



Unigen Corp. Wireless Module Products

**PAN Radio Modules
Demonstration & Evaluation Kit
UGWxxxxxxxxx (Part Number)**

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REVISION HISTORY

Rev. No.	History	Issue Date	Remarks
0.1	Draft	Nov. 19, 2008	

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PRODUCT INTRODUCTION

Unigen's PAN is a completed UHF Radio Transceiver Module operating in the license-free ISM (Industrial, Scientific and Medical) bands. The PAN module are pre-tuned for 433MHz, 868MHz or 915MHz. These modules are based on Semtech's XE1203 transceivers. The PAN module offers high power, excellent sensitivity, wide band FSK and DSS encoding/decoding for robust long range communications.

The PAN demonstration and Evaluation kit will allow developers to setup a connection between two PAN modules by the use of a personal computer and send data across. The range and performance can be evaluated in real world conditions.

PAN DEMO KIT CONTENTS

The PAN kit should include the following items. If you are missing any items below, please contact Unigen Sales for replacements.

QTY	Item	Description
2	PAN Modules	PAN modules with interface adapter to the Vesta Motherboard
2	Vesta Motherboards	Vesta Motherboards interface the PAN modules with a PC via a serial interface and also supplies power to the module
2	Radio Antennas	SMA style pole antennas
2	Serial cables	Straight thru serial cables with opposite genders on the ends
6	AAA Batteries	Battery supply for powering the Vesta and Pan modules
2	Pan Module Plastic Stand-offs	Support stands for the module on top of Vesta
4	Vesta board Stand-offs	Support stands for the Vesta Motherboard

HARDWARE CONNECTION

- 1.) Insert the PAN module with carrier board onto the Vesta motherboard as seen on Figure 1.
- 2.) Insert batteries into the Vesta board.
- 3.) Connect the serial cable to a personal computer and the Vesta board as seen on Figure 2.
- 4.) Attach antenna to the PAN module

