OPTION Wireless Technology
Embedded Modules
2011 portfolio overview
PCI Express MiniCard and LGA modules

High-speed multi-mode 3G

> A wealth of connectivity
  > High-speed data connectivity: 14.4Mbps downlink / 5.76Mbps uplink (HSPA)
  > Highly-sensitive GPS
  > Optional WiFi connectivity (GTM67x)
  > Optional PCM voice capability (GTM66x, GTM67x, GTM60x)
  > Optional SIM card holder and microSD card holder (GTM66x and GTM67x)

> Worldwide 2G/3G coverage
  > Quad-band GSM/GPRS/EDGE
  > Quad/penta-band HSDPA/HSUPA
  > Optional dual-band EV-DO (GTM6x9)

<table>
<thead>
<tr>
<th></th>
<th>Full Size / Half Size PCIe</th>
<th>Full Size PCIe</th>
<th>LGA</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Wifi</td>
<td></td>
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<tr>
<td>HSPA</td>
<td>GTM671W</td>
<td>GTM671W</td>
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<tr>
<td>HSPA/EV-DO</td>
<td>GTM679W</td>
<td>GTM679W</td>
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<tr>
<td>No Wifi</td>
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<tr>
<td>HSPA</td>
<td>GTM661W</td>
<td>GTM661W</td>
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<tr>
<td>HSPA/EV-DO</td>
<td>GTM669W</td>
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</table>

GTM681W

GTM601W

GTM689W

GTM609W
**Embedded Modules**

**PCle MiniCard – 3G+WiFi**

- **Half Size**
  - GTM671W (MO6712), GTM670W (MO6792)

- **Full Size**
  - GTM671WF (MO6718), GTM670WF (MO6798)

- **Full with SIM/µSD**
  - GTM671WFS (MO6717), GTM679WFS (MO6797)

**PCle MiniCard – 3G**

- **Half Size**
  - GTM661W (MO6612), GTM669W (MO6692)

- **Full Size**
  - GTM661WF (MO6618), GTM669WF (MO6698)

- **Full with SIM/µSD**
  - GTM661WFS (MO6617), GTM669WFS (MO6697)

By adding a WiFi component on the 3G PCIe minicard, only one PCIe minicard slot is needed to offer both WiFi and 3G connectivity to your device, hence lowering overall device cost. This module is available in half size form factor or full size form factor. For the full-size module, an optional SIM card holder and micro SD card holder can be mounted which allows an all-in-one connectivity solution on a single PCIe card.

**Hardware specifications**

<table>
<thead>
<tr>
<th>Physical specifications</th>
<th>Current consumption</th>
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</thead>
<tbody>
<tr>
<td>PCI Express Mini Card form factor, version 1.2 type H1 (half size) or type F1 (full size)</td>
<td><strong>Typical talk current (GPS off)</strong></td>
</tr>
<tr>
<td>Dimensions: 26.8 x 51 x 30.4 x 2.2 mm</td>
<td>&gt; 3G: 630mA (WCDMA 2100@ 24dBm), 250mA (voice 2100)</td>
</tr>
<tr>
<td>Weight: 910 g</td>
<td>&gt; 2G: 300mA (EDGE 850 PCL8), 230mA (GSM voice 850@ 23dBm)</td>
</tr>
<tr>
<td>Operating temperature: -10°C to +55°C</td>
<td><strong>Typical standby current (GPS off)</strong></td>
</tr>
<tr>
<td>Operational humidity range: 10% - 90% RH non-condensing</td>
<td>&gt; 3G: 1.7mA</td>
</tr>
<tr>
<td>Storage temperature: -40°C to +85°C</td>
<td>&gt; 2G: 3mA</td>
</tr>
<tr>
<td>Storage humidity range: 5% - 95% RH non-condensing</td>
<td><strong>Typical GPS delta current 30mA</strong></td>
</tr>
</tbody>
</table>

**Interfaces**

- 52-pin edge connector with USB2.0 high-speed
- DC power supply 3.3 V +/- 9%
- USIM/SIM connection – Class B and Class C
- W_DISABLE, WAKE, LED WWAN, LED_WLAN, COEX signals
- PCM voice signal pins
- WiFi signal pins (PCI interface) GTM67x only
- Primary and Diversity/GPS antenna, U.FL coax connector
- Primary and Diversity WiFi antenna, U.FL coax connector (GTM67x only)
- Optional SIM card holder (antenna side) and µSD card holder (back side) GTM67xxWFS only

