

# **CM800A - 800MHz CDMA Module**

**Version 4.1**

**December, 2003**

**PRESENTED BY**

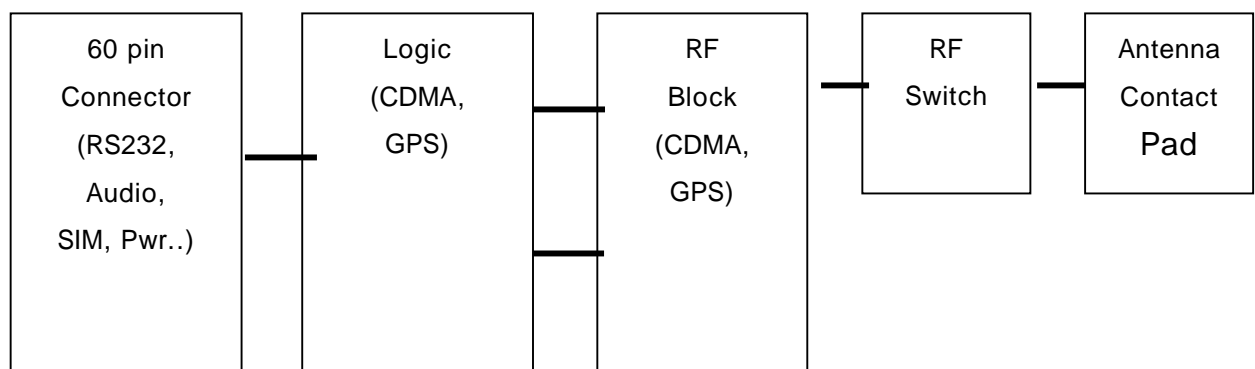
**GIGA Telecom**

## 1. CM800A Features

- CDMA modem designed for data communication
- IS-95A,B,C CDMA Protocol Support
- Standard RS-232 Interface
- Remote controlled by AT commands
- Power on/off control
- DATA Transmission up to 153.6 Kbps
- Small size and light weight
- Support GPS

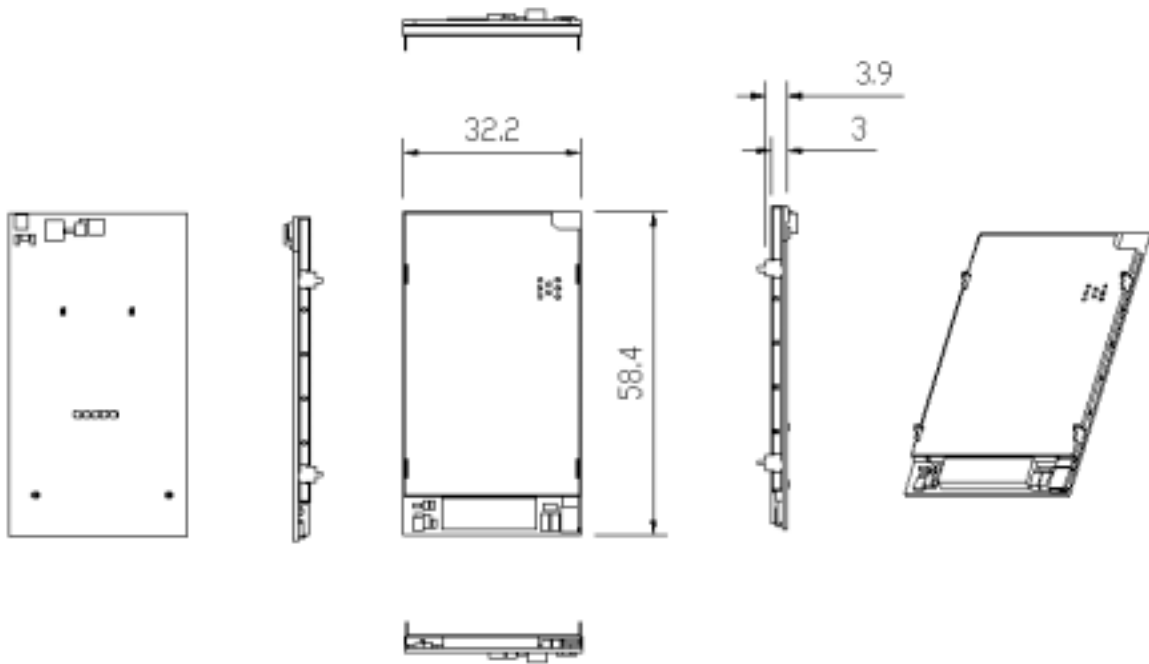
## 2. CM800A Specification

### 2.1 System Block Diagram



### 2.2 Mechanical Specification

- Dimension: **32.2 × 58.4 × 3.2 mm**
- Weight: 12g
- Modem interface connector: 14-5087-0609-30-861(60pin) / ELC0
- PCB Thickness: 0.95T



