概述

本文档适用于本司智能POS(Z90, Z91), MPOS(Z70)等产品Android平台SDK

开始

这里已Android Studio为默认IDE进行说明

- 拷贝SmartPos_xxx.jar文件到`app\libs`目录下，拷贝完成后，点击jar包，右键—>add as library
- 拷贝jniLibs目录至`src/main`目录下
- 基础库libSmartPosJni.so，libSmartPos.so， libEmvCoreJni.so，SmartPos_xxx.jar
- 收费扫码库 libjava_camera.so，libsyno_getparam.so，libsyno_jni.so，libsynochip_qrcode.so(需联系商务获取验证密码)
- 声明权限

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

注意

- 绝大多数函数返回int类型值，详细类型表见`com.zcs.sdk.SdkResult`
- **SDK的所有接口都推荐在子线程运行的，并保证接口之间顺序执行。推荐通过`DriverManager.getInstance().getSingleThreadExecutor`获取SDK的单线程线程池来保证顺序执行**

常用类

说明

- DriverManager 用于生成各模块操作类实例
- Sys 用于获取各种设备硬件信息、以及系统封装接口
- CardReaderManager 寻卡，获取各类型卡片操作类
  - ICCard 操作插入IC卡 PSAM卡
  - MagCard 操作磁条卡
  - RfCard 操作RF卡、m1、mifare plus、felica卡等
  - SLE4428Card 操作 SLE4428卡
  - SLE4442Card 操作 SLE4442卡
  - IDCard 操作身份证(中国)
- EmvHandler 执行Emv类
- PinPadManager 密码键盘相关
- Printer 打印
- FingerprintManager 操作指纹
- Led 操作Led灯
- Beeper 操作轰鸣器
- BluetoothHandler 用于本司Z70蓝牙刷卡器
- ExternalCardManager 用于本司ZCS160读卡设备

获取流程

通过`DriverManager`的各种`getXXX()`函数获取各个模块操作类

```
DriverManager mDriverManager= DriverManager.getInstance();
Sys mSys = mDriverManager.getBaseSysDevice();

CardReaderManager mCardReadManager = mDriverManager.getCardReadManager();
ICCard mICCard = mCardReadManager.getICCard();
MagCard mMagCard = mCardReadManager.getMAGCard();
RfCard mRfCard = mCardReadManager.getRFCard();
SLE4428Card mSLE4428Card = mCardReadManager.getSLE4428Card();
SLE4442Card mSLE4442Card = mCardReadManager.getSLE4442Card();
IDCard idCard = mCardReadManager.getIDCard();

EmvHandler mEmvHandler = EmvHandler.getInstance();

PinPadManager mPadManager = mDriverManager.getPadManager();

Printer mPrinter = mDriverManager.getPrinter();

FingerprintManager mFingerprintManager = mDriverManager.getFingerprintManager();

Beeper mBeeper = mDriverManager.getBeeper();
Led mLed = mDriverManager.getLedDriver();

BluetoothHandler mBluetoothHandler = mDriverManager.getBluetoothHandler();

ExternalCardManager mExternalCardManager =
mDriverManager.getExternalCardManager();
```

初始化

SPI(默认，如Z90)

```
int statue = mSys.getFirmwareVer(new String[1]);
if (statue != SdkResult.SDK_OK) {
    int sysPowerOn = mSys.sysPowerOn();
    Log.i(TAG, "sysPowerOn: " + sysPowerOn);
    try {
        Thread.sleep(1000);
    } catch (InterruptedException e) {
        e.printStackTrace();
    }
}
int i = mSys.sdkInit();
if (i == SdkResult.SDK_OK) {
}
```

蓝牙(适用于Z70)

```
private void initSdk() {
    // Config the SDK base info
    mSys = mDriverManager.getBaseSysDevice();
    mSys.showLog(true);
    mBluetoothManager = BluetoothManager.getInstance()
            .setContext(mActivity)
            .setBluetoothListener(new BluetoothListener() {
                @Override
                public boolean isReader(BluetoothDevice bluetoothDevice) {
                    // Get device searched by bluetooth
                    mAdapter.addDevice(bluetoothDevice);
                    mAdapter.notifyDataSetChanged();
                    return false;
                }

                @Override
                public void startedConnect(BluetoothDevice device) {
                    Log.e(TAG, "startedConnect: ");
                }

                @Override
                public void connected(BluetoothDevice device) {
                    Log.e(TAG, "connected: ");
                    mHandler.obtainMessage(MSG_TOAST,
"Connected").sendToTarget();
                    int sdkInit = mSys.sdkInit(ConnectTypeEnum.BLUETOOTH);
                    String initRes = (sdkInit == SdkResult.SDK_OK) ?
getString(R.string.init_success) : SDK_Result.obtainMsg(mActivity, sdkInit);

                    // mBluetoothManager.connect called in sub thread, u need to
switch to main thread when u need to change ui
                    mHandler.obtainMessage(MSG_TOAST, initRes).sendToTarget();
                }

                @Override
                public void disConnect() {
                    Log.e(TAG, "disConnect: ");
                    mHandler.obtainMessage(MSG_TOAST,
"Disconnect").sendToTarget();
                }

                @Override
                public void startedDiscovery() {
                    Log.e(TAG, "startedDiscovery: ");
                }

                @Override
                public void finishedDiscovery() {
                    Log.e(TAG, "finishedDiscovery: ");
                }
            })
            .init();
}
```

USB

```
int openUsb() {
    if (mUsbHandler != null) {
        mUsbHandler.close();
    }
    mUsbHandler = UsbHandler.getInstance().setContext(this).init();
    int nRet = mUsbHandler.connect();
    showLog("openUsb: " + nRet);
    if (nRet == USBConstants.USB_NO_PERMISSION) {
        mUsbHandler.checkPermission();
        nRet = mUsbHandler.connect();
    }
    if (nRet == 0) {
        nRet = mSys.sdkInit(ConnectTypeEnum.USB);
        showLog("sdkInit:" + nRet);
    }
    return nRet;
}
```

COM (适用于Z91)

```
int openSerialPort() {
    int statue = mSys.getFirmwareVer(new String[1]);
    if (statue != SdkResult.SDK_OK) {
        int sysPowerOn = mSys.sysPowerOn();
        try {
            Thread.sleep(1000);
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
    }
    return mSys.sdkInit(ConnectTypeEnum.COM);
}
```

蓝牙读卡器Z70独有

以下仅提供BluetootHandler类独有的函数使用，**更多具体的调用请参考demo中的 PbocActivity 和 EmvActivity**

PBOC(用于POBC卡)

该功能读卡有限, 仅支持中国PBOC卡, EMV卡请参考后文EMV卡

寻卡

```
int timeout = 10;
CardReaderTypeEnum cardType = CardReaderTypeEnum.MAG_IC_RF_CARD;
int ret = mBluetoothHandler.searchCard(cardType, timeout);
ret = mBluetoothHandler.cancelSearchCard();
```

