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Overview

The DRMCC UIM includes a highly integrated, rugged computer with a Linux-based operating system. There are three main program groups that are used in the monitoring system software, and each part needs some configuration for proper operation. This configuration is stored in configuration files, which are simple text files generated by the DRMCC Setup software. The programs that need configuration are DRMCC, MODBUS and DNP. These configuration files need to be uploaded from a PC or lap-top computer with terminal emulation software such as HyperTerminal. Other operations include downloading DRMCC data files, setting the hardware clock, using a modem and monitoring the system logging events.

The term **upload** refers to transferring files from a remote terminal to the DRMCC UIM. A **download** is a transfer of files from the DRMCC UIM to a remote terminal.

Creating DRMCC Configuration Files

The following assumes the install files are on diskette in drive a:\. of a PC running Windows. Click on [Start], [Run] and type in a:\ Install [Enter].

Directories C:\DRMCC and C:\DRMCC\Example are created if they do not already exist.

The following files are copied to the respective directories as shown:

- C:\DRMCC\DRMCCSetup.xls
- C:\DRMCC\DRMCCBlank.xls
- C:\DRMCC\Example\Example.xls

From Windows explorer, double click on C:\DRMCC\DRMCCSetup.xls.

Excel runs and opens the setup spreadsheet.

Type in a project name or ID, click on [OK].

A project subdirectory is created with a copy of DRMCCBlank.xls.

This project spreadsheet opens. Click on [Close].

Fill in the data in the spreadsheet and [Save].

Click on [Create DRMCC files].

The following configuration files will be created in the project directory:

- alarms.txt
- factory.txt
- history.txt
- linux_dnp.ini
- modbus.txt
- systemio.txt
- user.txt

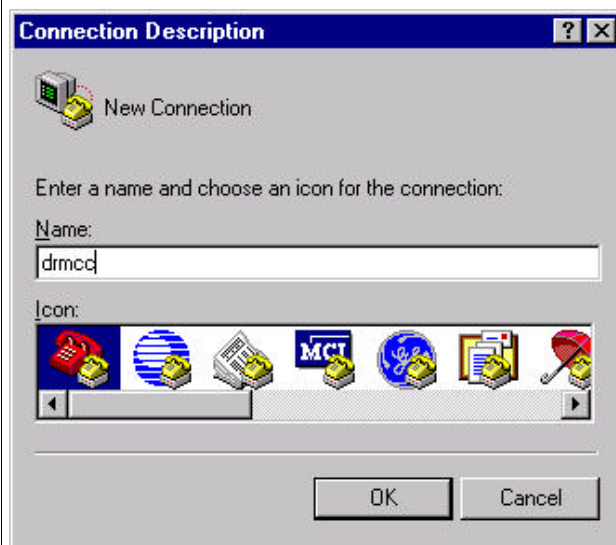
Running HyperTerminal

You will need:

- A PC with HyperTerminal (Located in Start->Programs->Accessories->HyperTerminal)
- A laplink cable (RS232 Null Modem cable)
- A functioning DRMCC

Plug the laplink cable into the PC COM1 port and the other end into DRMCC PORT 7 RS232. Start HyperTerminal.

HyperTerminal should prompt you for a connection name. Call it 'drmcc' as shown; click OK



The next screen is as shown.

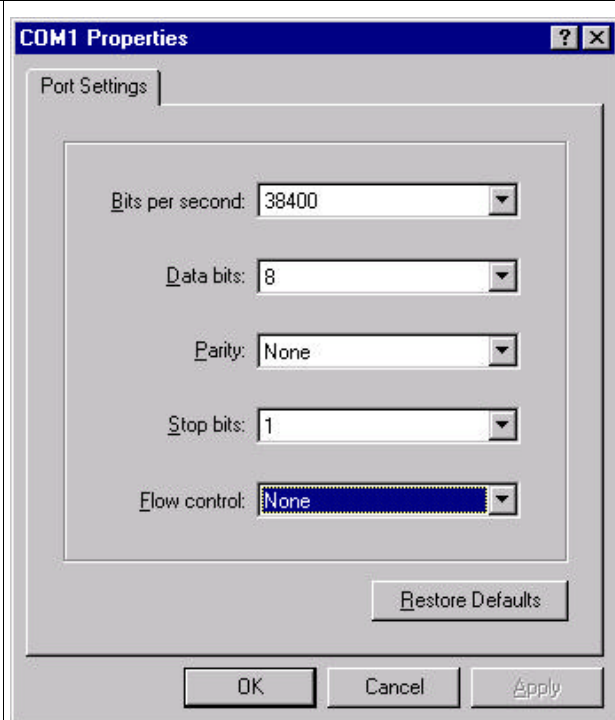
Simply click OK.



Then the following screen is displayed but with incorrect settings.

