

Supply voltage range	DC 10-18VDC (12VDC nominal)
Operating temperature	-30 to +80 degrees C
Operating relative humidity	10-90%
Mechanical dimensions	91x104x99mm
Carton dimensions	203x160x110mm

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## Companion Products

The following companion products are currently being offered by Tibbo:

- [GA1000](#) (Wi-Fi add-on module)
- [RJ203](#) (jack/magnetics module)

## GA1000



### Introduction

The GA1000 Wi-Fi add-on module further expands the scope of potential applications for Tibbo BASIC-programmable modules by adding 802.11b/g communications capability to the already powerful hardware mix. The GA1000 can be used with these Tibbo devices: [EM1000](#), [EM1202](#), [EM1206](#), [EM500](#).

The module utilizes an [SPI interface](#) and only requires [five GPIOs](#) to control. This can be reduced to four if two NAND gates are used to generate reset signal. On the EM500, the number is even down to three lines! For more information, see [Connecting GA1000 to Tibbo Devices](#).

The GA1000 is fully supported by TIDE software (see "TIDE and Tibbo BASIC Manual", wln. object). For convenient testing and evaluation Tibbo offers [EM1206EV](#), [EM1000TEV](#) and [EM1000EV](#) development systems.

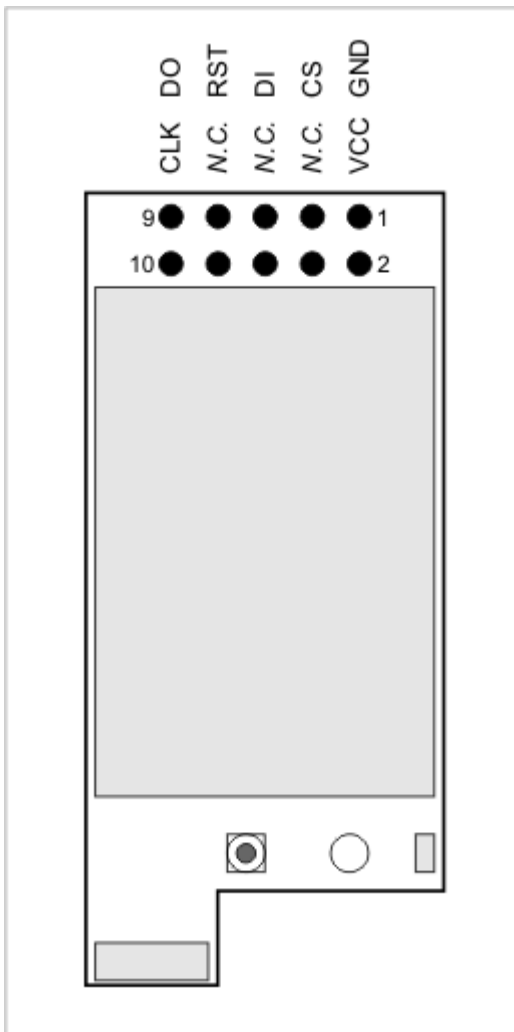
Please note that the GA1000 is a slave device and cannot be used on its own. This add-on will only work together a BASIC-programmable Tibbo module.

### Hardware features

- Superior upgrade to the now obsolete WA1000 module.

- Implements 802.11b/g Wi-Fi standard.
- Compatible with [EM1000](#), [EM1202](#), [EM1206](#), and [EM500](#) modules.
- Requires [3-5 GPIO lines](#) to control.
- Chip antenna onboard, coaxial connector for external antenna.
- [Red status LED](#) for scan/link indication.
- Max. power: 280 mA (max) @ 3.3V.
- Dimensions: 42.0x19.0x6.7mm.

## I/O Pin Assignment and Pin Functions



### I/O pin assignment

Pin #	Function	Description
1	GND	System ground.
2	VCC	Positive power input, 3.3V nominal, +/- 5%.
3	CS	Chip select, active LOW (input*).

4	N.C.	<i>No connection.</i>
5	DI	SPI port, data in (input*, must be connected to DO of Tibbo module).
6	N.C.	<i>No connection.</i>
7	RST	Reset, active LOW (input*).
8	N.C.	<i>No connection.</i>
9	DO	SPI port, data out (output*, must be connected to DI of Tibbo module).
10	CLK	SPI port, clock (input*).

