



Imaging a CF Card for a Trimble NetRS receiver.

FCFI-01GB-2230/2232 Series

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**THIS DOCUMENT ONLY APPLIES TO CALIFORNIA
PC FCFI-01GB-2230 & 2232 COMPACT FLASH
CARDS**

1. OVERVIEW

This document describes the procedure to image and test a flashcard for the Trimble *NetRS*. A *Linux* laptop in the repair lab is dedicated to flashcard imaging, and the instructions here refer to using that computer.

A script file has been created on this computer to semi-automate the imaging process, however user input is still required when running the script, and the user should pay attention to the results to make sure each command runs to completely correctly. A dedicated *NetRS* is located next to this computer for quick testing of the finished card.

If you are imaging a flashcard on another *Linux* computer, certain commands may be slightly different, for example your flashcard reader may appear as a drive other than ***/dev/sdb***. However, all commands used in the imaging process are explicitly listed here, and regardless of small syntax variations, the same sequence of commands should be used.

Be extremely careful when running “dd” commands. If you choose the wrong output file location (i.e. the “of=” part of the above command) you can destroy the computer’s hard drive.

2. COMPACT FLASHCARD MODEL

When installing a new *Compact Flash* card in a *NetRS* receiver, use the *California PC* 1GB Industrial Temperature card, part number **FCFI-01GB-2230 and FCFI-01GB-2232**.

The image file used by *UNAVCO* is for a 1014MB card (1014644736 bytes). Severe problems have been documented when an image file is loaded onto a card which is **smaller** than the image file, including complete receiver failure. It may be possible to use the process below to format a card that is **larger** than 1048 MB, but there are no guarantees with other models.

3. LINUX PC IN REPAIR LAB

Log into the *Linux* computer in the repair lab as user administrator (the password is labeled on the computer). Open a terminal. The home directory is ***/home/administrator***. Change to the directory containing *CF* card files with the command

cd /Documents/CaIPC_FCFI01GB_Image

In this directory you will see several files related to the flashcard image, including the image file itself, the md5 checksum, these instructions, and an imaging script file.

Insert the *CF* card into the *CF* card reader. Note the Trust *CF* card reader will always appear as */dev/sdb*. If another *CF* card reader is used, it may appear as a different drive.

4. FLASHCARD IMAGING PROCESS

The imaging script file is named *make_disc.sh*. Run this command by executing

```
make_disc.sh
```

The script executes the sequence of steps described below.

A. Unmount all partitions

The script makes sure all partitions on the *sdb* drive are unmounted, with the command

```
umount /dev/sdbx     where x=1,2,3,4
```

NOTE: You may see text that says some *sdb* drives were not mounted according to mtab. Also, note that a brand new flashcard will have one partition, *sdb1*. A previously formatted NetRS card will have four partitions, *sdb1-sdb4*.

B. Erase flashcard

The script erases the flashcard by writing all zeroes to the card, with the command:

```
sudo dd if=/dev/zero of=/dev/sdb bs=32M
```

NOTE: you may be prompted for a password at this point. Enter the same password that you used to login.

When the command finishes after a few minutes, you should see the following result (note time and speed will vary):

```
dd: writing to '/dev/sdb': No space left on device  
31+0 records in  
30+0 records out  
1014644736 bytes (1.0 GB) copied, 360.354s, 2.8MB/s
```

C. Write image file

The script writes the image file to the flashcard with the command:

```
sudo dd if= ./ OSU_7-24-14_NetRS_deploy_FW1.3-2of=/dev/sdb
```

resulting in the following (note time and speed will vary):

```
1981728 +0 records in  
1981728 +0 records out  
1014644736 bytes (1.0 GB) copied, 842.068s, 1.2MB/s
```

D. Check disk partitions

The script checks the disk partitions, with the command

```
sudo fdisk /dev/sdb
```

Here you will get a prompt, and the script pauses waiting for your input. Type the letter **p** and hit **Enter** to print the output, resulting in:

```
Disk /dev/sdb: 1024 MB, 1014644736 bytes  
32 heads, 63 sectors/track, 992 cylinders, total 1981727 sectors  
Units = sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		63	10079	5008+	83	Linux
/dev/sdb2		10080	82655	36288	83	Linux
/dev/sdb3		82656	122975	20160	83	Linux
/dev/sdb4		122976	1981727	929376	83	Linux

Type **q** then **Enter** to quit **fdisk** and proceed with the script.

NOTE: the **fdisk** program on the *Linux* laptop shows the results in units of sectors.

To toggle display units between sectors and cylinders, use the **fdisk -u** option.

E. Remove then re-insert CF card

The script now pauses and says

The make_NetRS_Cf_card.sh script is pausing. Follow instructions on next line.

Remove CF card, then reinsert CF card. Wait until CF partitions are mounted, then hit Enter.

Follow these instructions. Once you reinsert the card and hit **Enter**, the script pauses 15 seconds, then unmounts all CF card partitions.

F. Check file systems on partitions 2,3,4

The script checks the file systems on partitions 2,3,4, with the command

