

## WW-355, WWAN Mini PCIe Card with SIM Holder/GNSS Options

### Overview

WW-355 PCI Express Mini Card is designed based on Gemalto / Cinterion 3G/2.5G wireless WAN technologies. Not only exhibits excellent hardware/radio frequency performance, it also supports rich software for fast product development. Following the PCI Express Mini Card standard, it could be easily applied in devices with PC architecture.

In addition to WWAN, features of (a) ultra-sensitive GNSS (GPS & GLONASS), (b) SIM card holder, and (c) PCM for voice application are available for increasing your product value in just one card.

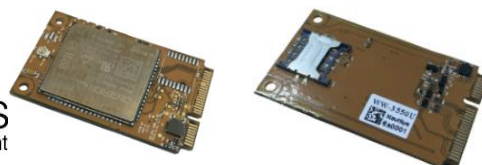
### Applications

- Industrial PC / Netbook PC / Tablet PC / SBC
- Financial / Security / Payment / Inventory / Healthcare
- Kiosk /Digital Signage / Intelligent Vending Machine
- POS / Automatic Meter Reading
- School Bus / Transit / Taxi / Police
- Tracking & Tracing / Fleets Management
- Mobile Internet Terminal / Fixed Wireless Terminal
- Remote Monitoring / Telematics / Tele-health

### Features

- PCI Express Mini Card standard V1.2 compliant
  - Communication via USB
  - Network status indication
  - Airplane mode support
  - Remote host wakeup support
- Powered by Gemalto EHS6 module
  - 5-band UMTS/HSPA+WCDMA

RoHS  
Compliant



- ◆ 2100, 1900, 900, 850, 800 (MHz)
- GSM/GPRS/ EDGE quad-band support
- ◆ 1900, 1800, 900, 850 (MHz)
- Downlink 7.2 Mbps/Uplink 5.76Mbps
- Abnormal board temperature protection (out of -40~90℃)
  - Automatic GPRS multi-slot class change
- Rich driver/RIL support for various platforms
- Rich internet communication protocol support
  - TCP/IP stack access via AT commands
  - FTP, ICMP, DNS, TCP server & client, UDP client etc.
  - HTTP, SMTP, POP3, Transparent mode
- Proprietary support of voice via PCM
- Option of micro SIM card holder
- Option of high performance GNSS (GPS&GLONASS)
  - GNSS antenna short circuit protection
- Customer's IMEI on request
- Rich certificates for the attached module
  - Australia Government
  - Australia Telstra
  - Brazil Government ANATEL
  - Canada Government IC
  - Canada Rogers
  - Europe GCF/R&TTE (CE)
  - Japan Business Law (JATE)
  - Japan Radio Law (TELEC)
  - Japan Docomo
  - Mexico COFETEL Government (new name IFT)
  - South Africa ICASA Gov.
  - USA FCC/IC/PTCRB/UL Gov.

