CDMA DATA TERMINAL

DT2000-Dual Reference Manual
Application Information

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01-DT2000-Dual-1 X3

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1. Introduction

1.1 Purpose

This Manual provides hardware interface and programming information for the DT2000-Dual CDMA Wireless Data Module.

1.2 Organization

This Manual will discuss the interface and operation of the module and is divided into the following subsections:

- Section 2 – Introduces users to the DT2000-Dual CDMA Wireless Data Module's basic features and general specifications.
- Section 3 – Lists each DT2000-Dual pin and its function within the device. The pinout for the module is listed in numeric sequence.
- Section 4 – Specifies the recommended operating conditions, DC voltage characteristics, I/O timing, and power estimations for the module. Timing diagrams are also included.
- Section 5 – Details each subsystem or block within the module and shows how the subsystem or block interfaces with external peripherals.
- Section 6 – Provides package dimensions for the module.

1.3 Revision History

The revision history for this document is shown in Table 1-1.

Table 1-1 Revision History

Version	Date	Description
V1_X1	April 2001	Initial Release – applicable DTS and DTSS series software
V1_X2	June 2001	Corrected document format
V1_X3	Oct. 2002	Corrected document content

1.4 References

1. QUALCOMM Incorporated. MSM5100 Mobile Station Modem™: Component Supply Specification. 80-V2180-7-X1, July 13, 2001.
2. QUALCOMM Incorporated. MSM5100™ Mobile Station Modem: Device Specification (Preliminary Information). 93-V2180-1-X3, August 30, 2001.
3. QUALCOMM Incorporated. SURF5100 User Manual. 80-V2535-1-X1, March 28, 2001.

1.5 Acronym List

Term	Definition
CDMA	Code-Division Multiple Access
CODEC	Coder-Decoder
GPIO	General-purpose Input/Output
JTAG	Joint Test Action Group (ANSI/ICEEE Std. 1149.1-1990)
LCD	Liquid Crystal Display
LDO	Voltage Regulator
LED	Light Emitting Diode
PCB	Printed Circuit Board
PCM	Pulse Coded Modulation
PCS	Personal Communications Service
RF	Radio Frequency
Rx	Receive
TCXO	Temperature-Controlled Crystal Oscillator
Tx	Transmit
UART	Universal Asynchronous Receiver Transmitter

2. Overview

2.1 Application Descriptions

The CDMA Wireless Data Module is a complex consumer communications instrument that relies heavily on both digital signal and embedded processor technologies. The Wireless Data Modules manufactured by AnyDATA.NET support Code-Division Multiple Access (CDMA). This operates in both the cellular and PCS spectrum.

In a continuing effort to simplify the design and to reduce the production cost of the Wireless Data Module, AnyDATA.NET has successfully developed the DT2000 series. The DT2000-Dual is AnyDATA.NET's latest compact Wireless Data Module operating in the Cellular and PCS spectrum. The DT2000-Dual also contains a complete digital modulation and demodulation system for CDMA standards as specified in IS-95 A/B and IS-2000.

The subsystem in the DT2000-Dual includes a CDMA processor (MSM5100), an integrated CODEC with an ear piece and microphone amplifiers, and an RS-232 serial interface supporting forward link data communications at a rate of 230.4kbps.

The DT2000-Dual provides an external interface that includes the standard RS-232, Digital Audio, External reset control, LCD Display, Keypad, and Ringer extension ports.

The DT2000-Dual has the capability to power down unused circuits in order to dynamically minimize power consumption.

2.2 Technical Specifications

2.2.1 General Specifications

Parameters	Descriptions
External Access	Code-Division-Multiple-Access (CDMA)
CDMA Protocol	IS-95 A/B, IS-98A, IS-126, IS-637A, IS-707A, IS-2000
Data Rate	153.6Kbps max
Transmit/Receive Frequency Interval	45MHz for Cellular and 80MHz for PCS
Number of Channel	832 for Cellular and 42 for PCS
Operating Voltage	DC +3.4V ~ +4.2V
Current Consumption	Stand by mode: Idle (110mA), Sleep (2mA) Busy mode: 900mA (Max)
Operating Temperature	-30ºC ~ +60ºC
Frequency Stability	±300Hz for Cellular and ±150Hz for PCS
Antenna	MCA Connector, 50ohm
Size	39 X 49 X 6.0mm with case
Weight	About 20g
External Interface	RS-232, Digital/Analog Audio, LCD, Keypad, Ringer External Reset Control

2.2.2 Receive Specifications

Parameters	Descriptions
Frequency Range	869.04 ~ 893.97 MHz for Cellular and 1931.25 ~ 1988.75MHz for PCS
Sensitivity	Below –104 dBm
Interference Rejection	Single tone (-30dBm @900KHz): Below –101dBm Two tone (-43 dBm @900KHz and 1700KHz): Below –101dBm Two tone (-32 dBm @900KHz and 1700KHz): Below –90dBm Two tone (-21 dBm @900KHz and 1700KHz): Below –79dBm
Spurious Wave Suppression	Below –80dBc
Input Dynamic Range	-25 dBm ~ -104dBm

2.2.3 Transmit Specifications

Parameters	Descriptions
Frequency Range	824.04 ~ 848.97 MHz for Cellular and 1851.25 ~ 1908.75MHz for PCS
Nominal Power	0.32 W (24.7dBm)
Minimum Controlled Output Power	Below –50dBm
Max Power Spurious	900KHz: Below –42dBc/30KHz 1.98MHz: Below –54dBc/30KHz

