CODE B24.0r1.20 LINUX INSTALLATION INSTRUCTIONS

What's New:

1. For QPE, Vertical Profile of Reflectivity Correction (VPRC) is on by default. Also, improvements to R(A), R(Z) and R(Z,ZDR) rain rate equations.
2. Long-Term Average Reflectivity (LTAR) input to the Hydrometeor Classification Algorithm (HCA) to flag persistent ground clutter is available when activated in the HCI and LTAR product display available in HCI Clutter Regions Editor window. Note that LTAR takes 30 days of accumulation before HCA will use it.
3. Range-Defined Quasi-Vertical Profile products are available for reflectivity, correlation coefficient, differential reflectivity and specific differential phase.
4. Removal of VCP 31.
5. Numerous bug fixes.

Concise examples of successful command checklists for installation of the most recent CODE B24.0r1.20 are provided here for your reference.

A "quick install" checklist can simplify your process, and is helpful when you need to quickly make clones of your initial installation. Checklists ensure uniformity of installations. Use of a command set as similar as possible to the one provided above will make it easier for CODE maintainers to provide fast and efficient assistance, by quickly pinpointing where you are in the installation process.

All commands provided are written in the C shell, as that is the required shell for compilation and execution of the ORPG. Understand that these command sets may or may not work "as is" on your system due to possible differences in directory names on your system. Placement of these commands in a single script is not recommended due to execution requirements of the various commands, including occasional need for root privileges.

NWS & PUBLIC EDITIONS

Installation & Configuring Linux for ORPG

Checking Operating System

```
[dev1@dev1 ~]$ more /etc/redhat-release
Red Hat Enterprise Linux Client release 8.8
[dev1@dev1 ~]$ uname -a
Linux dev1 3.10.0-693.21.1.el8.x86_64  #1 SMP
Wed Mar 7 19:03:37 UTC 2018 x86_64 x86_64
x86_64 GNU/Linux
[dev1@dev1 ~]$
```

Modifying /etc/hosts

```
# Do not remove the following line, or various
programs
# that require network functionality will fail .
127.0.0.1          localhost.localdomain   localhost
192.168.##.###     dev2 rpg
```

Modifying /etc/sysconfig/network

```
NETWORKING=yes
NETWORKING_IPV6=no
HOSTNAME=dev2
```

Modifying /etc/sysconfig/network-scripts/ifcfg-eno1

```
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=none
NETMASK=255.255.255.0
USERCTL=no
PEERDNS=yes
GATEWAY=192.168.##.#
TYPE=Ethernet
IPADDR=192.168.##.###
```

1. Log into **ANY** account on your LINUX machine.
   You are expected to have **RedHat Enterprise 8 or CentOS Stream 8,** 64-bit version with the development package. Type: **more /etc/redhat-release ; uname -a**
   (See e.g. on left). "i386 GNU/Linux" implies 32-bit version, x86_64 implies 64-bit version.

2. Make sure the following packages are installed. Type:
   rpm -q giflib-devel ; rpm -q ncompress ; rpm -q tcl-devel ; rpm -q tk-devel
   rpm -q gsl ; rpm -q gsl-devel ; rpm -q bzip2-devel ; rpm -q motif-devel
   rpm -q ncurses-devel ; rpm -q pam-devel ; rpm -q libxml2-devel
   rpm -q libgtop2-devel ; rpm -q gtk3-devel ; rpm -q gtk2-devel ;
   rpm -q cracklib-devel ; rpm -q gd-devel ; rpm –q gcc-c++ ;
   rpm –q libtirpc-devel ; rpm –q libnsl2-devel ; rpm –q libcanberra-gtk2
   rpm gcc-gfortran ; rpm libgfortran ; rpm -q libcurl-devel
   rpm -q xorg-x11-fonts-ISO8859-1-100dpi ; rpm -q ksh ; rpm -q netcdf-devel

   If any of these packages are not installed, use yum to install them. As root:
   yum -y install <rpm_name>

   Install all available updates.
   yum -y update

3. The ORPG requires that TCP/IP networking be configured; it is not compatible with DHCP. A common configuration error involves the hosts file. Open **/etc/hosts** with the editor of your choice and modify it to add the name and IP address of your PC. Be sure to alias the hostname to **rpg**. (See e.g. on left).

