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ASCII PROTOCOL COMMANDS SAMPLE APPLICATION (.NET DESKTOP)

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Design • Development • Manufacture

CONTENT

Overview

This document describes the ASCII Commands Sample application provided as part of the ASCII 2 Desktop SDK

History

Version	Date	Modifications
1.0	27/11/2013	Document creation

INTRODUCTION

The ASCII Protocol Commands Sample application was developed to provide developers with examples of using the .Net API to command devices that support the Technology Solutions ASCII 2 protocol. This sample builds on the Inventory, Switch and Read Write sample applications and demonstrates the majority of commands within the ASCII protocol.

This code sample includes the functionality of the other samples and adds commands to read and write transponders.

USING THE APPLICATION

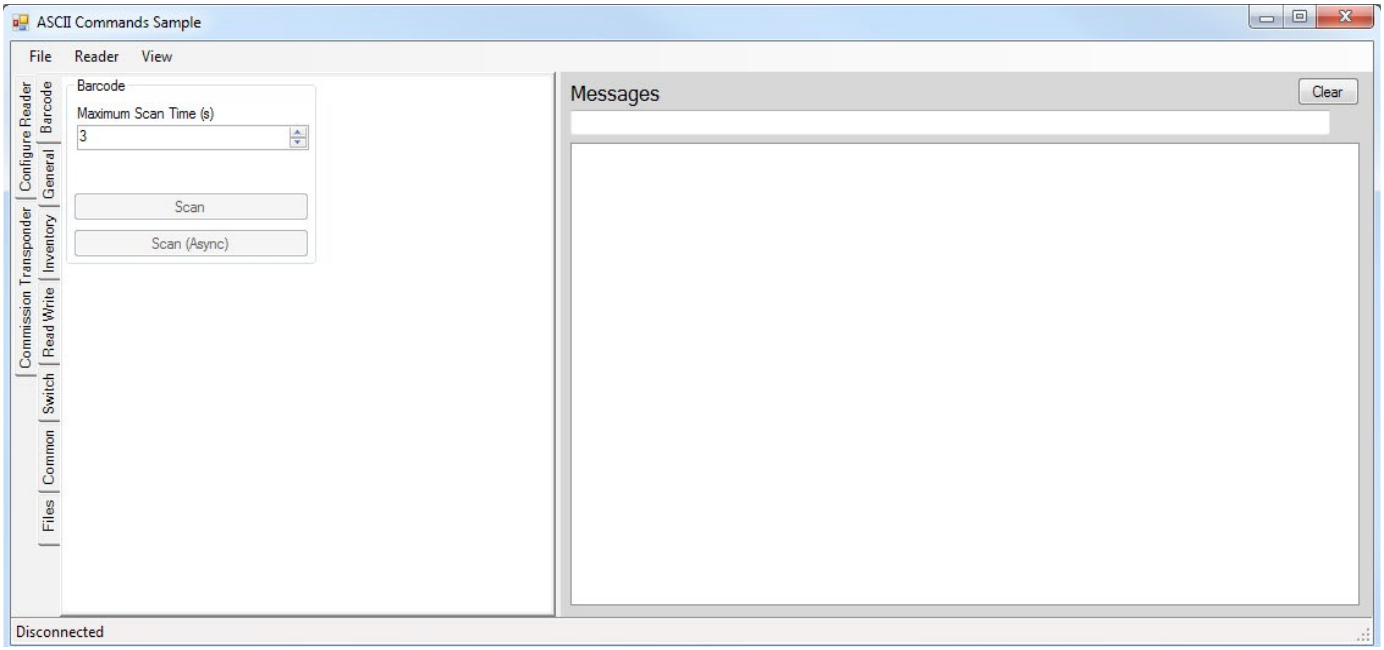

FIGURE 1: The main screen

The main screen (in its default state) is split into two main areas. The left side of the screen is split into tabs that group functionality. The right has a messages area to report command activity and responses.

You can exit the application by closing the window or with File>Exit.

