

PNS-816D
USER'S MANUAL
2W RPM (RADIO PACKET MODEM)

DRAFT
(Revised June 27, 2002)

PALMNET SYSTEM

PNS-816D User's Manual Draft
(Revised: June 27, 2002)

WARNING:

Output is specified at the antenna terminal of this module. This modular transmitter is only approved for OEM integration into final products that satisfy mobile operating requirements of 2.1091. The final product and its antenna must operate with a minimum separation distance of 25 cm or more from all persons using the antenna with the gain not exceeding 3 dBi to satisfy MPE compliance.

Separate approval is required for this module to operate in portable products with respect to 2.1093 of FCC rules.

Note:

Palmnet has devoted its best effort to make this User's Manual with accuracy; however information in this manual is subject to change without notice.

Contact Info:

5th ACE Techno Tower II, 197-7 Kuro-Dong, Kugo-Ku, Seoul, Korea
Tel: (822) 2634-2574 Fax: (822) 2634-2576
Web-site: www.palmnets.com

1 Centerpointe Dr., Suite 210, La Palma, CA 90623, USA
Tel: (714) 228-2211 Fax: (714) 228-2208
Email: info@pnsa.net

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1. this device may not cause harmful interference and***
- 2. this device must accept any interference received, including interference that may cause undesired operation.***

NOTE: *This equipment has been tested and found to comply with the limits for a Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:*

- Reorient or relocate the receiving antenna***
- Increase the separation between the equipment and receiver***
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.***
- Consult the dealer or an experienced radio/TV technician for help.***

Warning:

Changes or modifications not expressly approved by Palmnet System Co., Ltd. could void the user's authority to operate the equipment.

Industry Canada Compliance Statement

IC Class B Compliance

This device complies with the Class B limit for radio noise emissions as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

NOTE: *This device complies with ICAN RSS 119, under certification number 4358A-PNS816D.*

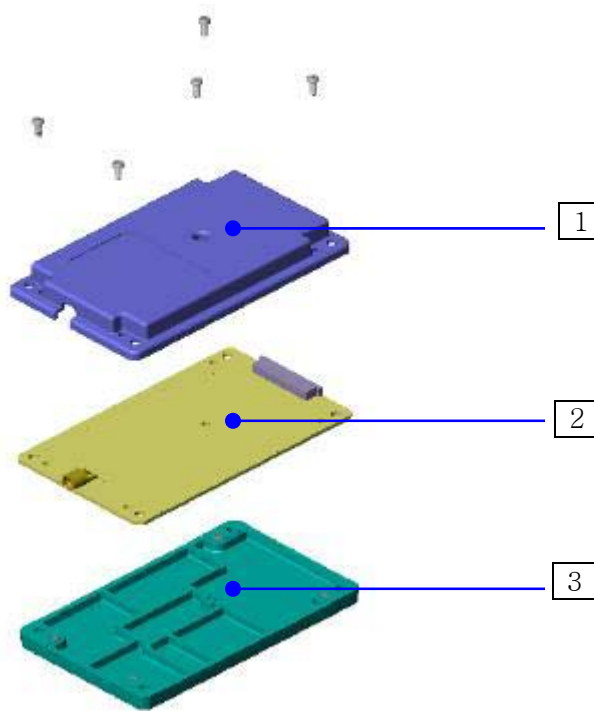
TABLE OF CONTENTS

1. PRODUCT OVERVIEW.....	6
2. DIAGNOSTIC PROGRAM OPERATION	7
3. H/W INSTALLATION GUIDE	13
3.1 DIMENSION.....	13
3.2 ZIF 30 PIN CONNECTOR DRAWING	14
3.3 ZIF 30 PIN CONNECTOR ASSIGNMENT	15
3.4 POWER SUPPLY	15
3.5 NOTICE TO INTEGRATORS	15
3.6 INSTALLATION.....	16
3.6.1 Mounting.....	16
3.6.2 Interface Cable and Connector	16
3.6.3 Antenna Connection.....	16
3.6.4 Antenna Connection Diagram.....	17
3.7 LABELING INSTRUCTION	17
4. GENERAL SPECIFICATIONS.....	18
4.1 GENERAL HARDWARE.....	18
4.2 ENVIRONMENTAL	18
4.3 POWER SUPPLY	18
4.4 COMMUNICATION INTERFACES.....	18
4.5 ANTENNA	18
4.6 GENERAL RF	18
4.7 TRANSMITTER	18
4.8 RECEIVER	19
4.9 DIGITAL BOARD	19

