

# CTFPND Supplementary APIs

[Serial port access](#)

[Package installation](#)

[To install a package](#)

[To get the installation status through BroadcastReceiver](#)

[To delete a package](#)

[Power management](#)

[Cradle detection](#)

[Notification blocker](#)

[Additional IOs](#)

[Ignition signal](#)

[Programmatic firmware upgrade and configuration](#)

[Accepted image name patterns](#)

[Through image copy](#)

[From the command line](#)

[From application code](#)

## Serial port access

Depending on the device, one or two serial ports are available for the application. In addition, some cradles provide extra serial ports that are also accessible from application level.

The interface follows the standard Linux tty model (access through `/dev/xxx_tty` and configuration through `stty()`.)

- `/dev/user_external_tty`  
RS232 type uart  
availability : all devices with a pogo pin connector.
- `/dev/user_tty`  
No longer used in recent devices

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voltage is TTL 3.3V

availability : older devices with 10-pin USB-B connector

- /dev/cradle\_rs485  
RS485 type uart  
availability : with cradle that provide rs485 interface
- /dev/cradle\_rs232  
RS232 type uart  
availability : with cradle that provide an extra rs232 interface

## Package installation

The devices include a PackageInstallerProxy service that allows package installation and removal without extra permission.

An example application with source code is in file "TestInstallerProxy"

The interface uses Android Intents.

## To install a package

Optionally, all runtime permissions can be granted by default, i.e. the end user will not be prompted for the permissions.

```
KP=GD> NO<OD> ADI<G 4OMDIB (3"/5□1&3.*44*0/□, &: ' >BM<IO□K@MHDNNDJI>/  
  
6MD ?<O< ' 6MDϕAMJH'DG@, ,<KF□ADG@□OJ□DINO<GG" //  
*IO@IO DIO@IO ' I@R *IO@IO,"$5*0/□*/45"--; ?<O< // DIO@IOϕN@O$JHKJI@IO,1309: //  
ÆÆ 5CDN JKODJI DN I@@?@? OJ BM<IO OC@ K@MHDNNDJIN  
DIO@IOϕKPO&SOM< , (3"/5□1&3.*44*0/□, &: ; OMP@ //  
NO<MO4@MQD>@, DIO@IO //
```

## To get the installation status through BroadcastReceiver

```
KMDQ<O@ ADI<G DIO $"--#"$, □*% ' 1MJ>@NNϕHT5D?, // ÆÆ <IT <M=DOM<MT IPH=@M RDGG ?J  
  
6MD ?<O< ' 6MDϕAMJH'DG@, ,<KF□ADG@□OJ□DINO<GG" //
```

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```

*IO@IO DIO@IO ' I@R *IO@IO,"$5*0/¤*/45"--; ?<O<„/ DIO@IO¢N@O$JHKJI@IO,1309:„/
ÆÆ I@@? OJ <?? @SOM< $"--#"$,¤*% DI JM?@M OJ M@>DQ@ OC@ IJODAD><ODJIN
DIO@IO¢KPO&SOM<,$"--#"$,¤*%¤,&:; $"--#"$,¤*%„/ NO<MO4@MQD>@,DIO@IO„/

KMDQ<O@ ADI<G #MJ<?><NO3@>@DQ@M $"--#"$,¤3&$&*7&3 ' I@R #MJ<?><NO3@>@DQ@M,„ ...
Ö0Q@MMD?@
KP=GD> QJD? JI3@>@DQ@,$JIO@SO >JIO@SO; *IO@IO DIO@IO„ ...
ADI<G 4OMDIB "$5*0/ ' DIO@IO¢B@O">ODJI,„/
-JB¢?,5"(; >JI3@>@DQ@ £ > ^ "$5*0/„/
ADI<G DIO *% ' DIO@IO¢B@O*IO&SOM<,$"--#"$,¤*%¤,&:;'W„/