\* Of the GA1000.

## Connecting GA1000 to Tibbo Devices

### GA1000 interface

The GA1000 communicates with Tibbo devices through an [SPI interface](#). Your device will control the GA1000 through five GPIO lines:

- CS -- SPI bus, chip select (active low);
- CLK -- SPI bus, clock;
- DI -- SPI bus, data in (must be connected to the GA1000's DO);
- DO -- SPI bus, data out (must be connected to the GA1000's DI);
- RST -- reset (active low). This line can be eliminated -- see below for details.

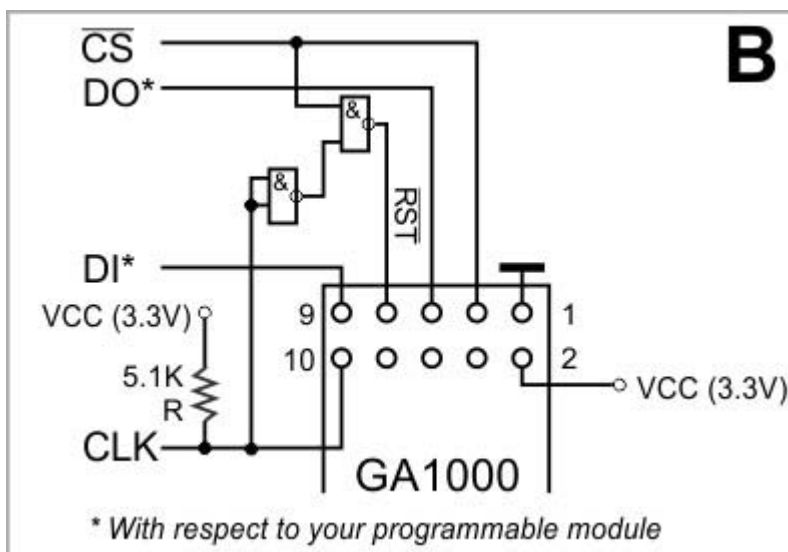
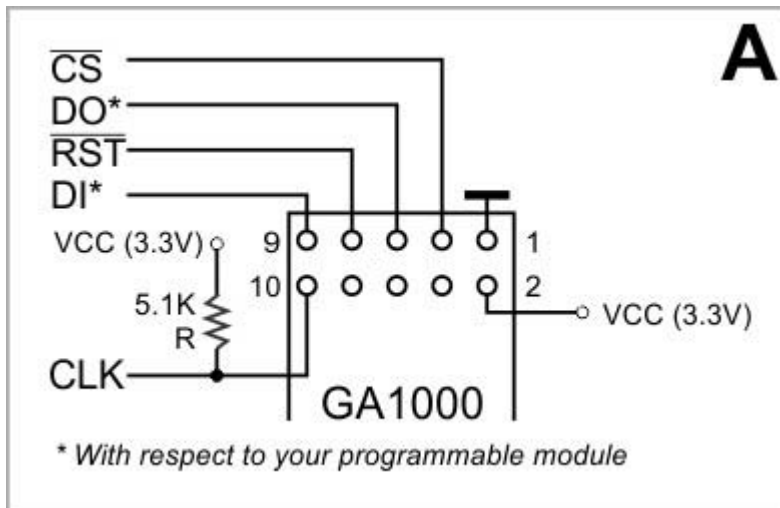


On the [EM1000](#), [EM1202](#), and [EM1206](#), do not forget to configure CS, CLK, DO, and RST as outputs. DI must be configured as input. The wln. object won't do this automatically. GPIO configuration is not necessary on the [EM500](#), whose lines are bidirectional.

