ANTware II
User's Guide

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Revision History

Revision	Effective Date	Description
1.0	October, 2009	Initial release
1.1	May, 2011	Added Tools section

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1   Introduction

ANTware is an application used for the control of ANT wireless devices. It is an excellent tool for first time ANT developers to explore the capabilities of ANT as a low power wireless solution, and for experienced users to easily setup and monitor advanced ANT networks. ANTware II improves upon past versions* with a slick new interface, streamlined functions, and a variety of new features.

The major changes from the original ANTware are outlined in section 5. 'Transitioning from the Original ANTware' for those familiar with version I ANTware

2   Introduction

Figure 2 – 1. shows the application window on opening ANTware II. On the left side of the application are the Device Panels, and the remaining portion of the window is the channel Pane.
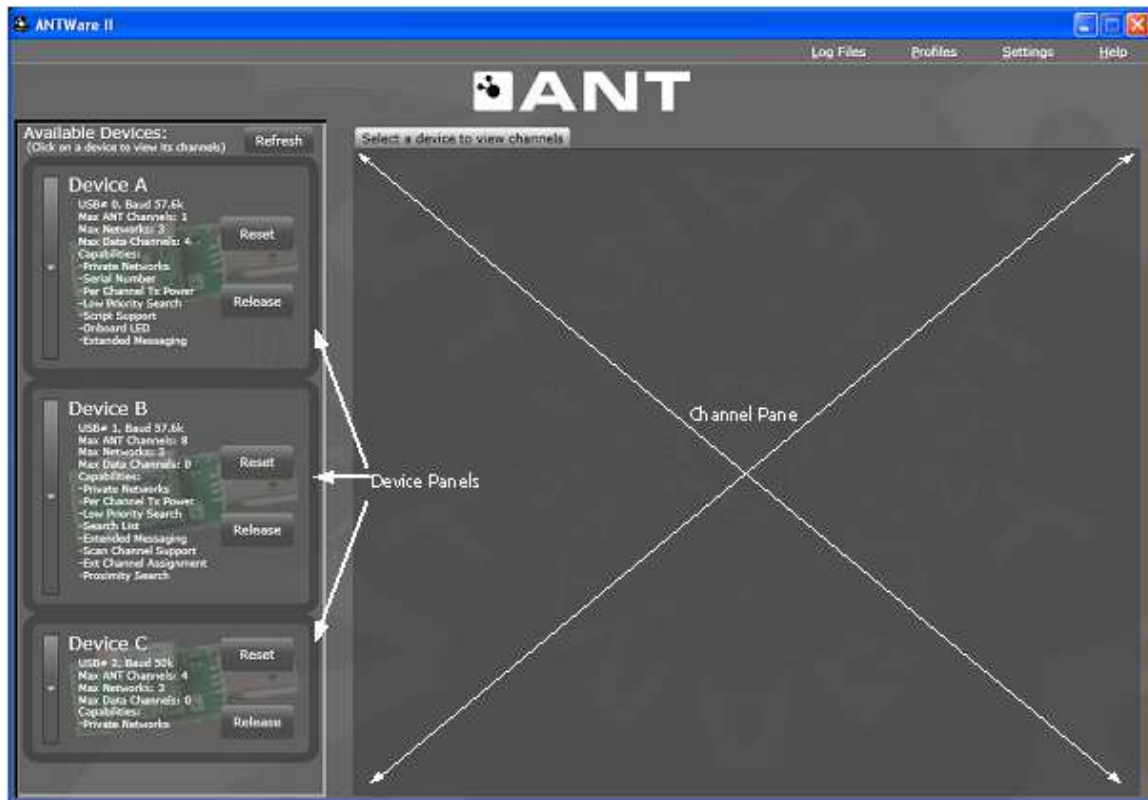
Figure 2 – 1. ANTware II Application window

2.1   Device Panel

The device panels show all devices detected as connected to the PC, and that are not in use in other applications (Figure 2 – 2.). Each panel shows the capabilities of the respective ANT device and provides access to the functions applicable to the entire device. The device panels are also used to select which device's channels are displayed in the channel pane.

