



CYNNOVO Kivvi Payment Device

The third party applications interface specification

V 2.3.7

CYNNOVO, Inc.

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Version Information

Version	Date	Instructions
2.0.0	2016.06.22	The first draft
2.0.1	2016.07.07	Improve the interface definition and instruction
2.0.2	2016.07.11	Improve the interface definition and instruction
2.0.3	2016.07.28	"Search card", "trade request" and "EMV trade" instructions to increase track data encryption.
2.0.4	2016.10.28	Improving the key management system
2.0.5	2016.11.11	Increase the isbusy instructions and led control; Password input increase password-less directly confirm the configuration parameters noPinFormat; Perfect apdu command function, support IC card
2.0.6	2016.12.17	Increase pinFormat parameters in pinprocess instructions "PLAIN_TEXT" plaintext password valid values Increase the qrcode optional parameters in the instruction of payType, used for displaying payment type LOGO in the middle of the qr code
2.0.7	2017.01.03	Increase the DUKPT KSN operating instructions
2.1.0	2017.03.09	Bank card, EMV Instruction parameter part redefined, increase support to the function of electronic cash, including electronic cash balance inquiries and transaction records query function.
2.1.1	2017.03.13	Add a serial port instructions
2.1.2	2017.03.23	Add the flow chart of how to load and use MSSK and DUKPT
2.1.3	2017.03.24	Transact command,add"transFlow"
2.1.4	2017.03.27	Add Key distribution management
2.1.5	2017.04.01	Add load terminal param in load EMV parameters part
2.1.6	2017.04.05	Add digital signature capabilities fuction on small screen. The LOGO and carousel pictures supports 256-color bitmap format. Add EMV parameter configruation fuction.
2.1.7	2017.04.06	Add "appld" for Load EMV Parameter
2.1.8	2017.04.17	Add Printer busy command
2.1.9	2017.06.19	Update instruction parameter configuration instructions. Add AppID assignment description.
2.2.0	2017.11.16	Add event to support "card.cmd.transact"
2.2.1	2017.11.21	Add some custom instructions.(mark with a yellow font) Delete some directives.

2.2.2	2017.11.23	Add some custom instruction(mark with a yellow font) Adjust parameter names(the red NOTE)
2.2.3	2017.12.01	Modify some of the parameters (mark with a yellow font)
2.2.4	2017.12.7	Add "Mactaglist" params in card.cmd.transactmint command Add Account Type Selection event function Add some params options(mark with a yellow font)
2.2.5	2017.12.11	Add event code return function Adjust the "card.cmd.issuer_process" command function
2.2.6	2017.12.22	Modify the parameters of the "card.cmd.issuer_process" command.
2.2.7	2017.12.28	Add the timeout param for "exscreen.cmd.custom_msg" Adjust the param of "card.cmd.issuer_process" Add new param "prefix" for "storage" command
2.2.8	2018.1.4	Modify cvmType
2.2.9	2018.01.08	Modify "transType" of "card.cmd.transactmint", Modify "emvError" of "card.cmd.transactmint" Delete "transFlow" "isSupportEC" "isSupportCVM" "isUsePinpad" of "card.cmd.transactmint" Add "scriptResult" of "card.cmd.issuer_process" Add Applist event
2.3.0	2018.01.08	Add new event "CARD_DETECTED"
2.3.1	2018.01.13	Add isfallback params
2.3.2	2018.01.18	Improve the interface definition and instruction
2.3.3	2018.01.23	Add a new param "EventFlow" for the event Allow control the pinbypass Add new params to the PinPad Event
2.3.4	2018.01.29	Add new params in the event.
2.3.5	2018.01.31	Add new ConfirmUI event.
2.3.6	2018.02.22	Add new Card FallBack Event
2.3.7	2018.02.24	Add new WrongCardInfo Event

1. Overview

These Interfaces are for CYNOVO smart terminal(Par6 and Par10), in Instruction to develop upper layer application.

2. Class and Interface

2.1. Result listener Interface class : KivviDeviceRespListener

```
public interface KivviDeviceRespListener {  
    void onResponse(KivviDeviceResp kivviDeviceResp);  
}
```

Result class: KivviDeviceResp

Only have one member now: int ErrCode (*)

*About error message, please refer to 4th quarter : *Error Message Definition*.

2.2. Device Class : KivviDevice

Prototype definition	int Set(String key, Object value)	
Function	Param Setting	
Param	key	Param name *
	value	Param value. Only have 3 types are supported included String、int and byte[]
Return	Error message	

* About Param name, please refer to 2nd Param definition &Examples

Prototype definition	int Action(String cmd [, final KivviDeviceRespListener listener])	
Function	Do device action	
Param	cmd	Device Command
	listener	asynchronous command result listener
Return	Error message	

Prototype definition	Object Get(String key [, int exParam])	
Function	Read result	
Param	key	Result data name
	exParam	Extra Param (option)

Return	Result data ObjectObject, if inexistence Return null
---------------	--

Prototype definition	String GetString(String key [, int exParam])	
Function	Read String type result。 (Extension in Getmethod)	
Param	key	Result data name
	exParam	Result data extra Param (optional)
Return	Result data StringObject, if inexistence Returnnull	

Prototype definition	byte[] GetByteArray(String key [, int exParam])	
Function	Read byte[] type result。 (Extension in Getmethod)	
Param	key	Result data name
	exParam	Result data extra Param (optional)
Return	Result data byte[]Object, if inexistence Return null	

Prototype definition	intGetInt(String key [, int exParam])	
Function	Read int type result (Extension in Getmethod)	
Param	key	Result data name
	exParam	Result data extra Param (optional)
Return	Result data int Object, if inexistence throw exception	

Prototype definition	boolean GetBool(String key [, int exParam])	
Function	Read boolean type result (Extension in GetIntmethod)	
Param	key	Result data name
	exParam	Result data extra Param (optional)
Return	Result data boolean Object, if inexistence throw exception	

