

UC864 and CC864-DUAL Multiple Channel User Guide V1.1

1 Introduction

The serial interfaces of [UC864/CC864-DUAL](#) product are composed of UART and USB, which allow DTE to use the services such as call, SMS, data service, GPS and so on, simultaneously. UC864/CC864 DUAL using Qualcomm solution has some limitation. This document describes how to use physical multiple channels on UC864/CC864-DUAL.

1.1 Scope

This scope of this document is to describe the multiple channel is implemented on [UC864/CC864-DUAL](#) products.

The content described in this document apply to below products



1.2 SW applicability table

This document is valid in below products and SW version

Product	SW Version	Applicability
UC864-E	08.01.004	
UC864-E-AUTO	08.01.504	
UC864-G	08.01.104	
CC864-DUAL	09.00.001-B023	



2 References

- [1]. UC864 and CC864 AT_Commands_Reference_Guide
- [2]. 3GPP TS 27.007
- [3]. V.250 ITU-T
- [4]. USB Class Definitions for Communication Devices version1.1



3 Serial Interface Architecture

UC864/CC864-DUAL products allow DTE with the multiple channels to transmit and receive PSD, FAX/CSD, GPS, SMS and so on through serial interfaces are composed of UART and USB.

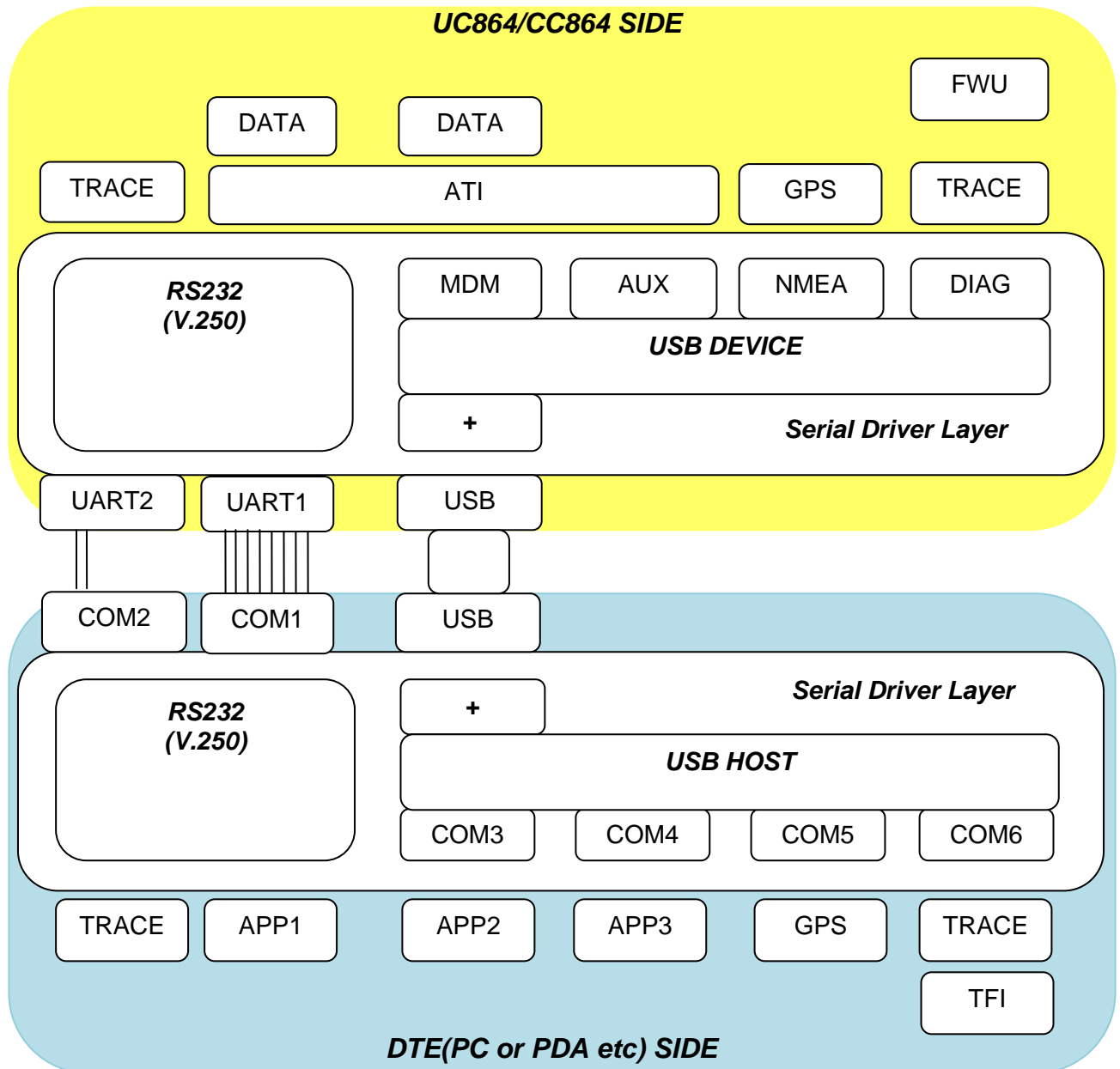


Figure 3.1 The architecture of serial interface on UC864/CC864-DUAL



3.1 UART Interface

This paragraph deals with the capability and available service for each UART. [UC864/CC864-DUAL](#) allow DTE with two UART, which is used for specific service according to their capability.

	TD (C103)	RD (C104)	RTS (C105)	CTS (C106)	DSR (C107)	DTR (C108)	RI (C125)	DCD (C109)	Available Service
UART1									DATA(Low Speed), ATI
UART2									TRACE

Table 3.1.1 the capability and service for each UART

UART1 fully supports RS-232C 8-wires, and it can be used for modem feature such as data service as well as ATI service which allow DTE to send/receive AT Commands related to SMS/Voice, Call/Phonebook/Phone status and so on. But UART1 can't support CMUX now so it should be used with USB interface before CMUX implementing

UART2 only support RS-232C 2-wires, UART2 is dedicated only for TRACE because of its capability (has no control pin such as RTS/CTS/DTR/DSR/RI/DCD).

3.2 USB Interface