1. PRODUCT OVERVIEW

PNS-816D is the wireless data modem that is based on MOTOLORA RD-LAP 19.2 and MDC4800 protocol. PNS-816D, a RPM (Radio Packet Modem), has transmitting frequency of 806~825 MHz and receiving frequency of 851~870 MHz.

PNS-816D is the interactive wireless data communication module which could easily be integrated into a variety of the applications that requires wireless connectivity. It is also supported by the Auto Roaming which will give full satisfaction of the real mobility. With the Interface Connector, applying to various devices is much simpler and it also has built-in Monitoring function which could check the performance status.












No	Description	Remark
1	Top Case	
2	PCB	
3	Bottom Case	

Figure 1. PNS-816D Diagram and Description

2. DIAGNOSTIC PROGRAM OPERATION

- Equipment and device requirement for test
 - a) IBM Compatible PC, 386 or higher
 - b) Modem Test JIG
 - c) RS-232C Serial Cable
 - d) Power source: DC5V 2.5A or higher
 - e) Software for the Test
 - f) Dos 3.0 or higher

1. Connect RS-232C Cable to COM1 Port on PC
2. Copy the program from provided program diskette to PC (create your own directory)
3. Run "rpm2w.bat"

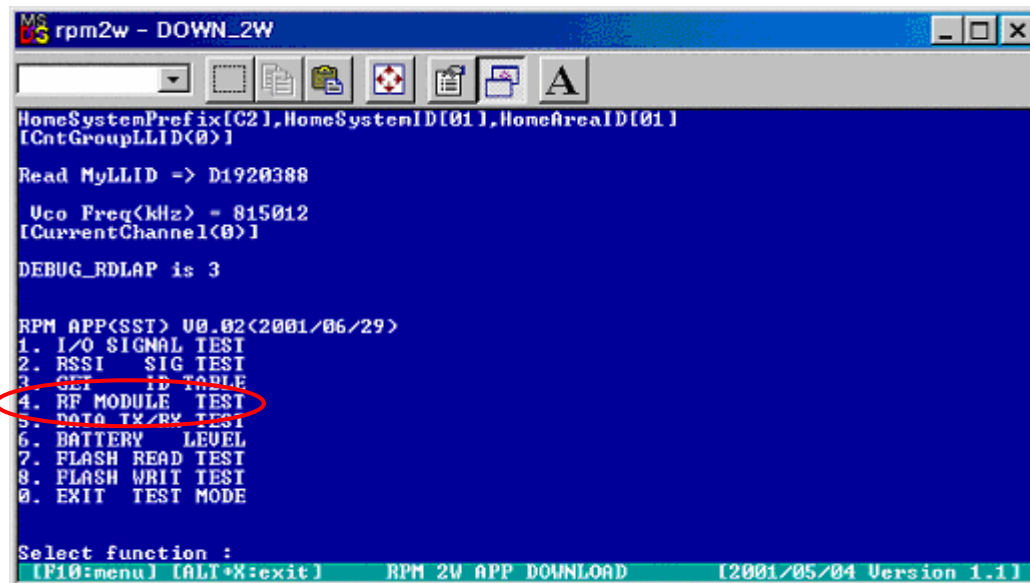
Name	Size	Type	Date Modified
 Down.bin	100KB	BIN FILE	01-05-31 ...
 Down_2w	41KB	APPLICATION ...	01-05-31 ...
 Gllid.dat	1KB	DAT FILE	01-05-31 ...
 Llid.dat	1KB	DAT FILE	01-05-31 ...
 Log	2KB	FILE	01-08-29 ...
 rpm_app2.bin	48KB	BIN FILE	00-06-29 ...
 rpm_app2.ol...	37KB	BIN FILE	01-05-31 ...
 rpm2w	1KB	MS-DOS Batch...	01-06-01 ...
 Sysid.dat	1KB	DAT FILE	01-05-31 ...