Prototype definition	boolean Has(String key [, int exParam])	
Function	Judge If there is key	
Param	key	Result data name

	exParam	Result data extra Param (optional)
Return	Visibal Returntrue, if inexistence Returnfalse	

3. Operational definition

3.1 Type of instruction

Instruction Type	Instruction definition	Authority require	Function Introduction
Card operation	"card."	KIVVI_CARD	Bank card and trade operation
PINPAD operation	"pinpad."	KIVVI_PINPAD	Pinpad operation like input key,data encryption and decryption,MAC calculation and so on
File Storage	"storage."	KIVVI_STORAGE	File storage operation 、 storage EMV Param、 clean EMV Param.....
Screen Display	"exscreen."	KIVVI_EXSCREEN	Show QR code、 show customer information
Basic operation	"basic."	At least include one of above authority	Get time ,set time , get version and so on
Printer operation	"printer."	KIVVI_PRINTER	Printer detection operation 、 print operation

*Ps: When you using the instruction, you mast config the apply permissions in the AndroidManifest.xml file, the code like :

```
<uses-permission android:name="android.permission.*"/>
```

Example: config the screen display permissions.

```
<uses-permission android:name="android.permission.KIVVI_EXSCREEN"/>
```

3.2 Instruction List

Type	Instruction name	Instruction	Suggestion way	Function Introduction
basicoperation	Read version	"basic.cmd.version"	sequential execution	Read all version
	Time operation	"basic.cmd.time"	sequential execution	Read or set time
	System operation	"basic.cmd.system"	sequential execution	System operation , like reboot
	Read BUSY state	"basic.cmd.isbusy"	sequential execution	If firmware is busy
	LED contol	"basic.cmd.led"	sequential execution	Control Led light
Bank Card	Search card	"card.cmd.search"	asynchronous execution	remind and wait customer search card
	EMV trade	"card.cmd.emv_process"	asynchronous execution	EMV trade request

	Trade request	"card.cmd.transactmint"	asynchronous execution	Bank card trade, remind and wait customer search card or input key
	Issuing bank data manage	"card.cmd.issuer_process"	sequential execution	EMV issuing bank data manage
	Detect IC slot	"card.cmd.detect_ic_slot"	sequential execution	Detect if IC slot has card
	Mifare card operation	"card.cmd.mifare"	sequential execution	Mifare card authority and read or write
	APDU operation	"card.cmd.apdu"	sequential execution	APDU interact operation
PINPAD	Load key	"pinpad.cmd.loadkey"	sequential execution	Load KPK、master key、work key
	Input key	"pinpad.cmd.pinprocess"	asynchronous execution	remind and wait customer search card
	Calculate MAC	"pinpad.cmd.mac"	sequential execution	Calculate MAC
	Create random	"pinpad.cmd.random"	sequential execution	Create random
	sensitive information confirm	"pinpad.cmd.confirm"	asynchronous execution	sensitive information confirm like balance
	Read /update KSN	"pinpad.cmd.ksn"	sequential execution	Read /update KSN
	Select button	"pinpad.cmd.confirmui"	asynchronous execution	Select Target button
File Storage	Save file	"storage.mpw.write_file"	sequential execution	Save file
	Read file	"storage.mpr.read_file"	sequential execution	Read file
	Delete file	"storage.cmd.delete_file"	sequential execution	Delete file
	Save picture	"storage.mpw.load_bitmap"	sequential execution	Save bitmap or logo
	Save scripts files	"storage.cmd.list_files"	Sequential execution	Save scripts files
Screen display	Stand by	"exscreen.cmd.idle"	sequential execution	Exscreen stand by Logo
	Show QR code	"exscreen.cmd.qrcode"	sequential execution	Exscreen show QR code
	slide show	"exscreen.cmd.bitmap"	sequential execution	Exscreen slide show
	show customer	"exscreen.cmd.custom_msg"	sequential execution	Exscreen show customer message

	message			
Print operation	Paper out test	"printer.cmd.paperout"	sequential execution	Paper out test
	Feed paper	"printer.cmd.feed"	sequential execution	Feed paper
	Print text	"printer.cmd.text"	sequential execution	print text
	print picture	"printer.cmd.photo"	sequential execution	print picture
	print QR code	"printer.cmd.qrcode"	sequential execution	print QR code
	print bar code	"printer.cmd.obcode"	sequential execution	print bar code

3.3 Instruction and Param details Introduction

Param name : the Param name that this Instruction can set or get

Type: STR String; INT int; BIN byte[]

Length: the length of value, VAR is elongate

Default value: if not Set the Param value, use the default value

request: input form Param, before Action, can be setted

response: output Param, after Action, can be getted

3.3.1 Basic Operation

3.3.1.1 Read Version number

Instruction: "basic.cmd.version"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
NULL				
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"hwVer"	STR			Hardware Version
"fwVer"	STR			Software Version
"serialNo"	STR			Financial Module
"security"	INT			Trigger value
"KivviDeviceSN"	STR			Master Device SN
"KivviDeviceHardwareVersio"	STR			Master Device
"SdkVerison"	STR			SDK Version
"KivviDeviceVerison"	STR			KivviDevice
"KivviDevicePlatform"	STR			KivviDevice

Reference code: `action/basic/ActionGetVersion.java`

3.3.1.2 Time Operation

Instruction: "basic.cmd.time"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"operate"	STR	"GET"	"GET"	Read Time
			"SET"	Set Time
"datetime"	STR		"yyyy/mm/dd/hh/mm/ss"	Only "SET" used
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"datetime"	STR		"yyyy/mm/dd/hh/mm/ss"	

Reference code: action/basic/ActionGetTime.java 和 ActionSetTime.java

3.3.1.3 System Operation

Instruction: "basic.cmd.system"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"operate"	STR		"reboot"	Reboot Financial Module
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/basic/ActionRebootPos.java

3.3.1.4 Read BUSY State

Instruction: "basic.cmd.isbusy"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
NULL				
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"isbusy"	INT			0 for "Free"; 1 for

