

Introduction of MTK Tools

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Agenda

- ❖ Introduction of Catcher tool
 - *Basic operation of catcher*
 - *Catcher debug usage*
 - *AT Command tool bar*
- ❖ Introduction of Meta tool
 - *Brief introduction of Meta*
 - *Meta Lab introduction*
 - *Meta factory introduction*
- ❖ Introduction of MTK download tools
 - *Brief introduction of brom, brom.dll and DA*
 - *Usage of Flash tool*
 - *Brief introduction of multiple bin mechanism*
 - *Usage of Multi-port download tool*
- ❖ Introduction of ATE tool
 - *Brief introduction of MTK production test solution*
 - *How to setup production line test station for RF Calibration and Final test*
 - *Usage of ATE*
- ❖ Introduction of SN Station tool
 - *Brief introduction of SN Station tool*
 - *Usage of SN Station tool*
- ❖ Q&A



Introduction of Catcher

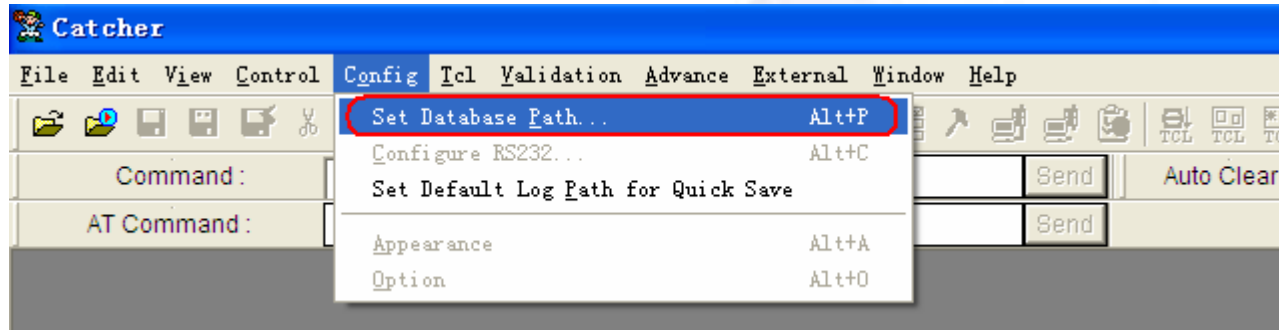
What is catcher?

- ❖ *Catcher is a PC-side tool for MTK GSM/GPRS Products.*
- ❖ *The main purpose of Catcher is for **logging primitives and debug information**. Engineers can use Catcher to analyze the behavior of mobile phones.*

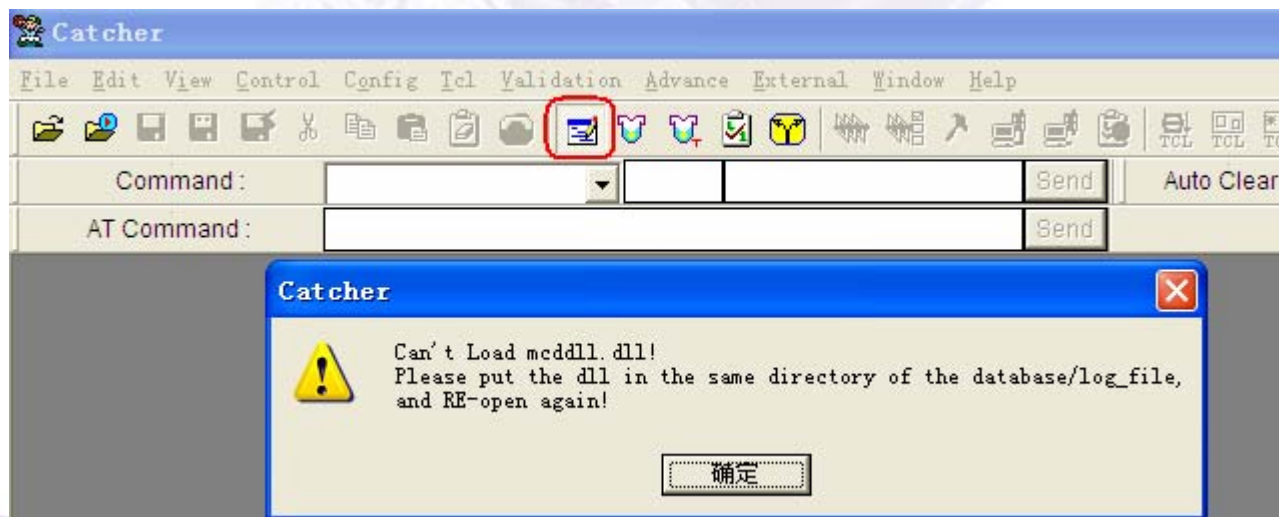
N.B:** Before using catcher, please remember to **set TST UART Port to UART 1.

Basic operation of catcher (1)

➤ Step1:Set database

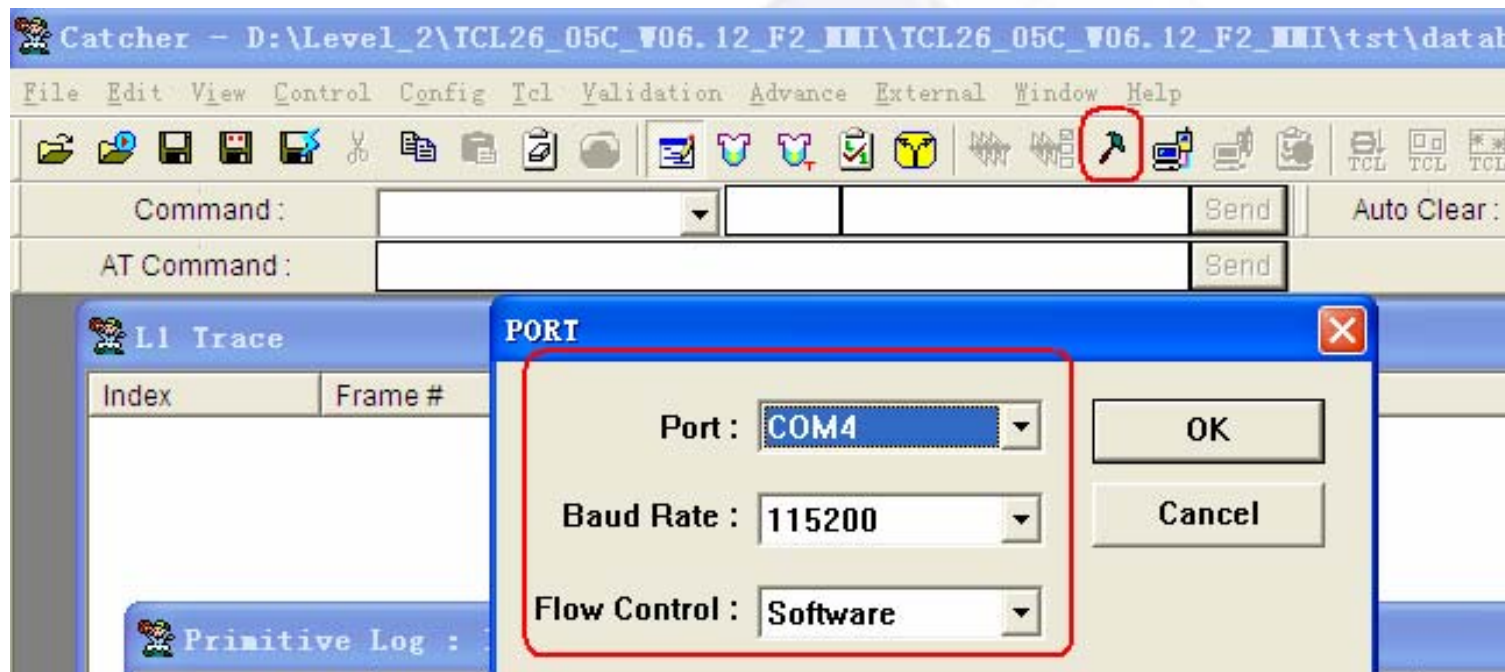


➤ Step2:Set logging mode



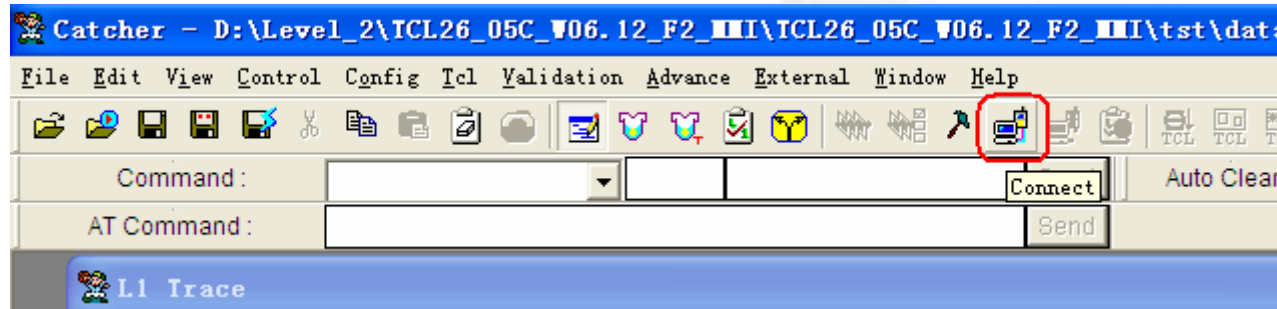
Basic operation of catcher(2)

❖ Step3: Configure RS232

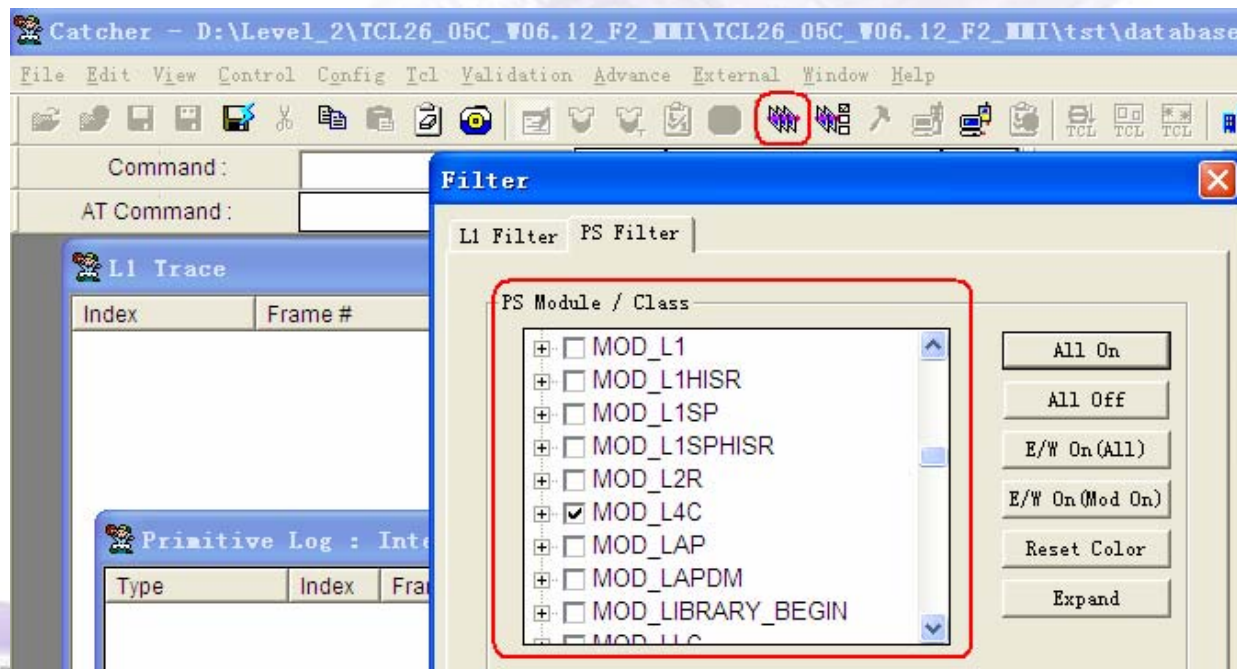


Basic operation of catcher(3)

❖ Step4: Start connect

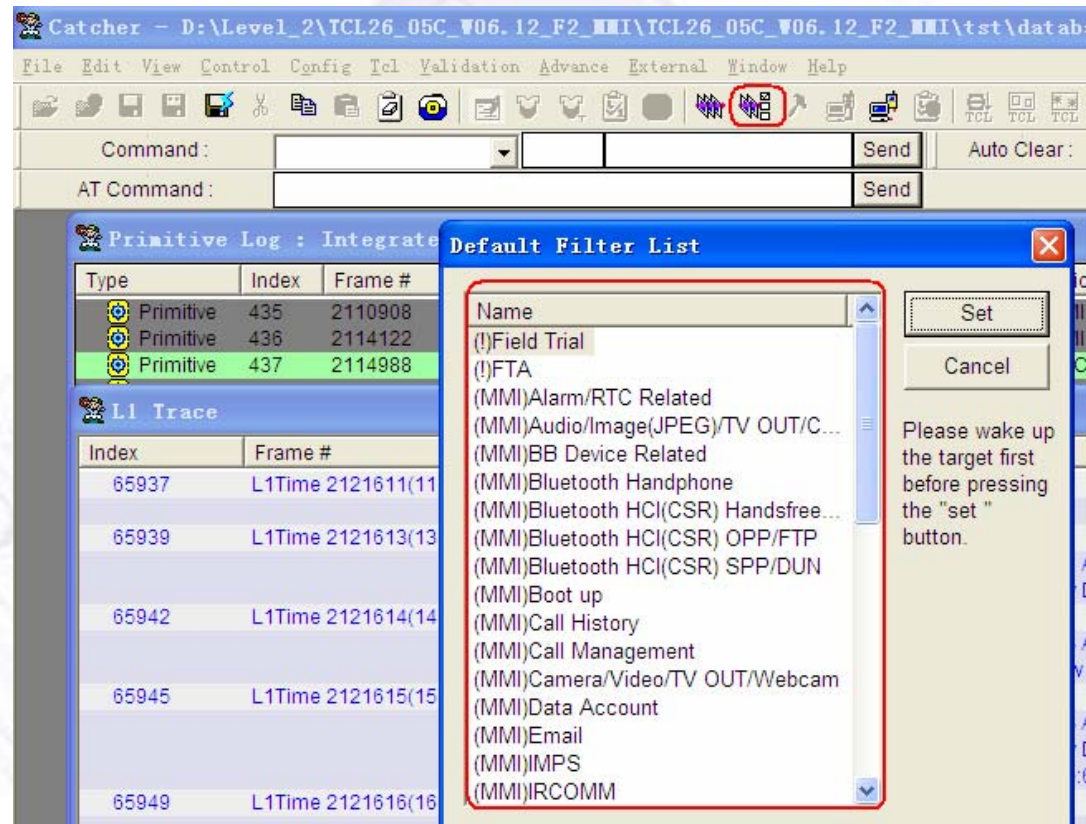


❖ Step5: Select the correct filter



Catcher default filter

- ❖ *User can select what type of log they want to catch and select the type from the List.*