### Providing hardware reset

The wln. object directly controls CS, CLK, DI, and DO lines. Your application, however, must take care of the proper hardware reset for the GA1000. There are two methods for doing this:

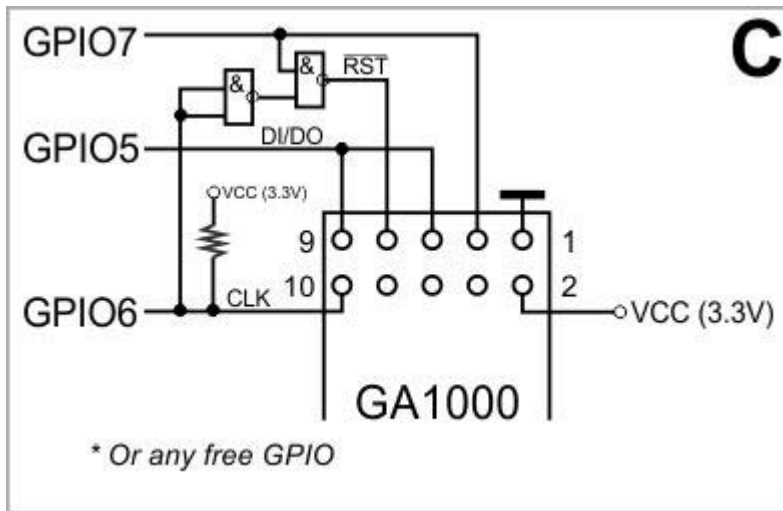
- Use a dedicated GPIO line to act as the RST line of the GA1000 interface (shown on diagram A below).
- Use 2 NAND gates to combine CS and CLK signals and produce the reset signal for the GA1000 (shown on diagram B). This approach takes advantage of the fact that during SPI communications, CLK line will never be LOW while the CS line is HIGH. Schematic diagram on figure B generates reset when CS=HIGH and CLK=LOW. This way you save one GPIO line of your programmable module.



Tibbo devices differ in whether the CS, CLK, DI, and DO lines are remappable. On the [EM1000](#), [EM1202](#), and [EM1206](#), you can choose any set of GPIOs to control the GA1000. On the [EM500](#) where remapping isn't provided, you just have to use "prescribed" GPIO lines.

#### Special case -- the EM500

Diagram C shows the recommended way of connecting the GA1000 to the [EM500](#) module. GPIO lines are a precious commodity on the EM500 -- there are only eight of them available. As seen on the diagram C, you can get away with using only three lines to control the GA1000 (against the standard five lines). One line is saved by producing the reset out of CS and CLK lines. The second line is saved because EM500's bidirectional GPIOs allow interconnecting DI and DO. The EM500 does not allow remapping of GA1000 lines, so GPIO line assignment shown below cannot be changed.



