

HTC ONE X (TEGRA 3 / ENDEAVORU)

ANDROID 4.1.1 -> ANDROID 5.1.1

CYANOGENMOD 12.1 DETAILED INSTALLATION, NEWLAYOUT, BACKUP AND ROOT GUIDE

IMPORTANT WARNING

This guide is specifically for the international NVIDIA Tegra 3 HTC One X, codename endeavoru.

DO NOT follow the destructive partition-formatting instructions on the Snapdragon HTC One XL (evita), another HTC model, or a device whose partition mapping has not been verified.

This procedure can erase all data and, if the wrong partition is formatted or flashed, can render the phone unbootable.

Before performing the NewLayout conversion: - Verify the device is endeavoru. - Verify the partition mapping. - Back up anything important. - Make raw stock images where possible. - Store backups on the PC. - Hash the backups and save the hashes.

Working configuration produced by this procedure: Device: HTC One X
Codename: endeavoru SoC: NVIDIA Tegra 3 Recovery: TWRP 2.8.5.3.BiG NEW
LAYOUT ROM: CyanogenMod 12.1 Android: 5.1.1 /data: mmcblk0p14, ext4,
approximately 25 GB /xtradata: mmcblk0p15 Google Apps: ARM / Android 5.1
/ Pico Root: CyanogenMod su, uid=0

1. WHAT YOU NEED

Download pack — All files needed for this guide are bundled here:

[HTC One X Root Tools Pack \(MediaFire\)](#)

Compatibility warning: This pack is for the international NVIDIA Tegra 3 HTC One X (endeavoru). Do not flash these files to another HTC One X variant.

- Android Platform Tools (adb and fastboot)
- Working HTC/ADB/Fastboot USB drivers

- twrp-3.1.1-0-endeavoru.img or suitable recovery for initial backup
- twrp2853-BiG.img
- cm-12.1-20160721-UNOFFICIAL-endeavoru.zip
- ARM Android 5.1 Open GApps Pico package, if Google services are wanted
- 7-Zip or similar for extracting boot.img
- Several GB of free PC storage for backups

Charge the phone before starting. At least 50% battery is recommended.

This procedure will erase data.

2. VERIFY THE PHONE IS ENDEAVORU

With USB debugging enabled:

```
adb devices
```

Reboot to bootloader:

```
adb reboot bootloader
```

Check Fastboot:

```
fastboot devices
```

Identify the device:

```
fastboot getvar product
```

The result for this guide must be:

```
product: endeavoru
```

The tested device also reported:

```
fastboot getvar version-bootloader
```

```
version-bootloader: 1.36.0000
```

If the product is evita, STOP.

3. UNLOCK THE BOOTLOADER

In Fastboot:

```
fastboot devices fastboot oem get_identifier_token
```

Use the identifier token with HTC's bootloader unlock process to obtain
Unlock_code.bin.

Then:

```
fastboot flash unlocktoken "C:_code.bin"
```

Approve the unlock on the phone.

WARNING: Unlocking wipes the device.

4. INSTALL INITIAL TWRP

The initial recovery used was:

twrp-3.1.1-0-endeavoru.img

Flash:

```
fastboot flash recovery "C:.1-0-endeavoru.img"
```

Successful output should include:

Sending 'recovery' ... OKAY Writing 'recovery' ... OKAY

A modern Fastboot may warn about skipping an AVB footer. The One X predates AVB; the OKAY results are what matter.

Enter HBOOT -> RECOVERY.

5. VERIFY THE ORIGINAL PARTITION LAYOUT

In TWRP:

```
adb devices adb shell cat /proc/partitions
```

On the tested 32 GB One X:

```
mmcblk0p12 1310720 mmcblk0p13 327680 mmcblk0p14 26476544 mmcblk0p15  
2248704
```

Check named mappings:

```
adb shell ls -l /dev/block/platform/*/by-name/
```

Tested mapping:

```
APP -> /dev/block/mmcblk0p12 CAC -> /dev/block/mmcblk0p13 ISD ->  
/dev/block/mmcblk0p14 UDA -> /dev/block/mmcblk0p15 LNX ->  
/dev/block/mmcblk0p4 SOS -> /dev/block/mmcblk0p5
```

Meaning:

APP / p12 = system CAC / p13 = cache ISD / p14 = old large HTC internal
storage UDA / p15 = old userdata LNX / p4 = boot/kernel SOS / p5 =
recovery

Check filesystems:

```
adb shell blkid
```

Originally p14 showed:

LABEL="HTC STORAGE" TYPE="vfat"

6. MAKE RAW STOCK BACKUPS

Create a PC directory such as:

C:-Stock-Backup

For the verified device: LNX = boot APP = system UDA = userdata

Create raw images from recovery and transfer them to the PC.

The clean images produced during this procedure were:

boot-clean.img 8,388,608 bytes system-clean.img 1,342,177,280 bytes

userdata-clean.img 2,302,672,896 bytes

These sizes describe the tested device. Verify another device independently.

7. HASH THE BACKUPS

Use:

```
certutil -hashfile "C:-clean.img" SHA256 certutil -hashfile
```

```
"C:-clean.img" SHA256 certutil -hashfile "C:-clean.img" SHA256
```

Hashes from the tested backup:

boot-clean.img

c6ec13f807cddff06023a86bad1d21980e5477f55e73c97a83aae9fe90864a40

system-clean.img

74ec113cc42451a83827eb8454ff13938e6d46abaf4241e1df94c58b610715d5

userdata-clean.img

01a35ac14c7a061271ca62dc3a96c6308da75f1252fb2f6e3580fe9ade205367

These hashes are specific to that backup. Save your own hashes.