4. Turn on the Test JIG power with PNS-816D installed
5. After Program screen displays, press F10 Key to display the pull down menu

6. Select "Test Mode"

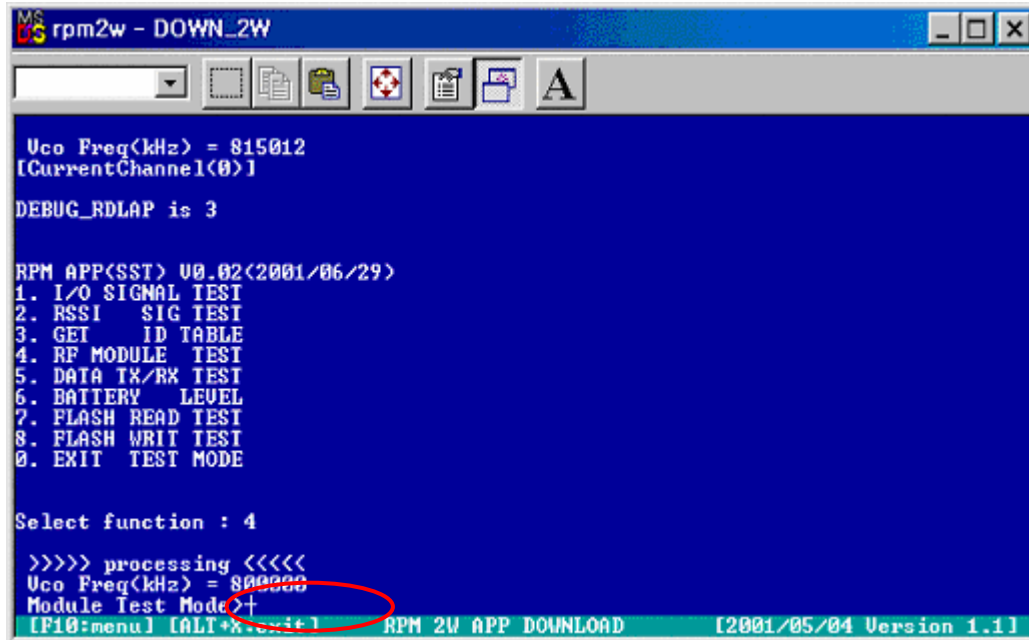


7. Select "4. RF MODULE TEST"



8. To set the TX frequency, type a "FC Value" and press Enter

TX Frequency	FC Value	Remarks
806.0125MHz	FC01E1	Low Frequency
813.0625MHz	FC0415	Middle Frequency
824.9875MHz	FC07CF	High Frequency



```

rpm2w - DOWN_2W

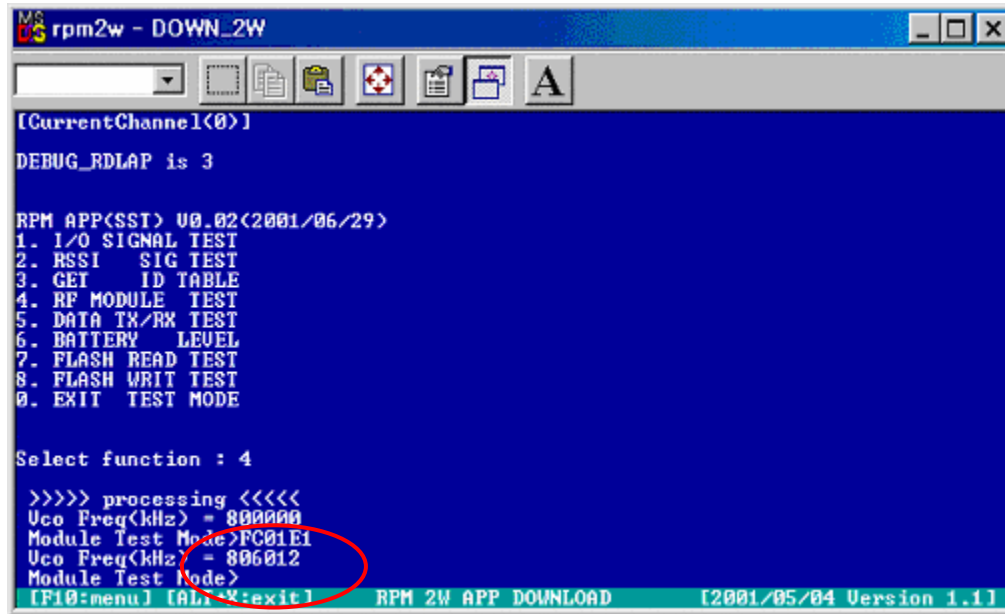
Uco Freq(kHz) = 815012
[CurrentChannel(0)]
DEBUG_RDLAP is 3

RPM APP(SST) U0.02(2001/06/29)
1. I/O SIGNAL TEST
2. RSSI SIG TEST
3. GET ID TABLE
4. RF MODULE TEST
5. DATA TX/RX TEST
6. BATTERY LEVEL
7. FLASH READ TEST
8. FLASH WRIT TEST
0. EXIT TEST MODE

Select function : 4

>>>> processing <<<<
Uco Freq(kHz) = 800000
Module Test Mode
[Alt+F10:menu] [Alt+F10:exit] RPM 2W APP DOWNLOAD [2001/05/04 Version 1.1]
  