```
sudo fsck.ext2 /dev/sdbx (where x=2,3,4)
```

resulting in the following output for each partition

```
e2fsck 1.42 (29-Nov-2011)  
/dev/sdb2: clean, 940/9080 files, 26812/36288 blocks
```

```
e2fsck 1.42 (29-Nov-2011)  
/dev/sdb3: clean, 177/5040 files, 3778/20160 blocks
```

```
e2fsck 1.42 (29-Nov-2011)  
/dev/sdb4: clean, 260/58112 files, 219641/232344 blocks
```

5. TEST COMPACT FLASHCARD

A *NetRS* (named *NEWCFCARD*) is located next to the *Linux* laptop in the repair lab, with its front panel removed. Install the new CF card into this receiver and turn the receiver on.

NOTE: If using a different *NetRS* to test the card, use a Torx T15 screwdriver to remove the 6 screws from the *NetRS* front panel and 2 screws from the bottom of this front panel. Then use small pliers to lift the black plastic-coated metal keeper tab from in front of the compact flashcard port. Gently pull out the old card and insert the new card. Replace the keeper tab. Reattach the *NetRS* front panel, taking care to nearly tuck the ribbon cable in the cavity up above the board.

Once the receiver boots up, pull up the web interface using *Firefox* on the *Linux* laptop. Note you will have to disable the wireless connection in order to use the wired connection, which goes straight to the *NetRS*.

Verify the following on this *NetRS*:

a) Receiver has fully booted and is running Firmware 1.3-2.

Note that firmware version 1.3-2 is not restricted by warranty date, so a firmware warranty code is not needed. A copy of this firmware file is also included in the image file, and will appear under the Firmware tab.

If another firmware is desired, it should be loaded now. Note that firmware warranty date may affect your ability to load other firmware. For *NetRS* receivers purchased through *UNAVCO*, codes to extend the firmware warranty date can be obtained from Trimble.

b) Receiver is tracking satellites and logging data files.

This receiver is programmed to log 8 simultaneous 10Hz data logging sessions.

c) Receiver is auto deleting old data files.

A newly-imaged flashcard has less than 1MB data free on partition 4 (the data storage partition). The receiver is set to auto delete at 1MB. Since the receiver is logging a high volume of data, you should be able to watch the free space decrease as the receiver logs data, then increase each time an old file is auto-deleted.

d) Manually delete old data files.

Once you see the free space increase, the receiver is completely full and successfully auto deleting. Now you can delete all the old data from the flashcard. To do this, go to the Programmatic Interface tab, look under the Data Files menu, and unselect the **Autosubmit** button. Now click *Delete Logged Files, and edit the command to read:

Delete?LoggedFiles&directory=/201503

6. SIGN AND DATE COMPACT FLASHCARD

In permanent ink, write your initials and the date on this card.

7. ADDITIONAL INFORMATION

The original image file is named:

OSU_7-24-14_NetRS_deploy_FW1.3-2.img

In addition to the *Linux PC* in the repair lab. This file is stored on the *CFC* drive:

***\Polar\Equipment\GPS Receivers\NetRS\GOLDEN NETRS 1.3-2
CARD\CaIPC_FCFI-01GB-2230 & 2232***

If you use another Linux computer to image a card, copy this *NetRS* image file onto the computer's hard drive. Then check that the file on the computer was not corrupted during transfer by obtaining an *MD5* checksum. Enter

```
md5sum OSU_7-24-14_NetRS_deploy_FW1.3-2.img
```

resulting in:

```
cf890f77042853457df4608cba0b4330 OSU_7-24-14_NetRS_deploy_FW1.3-2.img
```

On some computers you may need to run the command *md5* instead of *md5sum*.

On a Windows PC, File Checksum Integrity Verifier will perform the checks. Download this DOS Command Line tool here:

<http://www.microsoft.com/en-us/download/details.aspx?id=11533>

The command is:

```
fciv.exe OSU_7-24-14_NetRS_deploy_FW1.3-2.img -md5
```

On the *Linux PC*, there is a file named ***OSU_7-24-14_NetRS_deploy_FW1.3-2.img.original***. It is the image created by OSU (Dana Cacamise) on July 24th, 2014. The file system check (*fsck.ext3*) will correct this image. The current image used in the process described in this document is the original image corrected by *fsck.ext3*. It also includes data files (almost full, in order to test the *Auto Delete* function of the *NetRS* and the behavior of the CF card when full).

The *original* image has no files in it... You'll need to add files to test the auto delete functionality described above.

The checksum for the original file is:

```
f5624b1c19884319cd88678eed55d94f
```