SCF-V01

User Manual

VIA Telecom CBP7.1C CDMA Solution

REV 0.1

Samsung Electro-Mechanics

2012-06-18

Summary

This datasheet presents the general performance and specifications of SCF-V01 CDMA2000 A 1x Rel.0 and 1X EV-DO Rev.A Module.

Table of Contents

1 General Description

1.1 Functional Description

SCF-V01 is the cellular module for either the CDMA2000 A 1x Rel.0 or 1X EV/DO Rev. A at embedded and wireless M2M applications. It provides all the RF, Processing, Memory, Power Management and software, which is based on the Via Telecom CBP6.x or CBP7.x solution. It supports Cell and PCS bands.

1.2 Features

- Dual band cellular and PCS voice and data
- Variant module : CDMA2000 A 1x Rel.0 or 1X EV/DO Rev. A
- Optional GPS and RX Diversity reception
- Support Cell and PCS bands
- GPS (optional)
- 3 U.FL Antenna port : Main, AUX, & GPS (50 Ohm)
- Low power consumption
- Dimension: 50.95 x 30.0mm / Hmax : 4.75 mm
- USB2.0 full speed USB driver
- RoHS compliant
- Operating temperature range: -20 to 60℃

1.3 Applications

- All CDMA M2M devices (Energy, Industrial & Infrastructure, Security, etc.)
- CDMA equipment laptop PC
- CDMA portable device (Tablet, MID, PMP, etc.)
- Desktop CDMA CPE

1.4 Block Diagram

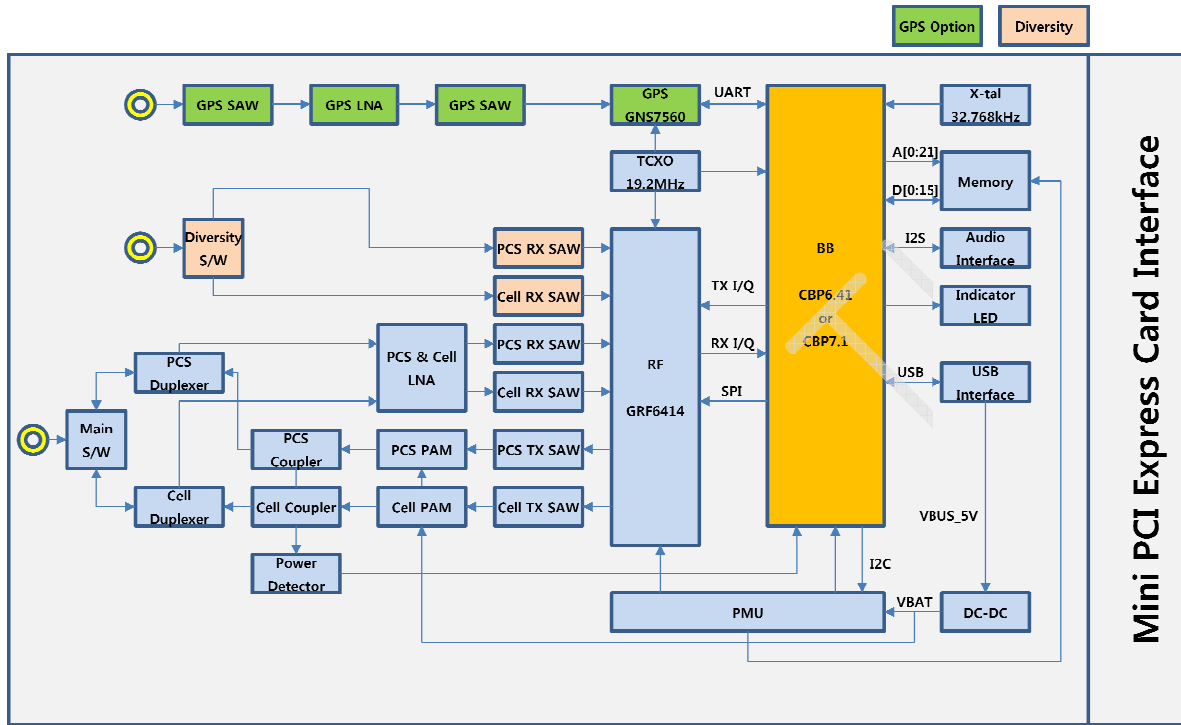The following SCF-V01 block diagram highlights the major functional blocks and interfaces.

Figure 1-1. SCF-V01 Hardware Block Diagram

2 Dimension and Pin Assignments

2.1 Mechanical Dimension

- Form factor : Standard PCI Express® Mini Card Electromechanical Specification

    (Full-Mini Card)

- Size : W x L x H (50.95 x 30.0 x 4.75mm) with 1.0mm PCB
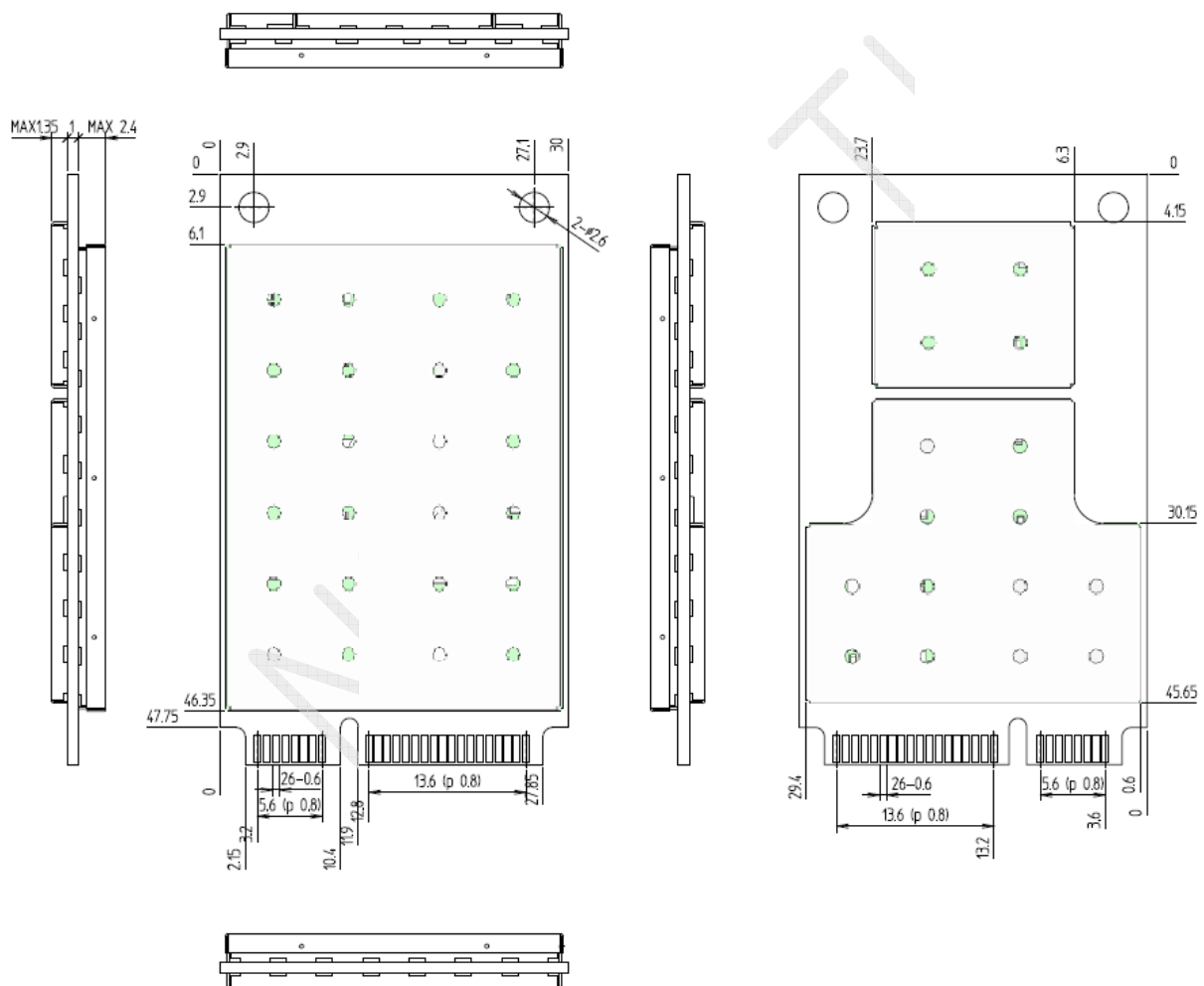
- Weight : 9.8g

Figure 2-1. SCF-V01 Mechanical Dimension (Top View)

2.2 Antenna Connection

U.FL connector for the Main ANT, Diversity ANT, and GPS ANT
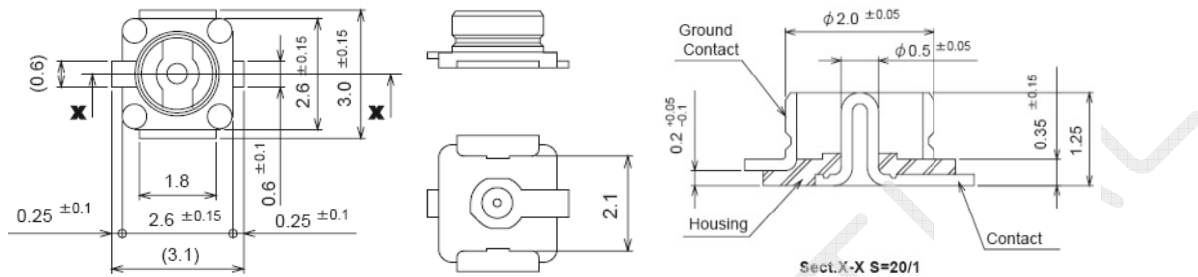
Figure 2-2. Antenna Connector Mechanical Dimension

Attaching an antenna to the SCF-V01 :

● Use a Hirose U.FL connector (Part No. : U.FL-R-SMT, CL No. : 331-0471-0-10) to attach an antenna to a connection point on the SCF-V01.

● Match coaxial connections between the SCF-V01 and the antenna to 50 Ω.

● Minimize RF cable losses between the SCF-V01 and the antenna to less than 0.5 dB.

2.3 Ground Connection

Connecting the SCF-V01 to system ground :

● Connect to system ground for preventing noise leakage.

● Connect with host connector, two mounting holes, and PCI express® mini card connector.

3 Pin Assignments and Descriptions

3.1 Pin Assignments

Pin#	Mini Card Standard	SCF-V01 Pin name	Pin#	Mini Card Standard	SCF-V01 Pin name
51	Reserved	(JTAG_RST_N)	52	+3.3Vaux	+3.3V
49	Reserved	(JTAG_TDI)	50	GND	GND
47	Reserved	(JTAG_TDO)	48	+1.5V	N.C
45	Reserved	(JTAG_TMS)	46	LED_WPAN#	N.C
43	GND	GND	44	LED_WLAN#	N.C
41	+3.3Vaux	+3.3V	42	LED_WWAN#	LED_WWAN#
39	+3.3Vaux	+3.3V	40	GND	GND
37	GND	GND	38	USB_D+	USB_D+
35	GND	GND	36	USB_D-	USB_D-
33	PETp0	(JTAG_CLK)	34	GND	GND
31	PETn0	(JTAG_RTCK)	32	SMB_DATA	N.C
29	GND	GND	30	SMB_CLK	N.C
27	GND	GND	28	+1.5V	N.C
25	PERp0	(RXD0)	26	GND	GND
23	PERn0	(TXD0)	24	+3.3Vaux	+3.3V
21	GND	GND	22	PERST#	RESET_N
19	UIM_C4	N.C	20	W_DISABLE#	W_DISABLE#
17	UIM_C8	N.C	18	GND	GND
		Mechanical Key			
15	GND	GND	16	UIM_VPP	N.C
13	REFCLK+	N.C	14	UIM_RESET	UIM_RESET_N
11	REFCLK-	N.C	12	UIM_CLK	UIM_CLK
9	GND	GND	10	UIM_DATA	UIM_IO
7	CLKREQ#	N.C	8	UIM_PWR	VDD_UIM
5	COEX2	N.C	6	1.5V	N.C
3	COEX1	N.C	4	GND	GND
1	WAKE#	N.C	2	3.3Vaux	+3.3V

Table 3-1. Pin Assignments

3.2 Pin Description

Pin#	Signal Name	Type	Connection to IC Pin	Power Domain	Description
JTAG Interface					
33	JTAG_CLK	I	CP_TCK		(N.C) JTAG Clock
47	JTAG_TDO	O	CP_TDO		(N.C) Data Out
45	JTAG_TMS	I	CP_TMS		(N.C) Mode Select
49	JTAG_TDI	I	CP_TDI		(N.C) Data In
51	JTAG_RST_N	I	CP_TRST_N		(N.C) JTAG Reset
31	JTAG_RTCK	O	CP_RTCK		(N.C) JTAG Return Clock
UART Interface					
23	TXD0	O	CP_UART0_OUT		(N.C) UART0 data out
25	RXD0	I	CP_UART0_IN		(N.C) UART0 data in
USB Interface					
38	USB_D-	IO	USB_DMN		Inverted USB transceiver data
36	USB_D+	IO	USB_DPS		Non-inverted USB transceiver data
UIM Interface					
10	UIM_IO	IO	UIM_IO		UIM data input-output
12	UIM_CLK	O	UIM_CLK		UIM clock signal
14	UIM_RST_N	O	UIM_RSTN		UIM reset signal
GPIOs and Miscellaneous					
22	PERST#	I	PM Reset		Functional Reset
20	W_DISABLE#	I	GPIO[01]		RF Disable, Active low signal
42	LED_WWAN#	O	GPIO[06]		Status indicator via LED device, Active low signal
Power Supplies					
41	+3.3V	I			3.3V Source
39	+3.3V	I			3.3V Source
52	+3.3V	I			3.3V Source
24	+3.3V	I			3.3V Source
8	VDD_UIM	O			UIM power output
2	+3.3V	I			3.3V Source
Ground					
43	GND	-			Ground
37	GND	-			Ground
35	GND	-			Ground
29	GND	-			Ground
27	GND	-			Ground
21	GND	-		-	Ground
15	GND	-		-	Ground
9	GND	-		-	Ground
50	GND	-		-	Ground
40	GND	-		-	Ground

34	GND	-		-	Ground
26	GND	-		-	Ground
18	GND	-		-	Ground
4	GND	-		-	Ground

Type: I=Input, O=Output, I/O=Bi-directional

Table 3-2. Pin Descriptions

4 Electrical Characteristics

4.1 DC Characteristics

Symbol	Parameter	Min	Typ.	Max	Unit
+3.3V	Main input supply from battery to switcher	-0.5	-	+4.8	V

Table 4-1. Absolute Maximum Ratings

Symbol	Parameter	Min	Typ.	Max	Unit
+3.3	Main input supply from battery to switcher	3.0	3.3	3.6	V

Table 4-2. Recommended Operating Conditions

4.2 Environmental Characteristics

Symbol	Parameter	Conditions	Min.	Max.	Unit
ESD	Electro-static discharge voltage	HBM	Class 1C		
To	Operating temperature		-20	+60	°C
Te	Extended operating temperature		-30	+85	°C
Ts	Storage temperature		-40	+125	°C

※ Extended operating temperature range is not fully 3GPP2 CDMA specification compliant.

Table 4-3. Environmental Characteristics

4.3 Power Consumption

Format	RF Band	Mode		Current @ 3.3V	Condition @ Room Temp
1x_RTT	PCS	Idle Mode	Typ	160mA	
		Min Tx Power	Typ	250mA	Cell Power -25dBm
		Tx Max Power	Typ	670mA	Tx Power 23.5dBm
			Max	750mA	
	Cellular	Idle Mode	Typ	160mA	
		Min Tx Power	Typ	220mA	Cell Power -25dBm
		Tx Max Power	Typ	610mA	Tx Power 23.5dBm
			Max	650mA	
EVDO [Rev 0]	PCS	Idle Mode	Typ	200mA	
		Min Tx Power	Typ	340mA	Cell Power -25dBm
		Tx Max Power	Typ	900mA	Tx Power 23.5dBm
			Max	940mA	
	Cellular	Idle Mode	Typ	200mA	
		Min Tx Power	Typ	330mA	Cell Power -25dBm
		Tx Max Power	Typ	800mA	Tx Power 23.5dBm
			Max	850mA	

5 RF Specifications

All measurements are made under nominal supply voltage and room temperature conditions.

5.1 Basic performance of RF Specifications

Frequency   : Band Class0 : TX:824MHz-849MHz; RX:869MHz-894MHz

Band Class1 : TX:1850MHz-1910MHz; RX:1930MHz-1990MHz

Impendence   : 50ohm

VSWR   : < 3

Transmitter Specification	Value
Operating Frequency	824MHz ~ 849MHz (Cellular Band) 1850MHz~1910MHz(PCS Band)
Modulation	OQPSK/HPSK
Conversion Method	GCT`s intrinsic zero-IF (intermediate frequency) & low-IF radio technology
Oscillation Method	VCTCXO & PLL Synthesizer
RF Output Power	Maximum 0.2W Minimum 10nW (-50dBm)
Frequency Stability	+/- 300Hz

Table 5-1. Transmitter Specifications

Receiver Specification	Value
Operating Frequency	869MHz ~ 894MHz (Cellular Band) 1930MHz~1990MHz（PCS Band）
Modulation	OQPSK/HPSK
Conversion Method	Zero-IF (intermediate frequency) & low-IF
Oscillation Method	VCTCXO & PLL Synthesizer
Receiver Sensitivity	-104dBm @ FER 0.5% for 1X -105.5dBm @ FER 0.5% for EVDO

Table 5-2. Receiver Specifications

ITEM	Spec				Test Condition
	LCL	Typ	UCL	Unit	
Tx Max Power	23.0	23.5	24.0	dBm	Cellular Band(824.7MHz,836.52MHz , 848.41MHz) Cal Target : 23.7dBm
	23.0	23.5	24.0	dBm	PCS Band(1851.25MHz , 1880MHz , 1908.75MHz) Cal Target : 23.7dBm
Tx Min Power			-50	dBm	Cellular Band(824.7MHz,836.52MHz , 848.41MHz)
			-50	dBm	PCS Band(1851.25MHz , 1880MHz , 1908.75MHz)
Rho	0.944		1		Cellular Band(824.7MHz,836.52MHz , 848.41MHz)
	0.944		1		PCS Band(1851.25MHz , 1880MHz , 1908.75MHz)
Frequency Error	-300		300	Hz	Cellular Band(824.7MHz,836.52MHz , 848.41MHz)
	-150		150	Hz	PCS Band(1851.25MHz , 1880MHz , 1908.75MHz)
Time Error	-1		1	us	Cellular Band(824.7MHz,836.52MHz , 848.41MHz)
					PCS Band(1851.25MHz , 1880MHz , 1908.75MHz)
Rx Sensitivity (Primary / Secondary)			0.5	%	Cellular Band(869.7MHz,881.52MHz , 893.31MHz) Cell Power : -105dBm , 95% Confidence
			0.5	%	PCS Band(1931.25MHz , 1960MHz , 1988.75MHz) Cell Power : -105dBm , 95% Confidence

Table 5-3. RF Conduction Specifications

6 Label Information

6.1 Module Label

The Label contains Model Name, Product Code, FCC ID, MEID and Serial Number.
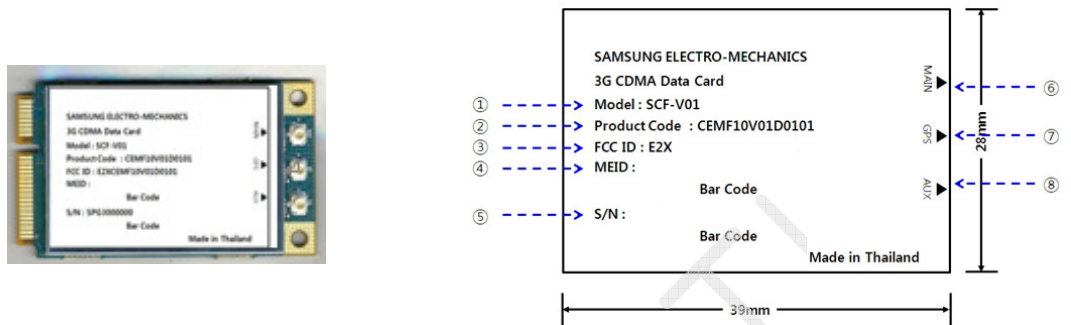
Figure 6-1. Label Information

[Information]

① Model : SCF-V01

② Product Code : CEMF10V01D0101

③ FCC ID : E2XSCF-V01

④ MEID : Mobile Equipment Identifier

⑤ S/N : Serial Number

⑥ MAIN : Main Antenna connection

⑦ GPS : GPS Antenna connection

⑧ AUX : Diversity Antenna connection

6.1.1 S/N(Serial Number)

Ex)

S Q G B 000001 ① ② ③ ④　⑤

S	Q	G	B	000001
①	②	③	④	⑤
Company S: Samsung	Custom Model Q : CEMF10V01D0101	Year F:2011 G:2012	Month 1~9:Jan~SEP A:OCT, B:Nov, C:Dec	000001~FFFFFF Serial No(Hex)

Table 6-1. Serial Number Information

7 Safety Information

7.1 Certification

FCC ID : E2XSCF-V01

	Warning: Exposure to Radio Frequency Radiation The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 20 cm during normal operation. The gain of the antenna for Cellular band must not exceed 2 dBi and PCS band must not exceed 2 dBi.

Can be found under the Display Grant section of www.fcc.gov/oet/ea/fccid after searching on FCC ID: E2XSCF-V01

FCC Compliance Information

This device complies with Part 15 of FCC Rules.
Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received.
Including interference that may cause undesired operation.

7.2 Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Revision History

Revision	Date	Descriptions
0.0	2012-02-10	Initial Release
0.1	2012-06-18	Add Label Information, Add Safety Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

For label requirement when transmitter module is installed in a host,
X
Xhe host shall have an additional permanent label referring to the enclosed module

"Contains Transmitter Module FCC ID: } j – SCF–V01

SCF-V01
ETS(Engineer Test Software) User Manual

REV 0

Steve Heo, Software Application Engineer

Software Part
WS Development Team
Samsung Electro-Mechanics

2012-06-28

Background & Summary
This document describes how to use ETS.