DA,*% ' '$"--#"$,¤*%„ ...
4OMDIB KFB¤I<H@ ' DIO@IO¢B@O4OMDIB&SOM<,1"$,"(&¤/".&¤,&:„/
DIO NO<OPN ' DIO@IO¢B@O*IO&SOM<,* /45"--¤45"564¤,&:;
45"564¤'"*-63&„/
4OMDIB HNB ' DIO@IO¢B@O4OMDIB&SOM<,* /45"--¤.4(¤,&:„/
-JB¢?,5"(; "$5*0/ ^ > AJM > ^ KFB¤I<H@ ^ > ; NO<OPN £ > ^ NO<OPN ^
> ; HNB £ > ^ HNB„/
%
%
%/

```

```

*IO@IO'DGO@M ADGO@M ' I@R *IO@IO'DGO@M,„/
ADGO@M¢<??">ODJI,"$5*0/¤*/45"--¤$#,„/
ADGO@M¢<??">ODJI,"$5*0/¤3&.07&¤$#,„/ M@BDNO@M3@>@DQ@M,$"--#"$,¤3&$&*7&3; ADGO@M„/

```

```

PIM@BDNO@M3@>@DQ@M,$"--#"$,¤3&$&*7&3„/

```

## To delete a package

```

KMDQ<O@ NO<OD> ADI<G 4OMDIB "$5*0/¤3&.07& '
>CF¢OJKD>JI¢PODGDOT¢K<>F<B@DINO<GG@MKMJST¢3&.07&>/

```

```

*IO@IO DIO@IO ' I@R *IO@IO,"$5*0/¤3&.07&„/
DIO@IO¢N@O$JHKJI@IO,1309:„/
ÆÆ ,KFB¤I<H@ DN AJM DINO<I>@ >JH¢@S<HKG@¢HT¤K<>F<B@
DIO@IO¢KPO&SOM<,1"$,"(&¤/".&¤,&:; ,KFB¤I<H@„„/
NO<MO4@MQD>@,DIO@IO„/

```

# Power management

Example in "PowerProxyTest" file.

We provide an interface to power off the device, reboot it and enter sleep mode without extra permission, through Android Intents.

The helper application PowerProxy.apk needs to be installed on the device as a *system package* (i.e. installed through perso.)

```
KMDQ<O@ NO<OD> ADI<G 4OMDIB "$5*0/108&300' ' ' >>JHçPODGDOTçKJR@MKMJSTç108&300' ' >/
KMDQ<O@ NO<OD> ADI<G 4OMDIB "$5*0/13&#005 ' ' >>JHçPODGDOTçKJR@MKMJSTç3&#005>/ KMDQ<O@
NO<OD> ADI<G 4OMDIB "$5*0/14-&&1 ' ' >>JHçPODGDOTçKJR@MKMJSTç4-&&1>/
```

```
Æ- NDI>@ "1* G@Q@G WX; ?@ADI@? <N *IO@IOç' -" (1*/$-6%&145011&%1"$, "(4 -Æ
Æ- R@ I@@? OJ M@?@ADI@? DO C@M@ AJM "1* G@Q@G ^ -Æ
KP=GD> NO<OD> ADI<G DIO ' -" (1*/$-6%&145011&%1"$, "(4 ' VSVVVVVVVV/
```

```
Æ- NDI>@ "1* G@Q@G X_i; ' -" (13&$&*7&31*/$-6%&1"$, (306/% DN I@@?@? -Æ
Æ- R@ I@@? OJ M@?@ADI@? DO C@M@ AJM "1* G@Q@G ^ -Æ
KP=GD> NO<OD> ADI<G DIO ' -" (13&$&*7&31*/$-6%&1"$, (306/% ' VSVVVVVVVV/
```

```
KP=GD> QJD? NG@@K, " ...
*IO@IO DIO@IO ' I@R *IO@IO, "$5*0/14-&&1"/
DIO@IOç<??' G<BN, ' -" (1*/$-6%&145011&%1"$, "(4"/
DIO@IOç<??' G<BN, ' -" (13&$&*7&31*/$-6%&1"$, (306/%"/
H$JIO@SOçN@I?#MJ<?><NO, DIO@IO"/
%
```

