

UC864-AK Product Description

80341ST10064a Rev.0 – May 2009



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1 Overview

The **Telit UC864-AK module** are small, lightweight, low power consumption and RoHS compliant devices that allow digital communication services wherever a WCDMA/HSDPA (2100 MHz network is present).

The **UC864-AK** is a low cost connector-less best solution for medium to high quantity projects.

The **UC864-AK** is provided with a 40 pin SAMTEC board to board connector and a 50 Ohm Murata RF connector.

The **UC864-AK** is specifically designed and developed by **Telit** for OEM usage and dedicated to portable data, voice and telemetric applications such as:

- **Automotive and Fleet Management applications**

From the interface point of view, the **UC864-AK** provides the following:

- **USB2.0 for AT commands**
 - Baud rate up to 12 Mbps
- **Full RS232 UART, CMOS level (ASC0) interface for AT commands:**
 - Fixed baud rate up to 230 Kbps
- **SIM card interface, 1.8 / 3 volts with auto-detection and hot insertion**

In order to meet the competitive OEM and vertical market stringent requirements, Telit supports its customers with a dedicated Support Policy with:

- **Telit Evaluation Kit EVK2** to help you develop your application;
- A Website with all updated information available;
- An high level specialist technical support to assist you in your development;

For more updated information concerning product Roadmap, availability, technical characteristics, commercial and other issues, please check on the Telit website www.telit.com > Products (UMTS/HSDPA) > UC864 Family.

NOTE: Some of the performances of the **Telit modules** depend on SW version installed on the module itself.

The **Telit modules** SW group is continuously working in order to add new features and improve the overall performances.

The **Telit modules** are easily upgradeable by the developer using the **Telit** Flash Programmer. Furthermore, all the **Telit modules** have the conformity assessment against KCC.



2.2 Weight

Weight	
UC684-AK	32 gr.

2.3 Environmental requirements

The **Telit UC864-AK** module is compliant with the applicable 3gpp reference documentation TS 25.101 Release 2004-03.

2.3.1 Temperature range

	UC864-AK	Note
Operating temperature	-20 ~ +55°C	The module is functional in all the temperature range, and it fully meets the ETSI specifications.
	-30 ~ +80°C	The module is functional in all the temperature range. Temperatures outside the range -20°C ÷ +55°C, might slightly deviate from ETSI specifications.
Temperature in not functional conditions	-40 ~ +90°C	

* Functional: the module is able to make and receive voice calls, data calls, SMS and make data traffic..

2.3.2 Vibration Test (non functional)

- 10 ~12Hz ASD = 1.92m 2 /s 3
- 12 ~ 150Hz -3dB/oct

2.3.3 RoHS compliance

As a part of Telit corporate policy regarding environmental protection, the **UC864-AK** comply with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2002/95/EG).



2.7.2 UC864-AK Antenna connectors

2.7.2.1 WCDMA Applications

The **UC864-AK** module is equipped with a 50 Ohm RF connector from Murata, GSC type P/N **MM7329-2700**. The suitable counterpart is Murata **MM7329-2700B**.

2.8 Supply voltage

The external power supply must be connected to VBATT signal and must fulfill the following requirements:

Nominal operating voltage	4.0 V
Operating voltage range	3.6 V – 4.4 V

NOTE: Operating voltage range must never be exceeded; care must be taken in order to fulfill min/max voltage requirements.

2.9 WCDMA Power consumption

The typical current consumption of the **Telit UC864-AK** is:

Power off current (typical)	< 26 μ A;
Stand-by current (WCDMA Idle)	< 22mA (<1.5mA using command AT+CFUN=5)
Operating current in WCDMA voice channel	< 690 mA @ worst network conditions
Operating current in WCDMA data channel	< 680 mA @ worst network conditions
Operating current in HSDPA channel	< 730 mA @ worst network conditions



2.10 User Interface

The user interface is managed by AT commands specified on the ITU-T V.250, 3gpp 27.007 and 27.005 specifications.

2.10.1 Speech Coding

The **UC864-AK** voice codec supports the following rates:

- WCDMA
 - Adaptive Multi Rate

2.10.2 SIM Reader

The **UC864-AK** supports R5 and R99 3gpp TS 31.114 - USIM 1.8V and 3V ONLY with an external SIM connector. For 5V SIM operation an external level translator can be added.