Figure 2 – 2. shows the device panel after the expander button has been pressed, allowing access to all the device-level functions such as setting the network key, transmit power or downloading SensRcore scripts. This expanded device view also shows the device level feedback display.
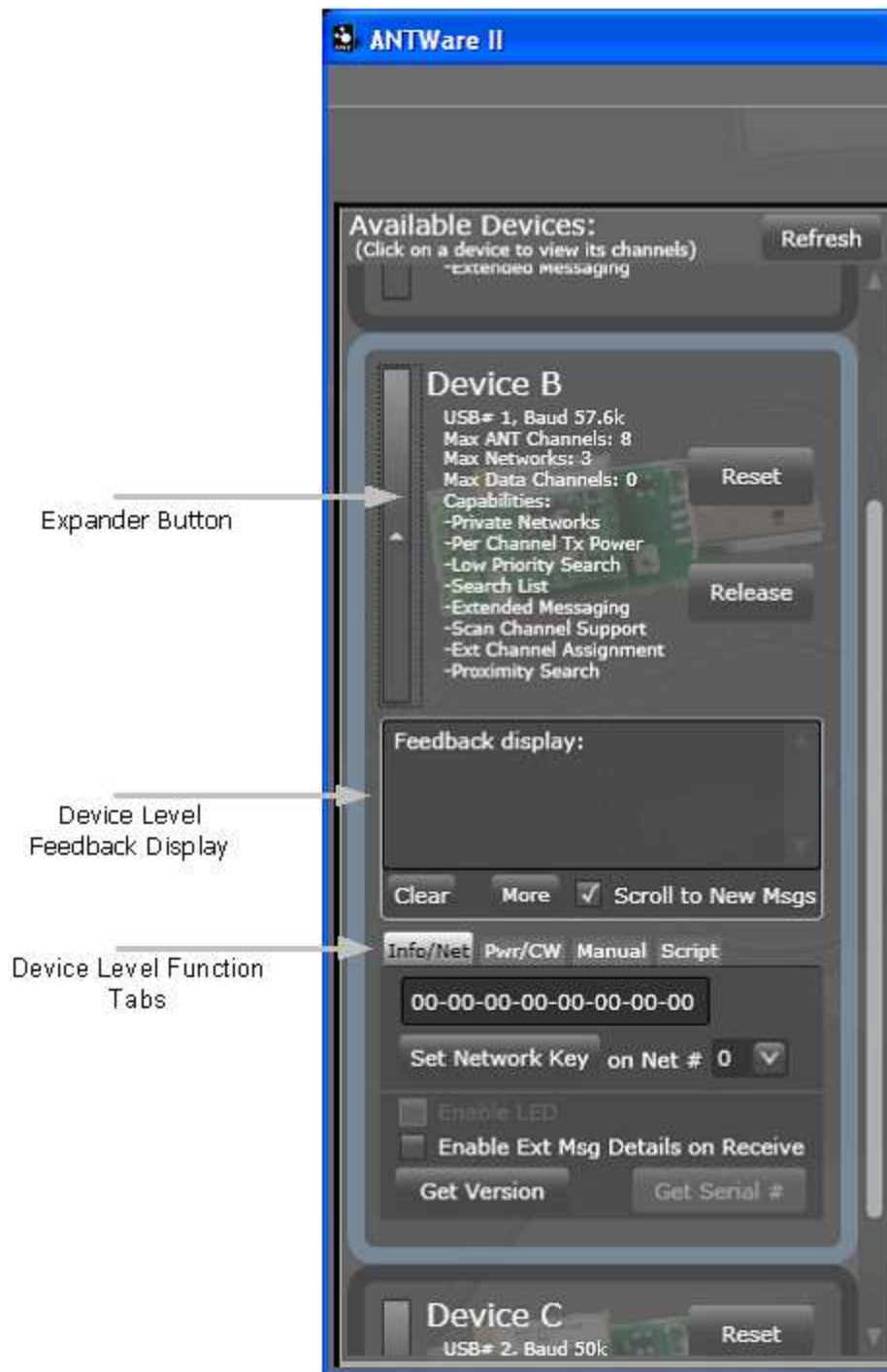
Figure 2 – 2. Detected ANT Devices