3.3.1.5 LED Control

Instruction: "basic.cmd.led"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				

"led"	STR		"RED"、"GREEN"、 "YELLOW"、"BLUE"、 "DRED"、"DGREEN" Ps: devided by " "	
"operate"	STR		"ON"、"OFF"	on / off
			"BLINK"	blink
"delay"	INT	1500		Only "BLINK"used
"speed"	INT	100		Only "BLINK"used
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

3.3.2 Bank Card

3.3.2.1 Search Card

Command: "card.cmd.search"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"cardType"	STR	"MSR IC NFC"	"MSR" or "IC" or "NFC", separate by ' '	Card Type
"trackMode"	STR	"plain"	"plain"	Plain of Track Data
			"entype0"	Cipher of Track Data , REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)
"keyMng"	STR	"MKSK"	"MKSK" "DUKPT" "FIXED" "JF"	Key Management Type
"IcSearchMaxNum"	INT	3		Maximum number of IC card reverse insertion
"appld"	INT		1~5	When track data need encrypt(Required)
"timeout"	INT	60	10~120	Unit: Second
"allowFallback"	INT	0	0:not allowed 1:allowed	Allow Fallback Flag
"amountAuth"	STR			Amount Auth(Optional)
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

"cardType"	STR		"MSR" or "IC" or "NFC"	
"isICCard"	INT		0: Not IC Card; 1: IC Card	"cardType" must be "IC"
"nfcType"	STR		"typeA"、"typeB"、 "M1"	"cardType" must be "NFC"
"track1"	STR			Track 1 Data; "cardType" must be "MSR"
"track2"	STR			Track 2 Data; "cardType" must be "MSR"
"track3"	STR			Track3 Data; "cardType" must be "MSR"
"pan"	STR			Primary Account Number; "cardType" must be "MSR"
"expDate"	STR			Expiration Date; "cardType" must be "MSR"
"withIC"	INT		0: Card without IC; 1: Card with IC	Card with IC ?; "cardType" must be "MSR"
"isfallback"	INT		1: fallback type 0: not fallback	The fallback type

Reference Code: action/card/ActionSearch.java

3.3.2.2 EMV Process

Command: "card.cmd.emv_process"

Parameter:

Parameter	Typ	Default Value	Effective Value	Description
Request				
"amountAuth"	STR			Amount Auth(Optional)
"amountOther"	STR			Amount Other(Optional)
"accountType"	STR	"00"	"00":unspecified "10":Saving "20":Cheque/debit "30":Credit	
"transDate"	STR		Eg: "171222"	Transaction date "yymmdd" (Optional)
"transTime"	STR		Eg: "093920"	Transaction time "hhmmss"(Optional)

"transCurrCode"	STR		Eg:"0554"	Transaction currency code(Optional)
"transCurrExp"	STR		Eg:"01"	Transaction currency exponent(Optional)
"transType"	INT		1.Consumption 2.Revocation 3.Return 4.Online Balance Query 5.Pre-authorization 6.Pre-Authorization revocation 7.Pre-Authorization Completion request 8.Pre-Authorization Completion notice 9.Pre-Authorization Complete revocation 11.E-Cash Balance Enquiry 12.E-Cash Deposit 13.E-Cash consumption 14.E-Cash non-specified account circle 15.E-Cash designated account deposit	Transaction type Code
balanceReadBeforeGAC	STR		read contactless balance in front of GAC	(use for PayPass)
balanceReadAfterGAC	STR		read contactless balance after the GAC	(use for PayPass)
merchantCustom Data	STR		Merchants custom data	(use for PayPass)
"keyMng"	STR	"DUKPT"	"MKSK" "DUKPT" "FIXED" "JF"(Customer Definition)	Key Management Type
"pinFormat"	STR	"FORMAT0"	"FORMAT0" "FORMAT1" "FORMAT3"	PINBLOCK Format
"trackMode"	STR	"entype0"	"plain"	Plain of Track Data
			"entype0"	Cipher of Track Data , REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)

"appld"	INT		1~5	Data Key
“appld2”	INT		1~5	PIN BLOCK key (if appld2 is not set , the pin block key will use appld)
"timeout"	INT	60	10~120	Unit: Second
"pinMinLen"	INT	4	4~12	PIN Minmum Length
"pinMaxLen"	INT	12	4~12	PIN Maximum Length
"isForceOnline"	INT	0	0: Not Force Online 1: Force Online	Force Online Flag(REF: If transaction is not Electronic Cash, this param must set to 1)
“keypadmode”	INT	0	0:random 1:order 2:prompt	
"rdol"	STR			EMV Tag List, Separate by ' ' (Optional)
“Mactaglist”	STR			(mint)The Mac TLV
“macType”	STR	"X919_8"	"X99"	
			"ECB"	
			"Unionpay_ECB"	
			"X919_8"	
“macRes”	STR		“MACK_RESP”(mint)	Response
			Other	Request or both ways
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"pan"	STR			Primary Account Number
"track2"	STR			Track 2 Data
"seqNo"	STR			Sequence Number of IC Card
"expDate"	STR			Expiration Date
"pinBlock"	BIN			
"pinpadResult"	STR		"OK": Cal Pinblock Succ "FAIL": Cal Pinblock Fail "USER CANCEL": User Cancel "TIMEOUT": Enter PIN Timeout "NO PIN": User NOT Enter PIN, Just Press "ENTER"	Pinpad Result

"cvmType"	STR	VAR	"ONLINE_PIN"	Online PIN
			"SIGNATURE"	Signature
			"NO CVM"	No CVM
"emvResult"	STR	VAR	"REQUEST: Indicate The Transaction Is Online"	EMV Data Type
			"CONFIRM: Indicate The Transaction is Offline"	
			"REVERSAL": Indicate The Transaction Should Be Reversal	
"rdolData"		VAR		EMVData(Field 55)

