CYNOVO Kivvi Payment Device
The third party applications interface specification

V 2.1.9

CYNOVO, Inc.

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Version Infomation

Version	Date	Modify	Instructions
2.0.0	2016.06.22	吴娟（Joyce）	The first draft
2.0.1	2016.07.07	陈俊俊（George）	Improve the interface definition and instruction
2.0.2	2016.07.11	郁丽（Lucy）	Improve the interface definition and instruction
2.0.3	2016.07.28	陈俊俊（George）	"Search card", "trade request" and "EMV trade" instructions to increase track data encryption.
2.0.4	2016.10.28	陈俊俊（George）	Improving the key management system
2.0.5	2016.11.11	陈俊俊（George）	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	杨东林(Neil)	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	陈俊俊（George）	Increase the DUKPT KSN operating instructions
2.1.0	2017.03.09	朱广伟（Scott）	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	朱勇敏(Eddard)	Add a serial port instructions
2.1.2	2017.03.23	杨东林(Neil)	Add the flow chart of how to load and use MSSK and DUKPT
2.1.3	2017.03.24	朱广伟(Scott)	Transact command,add”transFlow”
2.1.4	2017.03.27	杨东林(Neil)	Add Key distribution management
2.1.5	2017.04.01	朱广伟(Scott)	Add load terminal param in load EMV parameters part
2.1.6	2017.04.05	金晖(Martin)	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	朱广伟(Scott)	Add “appId” for Load EMV Parameter
2.1.8	2017.04.17	朱勇敏(Eddard)	Add Printer busy command
2.1.9	2017.06.19	金晖(Martin)	Update instruction parameter configuration instructions. Add AppID assignment description.

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 inclued 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 inexsistence 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 inexsitence 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 inexsitence 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 inexsitence 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 inexsitence 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 inexsitence 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 anthority	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.transact”	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
	APDUoperation	"card.cmd.apdu"	sequential execution	APDU interact operation
	e-cash off-line balance enquiry	"emv.cmd.balance"	sequential execution	e-cash off-line balance enquiry （please do “card.cmd.search”Instruction first）
	IC card trace record	"emv.cmd.log"	sequential execution	IC card trace record（please do “card.cmd.search”Instruction first）
	EMV parameter configuration	"emv.cmd.paramset"	sequential execution	Config Country Code&Currency Code
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
	encryption and decryption	“pinpad.cmd.crypto”	sequential execution	Test encryption and decryption Function
	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
	Digital signature	"pinpad.mpr.handwrite"	sequential execution	Sign your Name
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
	Load EMVParam	“storage.cmd.load_emvparams”	sequential execution	Load EMVParam
	Save picture	“storage.mpw.load_bitmap”	sequential execution	Save bitmap or logo
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 message	“exscreen.cmd.custom_msg”	sequential execution	Exscreen show customer 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	Length	Effective/Default	Description
Request				
NULL				

Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
"hwVer"	STR	VAR		Hardware Version
"fwVer"	STR	VAR		Software Version
"serialNo"	STR	VAR		Financial Module
“KivviDeviceSN”	STR	VAR		Master Device SN
“KivviDeviceHardwareVersion”	STR	VAR		Master Device
“SdkVerison”	STR	VAR		SDK Version
"KivviDeviceVerison"	STR	VAR		KivviDevice
"KivviDevicePlatform"	STR	VAR		KivviDevice

Reference code：action/basic/ActionGetVersion.java

3.3.1.2 Time Operation

Instruction： "basic.cmd.time"

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
"operate"	STR	VAR	"GET"（default）	Read Time
			"SET"	Set Time
"datetime"	STR	19	“yyyy/mm/dd/hh/mm/ss”	Only ”SET” used
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
"datetime"	STR	19	“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	Length	Effective/Default Value	Description
Request				
" operate"	STR	VAR	"reboot"	Reboot Financial Module
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference code：action/basic/ActionRebootPos.java

3.3.1.4 Read BUSY State

Instruction："basic.cmd.isbusy"

Parameter list：

Parameter	Type	Length	Effective/Default	Description

Request				
NULL				
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
"isbusy"	INT	4		0 for “Free”；1 for “Busy”