2.2 Channel Pane

The channel pane displays all channels of a selected device. To select a device, simply click anywhere on the desired device panel (except for the Reset and Release buttons). Once a device is selected, its device panel will have a highlighted outline and all of its channels will appear as tabs in the channel pane (Figure 2 – 3.). Each channel can be managed under its respective channel tab. Each tab contains all of the functions to manipulate the channel's configuration parameters. All channel functions are explained in detail in the ANT Message Protocol and Usage document.
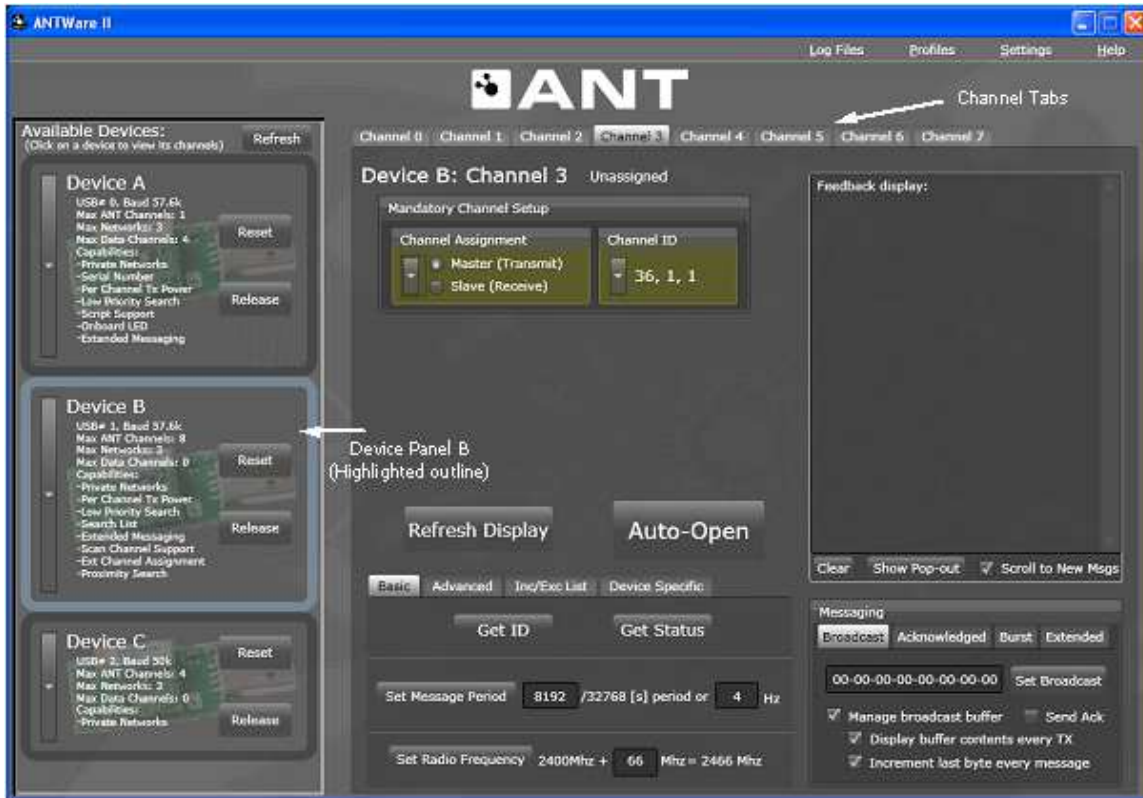
Figure 2 – 3. Channel Window Features

There are several areas under each channel tab (Figure 2 – 4.): The Channel Assignment and Channel ID expandable boxes allow control over the 'Mandatory Channel Setup' parameters that require user input prior to opening a channel. Using the Basic, Advanced, Inc/Exc List, and Device Specific tabs you can control more advanced channel configuration parameters as described in the following sections. For a reference of ANT messages to their location within ANTware II, go to section 7.

Figure 2 – 4. Channel Tab Features

The upper right hand side contains the feedback display and a set of tabs to control channel messaging. The button 'Show Pop-Out' will open the feedback display and message control in a separate pop-out window. This allows the user to view and manage activity on several channels at once.

An important new feature is the prominent 'Auto-Open' button. The Auto-Open button makes channel configuration easier by automatically applying all parameter changes with a single button press. As each parameter is set, their respective fields will change to a yellow tint; when the Auto-Open button is pressed, ANTware will apply all of these changes prior to opening the channel.

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3   Creating a Simple Network

The simplest network to create is a single independent master-slave channel between two ANT devices. In ANTware II, with the new Auto-Open button, and multiple device support, this can be achieved in just a few clicks within the same instance of the application. First, ensure you understand the two mandatory configuration parameters of an ANT channel. A simple description of each is provided below. For more detailed explanations refer to the ANT Messaging Protocol and Usage document.

Channel Assignment

In an ANT network, a channel consists of a master device which transmits a broadcast message at a set channel period; and a slave device, which finds and synchronizes to the master's periodic broadcast. On the master device, The Master and Slave channel assignments and the periodic broadcast are simply used for synchronization purposes, and do not limit the capabilities of a given node in a network; both Master and Slave nodes support bi-directional communication.

Channel ID

Each channel must have a set channel ID. The channel ID is one of the ANT mechanisms to allow multiple channels and networks in the same environment. The channel ID is used to uniquely identify a channel in a given network. The channel ID is set by the master node, and is used in the slave to specify the master to communication with. Slave nodes can search for a specific master, or for a type of master by setting one or more of the channel ID parameters to the wildcard value '0'. Once a matching master is found, its channel ID automatically replaces the wildcard values.

A simple network consists of a single master connecting to a single slave node. To configure this network, first ensure that two ANT USB devices are connected to the PC. On initiating ANTware, the two devices should be available in the ANTware II device list.

3.1   Configure Master

Click on the appropriate device panel to select the ANT device that will act as the channel master. In the channel tab (e.g. Channel 0) go to the Mandatory Channel Setup and select the 'Master (Transmit)' option in the 'Channel Assignment' box (Figure 3 – 1.) Set the 'Channel ID' as desired; in this example 33, 1, 1.

Figure 3 – 1. Channel 0 Configuration of Master Device

Click on 'Auto-Open', and ANTware II will send the configuration commands and open the master channel. Once the channel is opened, the master device will start transmitting broadcast messages at the default channel period. The channel pane's feedback display will show the:

Commands performed: 'Assigning Channel…', 'Setting Channel ID…', 'Opening Channel…'

Resultant RF events: EVENT_TX, message code 0x03

Data sent: 00-00-00-00-00-00-00-00 (defaults to increment every message)

Serial message decoded: 40, 00-01-03 (Channel Response Event, Channel #-Msg ID-Msg code)

To continue to see this feedback display while configuring other channels, click on the 'Show Pop-Out' button. This will open another window containing just that channel's feedback display.