```

9. After the frequency has been set, type "TT" and press Enter (it will transmit for 10 second).



The screenshot shows a Windows-style application window titled "rpm2w - DOWN_2W". The window has a menu bar with icons for file operations and a toolbar. The main text area is blue and contains the following text:

```
[CurrentChannel{0}]  
DEBUG_RDLAP is 3  
  
RPM APP{SSI} V0.02(2001/06/29)  
1. I/O SIGNAL TEST  
2. RSSI SIG TEST  
3. GEI ID TABLE  
4. RF MODULE TEST  
5. DATA TX/RX TEST  
6. BATTERY LEVEL  
7. FLASH READ TEST  
8. FLASH WRIT TEST  
0. EXIT TEST MODE  
  
Select function : 4  
  
>>>> processing <<<<  
Uco Freq(kHz) = 800000  
Module Test Mode>PC01E1  
Uco Freq(kHz) = 806012  
Module Test Mode>  
[F10:menu] [Alt-X:exit] RPM 2W APP DOWNLOAD [2001/05/04 Version 1.1]
```

A red circle highlights the "Module Test Mode>PC01E1" line.

10. Transmit time could be adjusted by using different "TC Value"

TX time	TC Value	Remarks
10 sec	TC100	
20 sec	TC200	
30 sec	TC300	
60 sec	TC600	

```

MS
rpm2w - DOWN_2W

DEBUG_RDLAP is 3

RPM APP(SST) V0.02(2001/06/29)
1. I/O SIGNAL TEST
2. RSSI SIG TEST
3. GET ID TABLE
4. RF MODULE TEST
5. DATA TX/RX TEST
6. BATTERY LEVEL
7. FLASH READ TEST
8. FLASH WRIT TEST
9. EXIT TEST MODE

Select function : 4

>>>> processing <<<<
Uco Freq(kHz) = 800000
Module Test Mode>FC01E1
Uco Freq(kHz) = 806012
Module Test Mode>TC300
Module Test Mode>
[F10:menu] [ALT+N:next] RPM 2W APP DOWNLOAD [2001/05/04 Version 1.1]

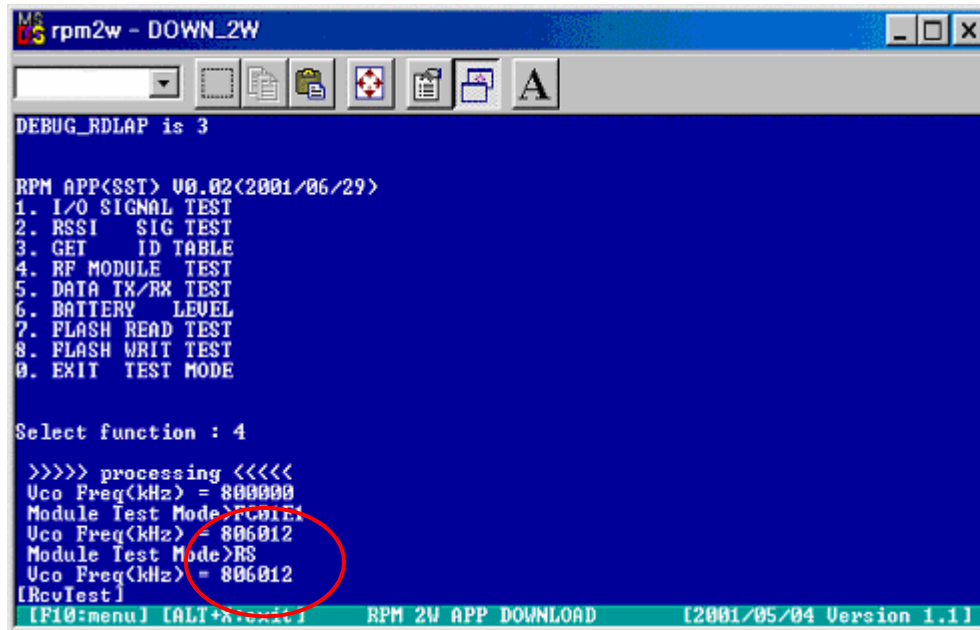
```