Reference Code: action/card/ActionEmvProc.java

3.3.2.3 Transaction

Command: "card.cmd.transact"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"appld"	INT		1~5	Data Key(Required)
"appld2"	INT		1~5	PIN BLOCK key(Optional) (if appld2 is not set , the pin block key will use appld)
"amountAuth"	STR		Eg: "23.5"	Amount Auth(Optional)
"amountOther"	STR		Eg: "68.2"	Amount Other(Optional)
"transDateTime"	STR		Eg: "171222093920"	Transaction date "YYMMDDHHMMSS" (Optional)
"transCurrCode"	STR		Eg:"0554"	Transaction currency code(Optional)
"transCurrExp"	STR		Eg:"01"	Transaction currency exponent(Optional)
"transType"	STR	"00"	"00" : Payment "01" : Cash "09" : Purchase With Cashback "17":Cash Disbursement "20" : Refund	Transaction Type
"rdol"	STR		Eg:"5A DFA208 50 D	EMV Tag List, Separate

			FA208"	by ' ' (Optional)
"Mactaglist"	STR		Eg: "9F02 DFAE02 DFAE03"	(mint)The Mac TLV
"macType"	STR	"X919_8"	"X99"	
			"ECB"	
			"Unionpay_ECB"	
			"X919_8"	
"macRes"	STR		"MACK_RESP"(mint)	Response
			Other	Request or both ways
"cardType"	STR	"MSR IC NFC"	"MSR" or "IC" or "NFC", separate by ' '	
"keyMng"	STR	"DUKPT"	"MKSK" "DUKPT" "FIXED" "JF"	Key Management Type
"pinFormat"	STR	"FORMAT0_CBC"	"FORMAT0" "FORMAT1", "FORMAT3" "FORMAT0_CBC" "FORMAT1_CBC" "FORMAT3_CBC"	PINBLOCK Format (mint) add new format for mint
"trackMode"	STR	"entype0"	"plain"(Default)	Plain of Track Data
			"entype0"	Cipher of Track Data , REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)
			"entype2"	Mint custom
"timeout"	INT	60	10~120	Unit: Second
"pinMinLen"	INT	4	4~12	PIN Minmum Length
"pinMaxLen"	INT	12	4~12	PIN Maxmum Length
"allowFallback"	INT	0	0:not allowed 1:allowed	Allow Fallback Flag
"isForceOnline"	INT	0	0: Not Force Online 1: Force Online	Force Online Flag(REF: If transaction is not Electronic Cash, this param must set to 1)
"IcSearchMaxNum"	INT	3		Maximum number of IC card reverse insertion
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"cardType"	STR		"MSR" or "IC" or "NFC"	Card Type

"isfallback"	INT		1: fallback type 0: not fallback	The fallback type
"pan"	STR			Primary Account Number
"seqNo"	STR			Sequence Number of IC Card
"expDate"	STR			Expiration Date
"pinBlock"	BIN			PIN BLOCK
"pinpadResult"	STR		"OK": Cal Pinblock Succ "FAIL": Cal Pinblock Fail "USER CANCEL": User Cancel "TIMEOUT": Enter PIN Timeout "NO PIN": User NOT Enter PIN, Just Press "ENTER"	Pinpad Result
"cvmType"	STR		"ONLINE PIN"	Online PIN
			"SIGNATURE"	Signature
			"NO CVM"	No CVM
"emvResult"	STR		"OFFLINE DECLINED" : transaction offline declined	EMV transaction result
			"OFFLINE APPROVED" : transaction offline approved	
			"TERMINATED" : transaction terminated	
			"GO ONLINE" : transaction should go online	
"rdolData"	BIN			EMVData(Field 55)
"emvError"	STR		"USER CANCELLED PIN INPUT" "PIN INPUT TIMEOUT" "USER CANCELLED APP SELECTION" "APP SELECTION	When transaction terminated, this field will be active.

			TIMEOUT" "USER CANCELLED ACCOUNT SELECTION" "ACCOUNT SELECTION TIMEOUT" "ACCOUNT SELECTION SET WRONG PARAM" "APPLICATION BLOCKED" "NO MUTUAL APP" "MISSING MANDTORY DATA" "DUPLICATE CARD DATA ELEMENT" "AIP NOT RECEIVED" "AFL NOT RECEIVED" "PARSING TAGS FAILED" "EFFECT DATE INCORRECT" "EXPIR DATE INCORRECT" "TRY ANOTHER INTERFACE"	
--	--	--	---	--

Reference Code: action/card/ActionTransact.java

3.3.2.4 Issuer Data Process

Command: "card.cmd.issuer_process"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"issuerData"	BIN		Field 55 Data	Data From Issuer, Sometimes Include Script of 71, 72(Required)
"rdolApprove"	STR		Result DOL Tags	EMV Tag List, Separate by ' ' (Optional)
"rdolDecline"	STR		Result DOL Tags	EMV Tag List, Separate by ' ' (Optional)
"keyMng"	STR	"DUKPT"	"MKSK" "DUKPT" "FIXED" "JF"	Key Management Type

“appld”	INT		1~5	(Required)
“CheckMacData”	BIN		The Check Mac data	
“macType”	STR	"X919_8"	"X99"	
			"ECB"	
			"Unionpay_ECB"	
			"X919_8"	
“macRes”	STR		“MACK_RESP”(mint)	Response
			Other	Request or both ways
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"emvResult"	STR		"ONLINE APPROVED": tranaction online approved	EMV Transaction Result
			"ONLINE DECLINED": transacton online declined	
			"TERMINATE": transaction terminated	
“scriptResult”	STR		Example: “0200000001020000002”	Script result 1: “0200000001” Script result 2: “0200000002”
“macResult”	STR		“success” 、 “fail”、 “Mac length should be 8”	The mac check result

Reference Code: action/card/ActionEmvIssuerProc.java

IC Card Detect

Command: "card.cmd.detect_ic_slot"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"isICCard"	INT		0: Test it When not Power On 1: Test it When Power On	IC Card Test

Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"cardInSlot"	INT		0: Card NOT In Slot 1: Card In Slot	Whether Card Is In Slot
"isICCard"	INT		0: Card Is Not IC 1: Card Is IC	Whether Card is IC Card

Reference Code: action/card/ActionIcslot.java

3.3.2.5 Mifare Card

Command: "card.cmd.mifare"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"operate"	STR		"AUTH"	Authorization
			"INCREASE"	Increase
			"DECREASE"	Decrease
			"READ"	Read Data
			"WRITE"	Write Data
"block"	INT			Block Index
"authKeyType"	STR		"KeyA"	When "operate" is "AUTH"
			"KeyB"	
"authKey"	BIN			When "operate" is "AUTH"
"num"	INT			When "operate" is "INCREASE" or "DECREASE"
"data"	BIN			When "operate" is "WRITE"
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"data"	BIN			When "operate" is "READ"

Reference Code: action/card/ActionMifare*.java

3.3.2.6 APDU

Command: "card.cmd.apdu"

Parameter:

Parameter	Type	Default Value	Effective Value	Description
Request				
"cardType"	STR	"NFC"	"IC"	
			"NFC"	

"operate"	STR	"EXCHANGE"	"OPEN"	When Card Type is "IC": Power On Card; When Card Type is "NFC": Field On
			"CLOSE"	When Card Type is "IC": Power Off Card; When Card Type is "NFC": Field Off
			"EXCHANGE"	Exchange APDU
"data"	BIN			APDU of Request
"timeout"	INT	60	10~120	Unit: Second
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"data"	BIN			APDU of Response

Reference Code: action/card/ActionNfcApu.java

3.3.3 PINPAD Operation

3.3.3.1 Load keys

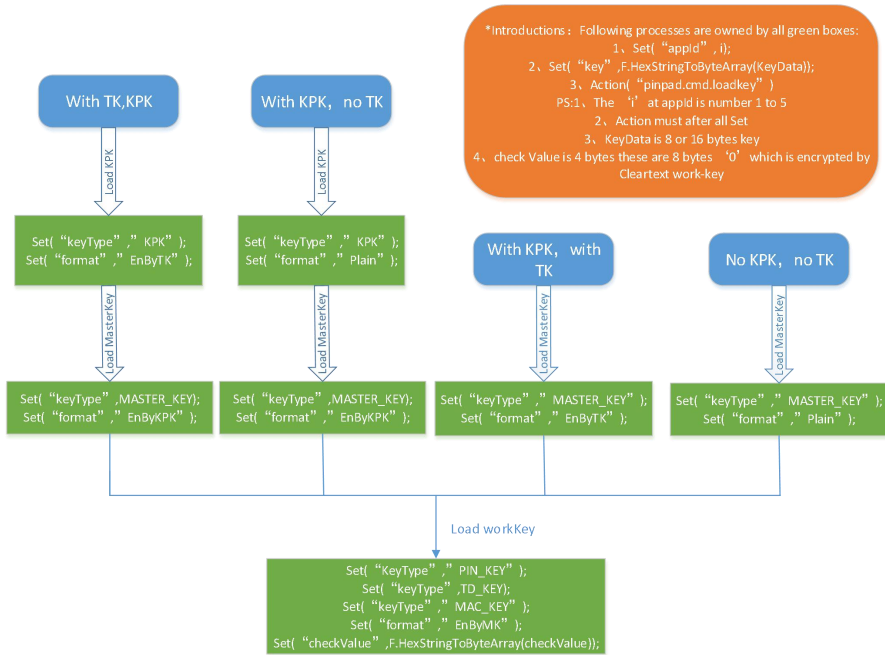
Instruction: "pinpad.cmd.loadkey"

Parameter	Type	Default Value	Effective Value	Description	
Request					
"appld"	INT		1~5	(Required)	
"keyMng"	STR	"MKSK"	"MKSK" "DUKPT" "FIXED"	key manage type	
"keyType"	STR		"KPK"	Key protect key	
			"MASTER_KEY"		
			"PIN_KEY"		
			"MAC_KEY"		
			"TD_KEY"		
			"INIT_KEY"	Just for DUKPT	
“format”	STR		"plain"	Plain text	Key data format
			"EnByTK"	Encrypted by terminal key	
			"EnByKPK"	Encrypted by KPK	
			"EnByMK"	Encrypted by Master key	
			"TR31"		
			“Input”	User input the key	
“key”	BIN			Key data	
“checkValue”	BIN			Check value (optional)	
“ksn”	BIN			Just for DUKPT	