2.2.4 Standards

IS-95 A/B: Protocol Between MS & BTS

IS-96A: Voice Signal Coding

IS-98A: Base MS Function

IS-126: Voice Loop-Back

IS-637: Short Message Service

IS-707: Data Service

2.3 Interface Diagram

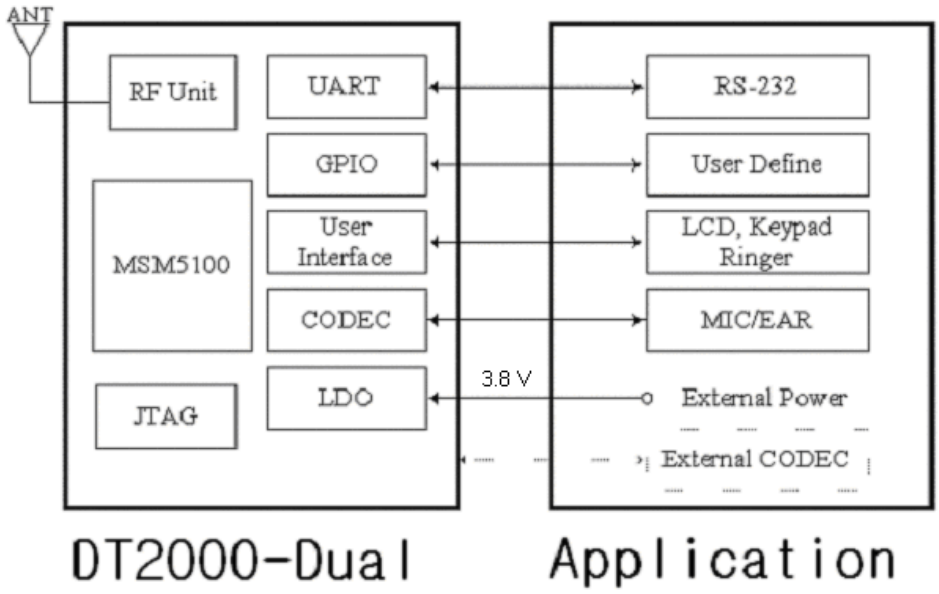


Figure 2-1 Interface Block Diagram

2.4 General Features

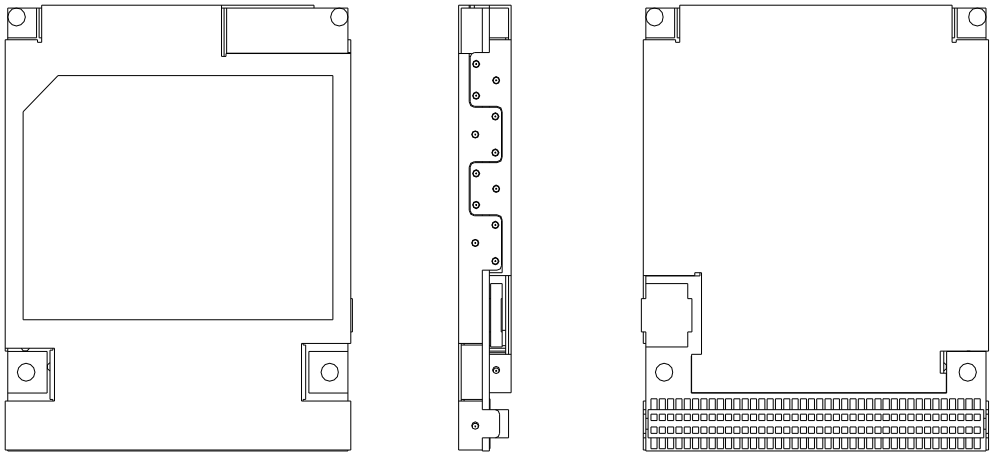


Figure 2-2 General Features

3. PIN Description

3.1 I/O Description Parameters

Symbol	Description
I	CMOS Input
O	Output
B	Bi-directional
N	Voltage or Current Level
IS	Input with Schmitt Trigger
BS	Bi-directional Schmitt Trigger
PU	Internal Pull-Up
PD	Internal Pull-Down
KP	Internal Weak Keeper Device (Keepers cannot drive external buses.)

3.2 PIN Names and Pinouts

3.2.1 60-Pin Connector

PIN	NAME	TYPE	DESCRIPTION
1	MSM_DP_DCD/ (GPIO_INT16)	BS-PD	Data carrier detect
2	MSM_DP_RI/ (GPIO_INT25)	BS-PD	Ring indicator
3	MSM_DP_RFR/	O	Ready for receive
4	MSM_DP_TXD	O	Transmit data
5	MSM_DP_DTR/ (GPIO_INT2)	BS-PU	Data terminal ready
6	MSM_DP_RXD	IS-PD	Receive data
7	MSM_DP_CTS/	IS-PD	Clear to send
8	GND	GND	Signal ground
9	AUX_PCM_DIN	IS-PD	External CODEC PCM data input, RXD *
10	GND	GND	Signal ground *
11	AUX_PCM_DOUT	BS_PU	External CODEC PCM data output, TXD *
12	GPIO_INT22 (PRE_DIAL)	BS_PU	General purpose input output
13	AUX_PCM_CLK	BS_PD	External CODEC PCM clock
14	AUX_PCM_SYNC	BS_PD	External CODEC PCM sync.
15	GPIO_INT23 (SMS_LED)	BS_PU	General purpose input output
16	GPIO_INT03 (IDLE_LED)	BS_PU	General purpose input output
17	GPIO_INT04 (BUSY_LED)	BS_PU	General purpose input output
18	EXT_RESET	I	External Hardware Reset
19	GPIO_INT09 (HOST_RESET)	BS_PD	General purpose input output
20	GPIO_INT12	BS_PU	General purpose input output
21	GPIO_INT13	BS_PD	General purpose input output
22	GPIO_INT17 (PS_HOLD)	BS_PD	General purpose input output
23	RINGER	O	Ringer output
24	D00	B-KP	Data line
25	D01	B-KP	Data line