<Physical Dimension of the CM800A V4.1 >



<Top/Bottom>

<Bottom without Shield Can>

< Picture of the CM800A V4.1>

## 2.3 Electrical Specification

-DC Power input voltage: DC 3.3~4.2v

-Maximum current: 700mA @ 3.7V

-Temperature range: Working condition from -30°C ~ 60°C

Parameter	Specifications	Unit	Condition
Frequency Range	824 to 849	MHz	TX
	869 to 894	MHz	RX
Channel Number	20	CH	
Channel Spacing	1.23	MHz	
Frequency Error	± 300	Hz	
Time Reference	± 1	Us	
Waveform Quality	> 0.944		
Tx Conducted Spurious	< -42	dBc/30KHz	+/-900KHz offset
	< -54	dBc/30KHz	+/-1.98MHz offset
Tx Maximum Power	23 to 27	dBm	
Tx Minimum Power	< -50	dBm	
Occupied Bandwidth	< 1.32	MHz	
Open Loop output Power	-48 ± 9.5	dBm	Rx Input – 25dBm
	- 8 ± 9.5	dBm	Rx Input – 65dBm
	18 to 27	dBm	Rx Input –104dBm
Standby Output Power	< -61	dBm/1MHz	
Rx Sensitivity	< -104	dBm	
	-25	dBm	
Single Tone Desensitization	> -30	dBm	+/-900KHz offset
Intermodulation Distortion	> -43	dBm	+/-900KHz,+/-1.7MHz offset
	> -32	dBm	+/-900KHz,+/-1.7MHz offset
	> -21	dBm	+/-900KHz,+/-1.7MHz offset
Rx Conducted Spurious	< -47	dBm/30KHz	At all other frequency
	< -61	dBm/1MHz	824 to 849 MHz
	< -81	dBm/1MHz	869 to 894 MHz
Supply Voltage	3.3 to 4.2	Vdc	
Sleep Current	< 1	mA	
Idle current	< 90	mA	
Tx mode	< 360	mA	Tx power 10dBm full rate

### 3. Modem Interface

- RS-232 serial connector by 60 pin female
- Power supply 3.3~4.2 VDC
- Antenna Contact Pad to external Antenna

#### 3.1 Pin Assignments

Signal	Pin number	I/O	Description
UIM_CLK	3	O	Clock for UIM interface
UIM_RST	5	O	Reset for UIM interface
CDMA_ON	6	I	Power ON/OFF control
UIM_DATA	7	O	Data for UIM interface or TXD2
GPIO_8	8		GPIO or TXD2, if pin 7 is TXD2
UIM_EN	9	O	SIM card power supply enable
GPIO_10	10		GPIO
GPIO_USB_DAT	12		GPIO or USB_DATA
KeyS_0	13	I/O	Key sense 00
CDMA_RST/	14	I	Reset Input
KeyS_1	15	I	Key sense 01
GPIO_USB_VMI	16		GPIO or USB_VMI
KeyS_2	17	I	Key sense 02
GPIO_USB_VPI	18		GPIO or USB_VPI
KeyS_3	19	I	Key sense 03
GPIO_USB_OE	20		GPIO or USB_OE
KeyS_4	21	1	Key sense 04
GPIO_USB_VMO	22		GPIO or USB_VMO
COL_0	23	O	Key column 00
GPIO_USB_VPO	24		GPIO or USB_VPO
COL_1	25	O	Key column 01
GPIO_26	26		GPIO
COL_2	27	O	Key column 02
EAR_SENSE/	28		Ear-Mic sense signal or GPIO
COL_3	29	O	Key column 03
RTS	30	I	RS232 interface
COL_4	31	O	Key column 04
RXD	32	O	RS232 interface
ADC_0	33	I	ADC input 0
DTR	34	I	RS232 interface
GND	35	-	Ground
DSR	36	O	RS232 interface
CTS	37	O	RS232 interface
ADC_1	38	I	ADC input 1
TXD	39	I	RS232 interface
+2.8V	40	O	+2.8V Supply output (Max. 50 mA)

