Firmware Restore Manual
for XL4/XL4P, X5/X5P, EXL6/XL6P, EXLW/XLWP, XL7/XL7P, EXL10/XL10P, XL10WP and XL15P

Contents

SECTION 1: Overview

1.1 Introduction

In rare cases, it may be required to boot the OCS from the Removable Media drive and then perform a system update. This is generally necessary if the OCS does not successfully boot up after applying power.

This document details the procedure used to turn a microSD card into a "boot disk" that can be used to recover the controller.

1.2 Materials Needed

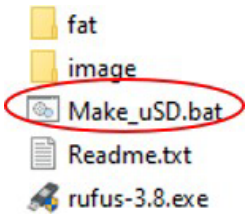
- microSD card
- microSD card reader for your computer
- Controller firmware files are available on the Horner website:
  North America: https://hornerautomation.com/controller-firmware-cscan/
  Europe: https://hornerautomation.eu/support/firmware/

  You will need to contact Tech Support for the "make_uSD.bat" file.
  APGUSATechSupport@heapg.com or 877-665-5666 x3

SECTION 2: Procedure to Create a Bootable microSD Drive

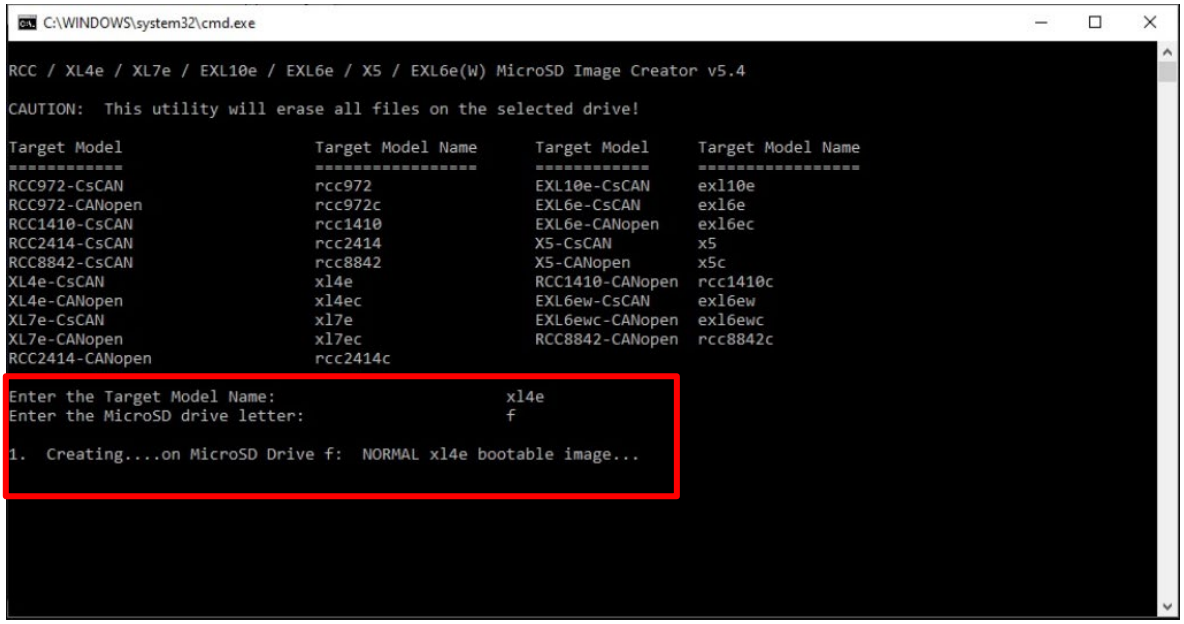
Step One:

Unzip the zip file to access all files within.
Double click on Make_uSD.bat file from IMX28 package folder.