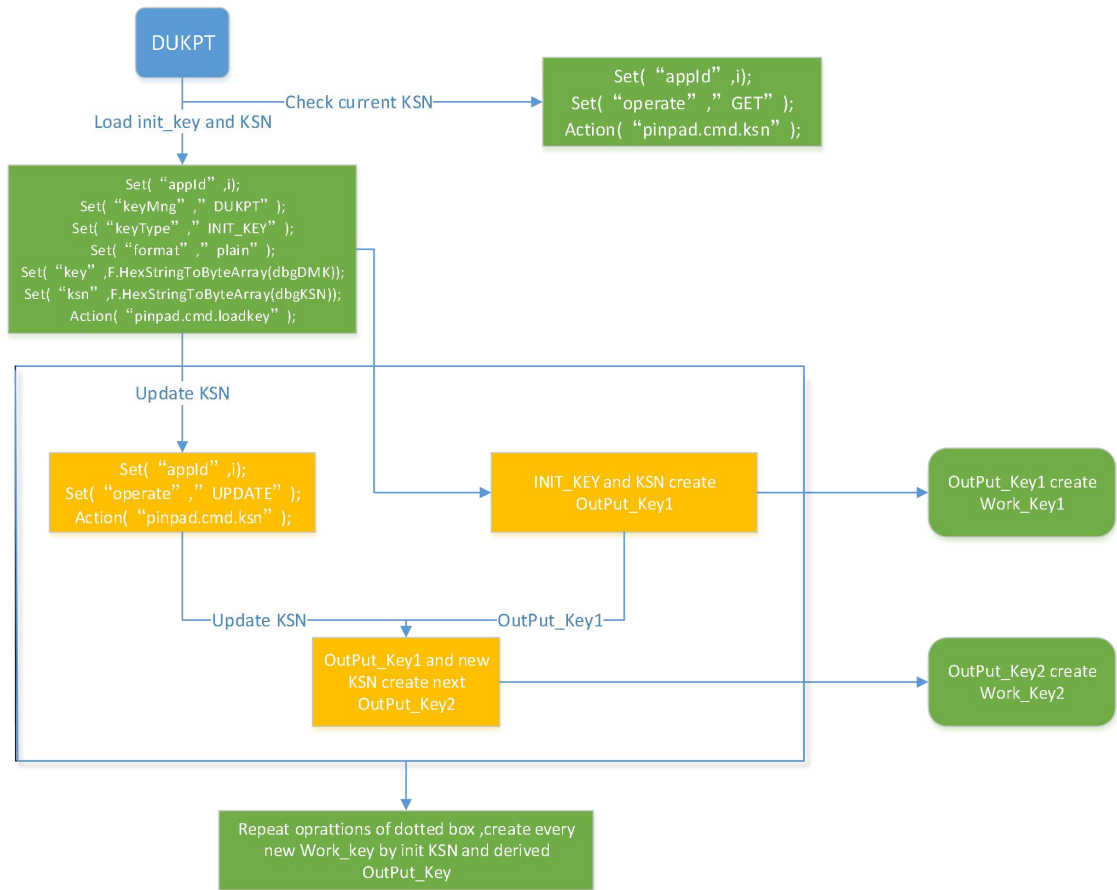
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference Code : action/pinpad/ActionLoadKpk.java 、 ActionLoadMkey.java 和 ActionLoadWkey.java 、 action/pinpad/loadkey/DUKPT/initkeyEnbyKPK/ActionInputkpk.java

MK/SK load key process:



DUKPT load key process:



3.3.3.2 Password input

Instruction: "pinpad.cmd.pinprocess"

Parameter	Type	Default Value	Effective Value	Description
Request				
"pan"	STR			(optional)
"amountAuth"	STR			(optional)
"keyMng"	STR	"MKSK"	"MKSK" (default) "DUKPT" "FIXED"	key manage type
"pinFormat"	STR	"FORMAT0"	"FORMAT0" (default) "FORMAT1", "FORMAT3",	PINBLOCK format
"appld"	INT		1~5	PIN BLOCK key(Required)
"appld2"	INT		1~5	PIN BLOCK key (if appld2 is not set , the pin block key will use appld)

"timeout"	INT	60	10~120	(seconds)
"pinMinLen"	INT	4	4~12	Password min length
"pinMaxLen"	INT	12	4~12	Password max length
"keypadmode"	INT	0	0:random 1:order 2:prompt	
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"pinBlock"	BIN			

Reference Code: action/pinpad/ActionGetPin.java

3.3.3.3 Random generate

Instruction: "pinpad.cmd.random"

Parameter	Type	Default Value	Effective Value	Description
Request				
"length"	INT			need length (1~3072)
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"data"	BIN			result

Reference Code: action/pinpad/ActionGetRandom.java

3.3.3.4 MAC calculate

Instruction: "pinpad.cmd.mac"

Parameter	Type	Default Value	Effective Value	Description
Request				
"macType"	STR		"X99"	ANSI-X9.9
			"ECB"	
			"CBC"	ANSI-X9.9(HEX)
			"UMS"	UnionPay Business
			"Unionpay_ECB"	Unionpay
			"X919_8"	ANSI X9.19
"macRes"	STR		"MACK_RESP"(mint)	Response
			Other	Request or both ways
"keyMng"	STR	"MKSK"	"MKSK" "DUKPT" "FIXED"	key manage type
"appld"	INT		1~5	(Required)
"data"	BIN			Data length < 3K bytes
Response				
"ret"	INT			Error Code

"result"	STR			Error Description
"mac"	BIN			

Reference Code: action/pinpad/ActionCaculateMac.java

3.3.3.5 Get and update KSN (Just for DUKPT)

Instruction: "pinpad.cmd.ksn"

Parameter	Type	Default Value	Effective Value	Description
Request				
"operate"	STR	"GET"	"GET" "UPDATE"	
"appld"	INT		0x01~0x05	(Required)
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"ksn"	BIN			Current KSN value

Reference Code: action/pinpad/ActionGetKsn.java 和 action/pinpad/ActionUpdateKsn.java

3.3.3.6 Message Confirm

Instruction: "pinpad.cmd.confirm"

Parameter	Type	Default Value	Effective Value	Description
Request				
"dataType"	STR		"BALANCE" "TEXT" "AMOUNT"	
"data"	STR			Display content
"data1"	STR			When datatype is "TEXT", the message will display at second line.
"data2"	STR			When datatype is "TEXT", the message will display at third line.
"timeout"	INT	60	10~120	(seconds)
"maxlen"	INT			When datatype is "TEXT", Maximum data length you can enter.
"pinpadmode"	STR		"normal" "random"	When datatype is "AMOUNT", the keypad will display normal or

				random
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"number"	BIN			When dataType is "AMOUNT", return the tip number

Reference Code: action/pinpad/other/ActionDispBalance.java
Action/pinpad/other/ActionTip.java

3.3.3.7 Build Selection Interface

Instruction: "pinpad.cmd.confirmui"

Parameter	Type	Default Value	Effective Value	Description
Request				
"funtype"	STR	"confirm"	"confirm" "choose"	Set the function type
"Textmsg"	STR			Set the title message
"BackColor"	INT	0xdcddcd		Set background color
"ButtonColor"	INT	0xe0e0e0		Set button color
"NameBT0"	STR			Set the button0 name
"NameBT1"	STR			Set the button1 name
"NameBT2"	STR			When "funtype" is "choose", it work.
"NameBT3"	STR			When "funtype" is "choose", it work.
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"ButtonId"	int			The button's ID which one you choose

Reference Code: action/pinpad/ActionGetKsn.java 和 action/pinpad/ActionUpdateKsn.java

3.3.4 File storage

3.3.4.1 Save the file

Instruction: "storage.mpw.write_file"

Parameters list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"prefix"	STR		Eg:"emv"	The prefix of the file name (Optional)
"fileName"	STR		Within the limit of 63 bytes in length	File name
"fileLen"	INT			File length

"filePath"	STR			File path
"fileData"	BIN			File data
Response				
"ret"	INT			Error code
"result"	STR			Error Description

* "filePath" and "fileData" must have one of them.