CONNECTING TO THE READER

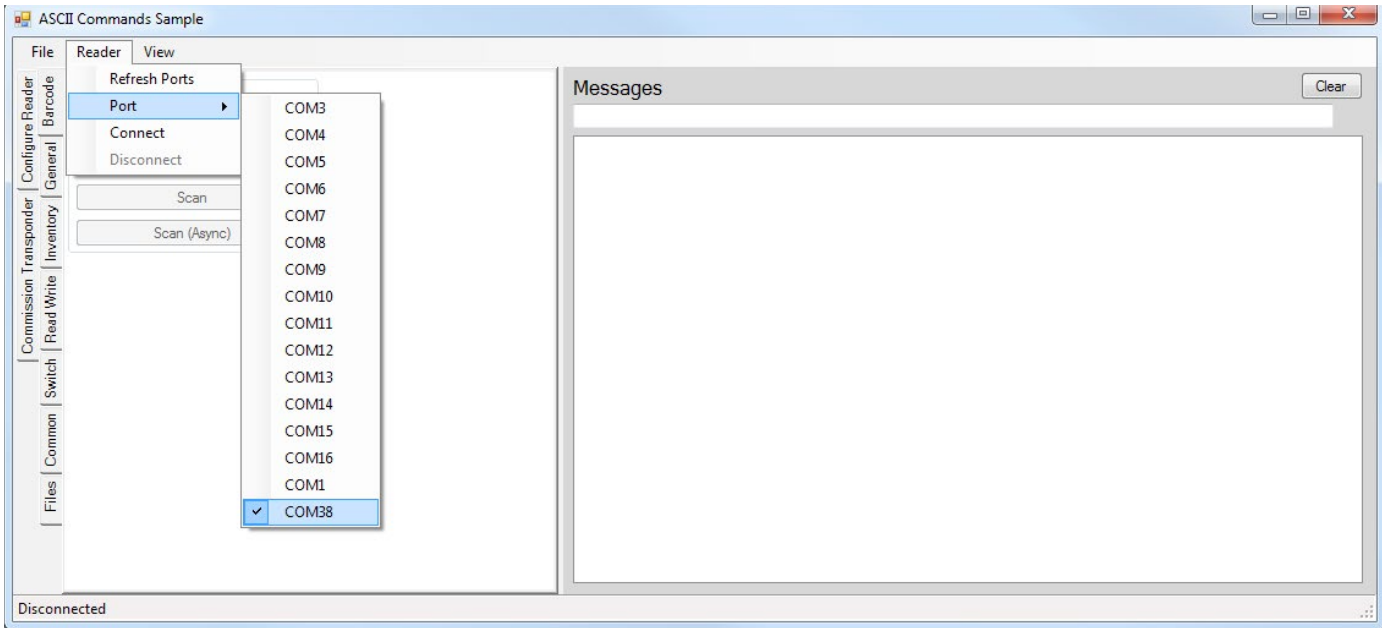

FIGURE 2: Connecting a reader

Readers are connected to the application using a standard serial port. This permits both the USB Desktop (e.g. 1126) and Bluetooth (e.g. 1128) UHF Readers to be used. A list of available com ports are provided in Reader>Port menu. You will need to determine the com port that the reader is connected to. If the port required is not in the port list use Reader>Refresh Ports to refresh the list of available ports.

For Bluetooth readers Windows will associate an incoming and outgoing com port when you pair a Technology Solutions UHF Reader. To establish a Bluetooth connection to the reader you need to select and connect to the outgoing com port. For more information refer to the information in the reader user guide.

For USB readers Windows will associate a USB serial com port to the Technology Solutions UHF Reader as the reader is connected. Refer to the reader user guide for more information.

Once the com port has been selected use the Reader>Connect menu to connect to the com port and the reader. The connection status is shown in the status bar. Reader>Disconnect will disconnect from the reader. Once a reader is connected the controls enable

BARCODE TAB

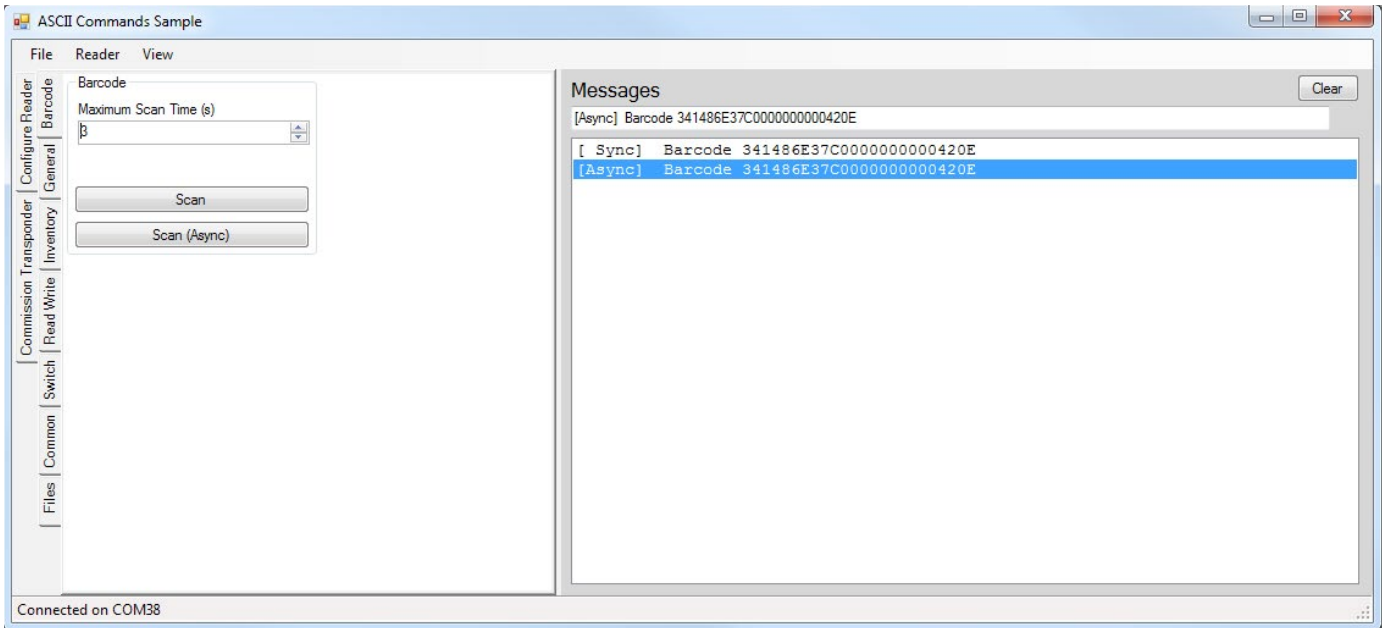

FIGURE 3: Barcode Tab

The barcode tab has controls to command a barcode. The barcode command is executed either synchronously or asynchronously depending on the button used. The maximum time in seconds that the scanner will wait for a barcode to be scanned is controlled with the up down control. Barcode output is reported in the Messages window. This feature is the sample as the Inventory sample.