```
KP=GD> QJD? KJR@MçJAA, " ...
*IO@IO DIO@IO ' I@R *IO@IO, "$5*0/108&300' ' "/
DIO@IOç<??' G<BN, ' -" (1*/$-6%&145011&%1"$, "(4"/
DIO@IOç<??' G<BN, ' -" (13&$&*7&31*/$-6%&1"$, (306/%"/
H$JIO@SOçN@I?#MJ<?><NO, DIO@IO"/
%
```

```
KP=GD> QJD? M@=JJO, " ...
*IO@IO DIO@IO ' I@R *IO@IO, "$5*0/13&#005"/
DIO@IOç<??' G<BN, ' -" (1*/$-6%&145011&%1"$, "(4"/
DIO@IOç<??' G<BN, ' -" (13&$&*7&31*/$-6%&1"$, (306/%"/
H$JIO@SOçN@I?#MJ<?><NO, DIO@IO"/
%
```

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# Cradle detection

Only available on CTFPND-11B, CTFPND-12B.

Example in "TestDock" file.

The interface is similar to Intent.ACTION\_DOCK\_EVENT of the Android API, but we are using a different action name (ACTION\_DOCK\_EVENT itself could not be used, as it triggers a lot of default reactions from the system and the applications.)

```
KMDQ<O@ NO<OD> ADI<G 4OMDIB "$5*0/□501*$0/□%0$, □&7&/5 `
>CFçOJKD>JIçDIO@IOç<>ODJIç"$5*0/□%0$, □&7&/5>/

*IO@IO'DGO@M DIO@IO'DGO@M ` I@R *IO@IO'DGO@M, //
DIO@IO'DGO@Mç<??>">ODJI, "$5*0/□501*$0/□%0$, □&7&/5, // M@BDNO@M3@>@DQ@M, %0$, □3&$&*7&3 ;
DIO@IO'DGO@M, //

KMDQ<O@ NO<OD> ADI<G 4OMDIB "$5*0/□501*$0/□%0$, □&7&/5 `
>CFçOJKD>JIçDIO@IOç<>ODJIç"$5*0/□%0$, □&7&/5>/

KMDQ<O@ ADI<G #MJ<?><NO3@>@DQ@M %0$, □3&$&*7&3 ` I@R #MJ<?><NO3@>@DQ@M, // ...

Ö0Q@MMD?@
KP=GD> QJD? JI3@>@DQ@, $JIO@SO >JIO@SO; *IO@IO DIO@IO, // ...
-JBç?, 5" ( ; >JI3@>@DQ@> //
DA, DIO@IO { ` IPGG, // ...
-JBç?, 5" ( ; ><>ODJI £ > ` DIO@IOçB@O">ODJI, // ` > ; DN KGPBB@? £ > `
DIO@IOçB@O*IO&SOM<, *IO@IOç&953"□%0$, □45"5&;
*IO@IOç&953"□%0$, □45"5&□6/%0$, &%, //

%

%

%/
```

# Notification blocker

We provide an API to block application notifications programmatically.

Note: by default the notification blocker server is *not installed*. Install NotificationBlocker\_android\_9.apk, then it must be added through perso (as system permissions are needed.)

```
KMDQ<O@ NO<OD> ADI<G 4OMDIB #-0$, "5*0/ '
>CFçOJKD>JIçPODGDOTçIJODAD><ODJI=GJ>F@Mç#-0$, "05*' *5*0/>/
```

```
KMDQ<O@ NO<OD> ADI<G 4OMDIB &953 "1111"$, " (& ' >K<>F<B@>/
KMDQ<O@ NO<OD> ADI<G 4OMDIB &953 "1111#"//&% ' >=<II@?>/
```

```
*IO@IO DIO@IO ' I@R *IO@IO, #-0$, "5*0//
DIO@IOçKPO&SOM<, &953 "1111"$, " (&ç , O<MB@OçKFBçI<H@ " //
DIO@IOçKPO&SOM<, &953 "1111#"//&%ç OMP@, //
H$JIO@SOçN@I?#MJ<?><NO, DIO@IO, //
```

## Additional IOs

### Ignition signal

Availability : 6" PND and all devices with pogo pin connector

The ignition pin status is broadcasted as a sticky intent (i.e. the current status is reported immediately when the application registers a listener.)