4. Open **/etc/sysconfig/network** with the editor of your choice and modify it to add the Hostname of your PC. (See e.g. on left).

5. Open **/etc/resolv.conf** with the editor of your choice and modify it to add the Nameserver. If you are not sure what it is ask your local SA. An example is:
   `nameserver 140.90.###.##`

6. Open **/etc/sysconfig/network-scripts/ifcfg-eno1** with the editor of your choice and make sure it has been customized. (See e.g. on left). The eth0 file is the configuration file for the primary or only network interface card. The entries that must be customized for the workstation are: **IPADDR – the IP address; GATEWAY – the default router address; NETMASK – 255.255.255.0; ONBOOT – should be yes; and DEVICE – the filename.**

7. Logout from root. Type:
   exit

8. Reboot your system by typing:
   reboot

Creating a New Account

1. From the RedHat Welcome Screen, enter your **Username and Password** to log into **ANY** account on your LINUX machine.

2. Open a terminal and type:
   su (login as root with root password)

3. Determine your new user account name, parent directory, home directory, data directory, group name, etc. then write them down. **Whenever you see a command with < > brackets around it, refer to the table below.** Here are some suggested examples. Add your own names:

COMMANDS	DEFINED	EXAMPLES
<user24_0r1_20>		code24_0r1_20
<parent_dir>		/home
<home_dir>	<parent_dir>/<user24_0r1_20>	/home/code24_0r1_20
<group_name>		rpg
<ip_address>		192.168.##.##

4. Check to see if the group already exists. (See e.g. on the left).
   grep <group_name> /etc/group
   If it does not exist, type:
   groupadd <group_name>

5. Create a new account by using the useradd command. In your terminal type:
   useradd -d <home_dir> -m -g <group_name> -s /bin/tcsh
   -c "CODE B##r#.##" <user24_0r1_20>
   (See e.g. on the left).

6. Create a password for the user and write it down somewhere. Type:
   passwd <user24_0r1_20>
   Enter new password when prompted twice.

7. Change modifications for home directory. Type:
   chmod +rx <home_dir>

8. Logout from root. Type:
   exit

9. To logout of the account you are in, select **Main Menu => Log Out**. Then click OK.

Summary of Commands

```
[root@dev2 ~]# grep  rpg  /etc/group
[root@dev2 ~]# groupadd rpg

[root@dev2 ~]# useradd -d /home/code24_0r1_10 -
m -g rpg -s /bin/tcsh -c "CODE B24.0r1.9"
code24_0r1_10

[root@dev2 ~]# passwd code24_0r1_10
Changing password for user code24_0r1_10.
New password:
Retype new password:
passwd: all authentication tokens updated
successfully.
[root@dev2 ~]# chmod +rx home/code24_0r1_10
[root@dev2 ~]# exit
```

Installing RPG & CODE Software

1. Login using your new **<user24_0r1_20>** account and password.

2. Obtain the CODE B24.0r1.20 tar files via Kiteworks site and place in your home directory.

3. Go to the home directory to make sure the folder has been downloaded by typing:
   cd; ls –al

4. Copy the RPG source file to your home directory. Type:
   If you have the NWS Edition:
   cd code_b24_0r1_20/files_orpg_sw
   cp -p rpg_b24_0_0r1_20_nws_src.tgz ~
   If you have the Public Edition:
   cd pub_code_b24_0r1_20/files_orpg_sw
   cp -p rpg_b24_0r1_20_pub_src.tgz ~