GENERAL TAB

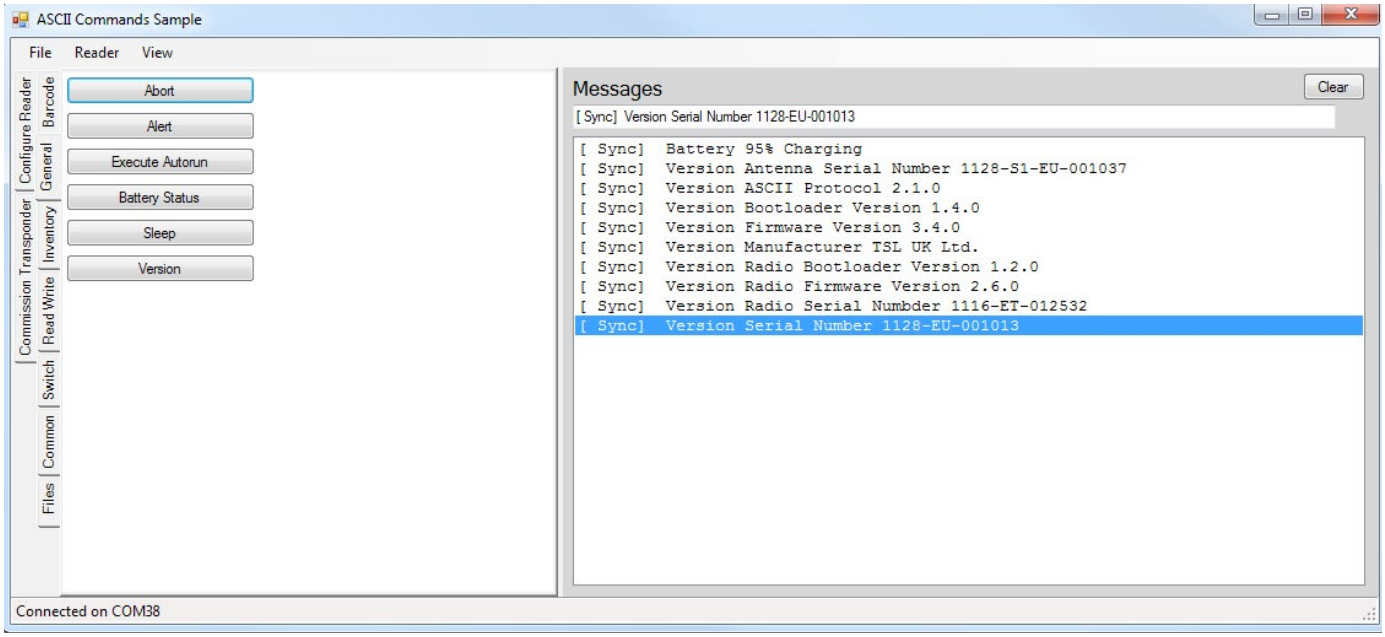

FIGURE 4: General Tab

The general tab demonstrates a number of different commands.

- The 'Abort' command is sent asynchronously to abort any currently executing long command (for example a switch press or barcode command).
- The 'Alert' command performs an alert
- The 'Execute Autorun' command executes the autorun file stored on the SD card
- 'Battery Status' will read back the battery percentage charge and charge status.
- 'Sleep' commands the reader to sleep (this is mainly provided to allow an iOS application to forcibly disconnect from a reader)
- 'Version' gets the version response of the reader containing many values

INVENTORY TAB

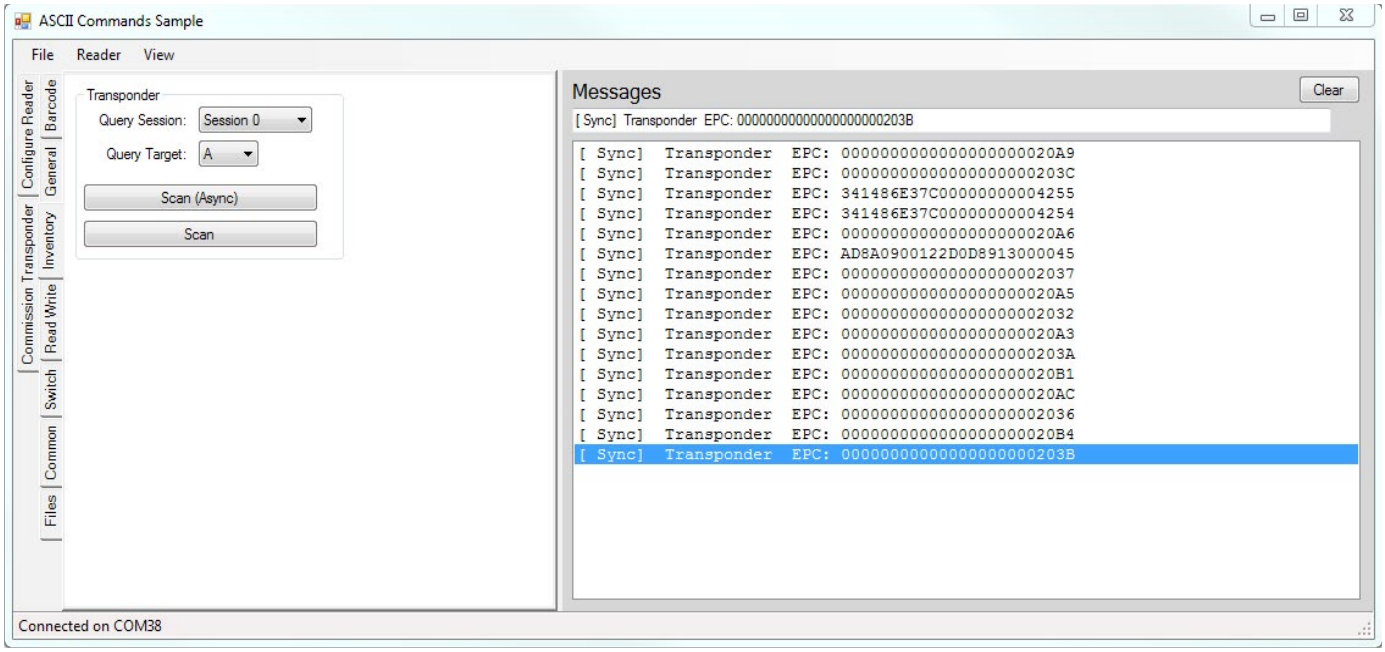

FIGURE 5: Inventory Tab

The Inventory tab contains the rest of the functionality of the original Inventory sample (the rest being on the barcode tab). The inventory can be performed synchronously or asynchronously and the basic parameters of the inventory can be set as required.

The inventory command is customised by the parameters on the Common tab which permit control of which fields are output for each transponder.