**Max. Connectivity speeds**

| Power Class 4 (2 W, 33 dBm) for GSM/GPRS 850/900 MHz bands |
| Power Class 1 (1 W, 30 dBm) for GSM/GPRS 1800/1900 MHz bands |
| Power Class E2 (0.5 W, 27 dBm) for EDGE 850/900 MHz bands |
| Power Class E2 (0.4 W, 26 dBm) for EDGE 1800/1900 MHz bands |
| Power Class 3 (0.25 W, 24 dBm) for UMTS 850/900/1900/2100 MHz bands |
| Power Class 3 (0.25 W, 24 dBm) for 1xRTT & EV-DO |
| Power 32 mW (15 dBm) for WiFi (GTM671/GTM679 only) |

**Max. RF output power**

| Typical RF conducted sensitivity |
| EDGE (850/900/1800/1900): -104.5/-107.5/-104.5/-102.5 dBm |
| WCDMA (B1/B2/B4/B5/B8): -110/-110.5/-111/-112.2/-112 dBm |
| 1x (BC0/BC1): -109.5/-108 dBm |
| EV-DO (BC0/BC1): -111/-110 dBm |

**GPS: gpsOne Gen8**

- Standalone GPS, Assisted GPS, gps OneXTRA™, WiFi PS
- Wideband GPS processing (20MHz)
- for improved measurement accuracy
- Tracking sensitivity -154 dBm (typical)
- TTF: strong signal <130 dBm) 32s, weak signal 50s

**Voice support**

- Basic Telephony and Supplementary services
- Voicoder support for 3GPP and 3GPP2 (Narrowband and Wideband)
- Enhanced Echo Cancellation and Noise Suppression
- Fluence Enhanced Voice Features
- Support for Voice Calibration & Tuning

**Supported frequency bands**

| GSM/GPRS/EDGE: 850/900/1800/1900 MHz |
| UMTS/HSDPA/HSUPA: 800-850/900/1900/2100 MHz (B1, B2, B5, B6, B8) |
| CDMA 1xRTT/EV-DO revA/EV-DO revB (GTM669/679 only): 800/1900 (BC0, BC1) |
This is the original Gobi™ 3000 design that was made by Qualcomm. Option is a Gobi licensee and can sell this module to its customers, customized and bundled with optional software (such as a connection manager or a RIL) and/or service offerings (such as specific regulatory or operator certifications).

### Hardware specifications

#### Physical specifications
- PCI Express Mini Card form factor, v 1.2, type F2 (full size, single sided)
- Dimensions: 51 mm x 30 mm x 3.1 mm
- Weight: 9 g
- Operating temperature: -30°C to +70°C
- Storage temperature: -40°C to +85°C

#### Interfaces
- 52-pin edge connector with
  - USB2.0 high-speed
  - DC power supply: 3.2-3.6 V (CDMA/WCDMA)
  - 3.0-3.6 V (GSM)
- USIM/SIM connection – Class B and Class C
- W_DISABLE, WAKE and LED_WWAN signals
- Primary and Diversity/GPS antenna, U.FL coax connector (primary on bottom)

#### Max. Connectivity speeds
See PCIe MiniCard Half Size, except for:
- GPRS: 85.6 Kbps DL/42.8 Kbps UL (class 10)
- EDGE: 236.8 Kbps DL/118.4 Kbps UL (class 10)

#### Memory Configuration
- 128 MB NAND + 32 MB DDR MCP Memory, stores up to 6 FW images

#### Supported frequency bands
- GSM/GPRS/EDGE: 850/900/1800/1900 MHz
- UMTS/HSDPA/HSUPA: 800-850/900/1900/2100 MHz and AWS band (1700/2100 MHz) (B1, B2, B4, B5, B6, B8)
- CDMA 1xRTT/EV-DO rev0/EV-DO revA (GTM689 only): 800/1900 (BC0, BC1)

#### Current consumption
- Typical talk current (GPS off):
  - 3G: 700mA (WCDMA 2100@ 23 dBm)
  - 2G: 325mA (EDGE 850 PCL8)
- Typical standby current (GPS off):
  - 3G: 1.7mA
  - 2G: 3mA
- Typical average GPS current (radio off) 80mA

#### Hardware description
See PCIe MiniCard Half Size

#### Max. RF output power
See PCIe MiniCard Half Size

#### Typical RF conducted sensitivity
See PCIe MiniCard Half Size

#### GPS: gpsOne Gen8
See PCIe MiniCard Half Size

Due to its ultra-thin form factor and excellent heat dissipation characteristics this is the perfect module for integration in small consumer electronics devices or broadband M2M applications. The GPS, voice and optional EV-DO capabilities give this module a unique position. The new and improved footprint facilitates soldering.