Table of Contents

1 Introduction

This document provides high-level functional descriptions of the CBP 5.X CDMA Baseband Processor digital hardware subsystems.

1.1 Acronyms

ADC   Analog-to-Digital Converter

AMPS   Advanced Mobile Phone System

APB   ARM Peripheral Bus

CBP5.X   CDMA Baseband Processor version 4.1/5.0/5.1

CP   Control Processor

DAI   Digital Audio Interface

DAC   Digital-to-Analog Converter

DSPM   Digital Signal Processor - Modem

DSPV   Digital Signal Processor – Voice

DUT   Device Under Test

EBI   External Bus Interface

ICE   In-Circuit Emulator

MMI   Man-Machine Interface

PCG   Power Control Group

PLL   Phase Locked Loop

PWM   Pulse-Width Modulator

RTOS   Real-Time Operating System

SAT   Supervisory Audio Tones

SPI   Serial Programming Interface

ST   Signaling Tone

THRE   Transmitter Holding Register Empty

UART   Universal Asynchronous Receiver/Transmitter

UIM   User Identity Module

WBD   Wideband Data

1.2 List of Terms

Table 1 contains a list of terms and abbreviations used in this section.

Table 1 - External Interface Pin Attributes

Type	Description
pu[1]	Internal pull-up
pd[2]	Internal pull-down
ldrv1	CMOS, low drive strength (1ma)
ldrv2	CMOS, low drive strength (2ma)
mdrv	CMOS, medium drive strength (4ma)
hdrv	CMOS, high drive strength (8ma)
_N	Indicates an active low signal
z	Tri-state
od	Open-drain
vanlg	Input or output with analog voltage levels
dvdd_c	Digital VDD to core cells (1.8V)
dvss_c	Digital VSS to core cells.
dvdd_r	Digital VDD to pad ring (3V)
dvss_r	Digital VSS to pad ring
avdd	Analog VDD (3V)
avss	Analog VSS

[1]Internal pull-up resistors are non-linear elements; they have a resistance of about 80 K at operating conditions of nominal process, 25° C and 3 V I/O supply voltage. They exhibit 140 K at operating conditions of WC process, 125^oC junction and 2.85 V I/O supply and 42 K at conditions of BC process, 0° C and 3.15 V supply voltage.

[2]Internal pull-down resistors: The same conditions apply as listed above for internal pull-up resistors.

Table 2 - Reset Legend

Type	Description
Z	Tri-State
H	Tri-State with Pull-Up
L	Tri-State with Pull-Down
1	CMOS High
0	CMOS Low
X	Unknown

2 Setup and Quick Start

2.1 System Requirements

The following are the minimum requirements for running ETS:

Operating System: Windows 2000/XP or later

Memory:	At least 128 MB of RAM
Processor:	Pentium II or better

2.2 Installing and Removing

2.2.1 Installing ETS

VIA Telecom delivers the installation program, **"ETS.exe"**, as part of the software release package. VIA Telecom strongly recommends installing **ETS** in the default directory as the installing shell indicated.

The VIA Telecom software releases are typically numbered "rX.Y.Z" where:

    X = Major Release Number

    Y = Minor Release Number

    Z = Patch to Minor Release

The VIA Telecom complete software package contains:

    a.   The VIA Telecom CP code, which executes on
        the ARM7TDMI-S™ processor embedded in the CBP5.X chip.

    b.   An ".img" Image file, which contains code or code patches that will run on the DSPM and DSPV
        embedded Oak processors.

    c.   The "ETS.exe" and "ETS_Config_x.exe" package, which installs ETS.

Example

Assume that the VIA Telecom software release is: **r6.0.6.**

1.   The ETS installation program would be: <Customer Path>\ PCTools\ ets\ ETS_6.0.6.exe and ETS_Config_0.14.2_vtui2_5x.

2.   Run ETS_6.0.6.exe and ETS_Config_0.14.2_vtui2_5x . For this example, ETS is installed in "C:\ Program Files\ VIA Telecom\ VTC-ETS\ ", ETS_Config is in "C:\ Program Files\ VIA Telecom\ ETS_Config\ ".
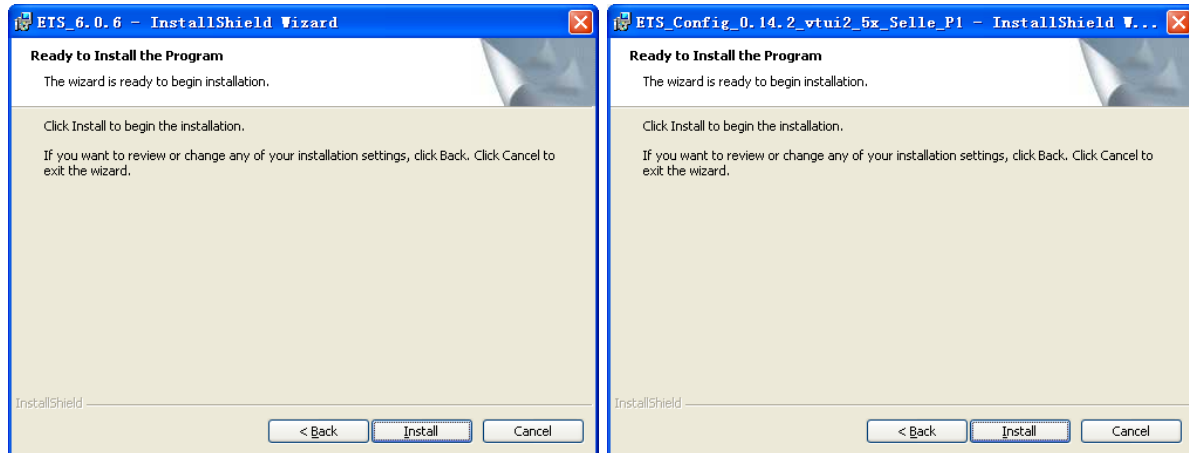
3. For other items which will meet in installing process, use default setting is fine. Since from now on, all of CBP5.X reference software will use same ETS.exe, you **NEED NOT** pay additional attention to associate version number between the software release and ETS.

2.2.2 Removing ETS

Use the standard Windows method to remove (uninstall) software.

1. Go to the **Control Panel** and select **Add or Remove Programs.**

2. Select **ETS** and click the **Add/Remove** button. Follow the standard procedure for uninstalling Windows-based software.
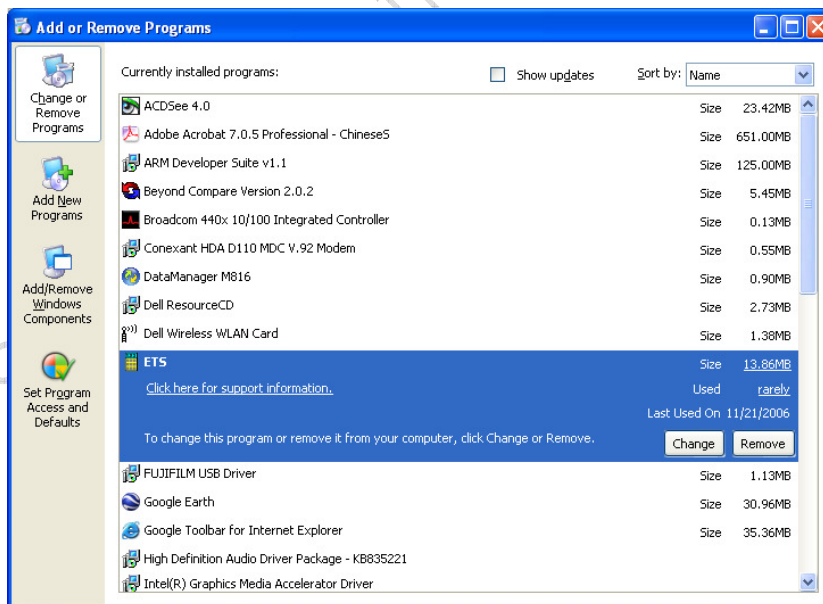
2.3 Running ETS for the First Time

Continuing with the example in Section 2.21, start ETS by selecting:

Windows Desktop →ETS(Config 0.14.2_vtui2_5x_Selle_P1):

Now follow the steps in Section 2.5.1.

2.4 How to Exit

1. From the ETS menu, select **File → Exit**.

    See Section 2.5.2 for details on how to save the ETS configuration when exiting.
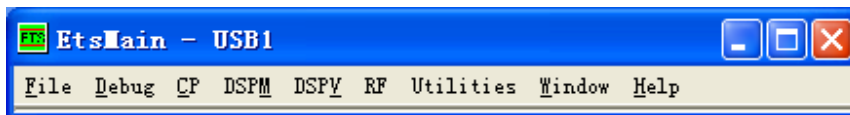
2.5 Opening and Saving Configuration Files

2.5.1 Opening Configuration Files

1. From the ETS menu, select **File → Open...**
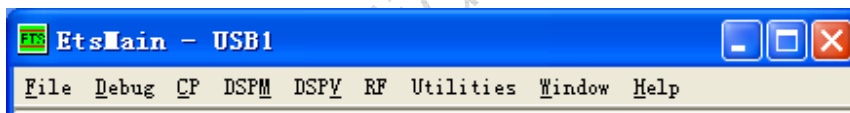
2. Continuing with the *Example* of Section 2.2.1, in the Window below select the Path:

    C:\ Program   Files\ VIA   Telecom\ ETS_Config\ 0.14.2_vtui2_5x_Selle_P1\ config\ cdma   and
    then select the file **default.cfg**
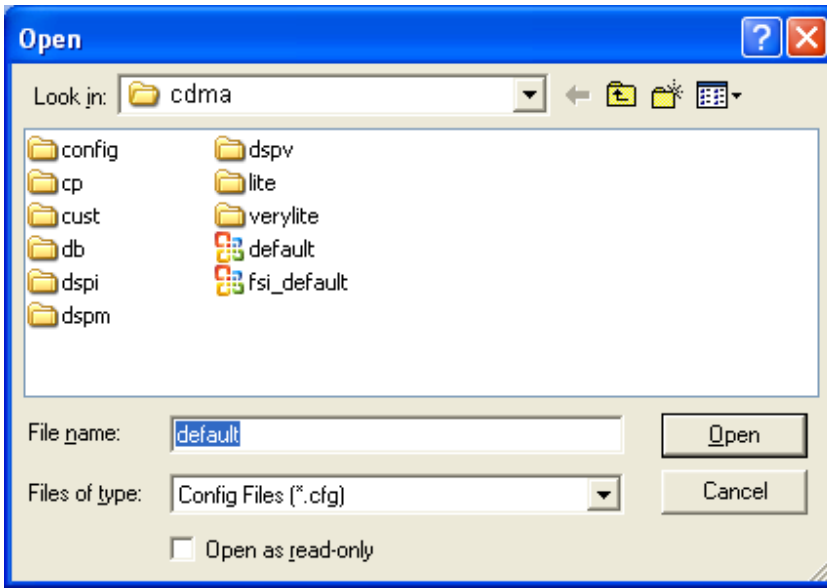
3. After opening **default.cfg** you should see a screen, which looks similar to the picture below. This screen has all the standard ETS sub-windows which are typically used at VIA Telecom.
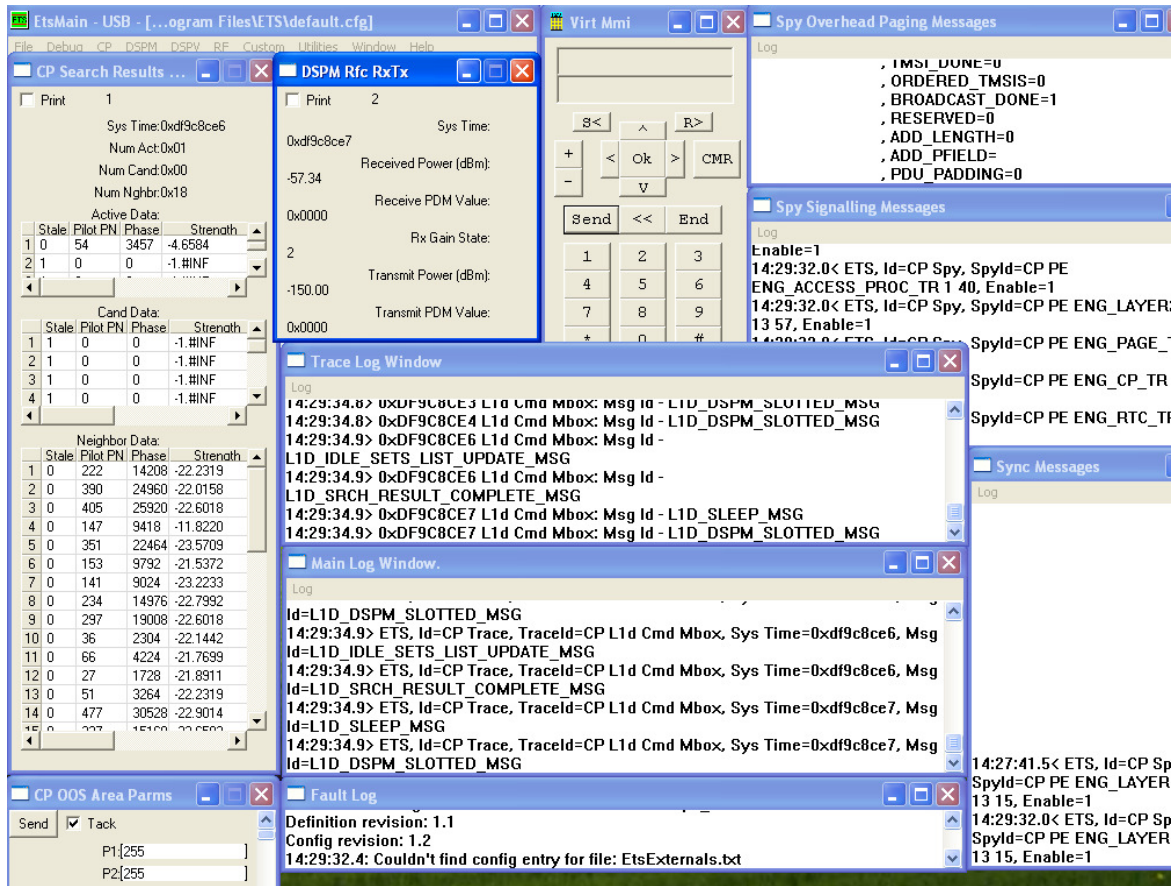
2.5.2 Saving Configuration Files

1. If you have used any special ETS commands during your present session which you'd like to use in a future session then you can explicitly save the present configuration by using the ETS Main Menu command:

> File → Save As
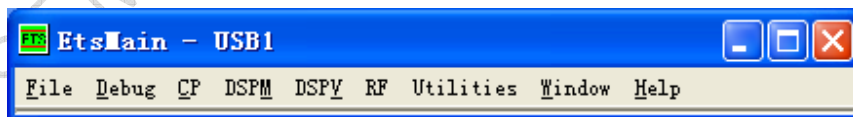
2. Enter the name and path for your configuration file in the dialog box below, or you can choose to overwrite the present configuration file (typically, "default.cfg").
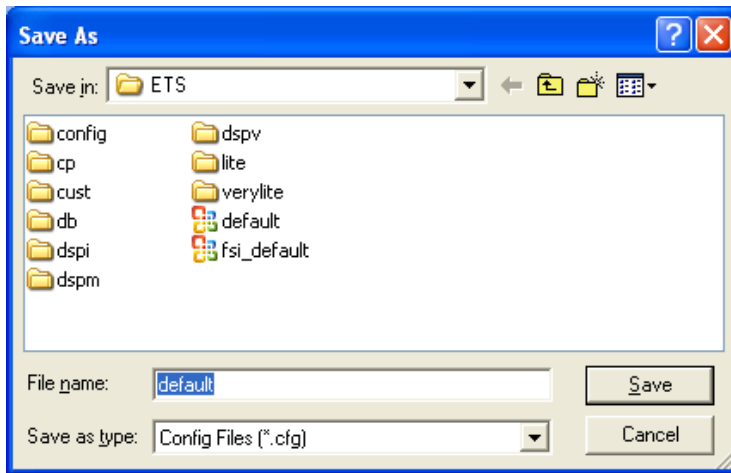
2.6 ETS Defines

File → Defines

ETS allows the user to configure the tool for various standard definitions:
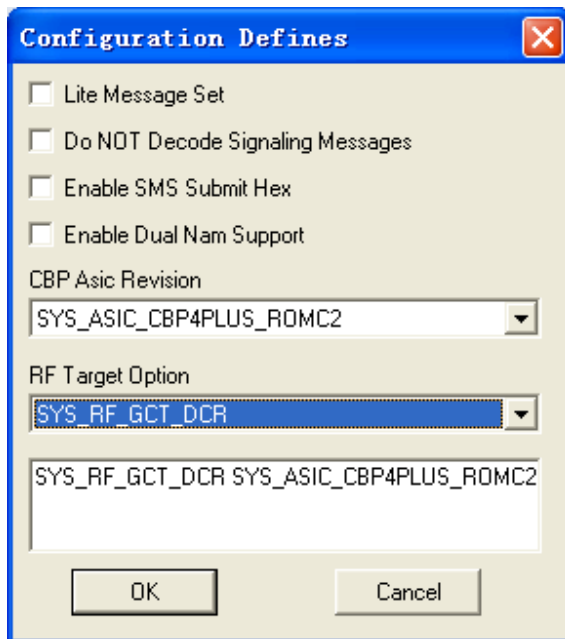
Note:

1. This defines must be configured correct as the target HW you using. Else it will case some UN-expect error. If you don't sure which option you should select, call VIA application engineer for help.

2. After you changed the definition, should close and restart ETS to make the effort available.

2.7 ETS Options

File → Options

There are some parameters you can modify, the value depend on the CP request. Special for **Flash Download Timeout (Sec)**, we recommend you adjust it longer than the total CP erase time (the lager CP size is, the longer erase time is). **200s** is the typically value VIA internal used.

3 Idle Mode

3.1 RSSI for CDMA

CDMA: DSPM → Spy → RFC → DSPM Rfc RxTx

Usually this window is opened from loading the "default.cfg" configuration file.
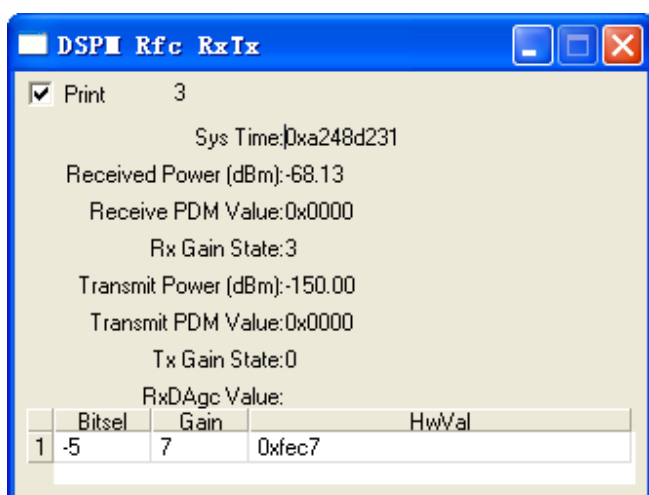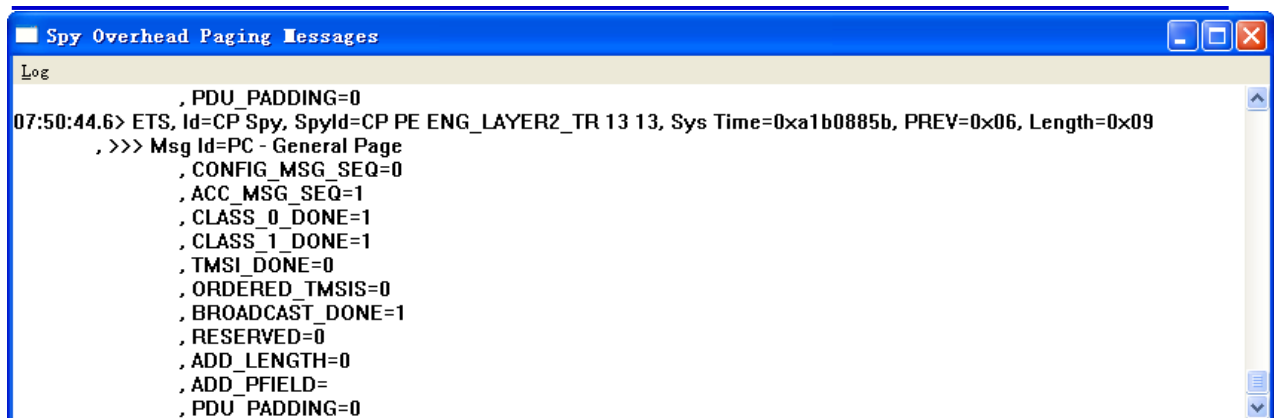
Window Entries	Definition
Print	If checked, the window will be printed onto the main log as a trace: 15:17:28.8> ETS, Id=DSPM Spy, SpyId=DSPM Rfc RxTx, Sys Time=0xa248d231, Received Power (dBm)=-68.13, Receive PDM Value=0x0000, Rx Gain State=3, Transmit Power (dBm)=-150.00, Transmit PDM Value=0x0000, Tx Gain State=0, Bitsel=-5, Gain=7, HwVal=0xfec7
Sys Time	Recorded system time for reference purposes.
Received Power (dBm)	Received power from the BS interpreted by the MS.
Receive PDM Value	Received power from the BS interpreted by the MS in PDM. This area used for superhet solution.
Rx Gain State	Gain state that the MS receiver is in.
Transmit Power (dBm)	Transmit power to the BS interpreted by the MS in dBm.
Transmit PDM Value	Transmit power to the BS interpreted by the MS in PDM.
Tx Gain State	Gain state that the MS transmitter is in.
RxDAgc Value	Received power from the BS interpreted by the MS, this area used for DCR solution.