Step Two:

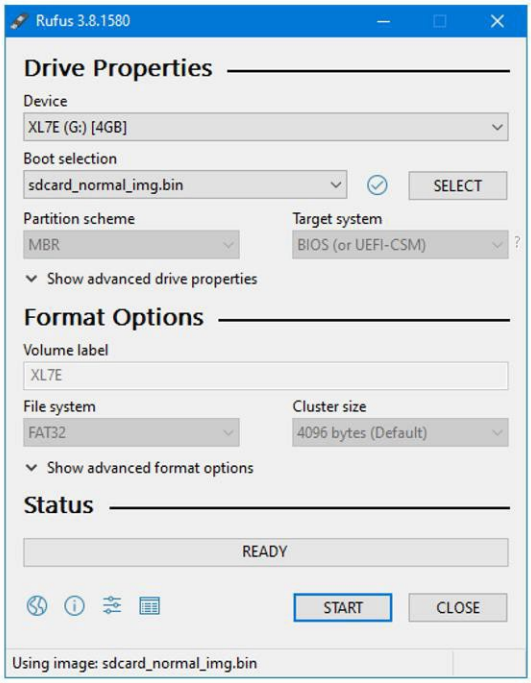
The following window will be displayed. Enter the necessary fields as shown below:



Please note: This utility does not work with drive :D, which is often what Windows will assign to a USB or microSD card. If assigned to :D, you will need to go into your Windows Disk Manager and change the drive letter to :E or higher.

Step Three:

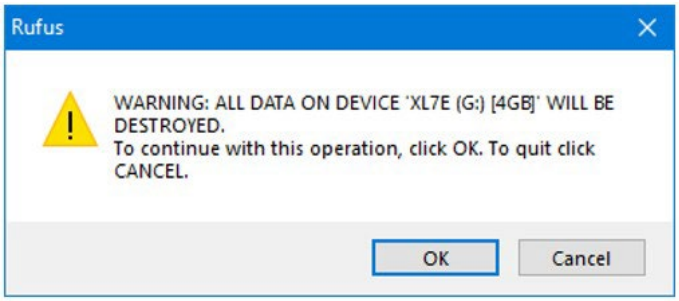
Select Enter and the batch file will launch the rufus exe. Select Yes. The following window will be displayed:



Please note: When Rufus is launched, it will often cite a newer version and ask if you want to download/install. DO NOT do the update, as it could cause the rest of this procedure to fail. The appropriate version for the firmware has been provided to you.

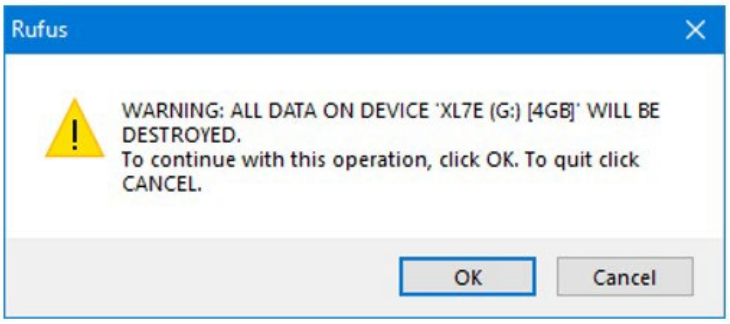
Step Four:

Check if Device and Boot Selection fields display the proper data. If so, select **START**. The following warning will be displayed:



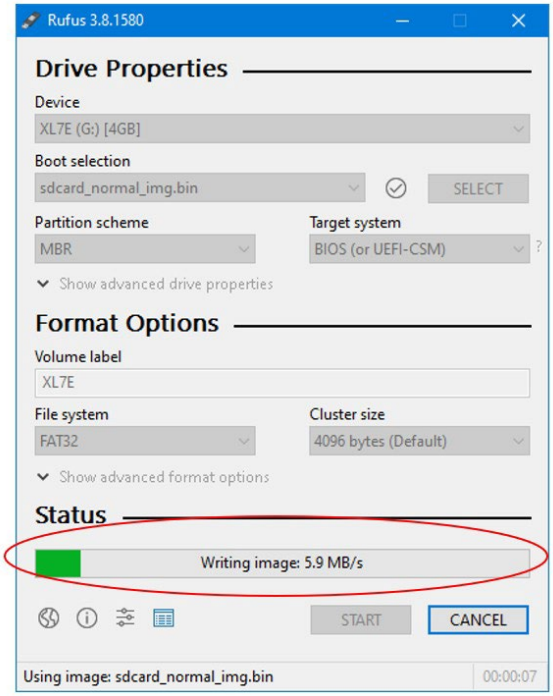
Step Five:

Reconfirm the message and select OK. The following message will be displayed:



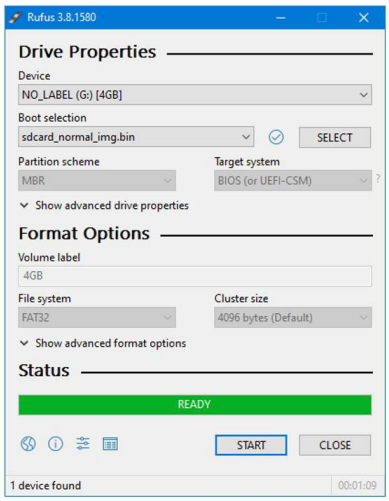
Step Six:

Select OK and the Writing Image Process will be started, and status will be displayed as shown below:



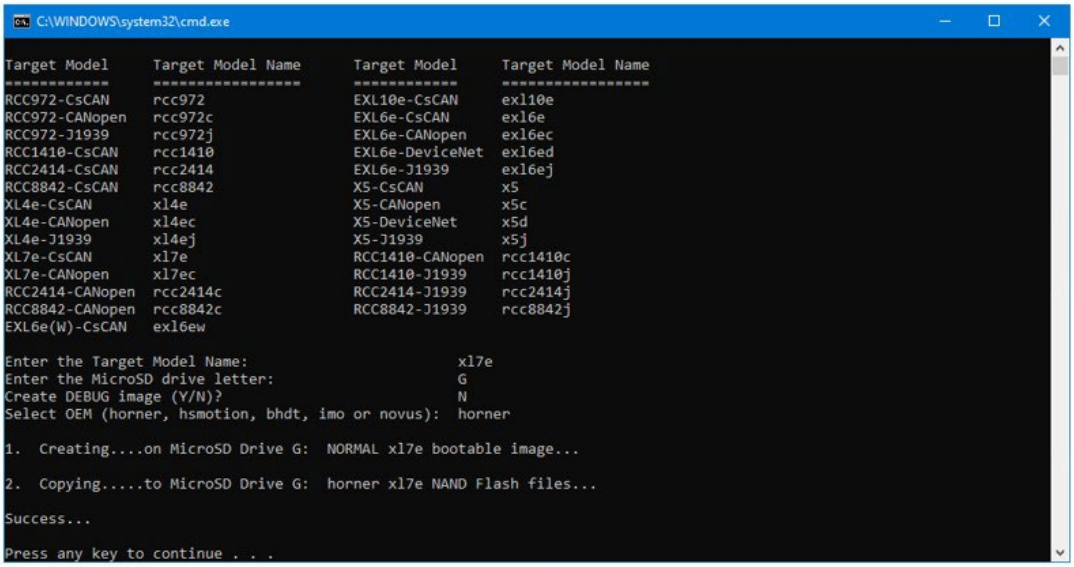
Step Seven:

Once Writing Image Process is complete, the following window will be displayed. Select CLOSE.



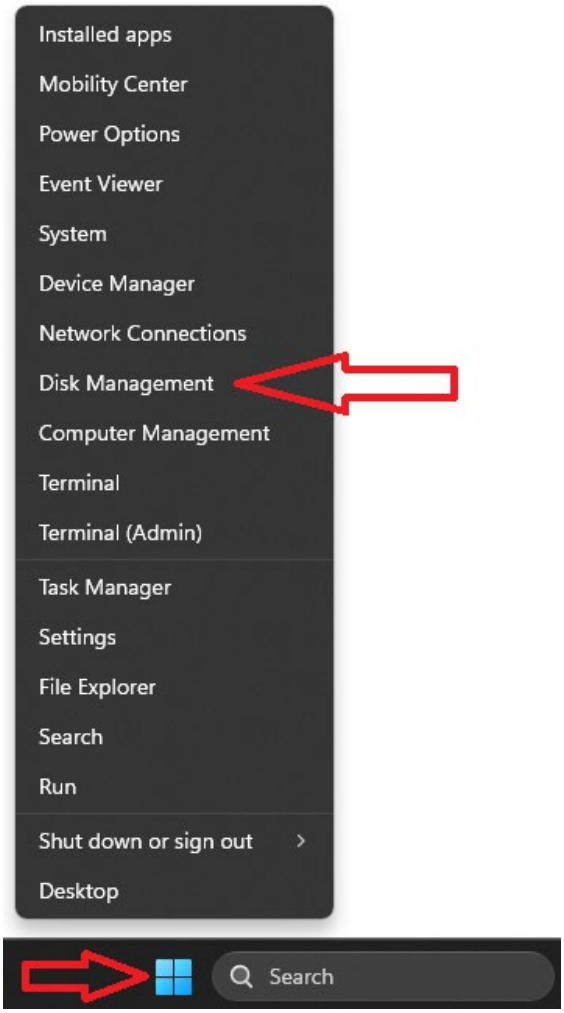
Step Eight:

The Flash files will be copied to the microSD card and the following window will be displayed after a successful completion:



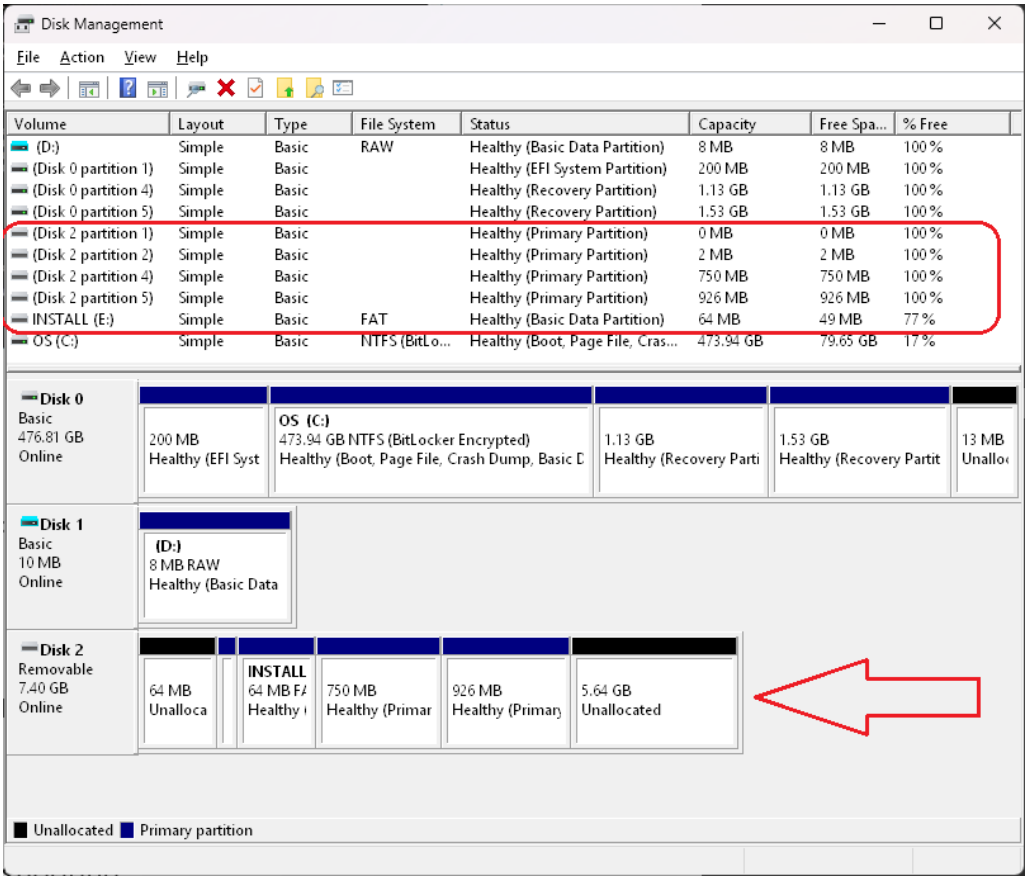
Step Nine:

To verify that the bootable microSD card has been set up successfully, right click the Windows start button (Win11) and select **Disk Management**.



Resize the **Disk Management** window if necessary so that all disks are in view.
Normally a micro-SD card will have one partition, such as drive D: in the image below.
A micro-SD card that has been set up as a bootable disk for Horner controllers will have several partitions.

In this example the micro-SD card was assigned as drive E. After making it a bootable disk there is still a drive E partition, but it is now only a small partition on the disk. The drive E format is FAT and it is the only usable partition by the Horner controller for normal operation. Booting and Restoring FW are handled by the extra partitions.



Once you have conditioned a micro-SD to be a bootable disk, it is common to leave it as is to be used for a backup restore device. If you intend to use the card again for normal operations it is recommended to **clean** the disk, create a **primary partition**, and **format**. There are numerous online resources that explain how to do this, or you may contact Horner Tech Support for help.