添加监听

寻卡, 键盘按键, pboc内核执行结果, 超时等将会触发各种回调

1. `onKeyEnter`, `onKeyCancel`: 确认和取消按键触发
2. `onCardDetect`: `BluetoothHandler.searchCard` 寻卡函数结果回调
3. `onEnterPasswordTimeout`: `BluetoothHandler.startInputPin` 开始输入密码超时后回调
4. `onEmvTimeout`, `onEmvStatus`: `BluetoothHandler.emv` 执行emv后回调

```
BluetoothManager mBluetoothManager = BluetoothManager.getInstance();
BluetoothHandler mBluetoothHandler = mDriverManager.getBluetoothHandler();
```

```
mBluetoothHandler.addEmvListener(new OnBluetoothEmvListener() {
    @Override
    public void onKeyEnter() {
        Log.e(TAG, "onKeyEnter: ");
    }

    @Override
    public void onKeyCancel() {
        Log.e(TAG, "onKeyCancel: ");
    }

    @Override
    public void onCardDetect(CardDetectedEnum cardDetectedEnum) {
        Log.e(TAG, "onCardDetect: " + cardDetectedEnum.name());
        switch (cardDetectedEnum) {
            case INSERTED:
                showLog("IC card insert");
                emvRet = mBluetoothHandler.emv(CardReaderTypeEnum.IC_CARD, 100,
"20180811121212", 10);
                showLog("Start emv ret:  " + emvRet);
                break;
            case SWIPED:
                getMagData();
                break;
            case CONTACTLESS_FR:
                showLog("Rf card");
                emvRet = mBluetoothHandler.emv(CardReaderTypeEnum.RF_CARD, 100,
10);
                showLog("Start emv ret:  " + emvRet);
                break;
            case REMOVED:
                showLog("IC card remove");
                break;
        }
    }

    @Override
    public void onEmvTimeout() {
        Log.e(TAG, "onEmvTimeout: ");
        showLog("onEmvTimeout");
    }

    @Override
    public void onEnterPasswordTimeout() {
        Log.e(TAG, "onEnterPasswordTimeout: ");
    }

    @Override
    public void onEmvStatus(EmvStatusEnum emvStatusEnum) {
        Log.e(TAG, "onEmvStatus: " + emvStatusEnum.name());
        showLog("onEmvStatus: " + emvStatusEnum.name());
        if (emvStatusEnum == EmvStatusEnum.PBOC_OK || emvStatusEnum ==
EmvStatusEnum.QPBOC_OK) {
            getEmvData();
        }
    }
});
```

读PBOC卡

```
    private void getEmvData() {
        String filed = mBluetoothHandler.get55Field();
        String track = mBluetoothHandler.getTrack();
        String cardNo = mBluetoothHandler.getCardNo();
        String cardHolder = mBluetoothHandler.getCardHolder();
        String expDate = mBluetoothHandler.getExpDate(track);
        String icSeq = mBluetoothHandler.getIcSeq();
        NFCCardType cardType = mBluetoothHandler.getNFCCardType();
        String encryptTrack = mBluetoothHandler.getEncrypTrackData(0);
        //if (mEmvDialog != null && mEmvDialog.isShowing()) {
        //    mEmvDialog.dismiss();
        //}
        showLog("cardNo:  " + cardNo);
        showLog("field55:  " + filed);
        showLog("track:  " + track);
        showLog("encryptTrack:  " + encryptTrack);
        showLog("cardHolder:  " + cardHolder);
        showLog("expDate:  " + expDate);
        showLog("icSeq:  " + icSeq);
        showLog("cardType:  " + cardType.name());

    }
```

读磁条卡

```
    private void getMagData() {
        showLog("Mag card swipe");
        CardInfoEntity magReadData = mBluetoothHandler.getMagData();
        MyApp.cardInfoEntity = magReadData;
        if (magReadData.getResultcode() == SdkResult.SDK_OK) {
            String tk1 = magReadData.getTk1();
            String tk2 = magReadData.getTk2();
            String tk3 = magReadData.getTk3();
            String expiredDate = magReadData.getExpiredDate();
            String cardNo = magReadData.getCardNo();
            showLog("tk1:  " + tk1);
            showLog("tk2:  " + tk2);
            showLog("tk3:  " + tk3);
            showLog("expiredDate:  " + expiredDate);
            showLog("cardNo:  " + cardNo);
            showLog("isICCard:  " + mBluetoothHandler.isICChip());
            //searchCard(CardReaderTypeEnum.MAG_CARD);
        } else {
            showLog("Mag card read error:  " + magReadData.getResultcode());
        }

    }
```

pinblock

```
// get pin block in OnBluetoothEmvListener.onKeyEnter()
// or stop input in OnBluetoothEmvListener.onKeyCancel()

boolean isEncrypted = true;
// the last param is true means encrypted pinblock, or is plaintext
 mBluetoothHandler.startInputPin((byte) 4, (byte) 12, 0, isEncrypted);

 mBluetoothHandler.closeInputPin();
 mBluetoothHandler.getPinBlock((byte) 0, 0, pan[0]);
```

EMV卡

该功能的实现请参考后文EMV

屏幕

```
private void setLcdMain() {
    int ret = mBluetoothHandler.LCDMainScreen();
    showLog("Set mpos Lcd main:  " + ret);
}

private void setLcdAmount() {
    int ret = mBluetoothHandler.LCDAmount(50 * 100);
    showLog("Set mpos Lcd amount ￥50:  " + ret);
}

private void showLcdQR() {
    int ret = mBluetoothHandler.LCDQRCodeShow(100, "www.google.com");
    showLog("Set mpos Lcd qr:  " + ret);
}
```

Z91

读卡

该设备仅支持NFC读卡, 读卡模块实现采用Android原生API, SDK和Demo中提供的接口暂不支持. 具体参考Android API官方链接

打印

打印使用通用打印接口, 具体参考下文打印

卡片操作

寻卡

通过 `CardInfoEntity` 实体类可以获取寻卡返回的相关信息，如卡片类型、非接卡复位信息、卡ID等

```
mCardReadManager.cancelSearchCard();
mCardReadManager.searchCard(CardReaderTypeEnum.MAG_IC_RF_CARD, 0, mListener);

boolean isM1 = false;
boolean isMfPlus = false;
OnSearchCardListener mListener = new OnSearchCardListener() {
    @Override
    public void onCardInfo(CardInfoEntity cardInfoEntity) {
        CardReaderTypeEnum cardType = cardInfoEntity.getCardExistslot();
        switch (cardType) {
            case RF_CARD:
                // only can get SdkData.RF_TYPE_A / SdkData.RF_TYPE_B /
SdkData.RF_TYPE_FELICA / SdkData.RF_TYPE_MEMORY_A / SdkData.RF_TYPE_MEMORY_B
                byte rfCardType = cardInfoEntity.getRfCardType();
                Log.e(TAG, "rfCardType: " + rfCardType);
                if (isM1) {
                    readM1Card();
                } else if (isMfPlus) {
                    readMFPlusCard();
                } else {
                    if (rfCardType == SdkData.RF_TYPE_FELICA) { // felica card
                        readFelica();
                    } else if (rfCardType == SdkData.RF_TYPE_A || rfCardType ==
SdkData.RF_TYPE_B) {
                        readCpuCard();
                    }
                }
                break;
            case MAG_CARD:
                readMagCard();
                break;
            case IC_CARD:
                readICCard(CardSlotNoEnum.SDK_ICC_USERCARD);
                break;
            case PSIM1:
                readICCard(CardSlotNoEnum.SDK_ICC_SAM1);
                break;
            case PSIM2:
                readICCard(CardSlotNoEnum.SDK_ICC_SAM2);
                break;
        }
    }

    @Override
    public void onError(int i) {
        isM1 = false;
        isMfPlus = false;
        mHandler.sendEmptyMessage(i);
    }

    @Override
    public void onNoCard(CardReaderTypeEnum cardReaderTypeEnum, boolean b) {

    }
};
```