3.2 Overhead Paging Spy

CP → SPY → PS → Call Proc → Engine → Eng_Layer2_TR → CP PE ENG_LAYER2_TR 13 13 (for CDMA)

The spy is enabled automatically once the "default.cfg" is loaded. This spy displays all CDMA overhead paging messages broadcast from the base station.
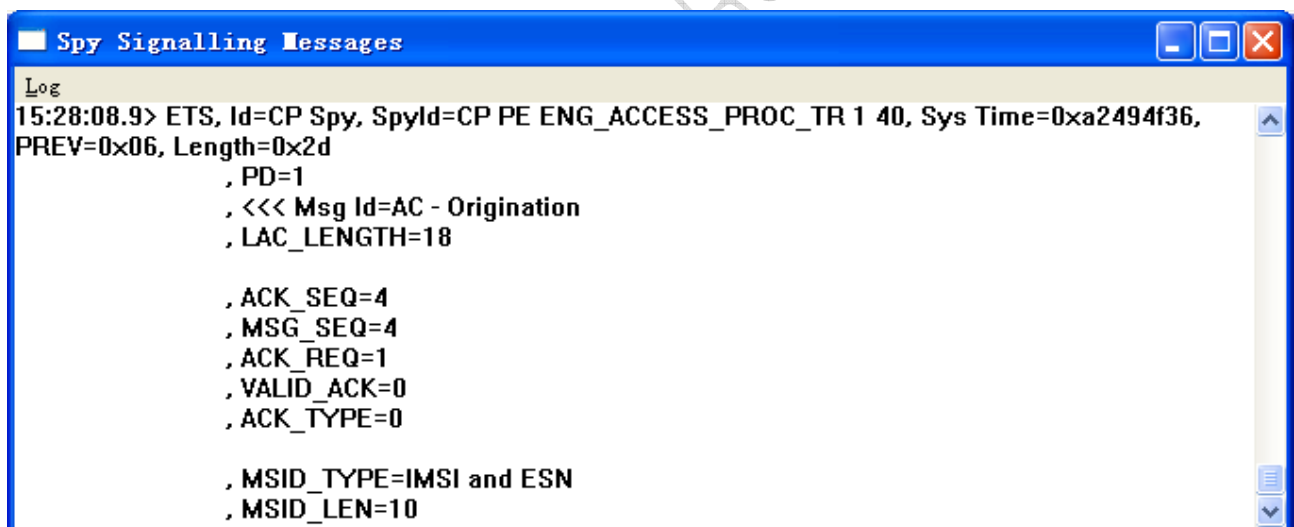
```
Spy Overhead Paging Messages                                              [_][□][X]
Log
                        , PDU_PADDING=0
07:50:44.6> ETS, Id=CP Spy, SpyId=CP PE ENG_LAYER2_TR 13 13, Sys Time=0xa1b0885b, PREV=0x06, Length=0x09
        , >>> Msg Id=PC - General Page
                        , CONFIG_MSG_SEQ=0
                        , ACC_MSG_SEQ=1
                        , CLASS_0_DONE=1
                        , CLASS_1_DONE=1
                        , TMSI_DONE=0
                        , ORDERED_TMSIS=0
                        , BROADCAST_DONE=1
                        , RESERVED=0
                        , ADD_LENGTH=0
                        , ADD_PFIELD=
                        , PDU_PADDING=0
```

3.3 Registration Message Spy

CP → SPY → PS → Call Proc → Engine → ENG_ACCESS_PROC_TR → CP

ENG_ACCESS_PROC_TR 1 40

The spy is enabled automatically once the "default.cfg" is loaded. This spy displays all messages from mobile to the base station during idle mode, through access channel.

```
Spy Signalling Messages                                                   [_][□][X]
Log
15:28:08.9> ETS, Id=CP Spy, SpyId=CP PE ENG_ACCESS_PROC_TR 1 40, Sys Time=0xa2494f36,
PREV=0x06, Length=0x2d
                , PD=1
                , <<< Msg Id=AC - Origination
                , LAC_LENGTH=18

                , ACK_SEQ=4
                , MSG_SEQ=4
                , ACK_REQ=1
                , VALID_ACK=0
                , ACK_TYPE=0

                , MSID_TYPE=IMSI and ESN
                , MSID_LEN=10
```

3.4 Tx PWR Detect Measurements Spy

CP → Spy → HWD → CP Tx Pwr Detect Measurements

This spy only works in the following conditions:

Tx Pwr Detect cal tables "Tx Pwr Detect" and "Tx Pwr Det Freq Adj" and "Det Temp Adj" are populated.

Mobile is transmitting beyond the threshold that AUX ADC actually kicks in (typically +15dBm or above)
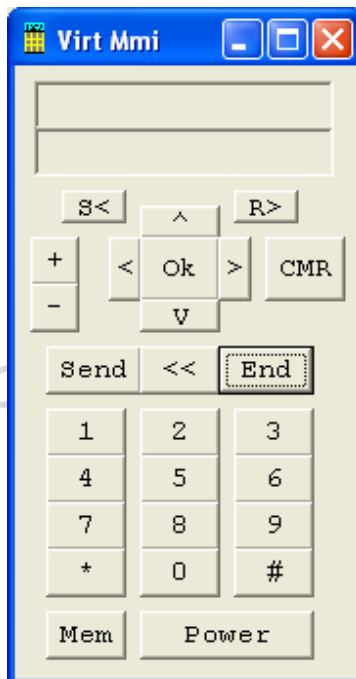
Window Selections	Definition
Print	If checked, the window will be printed onto the main log as a trace: 10:40:50.1> ETS, Id=CP Spy, SpyId=CP Tx Pwr Detect Measurements, Sys Time=0x823ee47e, Measured AUX ADC=0x04de, Tx Pwr (dBm)=-24.781250, Tx Pwr Freq Adj (dBm)=5.000000, Tx Pwr Temp Adj (dBm)=0.000000, Unadj Tx Pwr (dBm)=19.781250
Sys Time	Display system time for reference.
Measured AUX ADC	Reads AUX ADC value of Tx Pwr Detect.
Tx Pwr (dBm)	Displays mobile's final transmitting power in dBm.
Tx Pwr Freq Adj (dBm)	Display corresponding Adj read from cal table.
Tx Pwr Temp Adj (dBm)	Display corresponding Adj read from cal table.
Unadj Tx Pwr (dBm)	Display the unadjusted Tx power transmitted.

3.5 HWD Frequency Channel Trace

CP → Trace → HWD → CP Freq Channel

This trace is enabled automatically once the "default.cfg" is loaded. This trace displays the channels that the mobile searches in the Trace Log Window when the protocol stack is on:
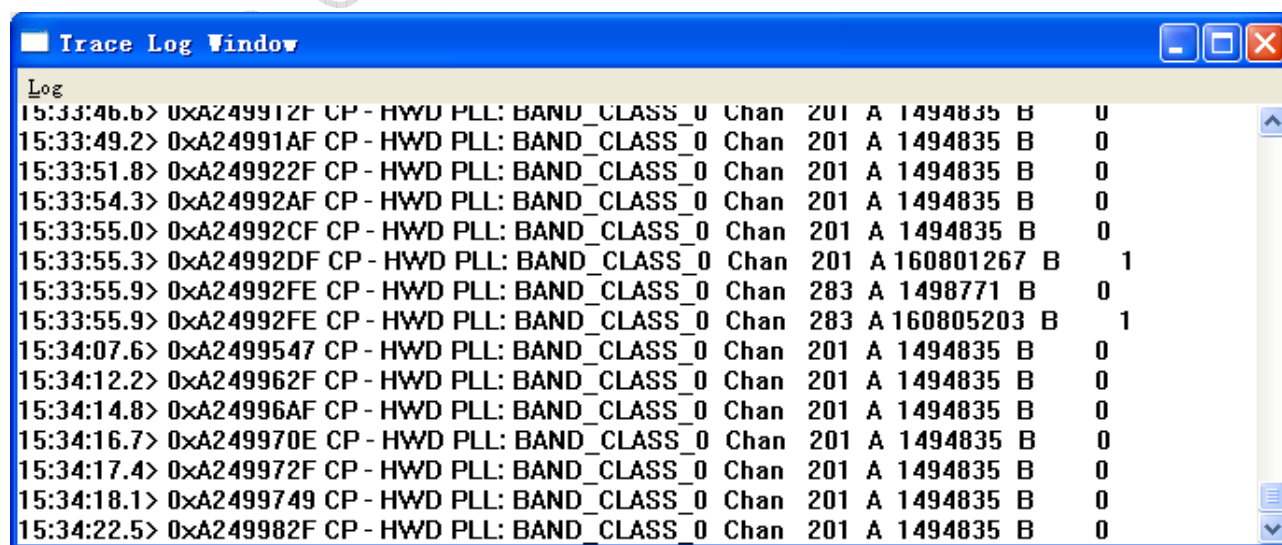
3.6 Pilot Strength Spy

CP → Spy → L1D → CP Search Results Active

Usually this window is opened from loading the "default.cfg" configuration file. This spy display information of Active PNs involved, candidate PNs that are possible for handoffs, and neighbor PNs that are available for possible handoffs.

Window Selections	Definition
Print	If checked, the window will be printed onto the main log as a trace: 15:36:10.1> ETS, Id=CP Spy, SpyId=CP Search Results Active, Sys Time=0xa249ad32, Num Act=0x01, Num Cand=0x00, Num Nghbr=0x17 , Stale.0=0, Pilot PN.0=54, Phase.0=3457, Strength.0=-4.4224 , Stale.1=1, Pilot PN.1=0, Phase.1=0, Strength.1=-1.#INF , Stale.2=1, Pilot PN.2=0, Phase.2=0, Strength.2=-1.#INF , Stale.3=1, Pilot PN.3=0, Phase.3=0, Strength.3=-1.#INF , Stale.4=1, Pilot PN.4=0, Phase.4=0, Strength.4=-1.#INF , Stale.5=1, Pilot PN.5=0, Phase.5=0, Strength.5=-1.#INF , Stale.0=1, Pilot PN.0=0, Phase.0=0, Strength.0=-1.#INF , Stale.1=1, Pilot PN.1=0, Phase.1=0, Strength.1=-1.#INF , Stale.2=1, Pilot PN.2=0, Phase.2=0, Strength.2=-1.#INF , Stale.3=1, Pilot PN.3=0, Phase.3=0, Strength.3=-1.#INF , (etc. up to Stale39=…)
Sys Time	Display system time for reference.
Num Act	Number of PNs currently on the active list.
Num Cand	Number of PNs currently on the candidate list.
Num Nghbr	Number of PNs currently on the neighbor list.
Stale	"1" = such PN is actually available for communications to mobile.
Pilot PN	Display the PN number(s) of the pilot(s) that the mobile is aware of.
Phase	Display the phase of the pilot seen by the mobile.
Strength	Display the strength of the pilot seen by the mobile.

4 In-Call Mode

4.1 Voice Call Initiate

Utilities -> Virtual MMI Utility

To initiate a call, first click "Power" then dial any number and click "Send" Key on the Virt MMI.

As an alternative to using the Virtual MMI, calls can be initiated using:

CP → PS → UI Command → CP Call Initiate
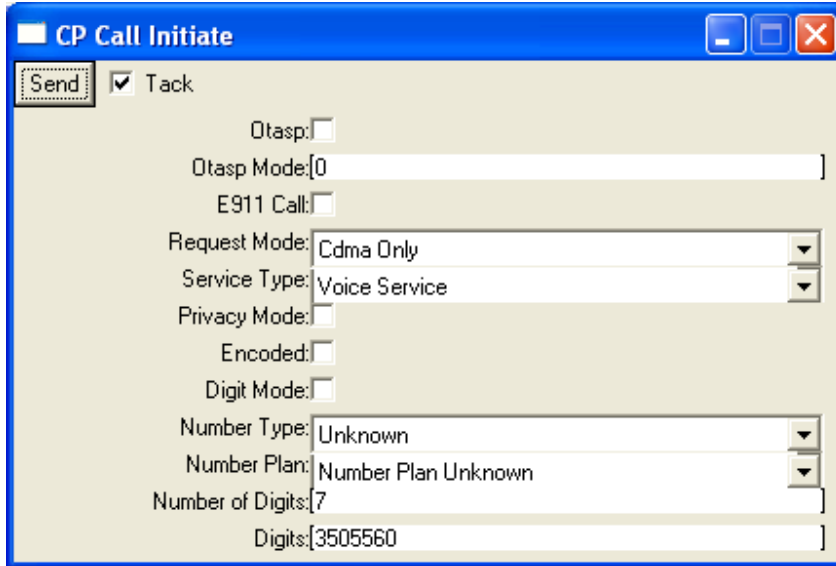
Window Selections	Definition
Send	Send to perform call initiate command.
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Otasp	Check if it is an OTASP call.
Otasp Mode	If it is an OTASP call, entry OTASP mode.
E911 Call	Check if it is calling "E911".
Request Mode	
Service Option	Choice a service option
Privacy Mode	
Encoded	
Digit Mode	
Number Type	
Number Plan	
Number of Digits	
Digits	

4.2 Voice Call Answer

Similar to section 4.1, there are two ways of achieving this: through Virtual MMI or CP command.

1. Using Virtual MMI, click "Send" when "Call Alert" is displayed.

2. Or use CP → PS →UI Command → CP Call Answer and click "Send"
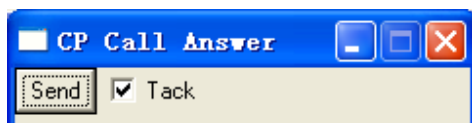
4.3 Voice Call Hang Up

Similar to section 4.1, there are two ways of achieving this: through Virtual MMI or CP command.

Using Virtual MMI, click "End" to terminate a call.

Or use CP → PS → UI Command → CP Call Hangup and click "Send"

4.4 Voice Call Configuration

4.4.1 Voice Privacy Enable/Disable

CP → UI → CP Set Privacy Mode
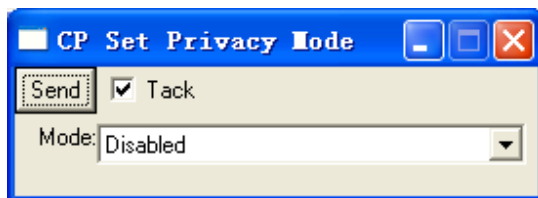
CP → PS → Voice Privacy → CP Voice Privacy Enable (or Disable)
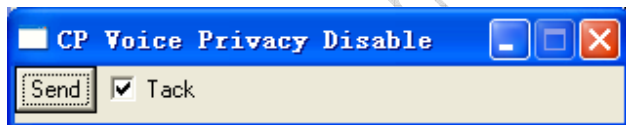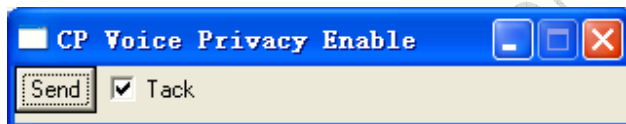
4.4.2 Protocol Rev in Use

CP → PS → CP Protocol Rev in use
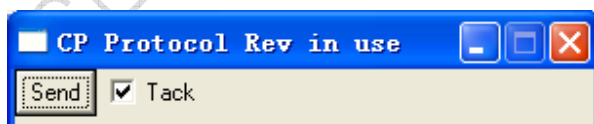
This command returns the protocol revision in use for the mobile which responds as follows:

17:05:46.6< ETS, Id=CP Protocol Rev in use

17:05:46.7> ETS, Id=CP Protocol Rev in use, P_REV in use=IS_2000

4.4.3 OOS Parameters

CP → PS → CP OOS Area Parms

Sending this command with the default values shown disables the phone from going out of service (sleep) when the base station is not available for an extended period of time.
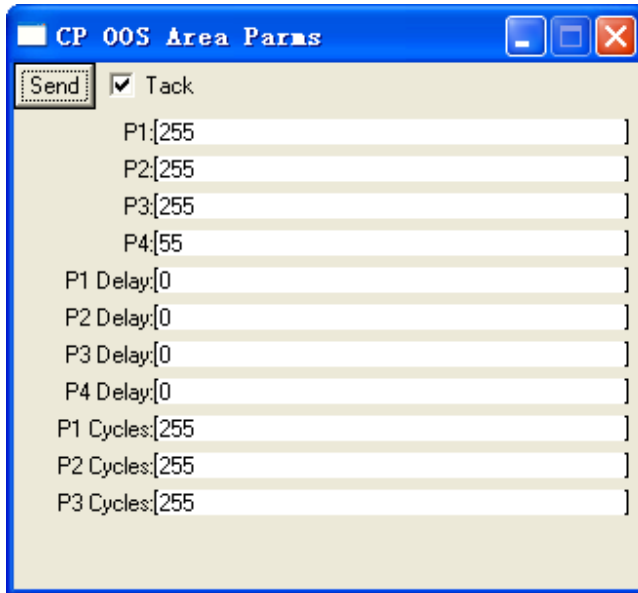
Window Selections	Definition
P1-P4	# of attempts in phase 1-4
P1 Delay-P4 Delay	sec delay between phase 1-4 attempts
P1 Cycles-P3 Cycles	number of repeats of N attempts + a delay

4.4.4 Set Deep Sleep Slice Time

CP → UI → CP Set Deep Sleep Time Slice

Window Selections	Definition
Send	Send to perform the command.
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Time Slice	

4.5 Radio Control

4.5.1 Tx Pwr Detect Measurements Spy

Please refer to section 3.4 for detailed description.

4.5.2 RSSI for AMPS and CDMA

Please refer to section 3.1 for detailed description.

4.5.3 DSPM AFC Frequency Error Spy

DSPM → Spy → Rfc → DSPM Rfc Afc Freq Error
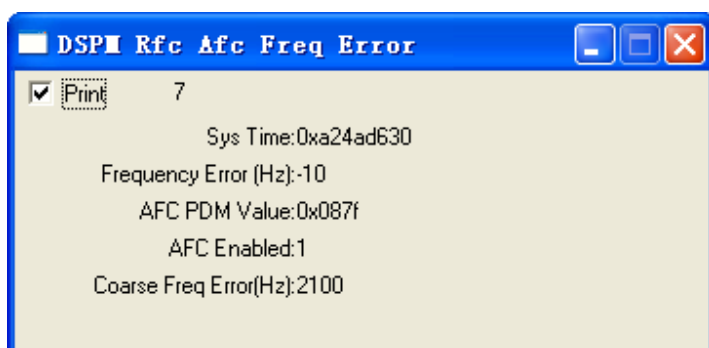
Window Selections	Definition
Print	If checked, the window will be printed onto the main log as a trace: 16:01:30.6> ETS, Id=DSPM Spy, SpyId=DSPM Rfc Afc Freq Error, Sys Time=0xa24ad630, Frequency Error (Hz)=-10, AFC PDM Value=0x087f, AFC Enabled=1, Coarse Freq Error(Hz)=2100
Sys Time	Display system time for reference.
Frequency Error (Hz)	Frequency error recorded.
AFC PDM Value	AFC PDM Value used.
AFC Enabled	AFC enabling state.
Coarse Freq Error (Hz)	Display coarse frequency error.

4.5.4 HWD Freq Channel Trace

Please see section 3.5 for detailed descriptions.

4.5.5 Pilot Strength Spy

Please see section 3.6 for detailed descriptions.

5 Test/Debug Capability

5.1 Basics

5.1.1 Communication Port Configuration

USB Port

Debug -> Comm -> USB

Then the ETS will show the connect port as USB
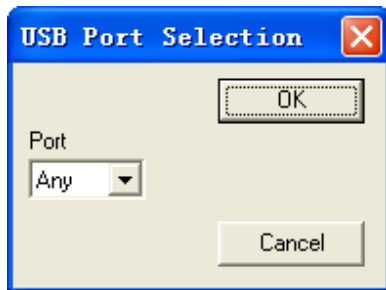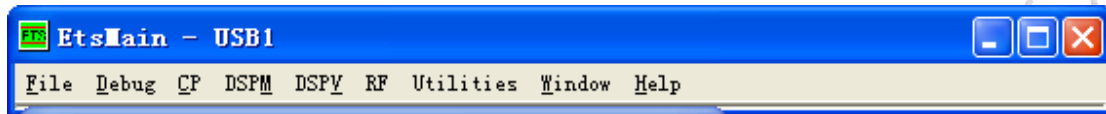
Serial Port

Debug → Comm → Serial, to select a COM port for communicate with DUT.
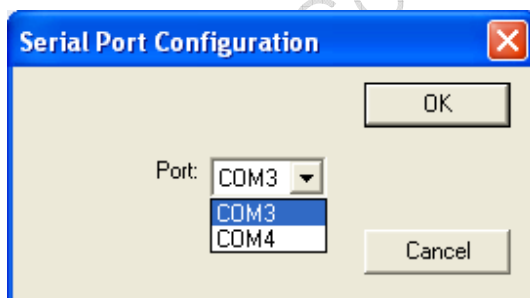
CP -> Options, set the Initial Baud Rate as 115200.
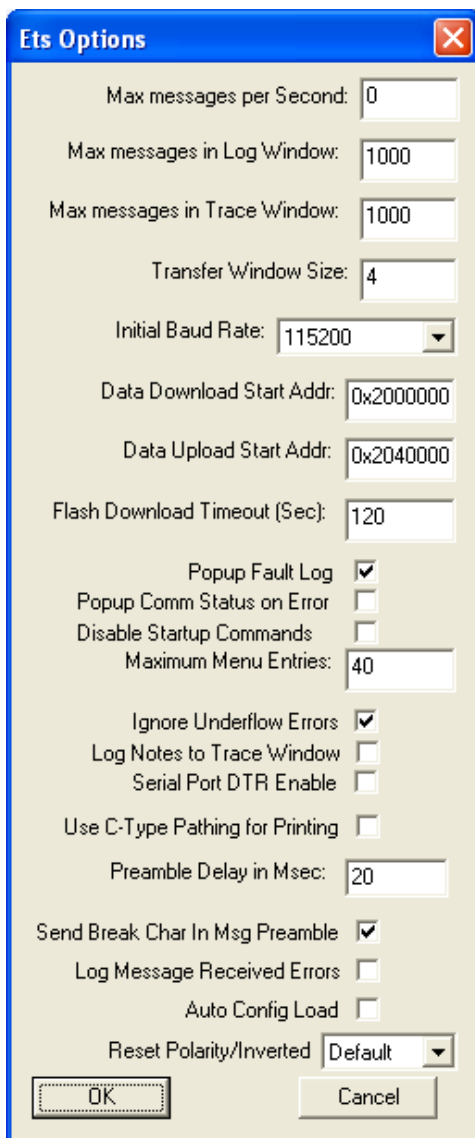
5.1.2 Loopback Test

Debug → Loopback

This function used to test the USB/COM communications with CP, DSPM, or DSPV.