```
KMDQ<O@ NO<OD> ADI<G 4OMDIB "5*0/ç* (/ *5*0/ ' >CFçOJKD>JIçDIO@IOç<>ODJIç* (/ *5*0/>/
KMDQ<O@ NO<OD> ADI<G 4OMDIB &953 "45"5& ' >NO<O@>/
```

```
*IO@IO' DGO@M DIO@IO' DGO@M ' I@R *IO@IO' DGO@M, //
DIO@IO' DGO@Mç<??>">ODJI, "5*0/ç* (/ *5*0//
M@BDNO@M3@>@DQ@M, * (/ *5*0/ç3&$&*7&3ç DIO@IO' DGO@M, //
```

```
KMDQ<O@ ADI<G #MJ<?><NO3@>@DQ@M * (/ *5*0/ç3&$&*7&3 ' I@R #MJ<?><NO3@>@DQ@M, , ...
```

Ö0Q@MMD?@

```
KP=GD> QJD? JI3@>@DQ@, $JIO@SO >JIO@SOç *IO@IO DIO@IO, ...
```

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```

-JBç?,5" ( i >JI3@>@DQ@>_//
DA,DIO@IO { ' IPGG_ ...
-JBç?,5" ( i ><>ODJI £ > ' DIO@IOçB@O">ODJI,_" ' > i DN JI £ > '
DIO@IOçB@O#JJG@<I&SOM<, &953 "□45 "5&i A<GN@_//
%
%
%/

```

# Programmatic firmware upgrade and configuration

Most of these features have been supported on all devices, meanwhile the API described below is only official since Android 12. For earlier devices there are some variations in the action name and flags to use.

## Accepted image name patterns

- "update\_config\_xxx.zip" will be recognized as a configuration image
- for compatibility purpose, a directory (not a file) called "perso" will also be accepted as a configuration image (the content of this directory being the unzipped version of update\_config\_xxx.zip)
- "update\_xxx.zip" will be recognized as an upgrade image

In addition, in case of a configuration image, a file called "force\_clean" put in the same directory as the image will trigger a factory reset after the new configuration is applied.

## Through image copy

Copying a file called update\_xxx.zip at the root of the internal storage (i.e. /sdcard or /storage/emulated/0/) will automatically start the upgrade process, or configuration process if the file is called update\_config\_xxx.zip.

Note : the upgrade is triggered when the file was opened for writing, then closed, then the system checks the name and content. So it will not work if you first copy the file under another name, like vendor\_update\_xxx.zip, then rename it.

## From the command line

The following command can be used to trigger upgrade or configuration from a file already present in the device:

```
□ ' * - & ' ÆN? > < M? ÆPK? < O@ ðSSS ÷ UDK
61 (3 "%&ð*/5&/5 ' CF÷OJKD>JI÷PKBM<?@AR÷61%"5&
° OCDN PKBM<?@ DIO@IO DN <GNJ <>>@KO@? =PO JIGT RC@I PN@? AMJH OC@ >JHH<I? GDI@
°61 (3 "%&ð*/5&/5 ' >JH÷PODGDOT÷PK? <O@H<I<B@M÷61%"5&

r" <H =MJ<?><NO ' 'M@>@DQ@M'DI>GP?@' =<>FBMJPI? ' < r61 (3 "%&ð*/5&/5 >ADG@fÆÆ>r... ' * - &%
□
```