3.3.1.5 LED Control

Instruction："basic.cmd.led"

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
"led"	STR	VAR	"RED"、"GREEN"、"YELLOW"、"BLUE" 、 "DRED" and "DGREEN"	
" operate"	STR	VAR	"ON""OFF"	on / off
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

3.3.2 Bank Card

3.3.2.1 Search Card

Command："card.cmd.search"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
"cardType"	STR	VAR	"MSR" or "IC" or "NFC"，separate by '|', Default: "MSR|IC|NFC"	Card Type
"trackMode"	STR	VAR	"plain"(Default)	Plain of Track Data
			"entype0"	Cipher of Track Data，REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)
"keyMng"	STR	VAR	"MKSK"(Default) "DUKPT" "FIXED" "JF"	Key Management Type
"appId"	INT	4	0x01~0x0F Default(0x01)	When track data need encrypt
"timeout"	INT	4	10~120 Default(60)	Unit: Second
Response				

"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"cardType"	STR	VAR	"MSR" or "IC" or "NFC"	
"isICCard"	INT	4	0: Not IC Card; 1:IC Card	"cardType" must be "IC"
"nfcType"	STR	VAR	"typeA"、"typeB"、"M1"	"cardType" must be "NFC"
"track1"	STR	VAR		Track 1 Data; "cardType" must be "MSR"
"track2"	STR	VAR		Track 2 Data; "cardType" must be "MSR"
"track3"	STR	VAR		Track3 Data; "cardType" must be "MSR"
"pan"	STR	VAR		Primary Account Number; "cardType" must be "MSR"
"expDate"	STR	VAR		Expiration Date; "cardType" must be "MSR"
"withIC"	INT	4	0: Card without IC; 1: Card with IC	Card with IC ?; "cardType" must be "MSR"

Reference Code：action/card/ActionSearch.java

3.3.2.2 EMV Process

Command： "card.cmd.emv_process"

Parameter：

Parameter	Type	Length	Effective/Default Value	Description
Request				
"amount"	STR	VAR		Amount Auth(Optional)
"amountOther"	STR	VAR		Amount Other(Optional)
“transType”	INT	4	1.Consumption 2.Revocation 3.Return 4.Online Balance Query 5.Pre-authorization 6.Pre-Authorization revocation 7.Pre-Authorization Completion request	Transaction type Code

			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	
"transFlow"	INT	4	1：Complete Flow 2：Simple Flow(Just Get ICC Data From Card)	Transaction Flow
"keyMng"	STR	VAR	"MKSK"(Default) "DUKPT" "FIXED" "JF"(Customer Definition)	Key Management Type
"pinFormat"	STR	VAR	"FORMAT0"(Default) "FORMAT1" "FORMAT3"	PINBLOCK Format
"trackMode"	STR	VAR	"plain"(Default)	Plain of Track Data
			"entype0"	Cipher of Track Data，REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)
"appId"	INT	4	0x01~0x0F Default(0x01)	
"timeout"	INT	4	10~120 Default(60)	Unit: Second
"pinMinLen"	INT	4	4~12 Default(4)	PIN Minmum Length
"pinMaxLen"	INT	4	4~12 Default(12)	PIN Maxmum Length
"isForceOnline"	INT	4	0: Not Force Online(Default) 1: Force Online	Force Online Flag(REF: If transaction is not Electronic Cash, this param must set to 1)
"isSupportEC"	INT	4	0: Not Electronic Cash(Default) 1: Electronic Cash Transaction	Electronic Cash Transaction Flag
"isSupportCVM"	INT	4	0: CVM NOT Executed 1: CVM Executed(Default)	CVM Execute Flag