磁条卡

`getMagTrackData()` 返回磁条卡各轨道数据
`getMagReadData()` 将按照标准银行卡格式解析磁道数据并返回

```
private void readMagCard() {
    // use `getMagReadData` to get mag track data and parse data
    // use `getMagTrackData` to get origin track data
    //CardInfoEntity cardInfo = mMagCard.getMagReadData();
    CardInfoEntity cardInfo = mMagCard.getMagTrackData();
    Log.d(TAG, "cardInfo.getResultcode():" + cardInfo.getResultcode());
    if (cardInfo.getResultcode() == SdkResult.SDK_OK) {
        //String exp = cardInfo.getExpiredDate();
        //String cardNo = cardInfo.getCardNo();
        String tk1 = cardInfo.getTk1();
        String tk2 = cardInfo.getTk2();
        String tk3 = cardInfo.getTk3();
    }
    mMagCard.magCardClose();
}
```

接触式CPU卡

```
public static final byte[] APDU_SEND_IC = {0x00, (byte) 0xA4, 0x04, 0x00, 0x0E,
0x31, 0x50, 0x41, 0x59, 0x2E, 0x53, 0x59, 0x53, 0x2E, 0x44, 0x44, 0x46, 0x30,
0x31, 0X00};
public static final byte[] APDU_SEND_RF = {0x00, (byte) 0xA4, 0x04, 0x00, 0x0E,
0x32, 0x50, 0x41, 0x59, 0x2E, 0x53, 0x59, 0x53, 0x2E, 0x44, 0x44, 0x46, 0x30,
0x31, 0x00};
public static final byte[] APDU_SEND_RANDOM = {0x00, (byte) 0x84, 0x00, 0x00,
0x08};
public static final byte[] APDU_SEND_FELICA = {0x10, 0x06, 0x01, 0x2E, 0x45,
0x76, (byte) 0xBA, (byte) 0xC5, 0x45, 0x2B, 0x01, 0x09, 0x00, 0x01, (byte) 0x80,
0x00};


private void readICCard(CardSlotNoEnum slotNo) {
    int icCardReset = mICCard.icCardReset(slotNo);

    int[] recvLen = new int[1];
    byte[] recvData = new byte[300];

    if (icCardReset == SdkResult.SDK_OK) {
        int icRes;
        byte[] apdu;
        if (slotNo != CardSlotNoEnum.SDK_ICC_USERCARD) {
            apdu = APDU_SEND_RANDOM;
        } else {
            apdu = APDU_SEND_IC;
        }
        icRes = mICCard.icExchangeAPDU(slotNo, apdu, recvData, recvLen);
        if (icRes == SdkResult.SDK_OK) {
            String apduRecv =
StringUtils.convertBytesToHex(recvData).substring(0, recvLen[0] * 2);
        }
    }
    int icCardPowerDown =
mICCard.icCardPowerDown(CardSlotNoEnum.SDK_ICC_USERCARD);
}
```

非接CPU卡

```
private void readRfCard(byte realRfType) {
    int rfReset = mRfCard.rfReset();
    if (rfReset == SdkResult.SDK_OK) {
        byte[] apduSend;
        if (realRfType == SdkData.RF_TYPE_FELICA) { // felica card
            apduSend = APDU_SEND_FELICA;
        } else {
            apduSend = APDU_SEND_RF;
        }
        byte[] recvData = new byte[300];
        int[] recvLen = new int[1];
        int rfRes = mRfCard.rfExchangeAPDU(apduSend, recvData, recvLen);
        int powerDownRes = mRfCard.rfCardPowerDown();
        if (rfRes == SdkResult.SDK_OK) {
            mHandler.sendEmptyMessage(rfRes);
            String recv = StringUtils.convertBytesToHex(recvData).substring(0,
recvLen[0] * 2);
        }
    }
}
```

M1卡

- 1k

```
String keyM1 = "FFFFFFFFFFFF";
private void readM1Card() {
    StringBuilder m1_message = new StringBuilder();
    byte[] key = StringUtils.convertHexToBytes(keyM1);
    int status;
    do {
        // sector 10 = 4 * 10
        status = mRfCard.m1VerifyKey((byte) (4 * 10), keyType, key);
        if (status != SdkResult.SDK_OK) {
            break;
        }
        m1_message.append("Read sector 10:");
        for (int i = 0; i < 4; i++) {
            byte[] out = new byte[16];
            status = mRfCard.m1ReadBlock((byte) (4 * 10 + i), out);
            if (status == SdkResult.SDK_OK) {
                m1_message.append("\nBlock").append(i).append(":")
                        .append(StringUtils.convertBytesToHex(out));
            } else {
                break;
            }
        }
    } while (false);
}

void writeM1() {
    // 1. verify the sector key
    // 2. write it
    byte[] key = StringUtils.convertHexToBytes(keyM1);
    int status = mRfCard.m1VerifyKey((byte) (4 * 10), keyType, key);
    if (status == SdkResult.SDK_OK) {
        for (int i = 0; i < 3; i++) {
            byte[] input =
StringUtils.convertHexToBytes("0123456789ABCDEF0123456789ABCDEF");
                mRfCard.m1WirteBlock((byte) (4 * 10 + i), input);
            }
        }
    }
```

- 4k

```
/**
 * 1K : 16 sector * 4 blocks * 16 bytes = 1024
 * 4K : 32 sector * 4 blocks * 16 bytes(big sector: 0 ~ 127)
 * + 8 sector * 16 blocks * 16 bytes(little sector: 127 ~ 255) = 4096
 */
String keyM1 = "FFFFFFFFFFFF";

void readM14K() {
    byte[] key = StringUtils.convertHexToBytes(keyM1);
    int ret = -1;
    StringBuilder sb = new StringBuilder();
    for (int i = 0; i < 32; i++) {
        ret = mRFCard.rfSearchCard(SdkData.RF_TYPE_A, new byte[1], new
byte[300]);
        Log.e(TAG, "readM14K: " + i + "  " + ret);
        ret = mRFCard.m1VerifyKey((byte) (i * 4), (byte) 0, key);
        if (ret == SdkResult.SDK_OK) {
            for (int j = 0; j < 4; j++) {
                byte[] out = new byte[16];
                ret = mRFCard.m1ReadBlock((byte) (i * 4 + j), out);
                if (ret == SdkResult.SDK_OK) {
                    sb.append("\nsector").append(i)
                            .append(" block").append(j).append(": ")
                            .append(StringUtils.convertBytesToHex(out));
                } else {
                    sb.append("\nsector").append(i)
                            .append(" block").append(j).append(": ")
                            .append("read error");
                }
            }
        } else {
            sb.append("\nsector").append(i)
                    .append(" key is error");
        }
    }
    Log.e(TAG, "readM14K: " + sb);
    sb.setLength(0);

    for (int i = 0; i < 8; i++) {
        ret = mRFCard.rfSearchCard(SdkData.RF_TYPE_A, new byte[1], new
byte[300]);
        Log.e(TAG, "readM14K: " + (32 + i) + "  " + ret);
        ret = mRFCard.m1VerifyKey((byte) (128 + i * 16), (byte) 0, key);
        if (ret == SdkResult.SDK_OK) {
            for (int j = 0; j < 16; j++) {
                byte[] out = new byte[16];
                ret = mRFCard.m1ReadBlock((byte) (128 + i * 16 + j), out);
                if (ret == SdkResult.SDK_OK) {
                    sb.append("\nsector").append(i + 32)
                            .append(" block").append(j).append(": ")
                            .append(StringUtils.convertBytesToHex(out));
                } else {
                    sb.append("\nsector").append(i + 32)
                            .append(" block").append(j).append(": ")
                            .append("read error");
                }
            }
        } else {
            sb.append("\nsector").append(32 + i)
                    .append(" key is error");
        }
    }
    Log.e(TAG, "readM14K: " + sb);
}
```