Horner recommends using tools from sdcard.org. The sdcard.org utility will do the clean, create partition primary, and format in one operation.

Step 10:

Eject the microSD card. It can now be used to boot the unit.

NOTE: After inserting the bootable microSD card to the unit, please wait for **4** seconds before applying the power to the device to discharge power supply of the device completely.

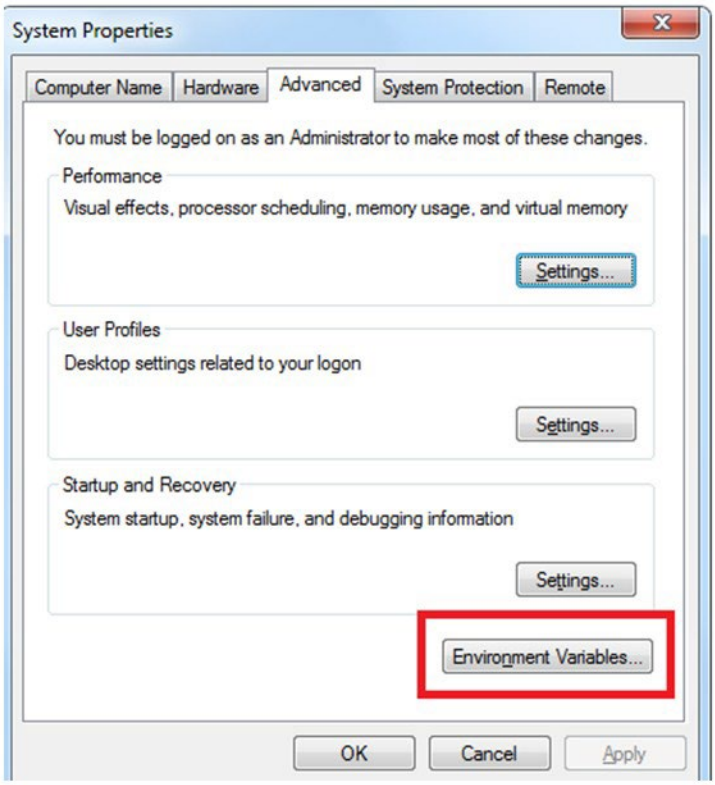
SECTION 3: Troubleshooting

3.1 Issue #1 – Rufus Application does not Launch

If any issue is seen in popping up of rufus.exe application, please follow below troubleshooting procedure and launch the Make_uSD.bat file again.

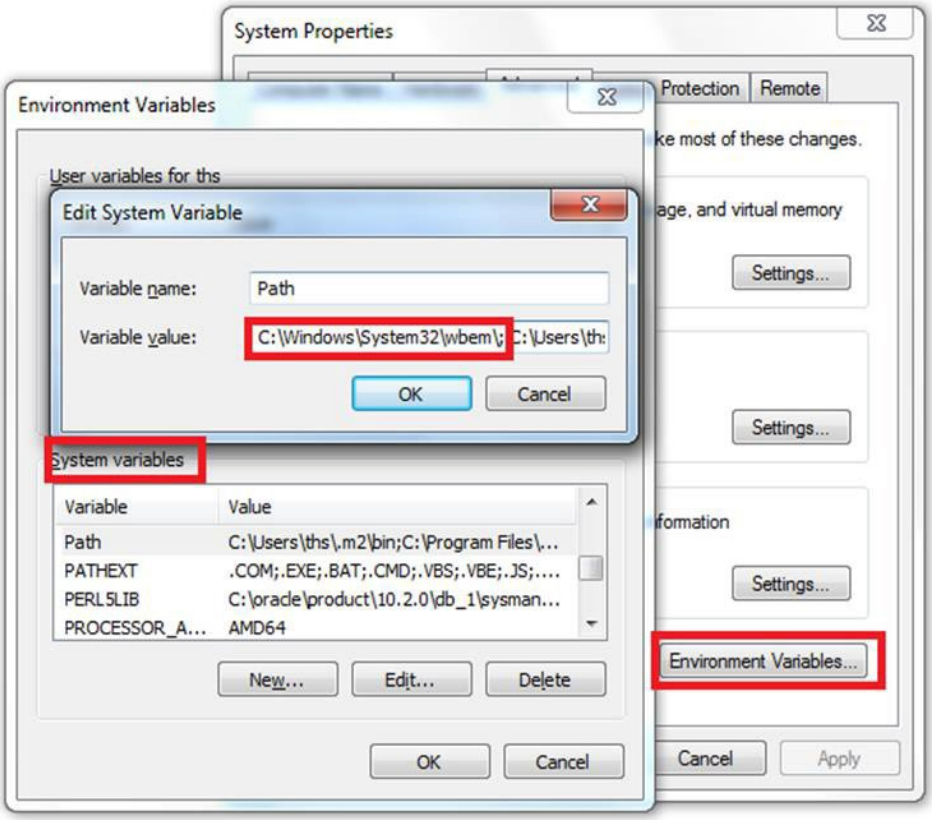
Perform the following steps for adding C:\Windows\System32\wbem\ to system PATH environment variable, so that it will be available for all the command prompt sessions:

1. Open Control Panel > System > Advanced System settings. A window like the one below will open:



2. Select Environment Variables > System Variables.

Edit Path variable and add C:\Windows\System32\wbem\ to the beginning of the path followed by a semicolon (";").



3. Save the changes made to the Path environment variable.

3.2 Issue #2 – Unit does not Boot

The Unit does not boot with the created microSD and there is only a white screen.
Please try using another microSD and check if the unit boots with the created microSD.

3.3 Issue #3 – Cannot Reuse microSD card

Bootable microSD card does not work when the same card is reused.

Some microSD cards, when used for creating bootable microSD card might be successful for the first time and when same card is used to create bootable microSD card for second time, it might fail in certain Windows 10 version. In such cases, user must format disk before making bootable microSD card via Rufus.

SECTION 4: Helpful Tips

4.1 Procedure Options to Format Disks

Method 1:
The following link points at a utility which can be used for formatting cards.
https://www.sdcard.org/downloads/formatter/

Method 2:
Open Command Prompt and type "diskPart"

- Type: list disk
- Enter: select disk # (Make sure to select the correct disk.)
- Type: clean
- Type: create partition primary
- Type: format fs=fat32 quick
- Type: assign

Use the formatted microSD card to make the bootable card.

4.2 Usability Space

After making bootable microSD card, the card will show size of about 1 GB. In order to make use of remaining space after boot loading the device, user might need to format the disk as mentioned above so that original capacity of the disk is obtained for usage.

NOTES:

a. User may be prompted to update Rufus or may set the settings to update Rufus automatically. If this is done, a newer version is downloaded but the original version "rufus-3.13.exe" included in the package will not be deleted.
b. If the original version is removed the batch file will not work properly.

SECTION 5: Restoring an XL4/XL4P, XL7/XL7P (legacy), X5/X5P

1. Power down the unit to be restored.
2. Switch number 3 of dipswitch "SW1" should be to the "ON" position. Refer to page 3 for switch location.
3. Install the microSD card into the unit and apply power to the unit.
4. The unit will power up to the Boot Installer Screen.
5. On the Boot Installer Screen, select "Install Bootloader".
6. Upon completion of the update, touch "OK", and then power down the unit.
7. Set switch 3 of dipswitch "SW1"to the "OFF" position.
8. Once all these steps are completed, power on the unit. It should now boot normally.

SECTION 6: Restoring an EXL6/XL6P, EXLW/XLWP, XL7P (new), EXL10/XL10P, XL10WP, XL15P

1. Power down the unit to be restored.
2. Install the boot-enabled the microSD card into the unit.
3. Depress the Bootload switch with a paperclip while applying power to the unit. Once power is applied, you can release the Bootload switch. Refer to page 3 for switch location.
4. The unit will power up to the Boot Installer Screen.
5. On the Boot Installer Screen, select "Install Bootloader".
6. Upon completion of the update, touch "OK", and then power down the unit.
7. Set switch 3 of dipswitch "SW1"to the "OFF" position.
8. Once all these steps are completed, power on the unit. It should now boot normally.

SECTION 7: Locations of Bootloader Switches

Top of XL4/XL4P	Back of XL7/XL7P
Dip Switches 	*Remove I/O to access Dip Switches.* 
Top of X5/X5P	
Dip Switches 	
Side of EXL6/XL6P, EXLW/XLWP, XL7P (new), EXL10/XL10P, XL10WP, XL15P	
Bootload Switch (A small, gray paperclip button)