2.10.3 SMS

The **UC864-AK** supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 with signaling of new incoming SMS, SIM full, SMS read
- Mobile Originated class 0 – 3 with writing, memorize in SIM and sending
- Cell Broadcast compatible with CB DRX with signaling of new incoming SMS.

2.10.4 Data/fax Transmission

The **Telit UC864-AK** supports:

- WCDMA/HSDPA category 8, MS Class A (Simultaneous Voice and Data)
- CSD up to 14.4 Kbps
- Fax service, Class 1 Group 3.

2.10.5 Local security management

The local security management can be done with the lock of Universal Subscriber Identity module (USIM), and security code request at power-up.



2.10.6 Call control

The call cost control function is supported.

2.10.7 Phonebook

This function allows the storing of the telephone numbers in SIM memory. The capability depends on SIM version and embedded memory.

2.10.8 Characters management

The **Telit UC864-AK** supports the IRA characters set (International Reference Alphabet), in TEXT and PDU mode.

2.10.9 SIM related functions

Activation and deactivation of the numbers stored in phone book FDN, ADN and PINs are supported. Extension at the PIN2 for the PUK2 insertion capability for lock condition is supported.

2.10.10 Call status indication

The call status indication by AT commands is supported.

2.10.11 Automatic answer (Voice, Data)

After a specified number of rings, the module will automatically answer with a beep. The user can set the number of rings by means of the command `ATS0=<n>`.

2.10.12 Supplementary services (SS)

The following supplementary services are supported:

- Call Barring,
- Call Forwarding,
- Calling Line Identification Presentation (CLIP),
- Calling Line Identification Restriction (CLIR),
- Call Waiting, other party call Waiting Indication,
- Call Hold, other party Hold / Retrieved Indication,
- Closed User Group supplementary service (CUG),
- Advice of Charge,
- Unstructured SS Mobile Originated (MO)



2.10.13 Acoustic signaling

The acoustic signaling of the **UC864-AK** on the selected acoustic device are the following:

- Call waiting;
- Ringing tone;
- SMS received tone;
- Busy tone;
- Power on/off tone;
- Off Hook dial tone;
- Congestion tone;
- Connected tone;
- Call dropped;
- No service tone;
- Alarm tone.

2.11 Logic level specifications

Where not specifically stated, all the interface circuits work at 2.6V CMOS logic levels. To get more detailed information about the logic level specifications used in the **Telit UC864-AK** interface circuits please consult the **UC864-AK** Hardware User Guide.

2.11.1 Reset signal

Signal	Function	I/O	UC864-AK pin
RESET	Phone reset	I	28

RESET is used to reset the **UC864-AK**. Whenever this signal is pulled low; the **UC864-AK** is reset. When the device is reset it stops any operation and after the release of the reset it is unconditionally rebooted, without doing any detach operation from the network where it is registered to. This behavior is not like a proper shut down because any device is requested to issue a detach request on turn off. For this reason the Reset signal must not be used to normally shutting down the device, but only as an emergency exit in the rare case the device remains stuck waiting for some network response. The RESET is internally controlled on start-up to achieve always a proper power-on reset sequence, so there's no need to control this pin on start-up. It may only be used to reset a device already on that is not responding to any command.

NOTE: do not use this signal to power off the **Telit UC864-AK module**. Use the ON_OFF* signal to perform this function or the AT#SHDN command. (To turn off UC864-AK, first of all, you MUST cut off supplying power to the USB_VBUS, or the module does not turn off).



2.12 Audio levels specifications

The audio of the **UC864-AK** is organized into two main paths:

- internal path (called also MT)

