



# TCOPlus – Extended Features

Tech Note – TN1001  
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# Introduction

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TCOPlus is a set of features designed to dramatically reduce your total cost of ownership (TCO) and improve the service that your wireless endpoint provides.

This application note describes configuration and operation of those TCOPlus features having a graphical user interface accessed through the main SkyRouter menu with the exception of the PowerMinder feature which is described in TechNote 0020. In addition to this document see the following references for information on other TCOPlus features.

- TIB0001 – Network Data Logging
- TIB002 – SkyRouter Firmware Update Application
- TN0009 – SkyRouter SMS Management Commands
- TN0013 – SkyRouter Configuration Facilities
- TN0020 - PowerMinder power reduction TechNote

# Accessing TCOPlus

On SkyRouter products TCOPlus is accessible through the main menu by selecting Tools. This menu is shown in figure 1. If your SkyRouter doesn't display the TCOPlus buttons under the tools selection the TCOPlus feature has not been installed. In this case contact Ctek for additional upgrade information.

Selecting the Tools menu option advances you to the TCOPlus top level menu which provides a path to each of the TCOPlus top level features.

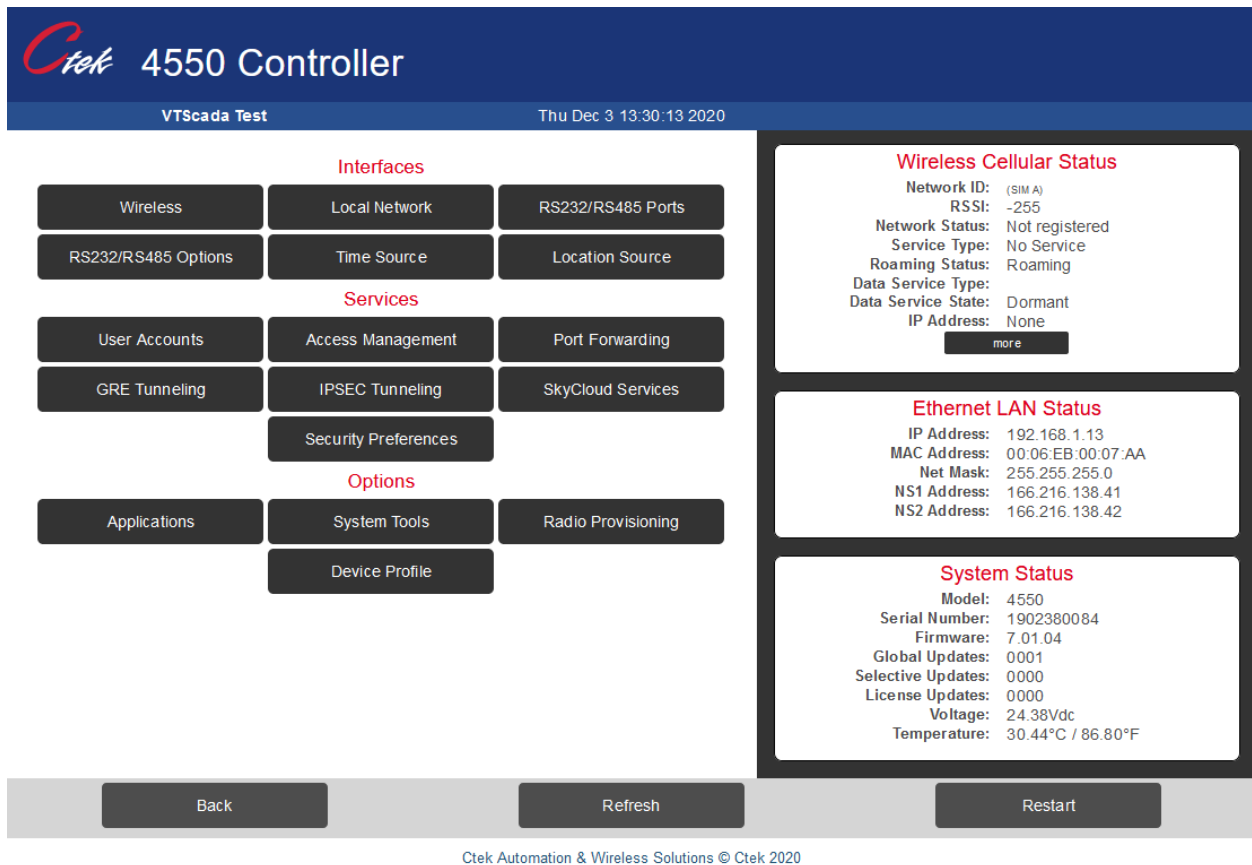


Figure 1

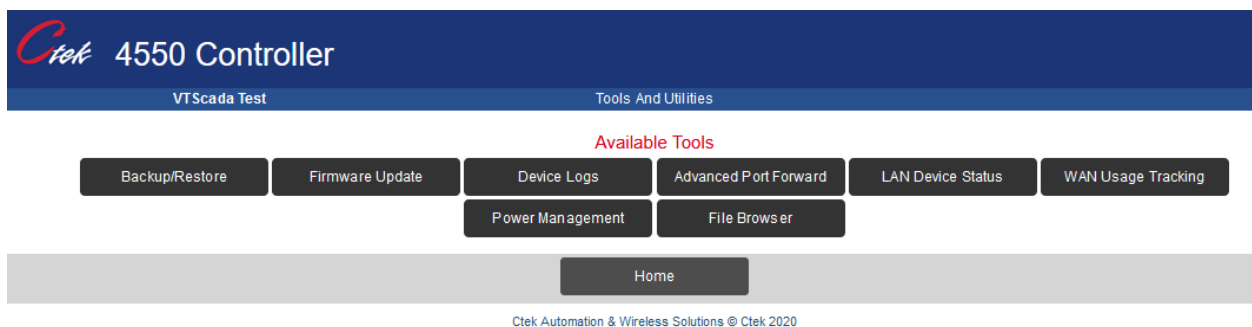


Figure 2

# TCOPlus Features

## Screen Editor

While almost all of the administrative tasks associated with SkyRouter operation can and should be performed through the web interface the occasion may arise when a specific configuration file requires editing. The TCOPlus screen editor is a safe, user friendly tool to accomplish that task. When selected the screen editor displays an editable view of the SkyRouter's root (top level) directory structure as shown in figure 3.