"isUsePinpad"	INT	4	1: Input PIN Controlled by EMV Kernel(Default)	Input PIN Controlled by EMV Kernel or User Application
			0: Input PIN Controlled by Application, The Deveopler must call "pinpad.cmd.pinprocess" command	
"reqTagList"	STR	VAR		EMV Tag List, Separate by '|'(Optional)
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"pan"	STR	VAR		Primary Account Number
"track2"	STR	VAR		Track 2 Data
"seqNo"	STR	2		Sequence Number of IC Card
"expDate"	STR	VAR		Expiration Date
"pinBlock"	BIN	8		
"pinpadResult"	STR	VAR	"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
			"SIGN"	Signature
"emvDataType"	STR	VAR	"REQUEST: Indicate The Transaction Is Online	EMV Data Type
			"CONFIRM: Indicate The Transaction is Offline	
			"REVERSAL": Indicate The Transaction Should Be Reversal	
"emvData"		VAR		EMVData(Field 55)

Reference Code：action/card/ActionEmvProc.java

3.3.2.3 Transaction

Command： "card.cmd.transact"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
"amount"	STR	VAR		Amount Auth(Optional)
"amountOther"	STR	VAR		Amount Other(Optional)
“transType”	INT	4	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	
“transFlow”	INT	4	1:Complete process 2:Streamline processes (Chip card only read card number and other parameters)	
"cardType"	STR	VAR	"MSR" or "IC" or "NFC"，separate by '|'，Default: "MSR|IC|NFC"	
"keyMng"	STR	VAR	"MKSK"(DDefault) "DUKPT" "FIXED" "JF"	Key Management Type
"pinFormat"	STR	VAR	"FORMAT0"(Default) "FORMAT1", "FORMAT3" “PLAIN_TEXT”	PINBLOCK Format
"trackMode"	STR	VAR	"plain"(Default)	Plain of Track Data
			"entype0"	Cipher of Track Data，REF 6.2
			"Unionpay"	Cipher of Track Data(Unionpay ECB)
"appId"	INT	4	0x01~0x0F Default(0x01)	

"timeout"	INT	4	10~120 Default(60)	Unit: Second
"msrPinProc"	INT	4	0:NotEnter PIN 1:Enter PIN	Whether Enter PIN after Swipe Card
"pinMinLen"	INT	4	4~12 Default is 4	PIN Minmum Length
"pinMaxLen"	INT	4	4~12 Default is 12	PIN Maxmum Length
"allowFallback"	INT	4	0:not allowed 1:allowed	Allow Fallback Flag
"isForceOnline"	INT	4	0: Not Force Online(Default) 1: Force Online	Force Online Flag(REF: If transaction is not Electronic Cash, this param must set to 1)
"isSupportEC"	INT	4	0: Not Electronic Cash(Default) 1: Electronic Cash Transaction	Electronic Cash Transaction Flag
"isSupportCVM"	INT	4	0: CVM NOT Executed 1: CVM Executed(Default)	CVM Execute Flag
"isUsePinpad"	INT	4	1: Input PIN Controlled by EMV Kernel(Default) 0: Input PIN Controlled by Application, The Deveopler must call "pinpad.cmd.pinprocess" command	Input PIN Controlled by EMV Kernel or User Application
"reqTagList"	STR	VAR		EMV Tag List, Separate by '|'(Optional)
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"cardType"	STR	VAR	"MSR" or "IC" or "NFC"	Card Type
"pan"	STR	VAR		Primary Account Number
"track1"	STR	VAR		Track 1 Data
"track2"	STR	VAR		Track 2 Data
"track3"	STR	VAR		Track 3 Data
"seqNo"	STR	2		Sequence Number of IC Card
"expDate"	STR	VAR		Expiration Date
"pinBlock"	BIN	8		PIN BLOCK
"pinpadResult"	STR	VAR	"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
			"SIGN"	Signature
"emvDataType"	STR	VAR	"REQUEST: Indicate The Transaction Is Online	EMV Data Type
			"CONFIRM: Indicate The Transaction is Offline	
			"REVERSAL": Indicate The Transaction Should Be Reversal	
"emvData"	BIN	VAR		EMVData(Field 55)

Reference Code： action/card/ActionTransact.java

3.3.2.4 Issuer Data Process

Command： "card.cmd.issuer_process"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
"respCode"	STR	2		Response Code From Acquire, When SUCC, usually is "00", When FAIL, other code
"issuerData"	BIN	VAR		Data From Issuer, Sometimes Include Script of 71, 72
"reqTagList"	STR	VAR		EMV Tag List, Separate by '|'(Optional)
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"emvDataType"	STR	VAR	"REQUEST": Indicate The Transaction Is Online	EMVData Type
			"CONFIRM": Indicate The Transaction is Offline	
			"REVERSAL": Indicate The Transaction Should Be Reversal	
"emvData"	BIN	VAR		EMV Data(Field 55)