SPK2P	41	O	Speaker 2 Positive signal
MIC2P	42	I	Microphone 2 Positive signal
SPK2N_GND	43	-	Speaker 2 Ground
MIC2N	44	I	Microphone 2 Negative signal
SPK1P	45	O	Speaker 1 Positive signal
MIC1P	46	I	Microphone 1 Positive signal
SPK1N	47	O	Speaker 1 Negative signal
MIC1N	48	I	Microphone 1 Negative signal
Ringer	49	O	Ringer signal
GPIO_50	50	I/O	GPIO signal
DCD	51	O	RS232 interface
LED	52	O	LED ON/OFF signal or GPIO
GPIO_53	53	O	GPIO
RI	54	O	RS232 interface
Vibrator	56	O	Vibrator ON/OFF signal
VBAT	55,57~60	I	Battery Power Input
N.C	1,2,4,11		No connected

### 3.2 Signal Description

All the digital interface signals of the modem are operating under 2.8V CMOS logic environment.

Design of the host interface needs to account for 2.8V CMOS logic interface circuitry.

Input voltage of 2.8V logic is recommended for interface circuitry.

#### 3.2.1 RS-232 Interface Signals

The modem communicates with serial data that conforms to the standard RS-232 interface protocol.

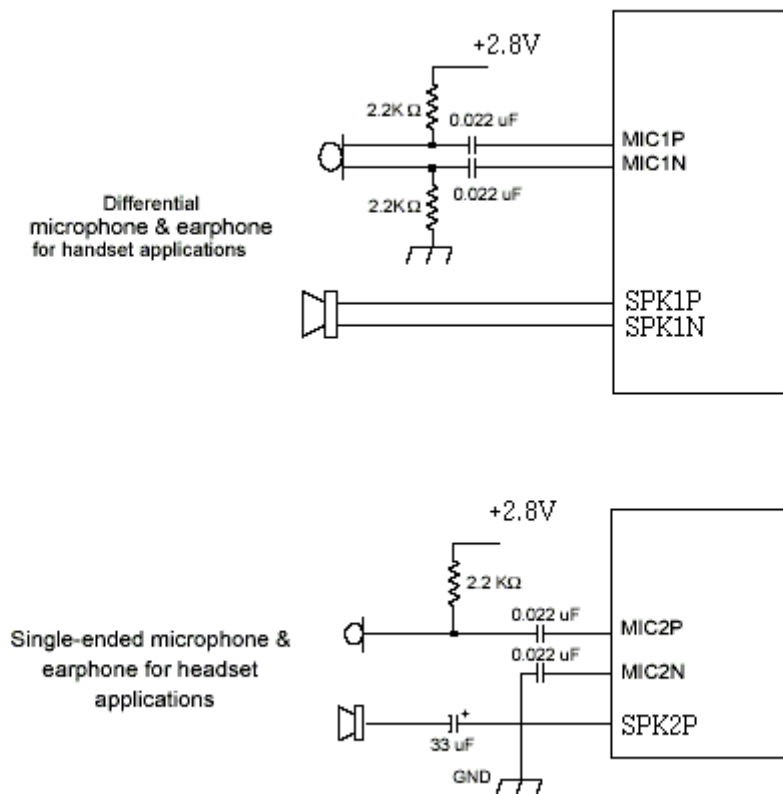
The modem provides 2.8V CMOS level signals.

Signal Name	Signal Description	Characteristic	Direction
DCD	Data Carrier Detect	Network connected from the modem	DCE to DTE
RXD	Receive Data	Input data from the host to modem	DTE to DCE
TXD	Transmit Data	Output data from the modem to host	DCE to DTE
DTR	Data Terminal Ready	Host ready signal	DCE to DTE
DSR	Data Set Ready	Modem ready signal to host	DTE to DCE
RTS	Request to Send	Ready for receive from modem to host	DCE to DTE
CTS	Clear to Send	Modem output signal	DTE to DCE
RI	Ring Indicator	Output to host indicating coming call	DCE to DTE
GND	Ground	Common ground	

\*DTE : HOST      DCE : MODEM

### 3.2.2 Audio Interface signals

The microphone and earphone is designed to interface directly to the CM800A module. The below Figure illustrates a typical audio interface used in handset and headset applications. You must supply the MIC BIAS Voltage at the MIC1 and MIC2 signals in external circuit. The output power for differential SPK1 output is typically 35mW for a full-scale +3dBm0 sine wave into 32 OHM speaker. The output power for Single-Ended SPK2P is typically 8.8mW. The Below Figure is recommended to circuit for audio interface.