Catcher debug usage (1)

- ❖ *Catcher will cache the log according to which filters has been set.*

The screenshot shows the Catcher software interface. The title bar reads "Catcher - D:\Level_2\TCL26_05C_W06.12_F2_III\TCL26_05C_W06.12_F2_III\tst\database". The menu bar includes File, Edit, View, Control, Config, Tcl, Validation, Advance, External, Window, and Help. Below the menu is a toolbar with various icons. There are input fields for "Command:" and "AT Command:" with "Send" buttons and an "Auto Clear:" checkbox. The main area displays a "Primitive Log : Integrated" table with the following data:

Type	Index	Frame #	Time	Local Time	Source	Destination
Primitive	24	1548372	112922	22:36:52:228 ...	MOD_MMI	MOD_L4C
Primitive	25	1549908	114458	22:36:59:308 ...	MOD_RAC	MOD_L4C
Primitive	26	1549908	114458	22:36:59:348 ...	MOD_L4C	MOD_MMI

A red box highlights the Source and Destination columns for the last three rows. Below the log table is an "L1 Trace" section with a table showing:

Index	Frame #	Time	Message
2483	L1Time 1563188(68) : 4328	127699 (22:3...	SetSync offset 39 : 9888

Catcher debug usage (2)

❖ User can cache the assert procedure by catcher.

▪ Assert 现象:

– 手机屏幕上打印出Assert的信息(文件名和行数)

Type	Index	Frame #	Time	Local Ti...	Source	De...	SAP	Message
Trace	66	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	Exception type: assert
Trace	67	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	a1 = 0x0001121C
Trace	68	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	a2 = 0x40015164
Trace	69	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	a3 = 0x40015168
Trace	70	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	a4 = 0x00000000
Trace	71	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	filename = EngineerMode
Trace	72	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	line = 8381
Trace	73	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	extension = 0x00000000
Trace	74	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	ext1 = 0x00000000
Trace	75	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	ext2 = 0x00000000
Trace	76	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	ext3 = 0x00000000
Trace	77	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	ip = 0x40015A24
Trace	78	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	sp = 0x0003B15C
Trace	79	589739	306...	17:09:2...	MOD_NIL		TRACE_ERROR	lr = 0x082B5E65

Index	Frame #	Time	Local Time	Message
0	589739	306182	17:09:27 200...	[1] Assert fail: 0 EngineerModeSrc.c 8381 - MMI

Catcher debug usage (3)

66	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	Exception type: assert
67	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	a1 = 0x0001121C
68	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	a2 = 0x40015164
69	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	a3 = 0x40015168
70	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	a4 = 0x00000000
71	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	filename = EngineerMode
72	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	line = 8381
73	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	extension = 0x00000000
74	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	ext1 = 0x00000000
75	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	ext2 = 0x00000000
76	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	ext3 = 0x00000000
77	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	ip = 0x40015A24
78	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	sp = 0x0003B15C
79	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	lr = 0x082B5E65
80	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	cpsr = 0x80000033
81	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	current thread id = 0x0003B298
82	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	current thread name = MMIMMI
83	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	current thread status = 0x00000000
84	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	rtc_sec = 47 rtc_min = 41 rtc_hour = 7
85	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	rtc_day = 8 rtc_mon = 1 rtc_wday = 1 rtc_year = 4
86	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	frame number = 589739 frame ebits = 0
87	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	stack dump:
88	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x00000000 0x000000DE 0x00000000 0x08947D24
89	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x08947D28 0x000020BD 0x00000000 0x00000001
90	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x08179669 0x0000000A 0x00000000 0x0801FB65
91	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x00000000 0x00000000 0x00000000 0x0817968D
92	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x00000000 0x080315D9 0x00000001 0x0003B1D0
93	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x0033B0AC 0x08941858 0x00000000 0x0806ABCD
94	589739	306...	17:09:2...	MOD_NIL	TRACE_ERROR	0x00000001 0x00000001 0x00000000 0x080734D0

R0 - R3

Assert設置的文件

Assert所在文件的行號

Stack Pointer

Current Program Status Register

Return Address(R14)

Task Name

Catcher debug usage (4)

- 对于手机在开机阶段即进入Assert，无法进入Idle界面的情况，无法采用开机进入Engineer Mode 设置TST UART 的方式。
- 为此，我们需要将代码中的默认值改为TST UART1。方法如下图：

```
static kal_uint8 const NVRAM_EF_PORT_SETTING_DEFAULT[] = {  
    0x01, 0x00, /* TST uses uart_port2(value is 1) */  
    0x00, 0x00, /* APP uses uart_port1 */  
    0x00, 0xC2, 0x01, 0x00, /* tst default baud rate base = 115200
```

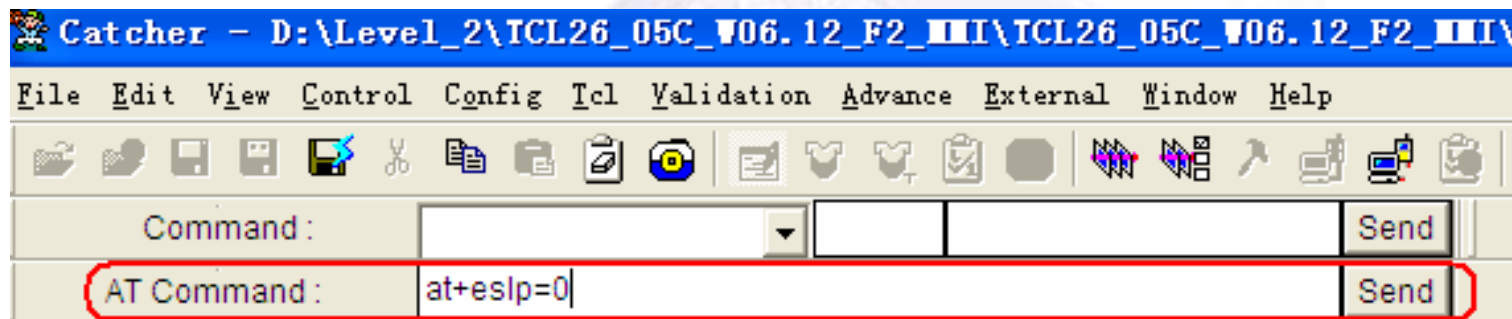
```
static kal_uint8 const NVRAM_EF_PORT_SETTING_DEFAULT[] = {  
    0x00, 0x00, /* TST uses uart_port2(value is 1) */  
    0x01, 0x00, /* APP uses uart_port1 */  
    0x00, 0xC2, 0x01, 0x00, /* tst default baud rate base = 115200
```

Catcher debug usage (5)

- ❖ *After connecting with the target, Catcher receives notification of any valid exception records in the NVRAM and shows them in the Sys Trace window.*
- ❖ *When the user press the read button, Catcher receives the corresponding primitive log messages and decodes the exception records into their data structures according to their exception type. Pressing the Reset button deletes all exception records in NVRAM.*

AT Command Toolbar

- ❖ *The AT Command toolbar allows the user to send AT commands to the protocol stack. The AT command may only be sent after the catcher is on-line and connected to a target mobile phone.*



Introduction of Meta

What is Meta?

- ❖ *Meta (Mobile Engineering Testing Architecture) application is composed of Meta LAB and Meta factory. Both Meta Lab and Meta factory are the windows application at PC side.*
- ❖ *Meta LAB offers versatile testing features in RF TX/RX/AFC control, NVRAM access testing and editing, audio related functions, BaseBand related functions, MMI data download, IMEI download, getting hardware and software version, barcode download, updating parameter, FAT editor and database change list. All Meta LAB testing procedure should be operated manually due to no specific equipment control.*
- ❖ *Meta factory provides the RF calibration and ADC calibration function required in factory mass production line and Ag8960, R&S CMU200 and Power Supply control will be supported.*

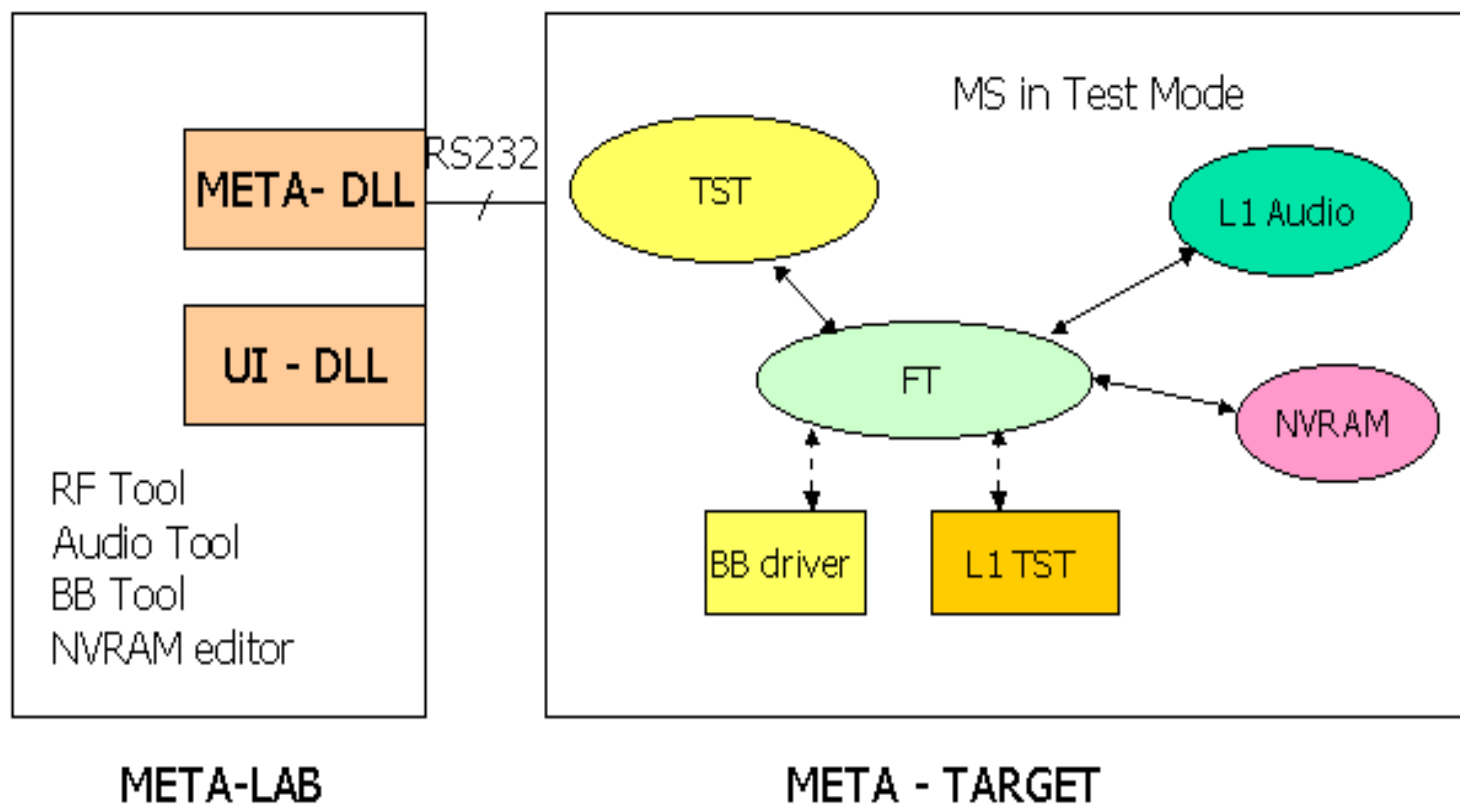
META Target Tasks

❖ **There are only the following five tasks wake up in Meta Mode:**

- *FT task*
- *TST task*
- *MEDIA task*
- *L1 audio task*
- *NVRAM task*

Meta Lab introduction (1)