Reference Code： action/card/ActionEmvIssuerProc.java

3.3.2.5 IC Card Detect

Command： "card.cmd.detect_ic_slot"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				

"isICCard"	INT	4	0: Test it When not Power On 1: Test it When Power On	IC Card Test
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"cardInSlot"	INT	4	0: Card NOT In Slot 1: Card In Slot	Whether Card Is In Slot
"isICCard"	INT	4	0: Card Is Not IC 1: Card Is IC	Whether Card is IC Card

Reference Code： action/card/ActionIcslot.java

3.3.2.6 Mifare Card

Command： "card.cmd.mifare"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
"operate"	STR	VAR	"AUTH"	Authorization
			"INCREASE"	Increasement
			"DECREASE"	Decresement
			"READ"	Read Data
			"WRITE"	Write Data
"block"	INT	4		Block Index
"authKeyType"	STR	4	“KeyA”	When "operate" is "AUTH"
			“KeyB”	
"authKey"	BIN	6		When "operate" is "AUTH"
"num"	INT	4		When "operate" is "INCREASE" or "DECREASE"
"data"	BIN	VAR		When "operate" is "WRITE"
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"data"	BIN	VAR		When "operate" is "READ"

Reference Code： action/card/ActionMifare*.java

3.3.2.7 APDU

Command： "card.cmd.apdu"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description

Request				
"cardType"	STR	VAR	"IC"	
			"NFC"(Default)	
"operate"	STR	VAR	"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"(Default)	Exchange APDU
"data"	BIN	VAR		APDU of Request
"timeout"	INT	4	10~120 Default value: 60	Unit: Second
Response				
"ret"	INT	4		Error Code
"result"	STR	VAR		Error Description
"data"	BIN	VAR		APDU of Response

Reference Code：action/card/ActionNfcApdu.java

3.3.2.8 Get Offline Balance

Command： "emv.cmd.balance"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
NULL				
Response				
"ret"	INT	4		Error Code
"data"	ASCII	12		Offline Balance of IC Card

Reference Code：action/card/ActionEmvBalance.java

3.3.2.9 Get Transaction Log

Command： "emv.cmd.log"

Parameter：

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
NULL				
Response				
"ret"	INT	4		Error Code
"data"	BIN	VAR		Transaction Log of IC Card
"logCount"	INT	4		Transaction Log Count of IC Card(>= 0 && <= 10)

Reference Code：action/card/ActionEmvLog.java

3.3.2.10 Configuration parameters of EMV

Command： " emv.cmd.paramset "

Parameter	Type	Length	Effective/Default Value	Description
Request				
NULL				
Response				
"ret"	INT	4		Error Code

Reference Code：action/emv/ActionStoreEmvParams.java

Note：This command can only set country code(9F1A) and currency code(5F2A) by customer screen.