## From application code

```
□ DHKJMO <I?MJD?÷>JIO@IO÷*IO@IO/
DHKJMO <I?MJD?÷I@O÷6MD/
DHKJMO E<Q<÷DJ÷' DG@/

KMDQ<O@ NO<OD> ADI<G 4OMDIB 61 (3 "%&ð* . ( ' > ÆN? > < M? ÆPK? < O@ ðO@NO÷UDK>/
ÆÆ AMJH <KKGD><ODJI >J?@; JIGT OCDN DIO@IO <>ODJI RDGG =@ <>>@KO@?
KMDQ<O@ NO<OD> ADI<G 4OMDIB 61 (3 "%&ð"$5*0/ ' > CF÷OJKD>JI÷PKBM<?@AR÷61%"5&>/

'DG@ DHB ' I@R ' DG@, 61 (3 "%&ð* . ( „/
*IO@IO D ' I@R *IO@IO, 61 (3 "%&ð"$5*0/ „/
D÷N@O%<O<, 6MD÷AMJH' DG@, DHB „ „/
N@I?#MJ<?><NO, D „/
□
```

## Apply a configuration on Android 9 and older devices

The configuration needs to be applied at the same time as a firmware update.

- Create a directory /sdcard/updater on the device
- put the perso content inside it (so for instance there will be /sdcard/updater/perso/my\_app.apk)
- Then launch a firmware upgrade using an update\_xxx.zip image as described above.



Note that if you want to keep the same firmware you can upgrade using the same firmware as the one already on the device.

## Access external storage on Android 11+ devices

External storage (so-called "internal SD card") typically stores the user's documents and image, and is used as a shared directory for the applications.

It is called /sdcard for historical reasons (in early android devices it was actually an SD card typically plugged below the battery.)

To access the directory /sdcard on Android 11+, the permission `MANAGE_EXTERNAL_STORAGE` must be declared in the application's `AndroidManifest.xml`. For Android 11 and 12, `WRITE_MEDIA_STORAGE` must also be requested for write access.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    android:versionCode="1"
    android:versionName="1.0">
    <uses-permission android:name="android.permission.MANAGE_EXTERNAL_STORAGE"/>
    <uses-permission android:name="android.permission.WRITE_MEDIA_STORAGE"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportRtl="true"
        android:theme="@style/Theme.AppCompat">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

These permissions will be granted to perso apps.

After the permissions are granted, normal file access can be used :

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    android:versionCode="1"
    android:versionName="1.0">
    <uses-permission android:name="android.permission.MANAGE_EXTERNAL_STORAGE"/>
    <uses-permission android:name="android.permission.WRITE_MEDIA_STORAGE"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportRtl="true"
        android:theme="@style/Theme.AppCompat">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```



## Accessing the SD card on Android 11+ devices

Accessing the SD card can be done through the StorageManger API. The permission `MANAGE_EXTERNAL_STORAGE` must be declared in the application's `AndroidManifest.xml`, and `WRITE_MEDIA_STORAGE` must also be requested for write access.

□ ,PN@N'K@MHDNNDJI <I?MJD?EI<H@'><I?MJD?CK@MHDNNDJIϕ83\*5&□.&%\*"□4503"(&>Æ"  
,PN@N'K@MHDNNDJI <I?MJD?EI<H@'><I?MJD?CK@MHDNNDJIϕ."/"(&□95&3/"-□4503"(&>Æ"  
□

Both of these permissions are granted automatically to applications installed through perso.

□DHKJMO <I?MJD?ϕJNϕNOJM<B@ϕ4OJM<B@7JGPH@/  
DHKJMO <I?MJD?ϕJNϕNOJM<B@ϕ4OJM<B@.<I<B@M/  
DHKJMO <I?MJD?ϕJNϕNOJM<B@ϕ4OJM<B@.<I<B@Mϕ4OJM<B@7JGPH@<GG=<>F/

ϕϕϕ

KMDQ<O@ NO<OD> 4OJM<B@.<I<B@M H4OJM<B@.<I<B@M/  
KMDQ<O@ ADI<G 4OJM<B@7JGPH@<GG=<>F 4503&□\$#, '  
I@R 4OJM<B@7JGPH@<GG=<>F,, ...  
KP=GD> QJD? JI4O<O@<C<IB@? ,4OJM<B@7JGPH@ QJGPH@,,  
...  
-JBϕ?,5" (i >JI4O<O@<C<IB@? AJM > ' QJGPH@,,/  
GDNO□N?□>JIO@IO,,/  
%  
%/