❖ Software architecture



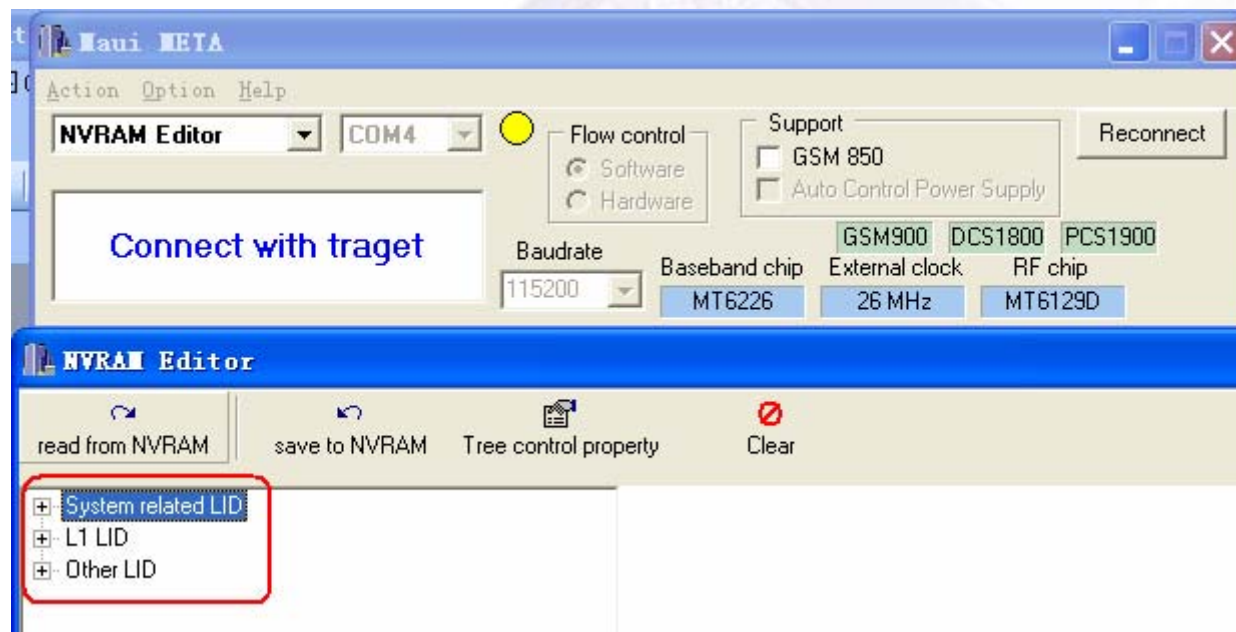
Meta Lab introduction (2)

❖ RF Tool

- *Totally, there are ten RF sections in the RF tool*
 1. PM: Used to measure the RX power transfer from the Radio Tester
 2. GainSweep: Used to measure the RX power in different gains
 3. Continuous RX: Used to do the target continuous RX quality
 4. Continuous TX: Used to control the target transmit power
 5. TX Level and profile: Used to measure the TX power of the target by using Radio Tester
 6. AFC Control: Used to do AFC control
 7. AFC DAC Sweep: Used to get the best AFC DAC value
 8. Crystal AFC control: Used to do Crystal AFC control
 9. Crystal AFC Sweep: Used to do the Crystal AFC calibration
 10. Multi Slot TX: Used to control target TX in multi Time slot

Meta Lab introduction (3)

- ❖ NVRAM Testing
- ❖ User can use this function to access and edit three kinds of NVRAM Data. There are System related Data , L1 Data and other data.



Meta Lab introduction (4)

❖ Audio function

- *There are many audio functions supported by Meta. They are acoustic FIR-coefficient, additional output FIR-coefficient, AMR FIR-coefficient, melody FIR-coefficient, audio testing ,ring composer, play song in FAT, play song using ID, customer volume setting, acoustic FIR tuning and Melody FIR tuning.*

Play song in FAT	Play song using ID	Customer volume setting	Audio test	Ring composer
Acoustic FIR Coeff	Additional Output FIR Coeff	Melody FIR Coeff	Speech Enhancement	
Media Playback Max Swing			Output Coeff. Index	
0			0	

Meta Lab introduction (5)

❖ BaseBand function

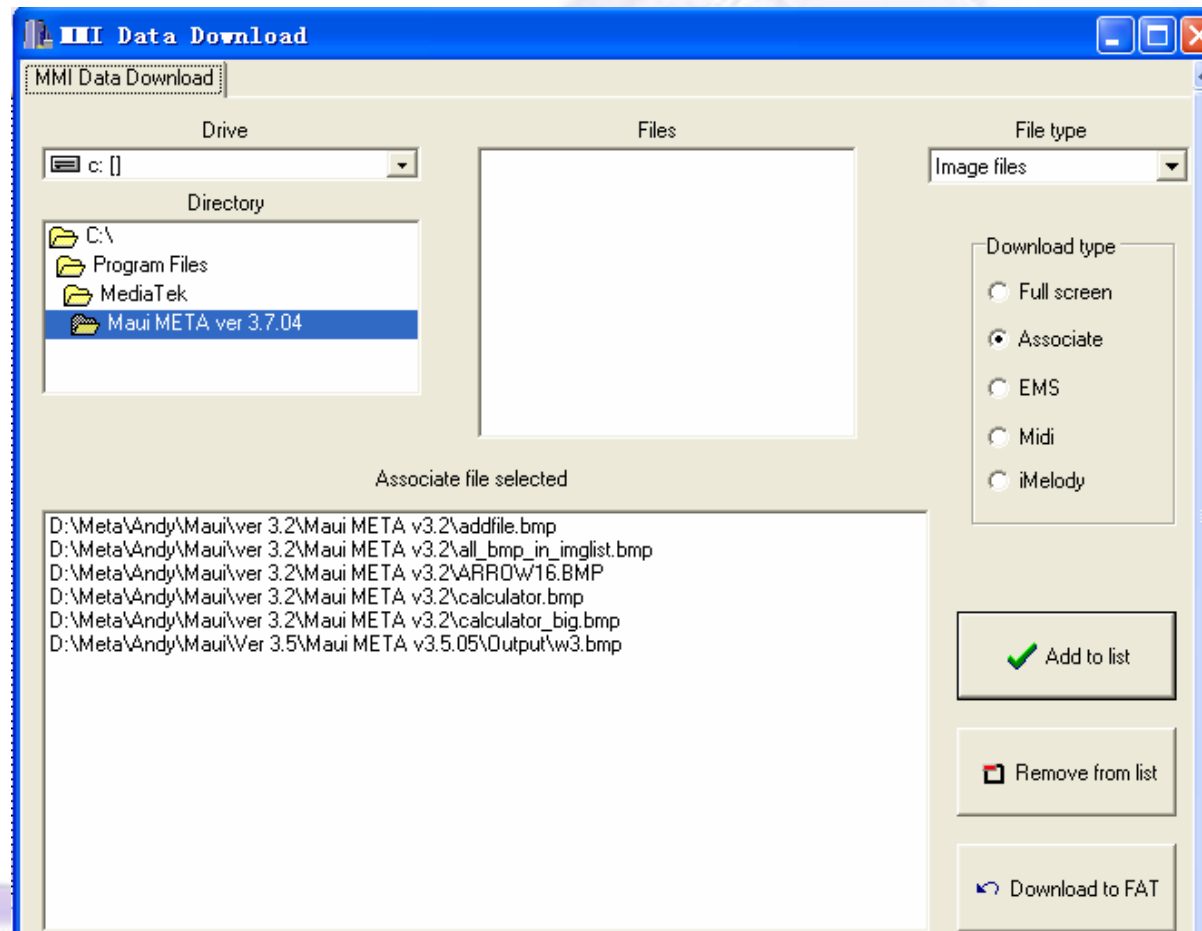
- *There are three following parts in this function.*
 - Auxiliary ADC: Used to do ADC calibration manually
 - Register Read/Write: Used to read or write the BB register value
 - Battery Level: Used to modify the battery level value

The screenshot displays the 'Baseband' software window with the 'Auxiliary ADC' tab selected. The interface includes a grid for configuring seven ADCs (ADC 0 to ADC 6) with fields for Slope and Offset. A 'Measure Count' field is set to 1000. Below this, the 'ADC 0' configuration is detailed, showing 'Analog Input (m Volt)' with two points (both at 0.000), 'Digital Output' (both at 0.0), and 'Start' buttons. It also features 'Battery channel' and 'Charger channel' dropdown menus. At the bottom, there are fields for 'Slope (uV/Dac)' and 'Offset (uV)' with an 'Apply' button. The footer contains buttons for 'Upload from flash', 'Download to flash', 'Change NVRAM DB', 'Load from file', and 'Save to file'.

Meta Lab introduction (6)

❖ MMI Data Download

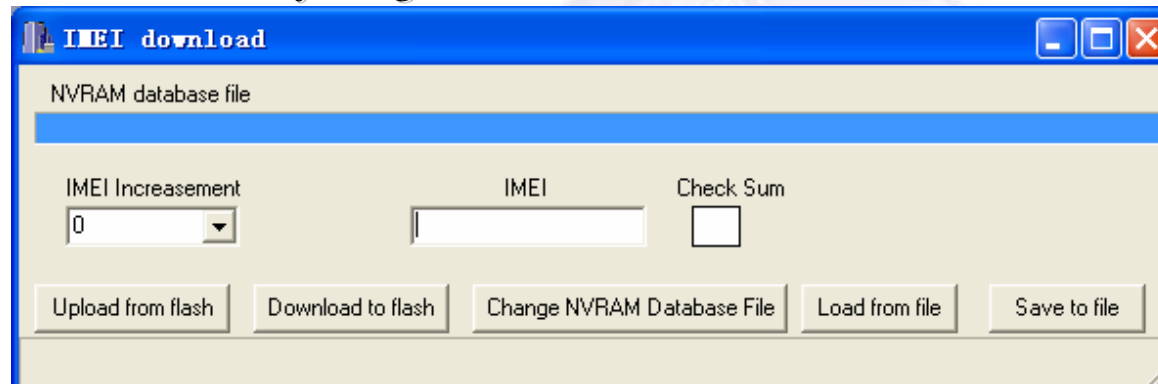
- *User can use MMI data download window to download full screen , associate, EMS , midi and iMelody files to FAT from PC Side.*



Meta Lab introduction (7)

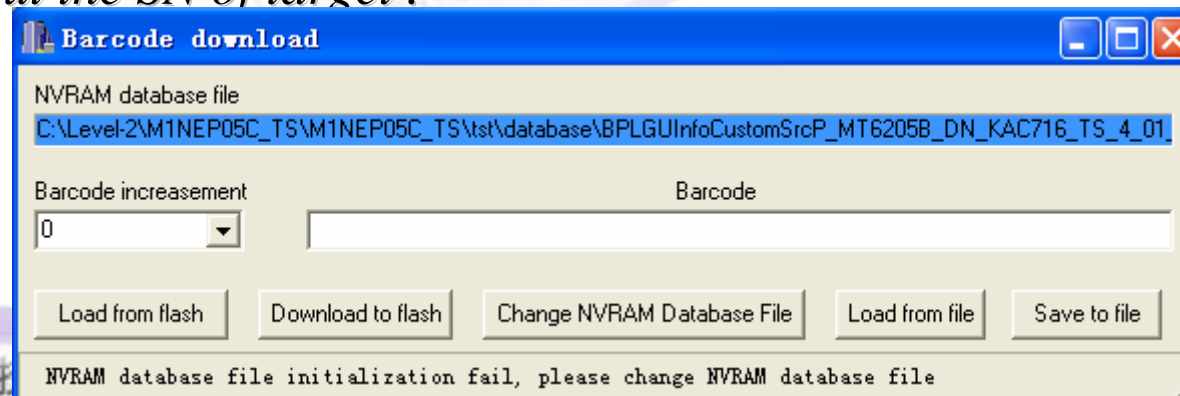
❖ IMEI download

- *User can use IMEI download window to write IMEI into target or read out the IMEI of target .*



❖ Barcode download

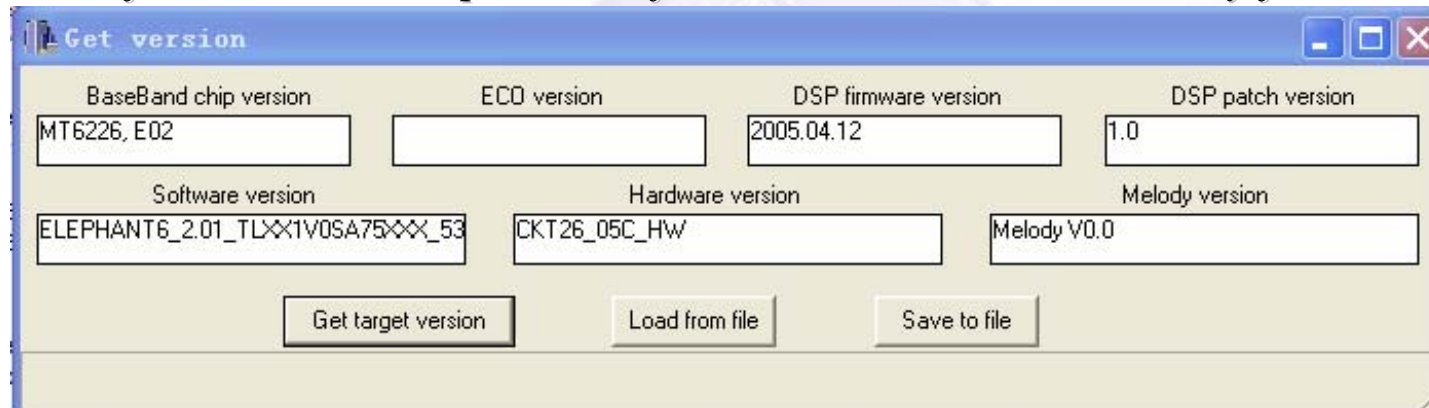
- *User can use Barcode download window to write SN into target or read out the SN of target .*



Meta Lab introduction (8)

❖ Get Version

- *User can use Get Version window to get version of BaseBand, ECO, DSP firmware, DSP patch ,software , Hardware , Melody from target.*



The screenshot shows a window titled "Get version" with the following fields and buttons:

BaseBand chip version	ECO version	DSP firmware version	DSP patch version
MT6226, E02		2005.04.12	1.0