11. To run the test with different frequency, go back to step 8

12. TX Audio Response could be measure by type in different "TT Value"

TTX	TX Audio Frequency	Remarks
TT1	200 Hz	Default
TT2	2400 Hz	
TT3	600 Hz	
TT4	4800 Hz	
TT5	960 Hz	1000 Hz

13. To test the RX Mode, type "RS" and press Enter Key from selected frequency



```

rpm2w - DOWN_2W
DEBUG_RDLAP is 3

RPM APP(SST) V0.02<2001/06/29>
1. I/O SIGNAL TEST
2. RSSI SIG TEST
3. GET ID TABLE
4. RF MODULE TEST
5. DATA TX/RX TEST
6. BATTERY LEVEL
7. FLASH READ TEST
8. FLASH WRIT TEST
0. EXIT TEST MODE

Select function : 4

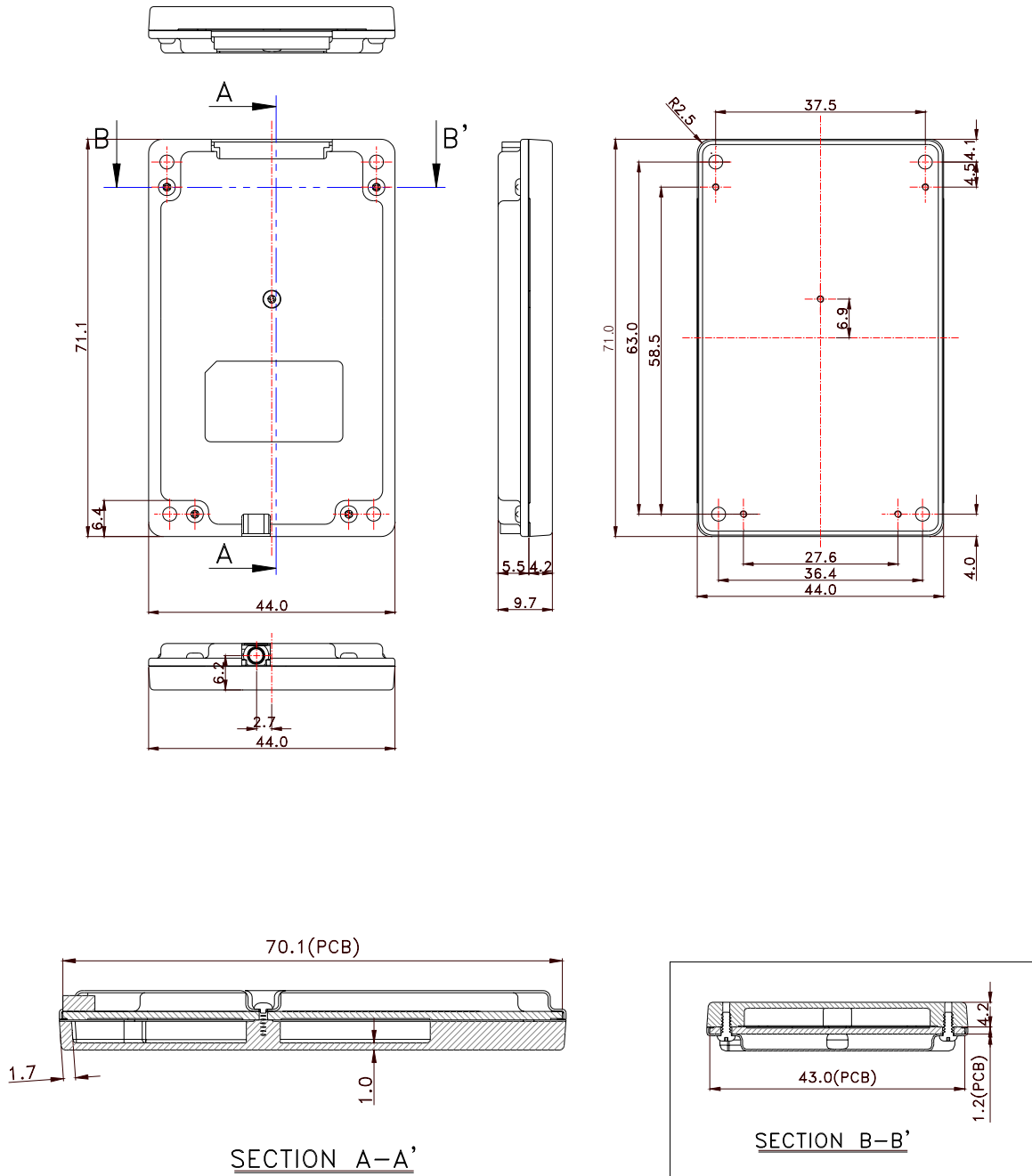
>>>> processing <<<<
Uco Freq(kHz) = 800000
Module Test Mode>RS
Uco Freq(kHz) = 806012
Module Test Mode>RS
Uco Freq(kHz) = 806012
[RcvTest]
[F10:menu] [ALT+A:exit] RPM 2W APP DOWNLOAD [2001/05/04 Version 1.1]
  