READ WRITE TAB

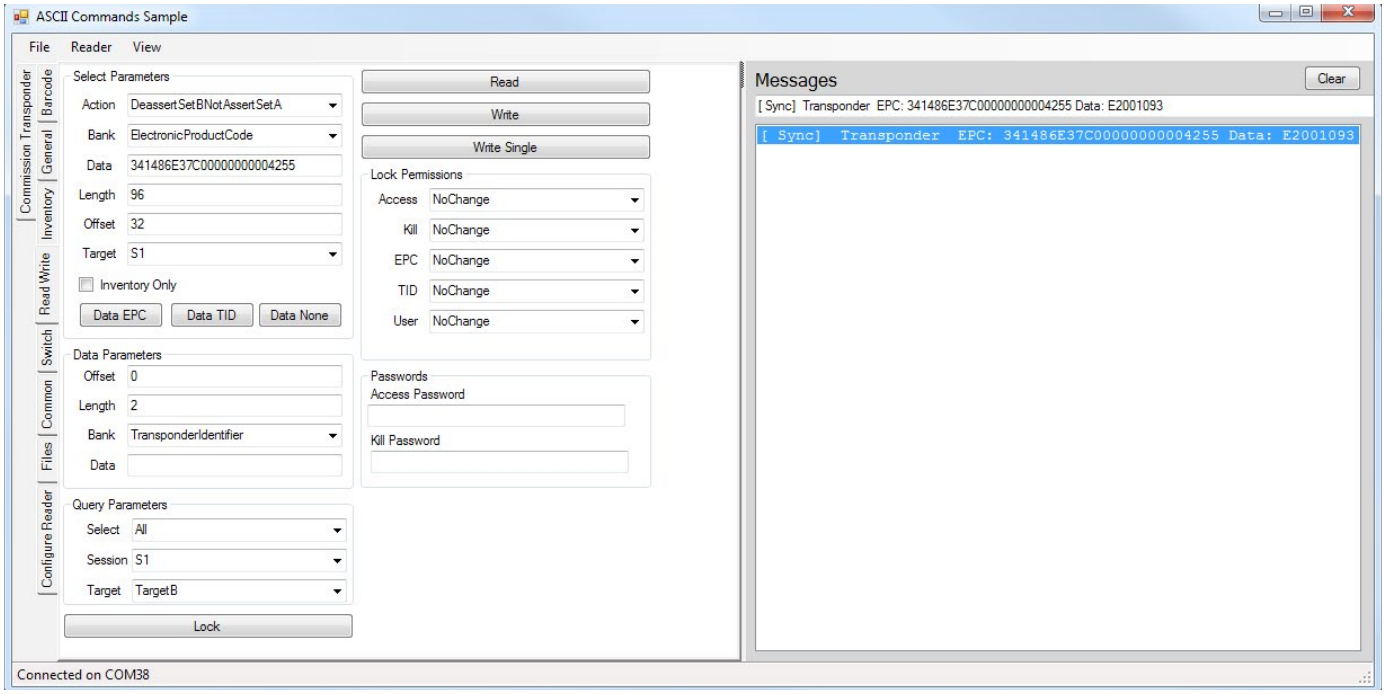

FIGURE 6: Read Write Tab

The read write tab contains functionality to perform transponder access operations.

- Lock – lock one or more transponders
- Read – read one or more transponders
- Write – write one or more transponders
- Write single – write a single transponder (see also commission transponder)

All the commands that access transponder memory have a similar set of properties that are represented on this screen.

The select parameters, when not performing 'Inventory Only' performs a select to split the transponders in range into a matching and non-matching group as determined by the select action and select target. The select bank, data, length and offset are used to determine what to match (or not match) for the transponders.

The query parameters determine which of the groups to return typically this is configured to be the matching select group although the alternate can be specified (i.e. not matching).

The 'Data EPC', 'Data TID' and 'Data none' assume that the value pasted into the Select Data is an EPC, TID or no data respectively and on pressing the button configures the select and query parameters to target transponders appropriately. To target more than one transponder the q value for the command will need to be set to a higher value.

The Data parameters are used to specify what to read or write.

The Password parameters are used to specify the required access and kill passwords. When specifying a password this should be an eight character (four byte) hex value.
The Lock parameters are used with the lock command to restrict access to the transponder memory

There is a text box above the messages list that displays the value of the selected list item. This provides mechanism to select a line in the messages list and copy values (e.g. EPC or TID) from the text box into the select mask field.

The parameters on the common tab are applied to the commands on this tab to control the output power and values output for each transponder.