### 3.2.3 UIM interface signals

The R-UIM is a smart Card for CDMA cellular application.

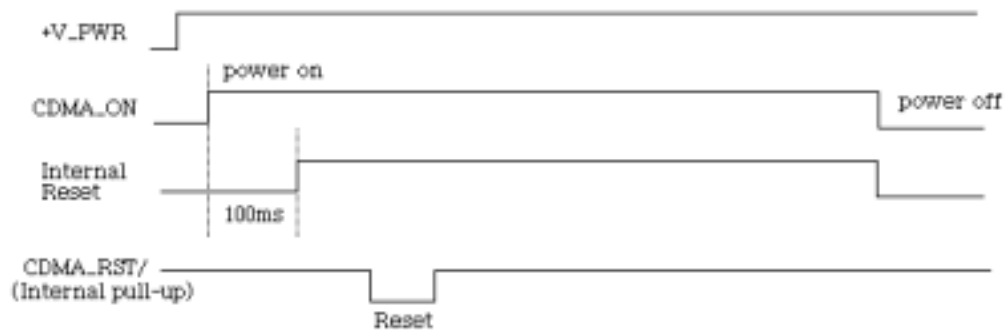
The CM800A supplies UIM\_CLK, UIM\_IO, UIM\_RESET/, and UIM\_EN to UIM reader. UIM\_RESET/ can be implemented by using a GPIO\_INT bit under software control. UIM\_CLK and UIM\_DATA are hidden behind the UART2 interface. R-UIM and UART2 functions cannot operate concurrently. R-UIM power is controlled by the UIM\_EN signal. A brief summary of the functional mode multiplex at pins is shown in table.

Signal Name	Pin No.	Primary Pin	UART2
UIM_CLK	3	GPIO_INT19	RFR_N2

UIM_IO	7	GPIO_INT21	DP_TX_DATA2
UIM_RST	5	GPIO_INT29	-
UIM_EN	9	GPIO_INT25-	-
GPIO_8	8	GPIO_INT20	DP_RX_DATA2

### 3.2.4 Power ON / OFF

After the CM800A is supplied with 4.2V DC, the CDMA\_ON pin must be set to high to start power on. The CDMA\_ON signal must be hold high till power off. Then the internal reset is automatically performed at the module for about 100ms. Once the initialization is complete, the AT command interface answers to the application. As soon as the CDMA\_ON signal is low, the module is power off. In operation, if the CDMA\_RST/ pin is low, the module is reset.



### 3.2.5 GPIO pins

Signal Name	Pin No.	Type	Alternate Function
UIM_CLK	3	BS-PU	GPIO_INT_19
UIM_RST	5	BS-PD	GPIO_INT_29
UIM_IO	7	BS-PU	GPIO_INT_21
GPIO_8	8	BS-PD	RXD2
UIM_EN	9	BS-PD	GPIO_INT_25
GPIO_10	10	BS-PU	GPIO_INT_1
USB_DATA	12	BS	GPIO_INT_42
USB_VMI	16	BS	GPIO_INT_43
USB_VPI	18	BS	GPIO_INT_44
USB_OE	20	BS-PU	GPIO_INT_45
USB_VMO	22	BS	GPIO_INT_46
COL_0	23	BS-PU	GPIO_INT_36
USB_VPO	24	BS	GPIO_INT_47
COL_1	25	BS-PU	GPIO_INT_35
GPIO_26	26	BS-PU	GPIO_INT_4
COL_2	27	BS-PU	GPIO_INT_34



EAR_SENSE/	28	BS-PU	GPIO_INT_0
COL_3	29	BS-PU	GPIO_INT_33
COL_4	31	BS-PU	GPIO_INT_32
DTR	34	BS-PU	GPIO_INT_2
DSR	36	BS-PD	GPIO_INT_24
GPIO_50	50	BS-PU	GPIO_INT_30
DCD	51	BS-PD	GPIO_INT_16
LED	52	BS-PD	GPIO_INT_13
GPIO_53	53	BS-PD	GPIO_INT_14
RI	54	BS-PU	GPIO_INT_11
VIBRATOR	56	BS-PD	GPIO_INT_28

BS : Bidirectional with Schmitt trigger.