3.3.3 PINPAD Operation

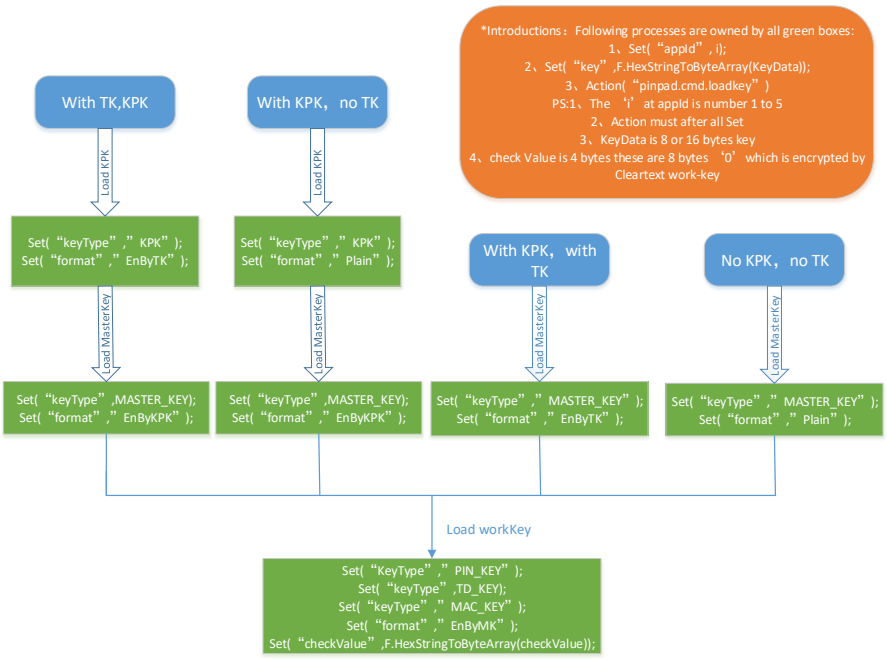
3.3.3.1 Load keys

Instruction： ”pinpad.cmd.loadkey”

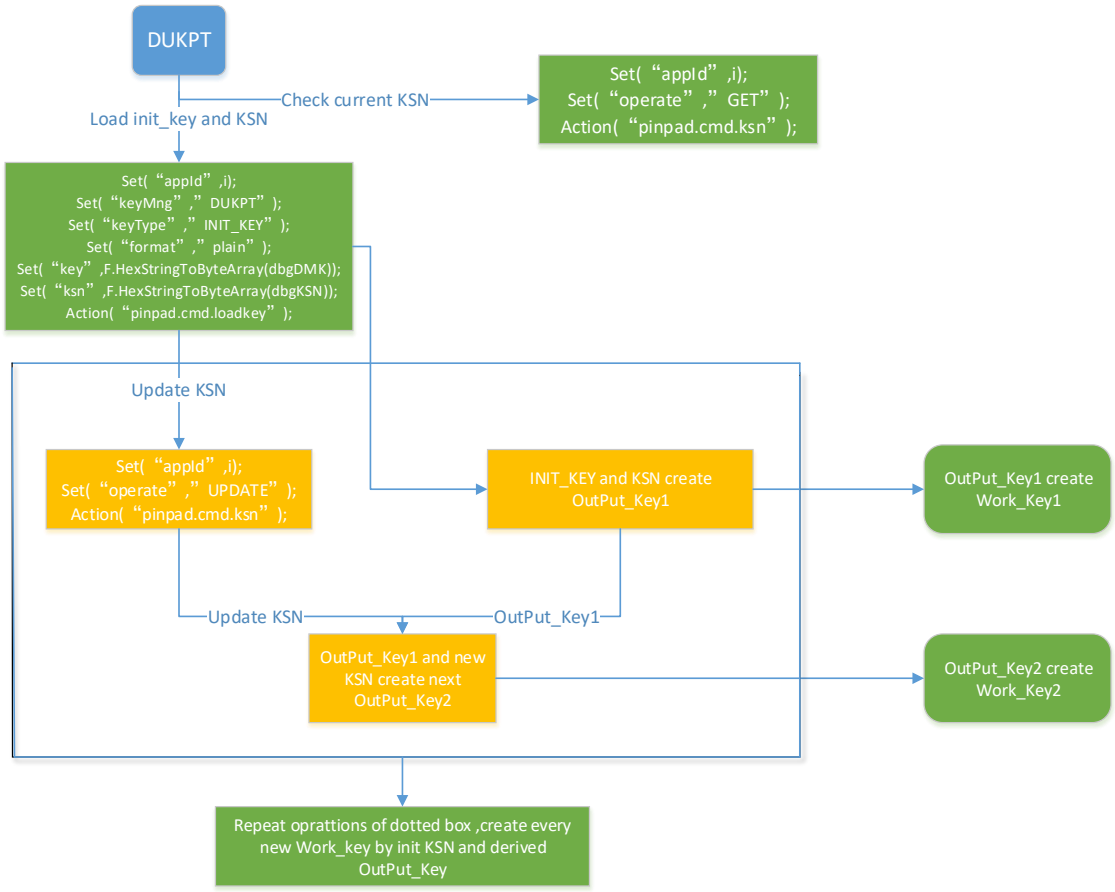
Parameter	Type	Lengt	Effective/Default Value	Description	
Request					
"appId"	INT	4	0x01~0x0F default: 0x01		
"keyMng"	STR	VAR	"MKSK" (default) "DUKPT" "FIXED"	key manage type	
"keyType"	STR	VAR	"KPK"	Key protect key	
			"MASTER_KEY"		
			"PIN_KEY"		
			"MAC_KEY"		
			"TD_KEY"		
			"INIT_KEY"	Just for DUKPT	
“format”	STR	VAR	"plain"	Plain text	Key data format
			"EnByTK"	Encrypted by terminal key	
			"EnByKPK"	Encrypted by KPK	
			"EnByMK"	Encrypted by Master key	
			"TR31"		
“key”	BIN	8/16		Key data	
“checkValue”	BIN	4		Check value (optional)	
“ksn”	BIN	VAR		Just for DUKPT	
Response					
“ret”	INT	4		Error Code	
“result”	STR	VAR		Error Description	