Calls CP Loopback, DSPM Loopback, and DSPV Loopback.
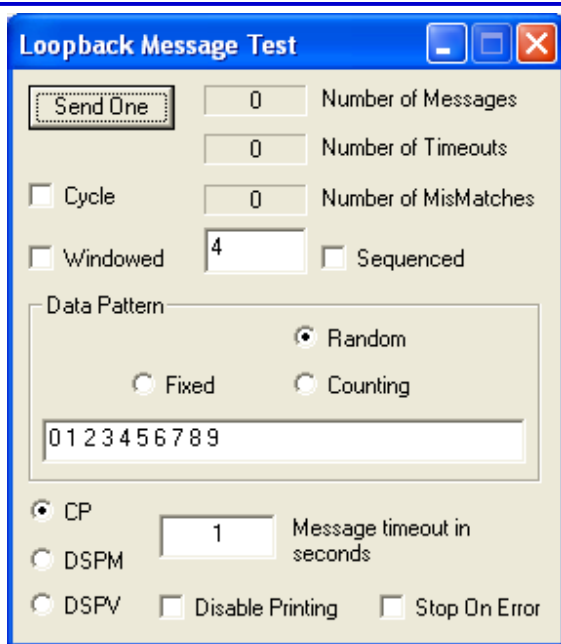
Window Selections	Definition
Number of Messages	Number of messages sent.
Number of Timeouts	Number of failures.
Number of Mismatches	Number of differences between what was sent and what was received.
Send One	Start Loopback test, one click will only sends out one command.
Cycle	When checked, loopback test will continuously run until either Cycle is un-checked or the Loopback window is closed. Will stop if you double clicked.
Windowed	When checked, four loopback requests are sent before any reply is received. Then sends and replies will alternate.
Fixed Pattern	The user can supply a pattern of choice. Multiple words can be sent with a size of: CP 0x00 – 0xff and 0x0000 – 0xffff for both DSPV and DSPM.
Stop On Error	Test will stop on timeout or mismatch errors.
CP	Tests the loopback with the CP.
DSPM	Tests the loopback with the DSPM.
DSPV	Tests the loopback with the DSPV.
Message timeout in seconds	Length of time the system will wait for a reply before issuing the message, "15:44:32.4: Timeout on message loopback"
Disable Printing	When checked, messages to the Main Log window are suspended.

CP, DSPM, DSPV

Referring to Section 5.1.2 above, selecting CP, DSPM or DSPV for the loopback debug ensures functionality of the specific sector in the mobile.

5.1.3 Raw Rx/Tx Serial Data

File → Raw → Tx or Rx

This command enables printing the raw data onto the Main Log window that describes the transfer of serial data between ETS and the board.
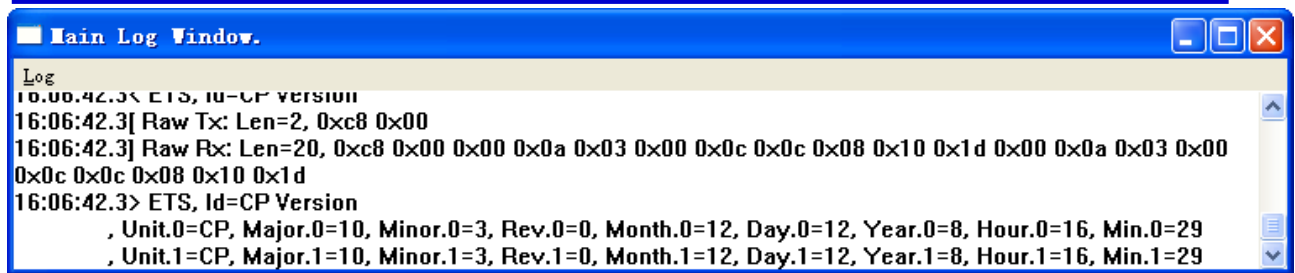
5.1.4 Enable Generic Ack
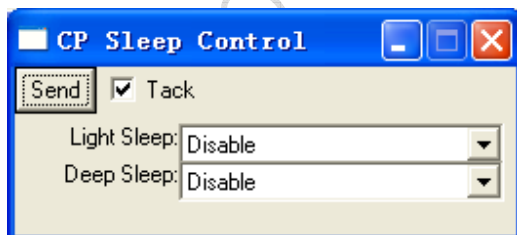
Debug → Enable Generic Ack

This command controls the display of the acknowledgement to any command sent from ETS to the mobile. If enabled, a response message for each command is returned. A check mark displays next to the command if enabled.
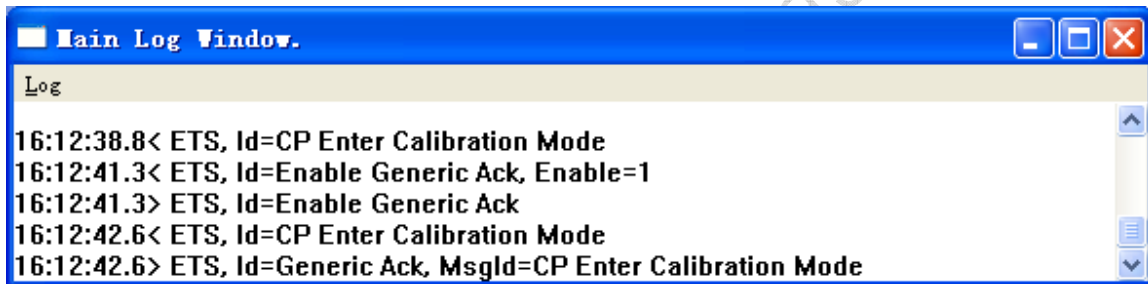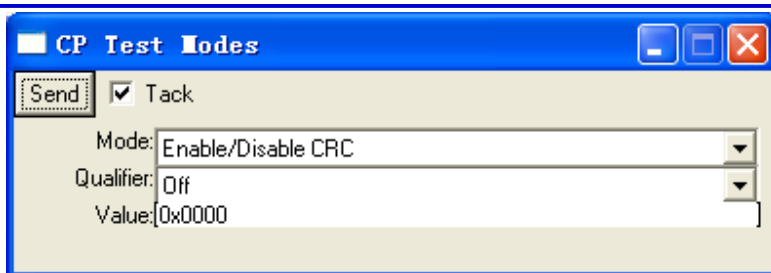

5.2 Test Modes

5.2.1 CP Sleep Control

CP → MON → CP Sleep Control

This command enables/disables the sleep operation of the CBP5.X software so the unit does/does not power down for a sleep period and wakes up for only the wake-up period duration.

5.2.2 Slotted Mode Enable/Disable

CP → PS → Test mode → CP Test Modes

To disable slotted: Set Qualifier to "Off" and click "Send" (Value entry is ignored).

To enable slotted: Set Qualifier to "On" and click "Send" (Value entry is ignored).

5.2.3 Pwr Savings Mode Config

CP → HWD → Pwr Savings → CP Power Savings Mode Config
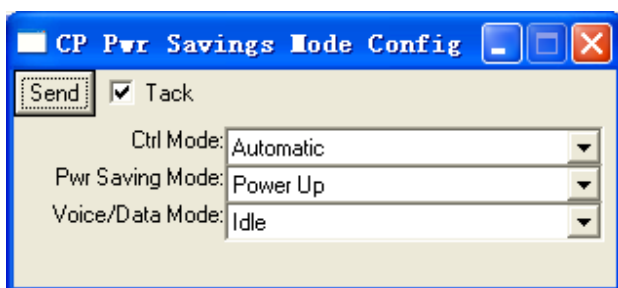
sets the power savings mode

Window Selections	Options	Definition
Send	--	Send to perform power savings mode configuration.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Ctrl Mode	Automatic	Stack values are used – selections in Band and Channel are ignored.
	Disable	
	Manual	Values selected in Band and Channel are used
Pwr Saving Mode	Power Up	
	Power Up Qpch	
	CDMA Rx Acq	
	CDMA Rx	
Voice/Data Mode	Idle	
	Mic On	
	Spkr On	
	Mic+Spkr On	

5.2.4 Pwr Savings Config

CP → HWD → Pwr Savings→ CP Pwr Savings Config

Window Selections	Options	Definition
Send	--	Send to perform power savings configuration.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Ctrl Mode	Automatic	Stack values are used – Hw Blks and Status are ignored.
	Disable	
	Manual	Selections made under "Hw Blks" and "Status" are used.
Hw Blks	All Blocks	This is the recommended setting for manual control.
Status	On	To turn blocks ON.
	Off	To turn blocks OFF.

5.2.5 Pwr Savings Status Get

CP → HWD→ Pwr Savings → CP Pwr Savings HW Status Get
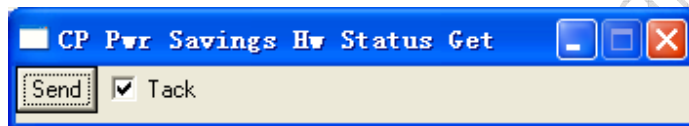
This command responds with the ON/OFF states of blocks within the chip. An example is shown below:
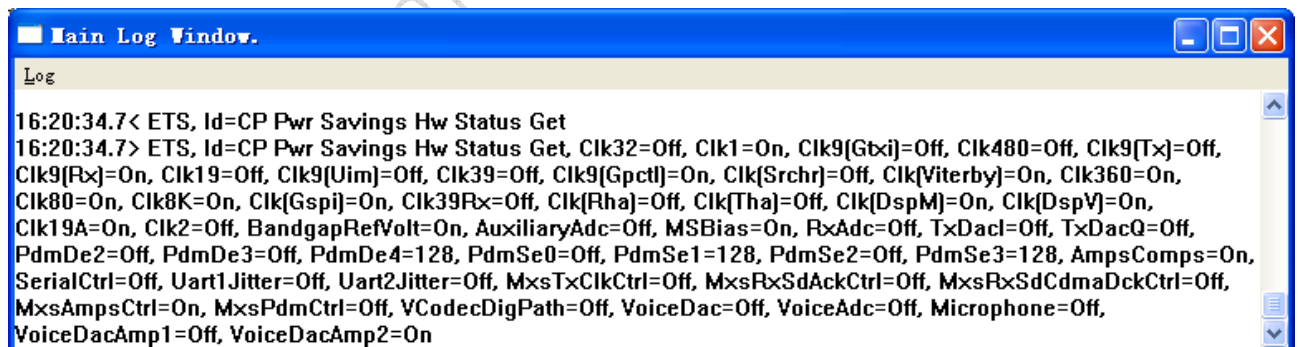
5.2.6 Pwr Savings Get Mode

CP → HWD → Pwr Savings→ CP Pwr Savings Get Mode
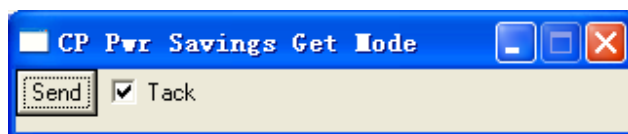
Below shows the command and respond while the mobile is in traffic:
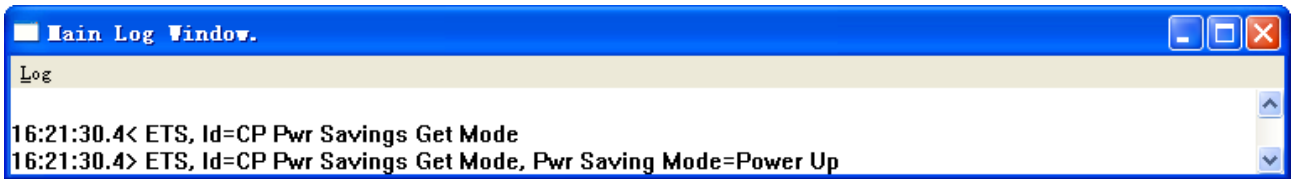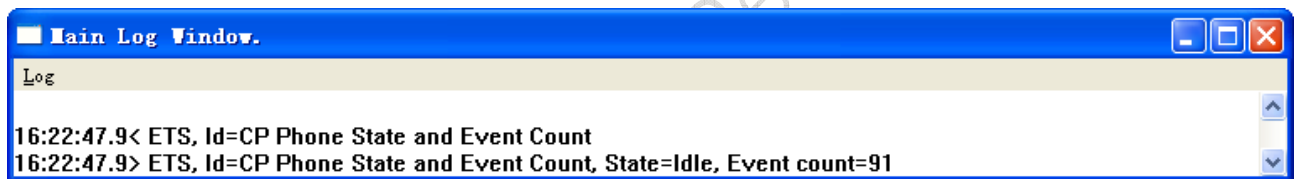

5.2.7 Diagnostic Parameters (L1D, LMD)

5.2.8 Phone State And Event Control

CP → PS →CP Phone State and Event Count
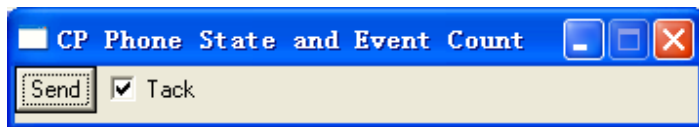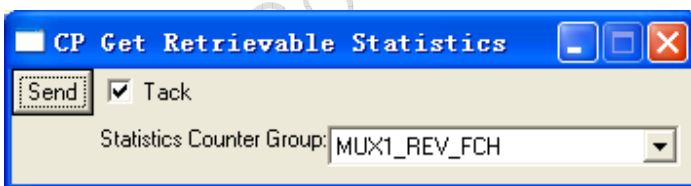

Below shows an example when the mobile is on paging:

5.2.9 Get Retrievable Statistics

CP → PS →Retrievable Stat → CP Get Retrievable Statistics

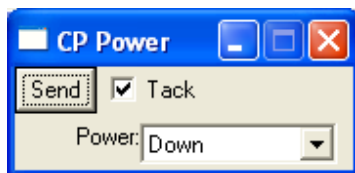| Window Selections	Options	Definition
Send		Send to perform the command, with a response as follow: 16:24:10.6< ETS, Id=CP Get Retrievable Statistics, Statistics Counter Group=MUX1_REV_FCH 16:24:10.6> ETS, Id=CP Get Retrievable Statistics , Statistics Counter Group=MUX1_REV_FCH , MUX1 REV FCH 1=0x000000a7 , MUX1 REV FCH 2=0x0000000a , MUX1 REV FCH 3=0x00000000 , MUX1 REV FCH 4=0x00000014 , MUX1 REV FCH 5=0x00000024 , MUX1 REV FCH 6=0x00000049

		, MUX1 REV FCH 7=0x00000000
		, MUX1 REV FCH 8=0x0000047e
		, MUX1 REV FCH 9=0x00000000
		, MUX1 REV FCH 10=0x00000000
		, MUX1 REV FCH 11=0x00000000
		, MUX1 REV FCH 12=0x00000000
		, MUX1 REV FCH 13=0x00000000
		, MUX1 REV FCH 14=0x00000000
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Statistics Counter Group	MUX1_REV_FCH	
	MUX1_FOR_FCH	
	PAG	
	ACC	

5.2.10 Timer Enable

5.2.11 PS Enable/Disable

CP Power:

CP → PS → UI Command → CP Power

This command enables/disables the protocol stack but does not perform any resets to the system. It serves the same purpose as the "Power" button on the MMI, which in turn performs a soft reset to the system.

5.2.12 OOS Parameter

Please refer to section 4.4.3.

5.2.13 Service Option - SO (TBD)

5.3 RF Interface and Control

5.3.1 CDMA Configuration

CP PLL Channel Config
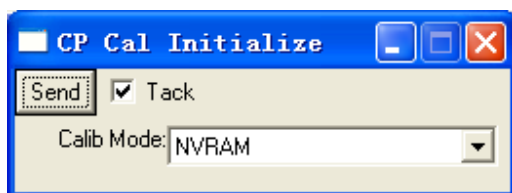
RF → CP PSW PLL Channel Config
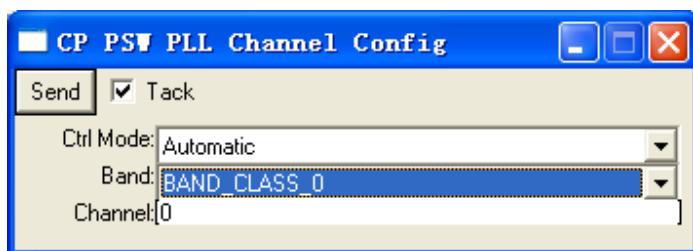
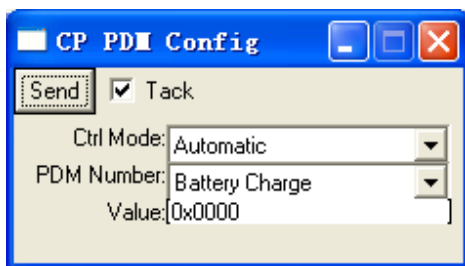| Window Selections	Options	Definition
Send	--	Send to perform the PLL channel configuration.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Ctrl Mode	Automatic	Stack values are used – selections in Band and Channel are ignored.
	Disable	
	Manual	Values selected in Band and Channel are used
Band	PCS	Selects BAND_CLASS_1
	AMPS	(NONE)
	Cellular	Selects BAND_CLASS_0
	JTACS	Selects BAND_CLASS_3 (Japanese Cellular)
	Korean KPCS	Selects BAND_CLASS_4 (Korean PCS)
	450M NMT	Selects BAND_CLASS_5
Channel	User defined channel number	

CP PLL Register Config

CP Cal initialize

RF → CP Cal Initialize

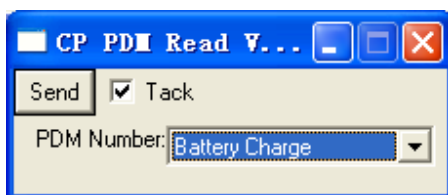| Window Selections	Options	Definition
Send	--	Send to perform the Cal Initialize command.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Calib Mode	NVRAM	This loads DBM cache of the DB templates onto the SRAM cache for execution.
	Default	This loads a default cal file onto flash. Command "CP CAL Init NVRAM" (under RF) is needed in conjunction after the Cal Initialize command.

CP PDM Config

RF → CP PDM Config

Window Selections	Options	Definition
Send	--	Send to perform PDM Configuration Control.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Ctrl Mode	Automatic	Stack values are used – selections in PDM Number and Value are ignored.
	Manual	Values selected in Band and Channel are used
	Disable	
PDM Number	Battery Charge	Battery Charge PDM value set
	Afc	Automatic Frequency Control PDM value set
	Tx Agc	TX AGC PDM value set
	Rx Agc	RX ACG PDM Value set
Value		Hex value in the format of 0x0000

CP PDM Read value

RF → CP PDM Read Value

Window Selections	Options	Definition
Send	--	Send to perform specified PDM Read.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
PDM Number	Battery Charge	Battery Charge PDM value set
	Afc	Automatic Frequency Control PDM value set
	Tx Agc	TX AGC PDM value set
	Rx Agc	RX ACG PDM Value set

CP Get PLL Channel

RF → CP Get PLL Channel

Window Selections	Definition
Send	Send to perform the command of getting PLL channel, response as shown: 16:35:21.8< ETS, Id=CP Get PLL Channel 16:35:21.8> ETS, Id=CP Get PLL Channel, Band=BAND_A, Channel=0x00c9
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

Note, the returned value is in Hex mode.