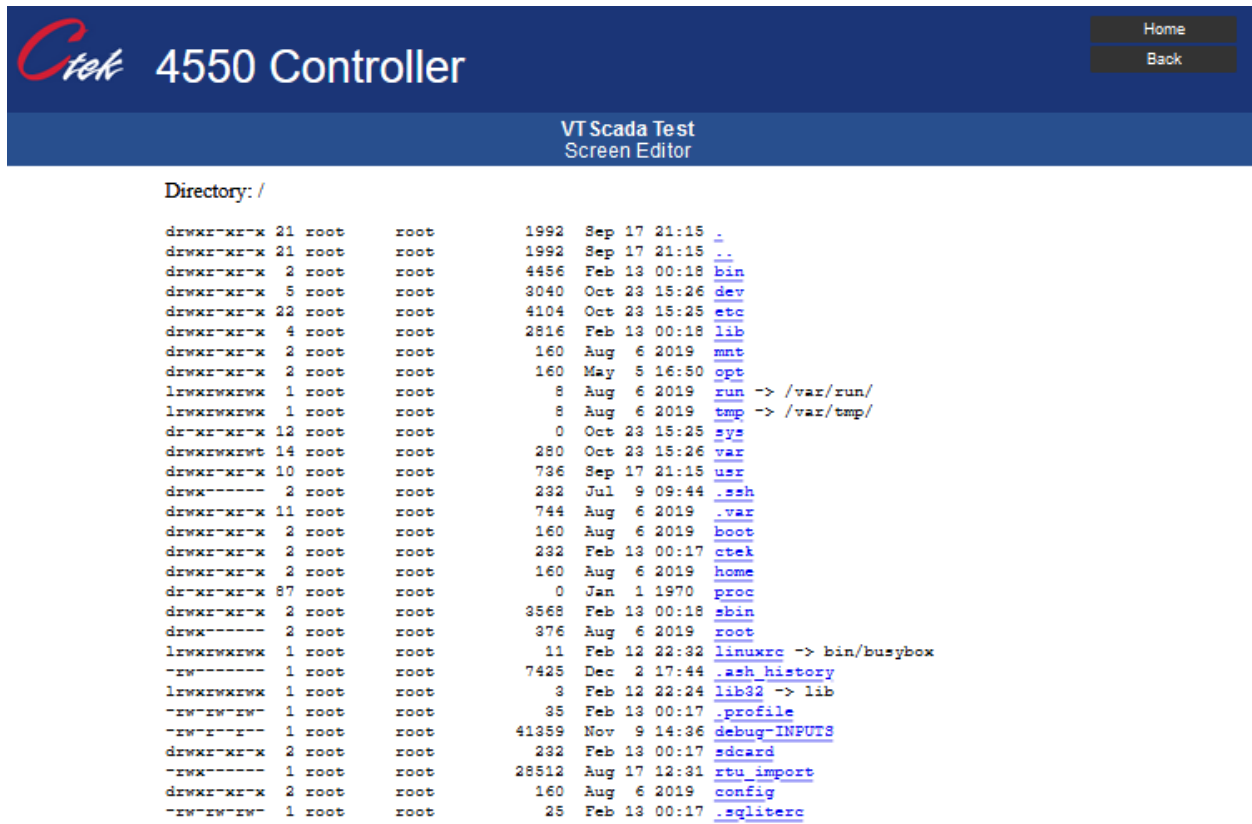


Figure 3

Selecting a directory or file advances the editor down the directory hierarchy. Selecting a file for edit produces the following screen.

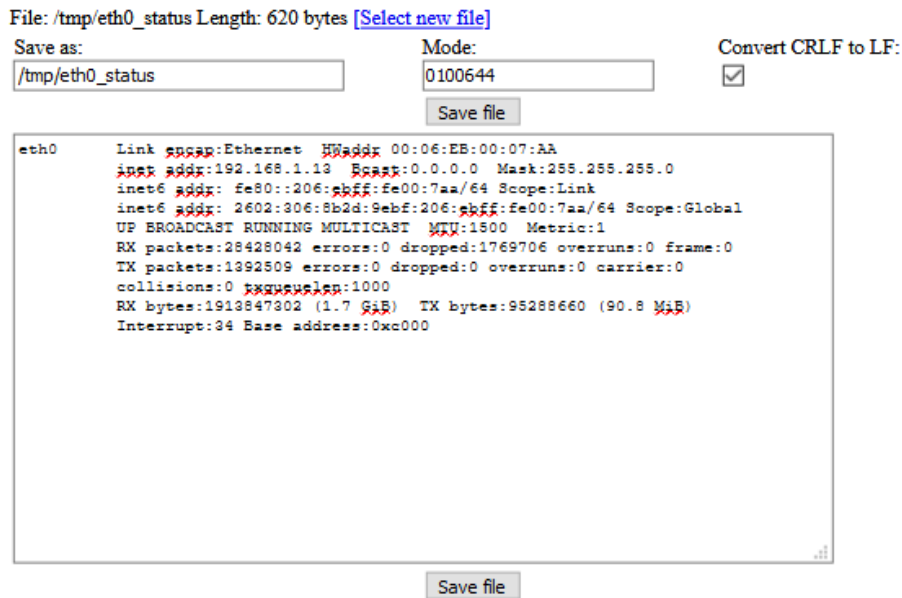


Figure 4

Using standard Windows mouse control and edit keys such as backspace and delete allows the user to change configuration variables. The screen editor operates in insert mode only meaning that characters entered will displace existing characters to the right. To change an existing value delete or backspace over the existing value and then enter the new value. When the required changes have been made press the Save file key and use the standard browser back arrow key to navigate back to main menu. To cancel changes simply back arrow to the higher level menu without selecting Save file.