■ USA AT&T

- Industrial grade operating temperature

## Technical Specifications

### Wireless WAN

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Core Engine                               | Gemalto/Cinterion EHS6 module                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Features/<br>3GPP<br>Release 4 | CS data rate – 64 kbps DL / 64 kbps UL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Frequency<br>bands                        | GSM/GPRS/EDGE: Quad-band<br>850/900/1800/1900MHz<br>UMTS/HSPA+: Penta-band<br>800/850/900/1900/2100MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | GSM/GPRS/<br>EDGE<br>Features  | Data transfer<br>GPRS:<br><ul style="list-style-type: none"> <li>● Multi-slot Class 12</li> <li>● Full PBCCH support</li> <li>● Mobile Station Class B</li> <li>● Coding Scheme 1 – 4</li> </ul> EGPRS:<br><ul style="list-style-type: none"> <li>● Multi-slot Class 12</li> <li>● EDGE E2 power class for 8 PSK</li> <li>● Downlink coding schemes – CS 1-4, MCS 1-9</li> <li>● Uplink coding schemes – CS 1-4, MCS 1-9</li> <li>● SRB loopback and test mode B</li> <li>● 8-bit, 11-bit RACH</li> <li>● PBCCH support</li> <li>● 1 phase/2 phase access procedures</li> <li>● Link adaptation and IR</li> <li>● NACC, extended UL TBF</li> <li>● Mobile Station Class B</li> </ul> CSD:<br><ul style="list-style-type: none"> <li>● V.110, RLP, non-transparent</li> <li>● 9.6kbps</li> <li>● USSD</li> </ul> SMS<br><ul style="list-style-type: none"> <li>● Point-to-point MT and MO</li> <li>● Cell broadcast</li> <li>● Text and PDU mode</li> <li>● Storage: SIM card plus SMS locations in mobile equipment</li> </ul> |
| GSM class                                 | Small MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | AT<br>commands                 | Hayes 3GPP TS 27.007, TS 27.005,<br>Gemalto M2M AT commands for RIL<br>compatibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Output power                              | <b>Class 4</b> (+33dBm $\pm$ 2dB) for EGSM850<br><b>Class 4</b> (+33dBm $\pm$ 2dB) for EGSM900<br><b>Class 1</b> (+30dBm $\pm$ 2dB) for GSM1800<br><b>Class 1</b> (+30dBm $\pm$ 2dB) for GSM1900<br><b>Class E2</b><br><ul style="list-style-type: none"> <li>● (+27dBm <math>\pm</math> 3dB) for GSM 850 8-PSK</li> <li>● (+27dBm <math>\pm</math> 3dB) for GSM 900 8-PSK</li> <li>● (+26dBm +3 /-4dB) for GSM 1800 8-PSK</li> <li>● (+26dBm +3 /-4dB) for GSM 1900 8-PSK</li> </ul> <b>Class 3</b><br><ul style="list-style-type: none"> <li>● (+24dBm +1/-3dB) for UMTS 2100, WCDMA FDD Band I</li> <li>● (+24dBm +1/-3dB) for UMTS 1900,WCDMA FDD Band II</li> <li>● (+24dBm +1/-3dB) for UMTS 900, WCDMA FDD Band VIII</li> <li>● (+24dBm +1/-3dB) for UMTS 850, WCDMA FDD Band V</li> <li>● (+24dBm +1/-3dB) for UMTS 800, WCDMA FDD Band VI</li> </ul> |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| HSPA<br>Features/<br>3GPP<br>Release 6, 7 | Down Link 7.2Mbps, Up Link 5.7Mbps<br>HSDPA Cat.8 / HSUPA Cat.6 data rates<br>Compressed mode (CM) supported<br>according to 3GPP TS25.212                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| UMTS                                      | PS data rate – 384 kbps DL / 384 kbps UL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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|     |                                                                             |
|-----|-----------------------------------------------------------------------------|
| SIM | SIM Application Toolkit: SAT Release 99<br>Support of 3V and 1.8V SIM cards |
|-----|-----------------------------------------------------------------------------|

### GNSS (GPS & GLONASS) \* option

|                              |                                                                                                                                                                         |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Receiver Type                | SiRFstarV - 52 channels,<br>L1 frequency, C/A code<br>GPS & QZSS:1575.42MHz<br>GLONASS: 1598.0625~1605.375MHz                                                           |
| Horizontal Position Accuracy | < 2.5m (Autonomous)<br>(50% 24hr static, -130dBm)                                                                                                                       |
| Velocity Accuracy            | <0.01 m/s (speed, autonomous)<br><0.01° (heading)<br>(50%@30m/s)                                                                                                        |
| Time To First Fix            | Autonomous (50% -130dBm)                                                                                                                                                |
| Hot start                    | <1sec                                                                                                                                                                   |
| Warm start                   | <30sec                                                                                                                                                                  |
| Cold start                   | <35sec                                                                                                                                                                  |
| Sensitivity (Autonomous)     | Acquisition: -146dBm (GPS)<br>Tracking: -165dBm (GPS),<br>-163dBm(GLONASS)<br>Navigation: -160dBm (GPS),<br>-159dBm(GLONASS)<br>(-142dBm 28dB-Hz with 4dB noise figure) |
| Max. Update Rate             | 5Hz                                                                                                                                                                     |
| Max. Altitude                | <18,000 m                                                                                                                                                               |
| Max. Velocity                | <1,852 km/hr.                                                                                                                                                           |
| Protocol Support             | NMEA V4.00, 115200 bps (default)<br>GGA, GSA, GSV, RMC, VTG<br>OSP (One Socket Protocol)                                                                                |
| SBAS Support                 | WAAS, EGNOS, MSAS, GAGAN                                                                                                                                                |
| Dynamics                     | <4g                                                                                                                                                                     |
| Power Consumption            | 29mA/average tracking                                                                                                                                                   |