Reference code: action/storage/ActionStoreFile.java 和 ActionStoreFile2.java

*Note: When the load emv scripts finished , please reboot the device to make it effect.

*Note: if you want to storage the emv scripts, the "prefix" must be "emv".

3.3.4.2 Read the file

Instruction: "storage.mpr.read_file"

Parameters list:

Parameter	type	Default Value	Effective Value	Description
Request				
"prefix"	STR		Eg: "emv"	The prefix of the file name (Optional)
"fileName"	STR		Within the limit of 63 bytes in length	File name
Response				
"ret"	INT			Error code
"result"	STR			Error Description
"fileData"	BIN			File data

Reference code: action/storage/ActionReadFile.java

3.3.4.3 Delete the file

Instruction: "storage.cmd.delete_file"

Parameters list:

Parameter	type	Default Value	Effective Value	Description
Request				
"prefix"	STR		Eg: "emv"	The prefix of the file name (Optional)
"fileName"	STR		Within the limit of 63 bytes in length	File name
Response				
"ret"	INT			Error code
"result"	STR			Error Description

* when "fileName" is set to "ALL", it will delete all files (Initialization file storage area)

Reference code: action/storage/ActionDeleteFile.java

3.3.4.4 Save the picturesBitmap)

Instruction: "storage.mpw.load_bitmap"

Parameters list:

Parameter	type	Default Value	Effective Value	Description
Request				
"type"	STR	"NORMAL"	"NORMAL"	The regular carousel pictures
			"LOGO"	The standby logo
"index"	INT		0~15	Picture index, it only be needed when the "type" is set to "NORMAL".
"fileLen"	INT			File length
"filePath"	STR	VAR		File path
"fileData"	BIN	VAR		File data
Response				
"ret"	INT			Error code
"result"	STR			Error Description

* "filePath" and "fileData" must have one of them.

Reference code: action/storage/ActionStoreBitmap.java 和 ActionStoreLogo.java

3.3.4.5 Save the scripts files Directory

Instruction: "storage.cmd.list_files"

Parameters list:

Parameter	type	Default Value	Effective Value	Description
Request				
"offset"	INT			The offset of block
"prefix"	STR		Eg: "emv"	The prefix of the file name (Optional)
Response				
"ret"	INT			Error code
"fileNames"	STR			The file's name
"fileNum"	INT			The file's number

Reference code: action/storage/fileRW/ActionListFiles.java

Note: if pass the "prefix", it will list the files under this prefix, if not , it will list all files

3.3.5 Screen Display**3.3.5.1 Display Stand-by Logo**

Instruction: "exscreen.cmd.idle"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
NULL				

Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/exscreen/ActionDisplayIdle.java

3.3.5.2 Display carousel Pictures

Instruction: "exscreen.cmd.bitmap"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"interval"	INT	5		Interval time (s)
"beginIdx"	INT			The Starting picture
"palyNum"	INT			Number of Pictures
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/exscreen/ActionImageCarousel.java

3.3.5.3 Display Customer data

Instruction: "exscreen.cmd.custom_msg"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"DisType"	STR	"message"	"message"、"picture"	Choose different function
"TransRes"	STR		"auth", "decl"	Different result of transact (When "DisType" is "picture" works.)
"msg"	BIN			Customer data , line feed by '\n' (when "message")
"fontsize"	INT	24		You can set 8,10,13,16,24 default is 24 (when "message")
"bkcolor"	INT	0x000000		The background color default is black(0x000000) (when "message")
"fontcolor"	INT	0xFFFF00		The font color Default is blue(0xFFFF00) (when "message")
"timeout"	INT	0	Default : 0 (always show)	The timeout of display
Response				
"ret"	INT	4		Error Code

Reference code: action/exscreen/ActionDisplayCustomMsg.java

3.3.5.4 Display QR code

Instruction: "exscreen.cmd.qrcode"

Parameter list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"data"	BIN			UTF8 format String
"payType"	STR	"NONE"	"ALIPAY": AliPay Logo "WECHATPAY": Wechat Logo	Optional Field
"Msgdata"	STR			Display text below QR Code
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/exscreen/ActionDisplayQR.java

3.3.6 Print operation

3.3.6.1 Out of paper checks

Instruction: "printer.cmd.paperout"

Parameters list:

Parameter	Type	Default Value	Effective Value	Description
Request				
none				
Response				
"ret"	INT			Error code
"result"	STR			Error description

Reference Code: action/printer/ActionPrintCheckpaper.java

3.3.6.2 Print text

Instruction: "printer.cmd.text"

Parameters list:

Parameter	type	Default Value	Effective Value	Description
Request				
"data"	STR			Print content
"size"	INT		Greater than 0, defalue is 24	Font size
"fonttype"	INT	android.graphics.Typeface.NORMAL	android.graphics.Typeface.NORMAL	Normal
			android.graphics.Typeface.BOLD	Bold
			android.graphics.Typeface.ITALIC	<i>Italic</i>
			android.graphics.Typeface.BOLD_ITALIC	<i>Bold&Italic</i>
"linegap"	INT		Greater than 0, defalue is 6	Line spacing