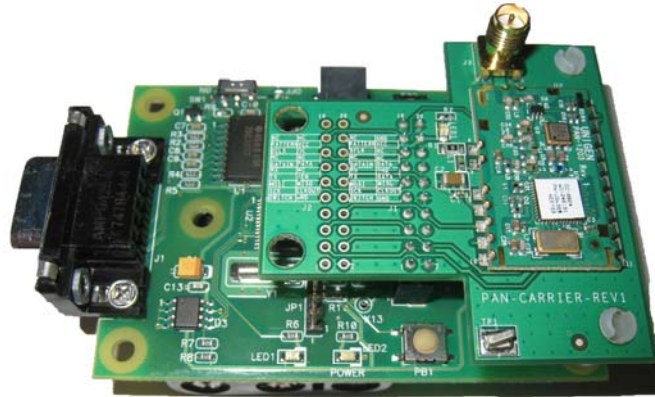


Figure 1

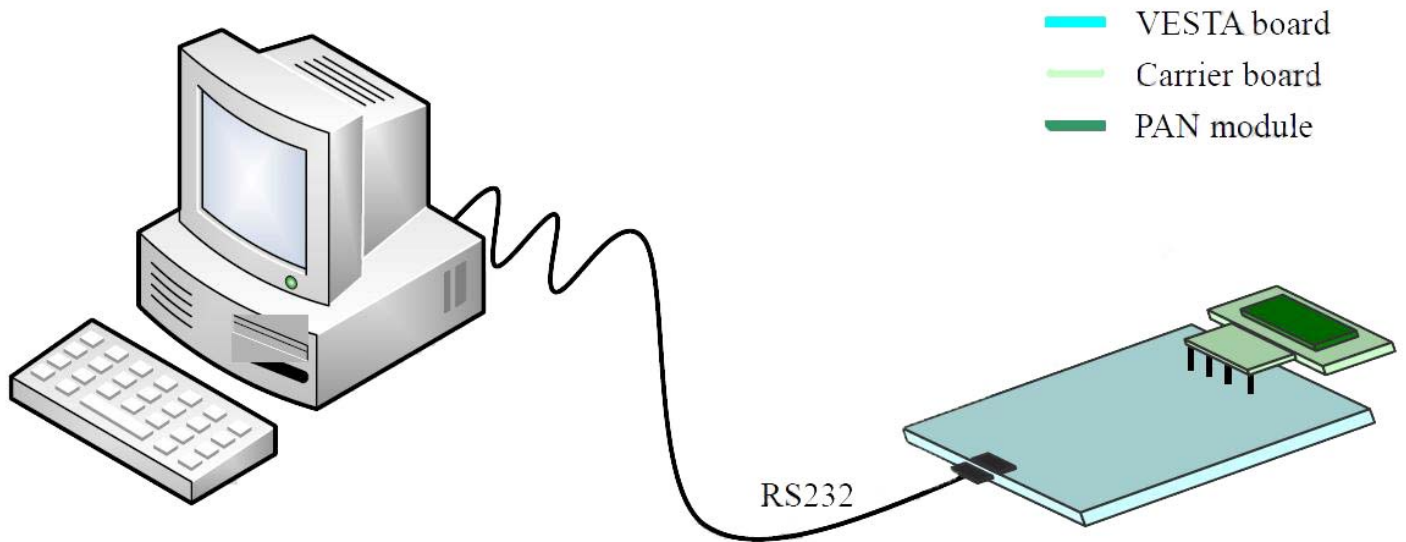


Figure 2

DEMONSTRATION KIT BLOCK DIAGRAM

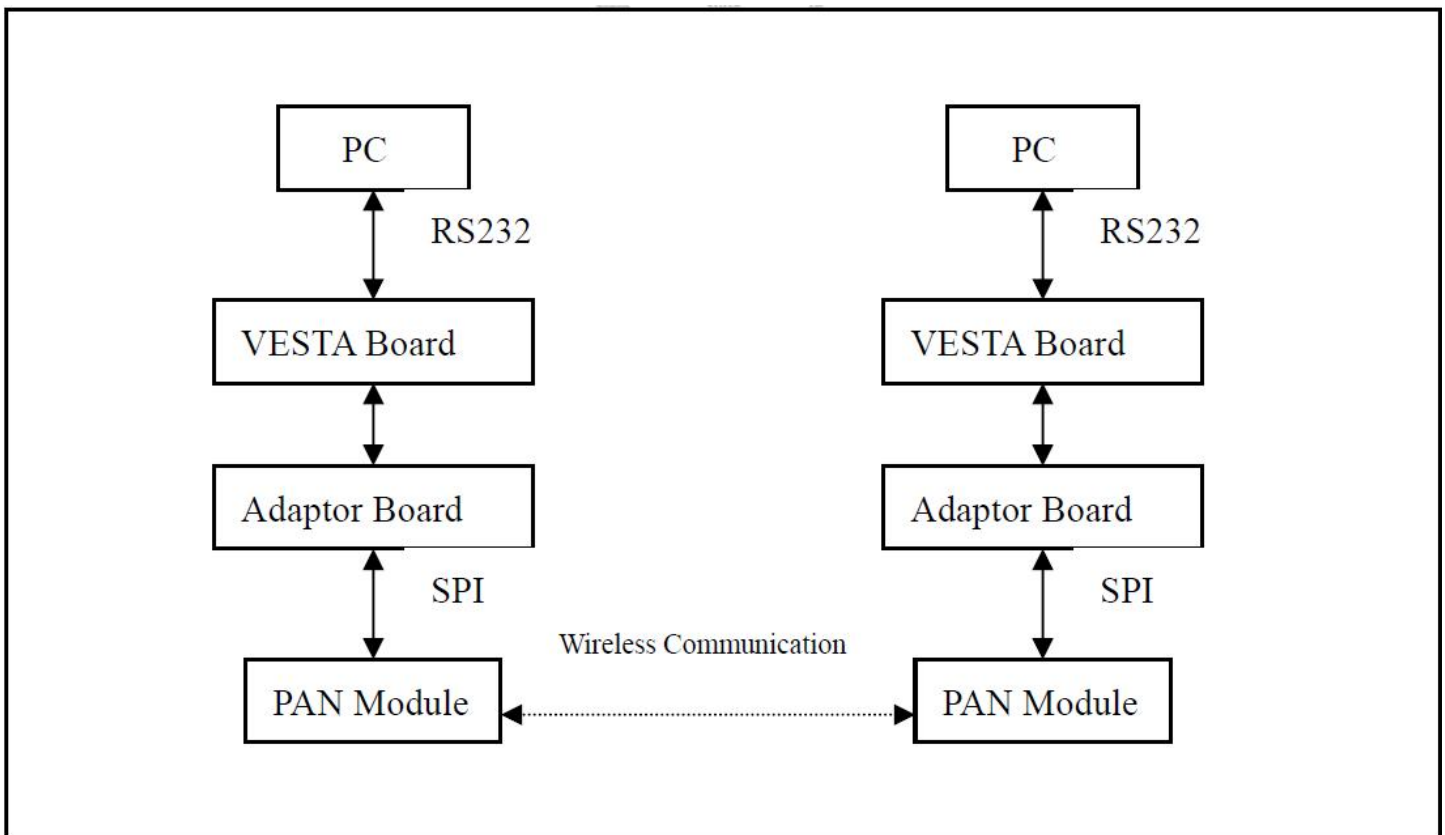


Figure 3

ESTABLISH COMMUNICATIONS

To communicate to the each end of the PAN modules HyperTerminal is used to sends and received commands and data over the serial cable via the Vesta motherboard. The terminal window can be used to display the commands and data sent and received from the module. You can use any other terminal programs as long as they match and support the settings used with HyperTerminal.

