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APPLICATION NOTE

Rainbow Scada Usage Guide		
PRODUCTS AFFECTED:	D-500 / D-700	
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Rainbow Scada Installation Guide



This document assumes that the RainbowScada program is installed to PC.

For installation details please check **Rainbow Scada D-500 D-700** Installation Guide.

Data Connection Establishment

Rainbow Scada requires an active internet connection to function. It acts as a server for all configured controllers.



As the Rainbow Scada program acts as a server, the router (ADSL modem, Fiber modem or standalone Router) must be configured to allow certain port(s) to be directed to the computer that the Rainbow Scada is running on.

Other than that, your internet connection must have a static IP-address or you have to use a Dynamic DNS service.

Static IP-address configuration requires you to communicate with your ISP (this may incur charges).

Dynamic DNS service is subscribed over the internet, very flexible and generally free for this kind of usage.

Running the program



When the program is installed, the RainbowScada icon is on your desktop.

Double click this icon in order to start the RainbowScada program



Configuring RainbowScada



The default TCP port that controllers will connect is port 90.

Other ports may be used as well.

To do that, please choose "Config" from the "File" menu. The "Config" screen will open.

Config X	ln T
TCP Listening Port 90 TCP Port	Va
UDP Listening Port 91	a
Communication Timeout (in seconds) 900 Comm	T
DynDns / User	a
Dynamic DynDns / Pass	U
DNS DynDns / Host	p
parameters	ru ef
Save Cancer	th

In order to change the TCP port number, enter a valid new port number and then click "Save".

The program will warn you to exit & re-run the application. "

UDP Listening Port" parameter is reserved for future use and has no effect in the operation of the unit.

The "Communication Timeout" parameter's default value should not be changed.

DynDns parameters hold your DynDns account details and when configured, refresh your IP information automatically. (there is no need to install DynDns update tool)



If DynDns parameters are not configured properly, then the automatic refreshing of the IP address will not occur.

After Rainbow Scada and remote controllers are configured and the router port redirection is set-up properly, remote controllers should start to appear on the geographical map.



They are also listed on the right hand "ControllerTree" under the "UNASSIGNED" block.

This ControllerTree configuration is read from the tree_*.cnf files that reside in the application executable directory.



As controllers connect to the Rainbow Scada, they appear on the Geographical Map and under the UNASSIGNED block at the right hand side of the screen.

If you edit the tree_*.cnf file according to your needs, you can relocate the controllers to more appropriate nodes by just dragging them with the mouse.

If you single-click on a controller on the Tree, the Map repositions itself to show that controller. If you single-click a controller on the Map, that particular controller is selected on the Tree.

If you double-click on a controller on the Tree, the Map repositions itself and the Device tab shows all the received information from that particular controller if that controller is currently online.

If you right-click on a controller on the Tree, You see a menu for useful actions related to that controller.



"Show Device Info" activates the Device Tab that displays all the information received from this controller.

"Set Device Position at Map Center" relocates the icon of this controller to the center of the Map if it is not position-locked.

"Set Device Position at Last Mouse Click" relocates the icon of this controller to the position of the Last Mouse Click. With this, you can locate the controllers accurately.

"Delete This Device" deletes this controller from both Map and Tree. If the controllers sends data again, then it will reappear in the UNASSIGNED block.

"Show Device Parameters" opens the screen on the left. You can only edit the GPS Data value and check/uncheck the Position Locked checkbox. If Position Locked is checked, this controller can not be relocated (useful for accidental relocations).

Site-ID	DATAKOM_2
Engine Serial	987654
Unique-ID	0A0305050C1F5453C898D04D
GPS Data	41.000423430, 29.155712130
GPS Lock	Position Locked
	Save Cancel



When you double-click a controller on the Tree, application takes you to the Summary screen that is shown on the left.

On this screen, you see the most vital information for your controller and the KeyPad that looks just like the one on an actual controller.

This KeyPad is functional but not real-time like a physical KeyPad. Depending on the connection type/quality, you may feel some feedback lag.

Color coding



Every genset is represented by a colour box, both on the map and on the right hand tree structure.

Colors on the map are sorted so that the most important information overrides other information.

On the right hand side tree structure, a controller with a fault condition will turn all upper levels to this color. As an example, if a controller shows a shutdown in a town, all these blocks will have orange color: the controller, the town, the city, the country.