Mifare Plus

```
String keyMfPlus = "FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF";
byte[] addressMfPlus = {0x40, 0x00};
private void readMFPlusCard() {
    StringBuilder m1_mf_puls = new StringBuilder();
    byte[] key = StringUtils.convertHexToBytes(keyMfPlus);
    int status = mRfCard.mFPlusFirstAuthen(addressMfPlus, key);
    if (status == SdkResult.SDK_OK) {
        m1_mf_puls.append("Read sector 0:");
        byte[] outdata = new byte[64];
        if (mRfCard.mFPlusL3Read(StringUtils.convertHexToBytes("0000"), (byte)
4, outdata) == SdkResult.SDK_OK) {
            m1_mf_puls.append(StringUtils.convertBytesToHex(outdata));
        }
    }
}
```

SLE4442

```
private String key = "FFFF";
private int startAddr = 0;
private int len = 127;
private byte[] data;
private byte[] protectedData;

SLE4442Card mSLE4442Card =
DriverManager.getInstance().getCardReadManager().getSLE4442Card();
private int init() {
    int ret = mSLE4442Card.init();
    Log.e(TAG, "init: " + ret);
    showLog("init: " + ret);
    if (ret != SdkResult.SDK_OK) {
        showLog(getString(R.string.init_failed), Color.RED);
    }
    return ret;
}

private int verifyKey() {
    int ret = mSLE4442Card.verifyKey(StringUtils.convertHexToBytes(key));
    Log.e(TAG, "verify: " + key + "\t" + ret);
    showLog("verify: " + key + "  \t" + ret);
    if (ret != SdkResult.SDK_OK) {
        showLog(getString(R.string.verify_failed), Color.RED);
    }
    return ret;
}

private void read() {
    data = new byte[len];
    int ret = mSLE4442Card.readData(startAddr, len, data);
    Log.e(TAG, "readData: " + ret + "\t" + StringUtils.convertBytesToHex(data));
    String prefix = "readData: " + ret + "\t";
    showLog(prefix + StringUtils.convertBytesToHex(data), Color.RED,
prefix.length() + 32 * 2, 2);
}

private void readProtected() {
    protectedData = new byte[32];
    int ret = mSLE4442Card.readProtectedData(protectedData);
    Log.e(TAG, "readProtectedData: " + ret + "  \t" +
StringUtils.convertBytesToHex(protectedData));
    showLog("readProtectedData: " + ret + "\t" +
StringUtils.convertBytesToHex(protectedData));
}


private void changeKey() {
    int ret = mSLE4442Card.changeKey(StringUtils.convertHexToBytes(key));
    Log.e(TAG, "changeKey: " + ret);
    showLog("changeKey: " + ret);
}

private void write() {
    if (data == null || data.length == 0) {
        showLog(getString(R.string.read_first), Color.RED);
        return;
    }
    int ret = mSLE4442Card.writeData(startAddr, len, data);
    Log.e(TAG, "writeData: " + StringUtils.convertBytesToHex(data) + "\t" +
ret);
    showLog("writeData: " + StringUtils.convertBytesToHex(data) + "\t" + ret);
}

private void writeProtected() {
    if (protectedData == null || protectedData.length == 0) {
        showLog(getString(R.string.read_first), Color.RED);
        return;
    }
    int ret = mSLE4442Card.writeProtectedData((byte) 0, (byte) 32,
protectedData);
    Log.e(TAG, "writeProtected: " + StringUtils.convertBytesToHex(protectedData)
+ "\t" + ret);
    showLog("writeProtected: " + StringUtils.convertBytesToHex(protectedData) +
"\t" + ret);
}
```

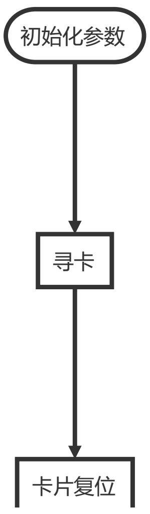
SLE4428

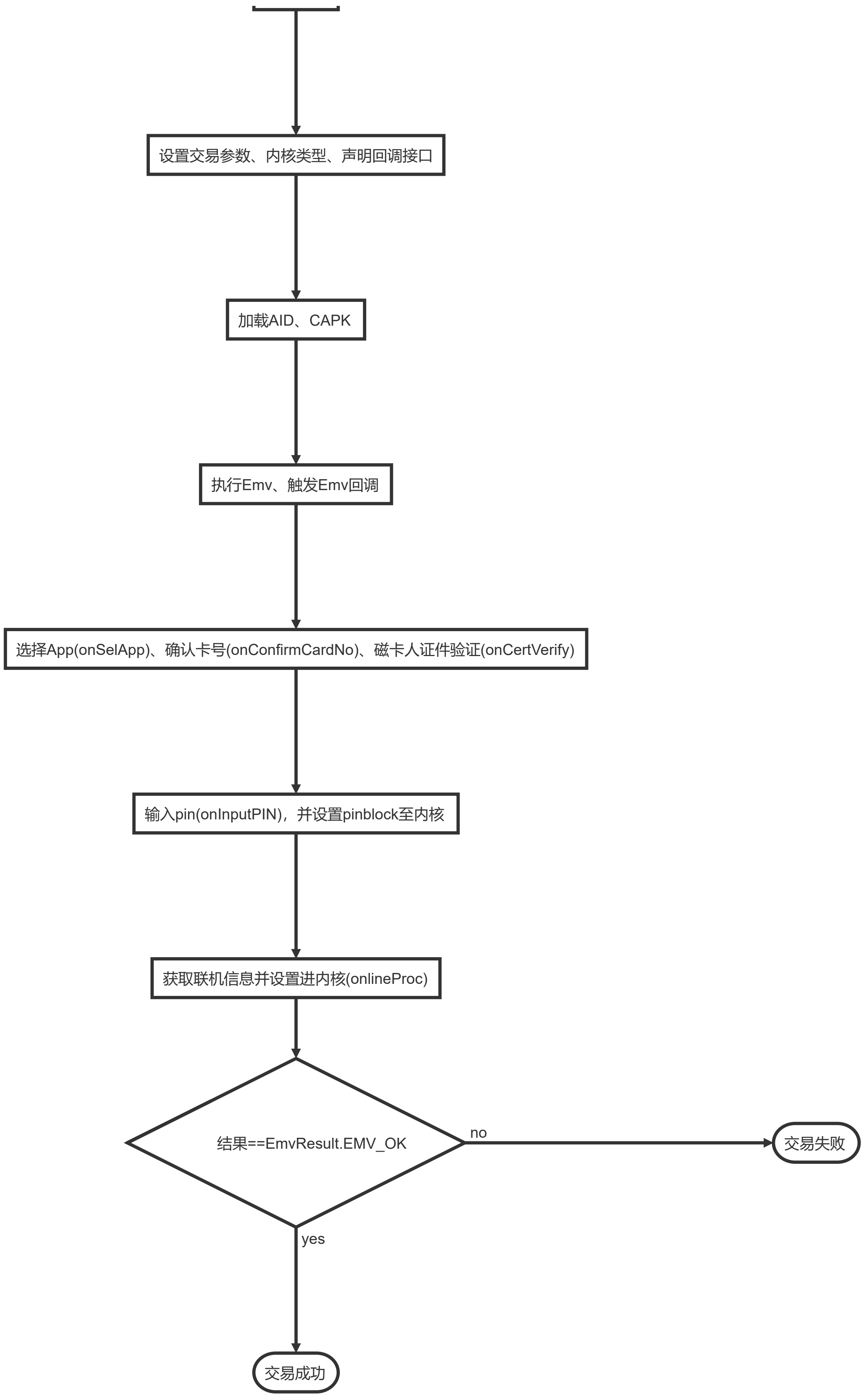
```
private String key = "FFFF";
private int startAddr = 0;
private int len = 127;
private byte[] data;
private byte[] protectedData;

SLE4428Card mSLE4428Card =
DriverManager.getInstance().getCardReadManager().getSLE4428Card();

private int init() {
    int ret = mSLE4428Card.init();
    Log.e(TAG, "init: " + ret);
    showLog("init: " + ret);
    if (ret != SdkResult.SDK_OK) {
        showLog(getString(R.string.init_failed), Color.RED);
    }
    return ret;
}

private int verifyKey() {
    int ret = mSLE4428Card.verifyKey(StringUtils.convertHexToBytes(key));
    Log.e(TAG, "verify: " + key + "\t" + ret);
    showLog("verify: " + key + "  \t" + ret);
    if (ret != SdkResult.SDK_OK) {
        showLog(getString(R.string.verify_failed), Color.RED);
    }
    return ret;
}

private void read() {
    data = new byte[len];
    int ret = mSLE4428Card.readData(startAddr, len, data);
    Log.e(TAG, "readData: " + ret + "\t" + StringUtils.convertBytesToHex(data));
    String prefix = "readData: " + ret + "\t";
    showLog(prefix + StringUtils.convertBytesToHex(data), Color.RED,
prefix.length() + 32 * 2, 2);
}

private void readProtected() {
    protectedData = new byte[32];
    int ret = mSLE4428Card.readProtectedData(startAddr, len, protectedData);
    Log.e(TAG, "readProtectedData: " + ret + "  \t" +
StringUtils.convertBytesToHex(protectedData));
    showLog("readProtectedData: " + ret + "\t" +
StringUtils.convertBytesToHex(protectedData));
}


private void changeKey() {
    int ret = mSLE4428Card.changeKey(StringUtils.convertHexToBytes(key));
    Log.e(TAG, "changeKey: " + ret);
    showLog("changeKey: " + ret);
}
```

```
private void write() {
    if (data == null || data.length == 0) {
        showLog(getString(R.string.read_first), Color.RED);
        return;
    }
    int ret = mSLE4428Card.writeData(startAddr, len, data);
    Log.e(TAG, "writeData: " + StringUtils.convertBytesToHex(data) + "\t" +
ret);
    showLog("writeData: " + StringUtils.convertBytesToHex(data) + "\t" + ret);
}

private void writeProtected() {
    if (protectedData == null || protectedData.length == 0) {
        showLog(getString(R.string.read_first), Color.RED);
        return;
    }
    int ret = mSLE4428Card.writeProtectedData((byte) 0, (byte) 32,
protectedData);
    Log.e(TAG, "writeProtected: " + StringUtils.convertBytesToHex(protectedData)
+ "\t" + ret);
    showLog("writeProtected: " + StringUtils.convertBytesToHex(protectedData) +
"\t" + ret);
}
```