PIN	NAME	TYPE	DESCRIPTION
26	D02	B-KP	Data line
27	D03	B-KP	Data line
28	D04	B-KP	Data line
29	D05	B-KP	Data line
30	D06	B-KP	Data line
31	D07	B-KP	Data line
32	A01	B	Address line
33	RES_OUT/	B	Reset output
34	LCD_CS/ (GPIO_INT40)	BS-PU	LCD chip select
35	RD/	B	Read enable output
36	LWR/	BS-PU	Write enable output
37	BATT+	I	Battery Monitoring **
38	GND	GND	Signal ground
39	VEXT_DC	I	External power input
40	VEXT_DC	I	External power input
41	MIC1P	I	Balanced Analog Audio Input (MIC) (Speaker)
42	MIC1N	I	Balanced Analog Audio Input (MIC) (Speaker)
43	EAR1P	O	Balanced Analog Audio Output (Speaker)
44	EAR1N	O	Balanced Analog Audio Output (Speaker)
45	GPIO_INT33 (KEYPAD_15)	BS_PU	General purpose input output
46	GPIO_INT35 (KEYPAD_11)	BS_PU	General purpose input output
47	GPIO_INT14 (MOTOR)	BS_PD	General purpose input output
48	GPIO_INT36 (KEYPAD_9)	BS_PU	General purpose input output
49	GPIO_INT34 (KEYPAD_13)	BS_PU	General purpose input output
50	KEYSENSE4/ (ON_SW)	IS_PU	Key sense input
51	KEYSENSE1/	IS_PU	Key sense input
52	KEYSENSE2/	IS_PU	Key sense input
53	KEYSENSE3/	IS_PU	Key sense input
54	KEYSENSE0/	IS_PU	Key sense input
55	LCD_E (GPIO_INT41)	BS-PD	LCD read enable
56	A00	B	Address line
57	EAR_DET1	I	Ear Kit Detect (small headset)
58	MIC2 (MIC)	I	Analog Audio Input (MIC) (small headset)
59	GND (GND_A)	GND	Signal ground (small headset)
60	EAR_JACK+ (EAR)	O	Analog Audio Output (Speaker) (small headset)

Notes:

* If not used as PCM, it can be used as a secondary UART for debugging. We strongly recommend that the user has a 3-pin connector or 3 test points on their board, so that one can easily monitor and diagnose their module.

** If the user wants the module to monitor battery voltage and the user is using a regulator in conjunction with a battery, whose maximum voltage exceeds 4.3 V, to drive the module, then the user should please contact our engineers.

When using a battery in which the voltage is between 3.3 V to 4.3 V and regulators aren't used to drive the module, leave this pin open.

3.3 60-PIN Connect Pinouts (Topview)

Table 3-1 60-PIN Connector Pinouts

1	MSM_DP_DCD/	2	MSM_DP_RI/
3	MSM_DP_RFR/	4	MSM_DP_TXD
5	MSM_DP_DTR/	6	MSM_DP_RXD
7	MSM_DP_CTS/	8	GND
9	AUX_PCM_DIN	10	GND
11	AUX_PCM_DOUT	12	GPIO_INT22
13	AUX_PCM_CLK	14	AUX_PCM_SYNC
15	GPIO_INT23	16	GPIO_INT03
17	GPIO_INT04	18	EXT_RESET
19	GPIO_INT09	20	GPIO_INT12
21	GPIO_INT13	22	GPIO_INT17
23	RINGER	24	D00
25	D01	26	D02
27	D03	28	D04
29	D05	30	D06
31	D07	32	A01
33	RES_OUT/	34	LCD_CS/
35	RD/	36	LWR/
37	BATT+	38	GND
39	VEXT_DC	40	VEXT_DC
41	MIC1P	42	MIC1N
43	EAR1P	44	EAR1N
45	GPIO_INT33	46	GPIO_INT35
47	GPIO_INT14	48	GPIO_INT36
49	GPIO_INT34	50	KEYSENSE4/
51	KEYSENSE1/	52	KEYSENSE2/
53	KEYSENSE3/	54	KEYSENSE0/
55	LCD_E	56	A00
57	EAR_DET1	58	MIC2
59	GND	60	EAR_JACK+

4. Interface Descriptions

4.1 Overview

This chapter covers information required to convert the DT2000-Dual into a subscriber unit application. In addition, some of the internal blocks of the device are described. Understanding these internal blocks is necessary for one to completely grasp the functions of the various interfaces.

This chapter discusses the interface to the major blocks of the DT2000-Dual as shown in the following figure. These blocks include:

- CODEC Interface
- UART Interface
- General Purpose Interface
- User Interface
- JTAG Interface

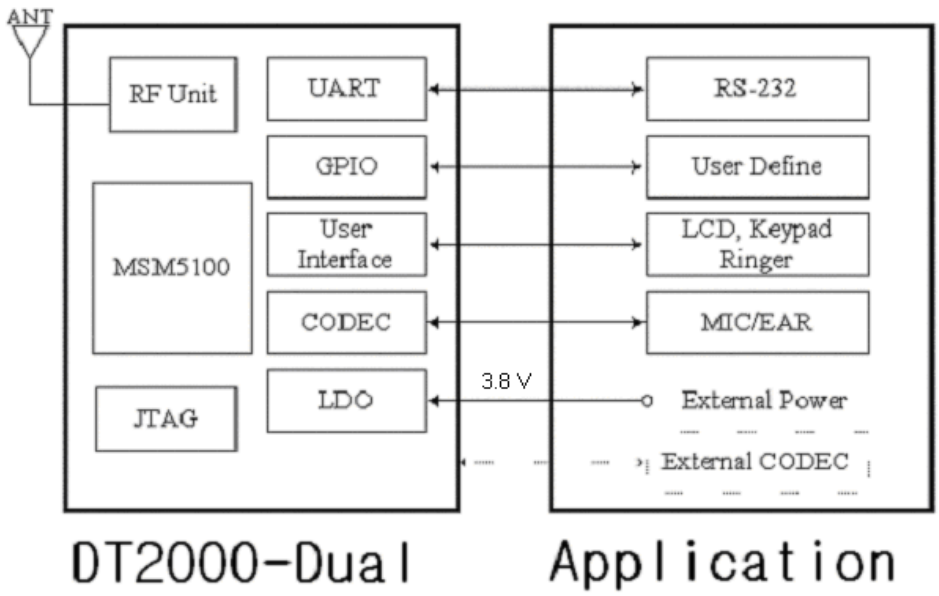


Figure 4-1 Interface Block Diagram

4.2 CODEC Interface

The CODEC Interface is configured by internal and external figures. If the internal CODEC interface is used, additional glue logic is not necessary and the module's very simple audio interface can be used. Otherwise if the internal CODEC interface is not used, an external CODEC is necessary to support the car-kit system. In this case, the module provides a PCM CODEC Interface.

4.2.1 Internal CODEC Interface

The module contains analog audio interface circuitry. The contained audio interface supports all of the required conversation and amplification stages for the audio front end.

The audio interface includes the amplification stages for both the microphone and earphone. The interface supports one single-ended microphone input and one single-ended earphone output.

