

Product Specification

TC100G

(Quad band GSM/GPRS modem
with
integrated GPS receiver)

850/900/1800/1900Mhz GSM/GPRS Quad Band
Infineon Chip Set Solution

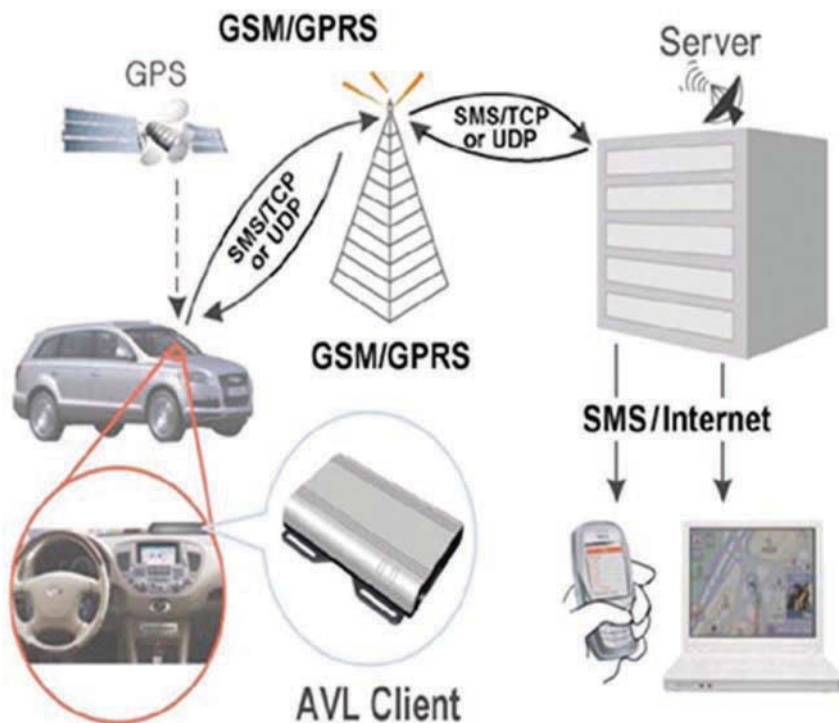
K-PRO KOREA INC.

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1. INTRODUCTION

The TC100G GSM/GPRS modem is a Quad Band device with an integrated GPS receiver that is capable of transmitting its current location (latitude, longitude) to the requesting party. It also performs generic GSM/GPRS modem features.



The TC100G supports following features;

- Powered by a Quad band GSM/GPRS.(850/1900/900/1800Mhz band) modem
- No CSD, nor FAX supported.
- The protocol run based on class 2 SMS message.
- Support generic GSM 07.07 AT commands.
- GSM/GPRS and GPS receiver all in one box and ready to install.
- Small, slim and light in weight.
- Low battery drain current.
- Two LED indicators.
- Two or three relay driving outputs, two or one digital logic inputs, and a pair of serial ports on board.
- I2C based expansion module bay for unlimited I/O customization or expansion.
- Power supply voltage range of +9 ~ +28 Volts.