Figure 3 – 2. Pop-Out Window of Channel Feedback Display. Note there is an expander button (circled) in the lower left corner.

3.2   Configure Slave

Select the device panel of the ANT device that will act as the slave. Under the channel tab, go to 'Channel Assignment' and select the 'Slave (Receive)' option. Also, ensure the Channel ID matches that of the Master (e.g. 33, 1, 1). Then press Auto-Open and the slave will begin searching for the matching master.

Figure 3 – 3. Slave Channel Configuration

As for the master, the channel pane's feedback display will show the configuration commands, and reception of data once the master has been found. The slave will synchronise with the master. Now that the simple network is established, it is possible to experiment with the many other ANTware II features.

4   Advanced Features

ANTware II features 'Settings', Profiles', 'Tools' and 'Help' menus.

4.1   Settings

The settings menu allows user interface options and filter control.

4.1.1   Options

ANTware II has a settings menu (Figure 4 – 1.) that you can use to customize display appearance, and startup and shutdown behaviours using several settings:
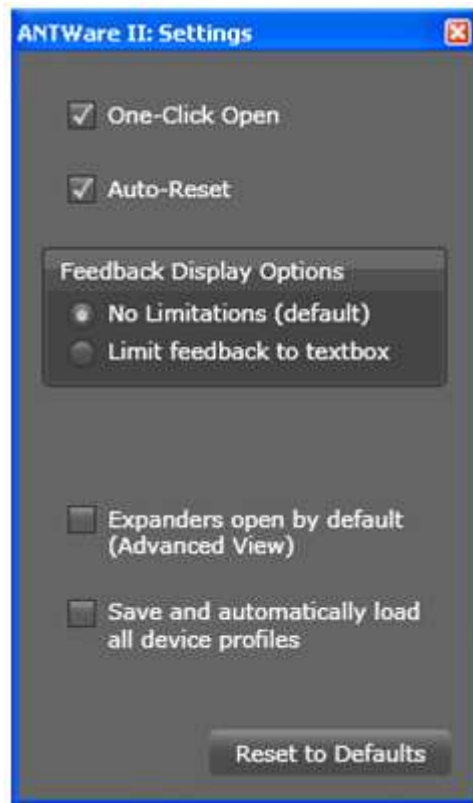
Figure 4 – 1. Settings -> Options Window

4.1.1.1   One-Click Auto Open

Enables 'Auto-Open' button. Disabling this feature means the Open button will send the open command only and any changed parameters must be individually sent by the user.

4.1.1.2   Auto-Reset

Controls if devices are automatically reset when they are released or connected to (via a refresh). Disabling this option means devices will continue to operate in their current state when ANTware II is closed (or the device 'released'). In addition, the current state of ANT will be unknown on ANTware II's start-up.

4.1.1.3   Feedback Display Options

Limit Feedback to Textbox - Feedback display will only keep messages within the limits of the textbox. As new messages are received, the text will scroll out of the limits of the text box and be deleted. This feature optimizes the application's memory usage during extended testing. This does not affect the log files in any way.

4.1.1.4   Expanders Open By Default

Opens all expanders to show additional controls by default.

4.1.1.5   Save and Automatically Load All Device Profiles

Saves the current multi-device profile on exit and attempts to reload the profile on the subsequent ANTware II start-up. This allows the channel configurations for all connected devices to be maintained between sessions.