5. Copy the CODE configuration file to your home directory. Type
   If you have the NWS Edition:
   cp -p code_config_b24_0r1_20.tgz ~
   If you have the Public Edition:
   cp -p code_config_b24_0r1_20pub.tgz ~

6. Uncompress the RPG source file by typing:
   cd; ls
   If you have the NWS Edition:
   tar xvzf rpg_b24_0r1_20_nws_src.tgz
   If you have the Public Edition:
   tar xvzf rpg_b24_0r1_20_pub_src.tgz

Modifying orpg_env_cshrc

```
# in order to simultaneously run multiple
instances of the ORPG on a
# single platform, RMTPORT must differ.
setenv RMTPORT 51000
```

7. Uncompress the CODE configuration file by typing:
   If you have the NWS Edition:
   tar xvzf code_config_b24_0r1_20.tgz
   If you have the Public Edition:
   tar xvzf code_config_b24_r1_20pub.tgz

8. Go to the env directory and run the env script. Type:
   cd code_config_b24_0r1_20/env; ls
   ./inst_env_config (answer **y** when prompted)

9. If more than one installed ORPG is going to run at the same time on a single workstation, open **orpg_env_cshrc** from your **$HOME** directory with the editor of your choice and manually change the defined value of **RMTPORT** on each account. It is recommended that the first account have a value of 50000, the second 50010, etc. Create a backup of the file if changed. Type:
   cd; cp orpg_env_cshrc orpg_env_cshrc.B24

10. Remove all tar files:
    cd ; rm *tgz (answer **y** when prompted)

11. To logout of the account you are in, select **Main Menu => Log Out**. Then click **OK**.

Compiling & Configuring the RPG

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **<user24_0r1_20>** account and password. If you have the Public Edition, you can ignore the two chmod error messages. Open a terminal console and verify your environment variables. Make sure your $HOME is set to the correct paths. Type:
   env | grep -e HOME

2. To compile the RPG, type:
   make_rpg $HOME >& make_rpg.out
   After compilation has finished, check for errors. Type:
   grep 'Error 1' make_rpg.out
   If there are errors that you cannot resolve, stop here and contact:
   brian.klein@noaa.gov

3. Install the ORPG configuration files by typing:
   cd code_config_b24_0r1_20/orpg; ls
   ./inst_orpg_config (answer **y** when prompted)
   Note: You need answer '**N**' for NWS Edition or '**P**' for Public Edition when prompted to install the right version of task_tables.

4. If the hostname has been aliased to **rpg**, skip this step. Otherwise variable **Client** needs to point to the hostname or **<ip_address>.** Open **.rssd.conf** from your **$HOME** directory with the editor of your choice. Modify the **Client** variable to be the **<ip_address>** of your machine. Save the file **.rssd.conf** and exit.

5. To logout, select **Main Menu => Log Out**, then click **OK**.

Modify the .rssd.conf file

```
# RPG Development Workstations
#Client: rpg
Client: 192.168.##.###

# Pathnames
#             [$ORPGDIR]
Path: ORPGDIR

# NEW B9
Path: HOME/save_logs

# NEW B12x1.206
Path: HOME/security_logs
```

Testing the RPG & Installing CODE Software (1 of 2)

Testing the RPG: Steps 1-9

Using the HCI & play_a2 Tools

```
code24_0r1_10:code24_0r1_10/  43 >hci &
[1] 7278
code24_0r1_10:code24_0r1_10/  44 > play_a2
Playback...
Playing file:
/home/code24_0r1_10/ar2data/KMLB20121026
_120332_V06.gz
Volume date [yyyy-mm-dd] 2012-10-26
Volume time [hh:mm:ss]: 12:03:35
```

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **< user24_0r1_20 >** account and password.

2. Open a terminal for testing the RPG. Type:
   mrpg -p -v startup

   Wait for "RPG startup completed."