SWITCH TAB

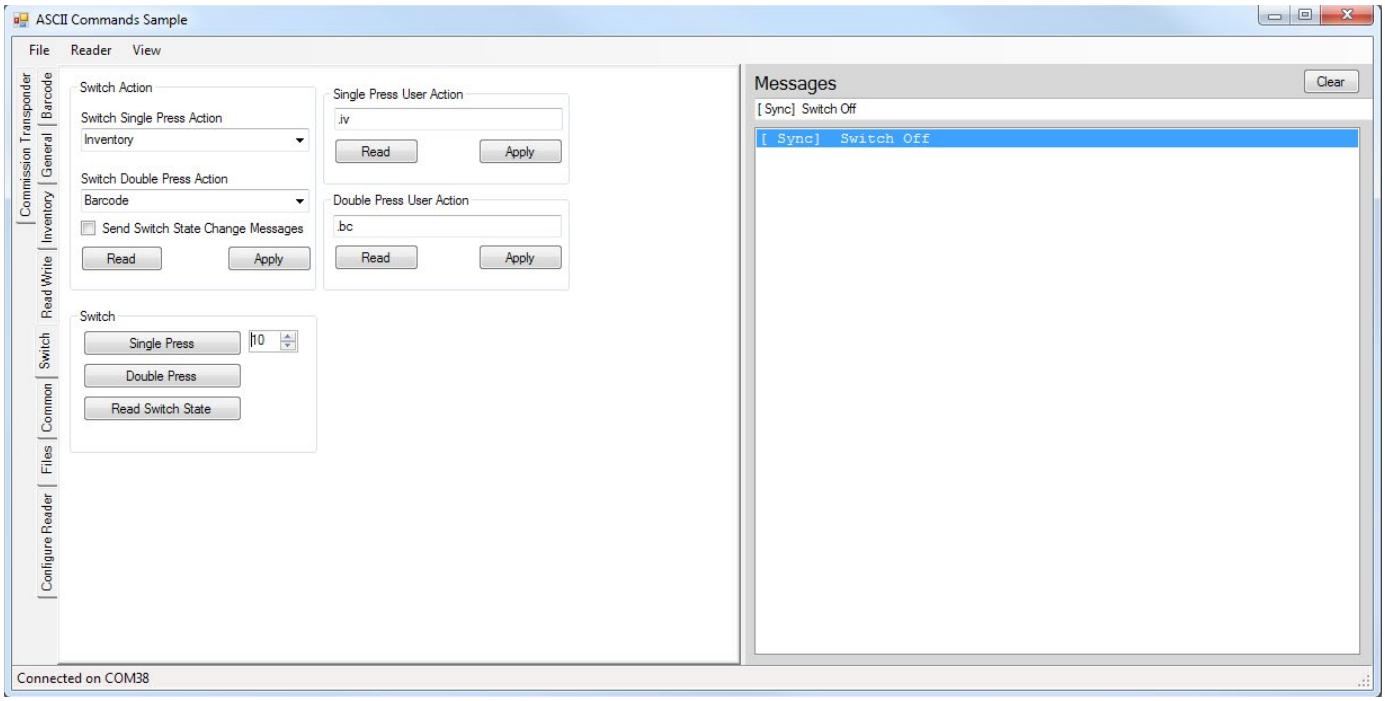

FIGURE 7: Switch Tab

The switch holds the controls added by the Switch sample code. The switch actions can be customised and configured or even turned off and the asynchronous notification of the change in switch state can be enabled.

There are also functions to perform a ‘soft’ switch, that is to command the reader to behave as if the single or double action has been triggered for a period in seconds. This can be aborted with the ‘Abort’ button on the commands tab.

COMMON TAB

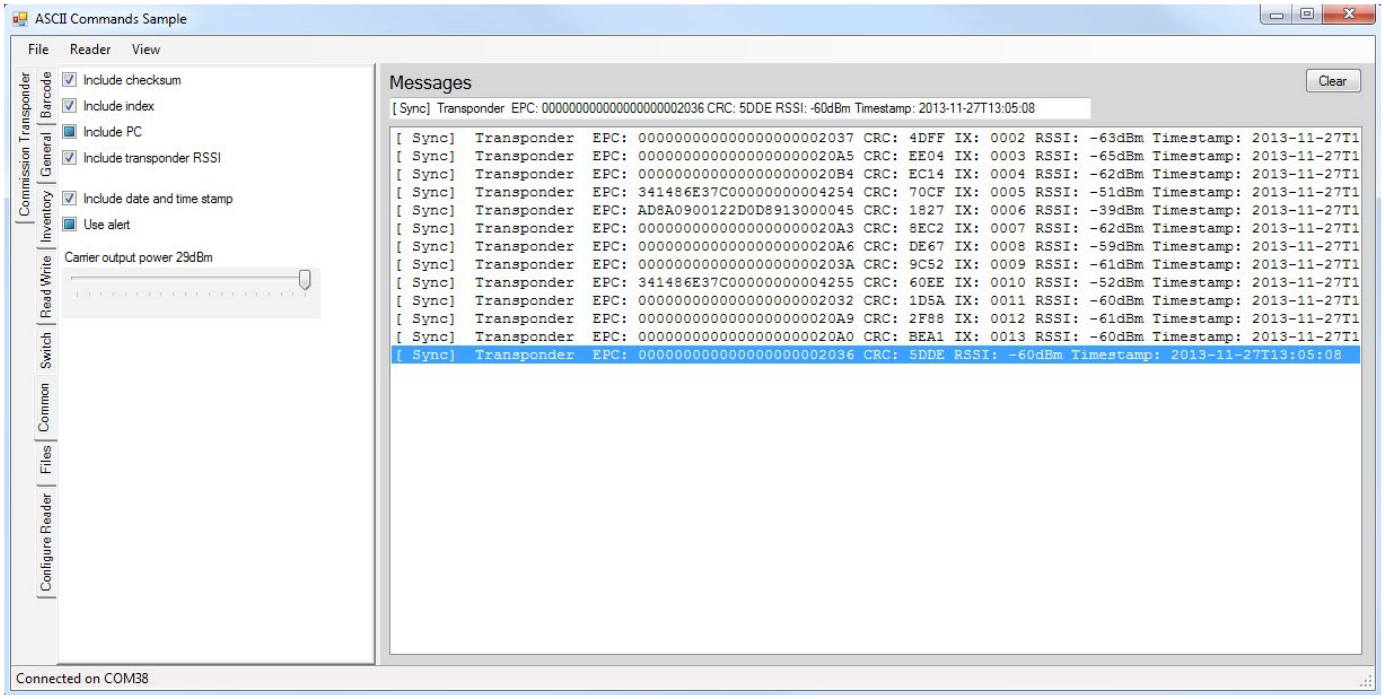

FIGURE 8: Common Tab

The common tab has been provided to provide a central location for a number of parameters that are common to many commands.

The majority of parameters for commands are optional. Where the parameter is not specified the reader uses the last specified value or the default if the value has never been specified. The checkboxes on this view are tri-state, they can be set to yes, no or not-specified. When set to not-specified the reader uses the last specified or the default value. When set they command the reader to that value and also specify the value for future commands. Note the reader maintains a separate cache for each value per command.

The ‘date and time stamp’ and ‘use alert’ properties are implemented by a number of commands. Where supported by a command they will inherit the values specified here when executed (e.g. inventory, read, write).