Setup HyperTerminal

- 1.) Open a HyperTerminal session. HyperTerminal can be found in Windows under "Accessories" and "Communications."
- 2.) Type in a Terminal Name for this session, then press "OK" to continue.

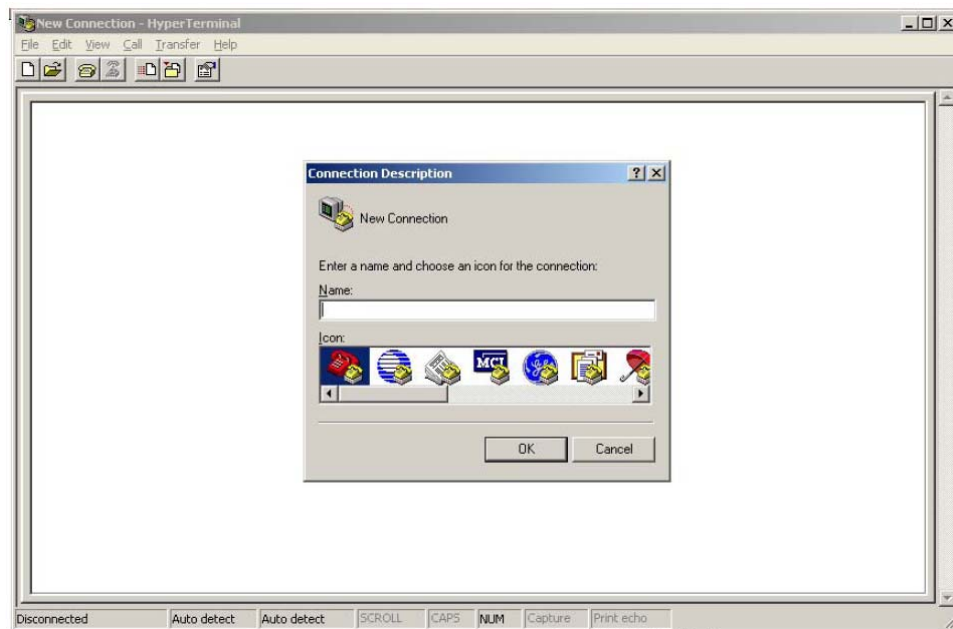


Figure 4

- 3.) Select the corresponding serial port the serial cable is connected on the PC to the Vesta board, then press "OK" to continue. Your COM choice maybe different from what is illustrated in Figure 5.

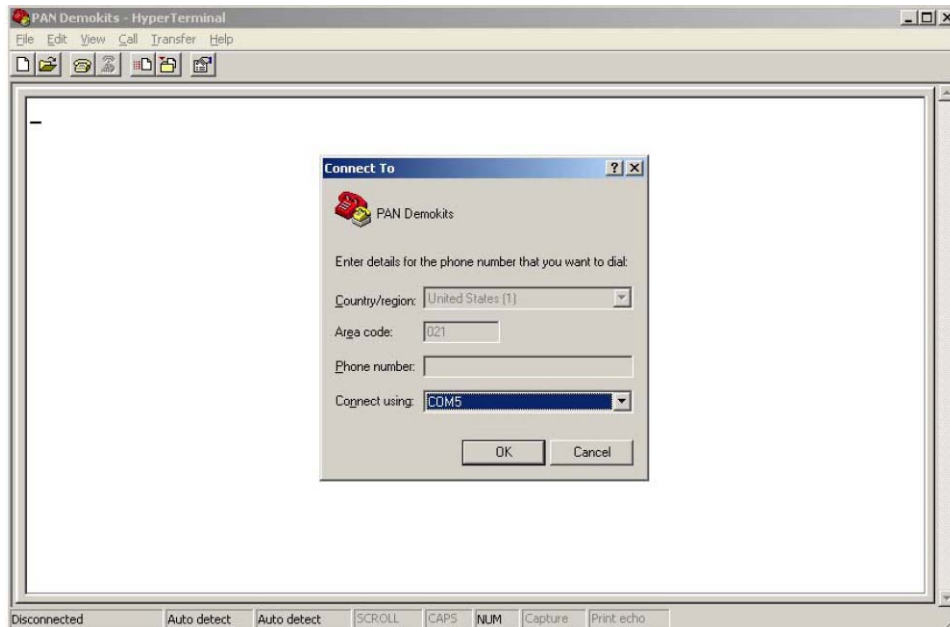


Figure 5

- 4.) Set the "Port Settings" to the following parameters and then click "Apply" and "OK"
 - a. 115200 Bits per second; 8 Data bits; No Parity; 1 Stop Bit; No Flow Control

