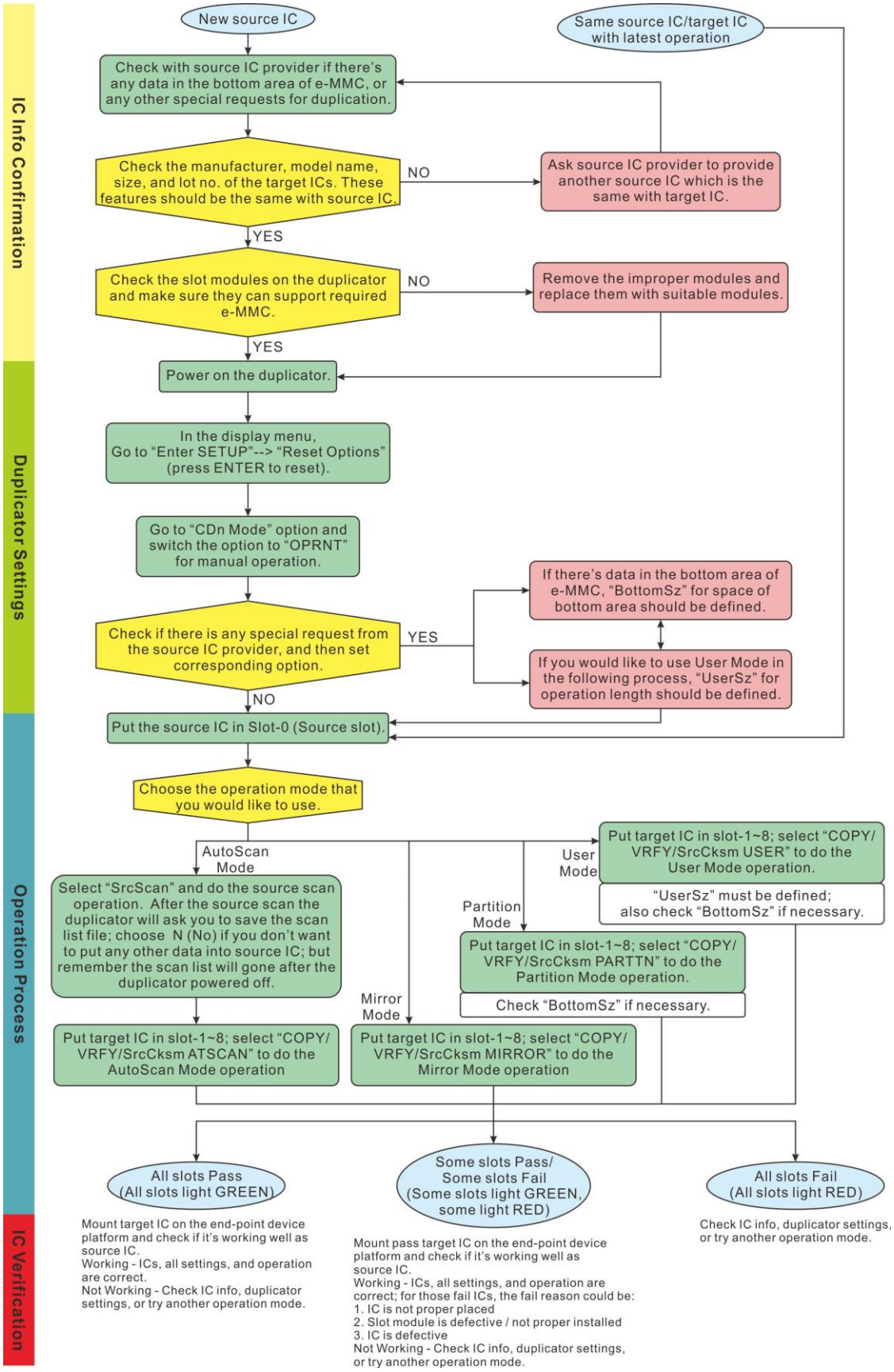
Please be noted and remember that when any e-MMC / eMCP are placed in the IC socket, it must be placed with correct direction. Take a look at the frame of the IC socket, you can find small triangle or arrow which shows the direction for the Pin-1 of the IC. Pin-1 of IC must be placed toward this direction; if e-MMC is placed in the wrong (opposite) direction, the IC or socket module will be damaged after the operation begins. Placing the IC with wrong direction is a human error, and we will not be responsible for any damages that been caused by human error.
請注意並切記，當把 e-MMC/eMCP 放入插槽時，必須以正確的方向置入。注意看 IC 插槽的框架,會發現三角形或是箭頭指出 IC 的 PIN-1 的方向。IC 的 PIN-1 必須朝該方向放置；如果 e-MMC 放錯方向(反向)，開始進行作業後 IC 或插槽模組會因此而毀損。IC 方向的錯置，乃屬於人為疏失，我們對於因人為疏失所造成的的任何損害，皆不予負責。