```

14. To end the TX Mode or RX Mode, type "O" and the current running Mode will be stop

15. To end the "RF-Module Test", type "QU"

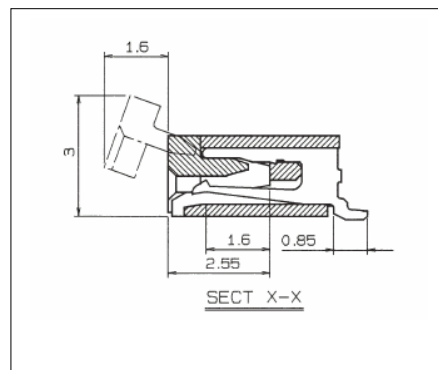
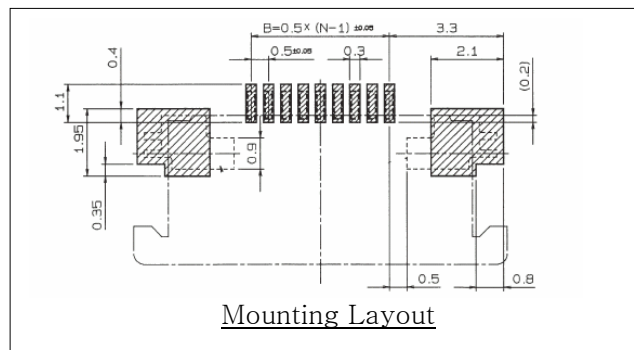
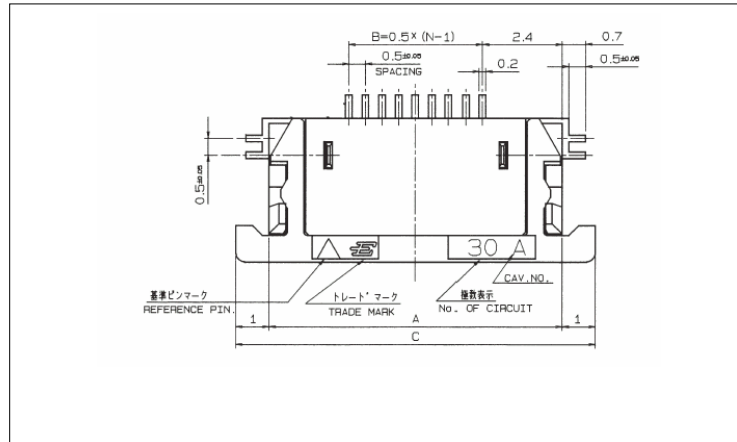
3. H/W INSTALLATION GUIDE