The checksum, index, PC and transponder RSSI are optional fields that are output when a transponder is reported by the API. Commands that return one or more transponders inherit these values.

AUTORUN AND LOG FILE

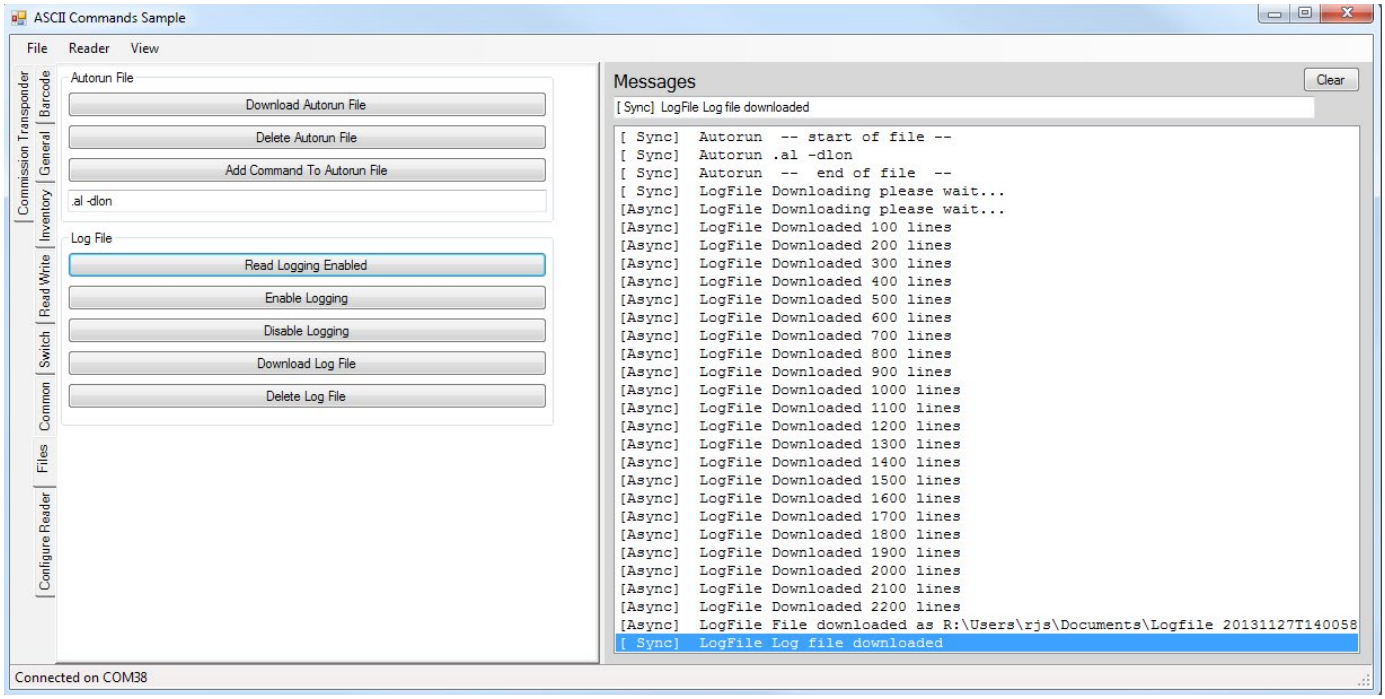

FIGURE 9: Autorun and Log Files

The Files tab demonstrates the Autorun and log files. For these commands to work an SD card must be installed in the reader.

The autorun file is a list of commands stored in a file on the SD card in the device. All the commands get performed as the reader boots. By adding a number of commands to the Autorun file and specifying the TakeNoAction parameter for each allows the reader to override its defaults for commands and also customise the trigger actions without any external commands.

- Download Autorun File – displays the autorun to the messages
- Delete Autorun File – deletes the autorun file from the device
- Add Command To Autorun File – Appends the specified command to the autorun file.

The log file (when logging is enabled) logs all the responses that are sent from the reader to the SD card.

- Read logging enabled – determines whether logging is enabled
- Enable logging – enables logging
- Disable logging – disables logging
- Download log file – Downloads the log to a file which is copied into “My Documents” prompts are displayed while the file is downloading.
- Delete Log File – deletes the log file on the reader

