Janus External GPS Kit

Supplement to the Janus Communications Controller User Guide

Janus External GPS Kit: Supplement to the Janus Communications Controller User Guide

The information in this document has been carefully reviewed and is believed to be reliable. Nanometrics, Inc. reserves the right to make changes at any time without notice to improve the reliability and function of the product.

Nanometrics, Inc.
250 Herzberg Road
Kanata, Ontario, Canada K2K 2A1
Tel (613) 592-6776
Fax (613) 592-5929
email info@nanometrics.ca

Part number	Revision	Date	Description
14327	1.0	2002-08-13	Initial release
	2.0	2002-09-06	Picture added

General description

The Janus External GPS Kit provides an external GPS receiver for a Janus Communications Controller. It works with a Janus which is prepared accordingly, i.e. modified to be connected to the kit.

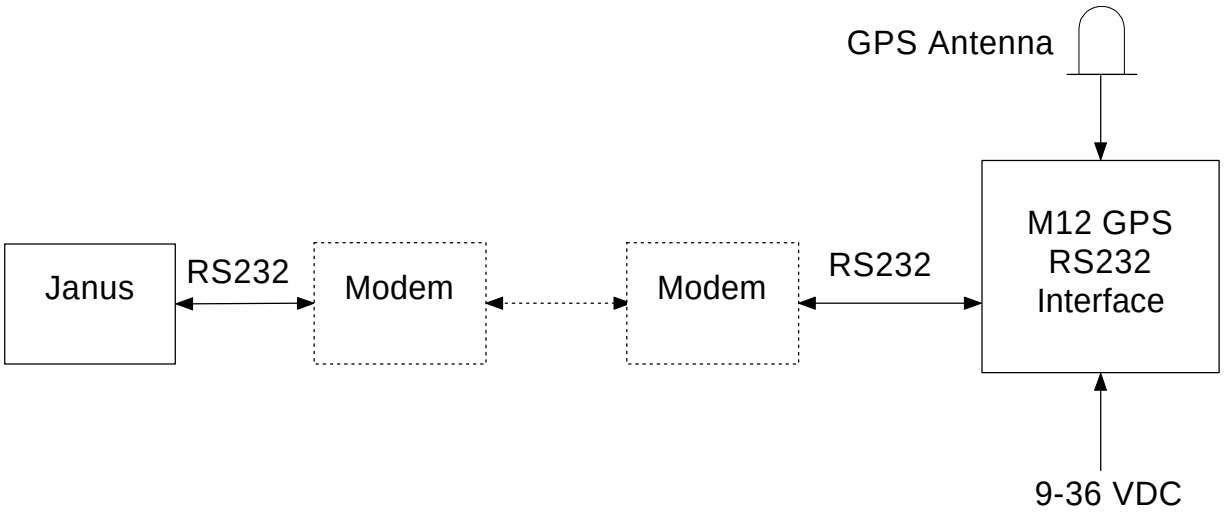
Contents of the kit

The kit contains the following:

- M12 GPS Interface Card (Nanometrics Part Number 14312)
- Power connector (P/N CON0136) with crimp terminals
- Signal connector (P/N CON0170) with crimp terminals
- GPS antenna transition cable (P/N 13168)
- Janus Comms connector (P/N CON0907)

Block diagram

The following block diagram shows how the main elements of the kit are connected to each other and to Janus:



The GPS Interface needs a 9 - 36 V DC input voltage and a GPS antenna connected to it. Output signals are generated by the GPS interface for Janus and input signals are expected from Janus.

These signals can travel a variety of ways. In the simplest case, the GPS Interface and Janus can be connected directly if the cable used is sufficiently short to carry RS232 signals. As the diagram indicates, various optional modems can also be used if they are able to convert and transmit the RS232 data.

Modems or other data transmission devices/equipment are not supplied in this kit, they are to be obtained by the user. Details of these signals are discussed in later chapters such that an applicable data transmission medium can be properly designed.