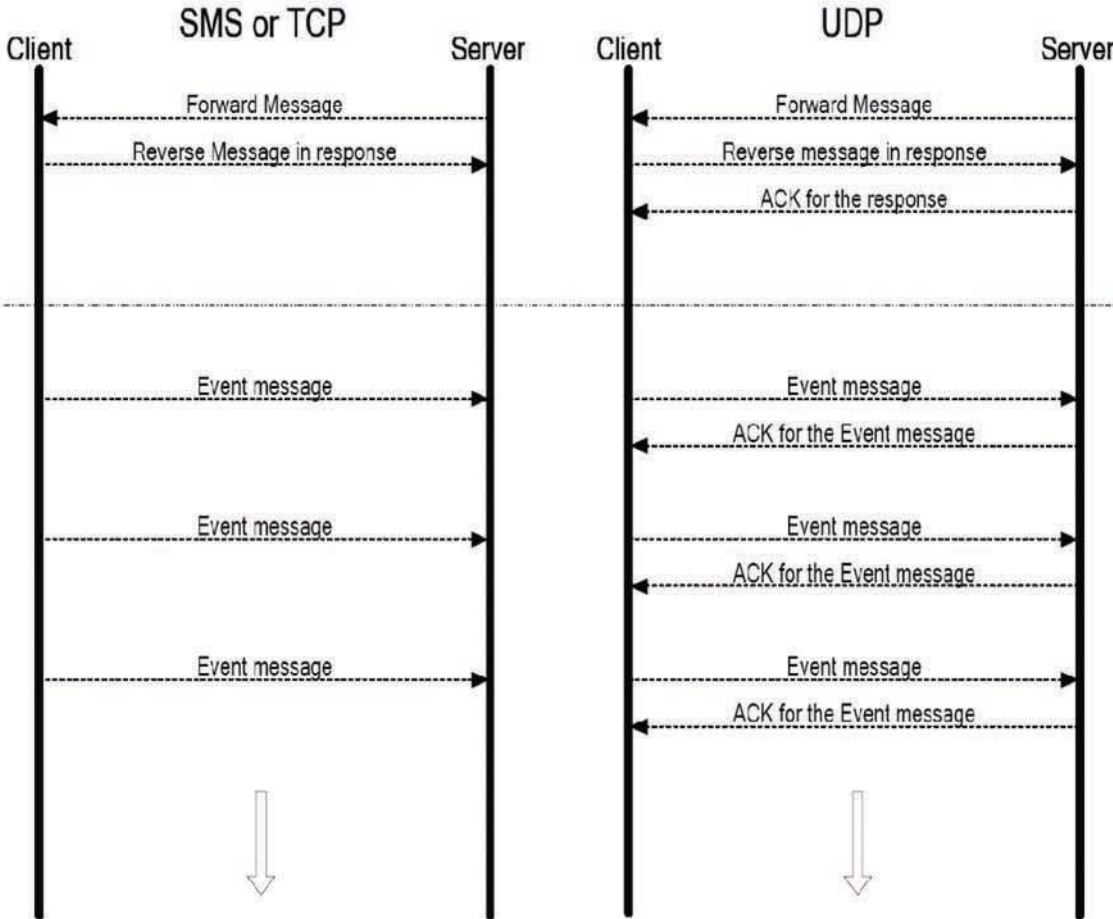
2. THE PROTOCOL

A two-way communication protocol named "OTAP" (stands for AISATech's **O**ver **T**he **A**ir **P**rotocol.) is being implemented.

The OTAP can be carried over SMS, TCP, UDP in any combination for better network penetration.

However, communication procedure between server and client for each SMS, TCP, UDP protocol are slightly differs from one to the other.

See followings for detail.



3. ARCHITECTURE AND DIMENSIONS.

3.1 Architecture.

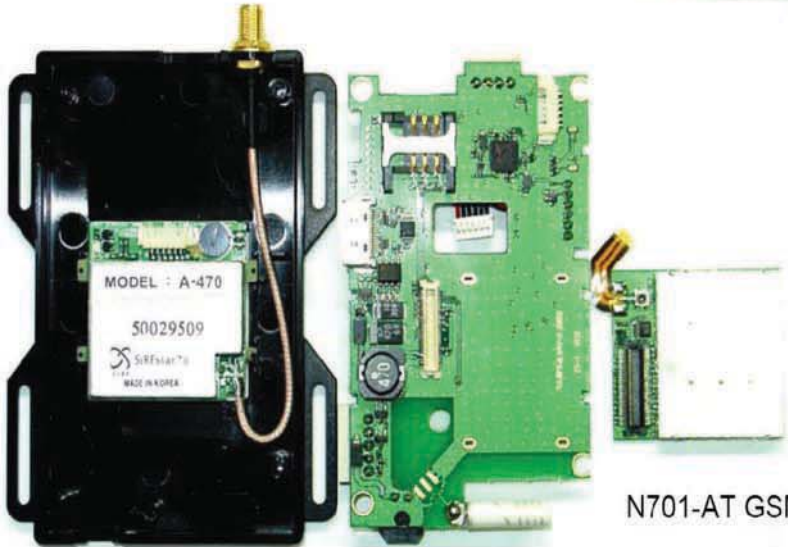
TC100G is composed of following.

- N701-AT GSM/GPRS modem
- TC100G main board
- A-470 GPS receiver.

- Model TC100G -



- TC100G construction -



A-470 GPS receiver

TC100G main board

N701-AT GSM/GPRS modem



TC100G inside view



TC100G out side view

3.2 Dimensions.

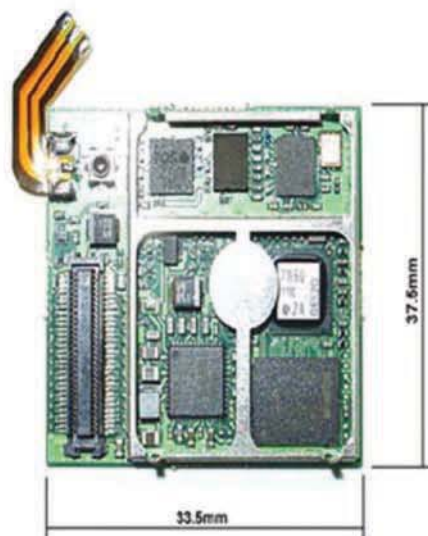
3.2.2 TC100G GSM/GPRS modem with GPS receiver