CP RF Rx Reg Read (TBD)

RF → RF Registers → CP RF Rx Reg Read
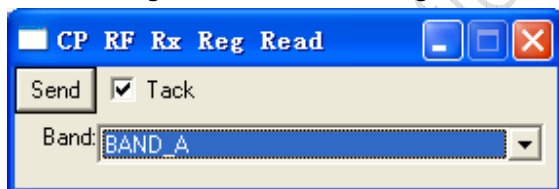
This message will select the relevant RF registers based on the Radio Design selected by the "RF Target Option" in Section 2.6
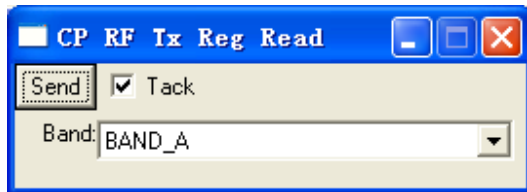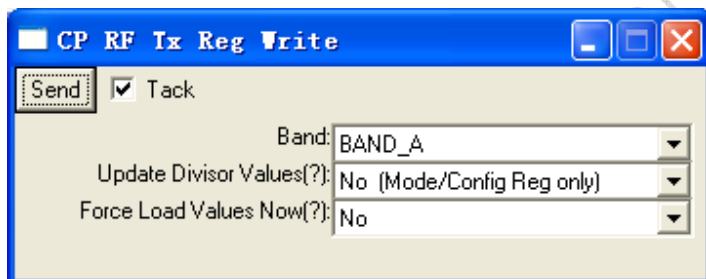
## CP RF Rx Reg Write (TBD)

RF → RF Registers → CP RF Rx Reg Write
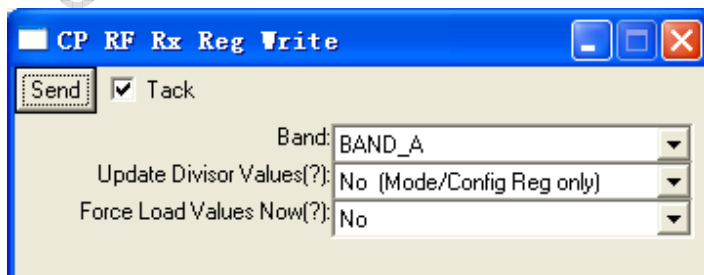
This message will select the relevant RF registers based on the Radio Design selected by the "RF Target Option" in Section 2.6

CP RF Tx Reg Read (TBD)

RF → RF Registers → CP RF Tx Reg Read

This message will select the relevant RF registers based on the Radio Design selected by the "RF Target Option" in Section 2.6

CP RF Tx Reg Write (TBD)

RF → RF Registers → CP RF Tx Reg Write

This message will select the relevant RF registers based on the Radio Design selected by the "RF Target Option" in Section 2.6

5.3.2 CDMA Receiver

CP CDMA Receiver Control

RF → CDMA → CP CDMA Receiver Ctrl
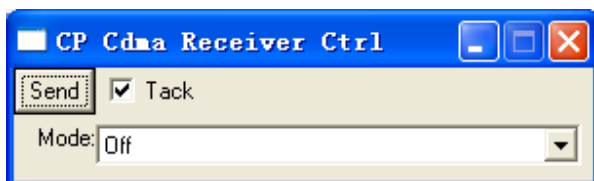
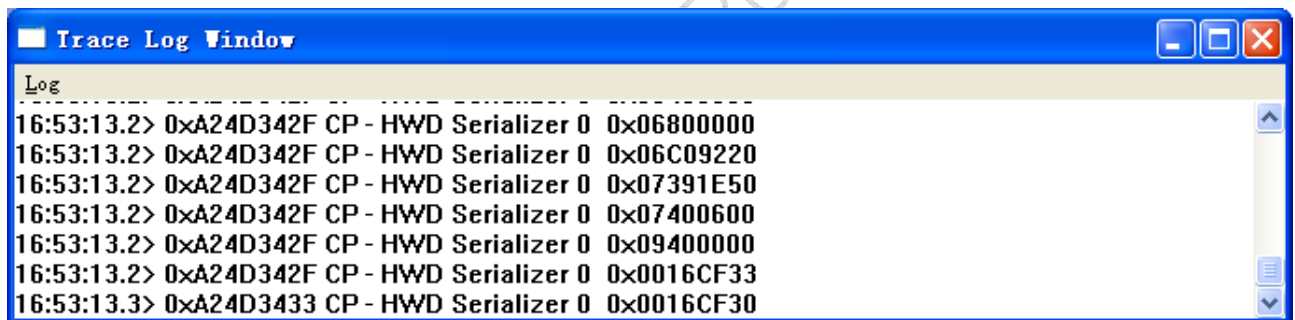| Window Selections	Options	Definition
Send		Send to perform CDMA Receiver Control command.
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Mode	Off	Turn CDMA Receiver OFF.
	On	Turn CDMA Receiver ON.

CDMA PLL Channel Config

Freq Error Trace

RSSI Trace

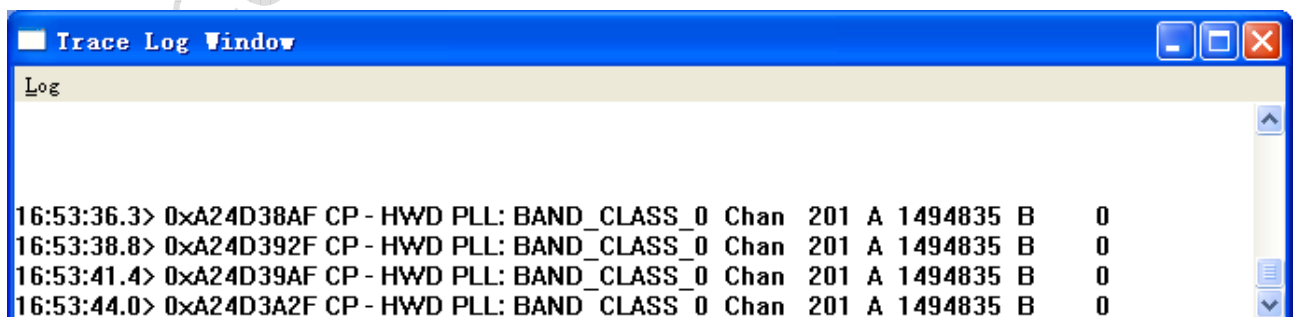**HWD CP Serializer Trace**

CP→ TRACE → HWD → CP Serializer

This trace is useful for monitoring all the activity on the serializer bus, particularly for control of the RF chips


```
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x06800000
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x06C09220
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x07391E50
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x07400600
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x09400000
16:53:13.2> 0xA24D342F CP - HWD Serializer 0  0x0016CF33
16:53:13.3> 0xA24D3433 CP - HWD Serializer 0  0x0016CF30
```

HWD Freq Channel Trace

CP→ TRACE → HWD → CP Freq Channel

This trace shows the channels which the CP cycles through while trying to acquire a Base Station.


```
16:53:36.3> 0xA24D38AF CP - HWD PLL: BAND_CLASS_0 Chan  201 A 1494835 B      0
16:53:38.8> 0xA24D392F CP - HWD PLL: BAND_CLASS_0 Chan  201 A 1494835 B      0
16:53:41.4> 0xA24D39AF CP - HWD PLL: BAND_CLASS_0 Chan  201 A 1494835 B      0
16:53:44.0> 0xA24D3A2F CP - HWD PLL: BAND_CLASS_0 Chan  201 A 1494835 B      0
```

L1D Search Results Active
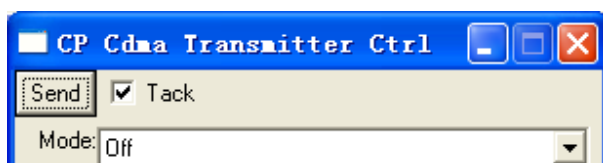
Refer to 3.6

Rx AGC Parameters (L1D)

Clear FER

5.3.3 CDMA Transmitter

CP CDMA Transmitter Control

RF → CDMA → CP CDMA Transmitter Ctrl

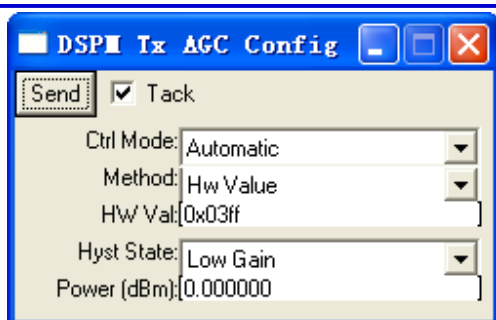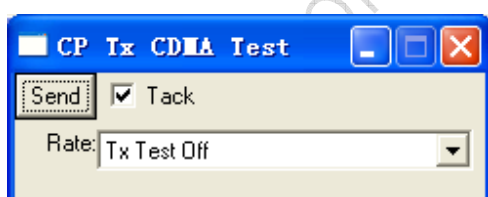| Window Selections	Options	Definition
Send		Send to perform Transmitter control command.
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Mode	On	Turn CDMA transmitter ON.
	Off	Turn CDMA transmitter OFF.

DSPM Tx AGC Get Params

RF → CDMA → DSPM Tx AGC Get Parms
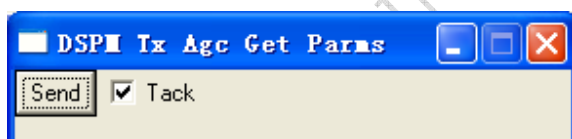
Window Selections	Definition
Send	Send to get the HW Value of the Tx AGC currently operating at, response as shown: 16:55:08.8< ETS, Id=DSPM Tx Agc Get Parms 16:55:08.8> ETS, Id=DSPM Tx Agc Get Parms, Power=0.000000, HW Value=0x0994
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

DSPM Tx AGC Config

RF → CDMA → DSPM Tx AGC Config

Window Selections	Options	Definition
Send		Send to perform Tx AGC control command.
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Ctrl Mode	Automatic	Stack values are used – selections in preceding entries are ignored.
	Manual	Values entered in the preceding entries are used.
Method	HW Value	Set to use PDM value from the Tx AGC Cal table. Selecting this ignores the field "Power(dBm)".
	dB Gain	Set to use "power" column from the Tx AGC Cal table for reference to transmit. Selecting this ignores the field "HW Val".
HW Val		PDM value in Hex referenced from CP DB HWD Tx AGC table.
Hyst State	Low/Mid/High	Gain state for the transmitter.
Power(dBm)		Actual transmitted power in dBm referenced from CP DB HWD Tx AGC table.

CP CDMA Tx Test

RF → CDMA → CP Tx CDMA Test

Window Selections	Options	Definition
Send		Send to enable TX CDMA test in specified Tx rate.
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Rate	Tx Test Off	Turn Tx OFF.
	Access	Turn TX ON to full rate but transmit through Access channel.
	Tr Full Rate	Turn Tx ON to full rate. This is used for debug purposes most.
	Tr ½ Rate	Turn Tx ON to half rate.
	Tr ¼ Rate	Turn Tx ON to quarter rate.
	Tr 1/8 Rate	Turn Tx ON to eighth rate.

Tx Tone Test

RF → CP TX Tone Test
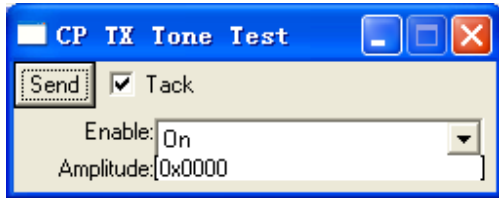
Window Selections	Options	Definition
Send	--	Send to transmit a single tone from the transmitter instead of a CDMA spectrum.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Enable	On/Off	Turn TX tone ON or OFF.
Amplitude	--	Amplitude of tone desired, typical value: 0x0200, in Hex.

HWD CP Serializer Trace

HWD Freq Channel Trace

Tx AGC Parameters (L1D)

CP Tune Radio

Get RSSI

Rx Calibration

Signaling Tone Mode (TBD)

DSPV → DSPV Amp Rev Path → DSPV Amp Signalling Tone Mode
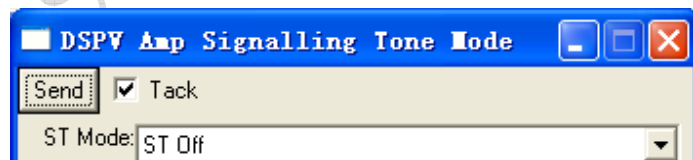
Set Busy Idle Status

Tx Fixed Freq

Tx Calibration

5.3.4AFC

DSPM AFC Get Params

DSPM AFC Config

AFC Cal Parameters (L1D)

5.3.5RF Pin Control

CP TXON Control

RF → CP TXON Control
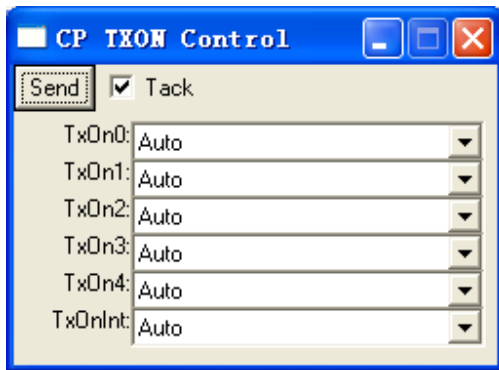
Window Selections	Options	Definition
Send	--	Send to enable TXON Control
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
TxOn [0:4]	Off	Turn TxOn OFF.
	On	Turn TxOn ON.
	Auto	Allow CBP software to control the TxOn

CP RXON Control

RF → CP RXON Control
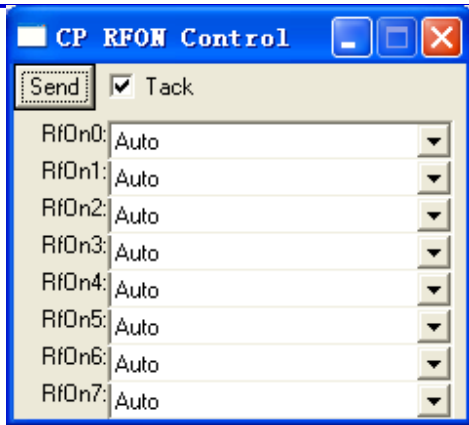
Window Selections	Options	Definition
Send		Send to enable RFON Control
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
RfOn [0:7]	Off	Turn RfOn OFF.
	On	Turn RfOn ON.
	Auto	Allow CBP software to control the RfOn

CP TXON Read

RF → CP TXON Read
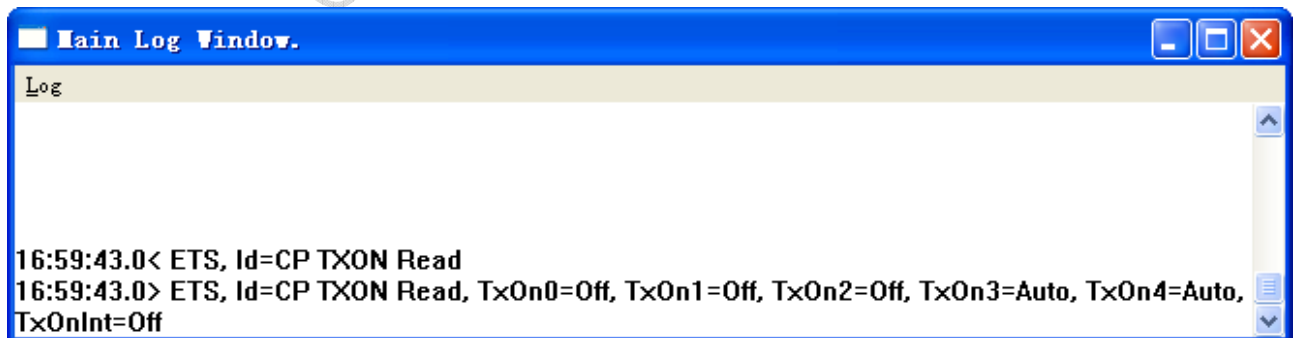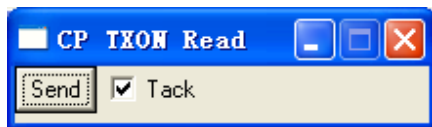
CP RXON Read

RF → CP RXON Read
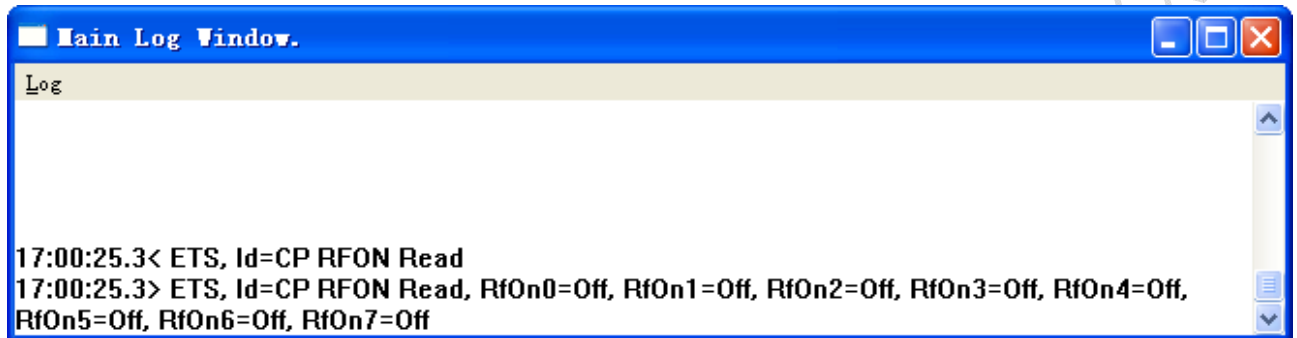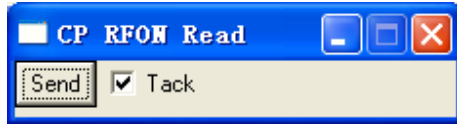
5.3.6GPIO Control

GPIO Read / GPIO Write

CP → MON → GPIO → CP Read GPIO
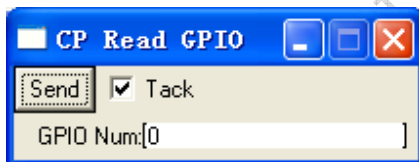
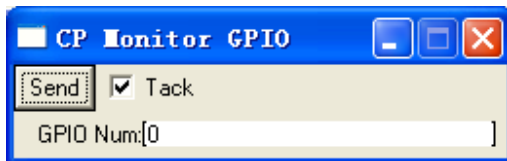| Window Selections	Options	Definition
Send	--	Send to read the relevant GPIO. **Caution:** This command will set the GPIO to INPUT mode and perform the read. The original state is not preserved so this command should only be performed on GPIOs which are known to be Inputs.
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
GPIO Num	[0:47]	Read the Relevant GPIO

CP → MON → GPIO → CP Set Clear GPIO

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Window Selections	Options	Definition
Send		Send to read the relevant GPIO
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
GPIO Num	[0:47]	Read the Relevant GPIO
Action	SET	Sets the GPIO to "0"
	CLEAR	Clears the GPIO to "1"

GPIO Read Monitor

CP → MON →GPIO → CP Monitor GPIO

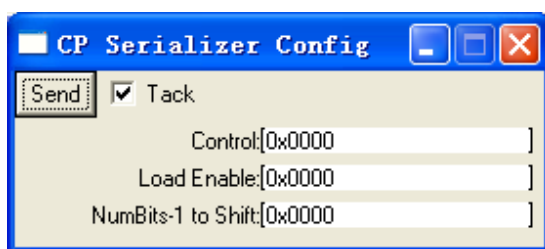| Window Selections	Options	Definition
Send	--	Send to Monitor the relevant GPIO
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
GPIO Num	[0:47]	

GPIO (trace ???)

5.3.7 Serializer

This section should be read in conjunction with the Serial Programmer chapters in References [2][3].
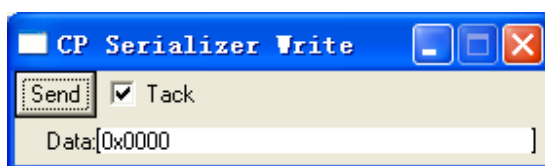
Serializer Configuration

CP → HWD → CP Serializer Config

| Window Selections	Definition
Send	Send to set the Serializer Configuration
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Control	Programs the register SER0_CTRL (listed as SER#_CTRL in Reference [3]). The PTR field can only be set to "000".
Load Enable	Programs the register SER0_LE (listed as SER#_LE in Reference [3])
NumBits-1 to Shift	Programs the register SER0_BC (listed as SER#_BC in Reference [3])

Serializer Write

CP → HWD → CP Serializer Write

| Window Selections	Definition
Send	Send to set the Serializer Configuration
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Data	Write Data to Serializer, which has been configured (see Section 0). This data is loaded into the registers SER0_D1, SER0_D0 (listed as SER#_D1, SER#_D0 in Reference [3])

5.4 SMS

Here, we only provide a brief summary to allow the user the user to access the SMS menu. The details of the SMS messages are covered in great detail in [6], while background information on SMS is provided in [5].