This paragraph deals with the capability and available service for each USB interface. [UC864/CC864-DUAL](#) allows DTE with two composite of USB interface according to the kind of products.

- USB Composite Device 1 ([UC864-E/UC864-E-AUTO](#))
 - MDM / AUX / DIAG
- USB Composite Device 2 ([UC864-G/CC864-DUAL](#))
 - MDM / AUX / DIAG / NMEA
 - **In the case of CC864, NMEA is being used to data port but will be changed to GPS in phase 2.**

USB Composite Device 1 provides to DTE three USB interfaces, which are used for special service according to their capability.

USB Composite Device 2 provides to DTE four USB interface , which allow DTE to use the GPS functionality as well as the functionality of Composite 1

[UC864/CC864-DUAL](#) products provide the convenience serial interface to DTE by emulating CDC(RS-232C functionality on USB).



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But, only MDM fully supports this functionality. Below table illustrates the capability and available service for each USB interfaces

	TD (C103)	RD (C104)	RTS (C105)	CTS (C106)	DSR (C107)	DTR (C108)	RI (C125)	DCD (C109)	Available Service
MDM									DATA(high speed), ATI
AUX									ATI
DIAG									TRACE Software updating (high speed)
NMEA									GPS

Table 3.2.1 the capability and service for each USB interface

MDM interface fully support RS-232C 8-wires, which allows DTE use this interface as the high speed DATA port such as PSD service under 3G/IX RTT network as well as ATI service.

AUX/DIAG/NMEA interfaces only support RS-232C 2-wires. Especially , DTE should not use AUX interface for DATA service(no support RS-232C pin emulation).

DIAG is used only for TRACE and firmware updating by TFI. and [UC864/CC864-DUAL](#) products offer two TRACE channel (USB DIAG and UART2), which can't be operated parallel with each other. Once one is activated as TRACE , other will be deactivated, automatically.

NMEA interface is offered to the product support GPS functionality ([UC864-G/CC864-DUAL](#))



4 ATI Architecture

This paragraph deals with the architecture of ATI which allows DTE to send AT Commands and receive URC messages.

[UC864/CC864-DUAL](#) have the following technical feature.

- Three channels can be assigned to ATI at the same time.
- One ATI is shared by every channels
- One AT Command Processor process AT Commands from every channels