## Flash Update Client

The Flash Update screen is used to set the control parameters that allow a SkyRouter to automatically obtain firmware updates over the air from a remote server. For additional information on the server see Ctek Technical Information Bulletin TIB002. Selecting the Flash Update Client causes the following screen to be displayed. An explanation of the parameters follows the screen image.

No Operation In Progress

### Update Counts

---

Global Updates: 0001  
Selective Updates: 0000  
License Updates: 0000

### Server Set-up

---

Server Address/URL: <input type="text" value="192.168.1.192"/>	Username: <input type="text" value="JES01"/>
File Path: <input type="text"/>	Password: <input type="text" value="Update Pass word"/>

### Auto-Update Configuration

---

Update Frequency:  
 ▼

Start UpdateSaveBack

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**Figure 5**

### ***Global/Selective/License Update***

The Global, Selective, and License Update counters indicate a sequence of updates applied to this unit. Global updates will be applied to all units of a specified model. Selective updates will be applied to units of select revisions of the model numbers. License updates may be applied to units that have purchased a License agreement for extra features like TCOPlus.

### ***Server IP Address/URL***

The routable (public or private) IP address or URL of the update server being used

### ***Update Frequency***

How often a SkyRouter check with its assigned update server to see if any new updates need to be applied. A SkyRouter will make this check after each power up sequence and at this interval. Valid values for this field are NEVER (no updates), DAILY, WEEKLY, MONTHLY.

### ***Username/Password***

The required login information for the update server.

### ***File Path***

This is an optional directory setting for this update server user account.

### ***Save***

This button applies the changes to flash memory where they will be available after the next restart.

### ***Start Update***

This button overrides the frequency setting and forces the SkyRouter to immediately connect to the update server to check for updates.

## LAN Device Status

The LAN device status function allows the user to ping (issue and ICMP echo request) to an IP address on the LAN or WAN side of the SkyRouter. Complete numeric IP addresses must be used as DNS resolution is not applied to this command. Figure 6 below shows a ping of IP address 216.58.219.46 (www.google.com). Buttons and fields are discussed after figure 6.



The screenshot displays a web interface for the LAN Device Status function. It features a label "IP Address:" followed by a text input field. Below this is a label "Response:" followed by a large, empty rectangular area intended for displaying the ping results. At the bottom of the form, there are two buttons: "Submit" on the left and "Back" on the right. The footer of the page reads "Ctek Automation & Wireless Solutions © Ctek 2020".

**Figure 6**

### ***IP Address***

This field is used to enter the LAN or WAN IP address.



# WAN Usage Tracking

The WAN usage tracking function monitors the number of bytes of data transmitted and received on the wireless interface during the current billing cycle (month) and the previous billing cycle. It also provides a mechanism to limit the data usage during and billing cycle, either manually by alerting selected personnel or optionally by turning off the data connection until corrective action has been taken.

<b>Data Usage Summary for Period: 11/17/2020 - 12/03/2020</b> Bytes		
Transmit (TX): 0	Recieve (RX): 0	Total: 0
<b>Data Usage Summary for Period: 10/17/2020 - 11/16/2020</b>		
Transmit (TX): 0	Recieve (RX): 0	Total: 0

## Mobile Data Plan

Billing Cycle Start Date:

Mobile Data Limit:

## Data Usage Management

### Approaching Data Limit:

Send Alarm at Limit:

Warning Limit(% of Total):

SMS Message:

### SMS Alert Destination:

Phone Number(s):

### Data Limit Reached:

Disable Data at Limit:

Send Alarm at Limit:

SMS Message:

## WAN Admin Access & Intrusion Prevention

Disable Access on Intrusion Attempt:

SMS Alert on Intrusion Attempt:

SMS Address:

SMS Message:

Figure 7

## ***Data Usage Numbers***

The usage summary for the current billing cycle

### ***Mobile Data Plan***

**Billing Cycle Start Date:** This field is used to specify the number day (1 – 28) on which the billing cycle begins.

**Mobile Data Limit:** This field is used to set a cap on the amount of data that can be used in a billing cycle.

It is a four digit (0000 – 9999) field that is multiplied by the drop down that allows you to set the measurement in Kilobytes, Megabytes, or Gigabytes.