PU : Contains an internal pull-up device

PD : Contains an internal pull-down device

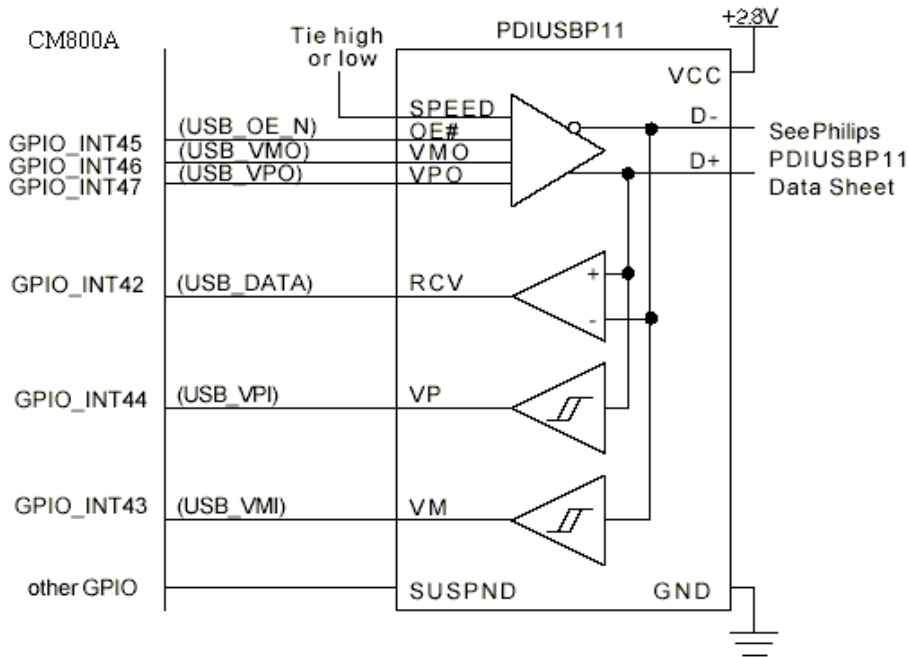
### 3.2.6 Key pad interface

The KeyS0~4 is used to sense key contact closure when connected to an external keypad. The input signal is an active-low, level-sensitive input and is connected to the interrupt controller for the microprocessor.

The pins COL0 ~4, KEYS0~4 can configure key matrix. The number of key is maximum 25.

### 3.2.7 USB interface

The USB interface is designed to comply with the Universal Serial Bus Specification, Revision 1.1. It supports both full-speed(12Mbps) and low-speed(1.5Mbps) data rates, and can be used to transfer general data, phone diagnostic data, over-the-air data, or voice PCM samples between the mobile phone and a USB host. It provides eight endpoints: a bi-directional control endpoint, isochronous IN and OUT endpoints for voice, three IN endpoints, and two OUT endpoints. An external USB transceiver is required to implement the USB interface.



Example Connections for Philips PDIUSBP11 Transceiver

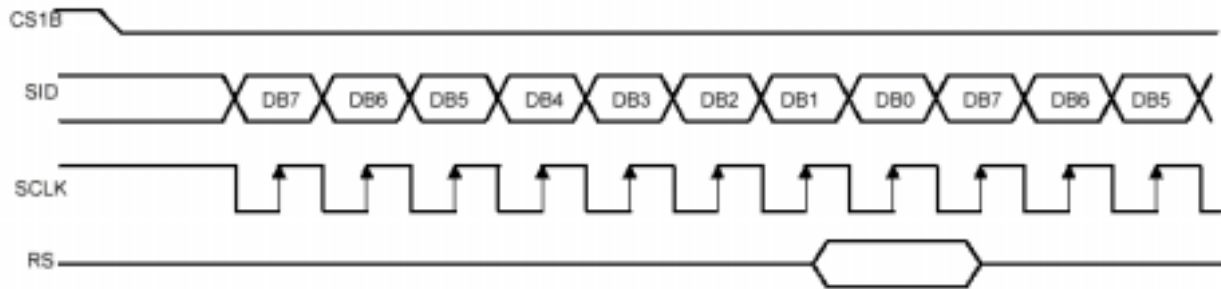
### 3.2.8 Serial LCD interface

The CM800A provides only serial interface to display LCD.

