

There are three serial connectors on the interface boards, as shown in Figure 5.4.3. The RJ-45 connector provides a high-speed RS232 interface to the DNT500P's main serial port. The USB connector provides an optional interface to the radio's main serial port. The RJ-11 connector provides a high-speed RS232 interface to the radio's diagnostic port. The DNT500 Wizard utility program runs on the radio's main port.



The preferred PC interface is a serial port card capable of operating up to 460.8 kb/s. Many desktop PCs have a built-in serial port capable of operation at 115.2 kb/s. The kit can be run satisfactorily at the 115.2 kb/s data rate, but not at its fastest throughput. Use the RJ-45 to DB-9F cable assemblies for serial port operation.

Optionally, the kit can be run from the USB port. Plugging in the USB cable automatically switches operation from the RJ-45 connector. The USB interface is based on an FT232RL serial-to-USB converter IC manufactured by FTDI. The driver files for the FT232RL are located in the *USB Driver* folder on the kit CD, and the latest version of the driver can downloaded from the FTDI website, <u>www.ftdichip.com</u>. The driver creates a virtual COM port on the PC. Power up an interface board with an installed DNT500P using one of the supplied wall plug power supplies. Next connect the interface board to the PC with a USB cable. The PC will find the new USB hardware and open up a driver installation dialog box. Click on the *Browse* button in the dialog box and point to the folder with the FT232R driver files. The driver installation dialog will run twice to complete the FT232R driver installation.

5.5 DNT500 Wizard Utility Program

The DNT500 Wizard utility program is located in the *PC Programs* folder on the kit CD. The Wizard requires no installation and can simply be copied to the PC and run. The Wizard start-up window is shown in Figure 5.5.1.

DNTWizard Eile <u>O</u> ptions <u>H</u> elp		:]
Current Settings	Tranceiver Setup System Status Serial Protocol 1/0 Peripherals 1/0 Setup RF Tests	
Device Mode Device Mode	Device Mode Steep Interval	
Network ID PAN ID	RF Data Rate	
Network Address Network Address	Hop Duration External Sync	
MAC Address MAC Address	Network ID User Tag	
Firmware Version Firmware	Sleep Mode	
Hardware Version Hardware	E Dissuits Fachlad	
Refresh		
Connect	Apply	
	<u>^</u>	
Upgrade	Clear	
DTR DSR RTS	CTS Changes=0 DCD Changes=0	-
	Figure 5.5.1	

Press the *Connect* button to open the serial port dialog box, as shown in Figure 5.5.2. Set the data rate to 115.2 kb/s (DNT500 default), select the COM port connected to the DNT500 interface board and press *OK*.

	Select Comm Port Settings
	Comm Port COM1-DK
	Baudrate 115200
	Parity NONE
	Stop Bits 1
	Auto Detect FALSE
1	
ļ	Figure 5.5.2

At this point the Wizard will collect configuration parameters from the DNT500. This data is organized under the first seven tabs, each corresponding to a Bank of register parameters as discussed in Section 4.2. The *Transceiver Setup* Tab as shown if Figure 5.5.3, and corresponds to Bank 0. The current values of each Bank 0 parameter are displayed and can be updated by selecting from the drop down menus or entering data from the keyboard, and then pressing the *Apply* button. Note that data is *displayed and entered into the Wizard in Big-Endian order*. The Wizard automatically reorders multi-byte data to and from Little-Endian order when building or interpreting protocol messages. In Figure 5.5.3 below, TX Power has been modified from its default value of 0 dBm to 18 dBm.

DNTWizard Eile Options Help	
Current Settings Device Mode Remote Network ID 0xFF Network Address 0xFF	Tranceiver Setup System Status Serial Protocol I/D Peripherals I/D Setup RF Tests Device Mode Sleep Interval Remote Image: Comparison of the system RF Data Rate TX Power 500 k Image: Comparison of the system Hop Duration External Sync 0x00C8 Ilser Tan
Firmware Version 0xE1	Network ID DNT500 0xFF DNT500 Security Key Sleep Mode 0x00000000000000000000000000000000000
Refresh Disconnect	Apply
Upgrade DTR RTS CTS	Clear CTS Changes=1 DCD Changes=0
, , , , ,	Figure 5.5.3

In addition to conventional mouse and keyboard inputs, the Wizard supports two special function keys, F1 and F2. F1 toggles the serial port DTR line off and on. Pressing F1 the

first time after the Wizard is started will place the DNT500 in power down mode. Pressing the F1 key again will reboot and restart the DNT500. The current status of the DTR line is seen in the lower left corner of the Wizard window. F2 toggles the RTS line. Pressing F2 the first time after the Wizard is started will halt the flow of data from the DNT500. Pressing the F2 key again will re-enable data flow. The current status of the RTS line is also seen in the lower left corner of the Wizard window.

Figure 5.5.4 shows the DNT500 Wizard *System* tab contents, corresponding to parameter Bank 1. The default parameters under this tab have been modified to change from CDMA to TDMA operation.

Current Settings	Tranceiver Setup System Status Serial Protocol 1/0 Peripherals 1/0 Setup RF Tests	
Device Mode Remote	Frequency Band ARQ Attempt Limit Full 900 MHz 0x05	
Network ID 0xFF	Access Mode TDMA Max Slots TDMA Cox02	
Network Address OxFF	Base Slot Size CSMA Persistence 0x14 0x00	
MAC Address FFFFFF	Lease Period CSMA Max Backoff 0x05 0x00	
Firmware Version 0xE1	Epoch Mode Max Prop Delay Use Previous Ox00	
Patrock	I ARQ Enabled	
Disconnect	Apply	
Upgrade	flear	

Figure 5.5.5 shows the DNT500 Wizard *Status* tab contents, corresponding to parameter Bank 2. Note the *Status* tab contains read-only parameters.