Kilobytes = Usage Limit Value \* 1024 bytes

Megabytes = Usage Limit Value \* 1024 \* 1024 bytes

Gigabytes = Usage Limit Value \* 1024 \* 1024 \* 1024 bytes

### ***Data Usage Management***

The data usage management panel is used to establish limits on the amount of data that can be transferred (transmit + receive) before action is taken.

**Approach Data Limit:** If Send Alarm at Limit is set to Yes it will send your custom SMS Alert Message when the designated percentage from 1 to 99 percent of data has been used.

**Data Limit Reached:** If Disable Data at Limit is set to Yes it will cause the router's WAN connection to be disabled and the unit to be cycled through a restart when the limit is reached. If Send Alarm at Limit is set to Yes it will send your custom SMS Alert Message when the set data limit has been reached.

**SMS Alert Destination:** allows you to set one destination phone number that will receive the Data Usage Alert message. Must be a 10 digit phone number of the handset or terminal where the SMS message is to be sent. Dialing plans using less than 10 digits should zero pad the number as in 0055551212.

### ***WAN Admin Access & Intrusion Prevention***

**Disable Access on Intrusion Attempt:** If set to Yes the system will lock out the ability to login for 30 minutes after 3 failed login attempts are made in a row regardless of time waited between attempts.

SMS Alert on Intrusion Attempt: If set to Yes will send a customized Alert Message to SMS Address.

SMS Address: allows you to set one destination phone number that will receive the WAN Admin Access & Intrusion Prevention message. Must be a 10 digit phone number of the handset or terminal where the SMS message is to be sent. Dialing plans using less than 10 digits should zero pad the number as in 0055551212.

SMS Message: Allows you to make a customized Alert Message that will be sent to the specified SMS Address.

### ***Remotely Override Data Limit WAN Shutdown***

If a router disables its WAN connection when the limit is reached it may be place back in service remotely by sending the unit an SMS message that contains only the SMS command `===ENABLE===`. This string should be sent in the body of a text message sent to the SkyRouters phone number.

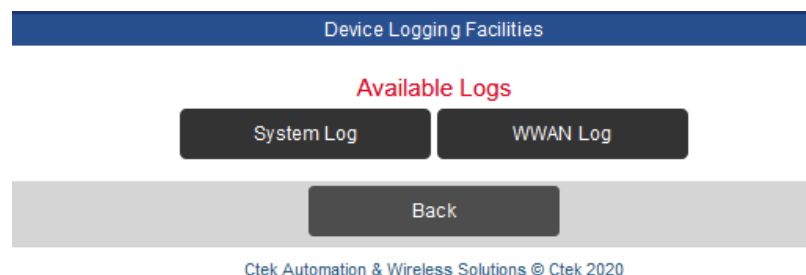
When this SMS is received at the router it will cause the unit to enable its wireless WAN interface and perform a restart. When the restart is completed the unit will be back online and the transfer of data will resume.

