

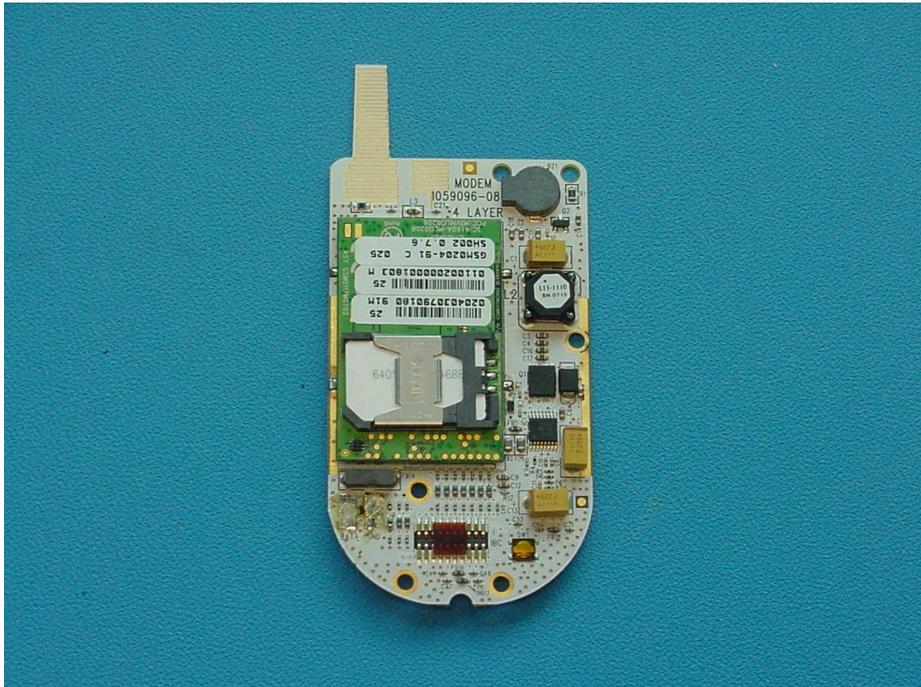


ActiveKEY Modem

User Manual

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GE SECURITY



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1. SCOPE

1.1. WHAT IT IS

This document describes the data modem used in the ActiveKEY product. The modem will be a PTCRB certified generic data modem that can be used in other applications beyond the ActiveKEY product. The modem supports SMS and GPRS data transmission, using the GSM cellular network.

2. ELECTRICAL COMPONENTS

2.1. CELLULAR DATA MODEM

The wireless communication for this design is currently handled by an Enfora model GSM-0204 Cellular modem module. This is a dual cellular band module and is controlled by the main microprocessor and associated GE proprietary firmware.

The cellular data modem circuit was designed for use in the ActiveKEY product and as a stand alone cellular data modem for universal use in any GE applications requiring digital cellular communication capability.

The module resides on a small circuit board that also contains a precision low noise switching voltage regulator that maintains the operating voltage of the cellular data modem at 3.6 Volts DC over the entire operating range of a lithium ion cell from 4.2 Volts DC down to 2.75 Volts DC.

A complete RS232 interface is included in this design and is pinned out to a twenty pin male header with Serial data input, serial data output, Clear To Send , Request To Send, Data Carrier Detect, Ring signal, Data Terminal Ready and Data Set Ready.

The twenty pin male header on the PCB provides connection for battery or external power and ground and an output for the regulated 3.6 Volt supply for use by the ActiveKEY main board or other devices when utilized in the stand alone mode of operation.

2.2. ENFORA RADIO

The Enfora module used in the ActiveKEY is the Enabler IIG GSM0204-91 850/1900 HW Ver C, SW Ver 0.7.6, SVN 14, NAPRD 3.7.1. For more information on the Enfora radio, please refer to the following documents:

Title	Version	Date
Enfora Enabler II-G Integration Guide GSM0108PB001MAN.pdf	1.03	5/9/06
Enabler-IIG AT Command Set GSM0107PB001MAN.pdf	1.06	6/29/06
GSM0000AN024 - Enhanced Test Mode Commands.pdf	1.00	2/20/07

2.3. RADIO COMMUNICATION

The AT+CPMS command is used to query the Enfora for the number of received messages currently stored in its SIM.