5.4.1 Connect (CP → PS → SMS → CP SMS Connect)

5.4.2 Disconnect (CP → PS → SMS → CP SMS Disconnect)

5.4.3 Broadcast Connect (CP → PS → SMS → CP SMS Bcast Connect)

5.4.4 Broadcast Disconnect (CP → PS → SMS → CP SMS Bcast Disconnect)

5.4.5 User Ack (CP → PS → SMS → CP SMS User Ack)

5.4.6 Service Option Pref (CP → PS → SMS → CP SMS Srv Opt Pref)

5.4.7 Cancel (CP → PS → SMS → CP SMS Cancel)

5.4.8 Broadcast Parameters (CP → PS → SMS → CP SMS Bcast Parms)

5.4.9 Term Status (CP → PS → SMS → CP SMS Term Status)

5.4.10 Cause Code Status (CP → PS → SMS → CP SMS Cause Code Status)

5.5 Database Upload/Download

5.5.1 Flash Device

Flash Download for Reference Phones

1. Phone has been connected to the ETS.

2. Before you begin to download cp.rom, **set Flash Download Timeout to 200. Open File->Options** and then set Flash Download Timeout to 200, then click OK button, see the following dialog box.
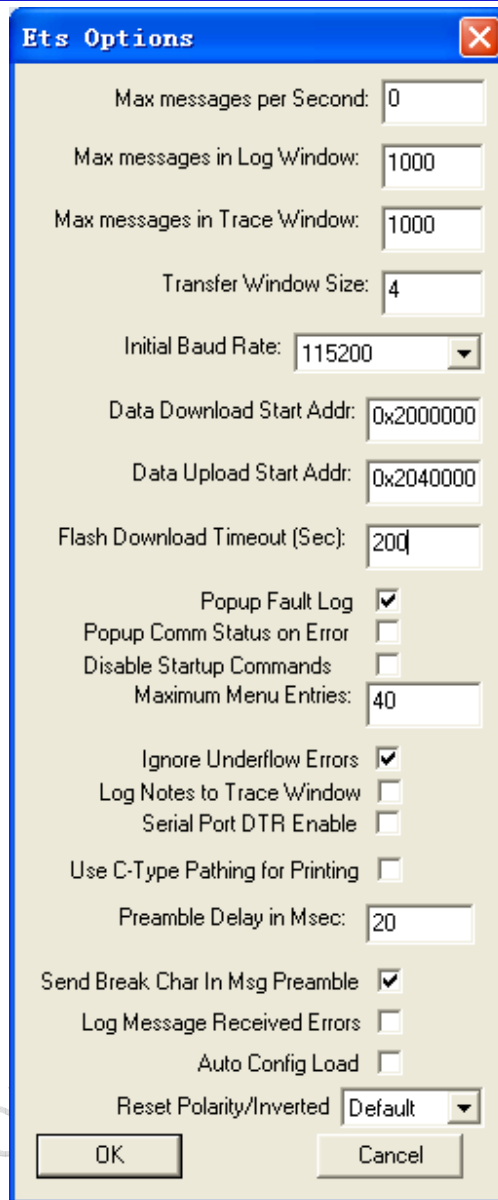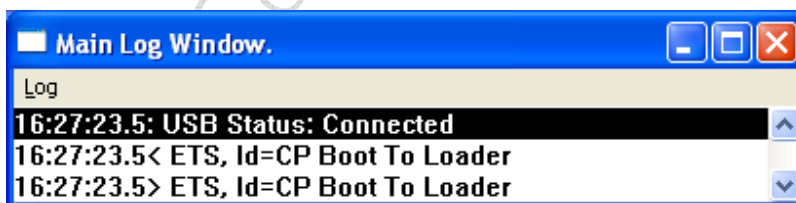
3. Open **File->Flash Download**, you can see the flash memory download dialog, see the following bitmap. Select the drop down box **CP Boot** for **Flash Section**; click the Browse to set your new **boot.rom** path, set **"wait for boot load command"** check box on, then the "Download" button will be disabled.
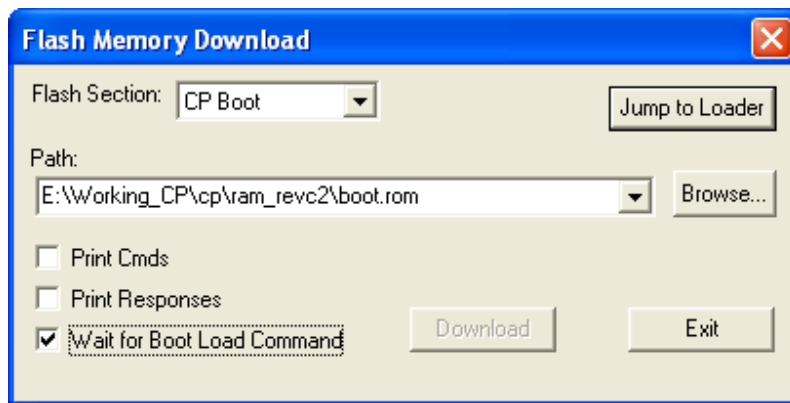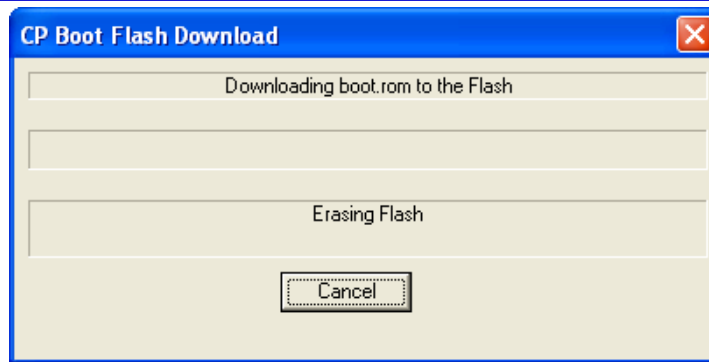
4. **Power OFF** the phone, connect the phone with PC and **Power ON** the phone, "Wait for boot load command" check box becomes unchecked, and "Download" button is enabled.
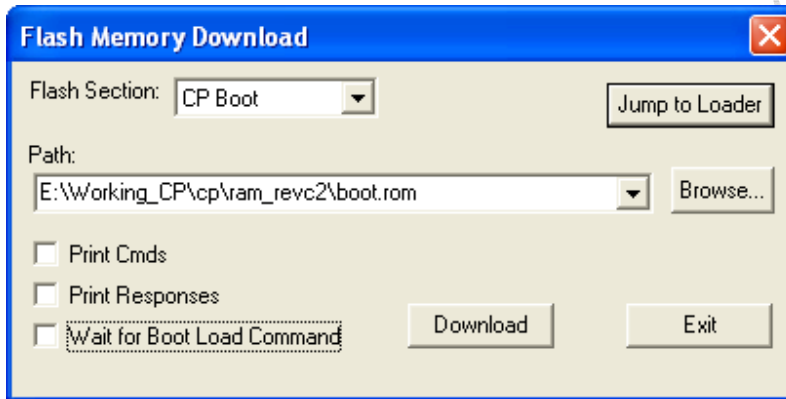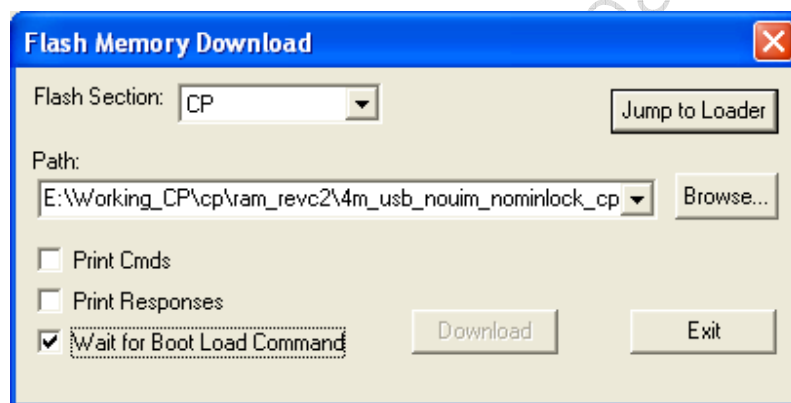

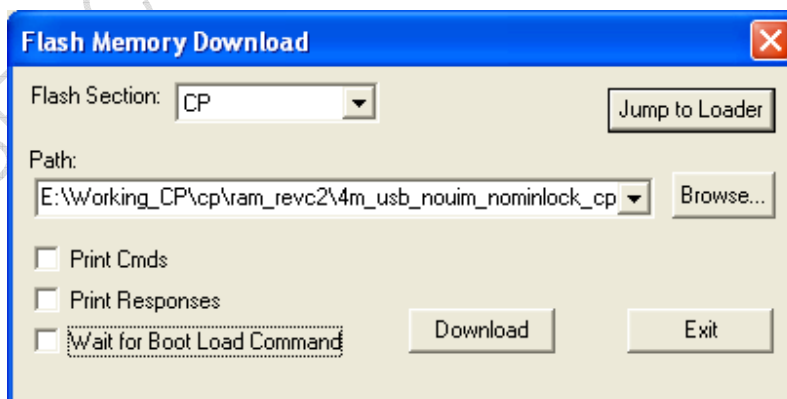You will see "**CP Boot Loader"** in the ETS Log Window.

5. Click "**Download"** button to begin download boot.rom, you can see the CP Flash Download dialog. ETS erases the flash, and then begin to write boot.rom in flash, and you can see the download progress.
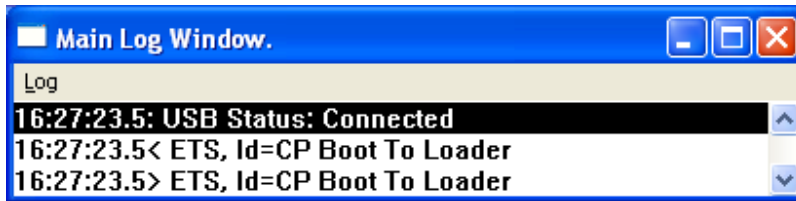
6. Open **File->Flash Download**, you can see the flash memory download dialog, see the following bitmap. Select the drop down box **CP** for **Flash Section**; click the Browse to set your new **cp.rom** path, set **"wait for boot load command"** check box on, then the "Download" button will be disabled.
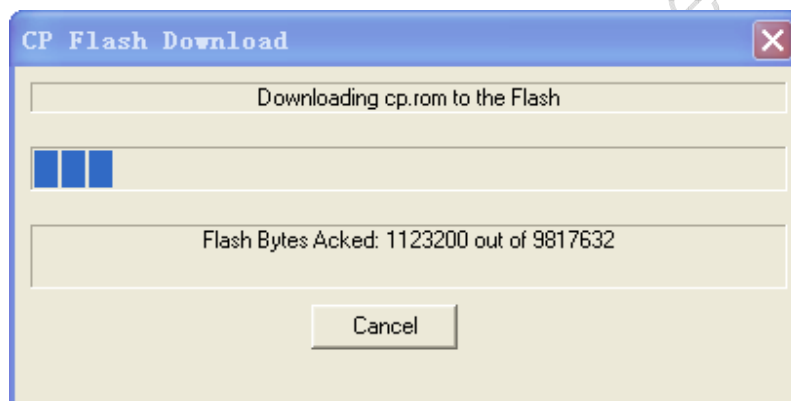

7. **Power OFF** the phone, then **Power ON** the phone again, "Wait for boot load command" check box becomes unchecked, and "Download" button is enabled.

You   will   see   "**CP   Boot   Loader"**   in   the   ETS   Log   Window.

8. Click "**Download"** button to begin download cp.rom, you can see the CP Flash Download dialog. ETS erases the flash, and then begin to write cp.rom in flash, and you can see the download progress.
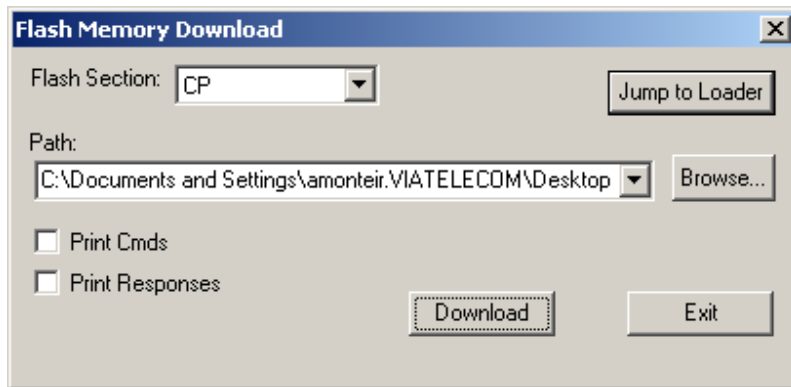

9. After download finished, **power off** the phone (If there is a battery in your phone, please remove and re-insert), then **power on** the phone.

Flash Download FOR CDS Products (NOT FOR Reference Phones)

File → Flash Download

Use to download CP Boot, CP, DSPM, and DSPV code to flash memory. System must be in boot mode to download any section of flash. See Reference [8] for more details.

Flash Memory Download   ✕

Flash Section: CP ▾   Jump to Loader

Path:

C:\Documents and Settings\amonteir.VIATELECOM\Desktop ▾   Browse...

☐ Print Cmds

☐ Print Responses

Download   Exit

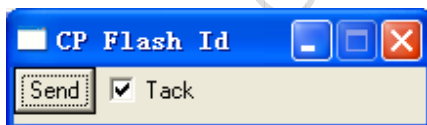| Window Selections	Options	Definition
Flash Section:	CP Boot	Downloads CP Boot code to flash memory when Download is clicked.
	CP	Downloads CP code to flash memory when Download is clicked.
	DSPM	Downloads DSPM code or DSPM patches to flash memory when Download is clicked.
	DSPV	Downloads DSPV code or DSPV patches to flash memory when Download is clicked.
	ALL FLASH	Downloads FLASH Image to flash memory when Download is clicked.
	FSM_DATA/FSM_USER	Downloads File system to flash memory when Download is clicked.
Path		Select recent paths or Browse mounted disks
Print Cmds		Used to print the commands sent from ETS to the Flash.
Print Response		Used to print the responses sent from Flash to ETS.
Download		Execute download of selected file
Exit		Close window

Flash Program

CP → Flash → CP Flash Program
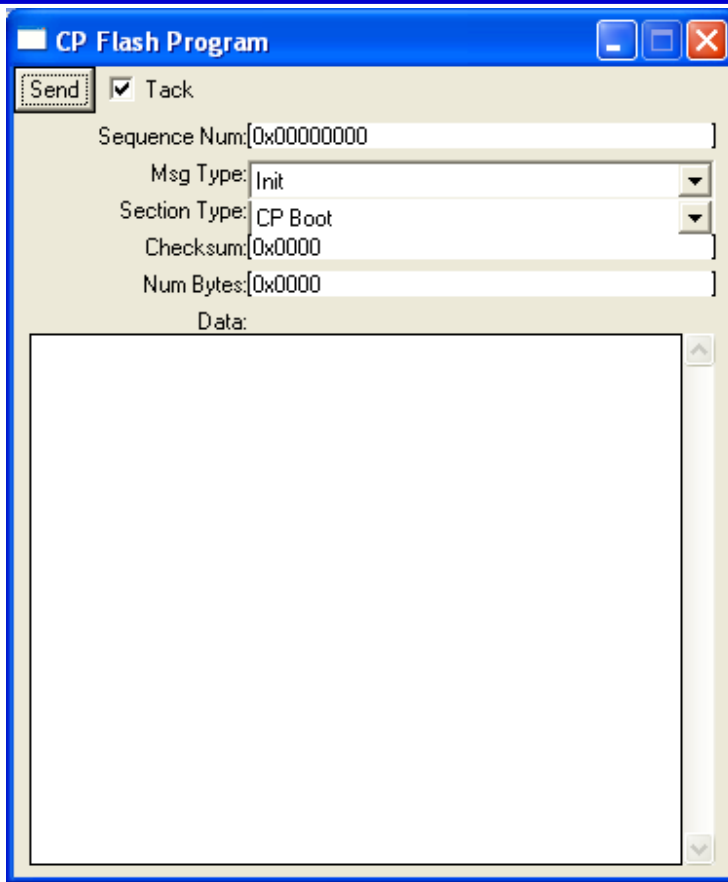
Flash ID

CP → Flash → CP Flash ID

Used to display the type and manufacture of the Flash device in usi. The customer must update *hwdflash.c* if any other than the AMD AM29DL163CB flash is used.

Window Selections	Definition
Send	Data that is displayed in the Main Log window when Send is clicked in the above example. 10:17:40.1< ETS, Id=CP Flash Id 10:17:40.1> ETS, Id=CP Flash Id, Manf Id=0x0001, Dev Id=0x002b In this example, the flash used is an AM29DL163CB manufactured by AMD. See hwdflash.c for more details.
Tack	When checked, window will remain on screen after every Send. When not checked, window will close after a Send

Flash Erase

CP → Flash → CP Flash Erase
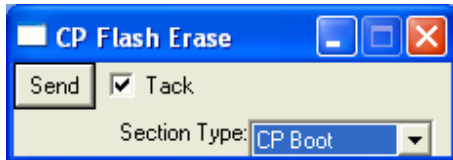
Window Selections	Options	Definition
Send		Data that is displayed in the Main Log window when Send is clicked in the above example.
Tack		When checked, window will remain on screen after every Send. When not checked, window will close after a Send
Section Type	CP Boot	Selects the CP Boot section of Flash.
	CP	Selects the CP section of Flash.
	DSPM	Selects the DSPM section of Flash.
	DSPV	Selects the DSPV section of Flash
	All	Selects all sections of Flash.

Configure Timers

IQ Polarity

Tx Voice Mode

Random Distribution

Rx Word Sync

Rx RSSI

AFC

Tx Levels

5.5.2RF Calibration Data

Hwd AFC Data

CP→DB→DB Templates→Common→CP DB HWD AFC Data

Hwd Battery Data

CP→DB→DB Templates→Common→CP DB HWD Battery Data.

Hwd Temperature Data

CP→DB→DB Templates→Common→CP DB HWD Temperature Data

Hwd Aux ADC Data

Hwd PDM Data

CP→DB→DB Templates→Common→CP DB HWD PDM Voltage Data

Hwd Bandgap Trim Data

CP→DB→DB Templates→Common→CP DB HWD BandGap Trim Data

Hwd Misc Cal Data ?

PCS Tx AGC

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC

PCS Tx AGC Freq Chan Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC Freq Chan Adj

PCS Tx AGC Temp Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC Temp Adj

PCS Tx AGC Battery Voltage Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC Batt Volt Adj.

PCS Tx AGC Limit Freq Chan Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx Limit Freq Chan Adj

PCS TxAGC Limit Temperature Adjustment

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx Limit Temp Adj.

PCS TxAGC Closed Loop RF Power Measurement

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx Pwr Detect

PCS TxAGC Closed Loop Frequency Channel Adjustment

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC Pwr Det Freq Chan Adj.

PCS TxAGC Closed Loop Battery Voltage Adjustment

CP→DB→DB Templates→ BAND B → CP DB HWD BAND B Tx Pwr Det Max Pwr Batt Voltage Adj.

PCS TxAGC Closed Loop Temperature Adjustment

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Tx AGC Pwr Det Temp Adj.

PCS Rx AGC

CP->DB->DB Templates-> BAND B ->CP DB HWD BAND B RxAGC CP DB HWD PCS RxAGC

PCS Rx AGC Freq Chan Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Rx AGC Freq Chan Adj

PCS Rx AGC Temp Adj

CP→DB→DB Templates→ BAND B →CP DB HWD BAND B Rx AGC Temp Adj

CELL Tx AGC

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC
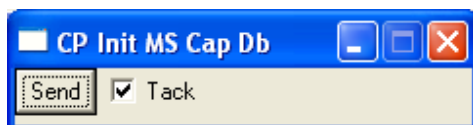
CELL Tx AGC Freq Chan Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC Freq Chan Adj

CELL Tx AGC Temp Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC Temp Adj

CELL Tx AGC Battery Voltage Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC Batt Volt Adj.

CELL Tx AGC Limit Freq Chan Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx Limit Freq Chan Adj

CDMA TxAGC Max Power Limit Temperature Adjustment

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx Limit Temp Adj.

CELL TxAGC Closed Loop RF Power Measurement

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx Pwr Detect

CELL TxAGC Closed Loop Frequency Channel Adjustment

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC Pwr Det Freq Chan Adj.

CELL TxAGC Closed Loop Battery Voltage Adjustment

CP→DB→DB Templates→ BAND A → CP DB HWD BAND A Tx Pwr Det Max Pwr Batt Voltage Adj.

CELL TxAGC Closed Loop Temperature Adjustment

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Tx AGC Pwr Det Temp Adj.

CELL Rx AGC

CP->DB->DB Templates-> BAND A ->CP DB HWD BAND A RxAGC CP DB HWD CELL RxAGC

CELL Rx AGC Freq Chan Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Rx AGC Freq Chan Adj

CELL Rx AGC Temp Adj

CP→DB→DB Templates→ BAND A →CP DB HWD BAND A Rx AGC Temp Adj
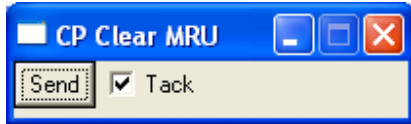
5.5.3 Non-RF Database

Init MS capabilities

CP → PS → Database → CP Init MS Cap Db

Clear MRU

CP → PS →Database→ CP Clear MRU

Window Selections	Definition
Send	The MRU (Most Recently Used Channels) is a list of (Band, Channel #) which is stored in Flash. At Power Up the CBP4 software first scans the channels in the MRU, and then goes to the PRL. Clearing the MRU ensures that the PRL will be scanned first. This command is particularly useful when a new PRL is downloaded to the phone.
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

Init NAM

CP → PS →Database→ CP Init Nam
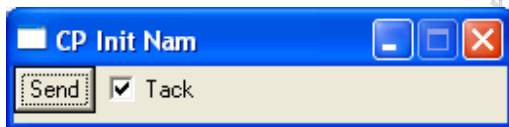
Window Selections	Definition
Send	Initializes the NAM with default values
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

Select Active NAM
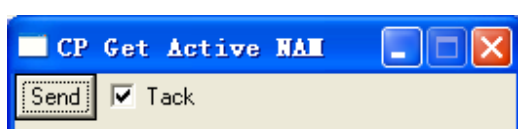
CP → PS → Database → CP Select Active NAM
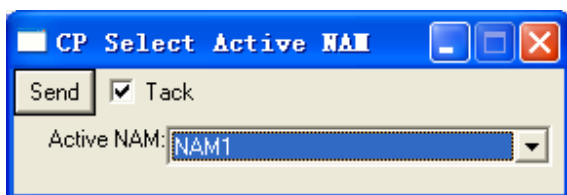
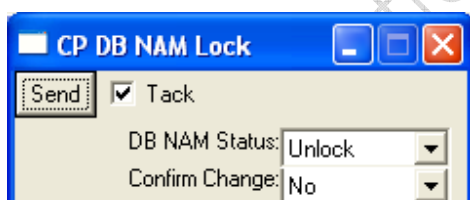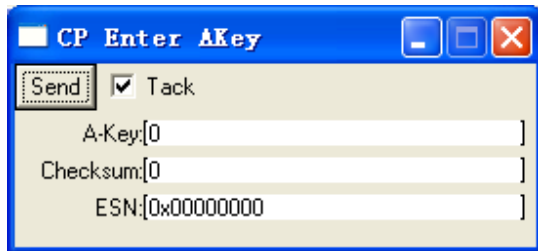| Window Selections	Options	Definition
Send	--	Send to set the active NAM
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Active NAM	NAM1	Select "NAM1" as the active NAM
	NAM2	Select "NAM2" as the active NAM

Get active NAM

CP → PS → Database → CP Get Active Nam

Window Selections	Definition
Send	Send to get the active NAM
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

NAM Lock, Unlock

CP → DB → CP DB NAM Lock

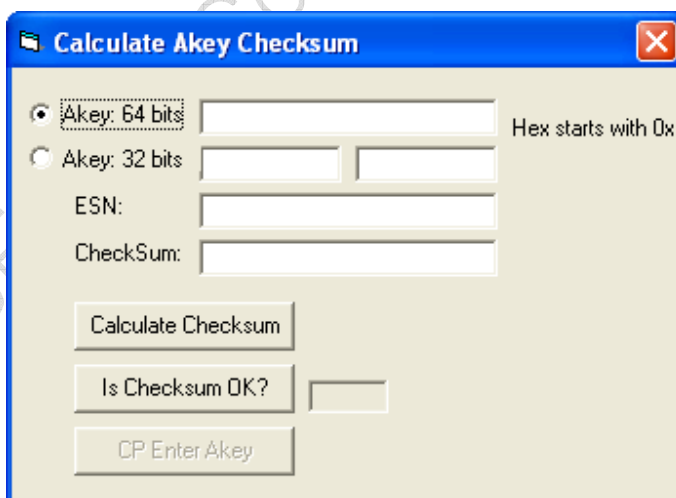| Window Selections	Options	Definition
Send		Send to Lock/Unlock the Active NAM
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
DB NAM Status	Lock	This option locks the NAM and prevents modifications
	Unlock	This option unlocks the NAM and allows modifications
Confirm Change	Yes	Confirm the change you will perform
	No	

Set the A-Key

CP → PS → Database → CP Enter A Key

Window Selections	Options	Definition
Send		Send to write the A-Key
A-Key		20 decimal digit A-Key
Checksum		6 digit checksum
ESN		32-bit (8 hexadecimal) ESN

Some Notes Regarding this command:

1. The A-Key is only updated in the Active NAM. Therefore the Select Active NAM command should be executed prior to this Akey command to explicitly select the NAM where the Akey should be updated.