\* Note. According to IC Spec

### Windows Platform support

Windows XP, Vista, 7, 8 (Connection Manager for 7, 8)

RIL for Pocket PC and Smartphone -

Windows Mobile 6, Windows CE 6,  
Windows Embedded Compact 7, and  
Windows Embedded Compact 2013

### Linux Platform support

Compatible with standard USB kernel drivers

### Mac OS/X Platform support

### Android Platform support

From Android 2.1 up to latest 5.1 and keeps updating

### Electrical Data

|                                     |                                                                                                                 |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Power Supply                        | 3.3 ± 0.3 V (VCC)                                                                                               |
| Power Consumption                   | (For WW-3550, w/o GPS)                                                                                          |
| Airplane mode                       | 55 mA                                                                                                           |
| Full function mode <sup>&amp;</sup> | 3G/2100MHz, RSSI -87 dBm:<br>Max. 350mA, Average 230mA<br>2G/900MHz, RSSI -89 dBm:<br>Max. 480mA, Average 270mA |

<sup>&</sup> Measurement during data communication, values depend on cellular environment, antenna efficiency etc.

### Environmental Data

|                             |                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------|
| EHS6 board temperature/WWAN | -40 ~ 85°C <sup>+</sup> :<br>-30 ~ 85°C <sup>+</sup> (fully functional)<br>-40 ~ -30°C (extended) |
| Operating temperature/GNSS  | -40 ~ 85°C                                                                                        |

<sup>\*</sup> Occasional deviations from spec may occur

<sup>+</sup> Airflow: min. 1 m/s

### Mechanical Data (mm) - (full-mini card)

30 x 50.9 x 4.4 (w/o SIM holder)

30 x 50.9 x 4.65 (w/ SIM holder)

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## Weight

|          |       |          |       |
|----------|-------|----------|-------|
| WW-3550S | 8 g   | WW-3550U | 8.2 g |
| WW-3553S | 8.8 g | WW-3553U | 9 g   |

## 52-Pin Definition

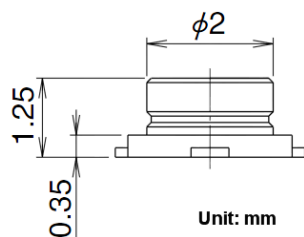
| Name                  | PINs                                            | Function                                             | I/O    |
|-----------------------|-------------------------------------------------|------------------------------------------------------|--------|
| VCC                   | 2,24,39,41,52                                   | 3.3V power supply,<br>Min 3.0V, Max 3.6V             | Input  |
| GND                   | 4,9,15,18,21,26,<br>27,29,34,35,37,<br>40,43,50 | Ground                                               | Input  |
| USB_DM                | 36                                              | USB data signal minus                                | I/O    |
| USB_DP                | 38                                              | USB data signal plus                                 | I/O    |
| LED                   | 42                                              | Open Drain active Low<br>WWAN status indicator;      | Output |
| SIM_VCC               | 8 <sup>1</sup>                                  | Power for SIM card                                   | Output |
| SIM_DATA              | 10 <sup>1</sup>                                 | SIM data signal                                      | I/O    |
| SIM_CLK               | 12 <sup>1</sup>                                 | SIM clock signal                                     | Output |
| SIM_RESET             | 14 <sup>1</sup>                                 | SIM reset signal                                     | Output |
| nWAKE                 | 1                                               | Open drain, active low<br>wakeup signal              | Output |
| nW_DISABLE            | 20                                              | Active low radio control<br>signal, internal pull-up | Input  |
| nRESET                | 22                                              | Active low, min 10ms<br>reset signal                 | Input  |
| PCM_CLK <sup>#</sup>  | 45                                              | PCM clock                                            | Output |
| PCM_RXD <sup>#</sup>  | 47                                              | PCM data into card                                   | Input  |
| PCM_TXD <sup>#</sup>  | 49                                              | PCM data out of card                                 | Output |
| PCM_SYNC <sup>#</sup> | 51                                              | PCM synchronization                                  | Output |
| NC                    | Remaining<br>pins                               | No connection                                        | -      |