Change the settings as shown.

Click OK.



Press Enter. The prompt to login should appear. Enter the name 'user' as below.

```
drmcc_t1 login: user <Enter>
```

```
Password: <Enter>
```

```
drmcc_t1 $ // This is the command-line prompt
```

Trouble-shooting - what if the login prompt does not appear:

- Could be hardware: cable faulty or not plugged in properly
- Maybe did not log-out of previous session: to clear press [Ctrl] + d
- Maybe last file transfer was interrupted: to clear press [Ctrl] + x

Uploading DRMCC Configuration Files

The DRMCC configuration files live in the '/home/user/etc' directory. The DRMCC UIM is supplied with a set of example files, which will not be suitable for customer installations. New files can be created using the DRMCC Setup utility - ref Creating DRMCC Configuration Files.

The files can only be uploaded once the existing files are moved. To move the existing files use the command:

```
drmcc_t1 $ config_drmcc new <enter>
```

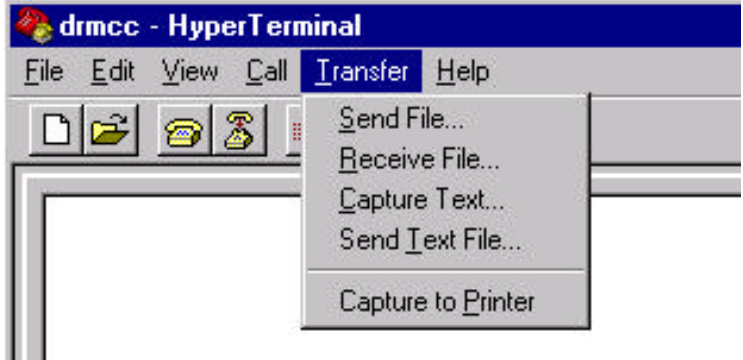
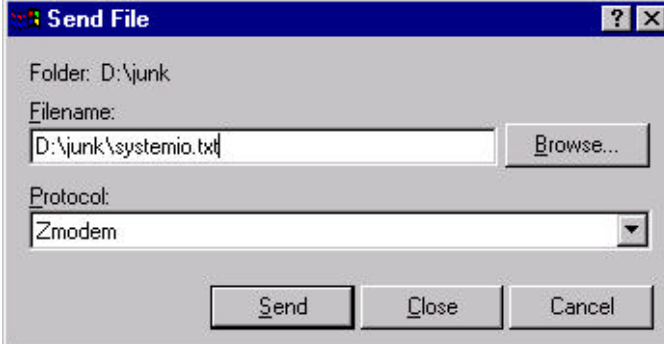
This script changes the directory to/home/user/etc and moves the essential configuration files to .old extensions. The .old files can be restored with the command below.

```
drmcc_t1 $ config_drmcc restore <enter>
```

This also over-writes any existing configuration .txt files so be careful.

To upload the new files, first change directory to /home/user/etc

```
drmcc_t1 $ cd /home/user/etc <enter>
```

<p>Run HyperTerminal and log in. Run script: "config_drmcc new" as previously discussed. Prepare HyperTerminal for a file upload. Click on <u>S</u>end File in the <u>T</u>ransfer menu.</p>	 <p>The screenshot shows the 'Transfer' menu in HyperTerminal. The menu items are: Send File..., Receive File..., Capture Text..., Send Text File..., and Capture to Printer.</p>
<p>Upload the new configuration files using Hyper-Terminal's Send File screen. Instead of "D:\junk\" as shown, enter the actual source path (hint: use the <u>B</u>rowse button). Example: C:\DRMCC\project_ID\ The files are sent to the current working directory in the UIM. Repeat for each file to be sent.</p>	 <p>The screenshot shows the 'Send File' dialog box. The 'Folder' field is set to 'D:\junk'. The 'Filename' field contains 'D:\junk\systemio.txt' and has a 'Browse...' button next to it. The 'Protocol' dropdown menu is set to 'Zmodem'. At the bottom, there are 'Send', 'Close', and 'Cancel' buttons.</p>

To verify that the new files have been uploaded list the files using:

```
drmcc_t1 $ ls -al <enter>
```

The following needs to be done for the changes to take effect:

- If linux_dnp.ini was changed, the UIM needs to be re-booted.
- If modbus.txt was changed, but not linux_dnp.ini, type:

```
drmcc_t1 $ killall mbserv // stops the Modbus process
```

```
drmcc_t1 $ /usr/local/modbus/bin/mbserv // restarts the Modbus process
```
- If alarms.txt was changed, but not linux_dnp.ini, type:

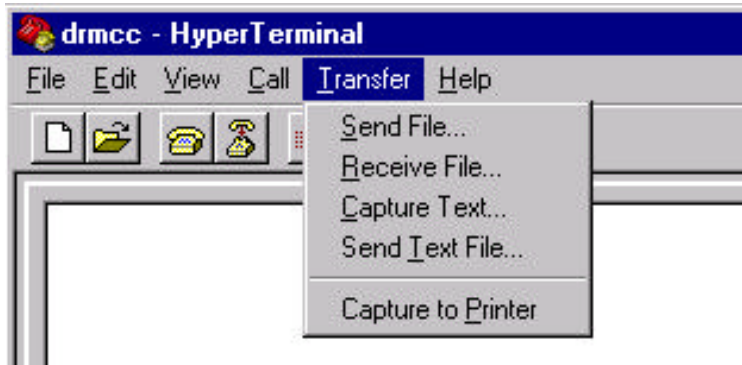
```
drmcc_t1 $ killall menu // stops the menu process - restarts automatically
```
- If any other file was changed, but not linux_dnp.ini, type:

```
drmcc_t1 $ killall drmcc_t1 // stops the DRMCC process - restarts automatically
```

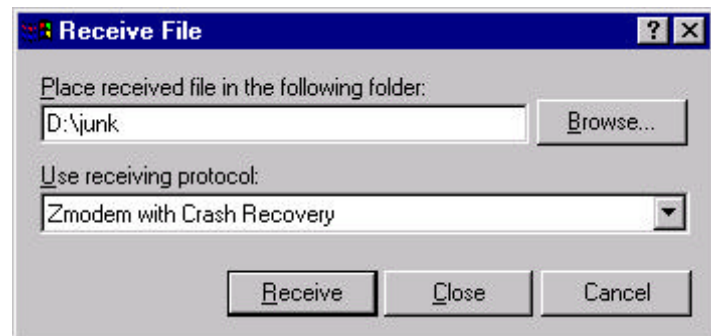
When uploading is complete follow the procedure *Logout and Close HyperTerminal*.

Downloading Data Files

Run HyperTerminal and log in.
Prepare HyperTerminal for a file download. Click on Recieve File in the Transfer menu.



Instead of "D:\junk", enter the name of the destination folder (type in or use the Browse button). The source is the current working directory set by the "cd" command - see below. Set the protocol to "Zmodem with Crash Recovery" as shown. Close the pop up menu when done.



Up to 53 DRMCC weekly data files may be located in the directory '/home/user/data'. The file names have format **data_wXX.tgz** where XX = 00 to 52 representing the week of interest and .tgz indicates that they are zipped files and can be unzipped once downloaded using WinZip.

To list these files, use the following commands:

```
drmcc_t1 $ cd /home/user/data <enter>
```

```
drmcc_t1 $ ls -al <enter>
```

This displays a list of data files, which have been zipped up at the end of each week.

Files are transferred using the Zmodem protocol, with the '*sz file*' command.

To download the data from a previous week, use the following commands;

```
drmcc_t1 $ sz data/data_wXX.tgz <enter> (where XX = week number)
```

To receive an individual data file from week 27, for example, use the following command.

```
drmcc_t1 $ sz data_w27.tgz <enter>
```

The DRMCC will recognise *wild cards* in the file specified, for example the command below will send all files from week 20 to 29 inclusive

```
drmcc_t1 $ sz data_w2?.tgz <enter>
```

If the command below was issued, all files from week 0 to 52 will be sent.

```
drmcc_t1 $ sz data_w??.tgz <enter>
```

If you enter a file name that does not exist, you may be left with the DRMCC UIM apparently not responding to keystrokes. Press [Ctrl] + x a few times, until the system prompt returns.

The data from the previous Sunday to today is stored in unzipped form in the /tmp/data_now file. This can be downloaded using the command

```
drmcc_t1 $  sz /tmp/data_now <enter>
```

^ Note the space here.

If an error message occurs, then the file will be stored in a different location (on some older versions of the software).

Use the command;

```
drmcc_t1 $  sz /home/usr/data_now <Enter>
```

The file will be transferred from the drmcc to the directory you specified earlier.

When downloading is complete follow the procedure *Logout and Close HyperTerminal*.

Format of Data Files

This file is a plain text file that can be opened using Excel.