EMV

具体接口以及参数含义请参考EMV_API.doc




设置交易参数、内核类型、声明回调接口
加载AID、CAPK
执行Emv、触发Emv回调
选择App(onSelApp)、确认卡号(onConfirmCardNo)、磁卡人证件验证(onCertVerify)
输入pin(onInputPIN)，并设置pinblock至内核
获取联机信息并设置进内核(onlineProc)
结果==EmvResult.EMV_OK
no
交易失败
yes
交易成功

初始化

```
emvHandler = EmvHandler.getInstance();
mPinPadManager = mDriverManager.getPadManager();
 byte[] pucIsEcTrans = new byte[1];
 byte[] pucBalance = new byte[6];
 byte[] pucTransResult = new byte[1];
```

回调

```
OnEmvListener onEmvListener = new OnEmvListener() {
    @Override
    public int onSelApp(String[] appLabelList) {
        Log.d("Debug", "onSelApp");
        return 0;
    }

    @Override
    public int onConfirmCardNo(String cardNo) {
        Log.d("Debug", "onConfirmCardNo");
        String[] track2 = new String[1];
        final String[] pan = new String[1];
        emvHandler.getTrack2AndPAN(track2, pan);
        int index = 0;
        if (track2[0].contains("D")) {
            index = track2[0].indexOf("D") + 1;
        } else if (track2[0].contains("=")) {
            index = track2[0].indexOf("=") + 1;
        }
        final String exp = track2[0].substring(index, index + 4);
        showLog("cardNum:" + pan[0]);
        showLog("exp:" + exp);
        return 0;
    }

    @Override
    public int onInputPIN(byte pinType) {
        // 1. open the secret pin pad to get pin block
        // 2. send the pinBlock to emv kernel
        if (emvTransParam.getTransKernalType() ==
EmvData.KERNAL_CONTACTLESS_ENTRY_POINT) {
            String[] track2 = new String[1];
            final String[] pan = new String[1];
            emvHandler.getTrack2AndPAN(track2, pan);
            int index = 0;
            if (track2[0].contains("D")) {
                index = track2[0].indexOf("D") + 1;
            } else if (track2[0].contains("=")) {
                index = track2[0].indexOf("=") + 1;
            }
            final String exp = track2[0].substring(index, index + 4);
            showLog("card:" + pan[0]);
            showLog("exp:" + exp);
        }
        Log.d("Debug", "onInputPIN");
        int iRet = 0;
        iRet = inputPIN(pinType);
        Log.d("Debug", "iRet=" + iRet);
        if (iRet == EmvResult.EMV_OK) {
            emvHandler.setPinBlock(mPinBlock);
        }
        return iRet;
    }

    @Override
    public int onCertVerify(int certType, String certNo) {
        Log.d("Debug", "onCertVerify");
        return 0;
    }

    @Override
    public byte[] onExchangeApdu(byte[] send) {
        Log.d("Debug", "onExchangeApdu");
        if (realCardType == CardReaderTypeEnum.IC_CARD) {
            return mICCard.icExchangeAPDU(CardSlotNoEnum.SDK_ICC_USERCARD,
send);
        } else if (realCardType == CardReaderTypeEnum.RF_CARD) {
            return mRFCard.rfExchangeAPDU(send);
        }
        return null;
    }

    @Override
    public int onlineProc() {
        // 1. assemble the authorisation request data and send to bank by using
get 'emvHandler.getTlvData()'
        // 2. separateOnlineResp to emv kernel
        // 3. return the callback ret
        Log.d("Debug", "onOnlineProc");
        byte[] authRespCode = new byte[3];
        byte[] issuerResp = new byte[512];
        int[] issuerRespLen = new int[1];
        int iSendRet = emvHandler.separateOnlineResp(authRespCode, issuerResp,
issuerRespLen[0]);
        Log.d("Debug", "separateOnlineResp iSendRet=" + iSendRet);
        return 0;
    }
};
```

设置参数

```
        // 2. set params, use `EmvTransParam` to set transaction date, amount,
transaction number etc.
        // setKernelType
        final EmvTransParam emvTransParam = new EmvTransParam();
        if (cardType == CardReaderTypeEnum.IC_CARD) {
            emvTransParam.setTransKernalType(EmvData.KERNAL_EMV_PBOC);
        } else if (cardType == CardReaderTypeEnum.RF_CARD) {

emvTransParam.setTransKernalType(EmvData.KERNAL_CONTACTLESS_ENTRY_POINT);
        }
        emvHandler.transParamInit(emvTransParam);
        final EmvTermParam emvTermParam = new EmvTermParam();
        emvHandler.kernelInit(emvTermParam);

        // 3. add aid or capk
        // add app and capk is persistently stored in the sdcard, if you need to
add dynamically, please be sure to clear the previous
        //emvHandler.delAllApp();
        //emvHandler.delAllCapk();
        //loadVisaAIDs(emvHandler);
        //loadMasterCardCapks(emvHandler);
```