<sup>1</sup> Leave these pins open if SIM card was built-in

<sup>#</sup> Reserved pins used, proprietary

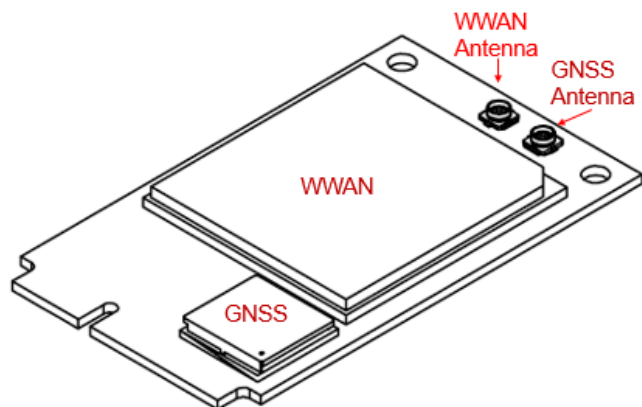
|    |          |            |    |
|----|----------|------------|----|
| 1  | nWAKE    | VCC        | 2  |
| 3  | NC       | GND        | 4  |
| 5  | NC       | NC         | 6  |
| 7  | NC       | SIM_VCC    | 8  |
| 9  | GND      | SIM_DATA   | 10 |
| 11 | NC       | SIM_CLK    | 12 |
| 13 | NC       | SIM_RESET  | 14 |
| 15 | GND      | NC         | 16 |
| 17 | NC       | GND        | 18 |
| 19 | NC       | nW_DISABLE | 20 |
| 21 | GND      | nRESET     | 22 |
| 23 | NC       | VCC        | 24 |
| 25 | NC       | GND        | 26 |
| 27 | GND      | NC         | 28 |
| 29 | GND      | NC         | 30 |
| 31 | NC       | NC         | 32 |
| 33 | NC       | GND        | 34 |
| 35 | GND      | USB_DM     | 36 |
| 37 | GND      | USB_DP     | 38 |
| 39 | VCC      | GND        | 40 |
| 41 | VCC      | LED        | 42 |
| 43 | GND      | NC         | 44 |
| 45 | PCM_CLK  | NC         | 46 |
| 47 | PCM_RXD  | NC         | 48 |
| 49 | PCM_TXD  | GND        | 50 |
| 51 | PCM_SYNC | VCC        | 52 |

## RF Connector: I-PEX Receptacle



Note. Corresponding plug cable: diameter of 1.13mm

## Ordering Information



WW-355xy, where x = 0, 3 as shown below

|         |                                           |
|---------|-------------------------------------------|
| WW-3550 | Without GNSS                              |
| WW-3553 | With GNSS, default without backup battery |

WW-355xy, where y = S, U as shown below

| Feature \ Model | S | U |
|-----------------|---|---|
| SIM Card Holder | - | Y |

E.g. WW-3553U: with GNSS and SIM holder

WW-3550U is the default standard product

\* Connection Manager for PC Windows available

\*This document is subject to change without notice.