Table 4-1 Analog Audio Pinouts

NAME	DESCRIPTION	CHARACTERISTIC
MIC2	MIC Input	Analog Input (Pin No. 58) *
EAR_DET1	EAR/MIC Set Detect	Logic Input (Pin No. 57) **
EAR_JACK+	Earphone Output	Analog Output (Pin No. 60)
GND_A	Audio Ground	Audio Ground (Pin No. 59)

Note:

* MIC2, along with being a microphone input, checks to see if the user has pressed the headset key, which allows the user to connect to or disconnect from a call. This pin is internally pulled high and is therefore normally in the high state. To activate this input and connect to or disconnect from a call, the user must set the MIC2 pin to a low state for 100ms to 200ms.

** EAR_DET1 checks to see if a headset has been connected to the ear-jack. When there is no headset connected to the ear-jack, the audio path is disconnected. When a headset is connected to the ear-jack an audio path is opened. To simulate a headset connected to the ear-jack, the user must apply a low signal to the EAR_DET1 pin for as long as the user wants the audio path to be kept open.

4.2.2 Extended CODEC Interface

The PCM CODEC interface is used for the car-kit audio system. This interface is optional.

External CODEC interface signals are listed below:

Table 4-2 Digital CODEC Pinouts

NAME	DESCRIPTION	PINOUTS
AUX_PCM_CLK	PCM Clock	Pin No. 13
AUX_PCM_DIN	PCM Data Input	Pin No. 9
AUX_PCM_DOUT	PCM Data Output	Pin No. 11
AUX_PCM_SYNC	PCM Sync.	Pin No. 14

4.3 UART Interface

4.3.1 Primary UART interface

The Universal Asynchronous Receiver Transmitter (UART) communicates with serial data that conforms to the RS-232 Interface protocol. The module provides 3.0V CMOS level outputs and 3.0V CMOS switching input levels. In addition, all inputs have a 5.0V tolerance, however 3.0V or 3.3V CMOS logic compatible signals are highly recommended.

All the control signals of the RS-232 are active low, however the data signals, RXD and TXD, are active high.

The UART has a 64 byte transmit (TX) FIFO and a 64 byte receive (RX) FIFO. The UART features hardware handshaking, programmable data sizes, programmable stop bits, and odd, even, no parity. The UART operates at a maximum bit rate of 115.2kbps.

Table 4-3 UART Interface Pinouts

NAME	DESCRIPTION	CHARACTERISTIC
DP_DCD/	Data Carrier Detect	Network connected from the module
DP_RI/	Ring Indicator	Output to host indicating coming call
DP_RFR/	Ready for Receive	Ready for receive from host
DP_TXD	Transmit Data	Output data from the module
DP_DTR/	Data Terminal Ready	Host ready signal
DP_RXD	Receive Data	Input data to the module
DP_CTS/	Clear to Send	Clear to send to the host
GND	Signal Ground	Signal ground

Reference Plane: DT2000 Dual

4.3.2 Secondary UART interface

The secondary UART is used to monitor and diagnose the status of the DT2000-Dual. It is strongly recommended for the user to have the following secondary UART pins connected to an extra connector or to test points, in order to easily troubleshoot any problems with the module.

Table 4-4 Secondary UART Interface Pinouts

NAME	DESCRIPTION	CHARACTERISTIC
AUX_PCM_DIN/	Data Input	Input data to the module
AUX_PCM_DOUT/	Data Output	Output data from the module
GND	Signal Ground	Signal ground

Reference Plane: DT2000 Dual

4.4 General Purpose Interface

The general purpose interface consists of 13 user-definable bi-directional pins.

Each GPIO pin can be configured as an input interrupt source. In addition, some GPIO pins can be used as output control pins from the module. The user can define these pins properly as follows.

Table 4-5 General Purpose Interface Pinouts

NAME	TYPE	CHARACTERISTIC
GPIO_INT03	BS_PU	Configured as a pull-up, Bi-directional
GPIO_INT04	BS_PU	Configured as a pull-up, Bi-directional
GPIO_INT09	BS_PD	Configured as a pull-down, Bi-directional
GPIO_INT12	BS_PU	Configured as a pull-up, Bi-directional
GPIO_INT13	BS_PD	Configured as a pull-down, Bi-directional
GPIO_INT14	BS_PD	Configured as a pull-down, Bi-directional
GPIO_INT17	BS_PD	Configured as a pull-down, Bi-directional
GPIO_INT22	BS_PU	Configured as a pull-up, Bi-directional
GPIO_INT23	BS_PU	Configured as a pull-up, Bi-directional
GPIO_INT33	BS_PU	Configured as a pull-down, Bi-directional
GPIO_INT34	BS_PU	Configured as a pull-down, Bi-directional
GPIO_INT35	BS_PU	Configured as a pull-down, Bi-directional
GPIO_INT36	BS_PU	Configured as a pull-down, Bi-directional

4.5 External Hardware Reset

There are two types of resets that the user can employ to restart the module. The first type will reset the MSM and the memory and is performed when the user gives the AT command, AT+RESET, to the MSM. Another way to reset the module is by using the external hardware reset. This type of reset will reset the hardware as well as the MSM and the memory. The flash memory will be the only information that is kept. To perform an external hardware reset, make sure the module has powered on and is not in

the initialization stage, and then apply a high signal of 2.5 V to 3.7 V to the external hardware reset pin for 200ms to 500ms. Keep the external hardware reset pin low when the module is initializing as well as during normal operation.

4.6 LEDs

The DT2000-Dual can indicate its current status through three pins. These three pins can be connected to LEDs to more quickly and easily determine the status of the module. The SMS LED indicates to the user if there is a SMS message or a voicemail message. If there is a SMS message or a voicemail message, the SMS LED will turn on. After the user has read the SMS message or listened to the voicemail message, the SMS LED turns off. Shortly after the module has been turned on, the Idle LED should turn on indicating that the module is in-service. This means that the module is within the range of the base station and is able to receive a signal from the base station. When the module is in traffic or conversation stage, the Busy LED is on.

Table 4-6 LED Pinouts

NAME	DESCRIPTION	PINOUTS
GPIO_INT23	SMS_LED	Pin No. 15
GPIO_INT03	IDLE_LED	Pin No. 16
GPIO_INT04	BUSY_LED	Pin No. 17

4.7 User Interface

4.7.1 Keypad

The keypad interface consists of a 4 X 5 matrix pattern. Only 4 of the 5-KEYSENSE/[4:0] pins are used to connect a matrix keypad to the module. The KEYSENSE/ pins are active low.