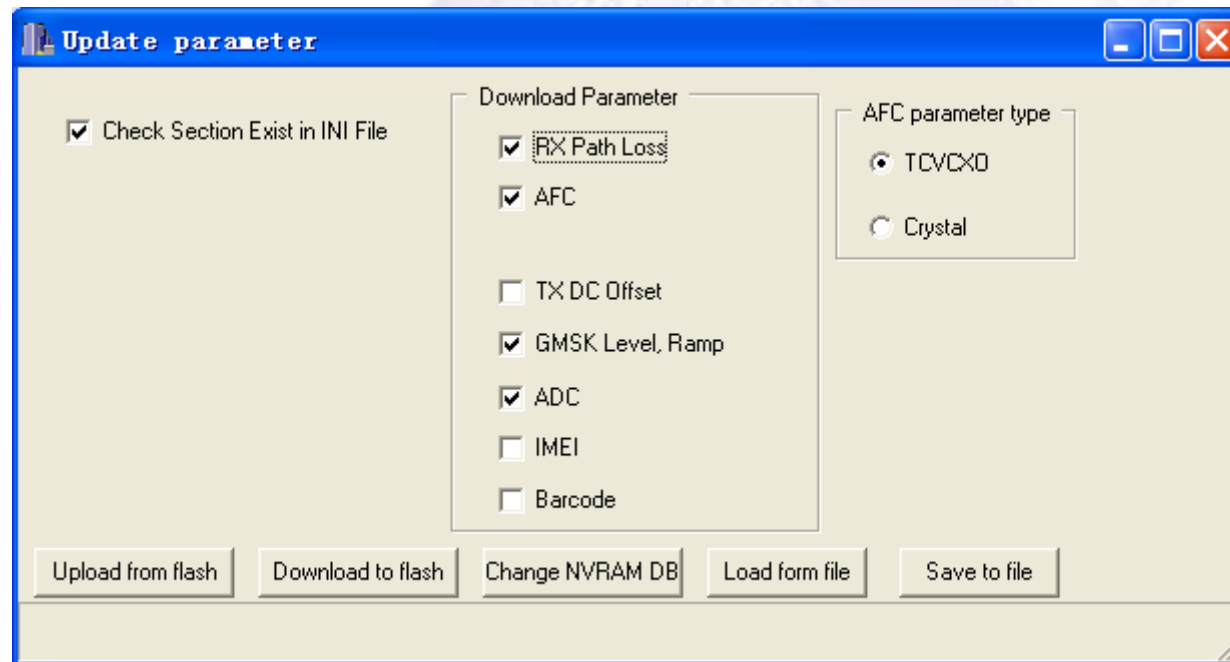
Software version	Hardware version	Melody version
ELEPHANT6_2.01_TLX1V0SA75XX_53	CKT26_05C_HW	Melody V0.0

Buttons: Get target version, Load from file, Save to file

Meta Lab introduction (9)

❖ Update parameter

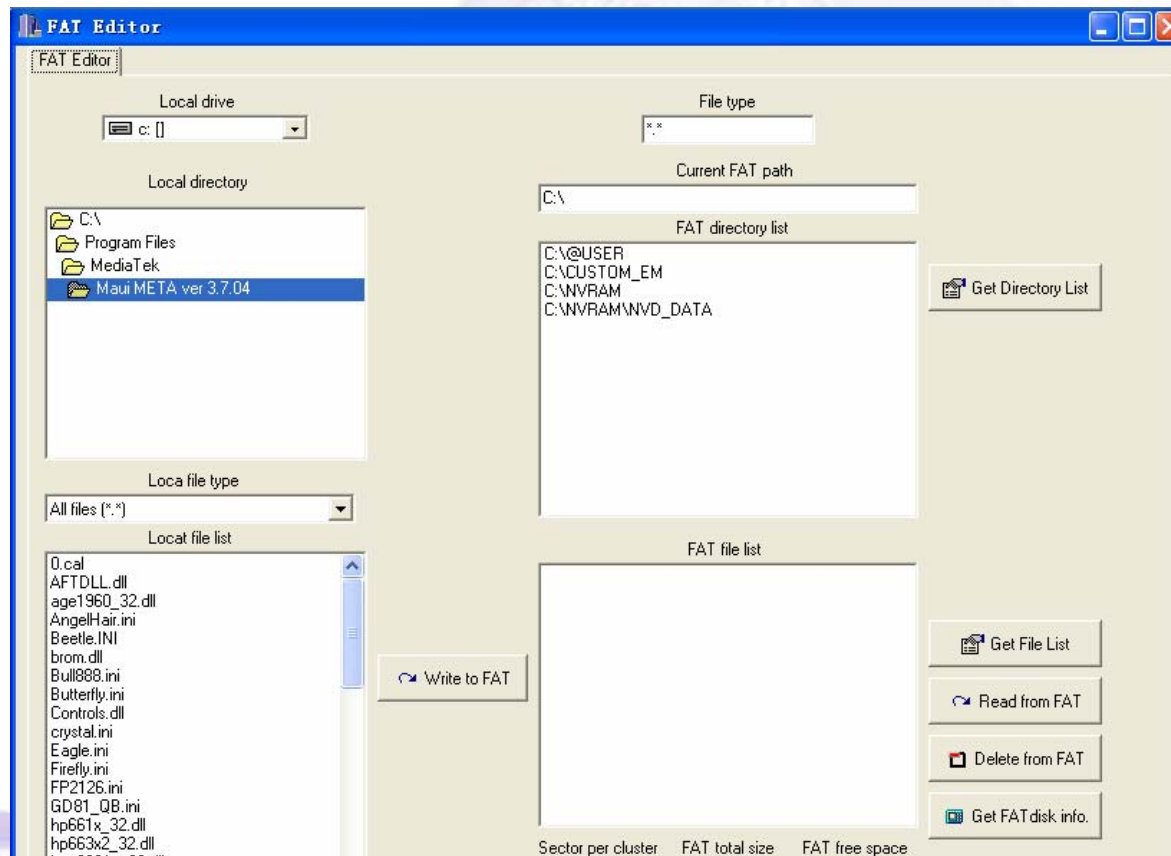
- *User can use update parameter window to upload/download RX path loss, AFC, APC and ADC calibration parameter or load/save RX path loss, AFC, APC and ADC calibration from/to file.*



Meta Lab introduction (10)

❖ FAT Editor

- *User can use FAT editor window to read ,write ,delete files in FAT and get FAT disk information which contains sector per cluster, FAT total size and FAT free space.*



Meta Lab introduction (11)

❖ DataBase Change

- *User can use database change window to get database change list between two NVRAM database files and FAT free space.*

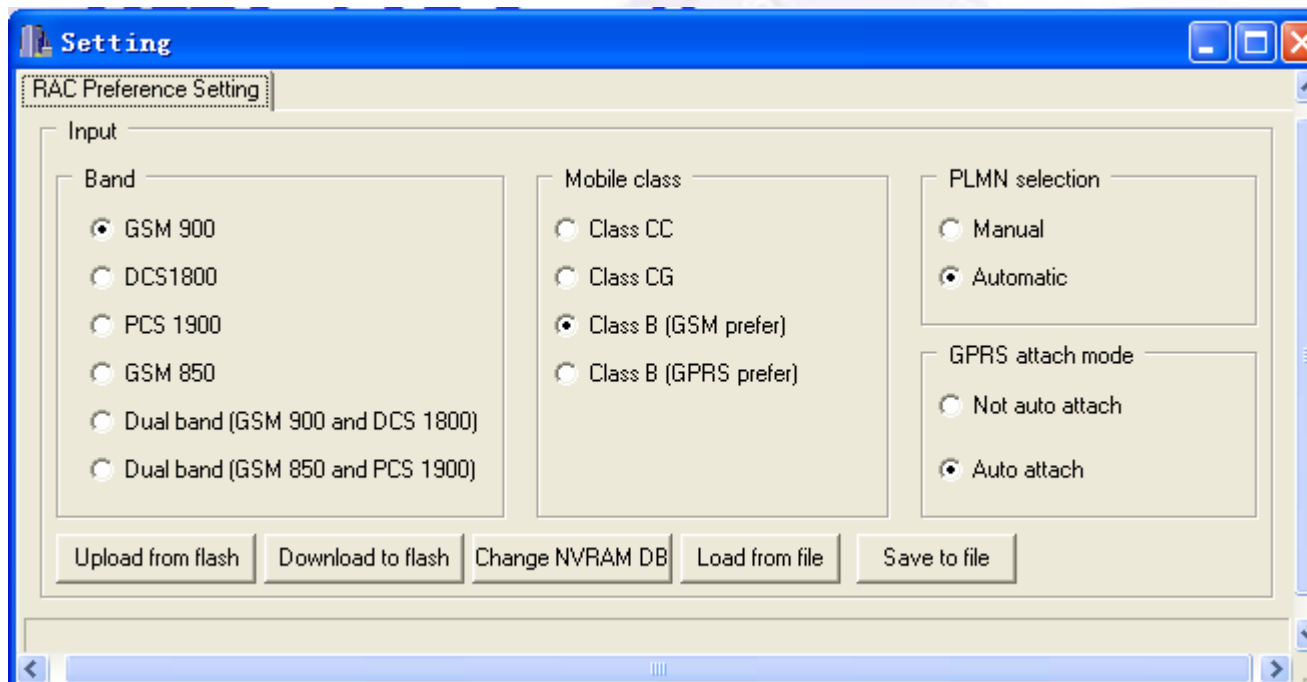
The screenshot shows a window titled "Database change" with a tab labeled "Database change". The window contains several input fields and lists:

- Input fields: NVRAM size, FAT free space, Overhead, New database NVRAM size.
- Lists: New added LID, Modified LID, Deleted LID.
- Counters: Num of new added LID, Num of modified LID, Num of deleted LID.
- Buttons: Disable force upgrade, Compare database, Get FAT free space, Enable force upgrade.

Meta Lab introduction (12)

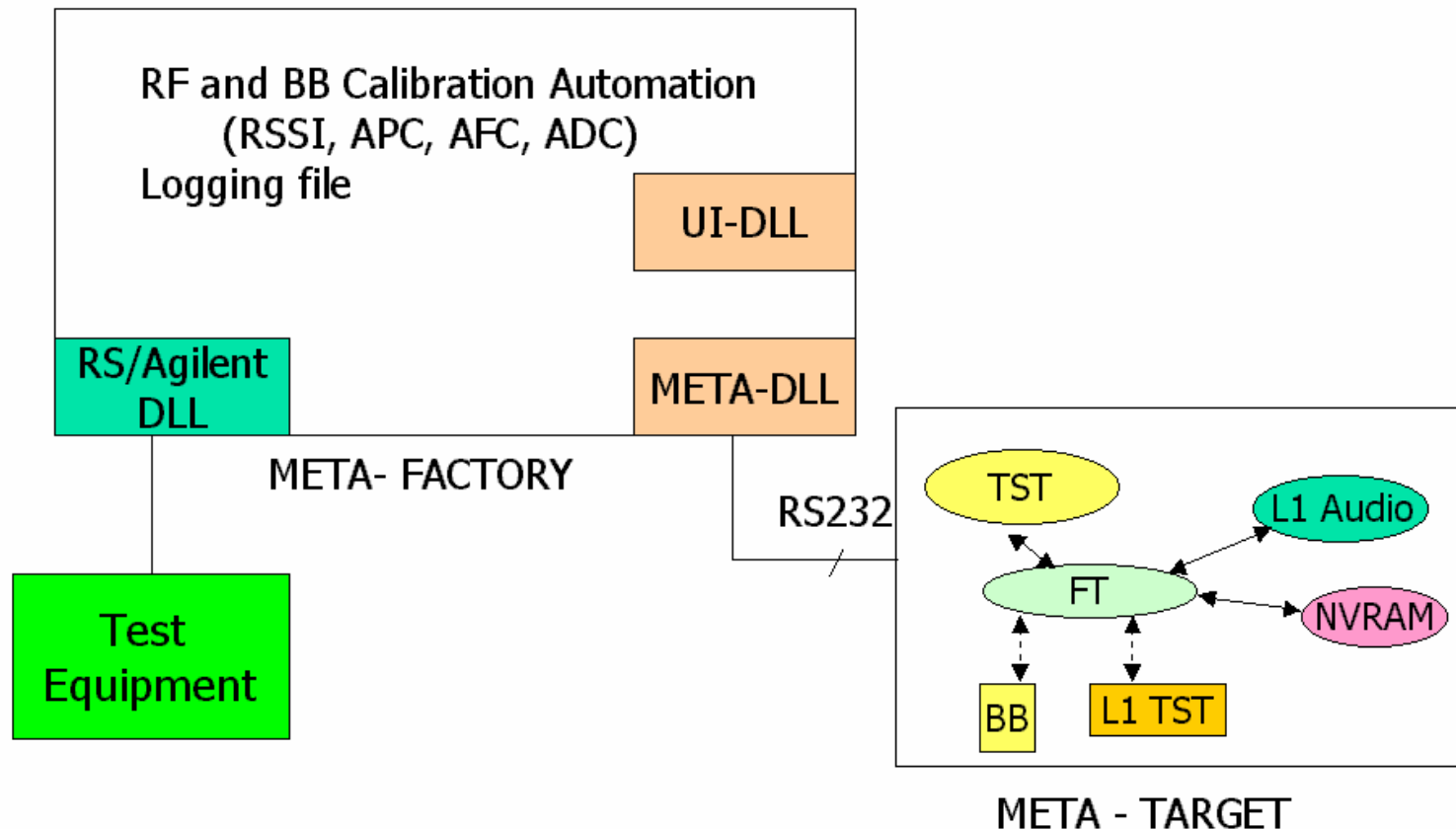
❖ Setting

- *User can use setting function to get/set target setting.*



Meta factory introduction (1)

❖ Software architecture



Meta factory introduction (2)

- ❖ In Meta factory mode, Meta controls Agilent 8960, R&S CMU200, Power Supply and target to do calibration procedure. Before using this mode, user must install driver of GPIB card and Visa.
- ❖ The Meta factory mode current support:
 - *Agilent 8960 with GSM only mode (E1960A) and GSM/GPRS combine mode (E1968A)*
 - *CMU200*
 - *Agilent 663x2 series power supply*
 - *Agilent 661x series power supply*
 - *Agilent and NI GPIB Card*