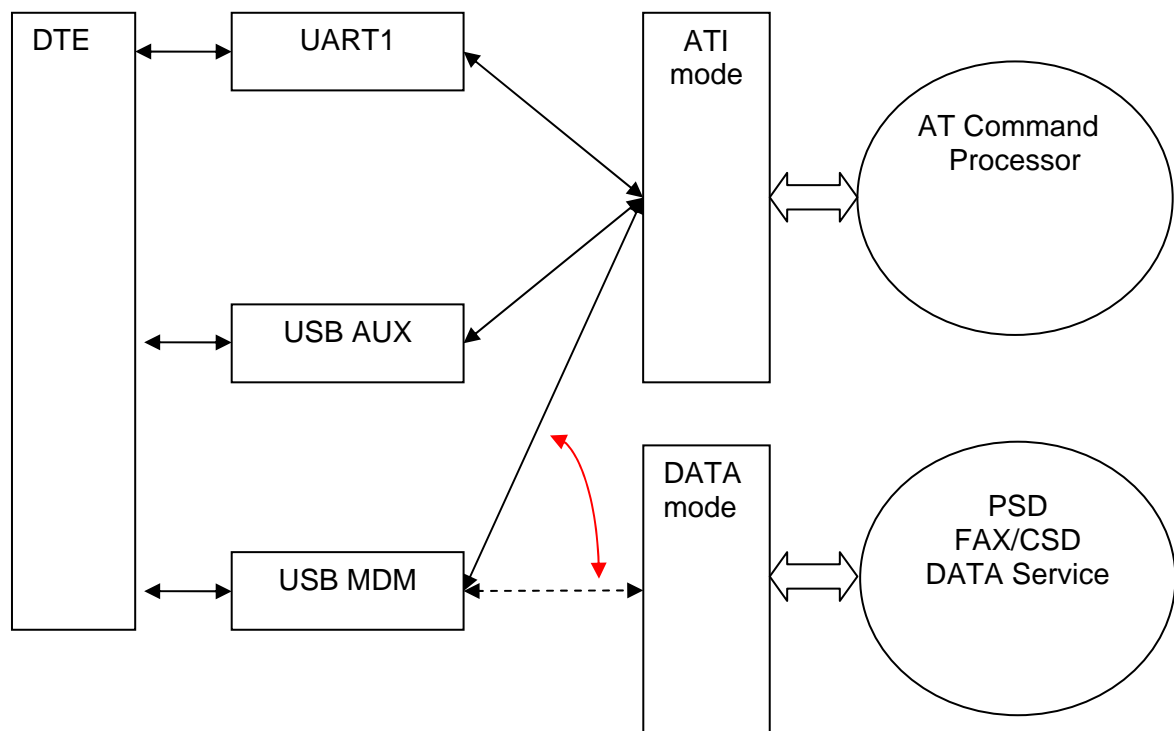


Figure 4.1 ATI Interface Architecture

[UC864/CC864-DUAL](#) products allow DTE to place three channels to ATI mode at same time and ATI (AT Command Interpreter) on [UC864/CC864-DUAL](#) provides to DTE with

- Sending AT commands on different channels
- Sending AT commands through other channels while one channel is activated as DATA mode
- Receiving URC message on channel is defined by AT#NOPT



Set Notification Port - #NOPT

#NOPT - Set notification port

AT#NOPT=<num>

Set command sets the port output notification data (Indication data)

UC864 Family has the following 5 ports:

- Telit USB Modem Port
- Telit USB Diagnostic Interface Port
- Telit USB Auxiliary Port
- UART Data Port
- UART Trace Port

Notification data will be sent to the specific port is set by #NOPT. Each port has the capability like as below table

	GND (C102)	TD (C103)	RD (C104)	RTS (C105)	CTS (C106)	DSR (C107)	DTR (C108)	RI (C125)	DCD (C125)
USB Modem									
USB Diagnostic									
USB Auxiliary									
UART DATA									
UART TRACE									

USB Diagnostic and UART TRACE are reserved for Telit Service. USB Modem, USB Auxiliary and UART DATA are dedicated for M2M Interface.

Parameter:

<num> - Notification Port

0 – All Ports (Telit USB Modem, UART Data, USB Auxiliary)
Notification data is sent to all ports. < default value >

- 1 – UART Data Port only
- 2 – Telit USB Modem Port only
- 3 – Telit USB Auxiliary Port only

AT#NOPT?

Read command reports the current notification port.

AT#NOPT=?

Test command reports the available range of values for parameter **<num>**.



There are some limitation for DTE to use multiple channels in ATI/DATA mode.

- **Limitation 1 (ATi mode)**

Don't send AT commands on different channel until receiving the response to AT command is issued on specific channel