Reference Code：action/pinpad/ActionLoadKpk.java、ActionLoadMkey.java 和 ActionLoadWkey.java

MK/SK load key process：



DUKPT load key process：



3.3.3.2 Password input

Instruction：”pinpad.cmd.pinprocess”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“pan”	STR	VAR		(optional)
"amount"	STR	VAR		(optional)
"keyMng"	STR	VAR	"MKSK" (default) "DUKPT" "FIXED"	key manage type
"pinFormat"	STR	VAR	"FORMAT0" (default) "FORMAT1", "FORMAT3", ”PLAIN_TEXT”	PINBLOCK format
"noPinFormat",	STR	VAR	"ZERO" (default) 8bytes 0x00 "PINBLOCK"	Return pinblock or all zero when no password inputted
"appId"	INT	4	0x01~0x0F (default 0x01)	
"timeout"	INT	4	10~120 (default 60)	(seconds)
"pinMinLen"	INT	4	4~12 (default 4)	Password min length
"pinMaxLen"	INT	4	4~12 (default 12)	Password max length
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
“pinBlock”	BIN	8		

Reference Code： action/pinpad/ActionGetPin.java

3.3.3.3 Encrypt and Decrypt

Instruction：”pinpad.cmd.crypto”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“operate”	STR	VAR	"ENCRYPT"、"DECRYPT"	
"algorithm"	STR	VAR	"DES_ECB"	algorithm
"padding"	STR	VAR	“NULL”	No padding
			“M1”	Padding with 0x00
			“M2”	Padding with 80 00[n]
"appId"	INT	4	0x01~0x0F (default 0x01)	
"keyMng"	STR	VAR	"MKSK" (default) "DUKPT" "FIXED"	key manage type
"keyType"	STR	4	default "TD_KEY"	
"data"	BIN	VAR		Data length < 3K bytes
Response				
“ret”	INT	4		Error Code

“result”	STR	VAR		Error Description
“data”	BIN	VAR		result

Reference Code： action/pinpad/ActionTestCrypt.java

3.3.3.4 MAC calculate

Instruction： ”pinpad.cmd.mac”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“macType”	STR	VAR	"X99"	
			"ECB"	
			"Unionpay_ECB"	
“keyMng”	STR	VAR	"MKSK" (default) "DUKPT" "FIXED"	key manage type
"appId"	INT	4	0x01~0x0F (default 0x01)	
“data”	BIN	VAR		Data length < 3K bytes
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
“mac”	BIN	8/16		

Reference Code： action/pinpad/ActionCaculateMac.java

3.3.3.5 Random generate

Instruction： ”pinpad.cmd.random”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“length”	INT	4		need length (1~3072)
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
“data”	BIN	VAR		result

Reference Code： action/pinpad/ActionGetRandom.java

3.3.3.6 Get and update KSN (Just for DUKPT)

Instruction： ”pinpad.cmd.ksn”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“operate”	STR	VAR	"GET" (default) "UPDATE"	
"appId"	INT	4	0x01~0x0F (default 0x01)	
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