添加AID, CAPK

注意添加AID和CAPK需要在`emvHandler.kernelInit(emvTermParam)`之后执行, 且AID和CAPK将会持久化存储在文件系统, 所以避免重复添加. 可通过 `emvHandler.delAllApp()`, `emvHandler.delAllCapk()` 清空之前添加过的

```
private void loadVisaAIDs(EmvHandler emvHandle) {
    // Visa Credit/Debit
    EmvApp ea = new EmvApp();

    ea.setAid("A0000000031010");
    ea.setSelFlag((byte) 0);
    ea.setTargetPer((byte) 0x00);
    ea.setMaxTargetPer((byte) 0);
    ea.setFloorLimit(1000);
    ea.setOnLinePINFlag((byte) 1);
    ea.setThreshold(0);
    ea.setTacDefault("0000000000");
    ea.setTacDenial("0000000000");
    ea.setTacOnline("0000000000");
    ea.settDOL("0F9F02065F2A029A039C0195059F3704");
    ea.setdDOL("039F3704");
    ea.setVersion("008C");
    ea.setClTransLimit("000000015000");
    ea.setClOfflineLimit("000000008000");
    ea.setClCVMLimit("000000005000");
    ea.setEcTTLVal("000000100000");

    emvHandle.addApp(ea);
}

private void loadMasterCardCapks(EmvHandler emvHandle) {
    EmvCapk capk = new EmvCapk();
    capk.setKeyID((byte) 0x05);
    capk.setRID("A000000004");
    capk.setModul("B8048ABC30C90D976336543E3FD7091C8FE4800"
            + "DF820ED55E7E94813ED00555B573FECA3D84AF6"
            + "131A651D66CFF4284FB13B635EDD0EE40176D8B"
            + "F04B7FD1C7BACF9AC7327DFAA8AA72D10DB3B"
            + "8E70B2DDD811CB4196525EA386ACC33C0D9D45"
            + "75916469C4E4F53E8E1C912CC618CB22DDE7C3"
            + "568E90022E6BBA770202E4522A2DD623D180E21"
            + "5BD1D1507FE3DC90CA310D27B3EFCCD8F83DE"
            + "3052CAD1E48938C68D095AAC91B5F37E28BB49EC7ED597");
    capk.setCheckSum("EBFA0D5D06D8CE702DA3EAE890701D45E274C845");
    capk.setExpDate("20211231"); // YYYYMMDD

    emvHandle.addCapk(capk);
    }
```

执行

```
int ret = emvHandler.emvTrans(emvTransParam, onEmvListener, pucIsEcTrans,
pucBalance, pucTransResult);
```

结果分析

```
- 函数返回值为`EmvResult`类定义常量值, `ret==0`代表成功
- `pucTransResult`为出参, 共有三种返回值`EmvData.APPROVE_M` Approve,
`EmvData.DECLINE_M` Decline, `EmvData.ONLINE_M` Need online, 仅当
`pucTransResult[0] == EmvData.APPROVE_M`, 才代表联机交易成功
```

密码键盘

下载主密钥

```
String main_key = "31313131313131313232323232323232";
String pin_key = "BF1CA957FE63B286E2134E08A8F3DDA903E0686F";
String mac_key = "8670685795c8d2ea0000000000000000d2db51f1";
String tdk_key = "00A0ABA733F2CBB1E61535EDCFDC34A93AA3EA2D";
// index 为密钥索引, 0x00~0x0F
// key 密钥长度为8的倍数
void upMainKey() {
    int ret = mPadManager.pinPadUpMastKey(0,
            StringUtils.convertHexToBytes(main_key),
            (byte) (main_key.length() / 2));
    Log.e(TAG, "upMainKey: " + ret);
}
```

下载工作密钥

```
// 密文
// 格式(20字节) = 16字节被主密钥加密的工作密钥 + 工作密钥加密8字节0后取前4个字节
// 长度为0即表示 不下载该密钥
void upWorkKey() {
    int ret = mPadManager.pinPadUpWorkKey(0,
            StringUtils.convertHexToBytes(pin_key), (byte) ((byte)
pin_key.length() / 2),
            StringUtils.convertHexToBytes(mac_key), (byte) (mac_key.length() /
2),
            StringUtils.convertHexToBytes(tdk_key), (byte) (tdk_key.length() / 
2));
    Log.e(TAG, "upWorkKey: " + ret);
}

// 明文
// 传null表示不下载该密钥
status = pinPadManager.pinPadUpPlainWorkKey(index, mainKey, pin, mac, tdk)
```

pinblock（安全随机密码键盘）

需在Manifest中声明指定Activity, 并定义其样式

```
<activity
    android:name="com.zcs.sdk.pin.pinpad.PinPadPasswordActivity"
    android:theme="@style/Theme.WindowActivity">
</activity>

<style name="Theme.WindowActivity" parent="android:style/Theme.Dialog">
        <item name="android:windowNoTitle">true</item><!-- //对话框无标题 -->
        <item name="android:windowIsTranslucent">true</item><!-- //此对话框的背景
-->
        <item name="android:windowBackground">@android:color/transparent</item>
<!-- //对话框是否透明 -->
        <item name="android:windowContentOverlay">@null</item><!-- //对话框是否有
遮盖 -->
        <item name="android:windowIsFloating">true</item> <!-- //对话框是否浮动 --
>
        <item name="android:backgroundDimEnabled">true</item><!-- //是否允许对话框
的背景变暗 -->
        <item
name="android:windowAnimationStyle">@android:style/Animation.Dialog</item>
</style>
```

```
pinPadManager.inputOnlinePin(getActivity(), (byte) 6, (byte) 12, 60, true,
"5187108106590784", (byte) 0, PinAlgorithmMode.ANSI_X_9_8, new
PinPadManager.OnPinPadInputListener() {
    @Override
    public void onError(final int code) {

    }

    @Override
    public void onSuccess(final byte[] bytes) {
        Log.e(TAG, "PinBlock: " + StringUtils.convertBytesToHex(bytes));
    }
});
```

mac计算

```
void mac() {
    String mac_data =
"0200302004C030C098110000000000000000010000080210001232518710810659076 99B0E751AD
D38E068010499518710810659078 4D15615619999999300199900000000343434130310DD0684236
010598000052192 98D060D745153979CC00313233343536373831323334353637383930313233343
5313536117A7E3A0DFD41792610000000000000001422000335000601";
    byte[] mac = new byte[8];
    int ret = mPadManager.pinPadMac(0, PinMacTypeEnum.ECB,
            StringUtils.convertHexToBytes(mac_data), mac_data.length() / 2,
            mac);
    Log.e(TAG, "mac: " + ret + "  " + StringUtils.convertBytesToHex(mac));
}
```

加密磁道数据

```
void encryptTrack() {
    String track = "6258091644092434=20102010000089500000";
    // track is ascii string, one letter is one byte
    // hex string: two letter is one byte
    byte[] encryptedTrack = new byte[track.length()];
    int ret = mPadManager.pinPadEncryptTrackData(0,
MagEncryptTypeEnum.UNION_ENCRYPT,
            track.getBytes(), (byte) (track.length()),
            encryptedTrack);
    Log.e(TAG, "encryptTrack: " + ret + "  " + new String(encryptedTrack));
}
```

加密数据

```
void encryptData() {
    String dataForDes = "11111111111111111111111111111111";
    byte[] res = new byte[dataForDes.length() / 2];
    int ret = mPadManager.pinPadEncryptData(0, PinWorkKeyTypeEnum.MAC_KEY,
            StringUtils.convertHexToBytes(dataForDes), dataForDes.length() / 2,
res);
    Log.e(TAG, "encryptData: " + ret + "  " +
StringUtils.convertBytesToHex(res));
}
```

dukpt密钥相关

- 下载dukpt密钥

```
private void setDukptKey() {
    String key = "6AC292FAA1315B4D858AB3A3D7D5933A";
    String ksn = "FFFF9876543210E00000";
    int upDukpt = mPadManager.pinPadUpDukpt(0,
StringUtils.convertHexToBytes(key), (byte) (key.length() / 2),
StringUtils.convertHexToBytes(ksn));
}
```