Below figure illustartes limitation 1

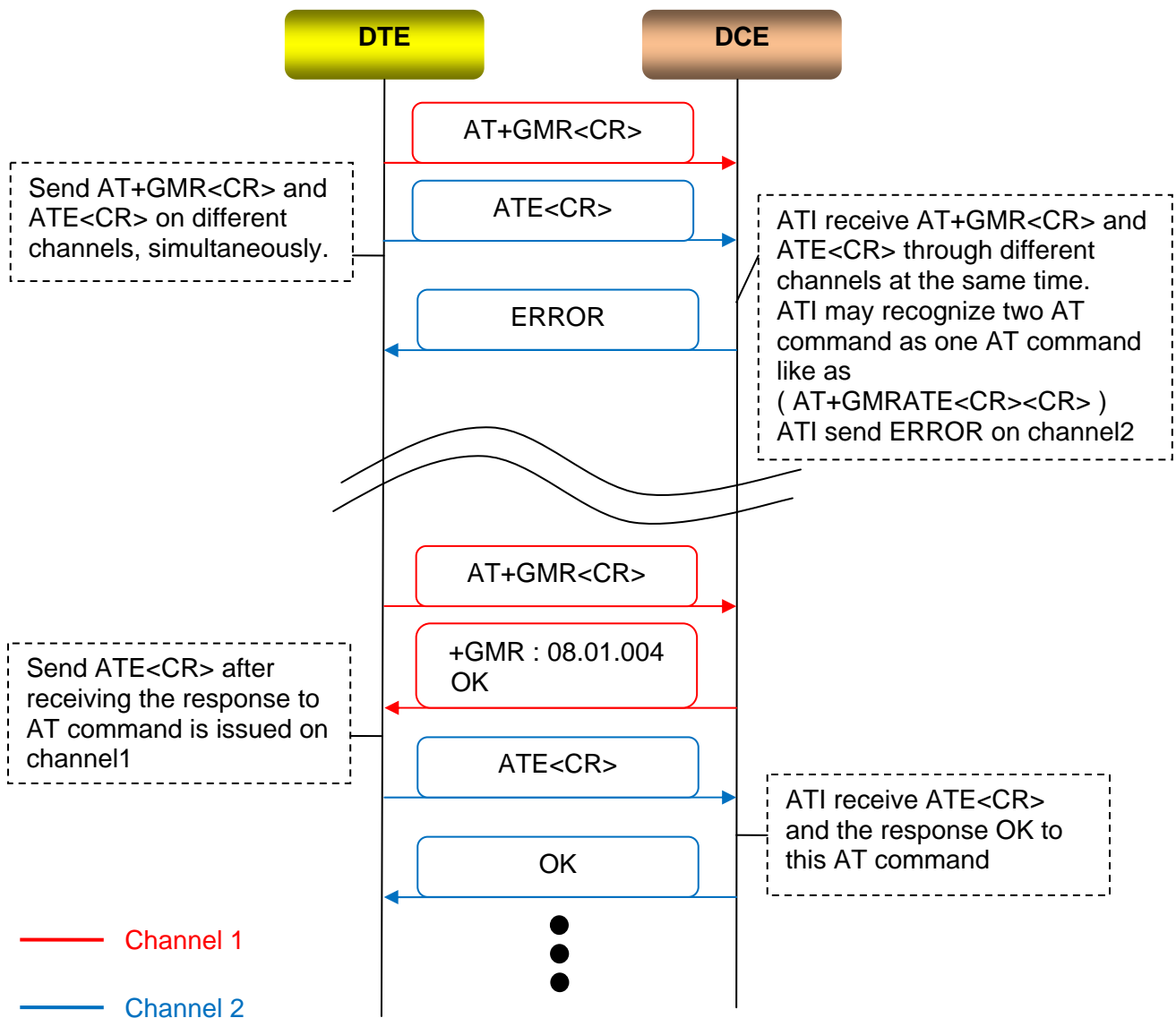


Figure 4.2 AT commands on multiple channels



- **Limitation 2 (DATA mode)**

Only one channel can be assigned as DATA mode

Even if UART1 and USB MDM have the capability to support DATA service,it's not allow for DTE to use two channels as DATA service,simultaneouly.(e.g. Not supported CSD for UART1 and PSD for USB MDM simultaneously)



5 Use cases

The customer can use USB and UART to support their serial interface and we are recommend as followed.

- A. USB only
 - USB AUX(AT command)+USB MDM(data services)+USB DIAG(Trace)+USB NMEA(GPS)
- B. Combiend UART1 and USB
 - UART1(AT command)+ +USB MDM(data services)+USB DIAG(Trace)+USB NMEA(GPS)
- C. UART only(CMUX and will be implemented)
 - 4 Full DLCI on UART1
 - CMUX0 channel (DATA) +CMUX1(AT command)+ CMUX2(GPS)+CMUX3(Diag)
 - CMUX3 is dedicated to DIAG and if it is closed, UART2 is connected to DIAG, automatically.
 - ATI(AT Interpreter) is shared by all CMUX channel (Only 1 AT Interpreter)
 - One AT Command Processor process AT Commands from every channels
 - Profiles(basic and extended profiles) are shared by all CMUX channels
 - ATI is shared by all CMUX every channels
 - UC864/CC864 can't process AT commands issued on each CMUX channel , at the same time



7 Document History

Date	Changes
10/02/08	Initial release
13/02/09	Updated 5. Use cases related to CMUX