## **LOGGING**

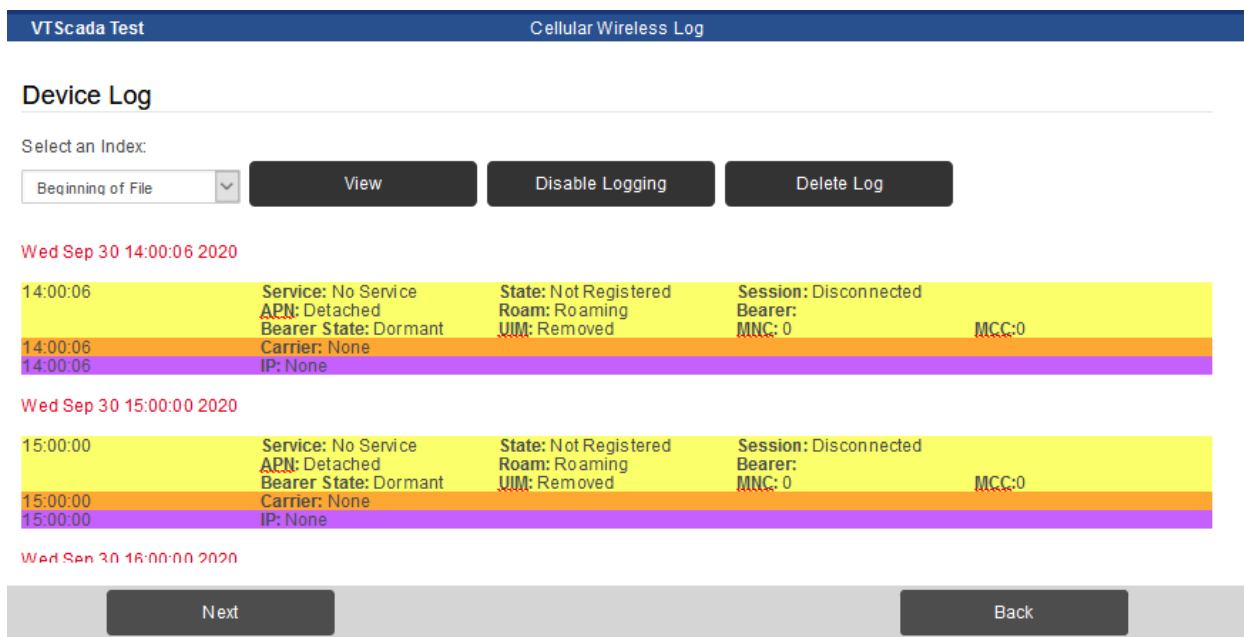
- An entry is made in the log when the unit goes over limit and is disabled.
- An entry is made in the log when the unit is enabled using the SMS command.

## Logging Facilities

SkyRouter's logging facility records changes in critical network parameters as well a key events occurring on the SkyRouter. Logging is controlled through the Logging Facilities feature. Log entries can also be viewed online using this feature. If you wish to send a small segment of a log via email the log information may be copied from the web screen using the Windows clipboard. In addition a complete log can be retrieved using the FTP command as described in Ctek Technical Information Bulletin TIB001. Selecting the Logging Facilities entry on the TCOPlus menu will display the screen shown in Figure 8.



**Figure 8**



**Figure 9**

### ***Disable/Enable logging***

This button acts as a toggle to either enable or disable the logging feature.

### ***Delete log***

This button will zero out an existing log. Creating an empty log is a convenient way to create a user controlled starting point to monitor a specific unit.

### ***View log***

Select an Index: The log index provides a series of convenient entry points into the details of the log. It is important to recognize the index entries are only starting points in a continuous log. Therefore it's likely, depending on the frequency of log updates, that some of the log indices may show overlapping data. When a log index is selected and the view button is pressed then the details of the log file are displayed.

### ***Next/Back***

At the bottom of each detailed log screen there will be a back and a next button. The back button will return the user to the Log Index screen while the Next button will advance the user to the details of the next index entry.

## System Log

Date	Event
Nov 6 12:01:10	Ctek_SkyRouter daemon.notice app_rtu: ##### 3 0 RD INPUT PARAMETERS 25 2
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal count 2 or address 50 in read_holding_registers
Nov 6 12:01:10	Ctek_SkyRouter daemon.notice app_rtu: ##### 3 0 RD OUTPUT PARAMETERS 25 2
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal count 2 or address 1050 in read_input_registers
Nov 6 12:01:10	Ctek_SkyRouter daemon.notice app_rtu: ##### 3 0 RD INPUT PARAMETERS 25 2
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal count 2 or address 50 in read_input_registers
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal data address 1029 in read_input_bits
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal data address 29 in read_input_bits
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal data address 29 in read_coils
Nov 6 12:01:10	Ctek_SkyRouter daemon.notice app_rtu: ##### 3 0 RD INPUT PARAMETERS 25 2
Nov 6 12:01:10	Ctek_SkyRouter daemon.err app_rtu: MODBUS TCP Client - Illegal count 2 or address 50 in read_holding_registers
Nov 6 12:01:10	Ctek_SkyRouter daemon.notice app_rtu: ##### 3 0 RD OUTPUT PARAMETERS 25 2