- 获取pinblock

```
    private void getPinBlockByDukpt() {
        final byte[] ksn = new byte[10];
        mPadManager.inputOnlinePinByDukpt(getActivity(), (byte) 6, (byte) 12,
60, true, "5187108106590784",
                (byte) 0, PinAlgorithmMode.ANSI_X_9_8, new
PinPadManager.OnPinPadInputListener() {
                    @Override
                    public void onError(final int code) {

                    }

                    @Override
                    public void onSuccess(final byte[] bytes) {
                        Log.e(TAG, "PinBlock: " +
StringUtils.convertBytesToHex(bytes));
                        Log.e(TAG, "ksn: " +
StringUtils.convertBytesToHex(ksn));
                        });
                    }
                }, ksn);
    }
```

- 计算mac

```
    private void getMacByDukpt() {
        String input =
"0200302004C030C098110000000000000000100000802100012325187108106590769 9B0E751AD
D38E0680104995187108106590784D15615619999999930019990000000343434130310DD0684236
0105980000521929 8D060D745153979CC0031323334353637383132333435363738393031323334 3
5313536117A7E3A0DFD41792610000000000000001422000335000601";
        byte[] outData = new byte[8];
        byte[] ksn = new byte[10];
        int ret = mPadManager.pinPadMacByDukpt(0, PinMacTypeEnum.ECB,
StringUtils.convertHexToBytes(input), input.length() / 2, outData, ksn);
        Log.d(TAG, "pinPadMacByDukpt:" + ret);
        if (ret == SdkResult.SDK_OK) {
            Log.d(TAG, "outData:" + StringUtils.convertBytesToHex(outData));
            Log.d(TAG, "ksn:" + StringUtils.convertBytesToHex(ksn));
        }
    }
```

- 加密

```
    private void encryptByDukpt() {
        String input =
"0200302004C030C09811000000000000000001000008021000123251871081065907699B0E751AD
D38E0680104995187108106590784D156156199999999300199900000003434341303 10DD0684236
01059800005219298D060D745153979CC003132333435363738313233343536373839303132333343
5313536117A7E3A0DFD417926100000000000000014220003";
        byte[] outData = new byte[input.length() / 2];
        byte[] ksn = new byte[10];
        int ret = mPadManager.pinPadEncryptDataByDukpt(0,
PinWorkKeyTypeEnum.PIN_KEY, StringUtils.convertHexToBytes(input), input.length()
/ 2, outData, ksn);
        Log.d(TAG, "sdkPadEncryptDataByDukpt:" + ret);
        if (ret == SdkResult.SDK_OK) {
            Log.d(TAG, "outData:" + StringUtils.convertBytesToHex(outData));
            Log.d(TAG, "ksn:" + StringUtils.convertBytesToHex(ksn));
        }
    }
```

打印

内置SDK打印

如果调用打印条形码或者二维码接口，请添加ZXing-core为项目依赖，否则将无法正常生成条形码二维码打印

打印文本

```
int printStatus = mPrinter.getPrinterStatus();
if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

} else {
    PrnStrFormat format = new PrnStrFormat();
    format.setTextSize(30);
    format.setAli(Layout.Alignment.ALIGN_CENTER);
    format.setStyle(PrnTextStyle.BOLD);
    format.setFont(PrnTextFont.CUSTOM);
    format.setPath(Environment.getExternalStorageDirectory() +
"/fonts/simsun.ttf");
    mPrinter.setPrintAppendString("POS SALES SLIP"), format);
    format.setTextSize(25);
    format.setStyle(PrnTextStyle.NORMAL);
    format.setAli(Layout.Alignment.ALIGN_NORMAL);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString("MERCHANGT NAME:" + " Test ", format);
    mPrinter.setPrintAppendString("MERCHANT NO:" + " 123456789012345 ", format);
    mPrinter.setPrintAppendString("TERMINAL NAME:" + " 12345678 ", format);
    mPrinter.setPrintAppendString("OPERATOR NO:" + " 01 ", format);
    mPrinter.setPrintAppendString("CARD NO: ", format);
    format.setAli(Layout.Alignment.ALIGN_CENTER);
    format.setTextSize(30);
    format.setStyle(PrnTextStyle.BOLD);
    mPrinter.setPrintAppendString("6214 44** **** **** 7816", format);
    format.setAli(Layout.Alignment.ALIGN_NORMAL);
    format.setStyle(PrnTextStyle.NORMAL);
    format.setTextSize(25);
    mPrinter.setPrintAppendString(" -----------------------------", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    printStatus = mPrinter.setPrintStart();
}
```

打印二维码（需要依赖ZXing库）

```
String QR_TEXT = "https://www.baidu.com";

int printStatus = mPrinter.getPrinterStatus();
if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

} else {
    PrnStrFormat format = new PrnStrFormat();
    mPrinter.setPrintAppendQRCode(QR_TEXT, 200, 200,
Layout.Alignment.ALIGN_NORMAL);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendQRCode(QR_TEXT, 200, 200,
Layout.Alignment.ALIGN_OPPOSITE);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendQRCode(QR_TEXT, 200, 200,
Layout.Alignment.ALIGN_CENTER);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    printStatus = mPrinter.setPrintStart();
    if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

    }
}
```

打印条形码（需要依赖ZXing库）

```
String BAR_TEXT = "6922711079066";

int printStatus = mPrinter.getPrinterStatus();
if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

} else {
    PrnStrFormat format = new PrnStrFormat();
    mPrinter.setPrintAppendBarCode(getActivity(), BAR_TEXT, 360, 100, true,
Layout.Alignment.ALIGN_NORMAL, BarcodeFormat.CODE_128);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    printStatus = mPrinter.setPrintStart();
    if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

    }
}
```

打印图片

```
private Bitmap mBitmapDef;

int printStatus = mPrinter.getPrinterStatus();
if (printStatus != SdkResult.SDK_PRN_STATUS_PAPEROUT) {
    if (mBitmapDef == null) {
        try {
            InputStream inputStream =
getActivity().getAssets().open("print_demo.bmp");
            Drawable drawable = Drawable.createFromStream(inputStream, null);
            mBitmapDef = ((BitmapDrawable) drawable).getBitmap();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
    PrnStrFormat format = new PrnStrFormat();
    mPrinter.setPrintAppendBitmap(mBitmapDef, Layout.Alignment.ALIGN_CENTER);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    mPrinter.setPrintAppendString(" ", format);
    printStatus = mPrinter.setPrintStart();
    if (printStatus == SdkResult.SDK_PRN_STATUS_PAPEROUT) {

    }
}
```

打印标签(仅定制设备支持, 具体咨询商务)

1. `Printer.labelPrintLocationFeed()` 标签重新定位
2. `Printer.labelPrintBackFeed()` 标签后退
3. `Printer.labelPrintForwardFeed()` 标签前进

每次都从新定位来进行标签打印

```
int paperWidth = 360;
int paperHeight = 240;
void singleLabel() {
    new Thread(new Runnable() {
        @Override
        public void run() {
            int ret = 0;
            for (int i = 0; i < 1; i++) {
                ret = mPrinter.labelPrintLocationFeed();
                if (ret == SdkResult.SDK_OK) {
                    ret = mPrinter.labelPrintBackFeed();
                    if (ret == SdkResult.SDK_OK) {
                        mPrinter.setPrintAppendQRCode(QR_TEXT, 220, 220,
Layout.Alignment.ALIGN_CENTER, paperWidth);
                        int printStatus =
mPrinter.setLabelPrintStart(paperWidth, 240);
                    }
                } else
                    break;
            }
            ret = mPrinter.labelPrintLocationFeed();
        }
    }).start();
}
```