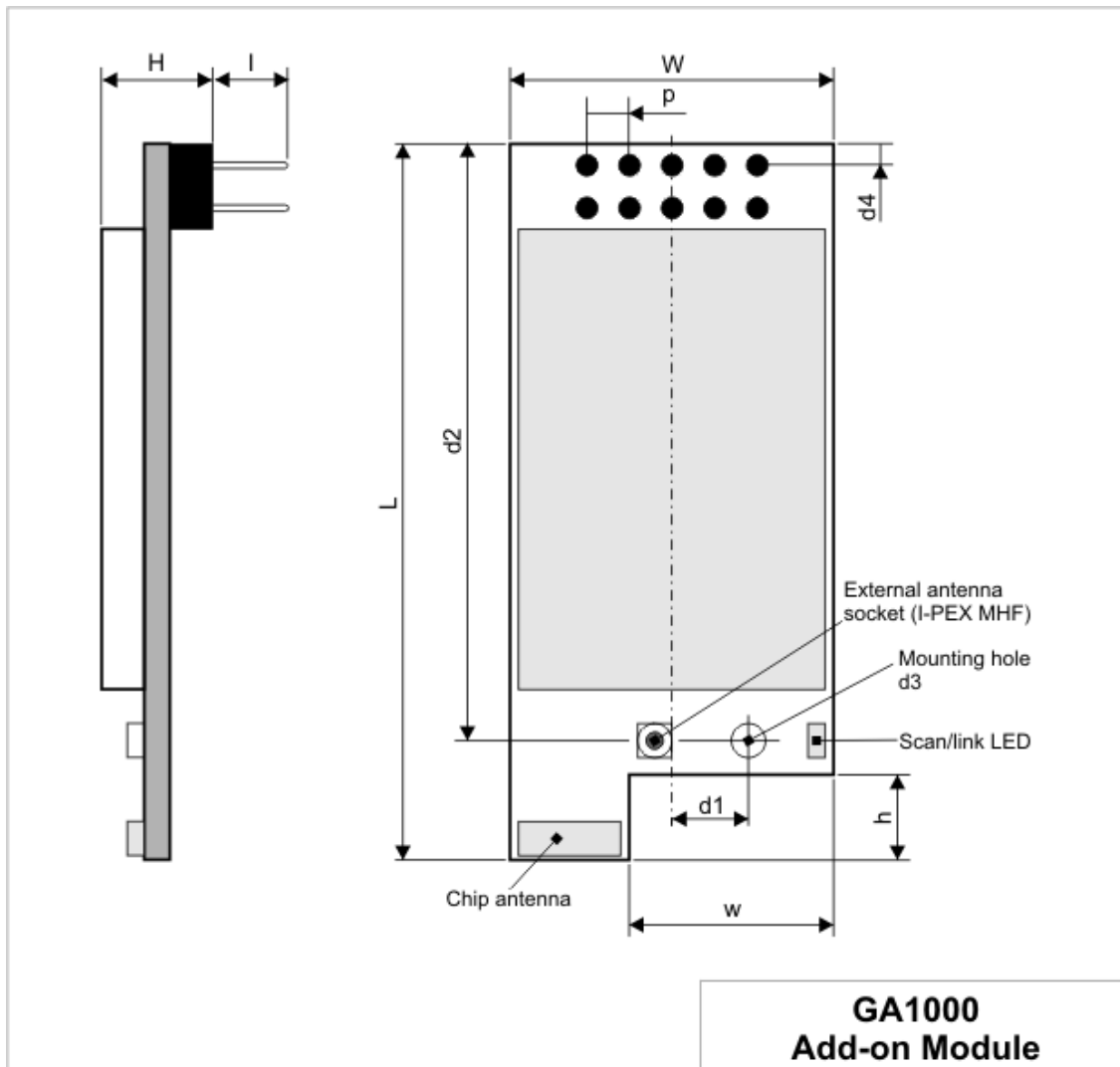
## Status LED

The GA1000 has a single red status LED:

- During scanning (see `wln.scan*`), the LED blinks.
- When the GA1000 is associated with an access point (see `wln.associate*`), the LED is ON.
- When the GA1000 is in ad-hoc mode and has another peer connected to it, the LED is ON as well.
- In all other cases, the LED is off.

*\*See "TIDE and Tibbo BASIC Manual", .wln object documentation.*

## Mechanical Dimensions



L	Max.	42.1	Module length.
W	Max.	19.1	Module width.
H	Max.	6.7	Module height.
I	Min.	4.0	Pin length.
w	Min	11.7	Horizontal cutout dimension.
h	Min.	4.5	Vertical cutout dimension.
d1	Aver .	4.5	Horizontal distance from the centerline of the module to the center of the mounting hole.
d2	Aver .	35.0	Vertical distance from the edge of the board to the center of the mounting hole.
d3	Min.	2.1	Mounting hole diameter
d4	Aver .	2.5	Vertical distance from the edge of the board to the center of the first row of pins of the connector
p	Aver .	2.54	Pin pitch

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## Ordering Info and Specifications

The GA1000 device is only available in a single configuration and can be order as "GA1000".

A set consisting of the [EM1000](#) and GA1000 modules can also be ordered using the "EM1000G" ordering code (see [Specifications and Ordering Info](#) for the EM1000). The GA1000 also works with [EM1202](#), [EM1206](#), and [EM500](#) devices.

### Specifications

Wireless interface	802.11b/g
Interface type	SPI
Nominal power supply voltage (VCC pin)	DC 3.3V, +/- 5%
Operating current (VCC pin)	Post-reset, before boot: ~65mA; Fully functional, no data transmission: ~200mA; During data transmission: ~280mA.
Operating temperature	-20 to +70 degrees C
Operating relative humidity	10-90%
Mechanical dimensions (excl. leads)	42x19x6.7mm
Packaging	Tray, 30 modules/tray.

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## RJ203 Jack/Magnetics Module

Patent pending



The RJ203 is an "Ethernet front-end" module that contains 10/100BaseT Ethernet magnetics and a standard RJ45 jack. Module's magnetics are designed to work with Davicom's DM9000B Ethernet controller.

Unique patent-pending design of the module minimizes module's footprint and allows you to put other components required on your host board under the RJ203,