4.1.2 Filters

ANTware II allows the channel feedback display to be filtered, controlling the messages that are shown. Go to Settings->Filters to access the filters window (Figure 4 – 2.). To filter a channel's feedback display, the 'Enable Filters' checkbox must be checked.
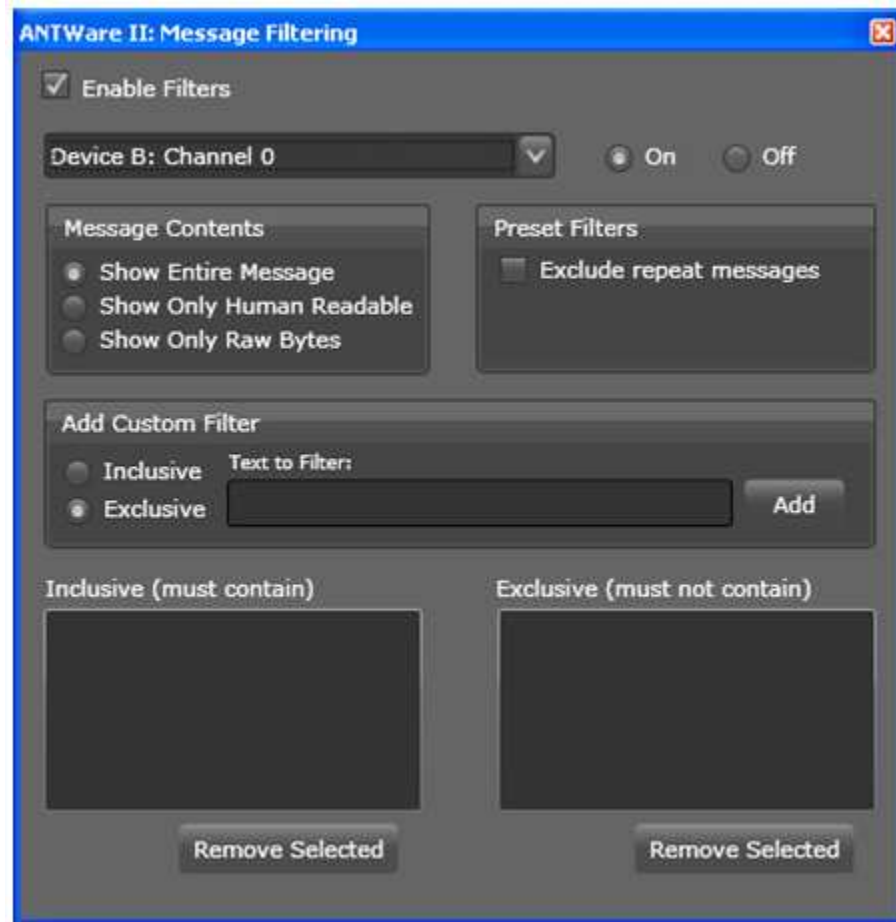
Figure 4 – 2. Settings -> Filters Window

Filters are applied on a device channel by channel basis. You can change the filters for a given channel by selecting that device and channel from the drop down box. Therefore, in addition to checking 'Enable Filters', select the corresponding device and channel that is to be filtered from the drop down menu, and check the 'On' checkbox.

Once the filter is turned on, the filter settings can be changed. The messages can be limited to show only the human readable portion or, only the raw hex bytes portion. The 'Exclude Repeat Messages' option can also be enabled to display only the first message of any given set of repeated messages.

Custom inclusive or exclusive filters can be manually added using the 'Add Custom Filters' controls. When creating a custom filter be aware that the filtering takes place based on a string comparison of the contents of every string printed to the feedback display.

4.2   Profiles

Profiles are a new way to make channel configuration simpler and faster. A profile is an xml file containing ANT configuration parameters that can be loaded into ANTware II's interface. They allow for quick and consistent setups, in addition to enabling complete configurations to be easily shared with others. Profiles can be saved or

loaded at three different levels. A channel profile contains the setup parameters of a single channel. A device profile contains several channel profiles along with the ability to set network keys (Note: To save network keys in a profile the value must be manually edited in the file). A multi-device profile contains several device profiles. (Note: Profiles contain only a subset of all the settings accessible in the ANTware II interface; the profile xml can be opened in any text editor for viewing of saved parameters)

4.3   Tools

The tools menu provides access to AutoANT to run scripts on the ANT device, as well as Channel Statistics.

4.3.1   Auto-ANT

ANTware II allows for running scripts that control an ANT device by means of its AutoANT feature (Figure 4 – 3).
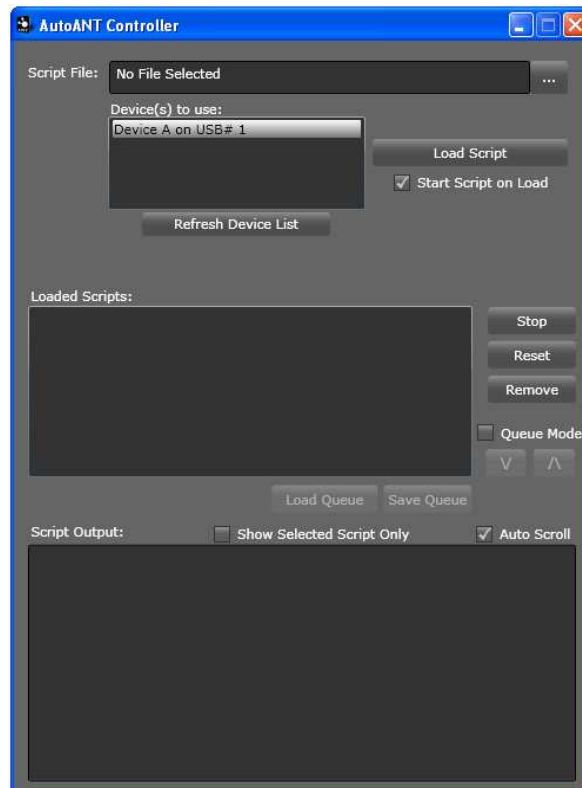
Figure 4 – 3. Tools-> AutoANT Window

4.3.1.1   Load Script

This feature loads a script file of .ants type that can later run on an ANT device. If the Start Script on Load option is selected, once the script is loaded, it will immediately begin executing. Script files contain sequences of ANT messages that can be sent to the device. For more information about the syntax of .ants scripts, and sample scripts, please refer to the ANTware II section of the forum on www.thisisant.com.