6 Mechanism



7 Appendix

7.1 Manual Operation Procedure



7.2 IC Supporting List

Brand	Capacity	Model No.	Package
SanDisk	4G	SDIN4C1-4G	12*16
SanDisk	8G	SDIN4C1-8G	12*16
SanDisk	4G	SDIN4C2-4G	12*16
SanDisk	8G	SDIN4C2-8G	12*16
SanDisk	4G	SDIN5C1-4G	12*16
SanDisk	4G	SDIN5C2-4G	12*16
SanDisk	8G	SDIN5C2-8G	12*16
SanDisk	2G	SDIN5D2-2G	11.5*13
SanDisk	32G	SDIN5E2-32G	14*18
SanDisk	32G	SDIN7DP4-32G	11.5*13
SanDisk	32G	SDIN5C4-32G	12*16
SanDisk	64G	SDIN5C4-64G	12*16
SanDisk	16G	SDIN7DU2-16G	11.5*13
SanDisk	8G	SDIN7DP2-8G	11.5*13
Sandisk	8G	SDIN7DU2-8G	11.5*13
SanDisk	32G	SDIN8DE4	11.5*13
SanDisk	16G	SDIN9DW4-16G	11.5*13
SanDisk	32G	SDIN9DW4-32G	11.5*13
SanDisk	64G	SDIN9DW4-64G	11.5*13
Samsung	4G	KLM4G1EEHM	14*18
Samsung	8G	KLM8G2FEJA	12*16
Samsung	8G	KLM8G2FE	12*16
Samsung	16G	KMVYL000LM-B503	12*16
Samsung	4G	KLM4G1FE3B-B001	11.5*13
Samsung	4G	KMSJS000KA-B308	11.5*13
Samsung	32G	KMK2U000VM-B604	12*16
Samsung	8G	KMCMG0000M-B998	12*18
Samsung	64G	KLMCG8GEAC-B001	11.5*13
Samsung	32G	KLMBG4GE4A-A001	11.5*13
Samsung	4G	KLM4G1YE4C-B001	11.5*13
Samsung	4G	KLM4G1YEMD-B031	11.5*13
Samsung	8G	KLM8G1WEMB-B031	11.5*13
Samsung	16G	KLMAG2WEMB-B031	11.5*13
Phison	2G	PSM4B11-2G	14*18
Micron	4G	IUA18	11.5*13

Brand	Capacity	Model No.	Package
Micron	4G	2M400FD0	11.5*13
Micron	4G	1OA18	11.5*13
Micron	32G	IWA18	14*18
Micron	4G	JW866	11.5*13
Micron	8G	JW870	11.5*13
Micron	16G	JW867	11.5*13
Micron	32G	JW869	11.5*13
Micron	2G	JW896	11.5*13
Micron	4G	JW857	11.5*13
Micron	8G	JW858	11.5*13
Micron	32G	JW894	14*18
Micron	64G	JW895	14*18
Micron	32G	JW828	14*18
Micron	4G	JW963	11.5*13
Micron	8G	JW962	11.5*13
Toshiba	2G	THGBM4G4D1HBAIR	11.5*13
Toshiba	4G	THGBM4G5D1HBAIR	11.5*13
Toshiba	8G	THGBM4G6D2HBAIR	11.5*13
Toshiba	16G	THGBM4G7D2GBAIE	12*16
Toshiba	32G	THGBM4G8D4GBAIE	12*16
Toshiba	16G	THGBM5G7A2JBAIM	12*16
Toshiba	16G	THGBW5G7A2JBAIR	11.5*13
Toshiba	4G	THGBM5G5A1JBAIR	11.5*13
Toshiba	4G	THGBM5G5A1JBAIR	11.5*13
Toshiba	8G	THGBM5G5A1JBAIR	11.5*13
Toshiba	4G eMCP	THGBM5G5A1JBAIR	11.5*13
Toshiba	4G eMCP	THGBM5G5A1JBAIR	11.5*13
Toshiba	4G	THGBMAG5A1JBAIR	11.5*13
Toshiba	8G	THGBMBG6D1K6AIL	11.5*13
Toshiba	4G	THGBMBG5D1KBAIT	11*10
Kingston	4G	KE44B-26BN	12*16
Kingston	16G	KE4BT4B6A	12*16
Kingston	16G	KE4CN4K6N	12*16
Kingston	2G	KE44B-25AN	11.5*13
Kingston	32G	KE4CN5B6A	12*16
Kingston	4G	KE4CN2H5A	11.5*13

Brand	Capacity	Model No.	Package
Hynix	16G	H26M52002EQR	12*16
Hynix	4G	H9DP32A4JJAC	11.5*13
Hynix	32G	H26M64002DQR	12*16
Hynix	8G	H26M42002GMR	11.5*13
Hynix	4G	H26M31002GPR	11.5*13
Hynix	64G	H26M78002BFA	12*16
Hynix	16G	H26M54003EMR	11.5*13
Hynix	8G	H26M42003GMR	11.5*13
Hynix	8G	H26M41103HPR	11.5*13
Hynix	16G	H26M52103FMR	11.5*13
Hynix	16G	H26M52003EQR	12*16
ADATA	4G	AE1DF04GAK-000MAA	12*16