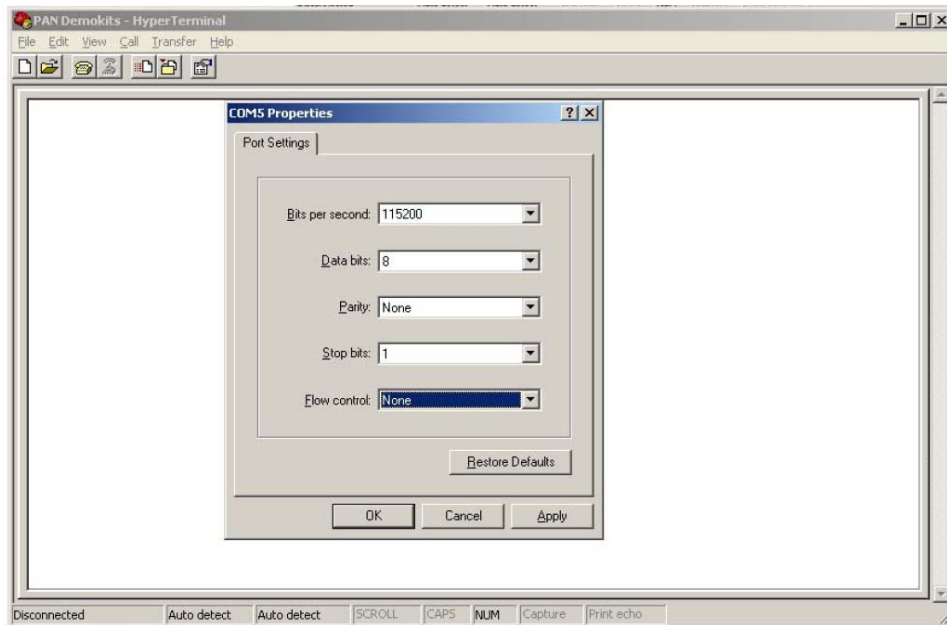


Figure 6

- 5.) Set the terminal ACII data properties. Go to "File" and select properties and set the following then click "OK".
 - a. Check "Echo typed Characters Locally"
 - b. Check "Append line feeds to incoming line ends"
 - c. The rest leave to default.