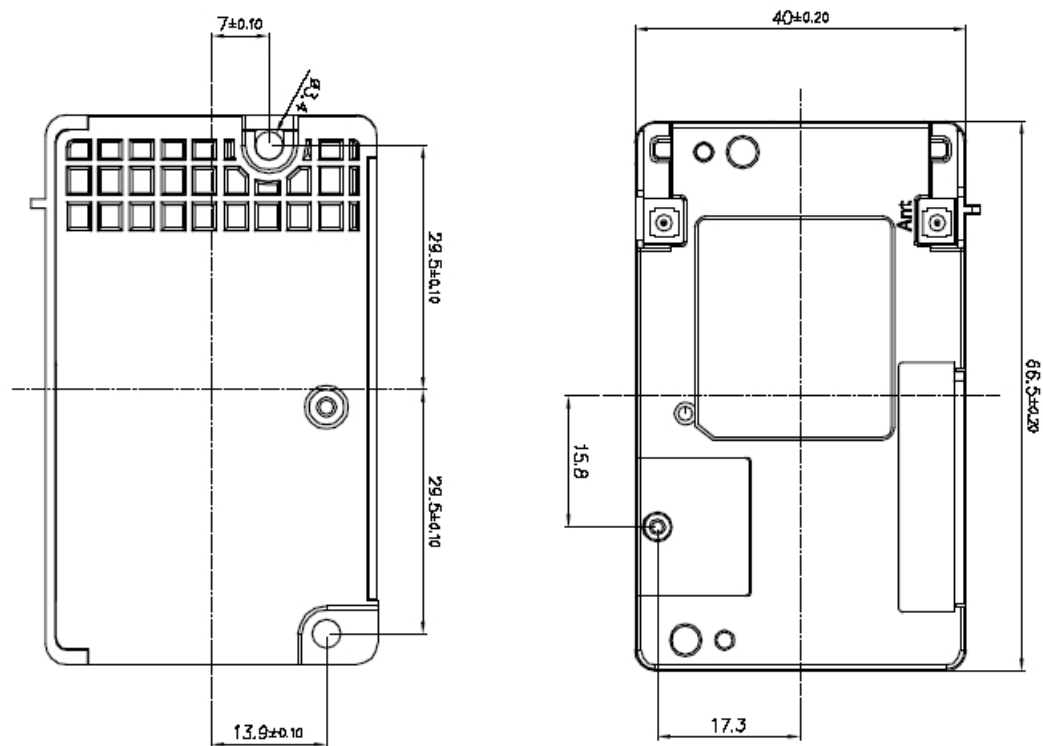
These two paths are meant respectively for handset and headset/hands-free use. The **UC864-AK** has a built in echo canceller and a noise suppressor, tuned separately for the two audio paths; for the internal path the echo canceller parameters are suited to cancel the echo generated by a handset, while for the external audio path they are suited for a hands-free use.

For more information on the audio refer to the **UC864-AK** Hardware User Guide.



2.13 Mounting the UC864-AK on your board

2.13.1 UC864-AK



NOTE: UC864-AK should be connected to GND



3 Evaluation Kit

In order to assist you in the development of your **Telit UC864-AK module** based application, Telit can supply the **EVK2 Evaluation Kit** with appropriate power supply, SIM card housing, RS 232 serial port level translator, direct UART connection, Handset, Headset and Hands-free (car kit) audio, antenna.

The **EVK2** provides a fully functional solution for a complete data/phone application.

The standard serial RS232 9 pin connector placed on the **Evaluation Kit** allows the connection of the **EVK2** system with a PC or other DTE.

The development of the applications utilizing the **Telit UC864-AK module** must present a proper design of all the interfaces towards and from the module (e.g. power supply, audio paths, level translators), otherwise a decrease in the performances will be introduced or, in the worst case, a wrong design can even lead to an operating failure of the module.

In order to assist the hardware designer in his project phase, the **EVK2** board presents a series of different solutions, which will cover the most common design requirements on the market, and which can be easily integrated in the OEM design as building blocks or can be taken as starting points to develop a specific one.

For a detailed description of the **Telit Evaluation Kit**, refer to the documentation provided with the Telit **UC864-AK** Hardware User Guide and EVK2 User Manual.



4 AT Commands

The **Telit UC864-AK module** can be driven via the serial interface using the standard AT commands¹. The **Telit UC864-AK module** is compliant with:

1. Hayes standard AT command set, in order to maintain the compatibility with existing SW programs.
2. 3gpp TS 27.007 specific AT command and WCDMA specific commands.
3. 3gpp TS 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)
4. FAX Class 1 compatible commands

Moreover the **Telit UC864-AK module** supports Telit proprietary AT commands for special purposes. For a more information about AT commands supported by UC864-AK modules please refer to document AT Commands Reference Guide, code 80341ST10065a.

¹ The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.



5 Conformity Assessment Issues

5.1 KCC(Korea country certification)

The UC864-AKmodule is assessed to the KCC.