"leftmargin"	INT		Greater than or equal to 0, default is 0	The left margin of page
"rightmargin"	INT		Greater than or equal to 0, default is 0	The right margin of page
"typeface"	STR		Eg: "/mnt/sdcard/kaiti.ttf" (optional)	The custom font file path
Response				
"ret"	INT			Error code
"result"	STR			Error Description

Reference Code: action/printer/ActionPrintText.java

3.3.6.3 Paper feed

Instruction: "printer.cmd.feed"

Parameters list:

parameter	type	Default Value	Effective Value	Description
Request				
"lines"	INT			Paper feed lines
Response				
"ret"	INT			Error code
"result"	STR			Error Description

Reference Code: action/printer/ActionPrintText.java

3.3.6.4 Print OB code

Instruction: "printer.cmd.obcode"

Parameters list:

parameter	type	Default Value	Effective Value	Description
Request				
"data"	STR			Print content
Response				
"ret"	INT			Error code
"result"	STR			Error Description

Reference Code: action/printer/ActionPrintObcode.java

3.3.6.5 Print QR codes

Instruction: "printer.cmd.qrcode"

Parameters list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"data"	STR			Print content
Response				

"ret"	INT			Error code
"result"	STR			Error Description

Reference Code: action/printer/ActionPrintQrcode.java

3.3.6.6 Print pictures

Instruction: "printer.cmd.photo"

Parameters list:

Parameter	Type	Default Value	Effective Value	Description
Request				
"data"	Bitmap			Picture data
Response				
"ret"	INT			Error code
"result"	STR			Error description

Reference Code: action/printer/ActionPrintPhoto.java

3.3.6.7 Printer busy

Instruction: "printer.cmd.busy"

Parameters list:

Parameter	Type	Default Value	Effective Value	Description
Request				
Response				
"ret"	INT			Error code
"result"	STR			Error description

Reference Code: action/printer/ActionPrintBusy.java

3.3.7 Serial Operation

3.3.7.1 Open Serial

Instruction:"usbserial.cmd.serialopen"

Parameter	Typ	Default Value	Effective Value	Description
Request				
"serialconfig"	STR		eg:"115200,n,8,1"(Optional Field)	Serial init param (Baud rate, check code, data bits, stop bit)
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/serial/ActionOpen.java

3.3.7.2 Close Serial

Instruction:"usbserial.cmd.serialclose"

Parameter	Typ	Default Value	Effective Value	Description
Request				
NULL				

Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/serial/ActionClose.java

3.3.7.3 Receive Data

Instruction:"usbserial.cmd.serialrx"

Parameter	Typ	Default Value	Effective Value	Description
Request				
maxDataLen	INT		>0, <=1024	Max data Length
Timeout_ms	INT		>0, <=10000	Reading data Timeout (ms)
Response				
"ret"	INT			Error Code
"result"	STR			Error Description
"data"	BIN			Receive data

Reference code: action/serial/ActionRx.java

3.3.7.4 Send Data

Instruction:"usbserial.cmd.serialtx"

Parameter	Typ	Default Value	Effective Value	Description
Request				
data	BIN			Sending data
dataLen	INT		>0, <=>1024	Length of sending data
Response				
"ret"	INT			Error Code
"result"	STR			Error Description

Reference code: action/serial/ActionTx.java

4. Error message define

Define	Value (HEX)	Value (DEC)	Introduction
KV.RET.OK	0x00	0	success
KV.RET.DATA_ERROR	0x10	16	Communicate data error
KV.RET.CMD_ERROR	0x11	17	Instruction error
KV.RET.PARAM_ERR	0x12	18	Param error

KV.RET.FAILED	0x20	32	Instruction done failed
KV.RET.BUSY	0x21	33	Doing another Instruction
KV.RET.PROCESSING	0x22	34	Instruction is doing
KV.RET.TIMEOUT	0x23	35	Instruction doing wait timeout
KV.RET.CANCELED	0x24	36	Customer stop operation
KV.RET.EMV_FAILED	0x30	48	EMV error
KV.RET.COMMUNICATE_ERROR	0x40	64	Communicate failed
KV.RET.DEVICE_ERROR	0x50	80	Device abnormal
KV.RET.OPEN_FAILED	0x51	81	Device open failed

5. Processing Error message define

Define	Value (HEX)	Value (DEC)	Introduction
KV.EVENT_RET.PINPAD	0xB1	177	Pinpad process
KV.EVENT_RET.ACCOUNTSELECT	0xB2	178	Account Selection Process
KV.EVENT_RET.AIDSELECT	0xB3	179	AID Selection Process
KV.EVENT_RET.AIDLIST	0xB4	180	App List Process
KV.EVENT_RET.CARD_DETECTED	0xB5	181	Card detected event
KV.EVENT_RET.CONFIRM_UI	0xB6	182	Confirm UI event
KV.EVENT_RET.CARD_FALLBACK	0xB7	183	Card FallBack event
KV.EVENT_RET.WRONGCARD_INFO	0xB8	184	Wrong Card Infomation event

6. Keys distribution and management rules

This is used to illustrate the Kivvi payment terminals (Par6, Par10), each application (App) key distribution and use of the rules.

5.1 Keys amount

Kivvi payment terminals (Par6, Par10) include 15 keys independent of each other

5.2 Keys allocation rules

5.2.1 Keys mutual independence

Keys are divided by each App, each App uses its own keys.

5.2.2 Keys number of each App

Each app includes 0-5 keys. If it has one key, the app ID is "1". If it has two keys, the app ID are

“1” and “2”,and so on.

5.2.3 The initial position of Keys

If an app include at least one key, the number of app ID begin with “1”,different app uses different key even if they have same app ID.

5.2.4 Permissions and key Assignments

It must add pinpad action permissions first when you want get the appld distribution.

Premission Fetch code :

```
<uses-permission android:name="adnroid.permission.KIVVI_PINPAD"/>
```