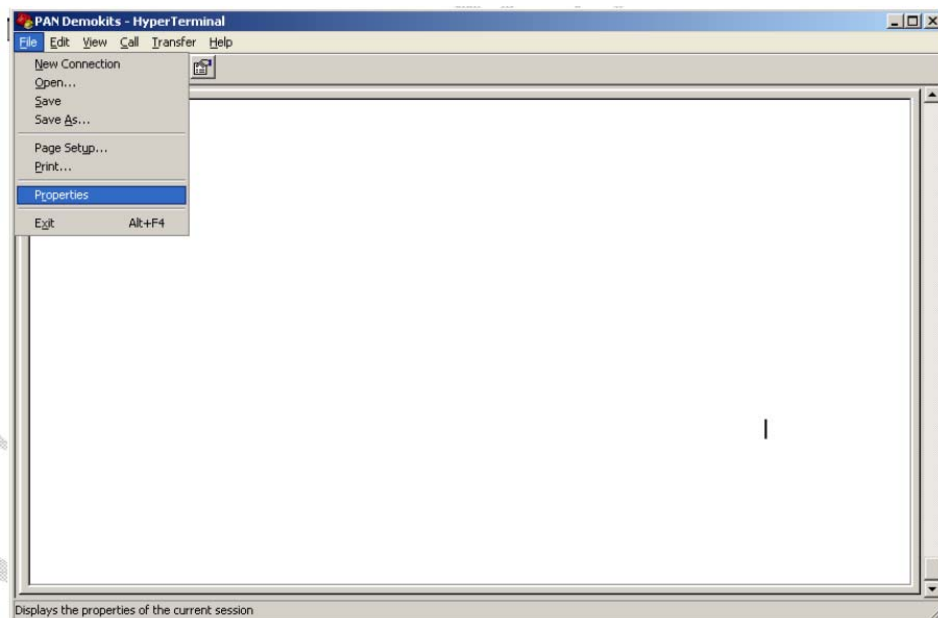


Figure 7

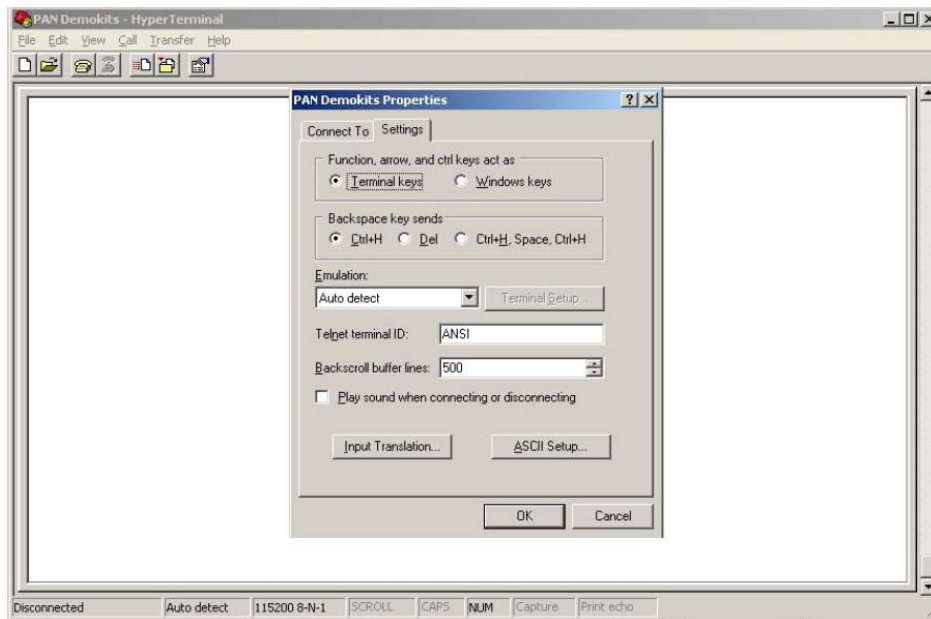


Figure 8

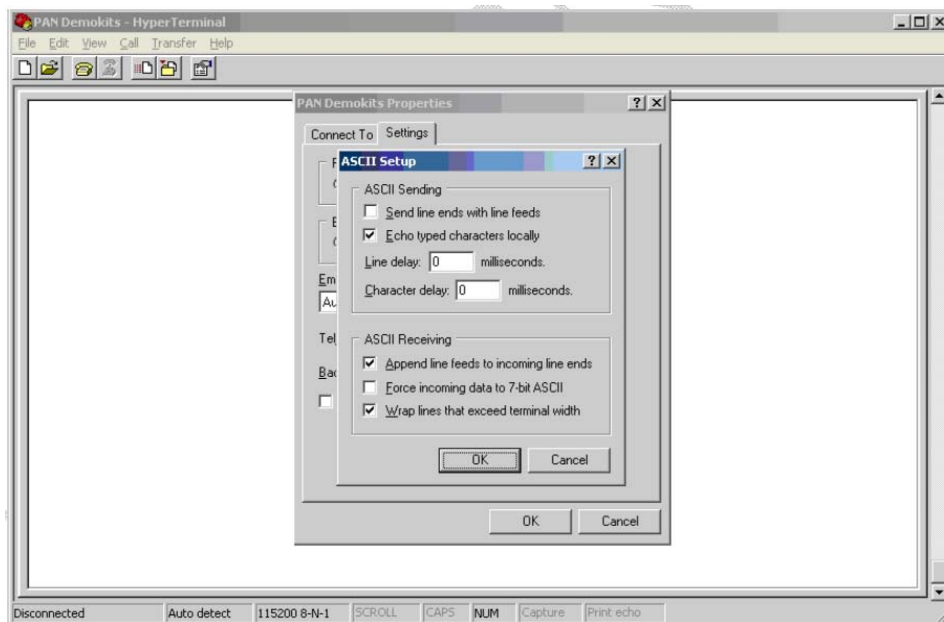


Figure 9

6.) Click the “Call” icon on the top of the menu bar to start the HyperTerminal session.