전자문서확인번호 MEWO-F315-TH61-1DRC



방송통신기기인증서 Certificate of Broadcasting and Communication Equipment

인증의 종류 <i>Certification Type</i>	형식등록(Type Registration)
상호 또는 성명 <i>Trade Name or Applicant</i>	주식회사 텔릿와이어리스솔루션즈
기기의 명칭 <i>Equipment Name</i>	이동통신용 무선설비의 기기
기본모델명 <i>Basic Model Number</i>	UC864-AK
과생모델명 <i>Series Model Number</i>	
인증번호 <i>Certification No</i>	TCS-UC864-AK
제조사/ 제조국가 <i>Manufacturer/Country of Origin</i>	주식회사 텔릿와이어리스솔루션즈/한국
형식기호 <i>Type Identification</i>	IMT9-IO3TAS1942.8/1977.2T,2132.8/2167.2R0.2G7W
인증연월일 <i>Date of Certification</i>	2008년(Year) 12월(Month) 16일(Date)
기타 <i>Others</i>	

위 기기는 「전기통신기본법」, 「전파법」에 따라 인증되었음을 증명합니다.
It is certified that foregoing equipment has been certificated under the Framework Act on Telecommunications and Radio Waves Act.

2008년(Year) 12월(Month) 16일(Date)

전파연구원장



Director General of Radio Research Laboratory
Korea Communications Commission Republic of Korea

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5.2 RoHS Declaration

Telit wireless solutions

DECLARATION OF EU RoHS Compliance

We,
TELIT WIRELESS Solutions Co., Ltd

Of :
**9th Fl., Daewoo Securities Bld.,
34-3, Yeouido-dong, Yeongdeungpo-Ku,
Seoul, 150-716, KOREA**


Declare under our sole responsibility that the products


UC864-AK(Commercial name)
4990250135 (Internal Code)

To which this declarations relates, is in full compliance with EU Directive 2002/95/EC and subsequent amendments, on restriction of the use of certain Hazardous Substances (including Deca-BDE) in electrical and electronic equipment (ROHS).

The technical documentation or information showing that electrical equipment which has put on the market, complies the requirements of regulation, will be held at :

TELIT WIRELESS Solutions Co., Ltd
**9th FL, Daewoo Securities Bld.,
34-3, Yeouido-dong, Yeongdeungpo-Ku,
Seoul, 150-716, KOREA**
29th May 2009

SWKim 
R&D Director

SWLee 
Quality manager

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Making machines talk.



6 SAFETY RECOMMENDATIONS

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc
- Where there is risk of explosion such as gasoline stations, oil refineries, etc

It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity.

We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations.

The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing the WCDMA/GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force.

Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case of this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.



6.1 Contact Information, Support

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

For general contact, technical support, report documentation errors and to order manuals, contact your regional Technical Support Center at:

- TS-EMEA@telit.com,
- TS-AMERICAS@telit.com,
- TS-APAC@telit.com

Or use:

<http://www.telit.com/en/products/technical-support-center/contact.php>

Telit appreciates feedback from the users of our information.

Technical documentation: available for download into the Website www.telit.com >Products >UMTS/HSDPA > selected model.



7 List of acronyms

ACM	Accumulated Call Meter
ASCII	American Standard Code for Information Interchange
AT	Attention commands
CB	Cell Broadcast
CBS	Cell Broadcasting Service
CCM	Call Control Meter
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CR	Carriage Return
CSD	Circuit Switched Data
CTS	Clear To Send
DAI	Digital Audio Interface
DCD	Data Carrier Detected
DCE	Data Communications Equipment
DRX	Data Receive
DSR	Data Set Ready
DTA	Data Terminal Adaptor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Equipment Institute
FTA	Full Type Approval (ETSI)
GPRS	General Radio Packet Service
GPS	Global Positioning System
GSM	Global System for Mobile communication
HF	Hands Free
HSDPA	High Speed Downlink Packet Access
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	International Reference Alphabet
ITU	International Telecommunications Union
IWF	Inter-Working Function
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Linefeed
ME	Mobile Equipment
MMI	Man Machine Interface



UC864-AK Product Description
80341ST10064a Rev.0 – May 2009

MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PB	Phone Book
PDU	Protocol Data Unit
PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
USSD	Unstructured Supplementary Service Data
WCDMA	Wideband Code Division Multiple Access
3gpp	3rd Generation Partnership Project