Meta factory introduction (3)

META Factory

File Edit Help

NVRAM database file	D:\Level_2\firefly856 05.04\BPLGUInfoCustomSrc
Configuration file	C:\Program Files\MediaTek\Maui META ver 3.7.04\Meta_MT6218.CFG
Logging file	C:\Program Files\MediaTek\Maui META ver 3.7.04\Log\test.log
Result file	C:\Program Files\MediaTek\Maui META ver 3.7.04\result\result.txt
Calibration data initial file	C:\Program Files\MediaTek\Maui META ver 3.7.04\Firefly.ini
Calibration data result path	C:\Program Files\MediaTek\Maui META ver 3.7.04

Logging file label:

Barcode:

Start (F6) Stop (F7) Reconnect (F8)

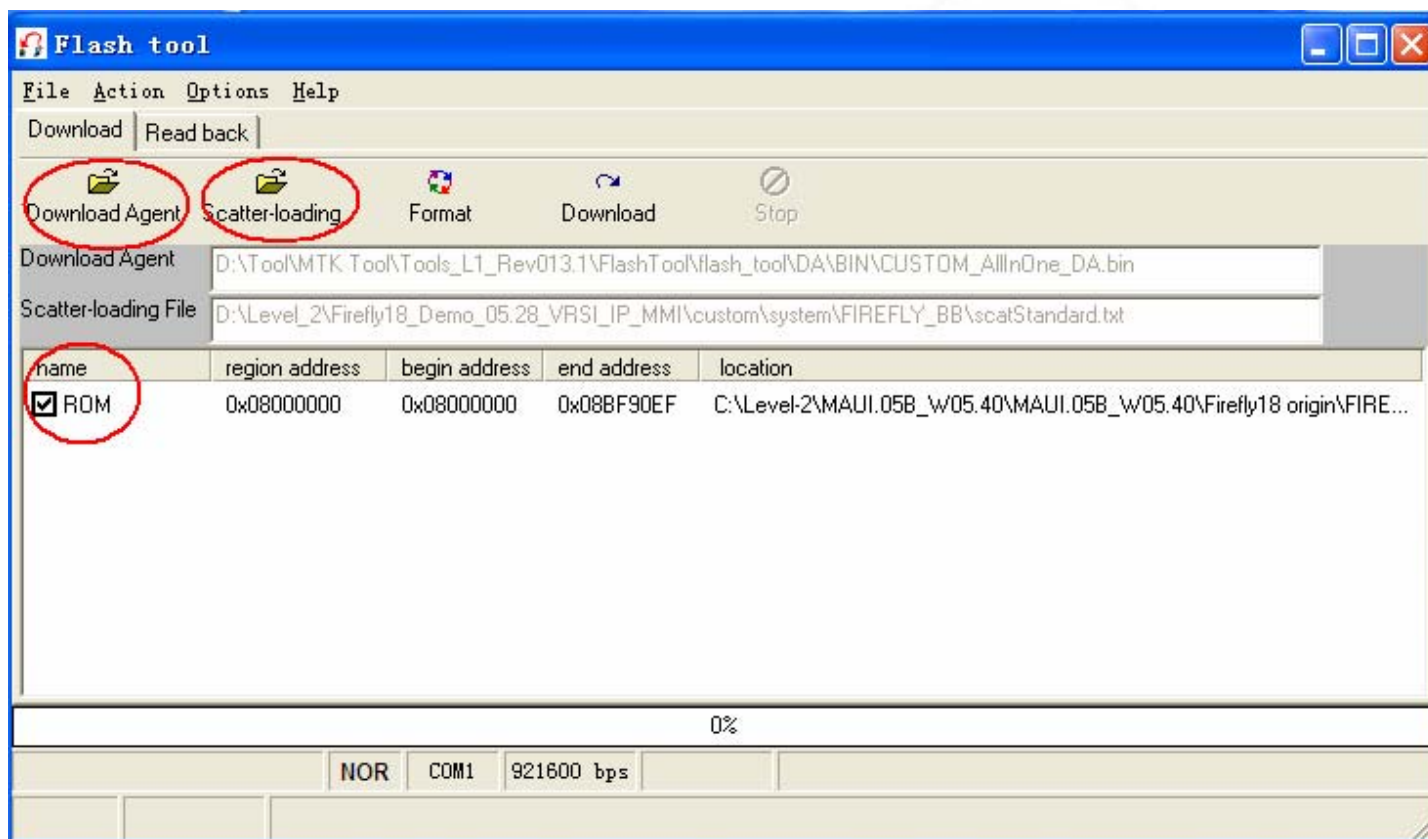
<p>Initial value</p> <p><input checked="" type="radio"/> from INI file</p> <p>Calibration Item</p> <p><input checked="" type="checkbox"/> AFC</p> <p><input checked="" type="checkbox"/> RX path loss</p> <p><input type="checkbox"/> TX DC offset</p> <p><input checked="" type="checkbox"/> TX PCL</p> <p><input checked="" type="checkbox"/> ADC</p> <p>Equipment option</p> <p><input type="checkbox"/> Reset CMU 200</p>	<p>RF calibration</p> <p><input type="radio"/> Agilent 8960</p> <p><input checked="" type="radio"/> CMU 200</p> <p>Power supply</p> <p><input checked="" type="radio"/> Agilent 663x2</p> <p><input type="radio"/> Agilent 661x</p> <p><input type="radio"/> Agilent E3631A</p> <p><input type="radio"/> Keithley 2306</p> <p>PA type</p> <p><input checked="" type="radio"/> RFMD 3140</p> <p><input type="radio"/> Skyworks 77328</p> <p><input type="radio"/> Renesas PFD8155B</p>	<p>AFC calibration</p> <p><input checked="" type="radio"/> TCVCXD</p> <p><input type="radio"/> Crystal</p> <p>TX PCL calibration</p> <p><input type="radio"/> 2 PCL</p> <p><input checked="" type="radio"/> 3 PCL</p> <p><input type="radio"/> Full PCL</p> <p>Crystal CAP ID</p> <p><input type="radio"/> Run time update</p> <p><input checked="" type="radio"/> Write NVRAM</p>	<p>Calibration success</p> <p>Barcode increasement</p> <p><input type="text" value="0"/></p> <p><input type="checkbox"/> Save barcode to NVRAM</p> <p><input type="checkbox"/> Save barcode to file</p> <p><input type="checkbox"/> Turn off power supply</p> <p><input type="checkbox"/> Terminate META</p> <p>Exit META Factory</p> <p>Barcode Increasement</p> <p><input type="text" value="0"/></p> <p><input type="checkbox"/> Save barcode to NVRAM</p> <p><input type="checkbox"/> Save barcode to file</p>	<p>Calibration fail</p> <p>Barcode increasement</p> <p><input type="text" value="0"/></p> <p><input type="checkbox"/> Save barcode to NVRAM</p> <p><input type="checkbox"/> Save barcode to file</p> <p><input type="checkbox"/> Turn off power supply</p> <p><input type="checkbox"/> Terminate META</p> <p>Enter META Factory</p> <p>Read barcode from</p> <p><input type="text" value="None"/></p> <p>Barcode increasement</p> <p><input type="text" value="0"/></p>
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Introduction of Download Tool

The component of Flash Tool

- ❖ *Flash tool requires four parts, one is Flash tool. exe, the others are BROM DLL, DA and scatter file.*
 - *Flash tool.exe*
Flash_tool.exe is only the UI program of Flash tool. It requires BROM DLL to all the Flash tool operations.
 - *BROM DLL*
Brom.dll is the kernel library of Flash_tool.exe, it is in charge of all the main functions to do BootROM handshake, DA downloading and DA handshake.
 - *DA (Download Agent)*
 - *Flash tool will download DA into target' s internal SRAM and execute*
 - *MTK_AllInOne_DA.bin → Support all MT6205B, MT621X, MT62XX BB chip projects.*
 - *Scatfile*
 - *The starting address of ROM should be same as the built image.*

Flash tool executable file



What is Boot ROM?

❖ Description

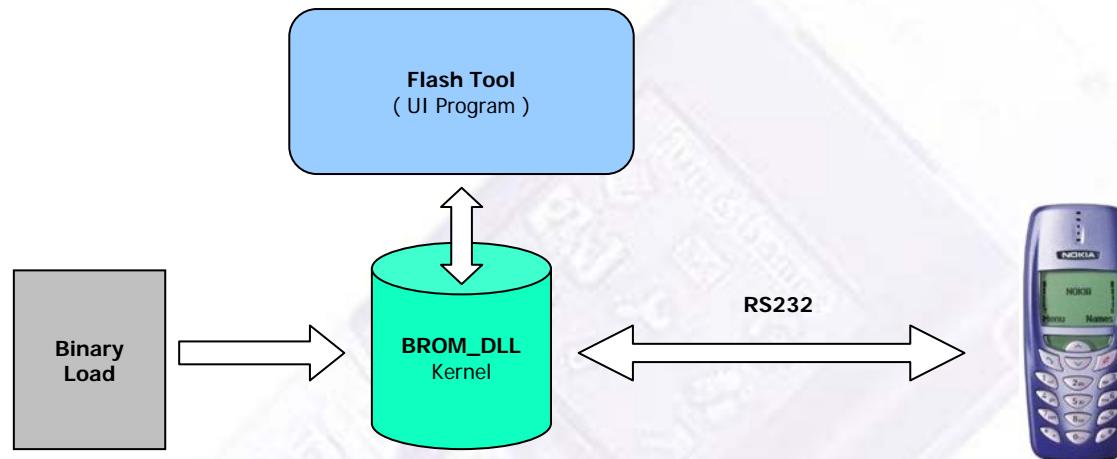
- *Every MTK base-band chips embed a Boot ROM, which is used to store a simple boot program. Internal BOOT ROM will be selected if BOOT pin (GPIO0) is tied to GND once reset.*
- *The Boot ROM contains a small program for downloading data via UART, and this feature is applied to download program or factory testing. Purpose of Boot ROM is to interpret commands received from UART1.*
- *The Boot ROM is useful in the absence of off-chip memory or when the external Flash memories have not been initialized yet.*

❖ Configuration

- *Boot ROM code is executed in ARM 32 bit mode, and the stack is allocated at 0x40000000~0x400007ff.*

What is BROM_DLL?

- ❖ *The Flash Tool is developed base on the kernel library BROM_DLL.*



- ❖ *BROM DLL is multi-thread safe library and it is designed to provide the functionality of BootROM handshaking and flash download/read back/format.*
- ❖ *BROM DLL provides two target boot modes, one is META mode; the other is FlashTool mode.*
- ❖ *Boot_META will trigger target to boot up to META mode for META testing; Boot_FlashTool will download the DA into target and then user can perform flash download/read back/format operations.*

What is DA?

- ❖ *DA is a target side agent*
- ❖ *After DA is successfully downloaded and running on target, it will be standby and passively waiting BROM DLL to issue flash download, read back or format command via UART.*

What is Scat file?

- ❖ *A simple sample of scat file is as follows:*

ROM 0x0

{
}

- ❖ *Flash tool will parse the scat file to get the name of the Load and the download start address of flash.*

Flash Tool Feature List

- ❖ Flash Tool supports the following features.
 - *Support NOR flash download/read back/erase operation.*
 - *Support NAND flash download/erase operation.*
 - *Support most popular NOR flashes in the world.*
 - Both of AMD family and Intel family flash.
 - *High-Speed download.*
 - Support high-speed baud rate download up to 921600bps.
 - *Support MBA (Multiple-Binary-Architecture) download.*

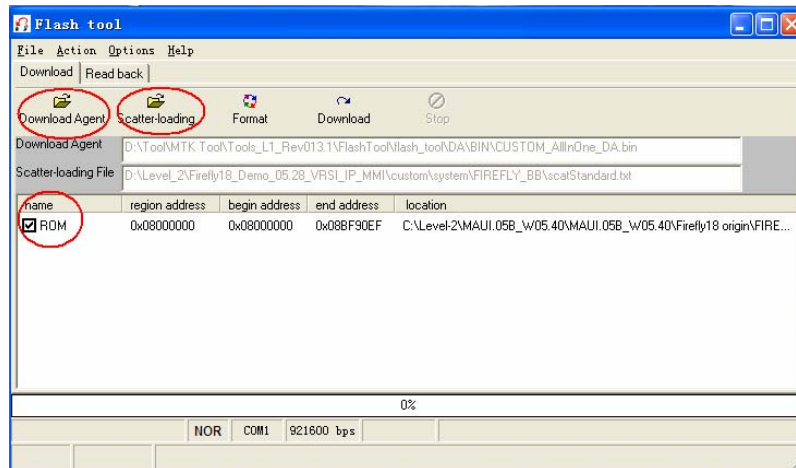
How to download at high-speed baud-rate?