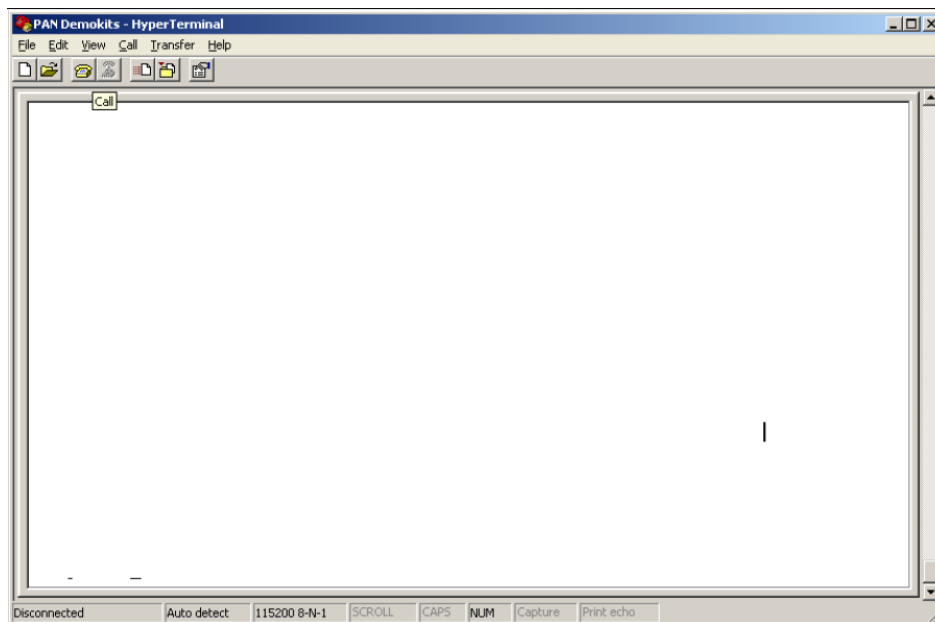


Figure 10

SETUP RF CONNECTION

A RF connection can be created between the two Vesta boards with the PAN modules attached. Two personal computers can be used or one personal computer with 2 separate serial ports can be used as well. One module will need to be setup as the transmitter while the other will need to be set as the receiver.

Setup the Receiver

The following setup of commands will need to be sent using HyperTerminal. After each command typed press "Enter" to send the command down. An acknowledgment will be sent back and displayed in the Hyperterminal window.

Commands:

- a) ATR7 ; Reads the module name
- b) ATR8 ; Reads the Vesta board firmware version
- c) ATW12 ; Sets the PAN baseband frequency to 868-870MHz
- d) ATW22 ; Set the radio into receiver mode

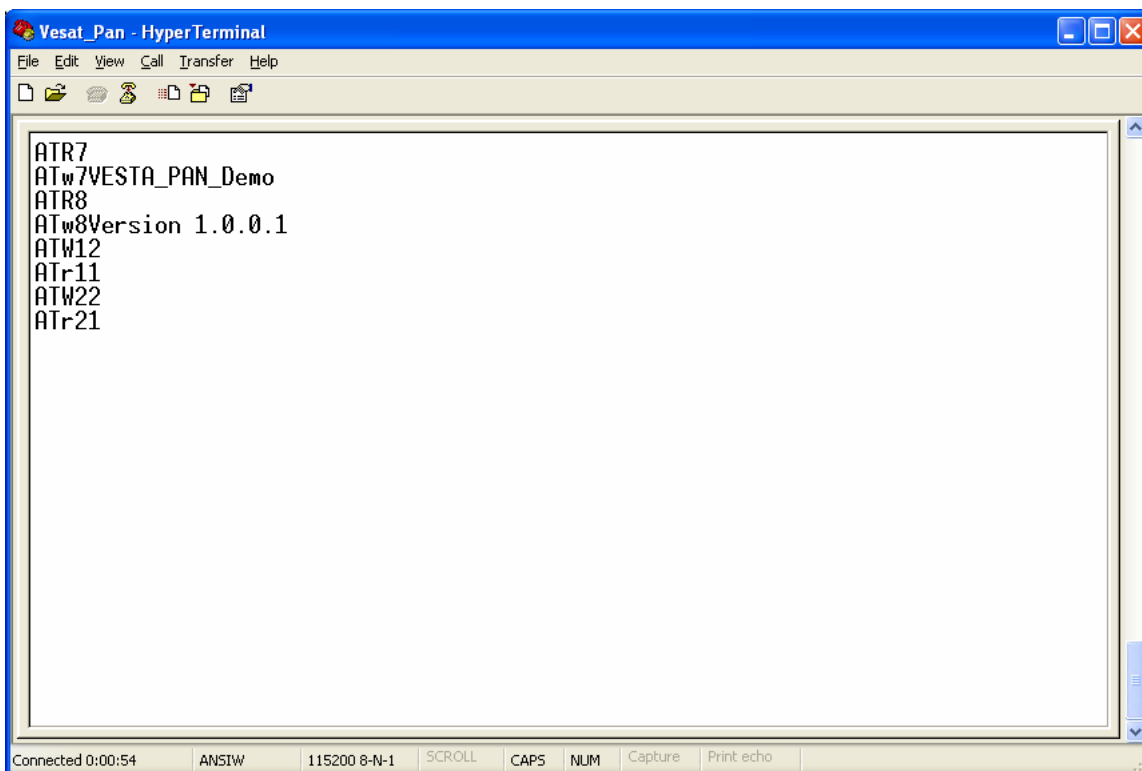
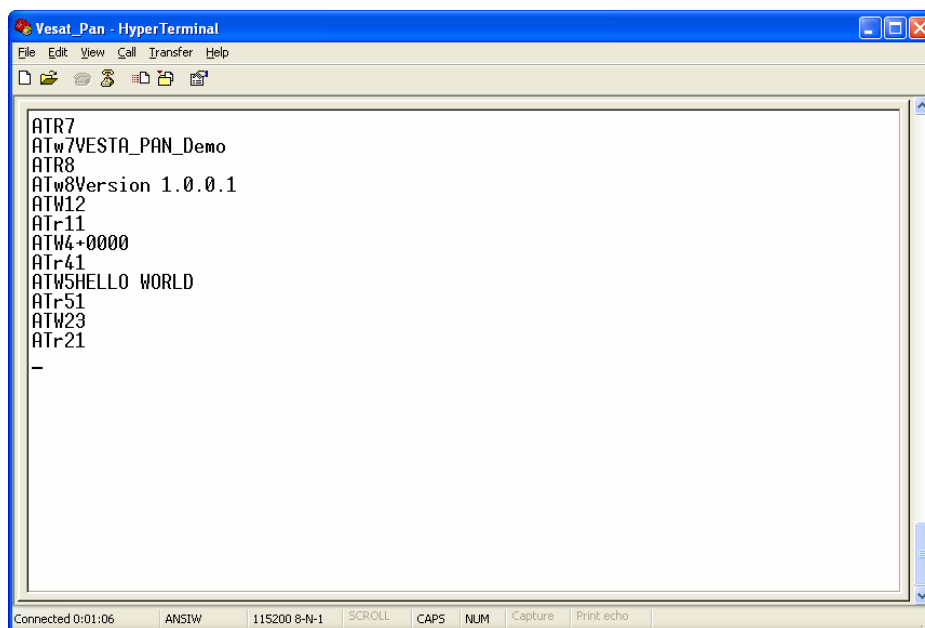