4.3.1.2   Loaded Scripts Controls

Once a script is loaded, you can use the controls to start and stop the script, as well as to reset the script, or remove it from the application.

4.3.1.3   Queue Mode

This feature allows you to queue multiple scripts onto the ANTware II, and run them one after the other.

4.3.2   Statistics

ANTware II allows for detailed statistics about transmissions on specific ANT channels (Figure 4 – 4).
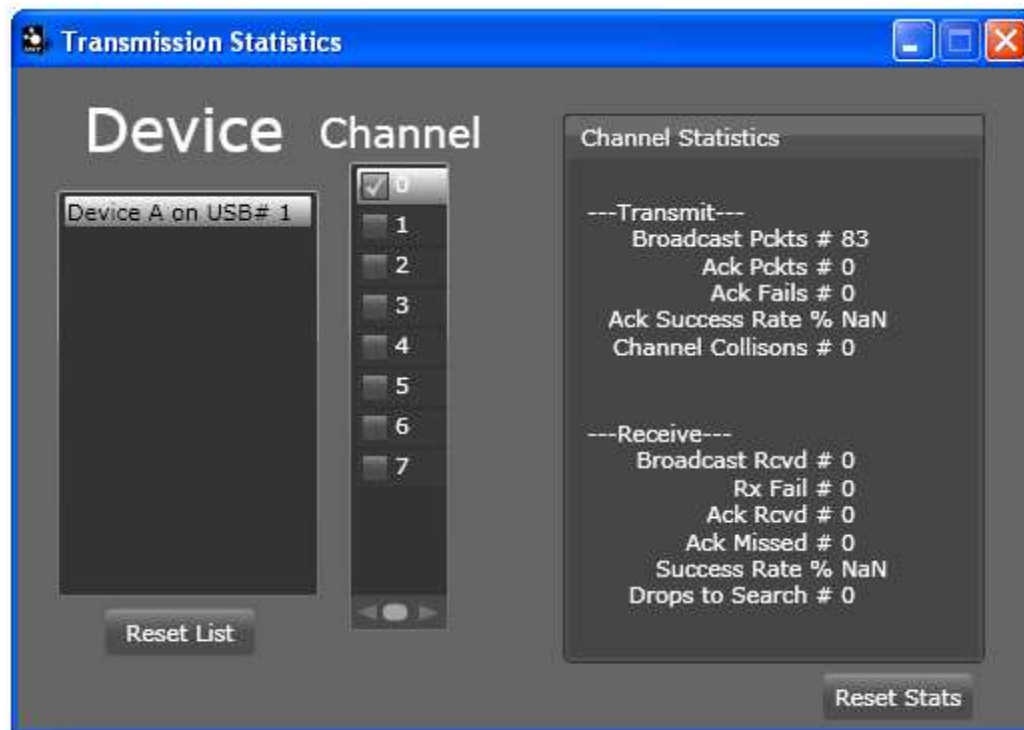
Figure 4 – 4. Tools-> Statistics Window

4.3.2.1   Channel

Check the checkbox next to the channel number to enable statistics collection for that specific channel. If the channel is already open, statistics collection will begin immediately, and will stop once the checkbox is unselected.

4.3.2.2   Channel Statistics Window

This window provides detailed statistics, for the channel for both transmitted and received data. Statistics for both transmitted and received packets are available, including, the number of broadcast packets, acknowledged packets, acknowledge fails, success rate, channel collisions, number of received packets, receive fails, and drops to search.

5   Transitioning from the Original ANTware

ANTware II includes all of the ANTware functionality and more.

5.1   ANTware II Features

Sleek new interface

Auto-Open feature which automatically sends the commands for all changed parameters, and opens the channel in one click

Ability to use multiple devices at once

More intuitive interface (including hiding advanced controls, and a cleaner interface)

Pop-out channel feedback displays for viewing multiple channels at once

Improved feedback textbox allowing more control over what is displayed, and can handle extremely fast message rates

Improved user input methods and parsing (i.e. can use comma, dashes, or even no delimiters in hex inputs etc.)

Current channel's Status displayed either at the top of ht channel pane or as the title of the pop-out window

Permanent settings to: filter/limit feedback display, disable the automatic device reset on application start-up and shutdown, automatically load last device and channel profiles

Save current configuration settings at the channel, device (multiple channels and network keys), or multiple device level in xml profiles that can be loaded later or by other users

Simple filtering of feedback i.e.: excluding broadcast messages (string comparison based, with some custom filters like filtering out repeat messages)

5.2   Interface

ANTware II has been completely overhauled from the original ANTware (Figure 5 – 1.).