Figure 10

## Advanced Port Forwarding

The Advanced Port Forwarding feature provides a web based interface to Iptables that supports the implementation of two specific types of port forwarding rules. The first category of rules are those that cause TCP and/or UDP traffic from a range of incoming (WAN side) ports to be forwarded to one specified IP address on the Local Area Network (LAN side) of a SkyRouter. Rule 1 shown in figure 10 is an example of this type of rule. In this case both TCP and UDP traffic arriving on ports 90 through 95 of the WAN will be forwarded to port 80 of IP address 192.168.1.10 on the LAN side of the SkyRouter.

VTScada Test		Advanced Port Forwarding	
<b>Add New Rule</b>			
For Traffic:	Inbound to Port:	Through:	
TCP	1-85535	1-85535	
Forward to:	Local Port/Start Port:	Local IP:	
Single Port	1-85535		
<b>Configured Rules</b> <span style="color: red;">Select a Rule to Delete</span>			
<input type="radio"/> Rule 1	For Traffic:	Inbound to Port:	Through Port:
	TCP/UDP	90	95
	Route to:	Local Port/Start:	Local IP:
	Single Port	80	15
<input type="radio"/> Rule 2	For Traffic:	Inbound to Port:	Through Port:
	UDP	5	10
	Route to:	Local Port/Start:	Local IP:
	Port Range	100	22
Delete		Add	
		Back	
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Figure 11

The second type of rule implemented by the Advanced Port Forwarding feature is demonstrated by Rule 2 in figure 10. Rule 2 directs the SkyRouter to forward all TCP and UDP traffic arriving

on ports 100 through 120 of the WAN interface to a range of ports on the LAN side IP address 192.168.1.10. In this example traffic on inbound port 100 will be routed to port 75 of 192.168.1.10, inbound traffic on port 101 will be routed to port 76 of the specified LAN address and so on and so forth up to the end of the rule which will route inbound port 120 to port 95 of 192.168.1.10.

Rules may be added by filling in the fields for Add New Rule and then clicking the Add button which displays an input screen as shown in figure 12. In the example shown in figure 11 a new rule (Rule 4) that forwards TCP traffic from inbound ports 133 through 137 to port 80 of LAN address 192.168.1.100 will be added when the Submit button is clicked. If successful you will see a green bar saying the Rule Successfully Added at the top of the screen.

To delete an existing rule, select the radial button next to the rule being deleted and click the Delete Button at the bottom of the screen. If successful you will see a green bar saying the Rule Successfully Deleted at the top of the screen.

**NOTE** – The Advanced Port Forwarding feature and the standard Routing and Forwarding feature found on the main SkyRouter menu may both be used in a single configuration or, each may be used independently of the other. However, care must be taken to avoid conflict between the standard forwarding rules and the Advanced Port Forwarding feature

**NOTE** – Advanced Port Forwarding changes (Add/Delete) will be stored in non-volatile memory once the Submit button is pressed. However, as with all SkyRouter setting changes the rule changes will not take effect until a Restart is performed on the SkyRouter.

## PowerMinder

The PowerMinder portion of the TCOPlus feature set is covered separately in TechNote TN0020

## Conclusion

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Once again it is important to note that this Application Note (APN) is targeted at the web interface portion of the TCOPlus feature set. In addition to this document see the following references for information on these and other TCOPlus features.

- TIB0001 - Network Data Logging
- TIB0002 - SkyRouter Firmware Update Application
- TN0009 - SkyRouter SMS Management Commands
- TN0013 - SkyRouter Configuration Facilities
- TN0020 - PowerMinder power reduction feature