“ksn”	BIN	VAR		Current KSN value

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

3.3.3.7 Digital signature

Instruction： ” pinpad.mpr.handwrite”

Parameter	Type	Length	Effective/Default Value	Description
Request				
none				
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
“fileLen”	INT	4		Bmp File Lenth

Reference Code： action/pinpad/ActionHandWrite.java

3.3.3.8 Message Confirm

Instruction： ”pinpad.cmd.confirm”

Parameter	Type	Lengt	Effective/Default Value	Description
Request				
“dataType”	STR	VAR	"BALANCE"	
“data”	STR	VAR		Display content
“data2”	STR	VAR		When datatype is “TEXT”, the message will display at second line.
"timeout"	INT	4	10~120 (default 60)	(seconds)
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference Code： action/pinpad/ActionDispBalance.java

3.3.4 File storage

3.3.4.1 Save the file

Instruction： ”storage.mpw.write_file”

Parameters list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“fileType”	STR	VAR	“CERT”, “TEXT”, “BIN”	File type
“fileName”	STR	VAR	Within the limit of 63 bytes in length	File name
"filePath"	STR	VAR		File path
“fileData”	BIN	VAR		File data
Response				

“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

* “filePath” and ”fileData” mast have one of them.

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

3.3.4.2 Read the file

Instruction：”storage.mpr.read_file”

Parameters list：

Parameter	type	length	Effective/Default Value	Description
Request				
“fileType”	STR	VAR	“CERT”, “TEXT”, “BIN”	File type
“fileName”	STR	VAR	Within the limit of 63 bytes in length	File name
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description
“fileData”	BIN	VAR		File data

Reference code：action/storage/ActionReadFile.java

3.3.4.3 Delete the file

Instruction：”storage.cmd.delete_file”

Parameters list：

Parameter	type	length	Effective/Default Value	Description
Request				
“fileType”	STR	VAR	“CERT”, “TEXT”, “BIN”, “ALL”	File type
“fileName”	STR	VAR	Within the limit of 63 bytes in length	File name
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

* when “fileType” and ”fileName” are both 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	length	Effective/Default Value	Description
Request				
“type”	STR	VAR	“NORMAL”（default）	The regular carousel pictures
			“LOGO”	The standby logo

“index”	INT	4		Picture index，it only be needed when the “type” is set to “NORMAL”.
"filePath"	STR	VAR		File path
“fileData”	BIN	VAR		File data
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

* “filePath” and ”fileData” mast have one of them.

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

3.3.4.5 Load EMV parameters

Instruction： ”storage.cmd.load_emvparams”

Parameters list：

Parameter	type	length	Effective/Default Value	Description
Request				
“operate”	STR	VAR	“ADD” (default)	Load parameters
			“CLEAN”	Clear parameters
"appId"	INT	4	0x01~0x0F Default(0x01)	app use independent appId
“type”	STR	VAR	"TERM", "AID", "CAPK", "CARD", "CERT"	Parameter Type
"data"	BIN	VAR		it only be needed when "operate" is set to "ADD".
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

Reference code： action/storage/ActionStoreEmvParams.java

Note: When “type” is “TERM”, User can config the terminal parameters such as country code(9F1A), currency code(5F2A), terminal capability(9F33), Example:”9F1A0208405F2A0208409F3303E0E8C0”

3.3.5 Screen Display

3.3.5.1 Display Stand-by Logo

Instruction： ”exscreen.cmd.idle”

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
NULL				
Response				
“ret”	INT	4		Error Code

“result”	STR	VAR		Error Description

Reference code：action/exscreen/ActionDisplayIdle.java

3.3.5.2 Display carousel Pictures

Instruction：”exscreen.cmd.bitmap”

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“interval”	INT	4	Default : 5s	Interval time (s)
“beginIdx”	INT	4		The Starting picture
“palyNum”	INT	4		Number of Pictures
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference code：action/exscreen/ActionImageCarousel.java

3.3.5.3 Display Customer data

Instruction：”exscreen.cmd.custom_msg”