Figure 11

Setup the Transmitter

Commands:

- a) ATR7 ; Reads the module name
- b) ATR8 ; Reads the Vesta board firmware version
- c) ATW12 ; Sets the PAN baseband frequency to 868-870MHz
- d) ATW4+0000 ; Sets the transmit offset to Zero
- e) ATW5Hello World ; Sets "HELLO WORLD" to be transmitted over the air
- f) ATW23 ; Turns on the transmitter



```
ATr7
ATw7VESTA_PAN_Demo
ATR8
ATw8Version 1.0.0.1
ATW12
ATr11
ATW4+0000
ATr41
ATW5HELLO WORLD
ATr51
ATW23
ATr21
-
```

Figure 12

When you set the transmitter on with the ATW23 command, the data will immediately start to transmit. The HyperTerminal session connected to your receiving module will start to display the data.

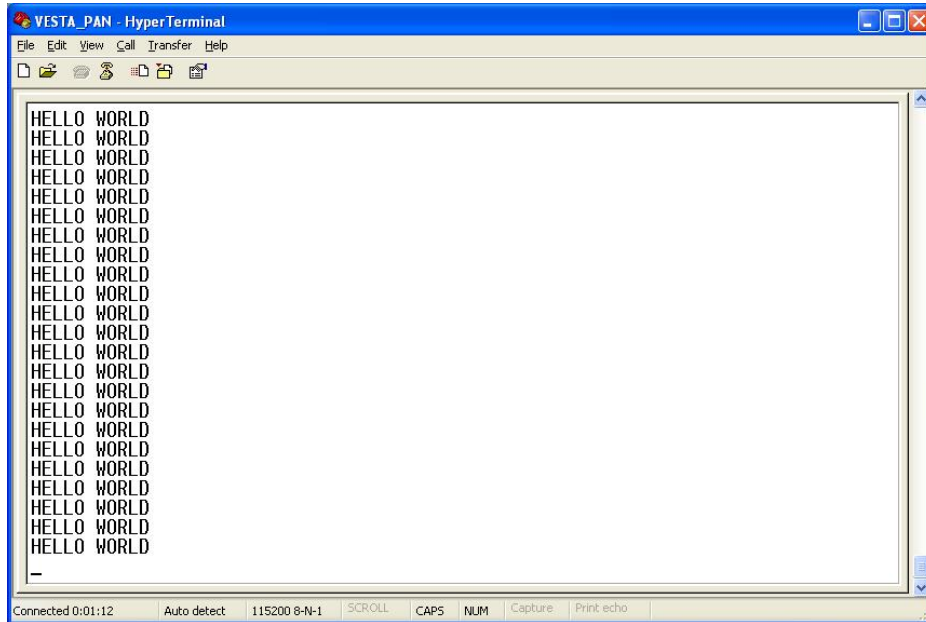


Figure 13

COMMAND PROTOCOL

The Vesta board interprets commands by text strings sent from HyperTerminal and executes the command once it is received. If the command was received successfully, the Vesta board will send back an acknowledgement regarding the success, failure or data requested from the received command. The commands are read/write operations that are immediately executed once received by the Vesta board. There is a small set of commands to control PAN and the kit. The list of commands and acknowledgments can be found in the three tables below.