通过调整纸张宽高, 计算每次打印应前进后退的行数, 优点是连续打印效率较高

```
int paperWidth = 360;
int paperHeight = 240;

void loopLabel(final int total, final int interval) {
    isLoop = true;
    new Thread(new Runnable() {
        @Override
        public void run() {
            int count = 0;
            int ret = mPrinter.labelPrintLocationFeed();
            ret = mPrinter.labelPrintBackFeed();
            do {
                mPrinter.setPrintAppendBarCode(getActivity(), BAR_TEXT, 320,
220, true, Layout.Alignment.ALIGN_CENTER, BarcodeFormat.CODE_128, paperWidth);
                int printStatus = mPrinter.setLabelPrintStart(paperWidth,
paperHeight);
                mPrinter.labelPrintForwardFeed();

                if (interval != 0) {
                    SystemClock.sleep(interval * 1000);
                }
            } while (isLoop && (total == 0 || ++count < total));

            ret = mPrinter.labelPrintLocationFeed();
            isLoop = false;
        }
    }).start();
}
```

虚拟蓝牙打印

在蓝牙设备列表中可以看到一个已经配对，且永远存在的蓝牙设备“ZCSPrint”，这是由操作系统虚拟出来的打印机设备，实际并不存在。
虚拟蓝牙打印方式就是通过连接 `ZCSPrint` 蓝牙设备，并发送ESC&POS指令来完成打印。
蓝牙扫描、连接、发送可参考Google官方文档，或者参考Demo https://github.com/AnilMH/Android-studio-bluetooth-printer

指纹

初始化

```
mFingerprintManager = mDriverManager.getFingerprintManager();
mFingerprintManager.admFingerprintManager.init();dFignerprintListener(this);
mFingerprintManager.init();
```

获取指纹图像

```
mFingerprintManager.capture();
```

```java
@Override
public void onGetImageComplete(int result, byte[] imgBuff) {
    if (result == 0) {
        try {
            save2File("/sdcard/raw.data", imgBuff);
            SimpleDateFormat sdf = new SimpleDateFormat("yyyyMMddHHmmss");
            String name = sdf.format(new Date()) + ".bmp";
            // convert raw format image to bmp
            final Bitmap bitmap = mFingerprintManager.generateBmp(imgBuff, files
+ name);
            mHandler.post(new Runnable() {
                @Override
                public void run() {
                    mIvResult.setVisibility(View.VISIBLE);
                    mIvResult.setImageBitmap(bitmap);
                }
            });
        } catch (Exception e) {
            e.printStackTrace();
        }
    } else {
        showLog(result);
    }
}

mFingerprintManager.captureAndGetFeature();

@Override
public void onGetImageFeature(int result, byte[] feature) {
    showLog("onGetImageFeature: ret = " + result + (result == SdkResult.SDK_OK ?
"\tfeature = " + StringUtils.convertBytesToHex(feature) : null));
}

mFingerprintManager.captureAndGetISOFeature();

@Override
public void onGetImageISOFeature(int result, byte[] feature) {
    showLog("onGetImageISOFeature: ret =  " + result + (result ==
SdkResult.SDK_OK ? "\tISO feature = " + StringUtils.convertBytesToHex(feature) :
null));
}
```

注册指纹

- 注册指纹是将指纹存储在指纹芯片中，指纹库容量大小为 64 个模板，即可以注册 64 个用户
- 指纹ID对应的值是 0~63
- 指纹模组默认注册需要采集 3 次指纹图像，因此将会触发回调 3 次
- 注册过程中任意环节出现错误都意味着注册失败，也就是说三次回调都需要返回成功，否则用户需重新执行所有注册操作再次尝试注册指纹

```
mFingerprintManager.enrollment(0);

@Override
    public void onEnrollmentProgress(int fingerId, int remaining, int reason) {
        if (reason == 0 && remaining == 0) {
            showLog("Fingerprint ID:" + fingerId + "  Enrollment success!");
        } else {
            showLog("Fingerprint ID:" + fingerId);
            showLog("remaining times:" + remaining);
            showLog("reason:" + reason);
        }
    }
```

比对指纹

- 指定指纹ID校验
- 全指纹库查询
- 下载指纹特性比对
- 下载指纹ISO特性比对
- 下载指纹特性并查询
- 下载指纹ISO特性并查询

```
// verify the specified fingerprint id
mFingerprintManager.authenticate(0, timeout);
// search in full fingerprint storage
mFingerprintManager.authenticate(timeout);
// download fingerprint feature to verify with the finger on the sensor
byte[] feature;
byte[] isoFeature;
mFingerprintManager.verifyWithFeature(feature)
// download fingerprint iso feature to verify with the finger on the sensor
mFingerprintManager.verifyWithISOFeature(isoFeature);
// download fingerprint feature to search finger id in fingerprint module
storage
mFingerprintManager.identifyWithFeature(feature);
// download fingerprint iso feature to search finger id in fingerprint module
storage
mFingerprintManager.identifyWithISOFeature(isoFeature);

@Override
public void onAuthenticationSucceeded(int fingerId, Object obj) {
    showLog("Fingerprint auth successfully:  fingerId = " + fingerId + "  score
= " + obj);
}
```

蜂鸣、LED灯

```

int ret = mLed.setLed(LedLightModeEnum.RED, true);
int ret = mBeeper.beep(4000, 600);
```

扫码

- 扫码使用的是google 开源扫码库 ZXing, 并做了部分优化。具体使用可参考demo中com.szzcs.smartpos.scan下java文件使用
- 本司另外提供扫码性能更强的扫码库，具体请联系商务获取

```
private void activateBarcode(String id, final Dialog loading, String sn) {
    SDKUtils.getInstance(MainActivity.this, id)
            .setDeviceId(sn)
            .activeBarcode(new OnActivateListener() {
                @Override
                public void onActivateResult(int code, String error) {
                    Log.e(TAG, "code = " + code + "   error = " + error);
                }

                @Override
                public void onActivateProcess(String msg) {
                    Log.e(TAG, msg);
                }

                @Override
                public void onActivateState(final boolean isActivated) {
                    runOnUiThread(new Runnable() {
                        @Override
                        public void run() {
                            loading.dismiss();
                            if (isActivated) {
                                startActivity(new Intent(MainActivity.this,
ScanActivity.class));
                            } else {
                                Toast.makeText(MainActivity.this, "Activated
failed", Toast.LENGTH_SHORT).show();
                            }
                        }
                    });
                }
            });
}
```

系统相关

静默安装卸载

```
// Care about installation results
//SdkResult.SDK_INSTALL_SUCCESS
//SdkResult.SDK_INSTALL_ERROR
//SdkResult.SDK_INSTALL_NONE
//SdkResult.SDK_INSTALLING
//SdkResult.SDK_NO_SIGNATURE
//SdkResult.SDK_SIGNATURE_ERROR
int ret = mSys.installApp(context, "/sdcard/xxx.apk");
int ret = mSys.uninstallApp(context, "com.xxx.xxxx");

// No installation result
mSys.installApp2(context, "/sdcard/xxx.apk");
```

其他

混淆

```
-keep class com.zcs.base.SmartPosJni{*;}
-keep class com.zcs.sdk.DriverManager{*;}
-keep class com.zcs.sdk.emv.**{*;}
```

错误码

常见错误