- with flange : 96 x 59 x 20 mm(H)
- without flange : 96 x 73 x 20 mm(H)



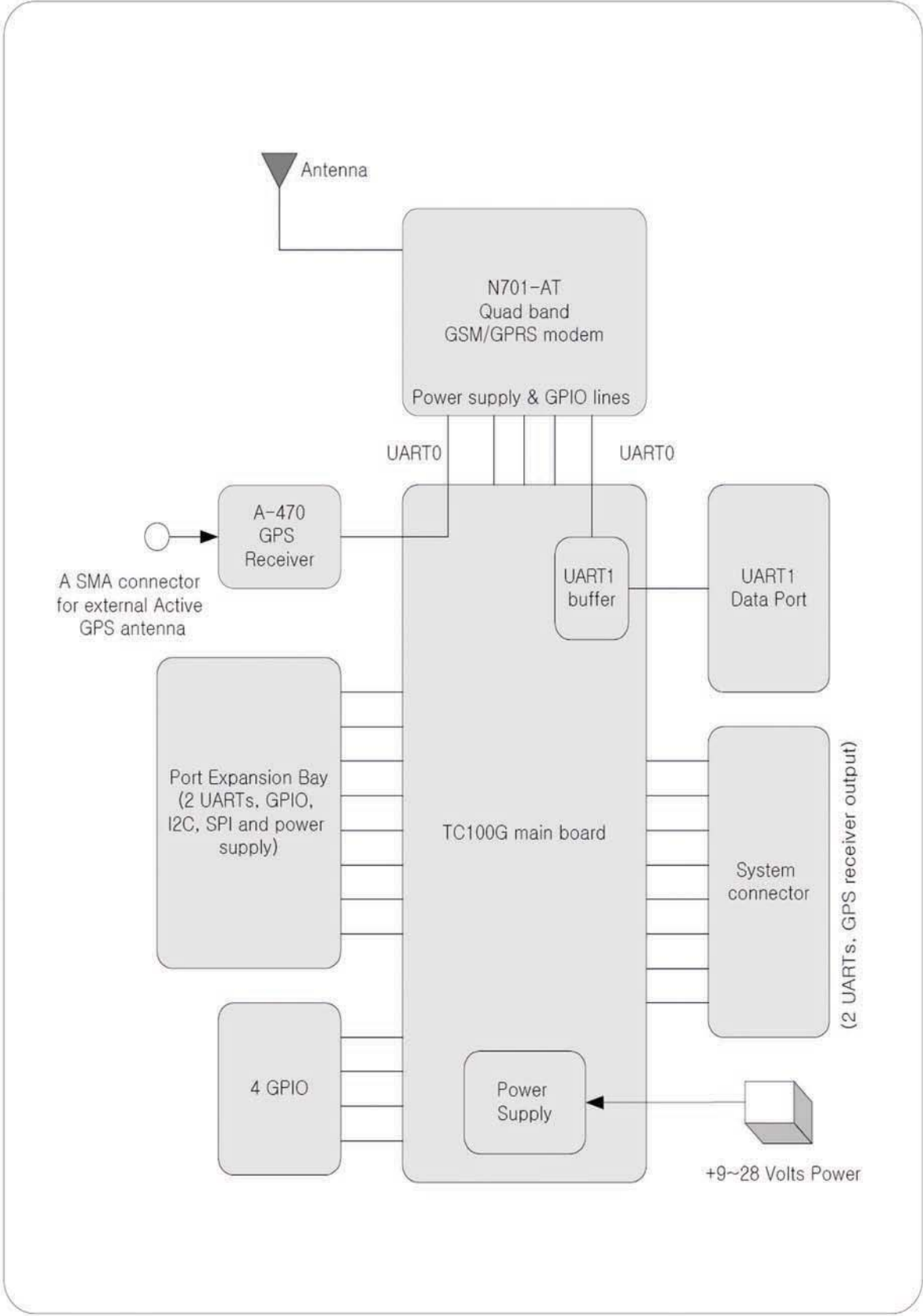
3.2.1 N701-AT GSM/GPRS module.

