

**EDW-ML8021 GSM GPRS Modem User's Manual**



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# EDW-ML8021 GSM GPRS Modem User's Manual

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## 1. Introduction

This document defines the EDW-ML8021 module series and describes the hardware interface of the EDW-ML8021 module that connects to the customer application and the hardware interface.

This document can help customer quickly understand module interface specifications, electrical and mechanical details. With the help of this document, associated application notes and user guide, customer can use EDW-ML8021 module to design and set up mobile applications quickly.

## 2. Product concept

The EDW-ML8021 is a Quad-band GSM/GPRS engine that works at frequencies GSM850MHz, GSM900MHz, DCS 1800MHz and PCS1900MHz. The EDW-ML8021 features GPRS multi-slot class 12 and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4.

The EDW-ML8021 is integrated with Internet service protocols, which are TCP/UDP, FTP and HTTP.

Extended AT commands have been developed for customer to use these Internet service protocols easily.

Table 1 Module key features

| Feature            | Implementation   |
|--------------------|--|
| Power supply       | Single supply voltage 5.0V – 12V.  |
| Frequency bands    | <ul style="list-style-type: none"><li>● Quad-band: GSM850, GSM900, DCS1800, PCS1900.</li><li>● The module can search these frequency bands automatically</li><li>● The frequency bands can be set by AT command.</li><li>● Compliant to GSM Phase 2/2+</li></ul> |
| Transmitting power | <ul style="list-style-type: none"><li>● Class 4 (2W) at GSM850 and GSM900</li><li>● Class 1 (1W) at DCS1800 and PCS1900</li></ul>  |
| GPRS connectivity  | <ul style="list-style-type: none"><li>● GPRS multi-slot class 12 (default)</li><li>● GPRS multi-slot class 1~12 (configurable)</li><li>● GPRS mobile station class B</li></ul>   |
| Temperature range  | <ul style="list-style-type: none"><li>● Normal operation: -35°C ~ +80°C</li><li>● Restricted operation: -45°C ~ -35°C and +80°C ~ +85°C<sup>1)</sup></li><li>● Storage temperature: -45°C ~ +90°C</li></ul>  |
| DATA GPRS:         | <ul style="list-style-type: none"><li>● GPRS data downlink transfer: max. 85.6 kbps</li><li>● GPRS data uplink transfer: max. 85.6 kbps</li><li>● Coding scheme: CS-1, CS-2, CS-3 and CS-4</li></ul>   |

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|                          |  |
|--------------------------|--|
| CSD:                     | <ul style="list-style-type: none"> <li>● Support the protocols PAP (Password Authentication Protocol) usually used for PPP connections</li> <li>● Internet service protocols TCP/UDP/FTP/HTTP/MMS</li> <li>● Support Packet Switched Broadcast Control Channel (PBCCH)</li> <li>● CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbps non-transparent</li> <li>● Unstructured Supplementary Services Data (USSD) support</li> </ul> |
| SMS                      | <ul style="list-style-type: none"> <li>● MT, MO, CB, Text and PDU mode</li> <li>● SMS storage: SIM card</li> </ul>   |
| FAX                      | Group 3 Class 1 and Class 2  |
| SIM interface            | Port SIM card: 1.8V, 3V, Protected against ESD with a TVS diode array.   |
| Serial interface         | <ul style="list-style-type: none"> <li>● Support from 4800 bps to 115200 bps, default auto baud rate</li> <li>● Support RS232</li> <li>● Embed standard AT command (GSM07.05 and 07.07)</li> </ul>   |
| Phonebook management     | Support phonebook types: SM, FD, LD, RC, ON, MC  |
| SIM Application Toolkit  | Support SAT class 3, GSM 11.14 Release 99  |
| Physical characteristics | 79*53*21 mm  |

1) When the module works in this temperature range, the deviations from the GSM specification might occur. For example, the frequency error or the phase error could increase.

Table 2 Coding schemes and maximum net data rates over air interface

| <b>Coding scheme</b> | <b>1 Timeslot</b> | <b>2 Timeslot</b> | <b>4 Timeslot</b> |
|----------------------|-------------------|-------------------|-------------------|
| CS-1:                | 9.05kbps          | 18.1kbps          | 36.2kbps          |
| CS-2:                | 13.4kbps          | 26.8kbps          | 53.6kbps          |
| CS-3:                | 15.6kbps          | 31.2kbps          | 62.4kbps          |
| CS-4:                | 21.4kbps          | 42.8kbps          | 85.6kbps          |

## 3. Application interface

### 3.1 Pin description

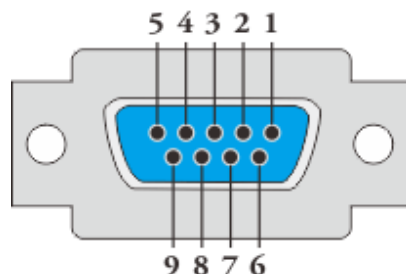


Table 3 Pin description

| PIN         | Name |
|-------------|------|
| 1,4,6,7,8,9 | NC   |
| 2           | TXD  |
| 3           | RXD  |
| 5           | GND  |

### 3.2 Operating modes

The table below briefly summarizes the various operating modes referred to in the following chapters.