The format of a data file is comma-separated fields of:

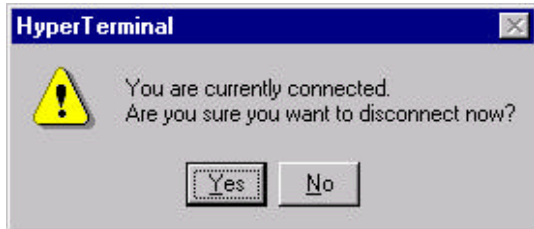
- Date & time {yy/MM/dd HH:mm:ss}
- VpuLV, {Secondary volts in pu}
- IpuLV, {Secondary amps in pu}
- VARpu, {VARS at the secondary side in pu}
- TeAmb, {Measured ambient temperature}
- TeTTO, {Measured tank top oil temperature}
- TeTO, {Calculated tank top oil temperature – should be close to measured}
- TeHSHV, {Calculated HV winding hot spot temperature}
- TeHSLV, {Calculated LV winding hot spot temperature}
- TeUHSMaXave, {Calculated ultimate hot spot temperature – used for smart cooling}
- TeUTOMaXave, {Calculated ultimate oil temperature – used for smart cooling}
- HydranGas, {The measured Hydran gas reading, H2 in ppm}
- Ntap, {Tap position}
- StatFan, {Status of fans, 0=off, 1=on}
- StatPump, {Status of pump, 0=off, 1=on}

Excel is very good at graphing these sets of data, and Dynamic Ratings will be developing macro utilities for this purpose. At this stage customers are encouraged to provide some feedback on possible graph configurations, i.e. what groups of data to be plotted together, etc.

Logout and Close HyperTerminal

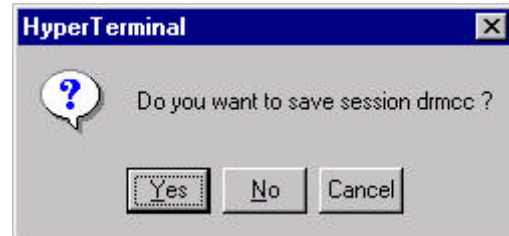
Once the required files are downloaded, press [Ctrl] + d to log out of the DRMCC.

When you exit HyperTerminal, you are prompted with:



Click Yes.

Then you'll see,



Click Yes again to save the HyperTerminal configuration.

Next time you start HyperTerminal, select the DRMCC icon. The serial port and receive file directory setup will be restored.

The Hardware or Real Time Clock

When the DRMCC is first powered up, it will have the time set to EST. The DRMCC will not cater for daylight savings. So the time should be set to local time without daylight savings, i.e. real time. The time in the real time clock is set using the 'hwclock' command.

First run HyperTerminal and log in.

To show the hardware clock, use the following;

```
drmcc_t1 $ hwclock --show <enter>
```

To set the hardware clock, use the following;

```
drmcc_t1 $ hwclock --set --date="MM/dd/yyyy HH:mm:ss" <enter>
```

Note the date/time format.

Note that here the 'HH' field is in 24 hour time, i.e. 15:00:00 for 3pm.

Once the hardware clock is changed, the system time that is maintained separately can be synchronised to the hardware clock using:

```
drmcc_t1 $ hwclock --hctosys <enter>
```

The DRMCC_T1 menu should now display the correct time.

When done follow the procedure *Logout and Close HyperTerminal*.

Modem Software

The DRMCC UIM comes equipped with modem software that can be used for remote data downloading. Any Hayes compatible external modem should work, and the system has been tested with a U.S. Robotics 56K Voice Faxmodem and a Netcomm Smartmodem 336. To enable/disable the modem software, a utility has been provided which takes care of the dirty

work, called 'config_ports'. The program takes one of two possible arguments. The 'modem' argument enables the modem software on RS232 port 5, and 'normal' disables the software. It is possible (but for the software catastrophic) to run the modem and MODBUS software on the same port (port 5). If the modem software is running, no other software should be configured to access port 5.

First run HyperTerminal and log in. Use the command as follows:

```
drmcc_t1 $ config_port modem <enter> // to enable modem comms
```

or

```
drmcc_t1 $ config_port normal <enter> // to disable modem comms
```

The software cannot complete the installation/deinstallation until the DRMCC UIM is rebooted. A message will be displayed to this effect. To reboot, simply remove power to the unit for a few seconds and re-apply.

When done follow the procedure *Logout and Close HyperTerminal*.

Monitoring the Communications Messages

The MODBUS and DNP communication messages can be monitored. All messages are logged to the /tmp/syslog file. The file size grows rapidly at times of heavy communication load. There is a process which zips up the existing log file after it grows to more than 5120 bytes, and places the log into /tmp/syslog.tgz. The file size is checked once per minute. First run HyperTerminal and log in. The messages can then be viewed with the command

```
drmcc_t1 $ tail -f /tmp/syslog <enter>
```

This command prints the messages going through the DNP and MODBUS communications. To stop the command simply type `Ctrl-C`. If the command stops printing data and the last message from `drmcc_cron` shows that the file size is greater than 5120 bytes, the syslog file was temporarily removed because it got too big. Simply press `Ctrl-C` to stop the tail command. To restart tail on the new file, press up arrow once to redisplay the last tail command and press `<enter>`.

When done follow the procedure *Logout and Close HyperTerminal*.