The AT+CMGL command is used to get the Enfora to output a list of received messages stored in the SIM, and their associated index number (1-25).

The AT+CMGR command reads a specific message from the SIM, accessed by its index number.

The AT+CMGD command deletes a message from the SIM, again, accessed by its index number.

2.4. SWITCHING POWER SUPPLY

The switching power supply for the ActiveKEY is based on a switchmode buck/boost controller device. For this application the "SEPIC" mode of operation was chosen for high efficiency operation of the regulator circuitry.

This device is a low noise high speed controller operating at ~800 KHz that is perfectly suited to the ActiveKEY requirements.

It is capable of regulating the output voltage to 3.6 Volts DC (optimum for the Enfora cellular data modem module) over a much wider range than can be realized using a Lithium Ion battery.

The actual input range of the power supply is from 1.8 Volts DC to 9.0 Volts DC and it can provide a constant 1 ampere to a load without issue.

This allows usage in secondary applications with a wide range of available power sources when used as a stand alone cellular data modem and has plenty of reserve for use by peripheral circuits using the 3.6 Volt output of the switching regulator.

3. INTERFACE BOARD

For universal applications of the GE modem card an interface board has been developed to allow the modem card to be easily utilized in any standard PC type of RS-232 application or direct interface to 3.6 volt logic levels by removal of the on board level translator (MAX3237) and connection directly to the on board sixteen pin header. A hot air tool is recommended for removal of the MAX3237 or the interface boards can be supplied without this device and its associated components mounted on request.

When used in PC type RS-232 applications an external DC supply is required and must be within the 2.5 to 4.5 Volt range and be capable of supplying up to 2 amperes of peak current. The on board regulator on the modem card will regulate this input voltage to a precise 3.6 volts to operate the modem circuitry and will supply the MAX3237 level translator IC on the interface board. The regulated 3.6 Volt supply is available on the sixteen pin header for operating additional external low current circuitry if desired, up to 200 Ma. is available for this purpose. When used in this mode the sixteen pin header can be used to monitor the various signals on the RS-232 buss.

When used in the direct mode all connections are made to the on board sixteen pin header, power must be supplied from an external source and must be in the 2.5 to 4.5 volt range with a capability of supplying up to 2 amperes of peak current.

The on board (modem) voltage regulator will supply external circuitry with the regulated 3.6 volts with a current requirement up to 200 Ma.

Do not connect the sixteen pin header to external logic with the MAX3237 in place, this may result in damage to both the MAX3237 and the external logic!

The interface pin out for the sixteen pin header is as follows:

1. DC input power +2.5 to +4.5 Volts.
2. Power and logic Ground.
3. Regulated 3.6 Volts DC output.
4. Modem Ring signal.
5. Transmit Data.
6. Receive Data.
7. Clear to Send.
8. Request to Send.
9. Data Terminal Ready
10. Data Carrier Detect.

11. Spare, used for buzzer in ActiveKEY
12. Spare, used for buzzer in ActiveKEY.
13. Switcher control (ground to operate 3.6 volt regulator).
14. Radio Reset, momentarily ground to reset the radio module.
15. Radio power control (ground for normal operation).

4. FCC INFORMATION

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.

The Active Key modem board is designed to be installed in specific identified host units in portable applications (used closer than 20cm to the body). In order to satisfy FCC rules conditions each modem installation must meet the following conditions:

The integral antenna design of the modem board cannot be changed.

The installer must ensure that when the modem is fitted in its final installation the ERP at 850MHz operation must not exceed +33dBm, and at 1900MHz operation the EIRP must not exceed +30dBm.

Each host installation must comply with the FCC Specific Absorption Rate (SAR) requirements and the intentional emissions to FCC Part 15, together with the appropriate warning text added to the user information.

The modem cannot be operated or co located in conjunction with any other antenna or transmitter.

A certification request must be filed with the FCC for each new host installation, which must include the test results taken.

If the FCC ID for the modem is not visible when installed in its host platform, then the integrator must place a label on the exterior of the host platform identifying the modem with FCC ID used.

Violation of the above will invalidate the RF exposure rules.