Current Settings	Tranceiver Setup Syste	em Status Serial Protoc	ol 1/0 Peripherals 1/0 9	etup RF Tests	
Device ModeRemoteNetwork ID0xFFNetwork Address0xFFMAC AddressFFFFFFFirmware Version0xE1Hardware Version0x41	MAC Address FFFFFF Current Nwk Addr 0xFF Current Nwk ID 0xFF Current Freq Band 0x00 Hardware Version 0x41	Link Status 0x01 Remote Slot Size 0xF5 TDMA Number Slots 0x00 TDMA Slot Stat 0x00	Firmware Build Unknown Epoch 0x00 Super Frame Count 0x00 RSSI Idle 0x00 RSSI Last 0x00	TDMA Current Slot 0xFF Current RF Data Rate 0x01	
Refresh Disconnect			Apply		*
Upgrade			Clear		*

Figure 5.5.6 shows the DNT500 Wizard *Serial* tab contents corresponding to parameter Bank 3. The values shown below are the defaults for serial port operation.

DNTWizard Eile Options Help		_ 🗆 🗙
Current Settings	Tranceiver Setup System Status Serial Protocol 1/0 Peripherals 1/0 Setup RF Tests	
Device Mode Remote	Baudrate Parity	
Network ID 0xFF	Ston Rite	
Network Address 0xFF		
MAC Address FFFFFF		
Firmware Version 0xE1		
Hardware Version 0x41		
Refresh		
Disconnect	Арріу	
		A
Upgrade	Clear	
	CTS Changes=1 DCD Changes=0	
	Figure 5.5.6	

Figure 5.5.7 shows the DNT500 Wizard *Protocol* tab contents, corresponding to parameter Bank 4. Transparent data serial communication is currently chosen.

DNTWizard File Ontions Help		_ 🗆 🗙	
Current Settings	Tranceiver Setup System Status Serial Protocol 1/0 Peripherals 1/0 Setup RF Tests		
Device Mode Remote	Protocol Mode Transparent		
Network ID 0xFF	Protocol Options 🔽 Link Announcements		
Network Address OxFF	0x00		
MAC Address FFFFFF	TX Timeout Escape Sequence 0x05 once		
Firmware Version OxE1	Min Packet Length		
Hardware Version 0x41	0x14		
Refresh			
Disconnect	Apply		
		A V	
Upgrade	Clear		
DTR RTS CTS	CTS Changes=1 DCD Changes=0		
	Figure 5.5.7		

Figure 5.5.8 shows the DNT500 Wizard *I/O Peripherals* tab contents, corresponding to parameter Bank 5. GPIO ports 0 - 2 are logic high, GPIO port 3 is logic low. The 10-bit ADC inputs and PWM outputs are given in *Big-Endian* byte order.

DNTWizard Eile <u>O</u> ptions <u>H</u> elp		_ 🗆 X
Current Settings	Tranceiver Setup System Status Serial Protocol 1/0 Peripherals 1/0 Setup RF Tests	1
Device Mode Remote	GPIO Value ADC0 Value ADC2 Value GPIO0 C 0 C 1 0x02FF 0x017E	
Network ID 0xFF	GPI01 0 0 1 ADC1 Value	
Network Address OxFF	6PI03 © 0 C 1	
MAC Address FFFFFF	PWM0 Value PWM1 Value	
Firmware Version 0xE1	0x00	
Hardware Version 0x41		
Refresh		
Disconnect		
		*
Upgrade	Clear	_
DTR RTS CTS	CTS Changes=1 DCD Changes=0	

Figure 5.5.9 shows the DNT500 Wizard *I/O Setup* tab contents, corresponding to parameter Bank 6. This tab allows the direction of the GPIO ports to be set both for active and sleep mode. The power-up initial values of the GPIO outputs can also be specified, and whether an input can generate a wake-up interrupt. GPIO event messaging and/or periodic reporting and reporting interval can also be specified under this tab. The ADC sampling interval and the high and low thresholds for event reporting on each ADC channel can be set, along with the start-up output values for each PWM (DAC) channel.

Eile Options Help	
Current Settings	Tranceiver Setup System Status Serial Protocol I/O Peripherals I/O Setup RF Tests
-	GPIO Direction GPIO Init GPIO Interruptible GPIO Sleep Direction Sleep I/O State
Device Mode Remote	GPI00 C Input C Output 0 Interruptible C Input C Output 0
	GPI01 Ginput C Output
Network ID 0xFF	GPI02 Ginput C Output
Network Address OvEF	GPI03 C Input O Output
Includic Address	Enable GPIO Messages
MAC Address FFFFFF	Enable GPIO Sleep Mode ADC0 Threshold Low ADC1 Threshold Low ADC2 Threshold Low
	Enable I/O Reporting
Firmware Version 0xE1	GPIO Alt Function ADC0 Threshold High ADC1 Threshold High ADC2 Threshold High
Hardware Version 0x41	
	I/O Reporting Interval ADC Sample Interval PWM0 Init PWM1 Init
Refresh	
	Apply
Disconnect	
Upgrade	
	Clear
	CTS Changes=1 DCD Changes=0

Figure 5.5.10 shows the DNT500 Wizard *RF Tests* tab contents. A message placed in the Transmit Window is sent to the specified MAC address each time the *Apply* button is pressed. Messages received are displayed in the lower text box. The receive message text box can be cleared with the *Clear* button. Note that a base station will accept a message from a remote with the MAC address 0x000000 regardless of the base station's actual MAC address.