The changes in the interface are mostly reflected in three main objectives: More intuitive interface, streamlined setup approach, and simplified interactions for users. In terms of the general layout, however, little has changed. Device-level functions are still managed on the left, and channel functionality managed on the right, with tabs separating the device's channels.

One of the significant changes in the application is the ability to connect to multiple devices from a single instance of the applications. The different ANT devices are selected by clicking the desired device panel from the list on the left.

Another major change is that functions are now grouped and the interface less cluttered through the use of tab controls and expander buttons. These mechanisms also serve to hide some of the more advanced details from beginner users such that it is not overwhelming.

The other significant improvement is the pop-out window feature. From the menu there are several windows that can be accessed to control some of the new features like filters, profiles, and permanent settings/user preferences. The most unique pop-out window is the new channel feedback pop-out window, accessed when the 'Show Pop-Out' button is pressed. This pop-out window displays the channel feedback in a small resizable window that can be observed while other configuration commands are performed in the main ANTware II window. The channel status is displayed in the window title, and the window also allows access to messaging controls in the expander at the bottom. This window is very useful for observing several channels at once.
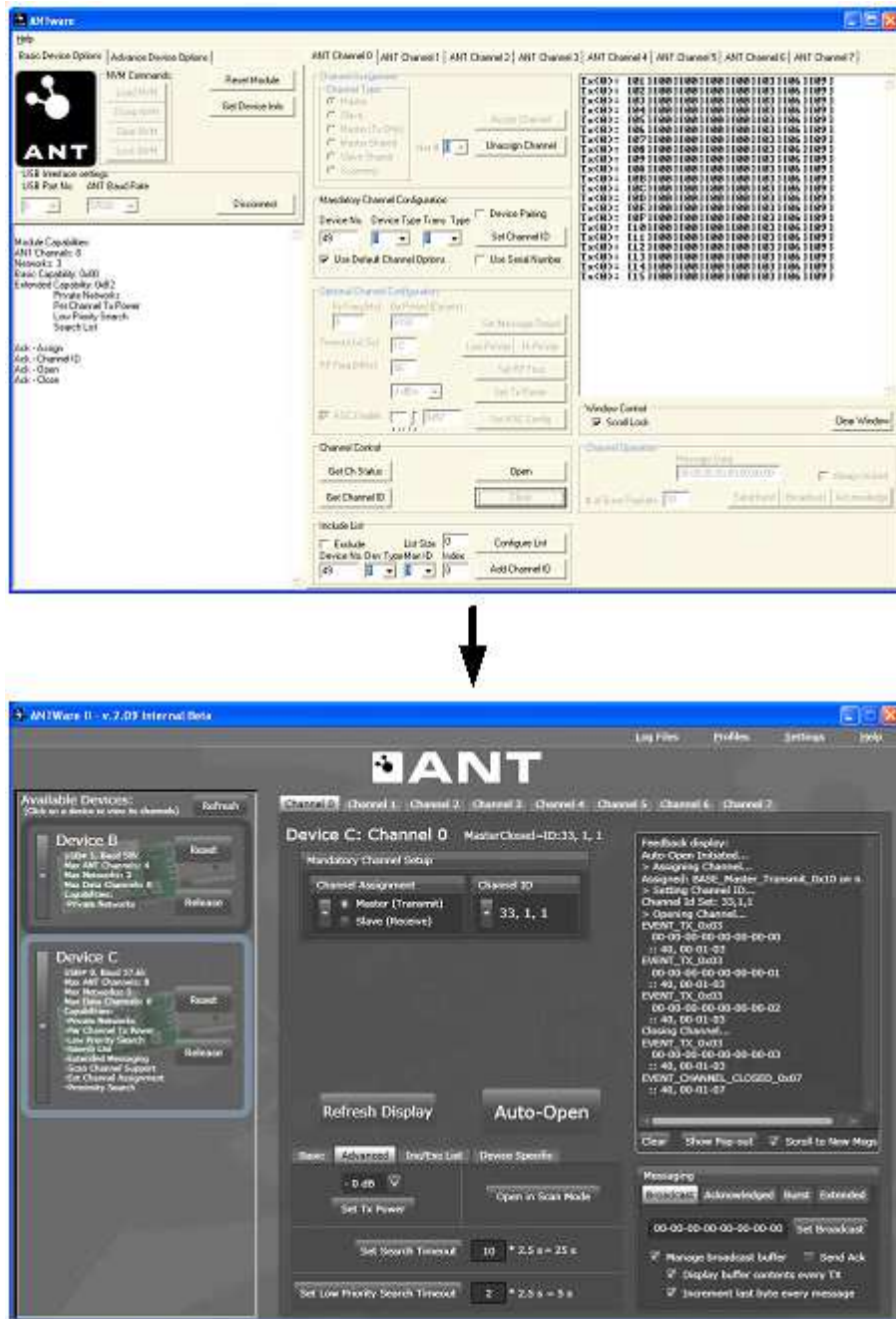
Figure 5 – 1. ANTware to ANTware II

6   Technical Notes

Expanders are used in several places to help the interface be less cluttered and confusing. Expanders can be kept open using the enable expanders checkbox in the Settings->Options menu

All devices displayed in the left pane are open connections to the given physical ANT device. If one of these devices is required for another application, the 'Release' button will allow that device to disconnect from ANTware II and be available to other applications.