5-GPIO pins are necessary to construct the other side of the matrix. These 5-GPIO pins must be active high in order for the keypad matrix to work properly. The general keypad matrix is shown below:

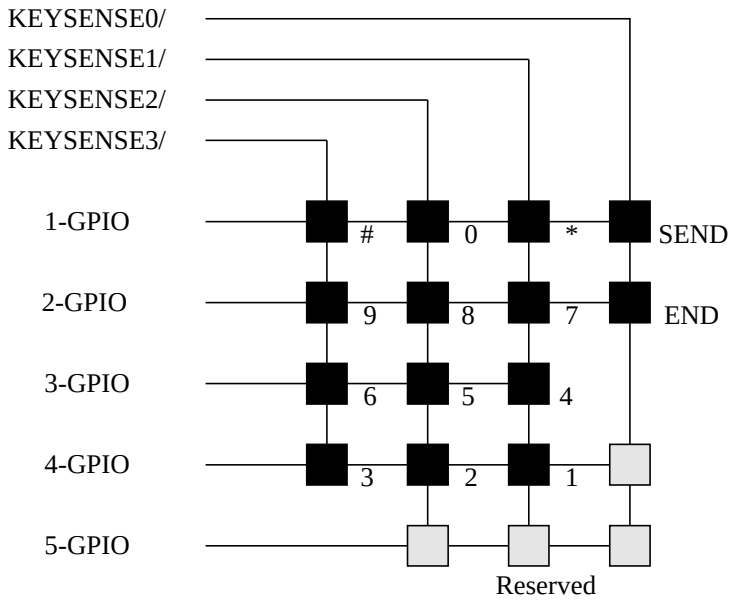


Figure 4-2 Keypad Matrix

4.7.2 LCD

The module supports the LCD interface. The LCD interface is composed of 15-signals. Direct access to the LCD driver is not applicable. Hence, 8-bit operation interface logic is required. The LCD interface block diagram is shown below:

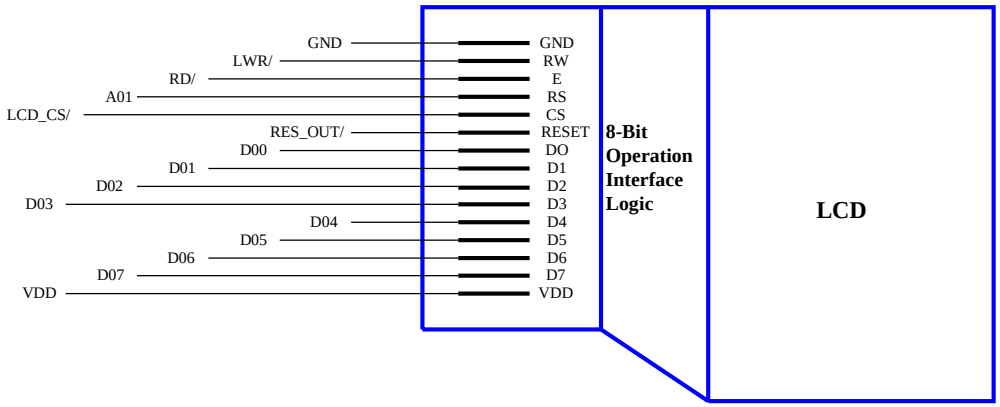


Figure 4-3 LCD Interface Block Diagram

Table 4-7 LCD Interface Signals

NAME	TYPE	CHARACTERISTIC
LWR/	BS_PU	LCD RW pin out from the module
RD/	BS	LCD E pin out from the module
A01	B	LCD RS pin out from the module
LCD_CS/	O	LCD Chip Select pin out from the module
RES_OUT/	O	LCD Reset from the module
D00 ~ D07	O	LCD Data Lines from the module
VDD		LCD Power Supply
GND		LCD Signal Ground

4.7.3 Ringer

The Ringer pin provides the output to drive the sound transducer on the host. It alerts the user of a voice call event and outputs key tones if the keypad is connected.

The reference external driver circuit is shown below:

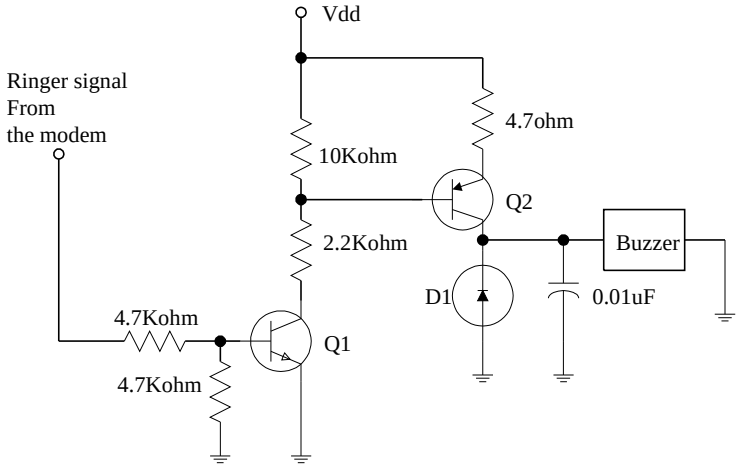


Figure 4-4 Reference External Ringer Driver Circuit

5. Electrical Specifications

5.1 DC Electrical Specifications

5.1.1 Absolute Maximum Ratings

Operating the module under conditions that exceed those listed in the Absolute Maximum Ratings table may result in damage to the module.

Absolute Maximum Ratings should be considered as limiting values. The module may not function properly and should not be operated if any one of the parameters is not within its specified operating range.