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“data”	BIN	VAR		**Customer data**，line feed by ’&’
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference code：action/exscreen/ActionDisplayCustomMsg.java

3.3.5.4 Display QR code

Instruction：”exscreen.cmd.qrcode”

Parameter list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“data”	BIN	VAR		UTF8 format String
“payType”	STR	VAR	“ALIPAY”: AliPay Logo “WECHATPAY”: Wechat Logo	Optional Field
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		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	Length	Effective/Default Value	Description
Request				
none				
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error description

Reference Code： action/printer/ActionPrintCheckpaper.java

3.3.6.2 Print text

Instruction：”printer.cmd.text”

Parameters list：

Parameter	type	Length	Effective/Default Value	Description
Request				
“data”	STR	VAR		Print content
“size”	INT	4	Greater than 0， defalue is 24	Font size
“fonttype”	INT	4	android.graphics.Typeface.NORMAL（default）	Normal
			android.graphics.Typeface.BOLD	**Bold**
			android.graphics.Typeface.ITALIC	*Ltalic*
			android.graphics.Typeface.BOLD_ITALIC	***Bold&Italic***
“linegap”	INT	4	Greater than 0， defalue is 6	Line spacing
“leftmargin”	INT	4	Greater than or equal to 0, default is 0	The left margin of page
“rightmargin”	INT	4	Greater than or equal to 0, default is 0	The right margin of page
“typeface”	STR	VAR	Eg:”/mnt/sdcard/kaiti.ttf”（optional）	The custom font file path
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

Reference Code： action/printer/ActionPrintText.java

3.3.6.3 Paper feed

Instruction：”printer.cmd.feed”

Parameters list：

parameter	type	length	Effective/Default Value	Description
Request				
"lines"	INT	4		Paper feed lines
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

Reference Code： action/printer/ActionPrintText.java

3.3.6.4 Print OB code

Instruction： ”printer.cmd.obcode”

Parameters list：

parameter	type	length	Effective/Default Value	Descripton
Request				
“data”	STR	VAR		Print content
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

Reference Code： action/printer/ActionPrintObcode.java

3.3.6.5 Print QR codes

Instruction： ”printer.cmd.qrcode”

Parameters list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“data”	STR	VAR		Print content
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error Description

Reference Code： action/printer/ActionPrintQrcode.java

3.3.6.6 Print pictures

Instruction： ”printer.cmd.photo”

Parameters list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
“data”	Bitmap	VAR		Picture data
Response				
“ret”	INT	4		Error code
“result”	STR	VAR		Error description

Reference Code： action/printer/ActionPrintPhoto.java

3.3.6.7 Printer busy

Instruction: ”printer.cmd.busy”

Parameters list：

Parameter	Type	Length	Effective/Default Value	Description
Request				
Response				
“ret”	INT	4		Error code

“result”	STR	VAR		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	Length	Effective/Default Value	Description
Request				
“serialconfig”	STR	VAR	eg:"115200,n,8,1"(Optional Field)	Serial init param（Baud rate，check code， data bits， stop bit）
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference code： action/serial/ActionOpen.java

3.3.7.2 Close Serial

Instruction:"usbserial.cmd.serialclose"

Parameter	Typ	Length	Effective/Default Value	Description
Request				
NULL				
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description

Reference code： action/serial/ActionClose.java

3.3.7.3 Receive Data

Instruction:"usbserial.cmd.serialrx"

Parameter	Typ	Length	Effective/Default Value	Description
Request				
maxDataLen	INT	4	>0，<=1024	Max data Length
Timeout_ms	INT	4	>0，<=10000	Reading data Timeout (ms)
Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		Error Description
"data"	BIN	VAR		Receive data

Reference code： action/serial/ActionRx.java

3.3.7.4 Send Data

Instruction:"usbserial.cmd.serialtx"

Parameter	Typ	Length	Effective/Default Value	Description
Request				
data	BIN	VAR		Sending data
dataLen	INT	4	>0，<=>1024	Length of sending data

Response				
“ret”	INT	4		Error Code
“result”	STR	VAR		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. 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 it self’s keys.

5.2.2 keys number of each App

Each app include 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 appId distribution.

Premission Fetch code :

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