- 33.5 x 37.5 x 3.9 mm(H)

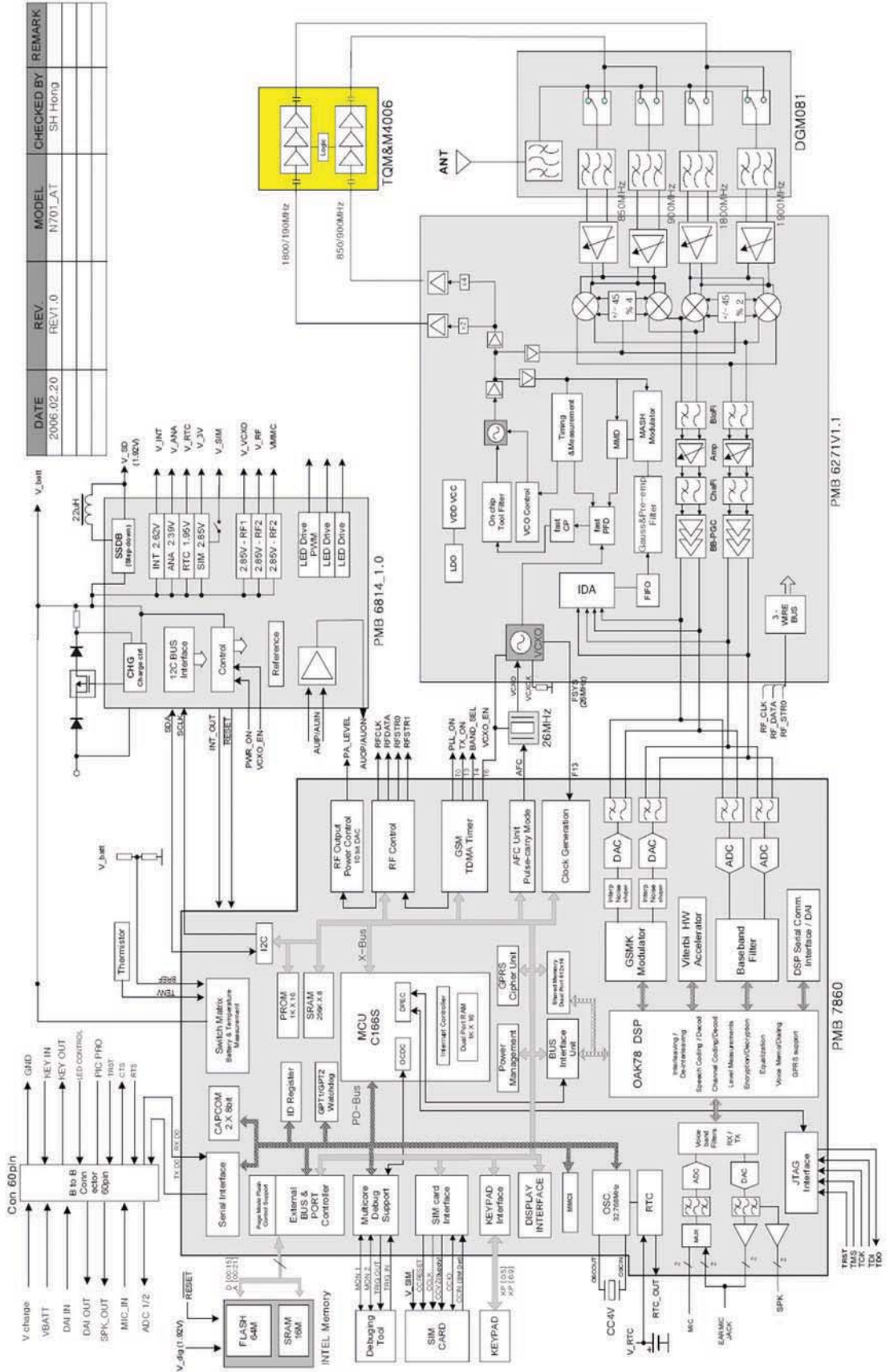


4. BLOCK DIAGRAM.

5.1 TC100G GSM/GPRS modem with GPS receiver.



4.2 N701-AT GSM/GPRS module.



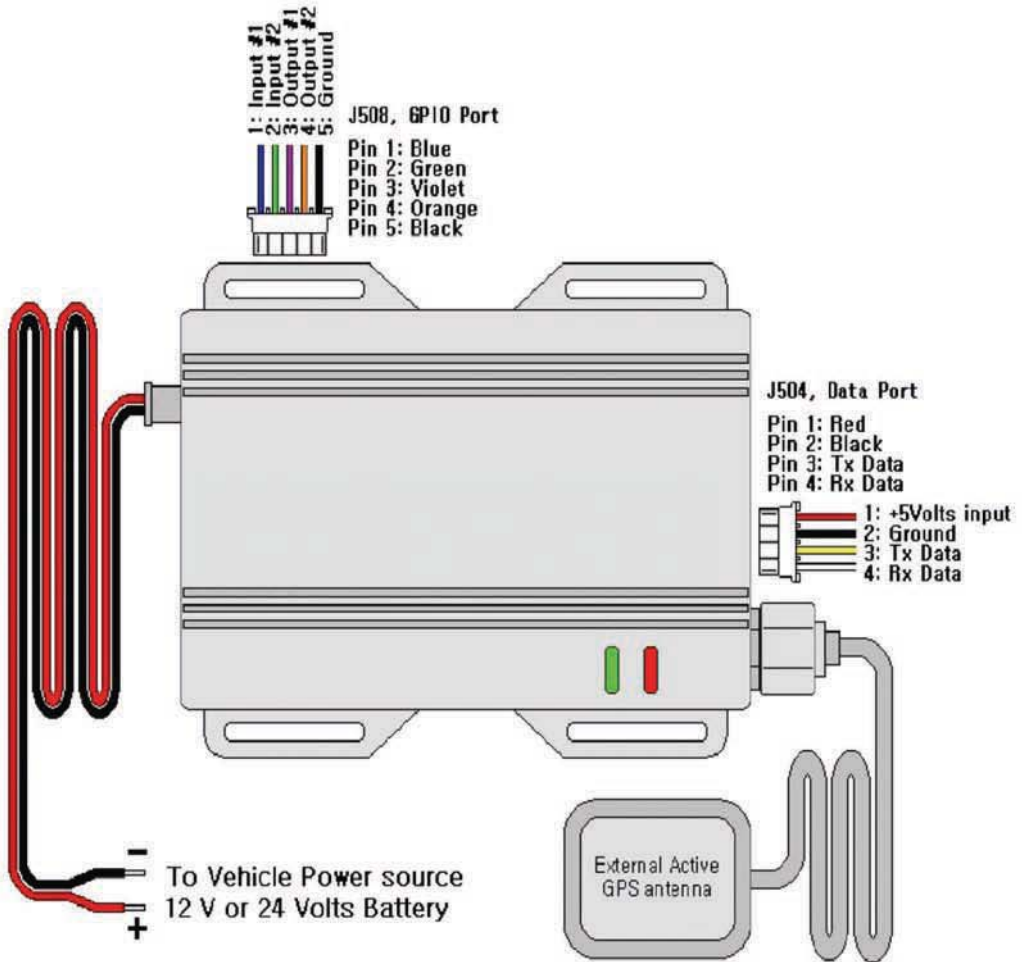
5. TC100G INTERFACES.

The interfaces supported by TC100G are as follows;

- Power Supply connector.