It is interface with 4 pins, SI (pin 26), SCLK (pin 36), CSB (pin 50), RS (pin 53).

The LCD's driver operated with CM800A is KS0173, SAMSUNG. The KS0713 is a driver and controller LSI for graphic dot-matrix liquid crystal display systems. It contains 65 common and 132 segment driver circuits. When KS0713 is active (CS1B=L, CS2=H), serial data and serial clock inputs are enabled. When not active, the internal 8-bit shift register and the 3-bit counter are reset. Serial data can be read on the rising edge of serial clock going into SCLK and processed as 8-bit parallel data on the eighth serial clock. Serial data input is display data when RS is high and control data when RS is low.

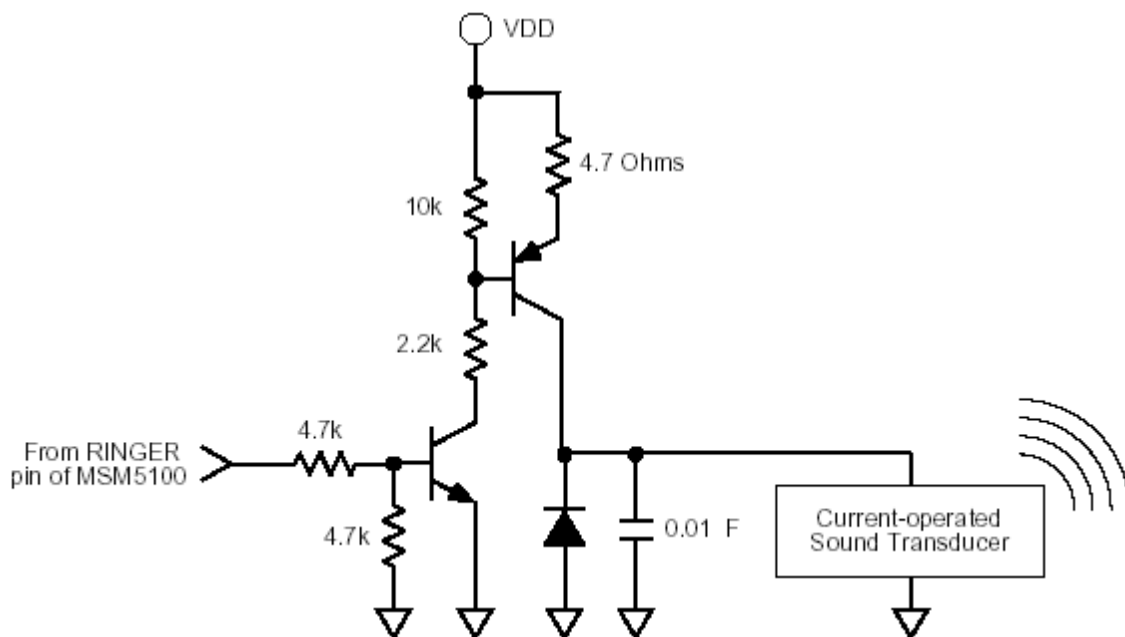
Refer to KS0173 datasheets for more information.



[ Serial Interface Timing ]

### 3.2.9 Ringer

The Ringer generation circuit is programmed to output single tone or DTMF tone pairs on the RINGER pin. The signal on the RINGER pin is a digital pulse stream. The RINGER output generally requires an external booster circuit, such as the one shown in Figure below to drive a sound transducer.



[ External Driver Circuit Example ]

### 3.2.10 Vibrator

The Evaluation Board includes vibrator generation circuitry.

### 3.2.11 LED

There are two indicator LED (LED1, LED2) on the Evaluation board. These are controlled by Module, via the 60 pin system connector.

When the power switch is on state, LED1 is illuminating.

### **3.2.12 General Purpose ADC Interface**

The CM800A has 2 channel on-chip 8-bit General Purpose Analog-to-Digital Converter (GPADC) input which is intended to digitize DC signal corresponding to analog parameter such as battery voltage.