Table 5-1 Absolute Maximum Ratings

PARAMETER	MIN	MAX	UNITS
Storage Temperature	-50	+85	ºC
Voltage On Any Input or Output Pin	-0.8	+4.8	V
Supply Voltage	-1.0	+5.0	V
Initializing Current	250		mA
Drop	No damages after 60-Inch drop over concrete floor		

5.1.2 Recommended Operating Conditions

PARAMETER	MIN	TYP	MAX	UNITS
Supply Voltage	+3.4	+3.8	+4.2	V
Operating Temperature	-30		+60	ºC
Operating Humidity	95% (50°C) Relative Humidity			

5.1.3 Power Consumption

CONVERSATION (Busy)	STANDBY	
	Idle	Sleep
900mA (MAX)	110mA	2mA

5.1.4 Serial Interface Electrical Specifications

PARAMETER	MIN	TYP (NO LOAD)	MAX	UNITS
Input High Voltage	+2.0	+3	+3.7	V
Input Low Voltage	-0.5	0	+0.8	V
Output High Voltage	+2.4	+2.7		V
Output Low Voltage		0	+0.4	V

5.2 Timing characteristics

5.2.1 External CODEC Timing

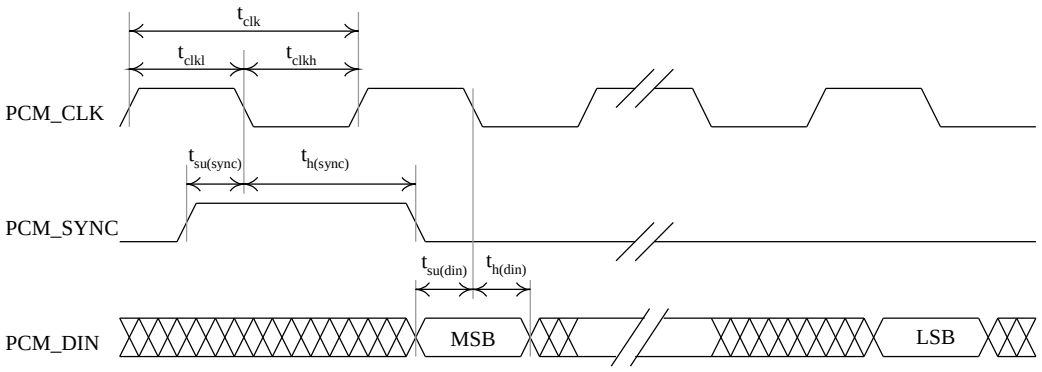


Figure 5-1 External PCM CODEC to Module timing

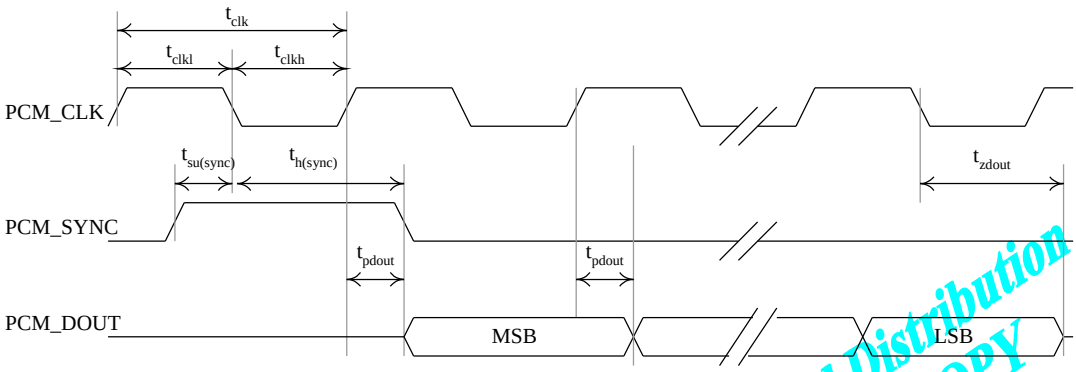


Figure 5-2 Module to External PCM CODEC timing

Table 5-2 External PCM CODEC Parameters

PARAMETER	DESCRIPTION	MIN	TYP.	MAX	UNIT
t_{clk}	PCM-CLK cycle time	400	500		ns
t_{clkl}	PCM-CLK low time	200	250		ns
t_{clkh}	PCM-CLK high time	200	250		ns
$t_{su(sync)}$	PCM_SYNC setup time to PCM_CLK falling		150		ns
$t_{h(sync)}$	PCM_SYNC hold time after PCM_CLK falling		350		ns
$t_{su(din)}$	PCM_DIN setup time to PCM_CLK falling	50			ns
$t_{h(din)}$	PCM_DIN hold time after PCM_CLK falling	10			ns
t_{pdout}	Delay from PCM_CLK falling to PCM_DOUT			50	ns