- General Purpose Input and Output(GPIO) interface connector.
- Data port connector.
- GPS external active antenna connector.
- System connector.
- Green and Red color LEDs.

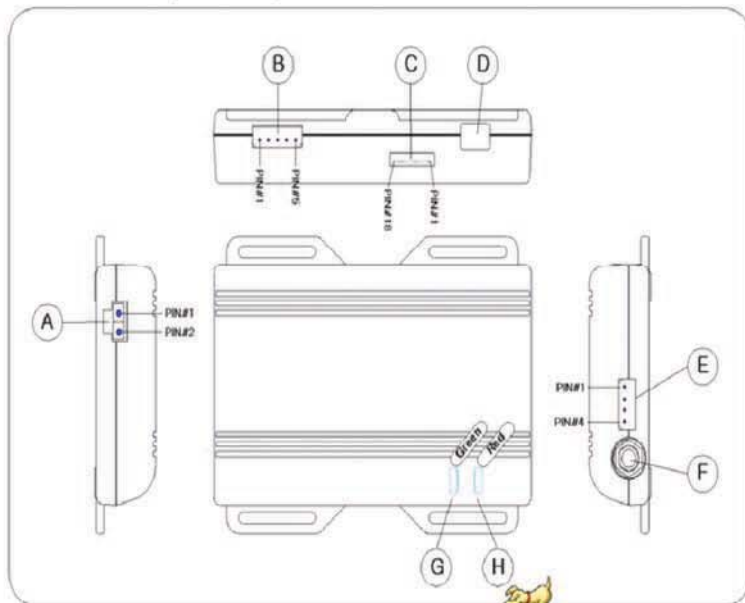
5.1 TC100G Interface Over View

A picture shown below shows typical wiring for the product.