Please check the controller DATAKOM_5 on the above picture. As the controller is red, Town_0101, City_010, Region_01 and Country_0 become red.

The color coding is as follows:

- **RED**: The controller has a high priority fault condition (shutdown or loaddump alarm)
- **ORANGE**: The controller has a low priority fault condition (a warning)
- GREY: The controller has stopped communication with the Rainbow Scada program.
- **GREEN**: The genset is running, there is no fault condition.
- BLUE: The controller is at rest, genset is not running, there is no fault condition.

Editing the Tree.cnf file

When installed for the first time, the Rainbow Scada program will come with a default tree file which is named TREE_XX.CNF

This file is found in the RainbowScada executable folder.

🖪 tree_XX - Notepad	
File Edit Format View Help	
Country_0	^
+Region_00 ++City_000 +++Town_0000 +++Town_0001 ++City_001 +++Town_0010	
+Region_01 ++City_010 +++Town_0100 +++Town_0101 +++Town_0102	~

This sample Tree Configuration file may be edited by **notepad** or any other text editor to reflect your Genset portfolio geographical distribution.

You can have several of these files in the form of "tree_***.cnf", they will be appended on the fly then used accordingly. Only ASCII/UTF-8 formatted files are accepted.

The tree file comprises a 4 level hierarchy which usually reflects countries, regions, cities and towns. In practice any other hierarch may be freely used.

Each block must be written on a new line without precedenting blank characters.

Top level blocks (usually countries), are directly written on a line. Level_2 blocks are precedented by a "+" (plus) sign.

Level_3 blocks are precedented by "++" (double plus).

Level_4 blocks are precedented by "+++" (double plus).

COUNTRY	REGION	CITY	TOWN
Country_0	Region_00	City_000	Town_0000 Town_0001
		City_001	Town_0010
	Region_01	City_010	Town_0100 Town_0101 Town_0102

Configuring the controller



The RainbowScada program must be installed to PC. The controller should be connected to the PC. Please check **Rainbow Scada D-500 D-700 Installation Guide**.



The RainbowPlus icon is on your desktop. **Double click** this icon in order to start the RainbowPlus program



The splash screen will come prior to program execution.

Below screen will open. Select **Tools>Connections** menu.

File Tools Help Sc
Sc Connections Password Protection Password Protection Dept. Mode Device Function
Harrs Engine Analog Inputs Digital Dutputs Connections menu Genset Reverse CT Direction Load Miscellaneous Emergency Backup Remote Control Enable
Read From Device Read From File Write To Device Write To File Device Write To File Device ID:

From the Connection Manager screen select **USB**. Then click **Connect**

Connection Manager		×
Serial Port Ethernet USB USB selection	Connect Disconnect Device Image: Scan Interval : Image: Image	
No Connection		

The connection status is announced in the bottom line. If a controller is connected through the **USB port**, the connection will be detected and device id and version will appear.

Rainbow Plus (Version 1.8)	
File Tools Help	
Scada Configuration	Functionality Screen Options Timers Exercise Scheduler Time Data Logging
Module Generator Mains Engine Analog Inputs Digital Inputs Digital Outputs Communication	Device Function Functionality Ammunicator Mode Engine Control Only Annunciator Mode CT Location Genset () Reverse CT Direction Load ()
Read From Device Read From File Write To Device Write To File	The connection status is displayed at this line
: Data Ready 🔰 Tx 🕘 Rx 🕘	Device ID: DSUU - HW Ver: 2.0 - SW Ver: 2.5

From below screen click *Read From Device*

Rainbow Plus (Version 1.8)		
File Tools Help		
Scada Configuration Image: Module Generator Image: Mains Engine Image: Analog Inputs Digital Inputs Image: Digital Outputs Digital Outputs Image: Communication Image: Communication	Functionality Screen Options Timers Exercise Scheduler Time Data Logging Device Function Functionality AMF Image: Control Only Annunciator Mode Image: CT Location CT Location CT Location Image: CT Location Image: CT Location Image: CT Location	
	Genset Reverse CT Direction Load	
Read From Device Read From File Write To Device Write To File	Read From Device button	
Data Ready 🥥 Tx 🌒 Rx 🌒	•	

A progress bar will open. Wait until read complete.