3.1 Dimension



3.2 ZIF 30 Pin connector Drawing

- KYOCERA ELCO 30Pin 0.5Pitch Connector (Part Number: 08-6210-030-010-800A)
- 0.5-30-80-D Flat Flex Cable (FFC): 30 pin, 0.5mm (centerline spacing), 80mm (cable length)
- The length of the FFC should be determined by each integrator's application.



3.3 ZIF 30 Pin connector Assignment

No	Signal	Description	No	Signal	Description
1	DCD	Data Carrier Detect	16	SS0	Status Input0
2	TXD	Receive Data	17	SS1	Status Input1
3	RXD	Transmit Data	18	SS2	Status Input2
4	DTR	Data Transmit Ready	19	SS3	Status Input3
5	GRD	Ground	20	VEE	3.9V
6	DSR	Data Set Ready	21	VEE	3.9V
7	RTS	Request to Send	22	VEE	3.9V
8	CTS	Clear to Send	23	VEE	3.9V
9	RI	Ring Indicator	24	VEE	3.9V
10	/RESET	Modem Reset	25	GRD	Ground
11	S_BACKUP	3.3V Sram Backup	26	GRD	Ground
12	RPM_PWR_ON_OFF	Modem Power on/off	27	GRD	Ground
13	MSG_WAIT	Message Waiting	28	GRD	Ground
14	IN_RANGE	In Range	29	N.C.	Not used
15	LOW_BATT	Low Battery	30	N.C.	Not used

3.4 Power Supply

- Power Supply: 5V \pm 10%, more than 3A
- Tx Current usage: 2A
- Rx Current usage: 80mA
- Stand-by: 12mA

3.5 Notice to Integrators

Warning: Output is specified at the antenna terminal of this module. This modular transmitter is only approved for OEM integration into final products that satisfy mobile operating requirements of 2.1091. The final product and its antenna must operate with a minimum separation distance of 25 cm or more from all persons using the antenna with the gain not exceeding 3 dBi to satisfy MPE compliance.

Separate approval is required for this module to operate in portable products with respect to 2.1093 of FCC rules.

3.6 Installation

3.6.1 Mounting

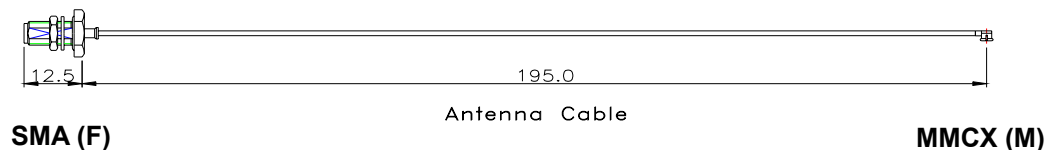
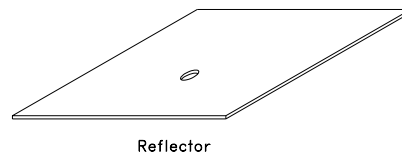
- Use four M2x11 type machine screws to secure the modem to host board or other mounting surface (modem has a 2.5mm diameter hole in each 4 corner)
- May require washer and nut to secure the modem
- The length of the machine screw should be determine by each different application