5.2 Connector and Pin assignment.

*** TC100G Input / Outputs and other interfaces.



"A" Power input	Pin#1	+9 ~ +28 Volts
	Pin#2	GND
"B" General purpose I/O	Pin#1	INPUT 1
	Pin#2	INPUT 2/OUT 1
	Pin#3	OUT 2
	Pin#4	OUT 3
	Pin#5	GND
"C" System connector	Pin#1 ~ #18	For factory use only.
"D"	-	Reserved
"E" Data Port	Pin#1	VCC, +5V from external device
	Pin#2	GND
	Pin#3	TXD, Serial data transmit port
	Pin#4	RXD Serial data receive port
"F"	SMA	GPS receiver antenna port
"G"	GREEN LED	GSM service status
"H"	RED LED	Power supply status

6. N701-AT GSM/GPRS INTERFACES

6.1 Modem features.

The GSM/GPRS modem has following interfaces.

- a) One antenna port.
following antenna connections are available.
 - Co planner strip line(default)
 - MMCX female.
- b) One 60 pin Board to Board connector.
 - 3.8 Volts Power supply connection.
 - on board integrated charger circuit.
 - 4 x 6 Keypad matrix.
*** the keypad matrix also can be configured for GPIO.
 - 4 GPIO.
 - 2 A/D converter input.
 - 1 high speed SPI output.
 - SIM interface.
 - UART0 with CTS/RTS flow control.
 - UART1 without flow control.
 - I2C interface.
 - reset input.
 - 2 set of Microphone inputs.
 - 1 set of earpiece outputs.
 - one loud speaker output.



6.2 Modem Pin assignment.

Pin	Description	Type	Remark
1	VBAT	Power	+3.4 ~ 4.0 Volts
3	VBAT	Power	+3.4 ~ 4.0 Volts
5	VBAT	Power	+3.4 ~ 4.0 Volts
7	VBAT	Power	+3.4 ~ 4.0 Volts
9	VCHARGE	CHG	+5~6 Volts@700mA
11	VCHARGE	CHG	+5~6 Volts@700mA
13	SIM_VCC	VCC	+2.85 Volts output
15	SIM_IO	I/O	SIM I/O
17	SIM_CLK	O	SIM Clock
19	SIM_RST	O	SIM reset
21	MRSTO	-	JTAG signal
23	MTSRO	-	JTAG signal
25	SCLK0	O	SPI clock line
27	SCL	O	I2C clock line
29	SDA	I/O	I2C data line
31	CKL0_DAI	-	DAI signal
33	RXD_DAI	-	DAI signal
35	TXD_DAI	-	DAI signal
37	WA0_DAI	-	DAI signal
39	EXTRSTN	I	System reset input
41	MICP1	Audio	Mic 1 input, positive
43	MICN1	Audio	Mic 1 input, negative
45	EPPA1B	Audio	Earpiece output 1
47	EPPA2A	Audio	Earpiece output 2
49	MICP2	Audio	Mic 2 input, positive
51	MICN2	Audio	Mic 2 input, negative
53	AUOP	Audio	Loud speaker output
55	AUON	Audio	Loud speaker output
57	ADC1	AI	A/D converter input
59	ADC2	AI	A/D converter input

Pin	Description	Type	Remark
2	GND	GND	Ground
4	GND	GND	Ground
6	GND	GND	Ground
8	GND	GND	Ground
10	DCD	I	UART0 DCD input
12	DTR	1	UART0 DTR output
14	CTS_0	I	UART0 CTS input
16	RTS_0	O	UART0 RTS output
18	RXD_0	I	UART0 Rx Data
20	TXD_0	O	UART0 Tx Data
22	RI	O	Ring Indicator output
24	DSR	I	UART0 DSR input
26	RXD_1	I	UART1 Rx Data
28	TXD_1	O	UART1 Tx Data
30	KEYOUT0	O	Key matrix output 0
32	KEYOUT1	O	Key matrix output 1
34	KEYOUT2	O	Key matrix output 2
36	KEYOUT3	O	Key matrix output 3
38	KEYOUT4	O	Key matrix output 4
40	KEYOUT5	O	Key matrix output 5
42	KEYIN0	I	Key matrix input 0
44	KEYIN1	I	Key matrix input 1
46	KEYIN2	I	Key matrix input 2
48	KEYIN3	I	Key matrix input 3
50	CAP19	I/O	GPIO
52	CAP02	I/O	GPIO
54	CAP05	I/O	GPIO
56	CAP06	I/O	GPIO
58	CAP00	I/O	GPIO (Interrupt supported)
60	CAP22	I/O	Headset detection

7. EXPANSION BAY INTERFACES (OPTION BOARD)

7.1 Expansion bay features.

The extension bay has following interfaces.

