Automatic Re-flashing Script for Digital Controllers

I. Scope

The purpose of this document is to inform you of a new procedure used to update/re-flash the firmware of the digital controllers on all Direct Drive consoles.

II. Background

Running setacq often fails and cannot update the firmware in the following scenarios, but the new script can be used to update the controller firmware in the following scenarios and a null-modem cable is NOT required:

A. When upgrading the VJ software:
   In the past, updating the firmware from VJ software older than and including VJ 2.2C with the 104 patch required multiple steps. Running the script is the only required step.
B. Installing a new digital controller:
   New controllers often come with older NDDS firmware versions requiring a manual reflashing procedure. The script will now correctly reflash these controllers.
C. If one or more controllers have not booted (i.e., no LED activity such as scrolling or blinking) due to missing files, OTHER than boot.ini or vxWorks, the script will reflash the controllers. **These 2 files must be present in the controller's flash for the script to update that controller.**

The script **cannot** be used to update the controller firmware in the following scenarios:

A. If the boot.ini or vxWorks405gpr.bdx is missing or corrupted, a null-modem cable and minicom are required. **These 2 files must be present in the controller's flash for the script to update that controller.** In this case, minicom must be set up, boot.ini must be created, and vxWorks must be copied to the controller as indicated in the "Controller Reflashing" document on the Tech Support website. Afterwards, you can then use the script as indicated in this document.
B. If there is a network/communication issue between a controller and the host, the script will not function. The communication issue must be resolved first before using this script.

III. How to use the re-flashing script

A. Note:
On some older RHEL versions (5.3 and older), a module that the script requires may not be installed. In this case the script will ask permission to go ahead and install it for you. Answer yes and have the root password available. The installation of the required module requires Internet access to download the module. Restart script after installation is complete.

If the computer is NOT online connected to the Internet, follow the procedure to install this module (pexpect) detailed in the document "How to install the pexpect file". Once the pexpect file is installed, proceed as stated below.

B. Open a terminal window
   a. Do an rlogin to the controller to be flashed
   b. Type: ffdir
   c. Make note of the current firmware files
   d. Type: logout

C. The script uses rsh to communicate to the controllers so it bypasses any NDDS version clash issues. (3x vs 4x). Ensure that the rsh service is running on the Linux host computer:

Note: Make sure to close any rlogin sessions to the controllers or else you get an rsh error

1. On Linux 6.1:
   To check if rsh is running, click system, administration, services. Click on the service then click on "enable".

2. On Linux 5.3 and 5.1
   To check if rsh is running, click system, administration, server settings, services…then click the "On Demand Services" tab. Ensure rsh is checked. Then save & exit.

D. Unzip the script
   1. Download the script from the Tech Support website and unzip it in your windows PC.

   2. Copy the script to the host computer into vnmr1's home directory [/home/vnmr1]

   3. **Note: Updating one controller can take over 6 - 7 minutes** (nddslib alone may take over 4 minutes) depending on how many files need re-flashing. This script checks one controller at a time sequentially and re-flashes needed files on it before proceeding to the next controller (setacq flashes a file to all controllers simultaneously). A progress bar shows status of the file being flashed.

   4. Usage of the script (do ONE of the following)

      i. type **./verifyCntlrsFlash.py**
         To verify flash content of all controllers and update if needed from /vnmr/acq/download. It will prompt if you want to update the files on

the flash, prior to writing anything to flash. If you do not want to be prompted every time for each controller, use **./verifyCntlrsFlash.py -y**

ii. type ./verifyCNtrlsFlash.py [list of controllers]
./verifyCntlrsFlash.py rf1,rf2,lock1,ddr1
To select specific controllers to check and flash only these controllers

5. Other usages of the script

i. type ./verifyCntlrsFlash.py -h
For the complete usage text and options

ii. type ./verifyCntlrsFlash.py -d [list of controllers]
For debugging purposes and will check and/or flash controllers listed

6. At the end of the process, the script will create a time-stamped log file in the current work directory for record keeping and the controller(s) will be rebooted.

7. Perform step III B above to confirm new firmware is installed in the controller(s)

8. You should run setacq, which will run quickly, to confirm it has no issues.

E. Below is an example of running the script for master1 and ddr1. On master1, all files were removed except for boot.ini and vxWorks while the ddr1 had all its files present in flash before running the script. After running the script, notice the master's NDDS version is indeterminate because the nddslib.o file was not originally present, but the ddr1 shows it has NDDS version 4.x. The master1's files were updated in its flash while the ddr1 did not require updating.

*vnmr1 >**./verifyCntlrsFlash.py master1 ddr1***

------ 2012-07-26:15:54:12 -------

Log file: "verifyCntlrsFlash_2012-07-26:15:54:12.log"

Debug Log file: "verifyCntlrsFlash_Debug-2012-07-26:15:54:12.log"

---

*Digital Controller: **master1**, Unique ID: 0x7d024b6c, NDDS Ver: Indeterminate*

Obtaining Directory Info: ..