- 1) *Install a general high speed RS232 card*
- 2) *Use USB-To-COM bridge cable.*

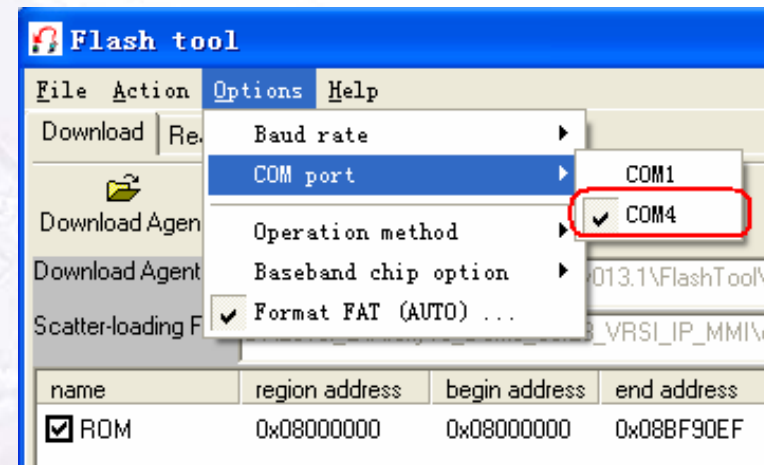


Usage of Flash tool (1)

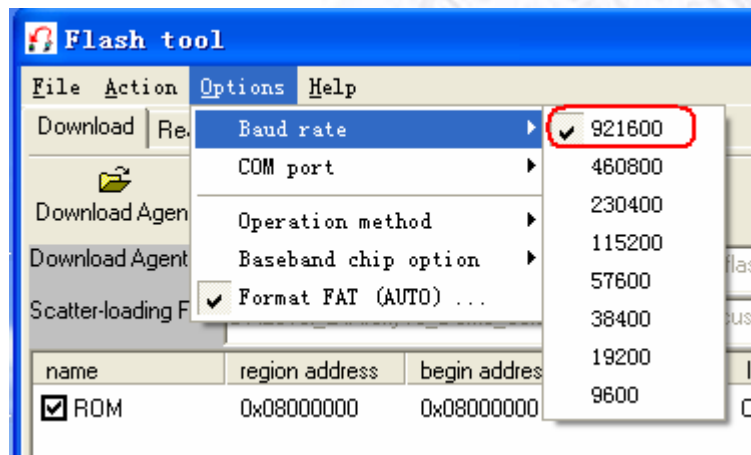
1) Choose the DA file, Scat file and ROM file



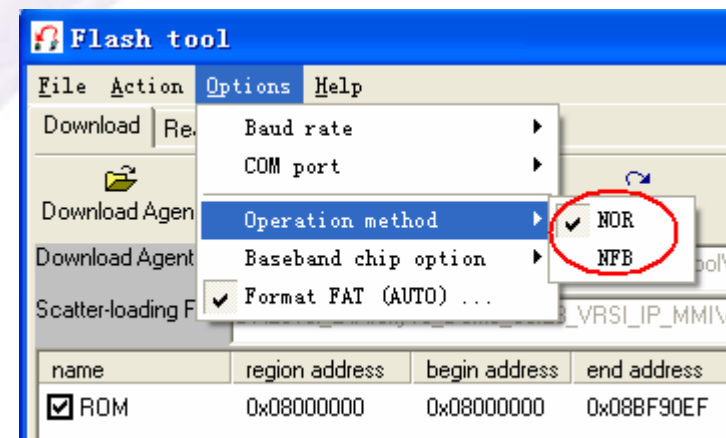
3) Choose COM Port



2) Choose the Bard-rate



4) Choose NOR/NAND Operation mode



Usage of Flash tool -Download

- 1) Power off target first
- 2) File/Open download agent file
- 3) File/Open scatter-loading file
- 4) Assign load regions you want to download
- 5) Press download button
- 6) Power on target

Usage of Flash tool -Read back

- 1) Power off target first
- 2) File/Open download agent file
- 3) Assign read back file
- 4) Select which file you want to read back
- 5) Press read back button
- 6) Power on target

Usage of Flash tool –Format Type (1)

❖ Format Type

➤ Do Not Format FAT

If select this option, Flash Tool will not erase the FAT area.

➤ Reset to factory default

If select this option, Flash Tool will do the following things:

- 1) Restore the DataItem with **NVRAM_CATEGORY_FACTORY**
- 2) Restore certain **byte/short/double** value to default value in NVRAM cache data items.

There are three functions in the **nvram_user_config.c**:

```
void nvram_restore_byte_cache(kal_uint8 *buffer){ }
```

```
void nvram_restore_short_cache(kal_uint16 *buffer){ }
```

```
void nvram_restore_double_cache(kal_uint32 *buffer){ }
```

- 3) Delete the folder defined in **NVRAM_CLEAN_FOLDER_LIST[]** in **nvram_user_config.c**:

Usage of Flash tool –Format Type (2)

❖ Auto Format FAT

If select this option , Flash Tool will format FAT by the area defined in Flashconf.c.

```
#define FLASH_BASE_ADDRESS 0x0E00000  
#define ALLOCATED_FAT_SPACE 0x200000
```

Note: Please use the following syntax in **flashconf.c**

```
#define FLASH_BASE_ADDRESS 0x0E00000  
#define ALLOCATED_FAT_SPACE 0x200000
```

but don't use the following syntax:

```
#if 0  
# defin FLASH_BASE_ADDRESS 0x0x700000  
#else  
#define FLASH_BASE_ADDRESS 0x0E00000  
#endif
```

❖ Manual Format FAT

If select this option , user can define which FAT area he want to format.

Usage of Flash tool -Format

- 1) Power off target first
- 2) File/Open download agent file
- 3) Press format button
- 4) Configure the format range
- 5) Power on target

Two Mode of Flash tool

- 1) Test Mode: CTRL+ALT+A (only for Nor flash)
- 2) Debug Mode: CTRL+ALT+T



Multiple bin mechanism

- ❖ MBA V2.0 is an enhanced version of MTK multiple binary architecture support.

Enabling multiple bin is simple and involves only 3 steps:

- - **#define MULTIPLE_BINARY_FILES** in
 \mcu\custom\system\[PROJECT]\custom_jump_table.h
- - Add multiple BINs sections in the scatter file
- - Clean and remake the following modules: custom, mmresource and plutommi

- ❖ There will be 4 BINs in the build folder:

- ROM : Code and most data
- LangPack_ROM: Strings, Fonts and IMEs
- CustPack_ROM: Customized NVRAM settings, audios, images and WAP/MMS settings
- JUMP_TABLE: the system jump table for accessing the BINs

Usage of Multi-port download tool (1)

- ❖ *Multi-port download tool is used in production line for download Bin file . It supports most 16 COM Port to download at the same time.*
- ❖ *Multi-port download tool is base on flash tool ,so it has the same function of flash tool.*
 - *Support NOR flash download/erase operation.*
 - *Support NAND flash download/erase operation.*
 - *Support most popular NOR flashes in the world*
 - Both of AMD family and Intel family flash.
 - *High-Speed download.*
 - Support high-speed baud rate download up to 921600bps.
 - *Support MBA (Multiple-Binary-Architecture) download.*

Usage of Multi-port download tool (2)

- ❖ *All the setting of Multi-port download tool is set in the file **MultiPortFlashDownloadProject.INI**.*
 1. ***TheFirstComPortNo=3***
 - *Please set the first COM port according to actual status here.*
 2. ***Format FAT begin address = 0x00E00000***
Format FAT length = 0x00200000
 - *If “Format FAT Option” is Manual and “Operation” is NOR, please set NOR flash format FAT information here.*
 3. ***NAND format FAT begin address = 0x02000000***
NAND format FAT length = 0x06000000
 - *If “Format FAT Option” is Manual and “Operation” is NFB, please set NAND flash format FAT information here.*
- ❖ ***Auto polling***
 - *If select Auto polling ,after finish downloading one handset , what you need to do is just pull out the handset and connect another handset waiting to downloaded. You don't need to click Start button again.*

Introduction of ATE

Environment Request

1) PC OS:

- MS Windows 2000 or XP

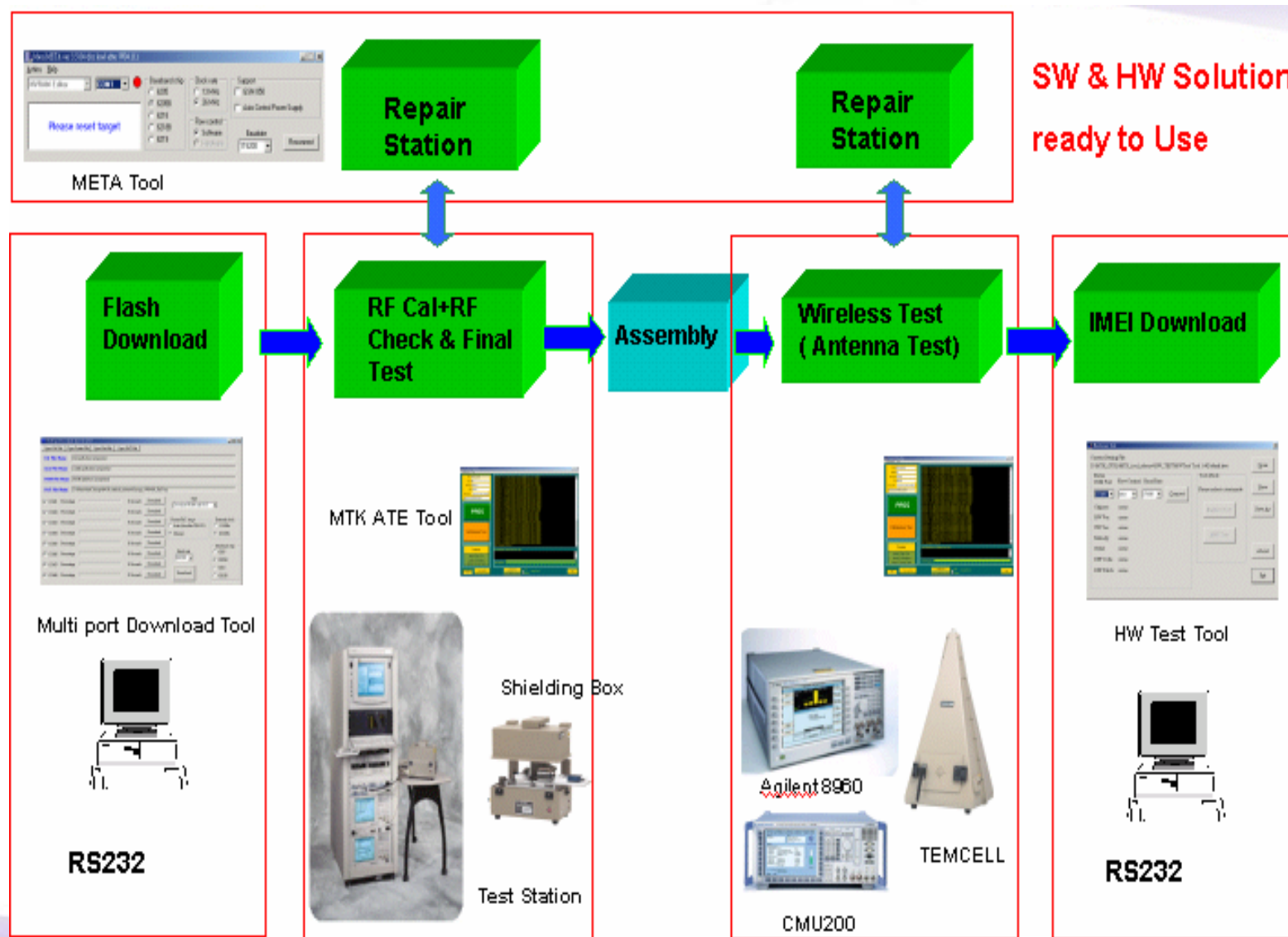
2) Hardware:

- Pentium III or above PC
- Radio Tester: AG 8960 , CMU200, CMD55, MT8820A, WT4400
- Power Supply: AG663x or AG 663xx, Keithley 230x , NGSM

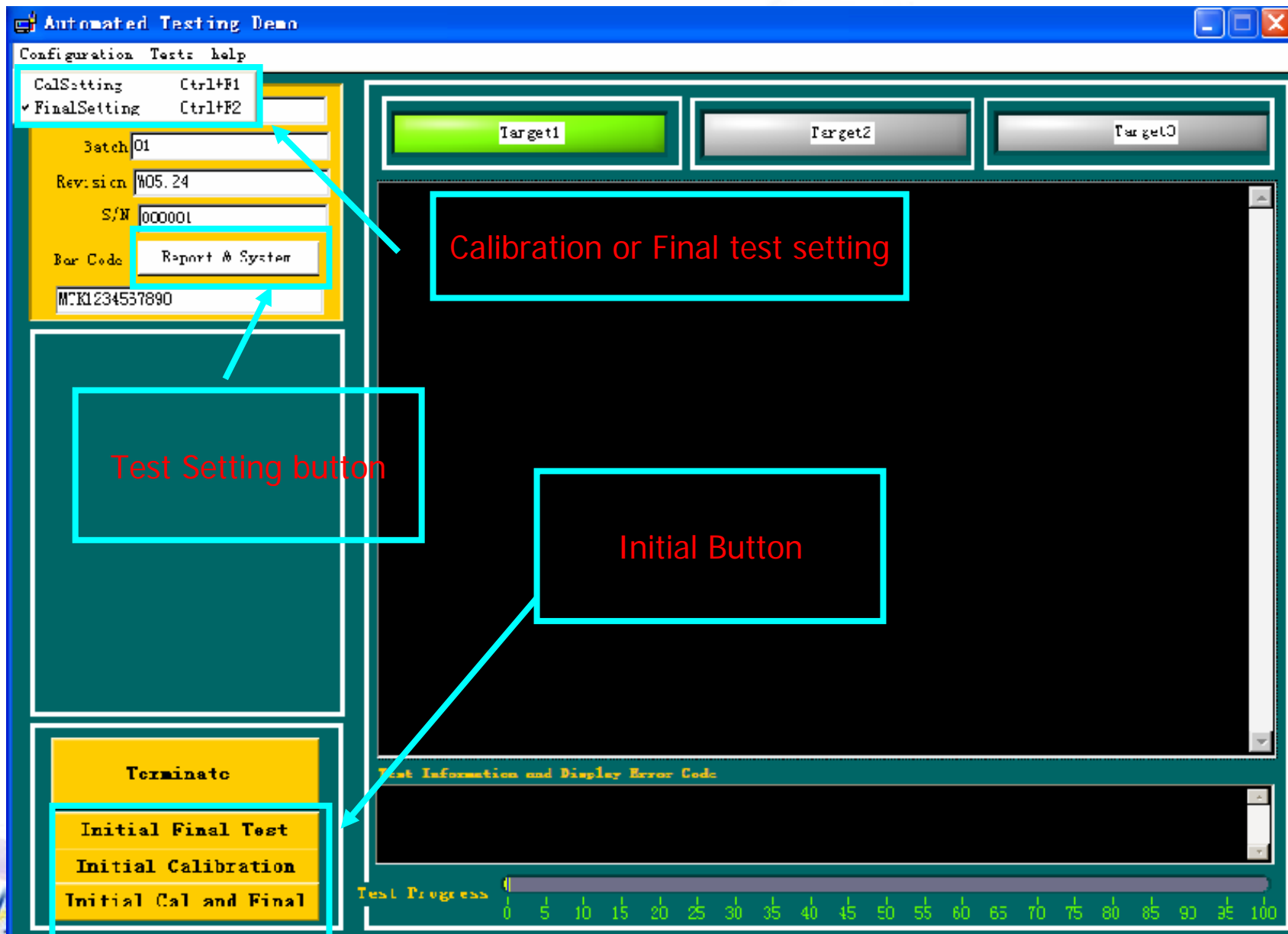
3) Software:

- NI (National Instruments) GPIB driver Ver 2.2.10 or later Version
- NI Visa Ver 3.0 or later version

MTK Production line test solution



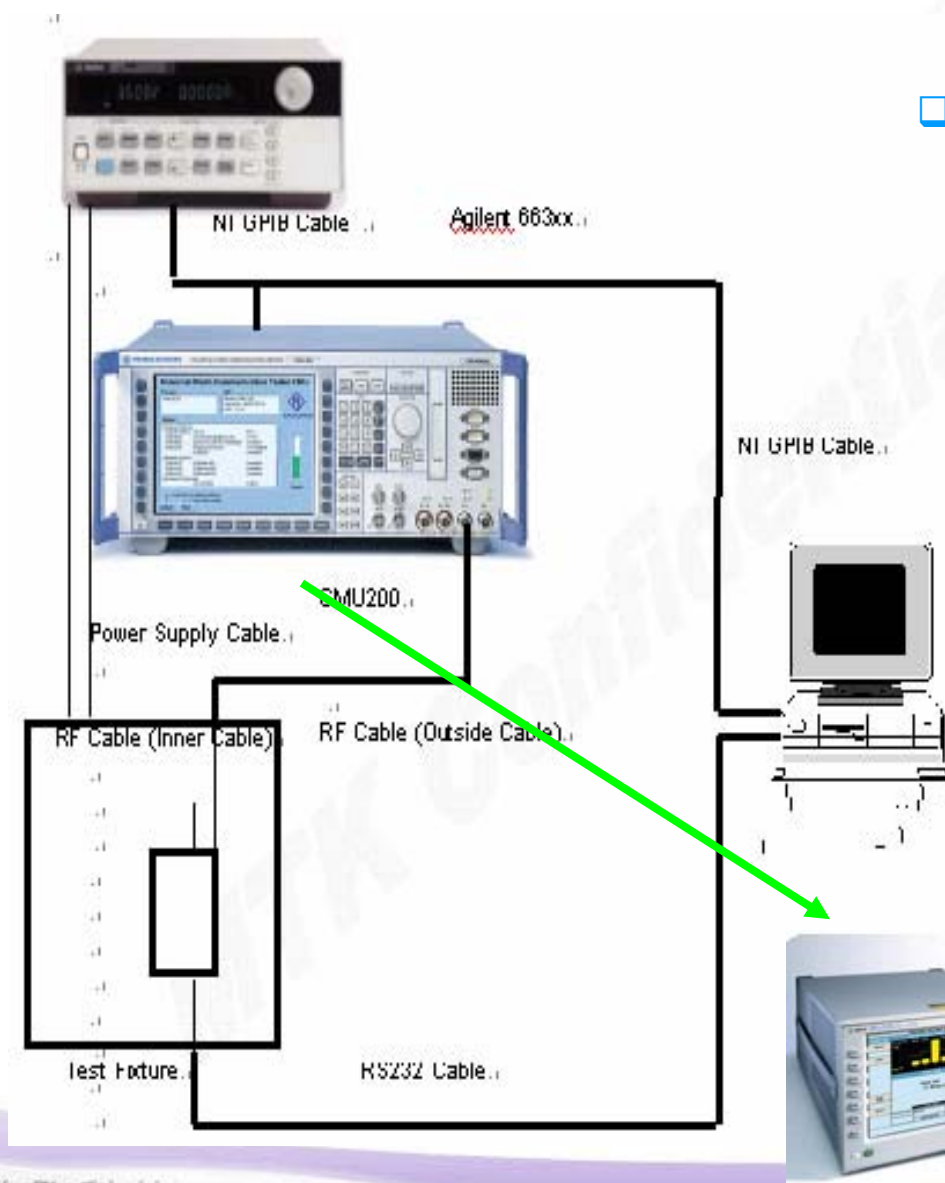
UI of ATE



Function of ATE

- ❖ **Calibration test** include calibration and check result for MTK chipset, such as AFC calibration, Pathloss Calibration, APC calibration, ADC Calibration.
- ❖ **Final test** include GSM/GPRS signaling test, such as power measurement, modulation measurement, spectrum measurement and BER measurement, and for the GPRS part include Test Mode B and BLER(CMU200) and Type B and BLER(Agilent 8960)
- ❖ Combined calibration(META mode) and final test(Normal mode) for reducing change test station

RF Calibration and Final test Setup



Support Hardware:

Power Supply

R&S NGSM

Agilent 663xx

Keithley 230x

NGSM

Radiocommunication Tester

R&S CMU200

Agilent 8960

CMD55

WT440

MT8820A

Report & System Setting (1)

Unit Under Test

Part Number: MTK_62183
 Batch: 01
 Revision: WL4.24
 Serial Number: 000001
 Bar Code: WTK1234567890

☒ Fast Power Measurement (CWJ 3.50)
☐ Wireless test
☒ GSM Default Items
☐ Stop Condition
☐ Add Band Tester
☐ RF Final Test with Check Bar Code
☐ Final Test with INEI Write
☒ Add Cal Status

Calibration Test Setting

☐ GSM850 Calibration
☒ GSM900 Calibration
☒ DCS1800 Calibration
☐ PCS1900 Calibration
☐ Phase Error Calibration (om2PC only)
☒ APU Calibration
☐ Crystal APC Calibration
☒ PA/Loss Calibration
☒ APC Calibration ☐ APC Cal Full
☒ APC Cal check
☐ AMC Calibration

Final Test Setting

☐ GPS Test
☐ GSM850 Final Test
☒ GSM900 Final Test
☒ DCS1800 Final Test
☐ PCS 900 Final Test

TEST MODE SELECT

Manual Initial
 Bar Code Cat Type When Calibration:
 Auto Bar Code With Date & Batch
 Power Supply Type:
 Agilent E6600
 Radio Communication Tester:
 Agilent E800
 Baseband Chip Type:
 6218B
 CMV Measurement Port:
 RF2
 COM Port Select:
 COM 4
 Power Supply GPIB Address: GPIB00000001

☒ Cal WP LOSS ☒ Cal OIP LOSS **Save Change**

NVRAM Database file
 c:\Level-2\Firefly_856_04_48_level2src\Firefly_856_04_48_level2src\test\database_classb\BPL3GInfoC
Select NVRAM Database file

Config File Location
 c:\Program Files\MTK_atodemo\MTK_6218B_CFG
Select Config File

Calibration File Location
 c:\Program Files\MTK_atodemo\MTKCAL_6218B.INI
...Select Calibration INI

Test Setup File Location
 c:\Program Files\MTK_atodemo\MTK_6218B_SETUP.ini
...Select Test Setup File

Test Report Location
 c:\Program Files\MTK_atodemo
Select Test Report Location

Report Database Location
 c:\Program Files\MTK_atodemo\6218E_statistics.xls
...Select Test Database Location

Report & System Setting (2)

❖ ***Fast Power Measurement (CMU 3.50)***

- *When you use CMU200 to do Cal or Final test, remember to select this option to speed up the power measure rate.*

❖ ***Wireless test***

- *If you want to do wireless test, remember to select this option.*

❖ ***GSM Default Items***

- *If select this option, ATE will do the default items RF Final test defined in the MTK_XXXXX_SETUP.ini.*

❖ ***Stop Condition***

- *If select this option, ATE will stop testing immediately while one test item can't pass . In production line, this option should be pitched on always.*

Report & System Setting (3)

❖ *RF Final Test with Check Bar Code*

- *If select this option, ATE will not continue to do final test while calibration result is fail*

❖ *Final Test with IMEI Write*

- *If you want to write IMEI to handset before doing final test, select this option.*

❖ *Add Cal Status*

- *If select this option, ATE will add “10” (calibration pass) or “01” (calibration fail) flag behind barcode after Calibration.*

Report & System Setting (4)

❖ *Band*

- *You can select which band need to do calibration here.*

❖ *RX*

- *Only select AFC Cal and Pathloss Calibration here.*

❖ *TX*

- *RFMD GSM*
 - If the handset use RFMD series PA ,please select this option
- *SKY GSM (77328)*
 - If the handset use Sky77328 series PA ,please select this option
- *RENESAS GSM*
 - If the handset use Renesas series PA ,please select this option
- *Full PCL GSM*
 - Select this option will do all PCL Apc calibration
- *APC Cal Check*
 - Select this option will check the power of all PCL after APC calibration
- *ADC Cal/PSU Ctrl*
 - Select this option will do ADC battery and charger calibration.

Report & System Setting (5)

❖ *Final Test Setting*

- *GPRS Test*

- Select this option will do GPRS Test

- *GSM850 Final, GSM900 Final, DCS1800 Final, PCS1900 Final*

- Please select which band you want to do RF Final test here

Report & System Setting (6)

❖ **Test MODE Select**

- *If want to initialize ATE manually, please Select “Manual Initialize”*
- *If want ATE initialize Final test automatically, please select “GSM Test”*
- *If want ATE initialize Calibration test automatically, please select “Calibration Test”*
- *If want ATE initialize Cal and Final test automatically, please select “Calibration & GSM Test”.*
- *“Three Unit Calibration” is hold for future use.*

❖ **Bar Code Get Type When Calibration**

- *If want to get barcode from handset NVRAM, please select “Get From NVRAM” and the barcode of all calibrated handset will be the same.*
- *If select “Auto Bar Code with Date & Batch”, ATE will write the PC date plus Batch into handset NVRAM as barcode.
Batch is define in MTK_XXXXX_SETUP.ini .*
- *If want to scan Barcode manually, please select “Scan Barcode” .*
- *”Check fixture close” is hold for future use.*

Report & System Setting (7)

❖ **PowerSupply Type**

- *Please select the Powersupply type used in your production line here.*

❖ **Radio Communication Tester**

- *Please select Radio Communication Tester type used in your production line here.*

❖ **BaseBand Chip Type**

- *ATE V5.0.3 or later version supports all MTK BB Chip type. You may select AutoDetect except handset use 6205B BB Chip.*
- *If the handset use 6205B BB Chip, please select 6205B in this option.*

❖ **CMU Measurement Port**

- *Just keep the type as RF2.*

❖ **PowerSupply GPIB Address**

- *Here shows the power supply GPIB address. The address is set in the Mtk_XXXXB_setup.ini file.*

❖ **Cal INP loss and Cal OUP loss**

- *Must select these two options always.*

Report & System Setting (8)

❖ ***NVRAM Database file***

- *Please select the database file like the following format BPLGUInfoxxxxxx here . The version of the database file should be the same as the bin file.*

❖ ***Config File location***

- *Please select the CFG file here.*

❖ ***Calibration file Location***

- *Please select the Calibration.ini file here.*

❖ ***Test Setup file Location***

- *Please select the MTK_XXXXX_SETUP.ini file here.*

❖ ***Test Report Location***

- *Please select the location where you want to store the test report here.
Default location is: C:\Program Files\MTK_atedemo. Suggest to change it.*

❖ ***Report DataBase Location***

- *Just keep the file: C : \Program Files\MTK_atedemo\6218B_statistics.xls here.*

Final Test Configuration Panel (1)

Final Test Configurations

Select Reset RF Function Group

☒ GSM050 Sig
☐ GSM 900 Sig
☒ GSM 900 Sig
☒ GSM 1800 Sig

Establish Call Type 1 MO Call

TEST NUMBER
 001010123456789

Call Setup Configuration

Call Setup Chann:BOCH Channel
 GSM050 128 128

Call Setup Chann:BOCH Channel
 GSM 1 02

Call Setup Chann:BOCH Channel
 DCS 512 700

Call Setup Chann:BOCH Channel
 PCS 512 700

Call Setup Network
 GSM050 to PCS

BOCH RF LEVEL
80.00

DC TCH LEVEL
00.00

GPRS Test Mode
☐ External 10MHz Reference Clock
 GPRS CNU BLEE CS3 ☐ GPRS ACK ON/OFF

Measurement Configurations

Power Measurement Burst
10

Modulation Measurement Burst
10

Use to Spectrum Measurement Burst
10

☒ Average Burst Power
☒ Peak Burst Power
☒ EVI Watch
☒ Timing Error

☒ Phase Error Peak
☒ Phase Error RMS
☒ Frequency Error

☒ Spectrum due to Modulation
☒ Spectrum due to Switching

Re Report
☒ RY Quality
☒ RY Level
☐ RFEF
☒ RBB
☒ Manual BER Limit Check

Re Quality

GSM En Meas Level
-102.00

PCS En Meas Level
-102.00

DCS En Meas Level
-102.00

Re RFEF Burst
128

Re RBB Burst
83

Bluetooth/GSM050 LOSS /

GSM OUT LOSS
0.60

ICE OUT LOSS
1.20

PCS OUT LOSS
1.30

GSM TYP LOSS
0.60

PCS TYP LOSS
1.20

PCS TYP LOSS
1.30

Re Quality 2 3

License

Final test Configuration Panel (2)

There are only three places perhaps need to modified in this panel according to actual status.