5.2.2 LCD Timing

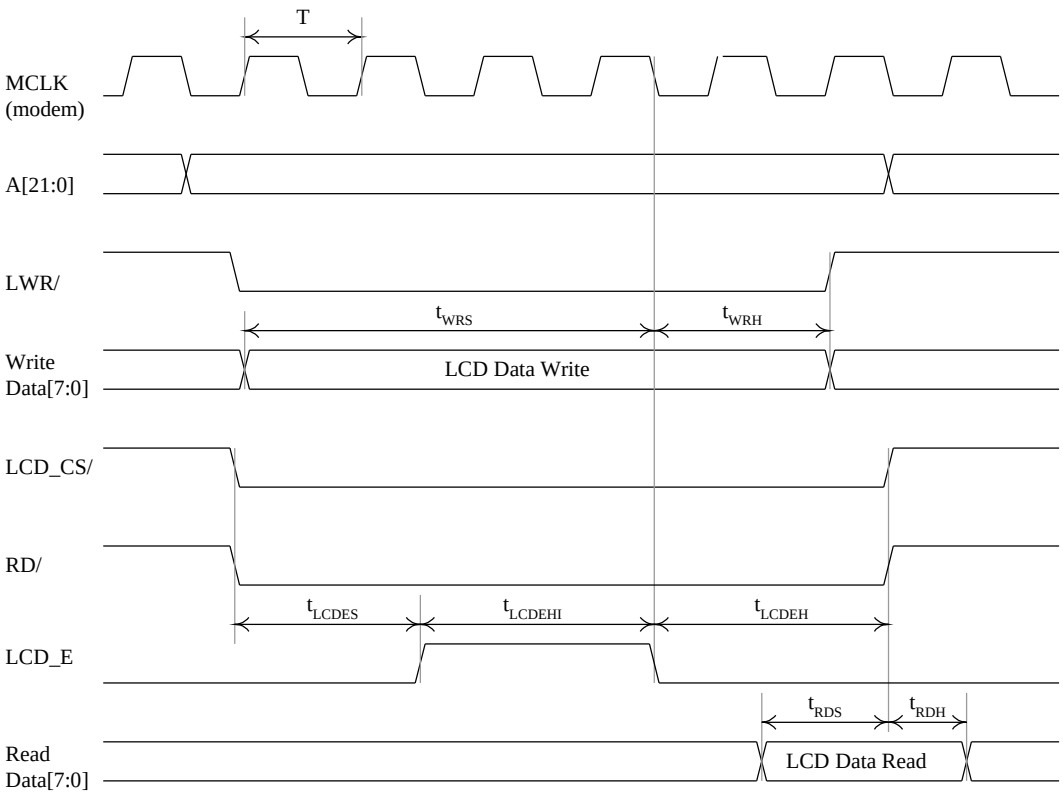


Figure 5-3 LCD Timing

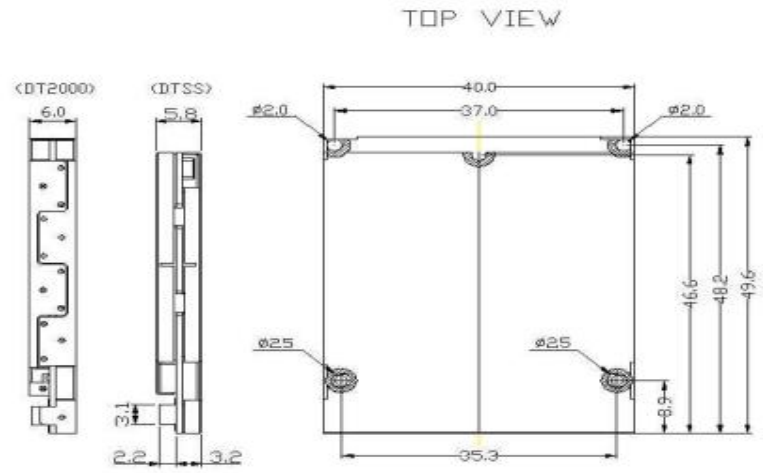
Table 5-3 LCD Timing Parameters

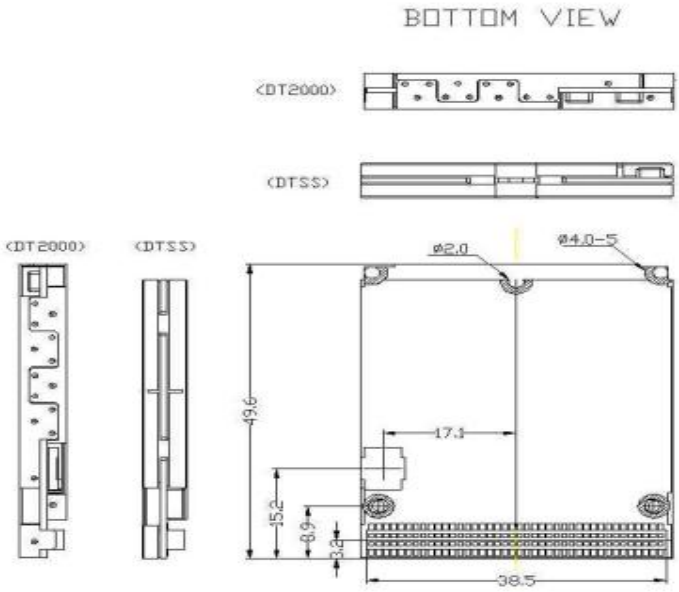
PARAMETER	DESCRIPTION	MIN	MAX	UNIT
t_{LCDES}	LCD_CS/ active to LCD_E active			ns
t_{LCDEHI}	Pulse width if LCD_E active			ns
t_{LCDEH}	LCD_E inactive to LCD_CS/ inactive (write)			ns
t_{LCDEHR}	LCD_E inactive to LCD_CS/ inactive (Read)			
t_{RDS}	Read data setup			ns
t_{RDH}	Read data hold			ns
t_{WRS}	Write data setup to LCD_E inactive			ns
t_{WRH}	Write data hold from LCD_E inactive			ns

- k, I, n is integer lower than 16, MCLK is internal Clock of module

6. Mechanical Dimensions

6.1 Outline for DT2000 and DTSS series





Units: mm

6.2 60-Pin Connector

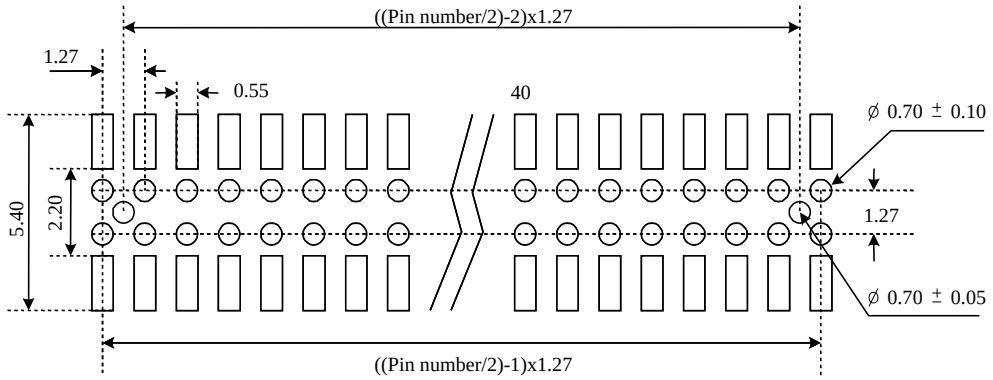


Figure 6-1 60-pin Female Connector (Units: mm)

Counter-Part (the 60-pin male connector (not on the DT2000-Dual)):

Part Name: Header pin connector (0.05" (1.27mm) pitch, straight, dual row)

Part Number: GDH7-60DBC-SMT

Note: For more information on the 60-pin male connector, please refer to:

http://www.goldenconnector.co.kr/index_product_e.html

Use the part name and number to help search for the correct part.