Janus, modified for external GPS

In order to accommodate the external GPS, the Janus units are modified. One of the most important changes is that the GPS engine is removed from inside Janus. Other changes include signal routing and connector modifications. The GPS antenna connector located on the front panel is now internally disconnected and not functional. The Comms Connector pinout is modified to contain the signals to and from the external GPS receiver. This also means that previously available serial ports are now replaced by the new signals.

Table 1 shows the pin assignment of these new signals, together with their ground pin. Use these pins when connecting Janus to the modem or data transmission lines of your choice that carry the signals to and from the GPS interface. All these signals are RS232 compatible. The kit contains connector CON0907 that can be used for this purpose.

Pin	Function
A	Ground
G	1PPS in
H	GPS power switch signal out
M	Tx to GPS
N	Rx from GPS

Table 1. New signals on the Comms Connector

The Janus manual provides the complete pinout of the Comms Connector for the regular Janus (without the external GPS option). This is now modified, and the consolidated pinout is shown in Table 2.

.

Pin	Name	Function
A	P1_DGND	P1 digital ground; common to pin U
B	SOH_AGND	SOH analog ground; common to pin S
C	SOH3	State-of-health channel 3
D	SOH1	State-of-health channel 1
E	TEMP	External temperature sensor
F	TEMP_+5V	+5V, fused, for external temperature sensor
G	TSCFG_Rx	1 PPS signal in
H	TSCFG_Tx	GPS power supply switch signal out
J	P2Rx	Serial port 2 receive
K	P2Tx	Serial port 2 transmit
L	P3Tx	Comms controller configuration port transmit
M	P1Tx	GPS port transmit
N	P1Rx	GPS port receive
P	PWRON	Internal +3 V, not separately fused. Use only to check internal voltage
R	SOH2	State-of-health channel 2
S	TEMP_AGND	Temperature sensor analog ground; common to pin B
T	TSCFGGND	Digital ground; may be either NC, or common to pins A and U
U	P2_DGND	P2, P3 digital ground; common to pin A
V	P3Rx	Comms controller configuration port receive

Table 2. Comms Connector pinout

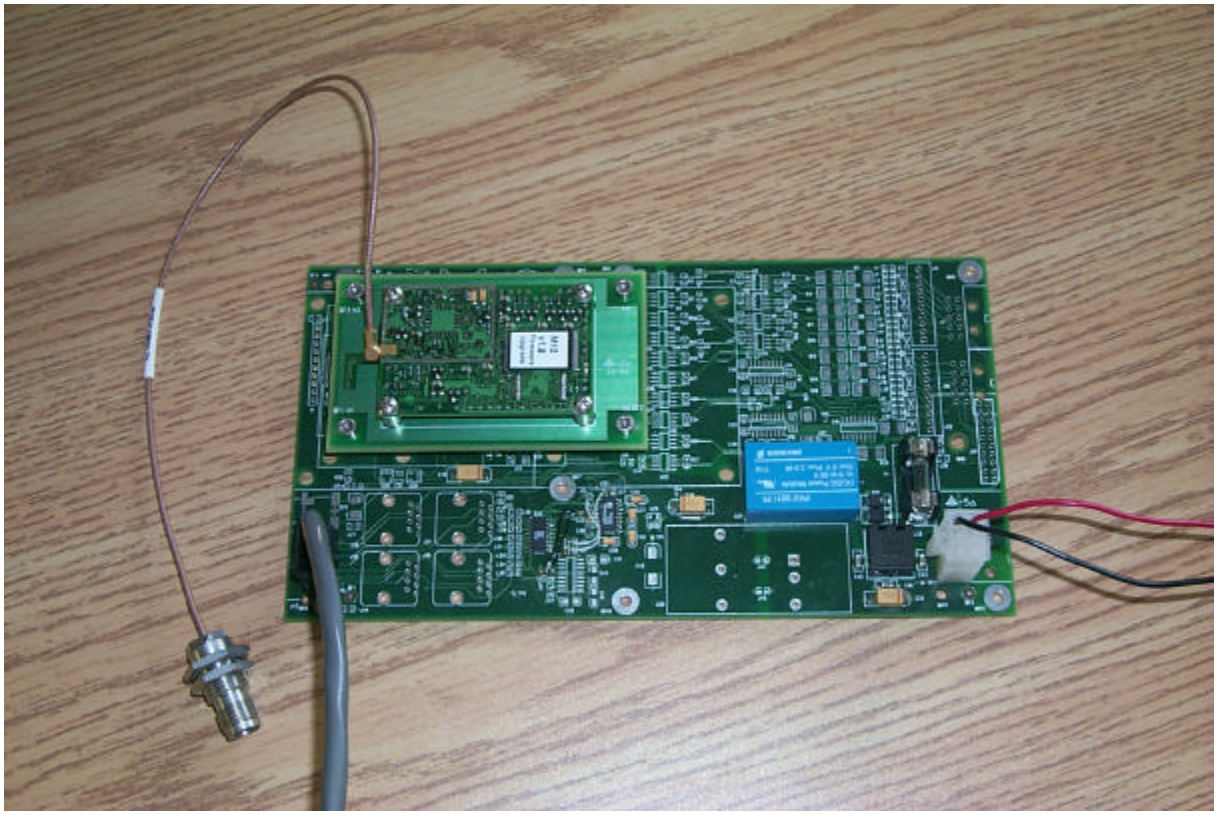
A quick comparison between this pinout table and the original one in the manual reveals that the following serial ports have been eliminated to give way to the external GPS signals:

- Serial Port 1
- TimeServer configuration port

Serial Port 2 is still available for (seismic) data routing.

M12 GPS RS232 Interface

The M12 GPS RS232 Interface connects the GPS engine to the modem or data transmission lines that carry the GPS signals to and from Janus. It is implemented on the Nanometrics Universal Interface Board and is part of the kit, together with the necessary connectors.



Picture 1.: M12 GPS RS232 Interface

Power connector

The power connector pinout is shown in Table 3.

Pin	Function
1	9 to 36 V DC in (+)
4	Power return

Table 3. Power Connector (J36) pinout

The input voltage can vary between 9 and 36 V. Built-in regulators provide the appropriate voltages to the GPS engine and its antenna.

Signal Connector

The signal connector carries the GPS signals already discussed in previous chapters. Use connector CON0170 included in the kit. The pinout is shown in Table 4.

Pin	Function
4	1PPS out
5	Ground
8	GPS Tx
9	GPS Rx
10	GPS power switch signal in

Table 4. Signal Connector (J43) pinout

As mentioned before, all signals are RS232 compatible. The 1PPS signal is typically 200 ms wide. Its rising edge corresponds to the 1 Hz GPS time mark.

GPS antenna connection

The GPS receiver should be connected to an applicable active GPS antenna. For this, the RF cable supplied in the kit (Nanometrics part number 13168) can be used. The cable is built with a TNC connector which can be mounted easily if the GPS Interface will be housed in a box. Alternatively, a custom made cable can also be used that has the necessary MMCX plug (50 ohm) to connect to the GPS engine.

The antenna voltage supplied on the connector is +5 V.

Data transmission between Janus and the GPS Interface

The user is free to choose any data transmission medium or method that is able to carry the two inbound and two outbound signals that are output by Janus and the GPS interface as RS232 data. From simple wire connection to fiber optic modems, a number of ways to transmit the signals can be envisioned, with only a few requirements to satisfy.

An obvious requirement is that the signals should not change polarity while travelling through the user-supplied medium. This is especially important for the 1PPS time mark because swapping the rising and falling edges on this signal would lead to serious timing errors in Janus.

The GPS Rx/Tx data and the power switch signal have high tolerance against delays. The 1PPS GPS time mark however requires some attention. Any delay on the transmission line directly results in a corresponding delay in Janus' time frame. The tolerable error is application-dependent and should be specified by the user. The tolerable jitter on the time signal is determined by the time-keeping algorithm in Janus and is a few hundred nanoseconds.