### LGA

#### Physical specifications
- MCM in LGA package
- Dimensions: 31.8 mm x 26.8 mm x 2 mm
- Weight: 5 g
- Operating temperature: -30°C to +80°C
- Storage temperature: -40°C to +85°C

#### Interface
- LGA with 70 signal contact pads
- 25 ground/heat dissipation pads
- DC power supply 3.2-4.2V (single cell battery)
- USIM/SIM connection – Class B and Class C
- W_DISABLE, WAKE and LED_WWAN signals
- Primary, diversity and GPS antenna contact pads
- 4 x 4-Wire for UART/UI/TP/PC/CM/FC/IP communication

#### Max. Connectivity speeds
See PCIe MiniCard Half Size, except for AT&T certified module:
- GPRS: 85.6 Kbps DL/42.8 Kbps UL (class 10)
- EDGE: 236.8 Kbps DL/118.4 Kbps UL (class 10)

#### Memory Configuration
See PCIe MiniCard Half Size

#### Supported frequency bands
- GSM/GPRS/EDGE: 850/900/1800/1900 MHz
- UMTS/HSDPA/HSUPA: 800-850/900/1900/2100 MHz
- CDMA 1xRTT/EV-DO rev0/EV-DO revA (GTM69 only): 800/1900 (BC0, BC1)

#### Current consumption
- Typical talk current (GPS off):
  - 3G: 630mA (WCDMA 2100@ 24dBm), 250mA (voice 2100)
  - 2G: 300mA (EDGE 850 PCL8), 230 mA (GSM voice 850@ 23dBm)
- Typical standby current (GPS off):
  - 3G: 1.7mA
  - 2G: 3mA
- Typical GPS delta current 30mA

#### Hardware description
See PCIe MiniCard Half Size

#### Max. RF output power
See PCIe MiniCard Half Size

#### Typical RF conducted sensitivity
See PCIe MiniCard Half Size

#### GPS: gpsOne Gen8 with GNSS
See PCIe MiniCard Half Size

Additionally: Concurrent GPS/Galileo operation with 5SSVs

#### Voice support
See PCIe MiniCard Half Size
Software

From embedded firmware to a full-featured connection manager, Option supports the entire software chain for embedded modules. Being a Qualcomm and Gobi licensee, Option has full access to the firmware that is running on the Qualcomm baseband processor. This allows Option to make customizations for its customers to support certain features or operator requirements. Drivers are available for the most popular operating systems. For some platforms such as Android™ and Windows® Mobile, a RIL (Radio Interface Layer) can be provided. For other platforms Option can deliver a SDK or a customizable connection manager.

Optional feature packs are available, like:
> “MyCloud”; cloud computing, delivering back-up, synchronisation and file sharing functionalities.
> uCAN® Control; a mobil data consumption and warning policy solution for end-users.

Supported operating systems:

Windows® XP 32 bit
Windows® Vista 32/64 bit
Windows® 7 32/64 bit (Mobile Broadband API, Sensor and Location API)
Linux® (kernel version 2.6.26 and higher)

Android™: RIL, audio HAL, GPS HAL
Google Chrome™
Windows CE/Mobile : RIL, GPS driver
MeeGo™

Services

Option® offers a complete portfolio of services ranging from 3G module/device design, certification, manufacturing and integration up to certification of devices with embedded modules. These services facilitate wireless 3G integration in a wide range of mobile broadband enabled devices such as the traditional laptops and netbooks, but also e-readers, MID’s, portable navigation devices and cameras.

Some of the services are standard and offered free of charge when purchasing a sufficient amount of modules from Option. Other services can be offered against a certain fee.

For more detailed information about our embedded modules services, please contact your Option account manager or services@option.com.
For more sales information, please contact sales@option.com.