3. To check for running tasks type:
   rpg_ps

4. To make sure the human computer interface will run, type:
   hci &

5. Ingest default Archive II data into the HCI by typing:
   play_a2

   When you are confident that data is being ingested into the HCI properly, press **Ctrl C** to end play_a2 then close the HCI. (See e.g. on left).

6. Check CVT version, **Version 4.4.3**. *Type*:
   cvt version

7. Launch CVG by typing:
   cvg

8. The title on the CVG window should show CODEview Graphics **9.2**. Close the CVG window by clicking File → Exit.

9. If everything works as expected, your CODE installation is complete. You can shutdown and cleanup the RPG by typing:
   mrpg shutdown; mrpg cleanup
   Remove all tar files:
   rm ~/src/*tar

Option 1 – Install DP Test Products:

Steps 10-14

- **Dual Pol Test Products**
  340-346
  600-605
  700-705

If you do not want to install the optional dual pol test products below, you are done.

10. Create the cfg/extensions directory. This is the location where non-operational snippet files are placed to activate non-operational tasks and products. This step only needs to be done once.
    cd ~/cfg
    mkdir extensions

11. Copy the dual pol 8-bit test product snippet files to the cfg/extensions directory:
    cd ~/src/cpc024/tsk001; ls
    cp *.dualpol8bit_test ~/cfg/extensions
    cd ~/src/cpc102/tsk018 ; ls
    cp *.test_base_prods_9bit_combbase ~/cfg/extensions
    cp *.test_base_prods_9bit_refldata ~/cfg/extensions

Testing the RPG & Installing CODE Software (2 of 2)

Option 2 – Install level II data:
Steps 12-21

Modifying the .cshrc File

setenv AR2_DIR **/opt/code/data/ar2data**

Changing the Radar Site

change_radar -r klwx

Real-time Level 2 Ingest

hci_read_l2
Select Iowa State or NCEP
Select WSR-88D site

12. A suggested location to install all of the desired CODE Archive II data sets is **/opt/code/data/ar2data**. Your local procedures might establish a different location. Check for the ar2data directory by typing:
    cd /opt/code/data/ar2data
    su (login as root with root password)
    If the directory has been created already, **go to next step**. (This directory might be different on your machine). If the directory has not been created, create the directories. Type:
    cd /opt; mkdir code
    cd code; mkdir data
    cd data; mkdir ar2data
    cd ar2data;

13. To install archive II data sets, obtain the CODE B21.0r1.7 CD, copy the desired data sets in ar2data directory to /opt/code/data/ar2data.
    exit (to logout as root)

14. Check the **.cshrc** file to see if AR2_DIR has been set already. Type:
    more ~/.cshrc | grep AR2_DIR
    If the $AR2_DIR has not been set to /opt/…. directory, open **.cshrc** from your **$HOME** directory with the editor of your choice. Modify the **setenv AR2_DIR** line to point to **/opt/code/data/ar2data**. (See e.g. on left). Save the file **.cshrc** and exit the editor that you used.

15. Create a backup of the file, by typing:
    cp .cshrc .cshrc.B24

16. For each console that is opened, type:
    source .cshrc

17. Start the ORPG for testing Archive II data. Type:
    mrpg -p -v startup

18. To start the human computer interface, type:
    hci &

19. Ingest default Archive II data into the HCI by typing:
    play_a2 -d f_load
    (If you downloaded another directory from the CD, replace f_load with the name of the downloaded directory). When you are confident that data is being ingested into the HCI properly, press **Ctrl C** to end play_a2 then close the HCI.

20. Shutdown and cleanup the RPG by typing:
    mrpg shutdown; mrpg cleanup

21. Installation is done.

22. For real-time level 2 data ingest from any WSR-88D site use the tools **change_radar** to reconfigure the RPG to the site of choice and then launch **hci_read_l2.**

23. When **hci_read_l2** is launched change the source of level 2 data to either Iowa State or NCEP and then select the radar site. Level 2 data will then be ingested by the RPG.

The End