6.3 RF Connector

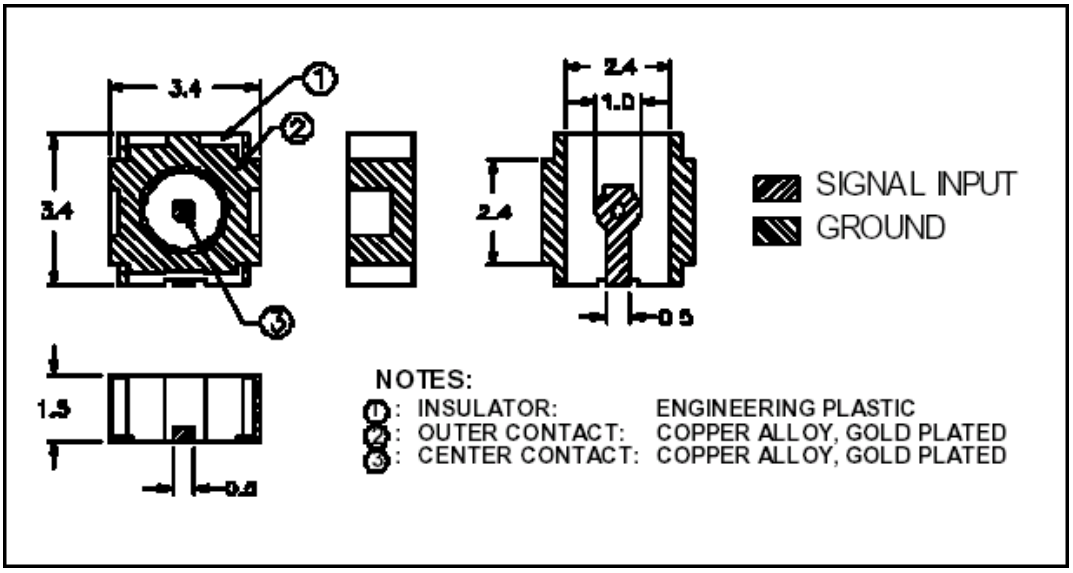


Figure 6-2 PCB Connector (Units: mm)

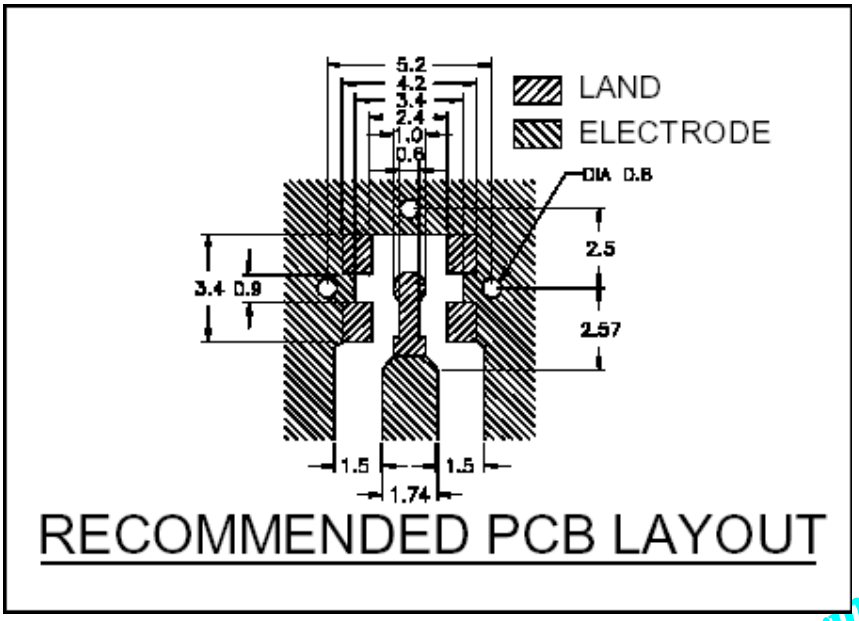
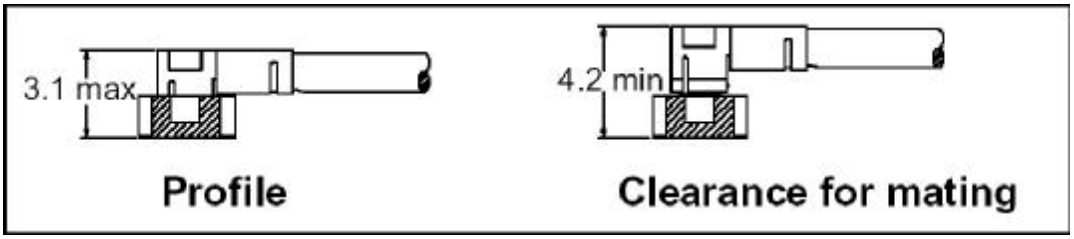


Figure 6-3 PCB Connector Layout (Units: mm)

Part name: PCB Connector (RF Connector)

Counter-Part (not found on the DT2000-Dual) used to connect the RF connector to an antenna:



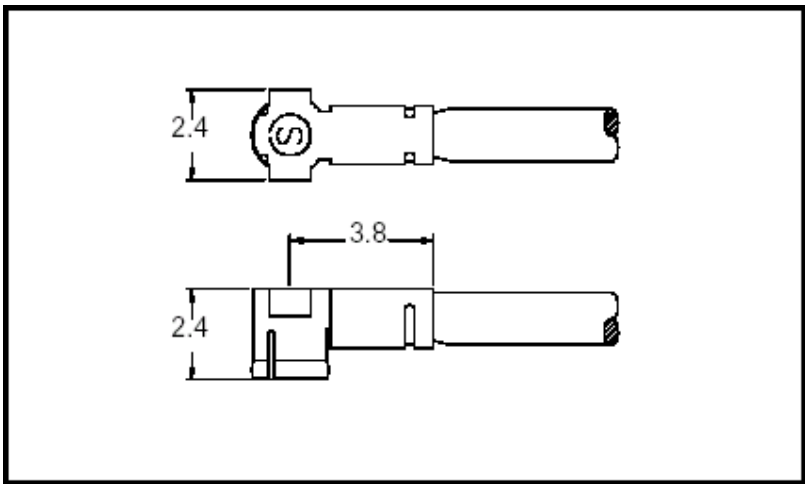


Figure 6-4 Mechanical Characteristics of Cable Harness Assembly (Units: mm)

Part name: Cable Harness Assembly

Note: For more information about the RF connector parts, please refer to the file found at http://www.sunridgecorp.com/pdf/MCAseries.pdf