Rainbow Plus (Version 1.8)	
File Tools Help	
Scada Configuration	Functionality Screen Options Timers Exercise Scheduler Time Data Logging
Module Generator Mains Engine Analog Inputs Digital Inputs Digital Outputs Communication	Device Function Functionality Amnunciator Mode Engine Control Only Annunciator Mode CT Location Genset Reverse CT Direction Load Miscellaneous Emergency Backup Remote Control Enable
Read From Device Read From File Write To Device Write To File	Progress bar

Select Communication>Basic tab.

Rainbow Plus (Version 2.3) File Tools Help	
Scada Configuration	Basic IP Settings Email DNS GSM Ethernet RS485
Module Generator Mains Engine Analeg logute	Modbus Slave Address 1 CP/IP Port 502
Digital Inputs Digital Outputs Digital Outputs	Timer Web Refresh Rate
- IP Settings	Rainbow Refresh Rate 30 📚 sec
Email DNS GSM	Ping Period 30 Sec
Ethernet RS485	Modem
	Selection None Saud Rate 57600 V
	Engine Serial Number 987654 Site Id DATAKOM_2

Adjust the *Rainbow Refresh Rate* parameter as required. The minimum advised refresh rate is 30 seconds.

Adjust *Ping Period* parameter. Advised range is 30 seconds to 3 minutes.

If GPRS modem is used, then adjust *Modem Selection* parameter accordingly.

Fill *Engine Serial Number* and *Site Id* definitions. These strings will let you identify this controller from the data center.

Select Communication>IP Settings tab

Rainbow Plus (Version 2.3)	
File Tools Help	
Scada Configuration Module Generator Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Mains Configuration Configuration Mains Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Configuration Config	Basic IP Settings Email DNS GSM Ethernet RS485 Web Control Enable Server TCP/IP Port 80 Programming Enable Programming Enable User IP Mask IP #1 255 . 255 IP #2 0 . 0 IP #3 0 . 0 Pt #3 0 . 0 Control Enable . 0 Veb User IP Mask IP #1 255 255 .

Fill *Rainbow Server Address #1* parameter. If a second data center is required to be updated, then fill also the *Rainbow Server Address #2* parameter.

Adjust *Rainbow Server Port* parameters. These ports numbers are the IP ports that the Rainbow Scada program is listening.



These settings must be identical in all units and the Rainbow Scada program.

GSM modem is used for central monitoring

If GSM modem is used for central monitoring, then select Communication>GSM tab

Rainbow Plus (Version 2.3)	
File Tools Help	
Scada Configuration E	Basic IP Settings Email DNS GSM Ethernet RS485
Hodule Generator Mains Analog Inputs Digital Inputs Digital Outputs Communication Hestings Email DNS GSM Ethernet RS485	Enable GPRS Connection Enable GPRS to RS485 Gateway Enable SMS on IP Change Miscellaneous GSM Sim Card Pin No Miscellaneous User Name wap User Name wap SMS Phone Number No #1 +905062787106 No #2 No #3 No #4

Tick the **GPRS Connection Enable** checkbox.

Fill completely the *Miscellaneous* and *APN* fields.



Correct <u>APN Name</u>, <u>Username</u> and <u>Password</u> are required for successfull GPRS connection. Otherwise GPRS connection cannot be established.

Ethernet port is used for central monitoring

If the ethernet port is used for central monitoring, then select Communication>Ethernet tab

Rainbow Plus (Version 2.3)	
File Tools Help	
Scada Configuration	Basic IP Settings Email DNS GSM Ethernet RS485
Module Generator Mains Engine Analog Inputs Digital Inputs Digital Outputs Communication P Settings Email DNS GSM Ethernet DR 145	Ethernet Enable Ethernet to RS485 Gateway Enable IP Address Network IP 192 168 2 95 Gateway IP 192 168 2 2 1 0 5 ubnet Mask 255 255 255 0 0 0

Tick the *Ethernet Enable* checkbox.

Fill **Network IP**, **Gateway IP** and **Subnet Mask** fields. These settings are the same on all computers connected to the same LAN (local area network)



Saving the setup to the unit

Click *Write to Device* button in order to save programmed parameters.

A progress bar will open.

Wait until write complete.