COMMISSION TRANSPONDER

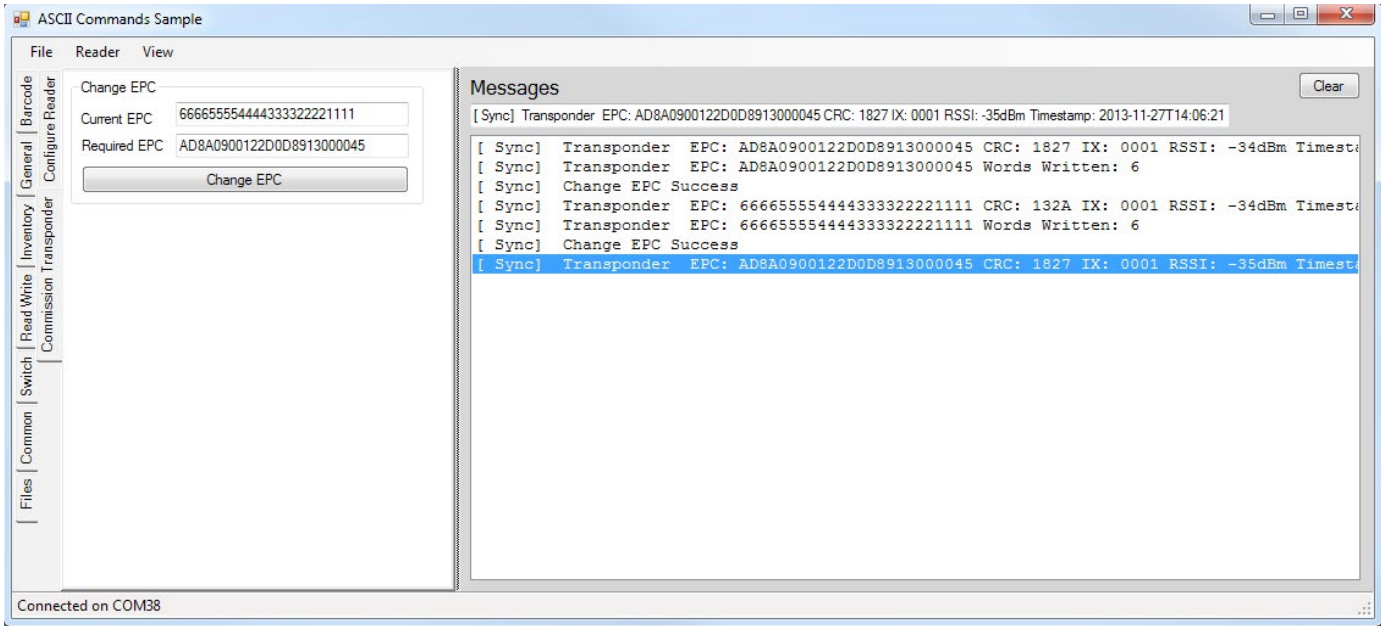

FIGURE 8: Commission Transponder

The Commission Transponder screen currently provides an example of changing the EPC of a transponder using the *WriteSingleTransponder* command. This currently only supports writing an EPC of the same length but could be expanded to support changing the length of the EPC by incorporating writing the PC word.

Used in conjunction with the read and write tab other areas of the transponder can be configured using including the access and kill passwords and then a *LockCommand* can be used to secure the transponder.

CONFIGURE READER

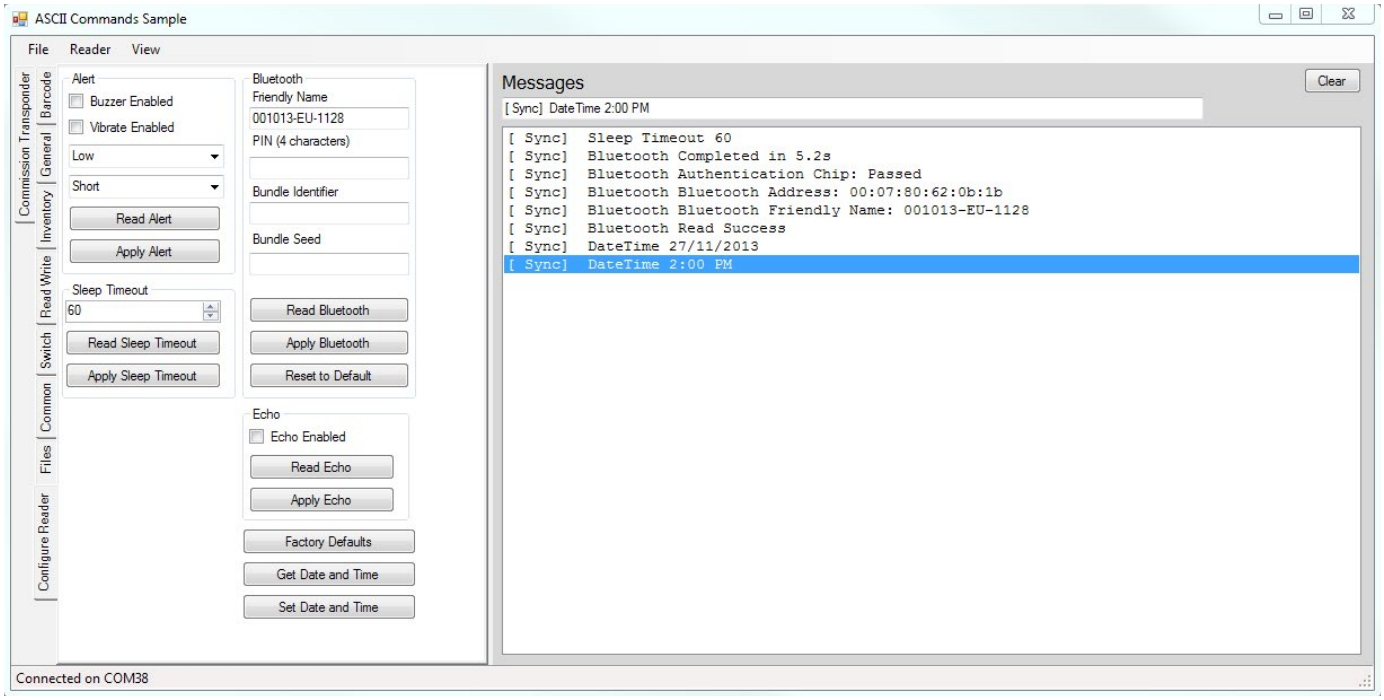

FIGURE 11: Configure Reader

- The ‘Alert’ box configures the alert command. Read will read the current settings and Apply will update the alert command.
- The ‘Sleep Timeout’ box reads and writes the idle time after which the reader will sleep in seconds.
- The ‘Bluetooth’ box provides the ability to read, reset and update the Bluetooth settings. Note that only the Bluetooth address and friendly name can be read back. Other values are write-only for security reasons. This command is useful to configure the Bundle identifier and seed so that compatible iOS applications can be identified from the app store based on these values.
- The ‘Echo’ group reads or applies whether command echo is turned on. When enabled the command sent to the reader is echoed to the host before sending the response.
- ‘Factory Defaults’ performs the factory defaults command to revert the reader to its defaults
- The date and time are provided to read and write the real time clock in the reader.