- 6 GPIO.
- 1 A/D converter input.
- UART0 with CTS/RTS flow control.
- UART1 without flow control.
- I2C interface.
- Interrupt Pin.
- 2 set of Microphone inputs.
- 1 set of earpiece outputs.

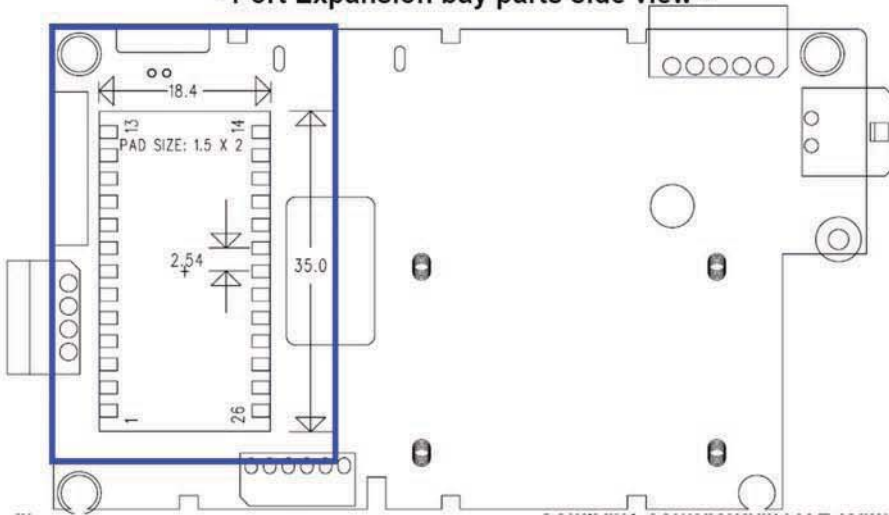
7.2 Expansion bay Pin assignment.

Pin	Description	Type	Remark
1	Wake_Up	I/O	GPIO (Interrupt supported)
3	RXD_0	I	UART0 Rx Data
5	CTS_0	I	UART0 CTS input
7	MICP1	Audio	Mic 2 input, negative
9	EPPA1B	Audio	Earpiece output 1
11	MICP2	Audio	Mic 2 input, positive
13	VBAT	Power	+3.4 ~ 4.2 Volts
15	TXD_1	O	UART1 Tx Data
17	GPIO-EXT4	I	Key matrix input 2
19	GPIO-EXT2	I	Key matrix input 1
21	GND	GND	Ground
23	SCL	O	I2C clock line
25	GPIO-EXT6	O	Key matrix output2

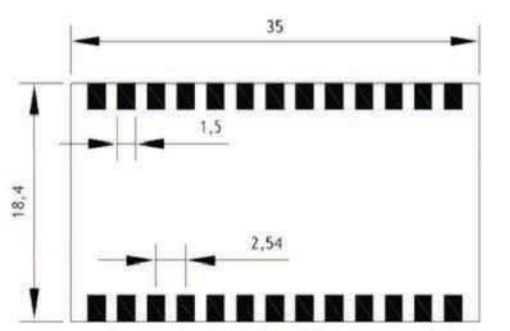
Pin	Description	Type	Remark
2	V2.85	Power	2.85 Volt
4	TXD_0	O	UART0 Tx Data
6	RTS_0	O	UART0 RTS output
8	MICN1	Audio	Mic 1 input, negative
10	EPPA2A	Audio	Earpiece output 2
12	GPIO-EXT5	O	Key matrix output 0
14	ADC2	AI	A/D converter input
16	RXD_1	I	UART1 Rx Data
18	GPIO-EXT3	I	Key matrix input 3
20	GPIO-EXT1	I	Key matrix input 0
22	GND	GND	Ground
24	SDA	I/O	I2C data line
26	H_DET	I/O	Headset detection