3.6.2 Interface Cable and Connector

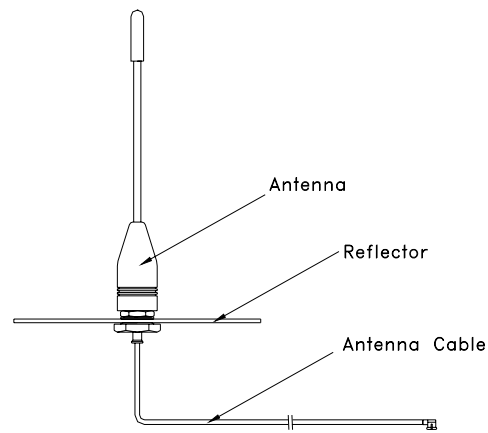
- KYOCERA ELCO 30Pin 0.5Pitch Connector (Part Number: 08-6210-030-010-800A)
- 0.5-30-80-D Flat Flex Cable (FFC): 30 pin, 0.5mm (centerline spacing), 80mm (cable length)
- The length of the FFC should be determined by each integrator's application.

3.6.3 Antenna Connection

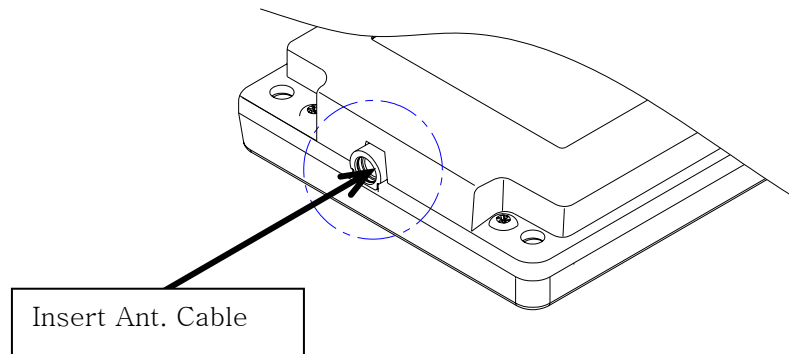
- Connector: Industry standard MMCX connector
- Antenna Cable: Low loss antenna cable with SMA screw-on connector is recommended
- Reflector could improve up to 20% of the antenna performance
- Antenna: An antenna with gain not exceeding 3 dBi should be used



3.6.4 Antenna Connection Diagram



Antenna Installation



3.7 Labeling Instruction

- FCC requires FCC ID number of the modem must be displayed outside of the device visibly, if the modem is installed inside another device, then the outside of the hosting device must display a label referring to the enclosed modem. IC also requires labeling in same manner.
- This exterior label should use wording as the following:
 “Contains Transmitter Module FCC ID: QEZPNS-816D & IC: 4358A-PNS816D”
 or “Contains FCC ID: QEZPNS-816D & IC: 4358A-PNS816D.”
 Any similar wording that expresses the same meaning may be used.

4. GENERAL SPECIFICATIONS

4.1 General Hardware

Weight	60g Max
Size	71 mm(L) x 44 mm(W) x 9.7 mm(H)
Serial Connector	ZIP, 30 Pin
Antenna Connector	MMCX Miniature Coaxial

4.2 Environmental

Operation Temperature	-20°C ~ +60°C
Storage Temperature	-35°C ~ +85°C

4.3 Power Supply

DC Voltage	3.9V
------------	------

4.4 Communication Interfaces

Modem Connector	Serial 30 Pin
Serial Interface	Serial asynchronous 3.3V CMOS
RF Protocol	RD-LAP19.2, and MDC4800
Host Protocol	Data TAC Native Control Language 1.2 or Status Send Mode and Serial Mode

4.5 Antenna

Normal Impedance	50Ω
------------------	-----

4.6 General RF

Modulation	FM
Mode	Half Duplex
Auto-Roaming	Auto-scanning, Channel Selection, Registration on a new Channel
Data Rate	RD-LAP19.2, MDC4800
Channel Spacing	25KHz

4.7 Transmitter

Frequency	806 ~ 825 MHz
Frequency Stability	2 ppm
RF Output Power	2 Watt

4.8 Receiver

Frequency	851 ~ 870 MHz
Selectivity : (dB) at room temp	55
Over full temperature	45
Intermodulation : (dB) at room temp	55
Over full temperature	45
Image Rejection (dB)	45
Spurious	60

4.9 Digital Board

MPU	Toshiba TMP93C41DF
Memory (SST31LF04)	Flash ROM 4M (8 bit)
	SRAM 1M (8 bit)
Clock Oscillator	14.7456 MHz