Parameters and values

Each write command and read acknowledgment must contain the write parameters or acknowledgment values. For write commands the parameter will need to be appended to the command. For read acknowledgments the returned acknowledgment will have the value appended to it.

Examples:

Command or Ack	Parameter or Value
ATW1	ATW12 = Write baseband frequency to 868~870MHz
ATR1	ATw12 = Baseband frequency is 868~879MHz

Commands

Table 1: Commands

Command	Description	Ack	Details
ATR1	Read Baseband	ATw1	Reads the frequency operation of the baseband. Returns ATw1 with a value response.
ATR2	Read RF State	ATw2	Reads the RF state of the radio. Returns the RF state of the radio with a value response.
ATR3	Read Transmit Power	ATw3	Reads the Transmit Power of the radio in the TX state. Returns the power with a value response.
ATR4	Reads Frequency Offset	ATw4	Read the frequency offset of the radio. Returns with a value response.

ATR5	Read RSSI Value	ATw5	Reads the RSSI value of the radio in the RX state. Returns the RSSI in a value response.
ATR6	Reads Frequency Error Indicator	ATw6	Reads the frequency error indicator. Returns the value of the error
ATR7	Read Radio Module	ATw7	Reads the name of the radio module. Return a text string of the name of the module.
ATR8	Read Firmware Version	ATw8	Reads the firmware version of the Vesta motherboard.
ATR9	Read Transmit Buffer		Reads the contents in the transmit buffer and the data to be transmitted over the radio.
ATW1	Select Baseband Frequency	ATr11 ATr10	Selects the Baseband Frequency. Values: a) 0 = 216~218MHz b) 1 = 433~435MHz c) 2 = 767~870MHz d) 3 = 902~928MHz
ATW2	Write RF State	ATr21 ATr20	Writes and executes new RF state. Values: a) 0 = Sleep Mode b) 1 = Standby Mode c) 2 = Receive Mode d) 3 = Transmit Mode
ATW3	Write Transmit Power	ATr30 ATr31	Writes and executes the new transmit power state in dBm Values: a) 0 = 0 dBm b) 1 = 5 dBm c) 2 = 10 dBm d) 3 = 15 dBm
ATW4	Write Frequency Offset	ATr40 ATr41	Writes and executes the new frequency offset. Value = ± XXXX KHz XXXX is 4 bytes long
ATW5	Write Transmit Content	ATr50 ATr51	Writes the contents of data to be transmitted over the air. The content is a text string. i.e "Hello World"

Acknowledgments

Table 2: Acknowledgment

Ack	Description	Description
ATw1	Ack for ATW1	Returns the baseband frequency. Response values: a) 0 = Sleep Mode b) 1 = Standby Mode c) 2 = Receive Mode d) 3 = Transmit Mode
ATw2	Ack for ATW2	Returns the RF State of the radio. Response values: a) 0 = Sleep Mode b) 1 = Standby Mode c) 2 = Receive Mode d) 3 = Transmit Mode
ATw3	Ack for ATW3	Returns the transmit power of the radio. Response values: a) 0 = 0 dBm b) 1 = 5 dBm c) 2 = 10 dBm d) 3 = 15 dBm
ATw4	Ack for ATW4	Returns the frequency offset of the radio. Response value: Value = ± XXXX KHz XXXX is 4 bytes long
ATw5	Ack for ATW5	Returns the RSSI value.
ATw6	Ack for ATW6	Returns the frequency error indicator
ATw7	Ack for ATW7	Returns the name of the radio module.
ATw8	Ack for ATW8	Returns the firmware version on the Vesta board.
ATr11 ATr10	Ack for ATR1	ATr11 = Command Failed ATr10 = Command successful
ATr21 ATr20	Ack for ATR2	ATr21 = Command Failed ATr20 = Command successful
ATr30 ATr31	Ack for ATR3	ATr31 = Command Failed ATr30 = Command successful
ATr40 ATr41	Ack for ATR4	ATr41 = Command Failed ATr40 = Command successful
ATr50 ATr51	Ack for ATR5	ATr51 = Command Failed ATr50 = Command successful

SUPPORT

Please contact support on Unigen website if you have any problems setting up the demo.

Forums

For active discussions on PAN demo kits, you can visit www.unigen.com/forums to ask questions in regards to Unigen's products.