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The 'Refresh' button on the top of the Available Devices display will scan for additional devices which have been newly connected to the system or have been previously released. Note: for several reasons, this button is not responsible for removing devices that have already been detected; this must be done manually with the 'Release' button

'Managing' the broadcast buffer option means the application will make a call to set the buffer every time a broadcast occurs

ANTware II is built on the new ANT Managed Library for the .Net environment. The library is fully managed-compliant code which means it is simply requires a drag and drop to use in any .Net

7   Functional Reference

A list of the ANT functionality related to its location in ANTware II is provided in this section. Refer to the ANT Message Protocol and Usage document, section 9.3 for summary of the ANT messages.

7.1   Channel Pane

The Channel Pane contains a tab for each channel

7.1.1   Mandatory Channel Setup

The channel assignment and ID fields in the Mandatory Channel Setup do not have default values and must be set prior to opening a channel:

Config Messages: Assign Channel (including extended assignment byte), Set Channel ID

7.1.2   Basic

The Basic Tab contains the fundamental and often used functions:

Requested Messages: Get Channel ID, Get Status

Config Messages: Set Channel Period, Set RF Frequency

7.1.3   Advanced

The Advanced Tab contains the more advanced function:

Control Message: Open in Rx Scan Mode

Config Messages: Set Tx Power, Set Search Timeout, Set Low Priority Search Timeout

7.1.4   Inc/Exc List

This Tab contains all the functions required to configure Inclusion and exclusion liststhe more advanced function:

Config Messages: ID List Add, ID List Config

7.1.5   Device Specific

The device specific Tab contains some of the device specific functions:

AT3 Config Message: Set Serial Number Channel ID

AP2 Config Messages: Set Proximity Search, Config Frequency Agility

7.1.6   Messaging

The Messaging area contains functions for controlling the data sent over the RF channel.

7.1.6.1   Broadcast Tab

This tab allows the user to set the data that will be sent as a broadcast message. Each subsequent message will be incremented by 1 every channel period.

Data Message: Send Broadcast Data

7.1.6.2   Acknowledged Tab

Similarly, this tab allows the user to specify an acknowledged message. On clicking the 'Send Acknowledge' button, a single acknowledged data packet (as specified in the data field) will be sent over the air and then ANTware will continue to send the default broadcast messages

Data Message: Send Acknowledged Data

7.1.6.3   Burst Tab

The user may use the functions in this tab to send a burst message. The user can select to send a set number of bytes produced by a counter, or to send a file.

Data Message: Send Burst Transfer Packet

7.1.6.4   Extended Tab

This tab allows the user to send a message using extended messaging (for continuous scanning mode applications). Please note that the extended message formats are supported differently in different ANT parts. Please refer to datasheets and the ANT Message Protocol and Usage document for capabilities and more details regarding extended message formats.

AT3: Ext Data Message: Send Extended Broadcast Message

AP2: Data Message: Send Broadcast Message (extended format)

7.1.6.5   General Tab

The 'Manage TX buffer' should be checked in order for the user to control the data. If the 'Display buffer contents every TX' box is checked, then that data that is sent over the RF channel will appear in the Feedback display. If the 'Increment last byte every message' box is checked, then ANTware will increment the broadcast

If acknowledged data packets are desired on every channel period, then select the 'Send Ack every TX event'.

7.1.7   Simulation

The simulation area contains functions for controlling responses to messages received. Checking the 'Auto Send Response to Received Msgs' box is used on slave devices. When checked, the user must also specify:

the type of message ANTware should respond to

The type of message ANTware should respond with

ANTware will send the specified message back to the master in reply to each (specified) message received. For example, the user may

7.2   Device Panels

Each Device Panel shows the specific devices capabilities, device-level feedback and device specific commands as detailed in the below sections.

7.2.1   Info/Net

The Info/Net Tab contains the following functions:

Requested Messages: Get Version, Get Serial Number (AT3 only)

Config Messages: Set Network Key, Enable LED, Enable Extended Rx Msgs

7.2.2 Pwr/CW

The Basic Tab contains the fundamental and often used functions:

Config Messages: Set Transmit Power (all channels)

Test Mode: Init CW Test Mode, Set CW Test Mode

7.2.3 Manual

This tab allows the user to set individual request messages and generic write messages. For a request message, the Message ID and channel number is entered, then the 'Request Message' button clicked. For writing general messages to ANT, enter the message ID, and fill in the Data 1 to Data 9 fields, then click 'Write Message'.

7.2.4 Script

The Script Tab provides for SensRcore script downloads. For descriptions of these commands see the SensRcore Messaging and Usage Document.

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