2. The **ValidAkey** field in the NAM is asserted after this command is executed

3. The entire **Checksum** of the NAM structure is updated after this command is executed. To be explicit, please note that this NAM checksum is independent of the A-key checksum.

4. There is also a tool help you calculate A-Key checksum, find it from Utilities->A Key Calculator. Put the Akey and ESN number into calculator, click "Calculate Checksum" .

Data services

PRL

Voice Memo 1

 Voice Memo 2

Voice Rec 1

Voice Rec 2

5.5.4DB Clear, Flush, Cache

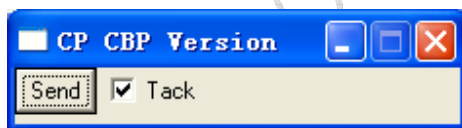**5.5.5DB Write**

5.5.6DB Read

5.6 Software Operation Status

5.6.1 Software Version CP, DSPM, DSPV, ETS

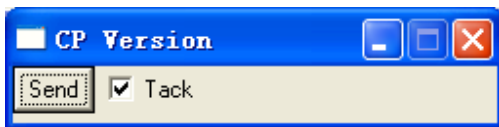**CBP Version**

CP → MON → CBP Version

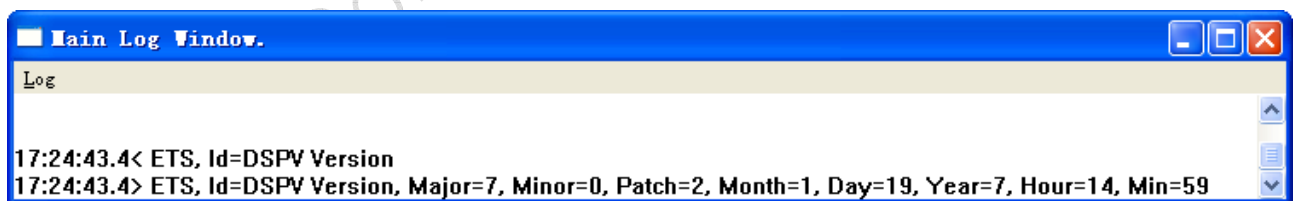| Window Selections	Definition
Send	Send to Log Details of CBP version in the ETS Main Log Window
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
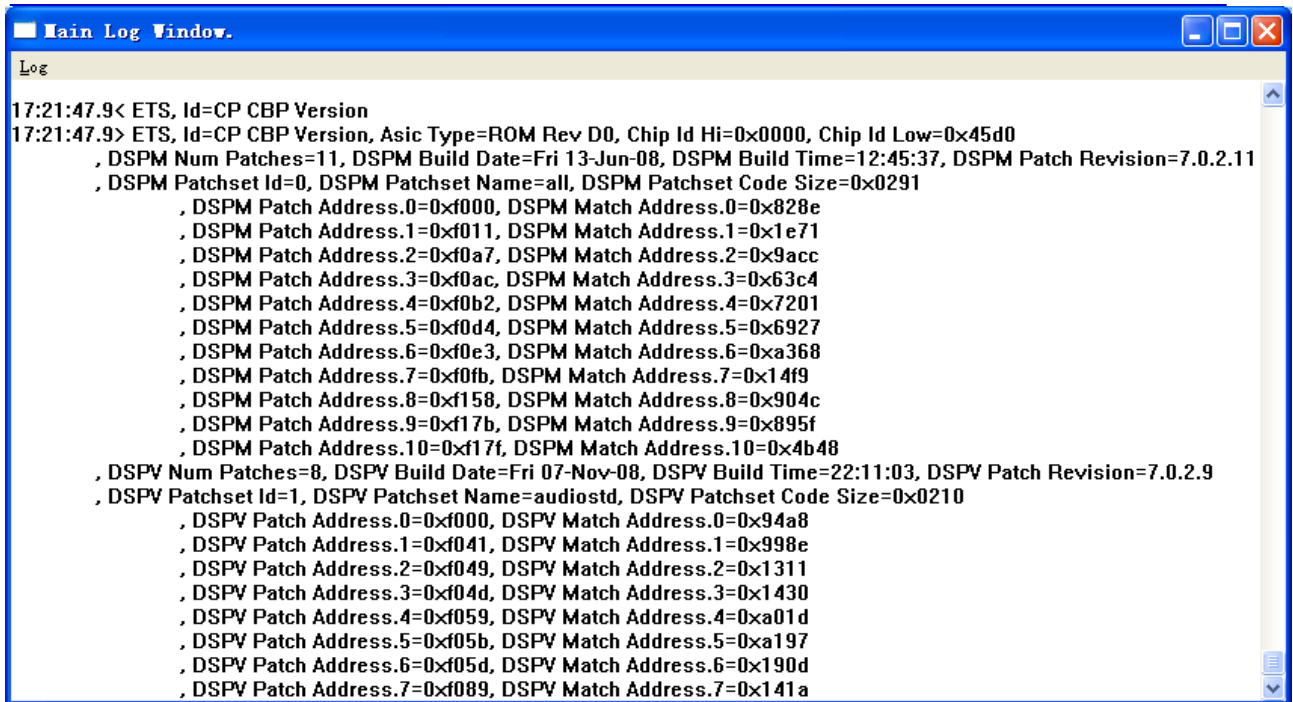
CP Version

CP → MON → CP Version

Window Selections	Definition
Send	Send to Log Details of CP Flash code in the ETS Main Log Window
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

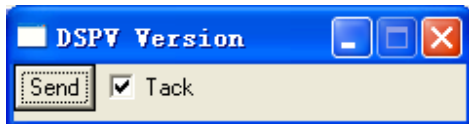**DSPM Version**

DSPM → DSPM Version

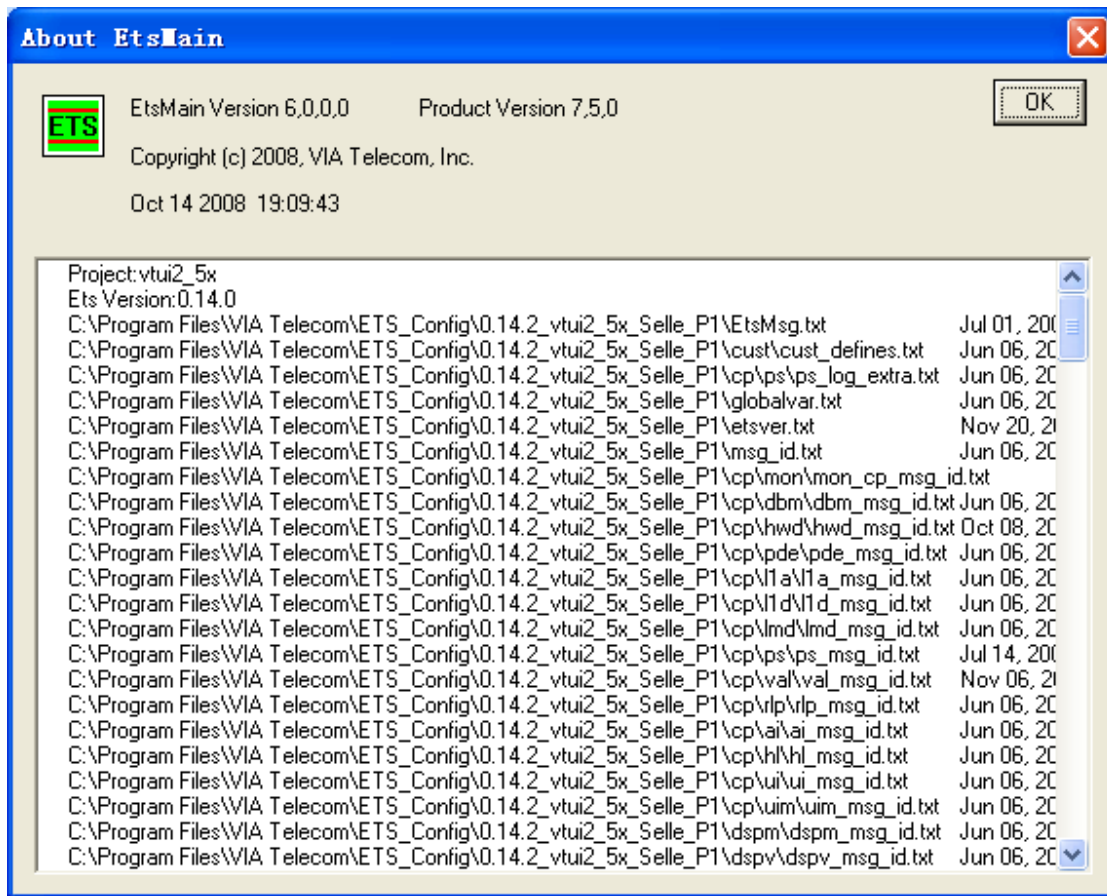| Window Selections	Definition
Send	Send to Log Details of DSPM Flash code in the ETS Main Log Window
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

DSPV Version

DSPV →MON → DSPV Version

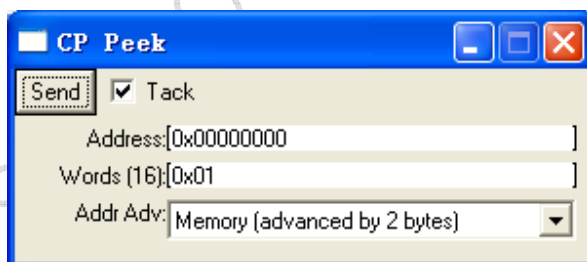| Window Selections	Definition
Send	Send to Log Details of DSPV Flash code in the ETS Main Log Window
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

ETS Version

Help → About EtsMain
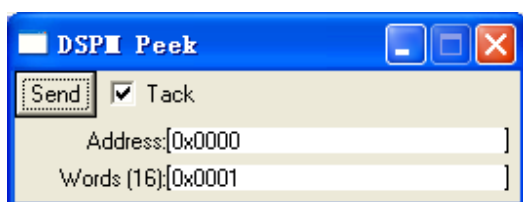
5.6.2 Memory Peek

CP Peek

CP → MON → CP Peek

Window Selections	Options	Definition
Send	--	Send to Peek the CP Memory Location(s) or Register(s)
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address	--	Address of CP Memory or Register

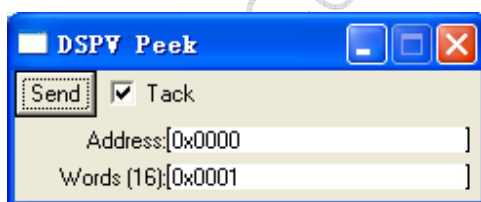| Window Selections	Options	Definition
Words(16)	--	Number of words, up to 16 to Peek. Valid values: 1-16
Addr Adv	Memory (advanced by 2 bytes)	Use this option to Peek Memory
	Register (advanced by 4 bytes)	Use this option to Peek Registers

DSPM Peek

DSPM → DSPM Peek

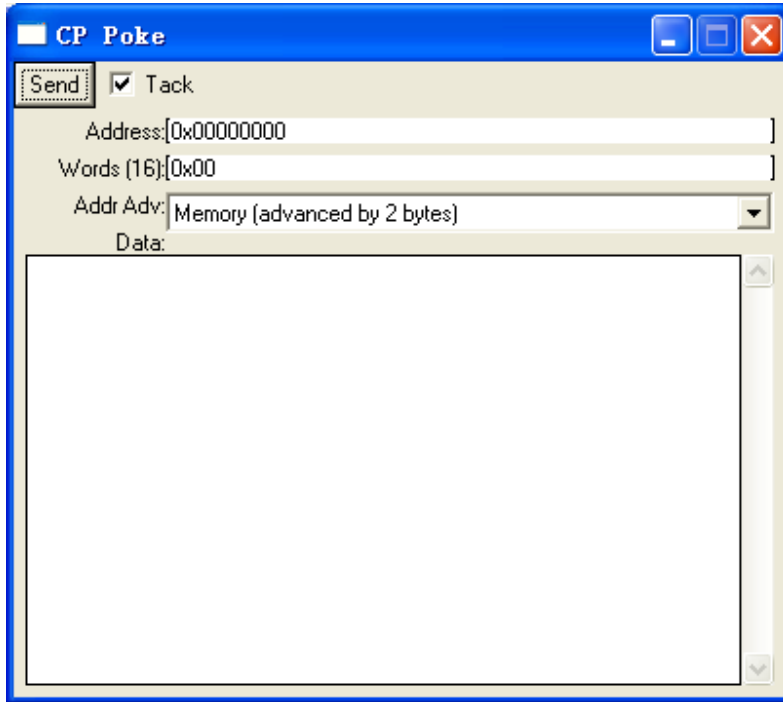| Window Selections	Options	Definition
Send		Send to Peek the DSPM Memory Location(s) or Register(s)
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address		Address of DSPM Memory or Register
Words(16)		Number of words, up to 16 to Peek. Valid values: 1-16

DSPV Peek

DSPV → MON → DSPV Peek

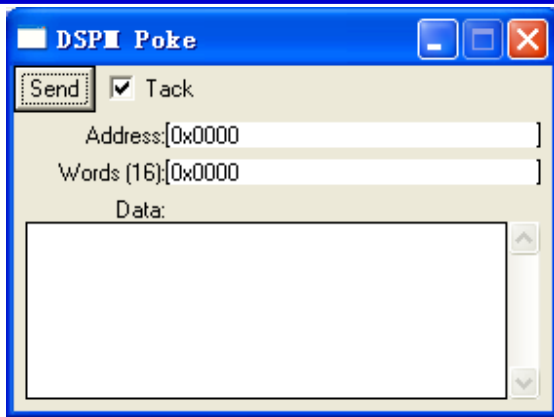| Window Selections	Options	Definition
Send	--	Send to Peek the DSPV Memory Location(s) or Register(s)
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address	--	Address of DSPV Memory or Register
Words(16)	--	Number of words, up to 16 to Peek. Valid values: 1-16

5.6.3 Memory Poke

CP Poke

CP → MON → CP Poke

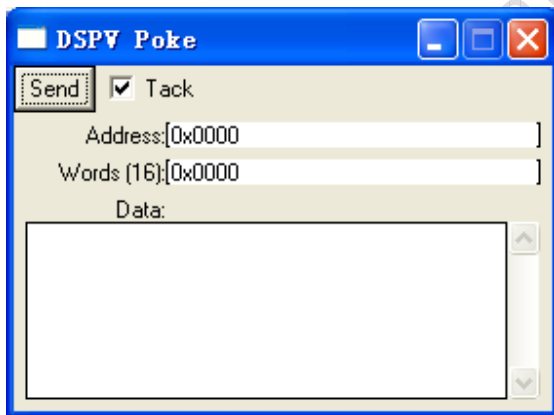| Window Selections	Options	Definition
Send	--	Send to Poke the CP Memory Location(s) or Register(s)
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address	--	Address of CP Memory or Register
Words(16)	--	Number of words, up to 16 to Poke. Valid values: 1-16
Addr Adv	Memory (advanced by 2 bytes)	Use this option to Poke Memory
	Register (advanced by 4 bytes)	Use this option to Poke Registers

DSPM Poke

DSPM → DSPM Poke

| Window Selections	Options	Definition
Send		Send to Poke the DSPM Memory Location(s) or Register(s)
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address		Address of DSPM Memory or Register
Words(16)		Number of words, up to 16 to Poke. Valid values: 1-16

DSPV Poke

DSPV → MON → DSPV Poke

Window Selections	Options	Definition
Send		Send to Poke the DSPV Memory Location(s) or Register(s)
Tack		If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
Address		Address of DSPV Memory or Register
Words(16)		Number of words, up to 16 to Poke. Valid values: 1-16

5.6.4Disabling All Spies And Traces

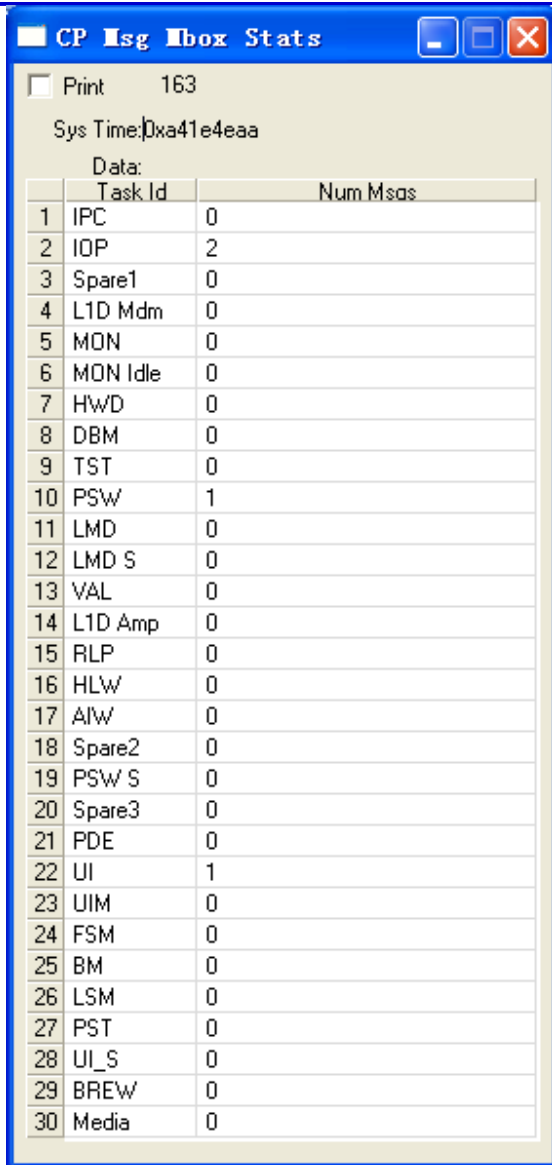### 5.6.5Msgs Buffer Stats Spy

CP → Spy → MON → CP Msg Buff Stats
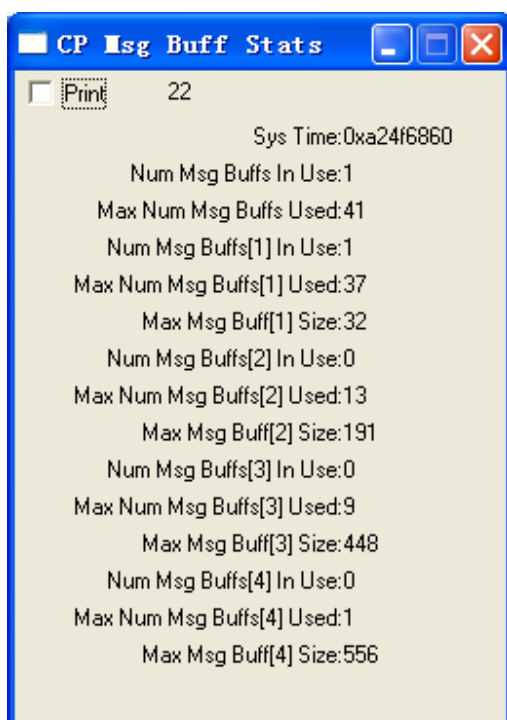
显示消息缓冲区的信息。

| Window Display	Description
Print	如果选中，窗口中的信息将显示在 main log window 中
Sys Time	
Num Msg Buffs In Use	当前从缓冲区 1-4 中分配的消息总数量
Max Num Msg Buffs Used	曾经从缓冲区 1-4 中分配的消息的最大数量
Num Msg Buffs[1:4] In Use	缓冲区 1-4 中，当前分配的消息数量
Max Num Msg Buffs[1:4]	缓冲区 1-4 中，曾经分配的消息的最大数量
Max Msg Buff[1:4] Size	缓冲区 1-4 中，可分配的消息的最大字节数

5.6.6Msgs Mbox Stats Spy

CP → Spy → MON → CP Msg Mbox Stats

显示任务消息队列的状态。

Window Display	Explanation
Print	如果选中，窗口中的信息将显示在 main log window 中
Sys Time	
Task Id	任务 ID
Num Msgs	任务消息队列中的消息数量

5.6.7 Msgs Buf Ptr Stats Spy

CP → Spy → MON → CP Msg Buff Ptr Stats
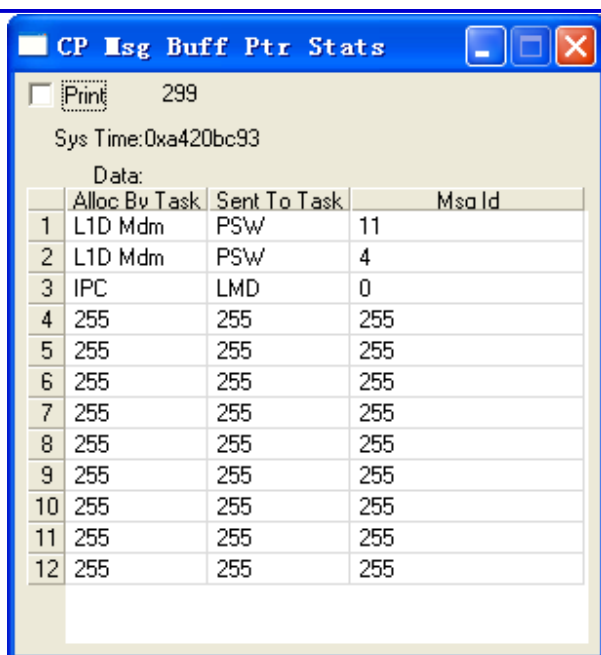
显示消息指针的有关信息。

Window Display	Explanation
Print	如果选中，窗口中的信息将显示在 main log window 中
Sys Time	
Alloc By Task	创建消息的任务
Sent To Task	接收消息的任务
Msg Id	消息 ID

5.6.8 Action Time Stats

CP->Spy->MON->CP Action Time Stats
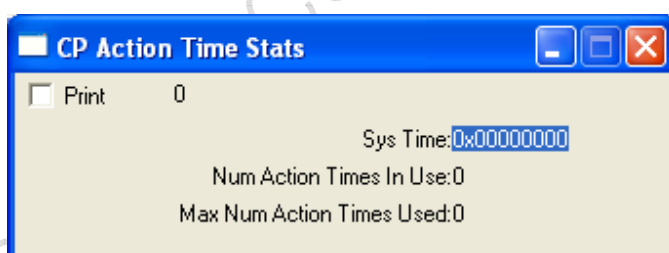
Window Display	Explanation
Print	
Sys Time	
Num Action Times In Use	
Max Num Action Times Used	

5.6.9 Clear TDSO Stats

5.6.10   Clear FER
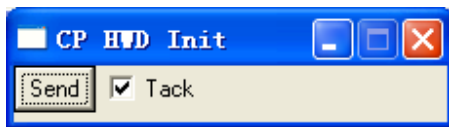
5.7 CBP Hardware

5.7.1 HW Version

5.7.2 Reset Processor

CP, DSPM, DSPV
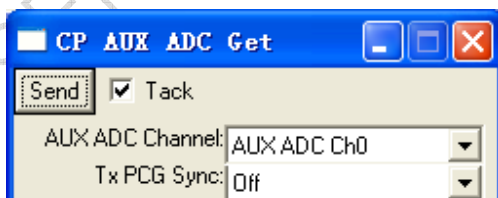
5.7.3 Initializing Hardware Control

5.7.4 Hwd Init

CP → HWD → HWD Init

Window Selections	Definition
Send	Send to Initialize Hardware Drivers
Tack	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".