Table 4 Overview of operating modes

| Mode             | Function          |  |
|------------------|-------------------|--|
| Normal operation | GSM/GPRS<br>SLEEP | The module will automatically go into SLEEP mode if DTR is set to high level and there is no interrupt (such as GPIO interrupt or data on serial port).<br><br>In this case, the current consumption of module will reduce to the minimal level.<br><br>During SLEEP mode, the module can still receive paging message and SMS from the system normally. |
|                  | GSM IDLE          | Software is active. The module has registered to the GSM network, and the module is ready to send and receive.   |
|                  | GSM TALK          | GSM connection is going. In this mode, the power consumption is decided by the configuration of Power Control Level (PCL), dynamic DTX control and the   |

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|  |   |  |
|--|---|--|
|  |   | working RF band.   |
|  | GPRS IDLE   | The module is not registered to GPRS network. The module is not reachable through GPRS channel.  |
|  | GPRS STANDBY  | The module is registered to GPRS network, but no GPRS PDP context is active. The SGSN knows the Routing Area where the module is located at.                           |
|  | GPRS READY  | The PDP context is active, but no data transfer is going on. The module is ready to receive or send GPRS data. The SGSN knows the cell where the module is located at. |
|  | GPRS DATA   | There is GPRS data in transfer. In this mode, power consumption is decided by the PCL, working RF band and GPRS multi-slot configuration.                              |
| POWER DOWN   | Normal shutdown by sending the “AT+QPOWD=1” command, using the PWRKEY pin. The power management ASIC disconnects the power supply from the base band part of the module, and only the power supply for the RTC is remained. Software is not active. The serial interfaces are not accessible. Operating voltage (connected to VBAT) remains applied.    |  |
| Minimum functionality mode (without removing power supply) | Use the “AT+CFUN” command can set the module to a minimum functionality mode without removing the power supply. In this case, the RF part of the module will not work or the SIM card will not be accessible, or both RF part and SIM card will be closed all, but the serial port is still accessible. The power consumption in this case is very low. |  |

**Note:** The module is set to auto baud rate mode (AT+IPR=0) in default configuration. In the auto baud rate mode, the URC “RDY” after powering on is not sent to host controller. AT command can be sent to the module 2-3 seconds after the module is powered on. Host controller should firstly send an “AT” or “at” string in order that the module can detect baud rate of host controller, and it should send the second or the third “AT” or “at” string until receiving “OK” string from module. If you need to using fixed baud rate, Then an “AT+IPR=x;&W” should be sent to module and save the configuration to flash memory of module. After these configurations, the URC “RDY” would be received from the Serial Port of module every time when the module is powered on. Refer to Chapter “AT+IPR” in AR command manual.

### 3.3 LED indication

**3.3.1 Red Led is the power indication.**

**3.3.2 Yellow Led is the RING indication.**

**3.3.3 Green Led is the Working state indication.**

The Working state of this LED is list in the table 6.

Table 6 Working state indication

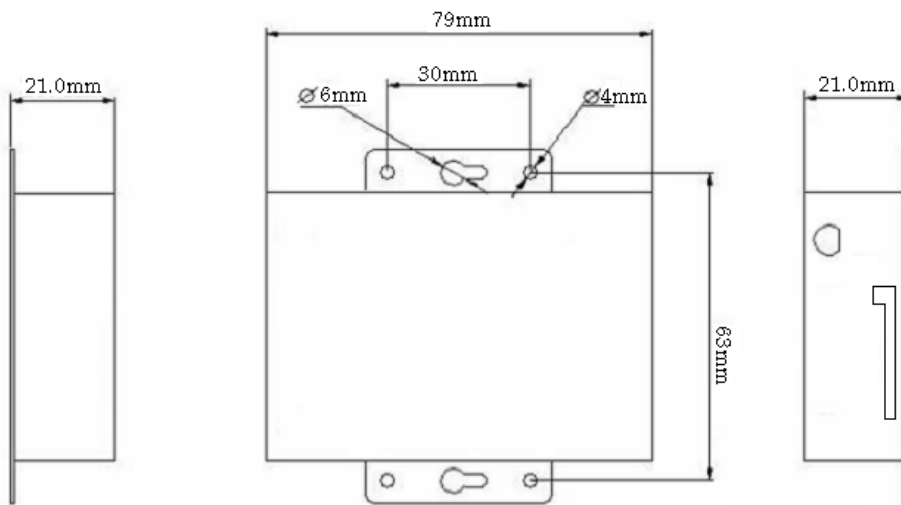
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| state              | Module Function                             |
|--------------------|---|
| Off                | The module is not running(Power Off)        |
| 64ms On/800ms Off  | The module is not synchronized with network |
| 64ms On/2000ms Off | The module is synchronized with network     |
| 64ms On/600ms Off  | GPRS data transfer is ongoing.              |

### 4. Mechanical dimension



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### 5. Product List

| Name                 | Unit | Quantity | Describe        | Picture   |
|----------------------|------|----------|-----------------|---|
| <b>EDW-ML8021</b>    | Item | 1        | Module          |    |
| <b>Antenna</b>       | Item | 1        | Standard Supply |    |
| <b>Power Adapter</b> | Item | 1        | DC 5V2A         |   |
| <b>RS-232 Cable</b>  | Item | 1        | Standard Supply |  |