7.3 Expansion bay PCB lay out information

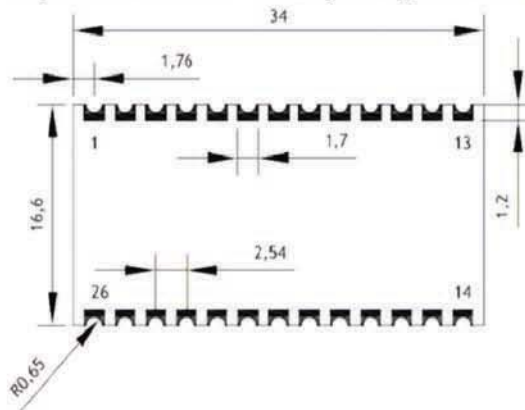
- Port Expansion bay parts side view -



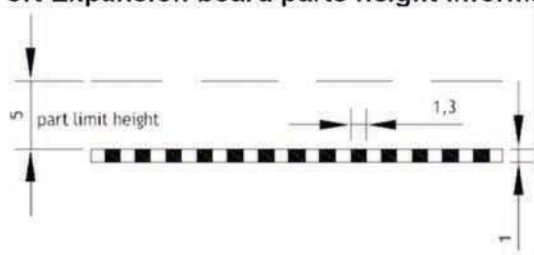
- Port Expansion bay mother board PCB lay out (part side view) -



- Port Expansion board PCB lay out (part side view) -



- Port Expansion board parts height information -



8 PERFORMANCE REQUIREMENTS

8.1 Electrical Specification.

The TC100G shall meet GSM standard GSM11.10, 05.05 and TS51.010

- Frequency Allocation :

- GSM850 : Tx 824Mhz~ 849Mhz, Rx 869Mhz~8894Mhz, 89 Channels.
- GSM900 : Tx 880.2Mhz~ 914.8Mhz, Rx 925.2Mhz~959.8Mhz, 124 Channels.
- DCS1800 : Tx 1710.2Mhz~1784.8Mhz, Rx 1805.2Mhz~1879.8Mhz, 374 Channels.
- PCS1900 : Tx 1850.2Mhz~1909.8Mhz, Rx 1930.2Mhz~1989.8Mhz, 299 Channels.

- Electrical parameter

	GSM-850	GSM-900	DCS-1800	PCS-1900
Power Class	4	4	1	1
Max. Output Power	33dBm(2Watts)	33dBm(2Watts)	30dBm(1Watts)	30dBm(1Watts)
Tx Freq. Range	824Mhz ~ 849Mhz	880.2 ~ 914.8Mhz	1710.2 ~ 1784.8Mhz	1850.2~ 1909.8Mhz
Rx Freq. Range	869Mhz ~ 894Mhz	925.2Mhz ~ 959.8Mhz	1805.2 ~ 1879.8Mhz	1930.2~ 1989.8Mhz
Duplex Freq. Offset	45Mhz	45Mhz	95Mhz	60Mhz
R/Tx Time Offset	3 Time slots	3 Time slots	3 Time slots	3 Time slots
Channel Spacing	200Khz	200Khz	200Khz	200Khz
Modulation Type	0.3 GMSK	0.3 GMSK	0.3 GMSK	0.3 GMSK
Modulator Type	I/Q	I/Q	I/Q	I/Q
Max Freq. Error	$< \pm 0.1$ ppm	$< \pm 0.1$ ppm	$< \pm 0.1$ ppm	$< \pm 0.1$ ppm
Max Phase Error	RMS < 5 degrees	RMS < 5 degrees	RMS < 5 degrees	RMS < 5 degrees
	Peak < 20 degrees	Peak < 20 degrees	Peak < 20 degrees	Peak < 20 degrees
Receiver BER	@-102Bm	@-102Bm	@-100dBm	@-100dBm
	BER $< 0.244\%$	BER $< 0.244\%$	BER < 0.244	BER < 0.244
	Class 1b RBER $< 0.41\%$	Class 1b RBER $< 0.41\%$	Class 1b RBER $< 0.41\%$	Class 1b RBER $< 0.41\%$
	Class 2 RBER $< 2.439\%$	Class 2 RBER $< 2.439\%$	Class 2 RBER $< 2.439\%$	Class 2 RBER $< 2.439\%$

8.2 Current drains.

Type of status	Max power	Idle power	Sleep power
@12Volts	300mA	100mA	20mA
@24Volts	180mA	80mA	20mA

8.3 Environmental Specification.

Normal Temperature : +15°C to +35°C

Operating Temperature : -10°C to +55°C

Normal Humidity Range : 20 – 75%

- The unit operates without fault after humidity test at +45°C/95% RH for 24 hours after the unit has been left at normal temperature for 4 hours.

Storage Temperature : -30°C to +70°C

8.4 Certification and Regulatory Requirements.

- GSM/GPRS(GCF-CC rev3.21.1) and PTCRB(NAPRD rev3.6.1) compliant.
- European Safety, UL.
- IEC publication 68-2-1 and 68-2-2
- FCC part 15 and 22, 24