### 5.7.5 Aux ADC Get

CP → HWD → CP AUX ADC Get

Window Selections	Options	Definition
Send	--	Send to Read the AUX ADC Channel

Window Selections	Options	Definition
Tack	--	If checked, the window will remain after clicking "Send". If not checked, window will close after clicking "Send".
AUX ADC Channel	AUX ADC Ch[0-15]	Read the Relevant AUX ADC Channel. There are 16 channels [0-15]
Tx PCG Sync	Off	Take the AUX ADC reading immediately
	On	Wait till an Active PCG to make a measurement. This is especially usefully for measuring Transmit Power from the Power Amplifier; selecting this option ensures that the Power Amplifier is ON.

6 Utilities

6.1 Virtual MMI

Utilities -> Virtual MMI Utility, operate the handset just link press keypad.
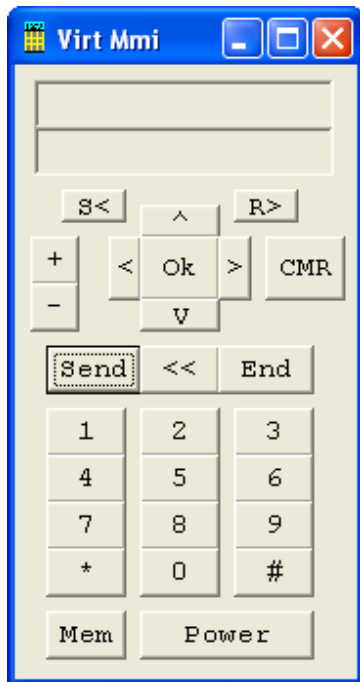
## 6.2 Script Utility

Utilities -> Script Utility

The following steps descript how to record an ETS script. Give an example of record data of command cp->DB->DB Templates->common->cp DB NAM 1, CP/DB/DB Templates/cellular/CP DB HWD Rx AGC.

1. Connect the phone to your computer, make sure all connection is ok.

2. Open **ETS**.

3. Run script thru **Utilities -> Script Utility**. In the **Script**, Select **Script->Record** command to let Script application in Recording status. Then Script.exe will record all commands that printed in ETS main window.
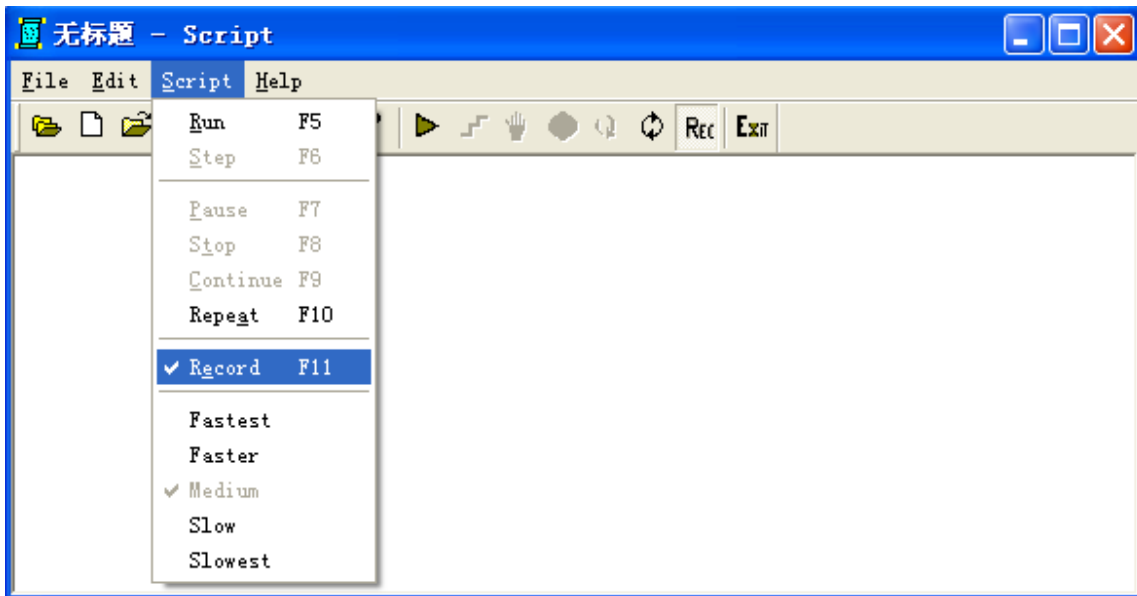

4. In ETS application, select **CP->DB->CP DB NAM LOCK** command to unlock the NAM. Then select **CP->DB->DB Templates->common->CP DB NAM 1** command to open the dialog of CP DB NAM1. And select **CP->DB->DB Templates->BAND A->CP DB HWD BAND A Rx AGC** to open the dialog of CP DB HWED Rx AGC. If you want record more you can select the commands you want to record.

```
09:45:37.9> , Id=CP Printf, Sys Time=0xA27B8C4B, AppCallDebug: OnRssiChanged
```
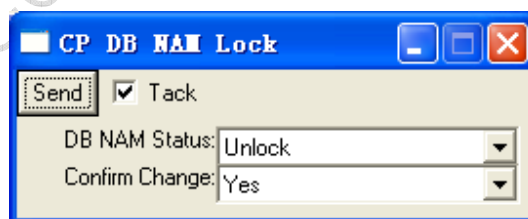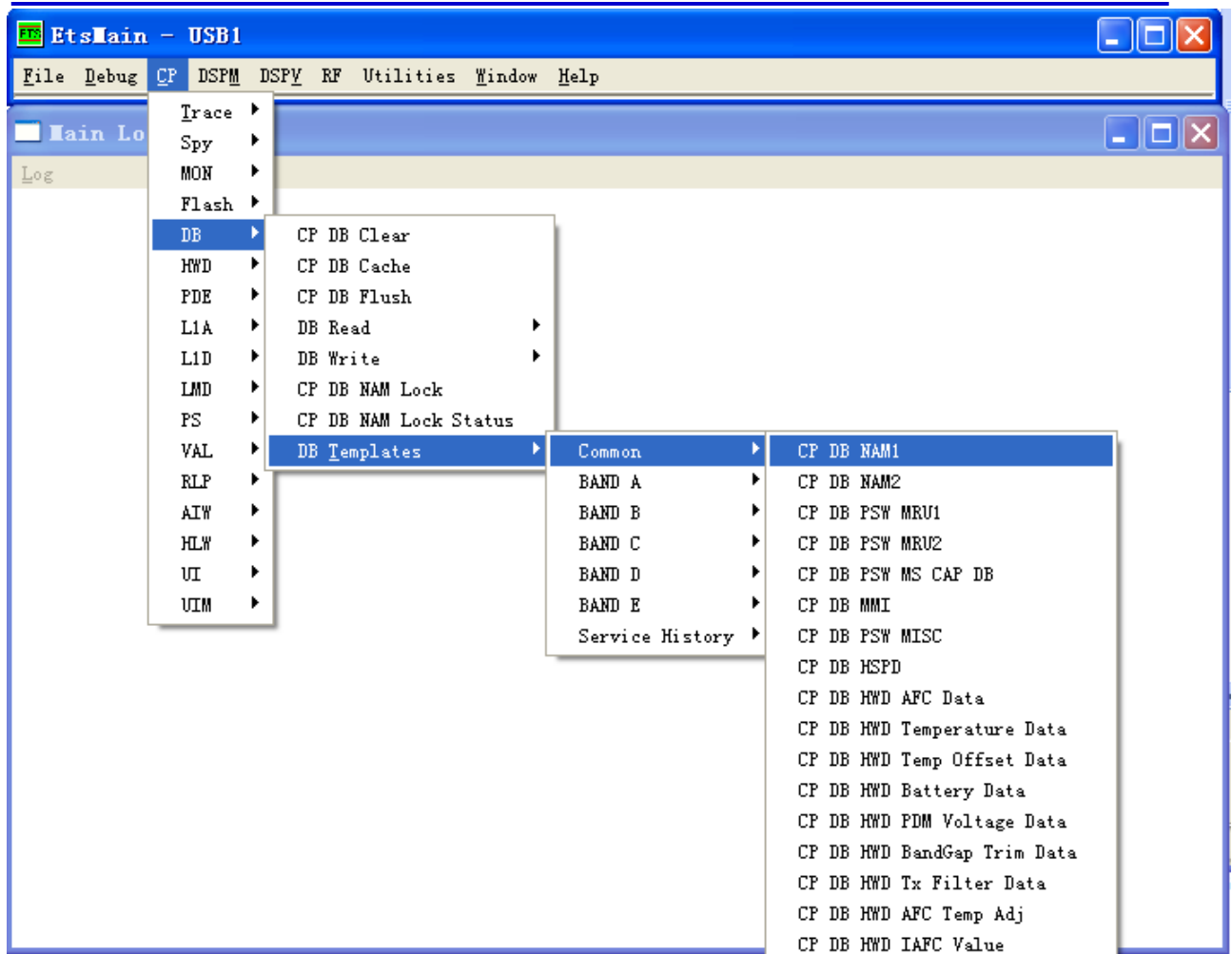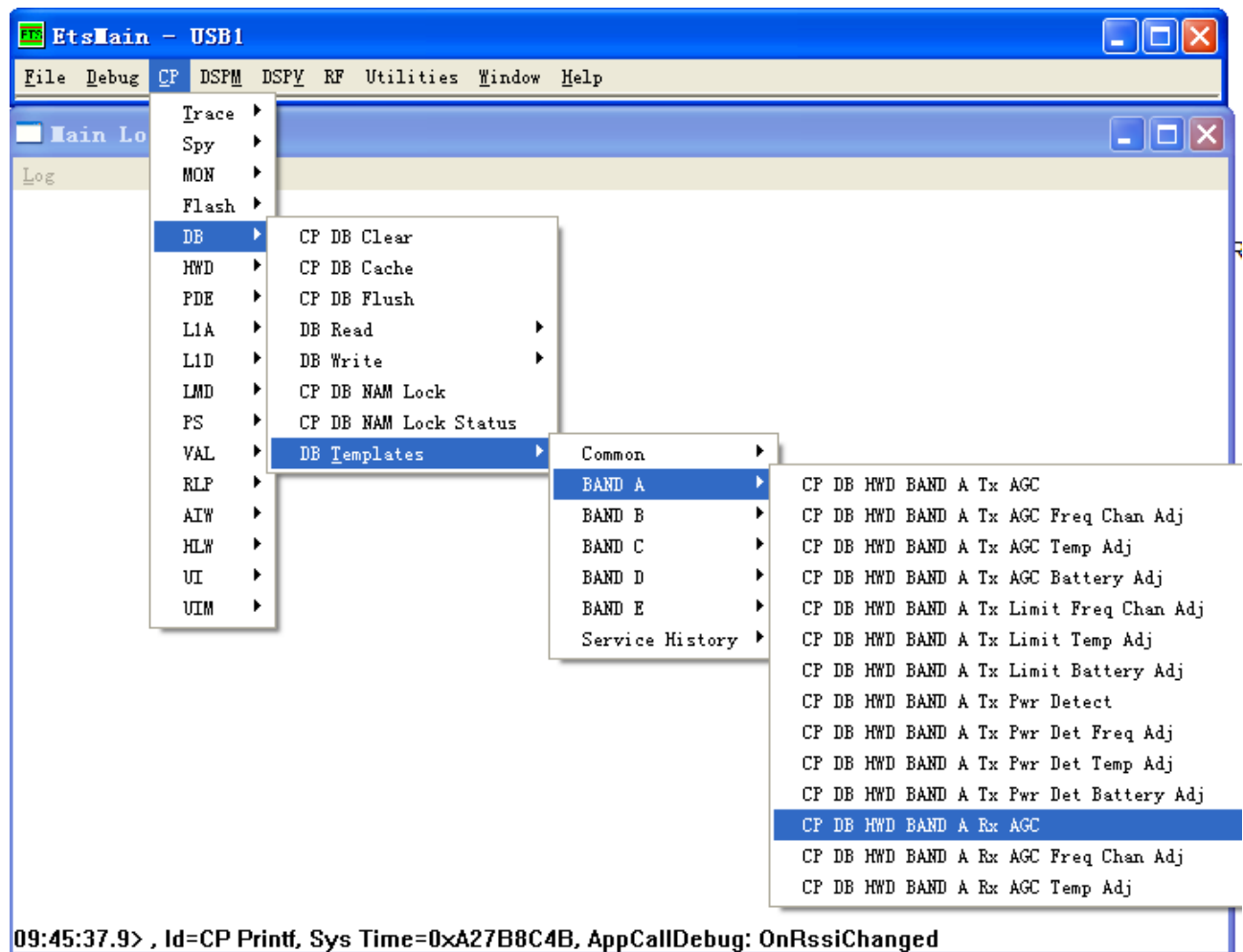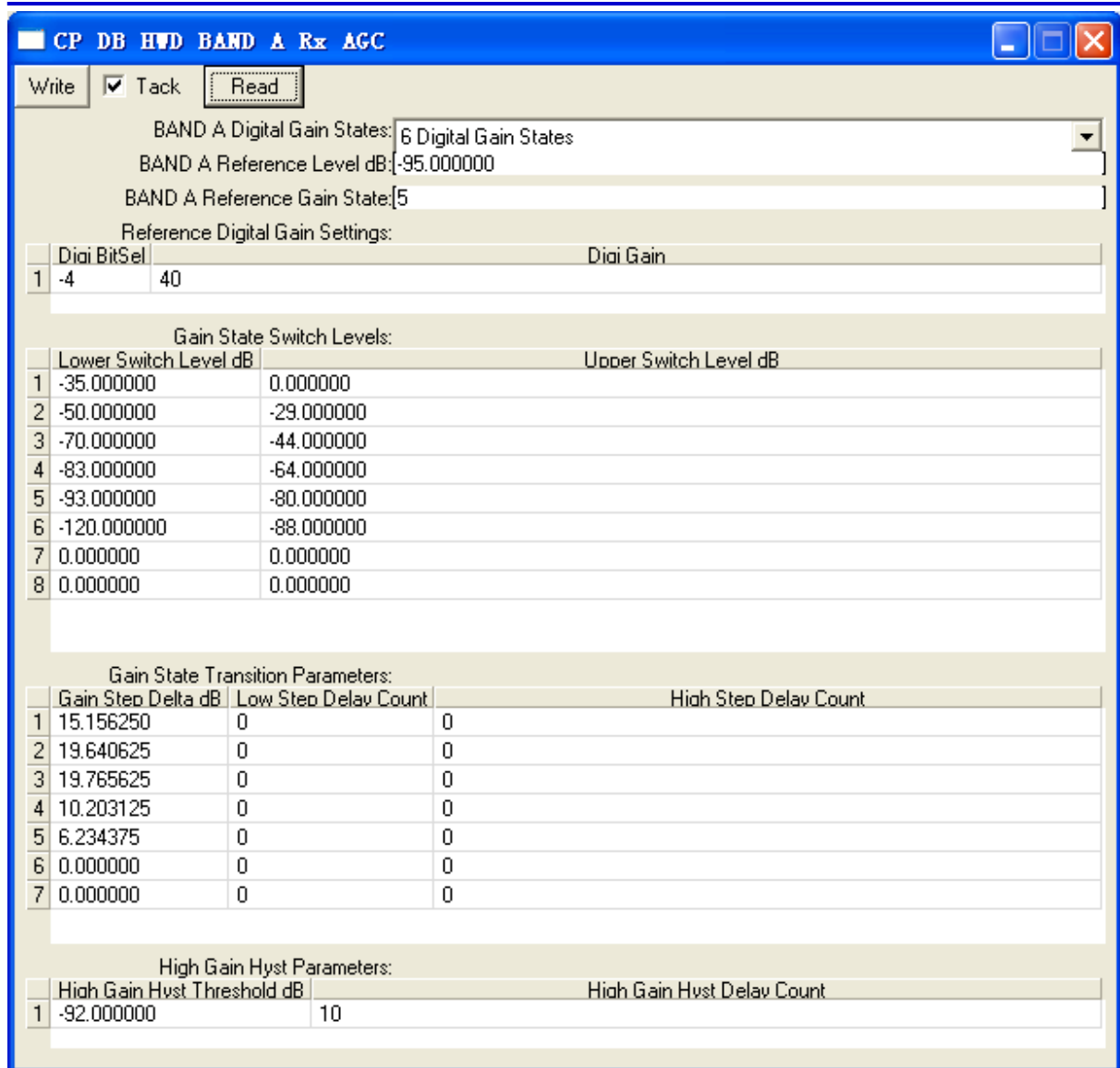
5. Click the "Read" commands in all dialog, For example In CP DB NAM1 dialog press the key "Read" to read NAM1 data from the phone, and in "CP DB HWD BAND A Rx AGC " dialog , press the key "Read" to read Rx AGC data from the phone.

6. Then in ETS, click "Write" in all dialogs that you have opened. In CP DB NAM1 dialog press the key "Write" to write NAM1 data into the phone, then this command will be printed in ETS main window and be sent to Script.exe. It will be recorded in the Script.exe main window. In "CP DB HWD BAND A Rx AGC " dialog press the key "Write", the Rx AGC data will be recorded into script main window. (See Picture <4>)

```
无标题 - Script                                                    [_][□][×]
File  Edit  Script  Help

 [toolbar icons]  ▶  ⌐  ✋  ●  ◑  ◌  Rec  Exit

ETS, Id=CP DB NAM Lock, DB NAM Status=Unlock, Confirm Change=Yes
WAIT 3609
ETS, Id=CP DB Read, DB Id=CP Read, Segment=DB PSW NAM1, Offset=0, Bytes=548
DatabaseRead=CP DB NAM1

WAIT 2188
ETS, Id=CP DB Read, DB Id=RF Read, Segment=DB HWD BAND A RXAGC, Offset=0,\
 Bytes=110
DatabaseRead=CP DB HWD BAND A Rx AGC

WAIT 3812
Database=CP DB NAM1, ESN=0xff04ffff, SCM=0x2a 0xaa 0x00 0x20 0xa8,\
 SlotCycleIndex=2, MobFirmRev=0, MobModel=0, MobPRev=6 6 0 6 6,\
 ValidZoneEntry=1, ZoneList RegZone=11, ZoneList Sid=14121, ZoneList Nid=1,\
 ZoneList AgeTimer=0, ZoneList TimerEnabled=0, ZoneList PcsBlock=0,\
 ZoneList BandClass=Band Class 0, ValidSidNidEntry=1, SidNidList Sid=14121,\
 SidNidList Nid=1, SidNidList AgeTimer=0, SidNidList TimerEnabled=0,\
 SidNidList PcsBlock=0, SidNidList CdmaBand=Band Class 0, BaseLat=434604,\
 BaseLong=1730256, Distance=0x0000, LockCodeReason=0x00, MaintReason=0x00,\
 DigitalReg=0, PrefBand=Eng Pref Band 0  Only,\
 PrefMode=Eng Pref Mode Cdma Only, PrefBlockBand1=All Blocks,\
 PrefServBand0=Eng Pref Sys A, PRL PRev=1X95_683_A_B, Reserved1=, Reserved2=,\
 Reserved3=, Count=0, ImsiMValid=Valid, ImsiTValid=Not Valid, M_MCC=359,\
 M_IMSI_11_12=92, M_IMSI_S2=503, M_IMSI_S1=15716883, M_IMSI_Class=0,\
 M_AddrNum=0, T_MCC=0, T_IMSI_11_12=0, T_IMSI_S2=0, T_IMSI_S1=0,\
 T_IMSI_Class=0, T_AddrNum=0, AssignTmsiZoneLen=0x00,\
 AssignTmsiZone=0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00, TmsiCode=0xffffffff,\
 TmsiExpTime=0x00000000,\
 Positive Sids=14121 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0,\
 Positive Nids=65535 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0,\
```

7. Switch to **script**, select **Script->Record**, to stop recording the script, and save the script in a file. The file will be saved as *****.srp. Then you have recorded the NAM1 data in a script file.

Note: Usually if you want to run the write NAM data into the phone, you should set the NAM unlock. So you need add the command "ETS, Id=CP DB NAM Lock, DB NAM Status=Unlock, Confirm Change=No" in the first line of script file. This command can also be directory recorded into script file. The script file is TXT file, so you can edit it, copy some ETS command into the file.

Revision History

Revision	Date	Descriptions
1	2012-06-05	Created
2		
2		