Controller Directory listing: 2 file(s) 1322104 bytes, 14275464 bytes free

vxWorks405gpr.bdx	*1320720 bytes*	*md5: unknown: Controller not fully booted*
boot.ini	*1384 bytes*	*md5: unknown: Controller not fully booted*

Files Not Requiring Updating: None

Files Requiring Updating:

nddslib.o
nvScript
gradientexec.o
ddrexec.o
vxWorks405gpr.bdx
rfexec.o
nvlib.o
pfgexec.o
masterexec.o
lockexec.o
icat_top01.bit
icat_top.bit
icat_config.4th

Update the files? (y/n): y

Update: nddslib.o

Update: nvScript

Update: gradientexec.o

Update: ddrexec.o

Update: vxWorks405gpr.bdx

Update: rfexec.o

Update: nvlib.o

Update: pfgexec.o

Update: masterexec.o

Update: lockexec.o

Update: icat_top01.bit

Update: icat_top.bit

Update: icat_config.4th

Rebooting Controller: master1

---

*Digital Controller: **ddr1**, Unique ID: 0x7e024922, NDDS Ver: NDDS 4.x*

Obtaining Directory Info: .....

Controller Directory listing: 14 file(s) 12250072 bytes, 3347496 bytes free

nddslib.o 5844541 bytes md5: 143922079ff397d09f1231cb807c9f71
ddrexec.o 681714 bytes md5: 4883aa794643dd02bcbd419647cce707
vxWorks405gpr.bdx 1320720 bytes md5: 5dc96afff0f7bdd038d4433c6b7aaa0d
boot.ini 1384 bytes md5: aec46c067e501f1443d4bc4028c6652f
nvScript 1025 bytes md5: c76c5297926ef38c702729d93fe9586c
icat_top01.bit 341657 bytes md5: 5d883b8cb00fbd0d5ccd52899c44828e
pfgexec.o 463126 bytes md5: 381e5ade26d62cf0a990e3f15c7d26cb
gradientexec.o 490128 bytes md5: 705845fc0e93e13d9b01f3fa2302ca60
rfexec.o 637751 bytes md5: ebe477416c8f68e7aeeceb555fe24ebd
lockexec.o 227004 bytes md5: e8a81c154279e9f9ee7bfa98ce55d5e9
nvlib.o 771969 bytes md5: 00a0395e971e8bc212b711b4b3a527cd
icat_top.bit 341657 bytes md5: 5d883b8cb00fbd0d5ccd52899c44828e
icat_config.4th 119732 bytes md5: 3e393b531c2824c984e3beb1027fde18
masterexec.o 1007664 bytes md5: 16321b54deba1d6ed87f332490cd6533

Files Not Requiring Updating:

nddslib.o
nvScript
gradientexec.o
ddrexec.o
vxWorks405gpr.bdx
rfexec.o
nvlib.o
pfgexec.o
masterexec.o
lockexec.o
icat_top01.bit
icat_top.bit
icat_config.4th

Files Requiring Updating: None

W A R N I N G !, Incompatible NDDS Versions detected.

NDDS 4.x: ddr1
Indeterminate: master1

------ Completed: 2012-07-26:15:54:12 -------

F. Below is screen shot of the progress bar seen during the file flashing (Example here is on the lock controller):

```
File  Edit  View  Search  Terminal  Help

Digital Controller: lock1, Unique ID: 0x7dd24908,    NDDS Ver: NDDS 4.x

Obtaining Directory Info: .........

Controller Directory listing:   9 file(s)         5375481 bytes,    10222087 bytes free

                 rfexec.o     637751 bytes    md5: ebe477416c8f68e7aeeceb555fe24ebd
                ddrexec.o     681714 bytes    md5: 4883aa794643dd02bcbd419647cce707
        vxWorks405gpr.bdx    1320720 bytes    md5: 5dc96afff0f7bdd038d4433c6b7aaa0d
                 boot.ini       1384 bytes    md5: 1b1d9a4dfec849eff684b2cfac09ff95
                 nvScript       1025 bytes    md5: c76c5297926ef38c702729d93fe9586c
                  nvlib.o     771969 bytes    md5: 00a0395e971e8bc212b711b4b3a527cd
                pfgexec.o     463126 bytes    md5: 381e5ade26d62cf0a990e3f15c7d26cb
           gradientexec.o     490128 bytes    md5: 705845fc0e93e13d9b01f3fa2302ca60
             masterexec.o    1007664 bytes    md5: 16321b54deba1d6ed87f332490cd6533


Files Not Requiring Updating:

                      nvScript
                gradientexec.o
                     ddrexec.o
             vxWorks405gpr.bdx
                      rfexec.o
                       nvlib.o
                     pfgexec.o
                  masterexec.o

Files Requiring Updating:

                     nddslib.o
                    lockexec.o
                icat_top01.bit
                  icat_top.bit
               icat_config.4th

Update the files? (y/n): y

Update: nddslib.o
100% ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
Writing File to Flash, Remaining Time:  0.0 sec

Update: lockexec.o
100% ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
Writing File to Flash, Remaining Time:  0.0 sec

Update: icat_top01.bit
100% ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
Writing File to Flash, Remaining Time:  0.0 sec

Update: icat_top.bit
100% ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
Writing File to Flash, Remaining Time:  0.0 sec

Update: icat_config.4th
100% ■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
Writing File to Flash, Remaining Time:  0.0 sec

Rebooting Controller: lock1

-----------------------------------------------------------------
-----------------------------------------------------------------
```