VIEWING THE ASCII PROTOCOL RESPONSES

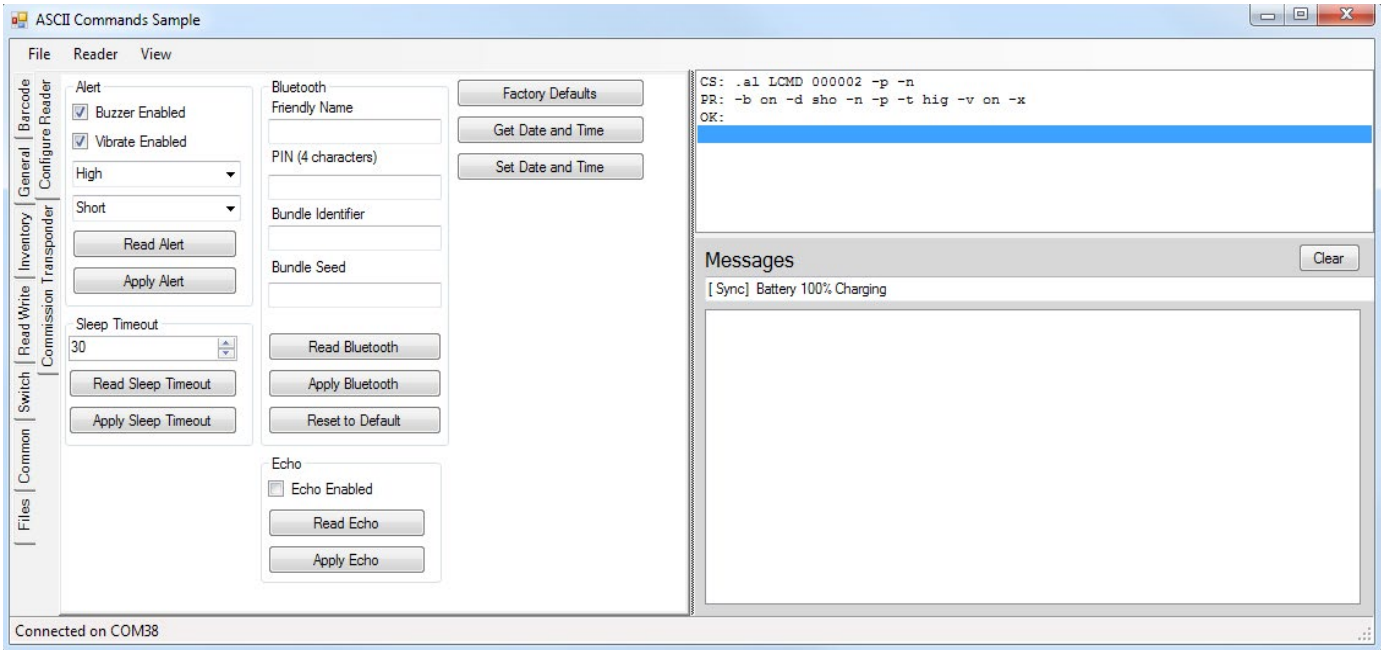

FIGURE 12: The Protocol Response Display (top)

All reader commands in the .Net API provide a convenient method of issuing ASCII commands to the device. To see the raw ASCII command responses for the operations in the sample application use the Protocol Response Display. This can be toggled using the View>Show Protocol Responses menu option.

To display the responses from the reader a *DisplayResponder* is inserted at the top of the responder chain. This echoes each line received in sequence to the screen. An exception is log download, the *FileDownloadResponder* is placed above the *DisplayResponder* in the responder chain. This identifies the start and end of a log file download and captures all the output to a file which is then opened at the end of a download. It is implemented this way as a file was considered more useful than displaying the log on screen. It demonstrates how responders in the responder chain can consume or pass on ASCII responses to later responders. Also the log file is potentially large and displaying all the messages to screen can take much longer than writing the log out to a file.

The Technology Solutions ASCII API has the options to identify a command as a library command and also to index each command sent. This is not required by the reader which has loose parsing requirements but as the reader can echo the command in the response the library uses this feature to determine responses to library commands and specifically indexed commands from responses generated from trigger presses and other means. This can be seen using the Protocol Response Display and comparing the lines prefixed by CS: for commands issued using the on-screen buttons and those arising from trigger operations.

CODE DESCRIPTION

This code sample builds on the simpler Inventory, switch and read write code samples. The functionality of the application is split into view models. The view models are mostly data bound using *System.ComponentModel.INotifyPropertyChanged* to reflect changes in values between the view model and the user interface (View / Form / User Control). Actions are implemented using *ICommand*. This simple interface allows an action to be defined and a method to determine whether it can execute. *Controls* on the views can then be bound to the *ICommands* presented by the view model using the appropriate *CommandBinder* instance to bind a Control to an *ICommand*. The *ReaderCommand* class handles reflecting the *ICommand.CanExecute* to the *Enabled* property of the bound control based on the state of the reader (connected, idle). To determine how a function of a button or menu item is implemented you can determine the *ICommand* the control is bound to in the View (Form) and find the execute delegate for that *ICommand* in the view model.

The *ReaderService* handles setting up the connection and communication with the reader via a com port. This class is inherited by *CommandService* which performs the setup of the responder chain to report reader responses back to the user interface. All messages to the user interface are now routed through the *MessageService* providing a common channel for messages from the responder chain and output after completing a synchronous command. The *DisplayResponder* is a custom responder to capture all responses from the reader to show on the UI routed through the *MessagesService*. The *SwitchAsynchronousResponder* is a custom responder that is added to the responder chain to capture the asynchronous changes in switch state when enabled.

The tabbed view hosts a user control per tab that encapsulates the user interface for that tab. The view in turn communicates with an appropriately named view model. The view model provides the properties and *ICommands* that are bound to the user interface in the view.

FURTHER INFORMATION

More information can be found on the Technology Solutions website. The product downloads section of each product requires a free, one time, registration. See “Product Downloads” of the following products to download the document describing the ASCII Protocol and also user manuals for the products.

http://www.tsl.com/products/1128-bluetooth-handheld-uhf-rfid-reader/

http://www.tsl.com/products/1126-desktop-uhf-rfid-reader-with-usb/

If you have any questions please contact support@tsl.com

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