Ö0Q@MMD?@  
KMJO@>O@? QJD? JI\$M@<O@,#PI?G@ N<Q@?\*INO<I>@4O<O@,, ...  
NPK@MϕJI\$M@<O@,N<Q@?\*INO<I>@4O<O@,,/  
ϕϕϕ

H4OJM<B@.<I<B@M ' ,4OJM<B@.<I<B@M,, B@O4TNO@H4@MQD>@,4503" (&□4&37\*\$&,,/  
%

Ö0Q@MMD?@  
KMJO@>O@? QJD? JI3@NPH@,, ...  
NPK@MϕJI3@NPH@,,/  
-JBϕ?,5" (i >JI3@NPH@>,,/

H4OJM<B@.<I<B@MçM@BDNO@M4OJM<B@7JGPH@\$<GG=<>F  
, B@O.<DI&S@>POJM, „ i 4503&¤\$#, „/

ÆEO@NO¤N?¤RMDO@, „/

GDNO¤N?¤>JIO@IO, „/

‰

Ö0Q@MMD?@

KMJO@>O@? QJD? JI1<PN@, „ ...

-JBç?, 5" ( i >JI1<PN@>, „/

H4OJM<B@.<I<B@MçPIM@BDNO@M4OJM<B@7JGPH@\$<GG=<>F, 4503&¤\$#, „/

NPK@MçJI1<PN@, „/

‰

ÆÆ ><I =@ ><GG@? HPGODKG@ ODH@N

KMDQ<O@ QJD? GDNO¤N?¤>JIO@IO, „ ...

'DG@ N?¤MJJO¤?DM ' B@O¤N?¤><M?, „/

DA, N?¤MJJO¤?DM ' ' IPGG, „ ...

-JBç?, 5" ( i >4% ><M? M@HJQ@?>, „/

M@OPMI/

‰ @GN@ DA, N?¤MJJO¤?DM { ' IPGG, „ ...

-JBç?, 5" ( i >4% ><M? DIN@MO@? £ > ´ N?¤MJJO¤?DM, „/

AJM, 'DG@ AÆ N?¤MJJO¤?DMçGDNO'DG@N, „ „ ...

-JBç?, 5" ( i AçOJ4OMDIB, „ „/

‰

‰

‰

KMDQ<O@ QJD? O@NO¤N?¤RMDO@, „ ...

'DG@ N?¤MJJO¤?DM ' B@O¤N?¤><M?, „/

DA, N?¤MJJO¤?DM ' ' IPGG, „ ...

-JBç?, 5" ( i >4% ><M? IJO AJPI?>, „/

M@OPMI/

‰

'DG@ O@NO¤RMDO@ ' I@R 'DG@, N?¤MJJO¤?DM i >O@NO¤ADG@>, „/

OMT ...

O@NO¤RMDO@ç>M@<O@/@R'DG@, „/

‰ ><O>C, &S>@KODJI @, „ ...

-JBç?, 5" ( i >@MMJM RCDG@ >M@<ODIB OC@ O@NO ADG@ £ > ´ @, „/

‰

‰

KMDQ<O@ 'DG@ B@O?N?><M?, „ ...

'DG@ M@O ' IPGG/

AJM, 4OJM<B@7JGPH@ QJG £ H4OJM<B@.<I<B@MçB@O4OJM<B@7JGPH@N, „ „ ...

-JBç?, 5" (i >?@O@>O@? QJGPH@ £ > ´ QJG„/

DA, QJG { ' IPGG óó QJGçDN3@HJQ<=G@, „ óó {QJGçDN1MDH<MT, „ „ ...

DA, QJGçB@O%@N>MDKODJI, OCDN„ çOJ-JR@M\$<N@, „ ç>JIO<DIN, >PN=> „ „ ...

-JBç?, 5" (i >QJGPH@ > ´ QJG ´ > DN < 64# QJGPH@i ?JI<O > ´

>M@KJMO DO <N 4% ><M?>„/

>JIODIP@/

‰

M@O ' QJGçB@O%DM@>OJMT, „/

=M@<F/

‰

‰

M@OPMI M@O/

‰