❖ **Call Type**

- *MO Call*
 - If select MO call, ATE will control handset to dial “112” connect the Radio communication tester while doing final test.
- *MT Call*
 - If select MT call, you should plug a Test SIM card into the handset. And Radio communication tester will call handset while doing final test.

❖ **RX Quality**

- *Please input the RX Meas Level here. The default value is -102.*

❖ **Cable loss setting**

- *Please input the RF Signaling cable loss of CMU200 here.*

Calibration Configuration Panel

- ❖ Please input the RF Non signaling cable loss of CMU200 here.

Calibration Configuration

Select Reset RF Function Group

- ☒ GSM900NSig
- ☒ GSM1800NSig

GSM OUT LOSS	DCS OUT LOSS	PCS OUT LOSS
0.60	1.20	1.30
GSM INP LOSS	DCS INP LOSS	PCS INP LOSS
0.60	1.20	1.30

Calibration Setup

CO for GSM900	AFC_Calibration_Number	Number of Fram measurement
70	10	5
CO_DCS1800	AFC DAC1 Value	Number of Measurement
700	4000	4
CO_PCS1900	AFC DAC2 Value	Down Link Power
660	5000	-60.00

Done

Usage of ATE-Related files

- ❖ There are following three files related to ATE:
 - *.INI File*
 - *.CFG File*
 - *SETUP.INI File*

Usage of ATE – Cal.ini File

- ❖ *This file contains all initialized data for calibration test.*
 - At the beginning of calibration, ATE will write the data of this file into handset NVRAM to be close to the target value.
- ❖ *This file should be modified the Power Ram Table by your RF engineer.*

Usage of ATE - CFG File (1)

❖ *This file contains all calibration setting data. There are following several place perhaps need to be modified in this file:*

- **[8960 Initialization]**

- 8960 GPIB Address = GPIB0::15::INSTR

Please set the Ag8960 GPIB address here.

- **[RX path loss table]**

- GSM850_MAX_RX_LOSS = 5.0,5.0,5.0,5.0,5.0,3.0,3.0,3.0,3.0,3.0,3.0,3.0,

- GSM850_MIN_RX_LOSS = -5.0,-5.0,-5.0,-5.0,-3.0,-3.0,-3.0,-3.0,-3.0,-3.0,-3.0,-3.0,

.....

Please set the RX Path Loss limit table here.

Usage of ATE - CFG File (2)

❖ [TX PCL table]

```
GSM900_CAL_PCL = 17, 12, 5,  
GSM900_2CAL_PCL = 19, 5,  
GSM900_PCL = 19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,  
GSM900_CHECK_PCL = 19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,  
GSM900_MAX_P = 6, 8, 10,12,13.8,15.8,17.8,19.8,21.8,23.8,25.8,27.8,29.5,31,32.8,  
GSM900_WANTED_P = 5.2,7,9,11,13,15,17,19,21,23,25,27,29,30.5,32.2,  
GSM900_MIN_P = 4,6,8,10,12.5,14.5,16.5,18.5,20.5,22.5,24.5,26.5,28.5,30,31.7  
GSM900_C = 3,3,3,3,4,4,6,6,8,8,12,12,15,15,35,40,  
GSM900_CORRECTION = "-0.4,-0.2,0.0,0.2,0.2,0.2,0.2,0.0,-0.1,-0.2,-0.1,-0.1,-0.1,-0.1,0.0,"
```

The red circle section perhaps need to be modified according to actual status.

❖ [ADC table]

- **CHARGER_CHANNEL = 1**
 - *If handset BB chip is 6205B, please set the : CHARGER_CHANNEL = 3*
 - *else CHARGER_CHANNEL = 1*
- **ADC_RESISTANCE = 0.33**
 - *Please set the ADC_RESISTANCE as 0.33 or 0.4 according to the handset schematic*

Usage of ATE - setup.ini File (1)

There are following place perhaps need to be modified in this file:

❖ [System Setting]

- *CMU Base GPIB Address = 20*
- *Power Supply Address = GPIB0::5::INSTR*

Please set the CMU200 and Power Supply GPIB Address here.

❖ [Call Setup Configuration]

- *Setup Network = 1*
 - If Setup Network= **1** , final test begins from **GSM900**
 - else if Setup Network= **4** , final test begins from **GSM850**
- *Triband Test Type = b*
 - If b=0, ATE will do GSM900/1800/1900 triple band final test
 - If b=1, ATE will do GSM850/1900/1800 triple band final test
 - If b=2, ATE will do GSM850/1800/1900 triple band final test

Usage of ATE – setup.ini File (2)

❖ [Final Test TX Check]

- *Please set the RF Final Test Power Limit here.*

```
GSM900_MAX_P = "6.0,8.0,10.0,12.0,15.5,16.0,18.0,20.0,22.0,25.0,26.0,28.0,30.0,31.5,34.2,"  
GSM900_MIN_P = "4.0,6.0,8.0,10.0,12.0,14.0,16.0,18.0,20.0,22.0,24.0,26.0,28.0,29.5,31.2,"  
DCS1800_MAX_P = "1.8,3.5,5.3,7.2,9.0,12.0,13.0,15.0,17.0,19.0,21.0,23.0,25.0,27.0,28.5,31.2,"  
DCS1800_MIN_P = "-0.2,1.5,3.3,5.2,7.0,8.0,11.0,13.0,15.0,17.0,17.5,21.0,23.0,25.0,26.5,27.5,"  
PCS1900_MAX_P = "0.5,2.5,4.5,6.5,8.5,10.5,12.5,14.5,16.5,18.5,20.5,22.5,24.5,26.5,28.5,31.0,"  
PCS1900_MIN_P = "-0.5,1.5,3.5,5.5,7.5,9.5,11.5,13.5,15.5,17.5,19.5,21.5,23.5,25.5,27.5,28.0,"
```

- *Please set the Ag8960 RF cable loss here.*

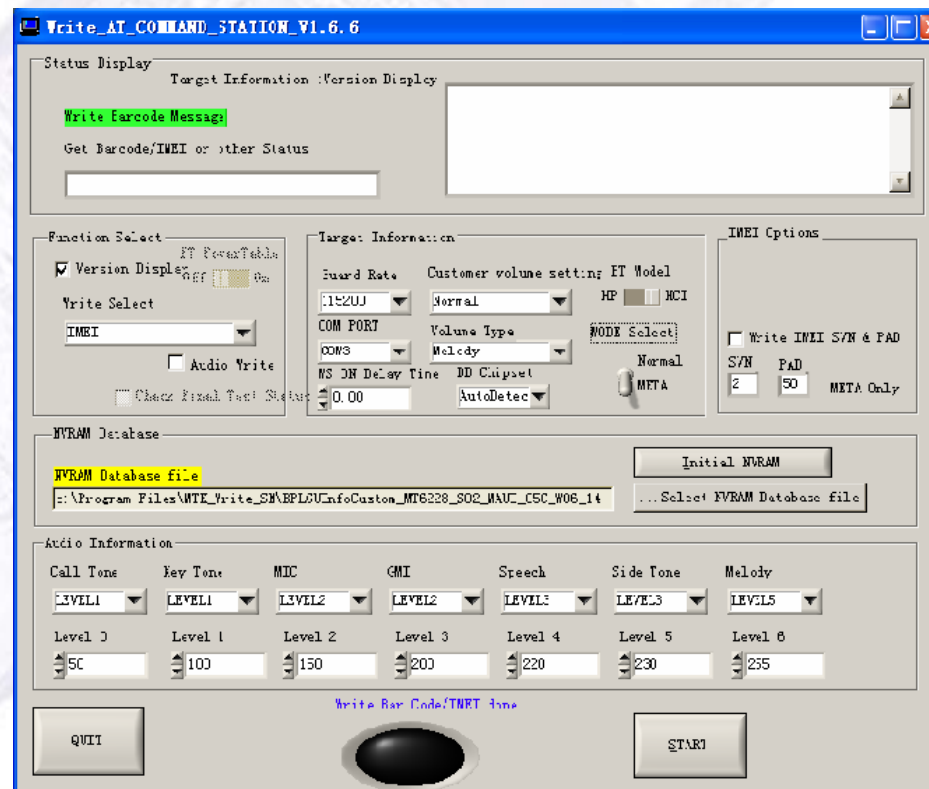
```
AG8960_RF_Amptd_Freq_Offset =  
"500000000,641000000,641100000,876000000,876100000,1312000000,1312100000,1880000000,1881000000,2000000000,"  
AG8960_RF_Amptd_Value_Offset = "-1.2,-1.2,-1.2,-1.2,-1.2,-1.2,-1.8,-1.8,-1.8,-1.8,"  
Using AG8960 Amptd Offset = 1
```

Introduction of SN-Station tool

What is the feature of SN-Station tool?

❖ *SN Station tool supports the following features:*

- 1. Write Barcode/IMEI/BD Address*
- 2. Do the BT Loopback1 ,Loopback2 test*
- 3. Write audio parameters*



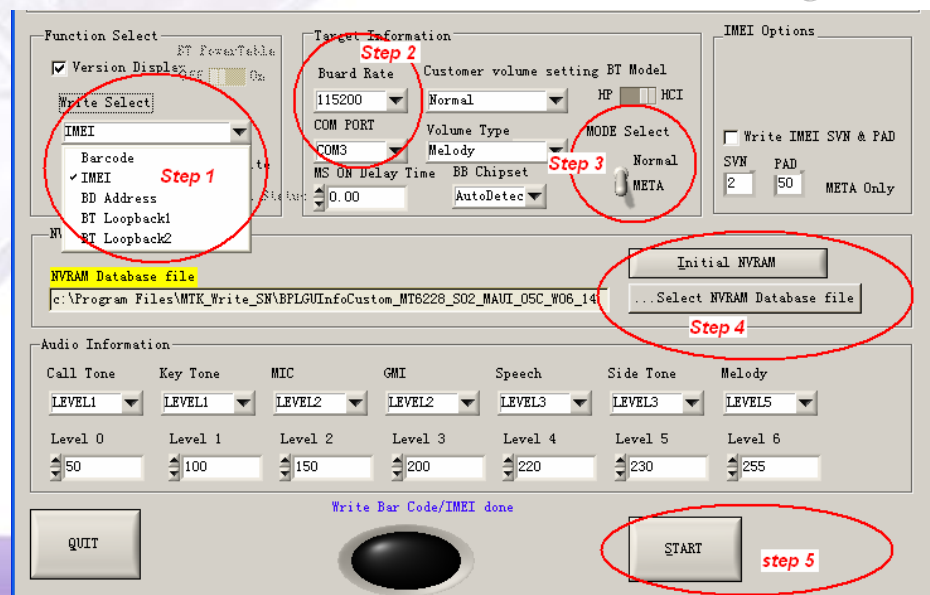
Two modes of SN-Station

- ❖ *One is Meta Mode and the other is Normal Mode.*
 1. *While writing Barcode or IMEI number, both two modes are support.*
 2. *While writing BD Address , Only meta mode is support.*
 3. *While doing BT Loopback1 or Loopback2 test, Only Normal mode is support.*
 4. *While writing audio parameters, Only Meta mode is support.*

Usage of SN Station Tool -Meta Mode

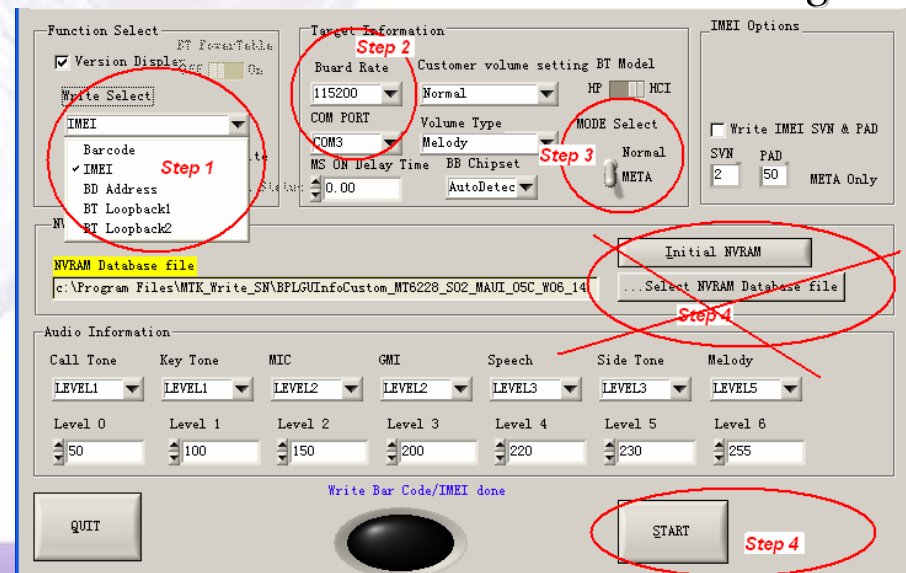
❖ Let's use writing IMEI number in **Meta** Mode as an example:

1. Select "IMEI" in the "Write Select" list
2. Select the right COM port and Baud-Rate.
3. Select **Meta** Mode in the "MODE Select" List
4. Select the NVRAM Database file and Initialize it
5. Press the Start button and scan into the IMEI number
6. Power on to let the handset into **Meta** mode
7. If write success, the "write Bar code/IMEI done" LED will change to blue, else change to red



Usage of SN Station Tool -Normal Mode

- ❖ Let's use writing IMEI number in **Normal** Mode as an example:
1. Select "IMEI" in the "Write Select" list
 2. Select the right COM port and Baud-Rate.
 3. Select **Normal** Mode in the "MODE Select" List
 4. Press the Start button and Scan into the IMEI number
(Don't need to initialize NVRAM)
 5. Power on the handset to enter **Normal** mode
 6. If write success, the "write Bar code/IMEI done" LED will change to blue, else change to red



Q&A





***That's All
Thank you!***