8. INSTALL NEWLAYOUT TWRP

Recovery:

twrp2853-BiG.img

It identifies as:

Team Win Recovery Project v2.8.5.3.BiG NEW LAYOUT

Verified image:

Size: 8,284,160 bytes MD5: ce7f41b7caa6e5048b4904d550230178 SHA-256:
40413d0a72dd88d9f01175b60000f08f3f5d9644cfd38e73f75642d53f0aea44

In Fastboot:

```
fastboot devices fastboot flash recovery "C:-BiG.img"
```

Wait for Sending and Writing to report OKAY, then HBOOT -> RECOVERY.

9. UNDERSTANDING NEWLAYOUT

Old layout: p14 / ISD = large FAT32 "HTC STORAGE" p15 / UDA = roughly
2.2 GB userdata

NewLayout recovery expects:

```
/dev/block/mmcblk0p14 /data ext4 /dev/block/mmcblk0p15 /xtradata ext4
```

The large approximately 25 GB p14 partition becomes Android /data.

10. VERIFY NEWLAYOUT EXPECTATIONS

Run:

```
adb shell cat /etc/fstab
```

Tested NewLayout TWRP returned:

```
/dev/block/mmcblk0p12 /system ext4 rw /dev/block/mmcblk0p13 /cache ext4  
rw /dev/block/mmcblk0p14 /data ext4 rw /dev/block/mmcblk0p15 /xtradata  
ext4 rw
```

Before conversion, blkid still showed p14 as vfat. Installing NewLayout TWRP alone does not convert the filesystem.

11. TRY TWRP'S NORMAL CONVERSION FIRST

TWRP -> Wipe -> Advanced Wipe.

The tested recovery showed: Dalvik Cache System Cache Data Internal Storage 2GB Extra Data

The initial wipe of Dalvik Cache, System, Cache and Data failed to mount /data because p14 remained FAT32.

Then try: Advanced Wipe -> Data -> Repair or Change File System -> Change File System -> EXT4

If this succeeds, skip the manual formatting step.

On the tested device it failed with: Unable to mount '/data' Unable to wipe '/data' Error changing file system

Check:

```
adb shell blkid /dev/block/mmcblk0p14
```

If it still says TYPE="vfat", conversion did not happen.

12. MANUAL P14 CONVERSION - DANGEROUS

THIS IS THE MOST DANGEROUS COMMAND IN THE GUIDE.

Before continuing verify ALL of these: 1. fastboot getvar product reports endeavoru. 2. ISD is verified as /dev/block/mmcblk0p14. 3. NewLayout /etc/fstab maps mmcblk0p14 to /data. 4. mmcblk0p14 contains the old FAT32 HTC STORAGE filesystem. 5. Important data is backed up. 6. You understand p14 will be erased.

Check formatter:

```
adb shell which mke2fs
```

Expected in this recovery:

```
/sbin/mke2fs
```

Check version:

```
adb shell /sbin/mke2fs -V
```

Tested version:

mke2fs 1.42.9 (28-Dec-2013) Using EXT2FS Library version 1.42.9

ONLY AFTER VERIFYING THE PARTITION MAPPING:

```
adb shell /sbin/mke2fs -t ext4 /dev/block/mmcblk0p14
```

Do not substitute another partition number.

13. VERIFY CONVERSION

Run:

```
adb shell blkid /dev/block/mmcblk0p14
```


It should now report TYPE="ext4".

Mount:

```
adb shell mount /data
```

Verify from Windows CMD:

```
adb shell "cat /proc/mounts | grep ' /data '"
```

A successful result resembles:

```
/dev/block/mmcblk0p14 /data ext4 rw,...
```

14. INSTALL CYANOGENMOD 12.1

ROM:

cm-12.1-20160721-UNOFFICIAL-endeavoru.zip

Keep the ZIP intact.

In TWRP: Advanced -> ADB Sideload -> Swipe to Start Sideload

Check:

```
adb devices
```

It should show "sideload".

Install:

```
adb sideload "C:-20160721-UNOFFICIAL-endeavoru.zip"
```

"Total xfer: 1.00x" confirms transfer, but check TWRP itself for installer errors.

DO NOT REBOOT YET.

15. INSTALL GOOGLE APPS - OPTIONAL

Use an ARM, Android 5.1 GApps package. Open GApps Pico was used during this procedure.

In TWRP: Advanced -> ADB Sideload -> Swipe to Start Sideload

Check adb devices shows sideload.

Then:

```
adb sideload "C:_gapps-arm-5.1-pico-....zip"
```

If "sideload connection failed: closed" appears, TWRP is probably not currently in ADB Sideload mode.

16. VERIFY GOOGLE APPS

Return to ordinary recovery mode.

```
adb shell mount /system adb shell ls
```

```
/system/priv-app/GoogleServicesFramework adb shell ls
```

```
/system/priv-app/Phonesky
```

The successful installation returned:

GoogleServicesFramework.apk

and:

Phonesky.apk lib

17. EXTRACT boot.img

For an S-ON HTC One X, extract ONLY boot.img from the root of:

cm-12.1-20160721-UNOFFICIAL-endeavoru.zip

The tested boot.img was 4,538,368 bytes.

18. FLASH boot.img

Reboot into HBOOT -> FASTBOOT.

Check:

```
fastboot devices
```

You need a real serial number.

If you get:

```
????????????? fastboot
```

do not flash. Fix the USB/driver connection first.

Then:

```
fastboot flash boot "C:.img"
```

Successful output:

```
Sending 'boot' ... OKAY Writing 'boot' ... OKAY
```

19. FIRST BOOT

The phone should now have: - CM12.1 system - CM12.1 boot.img - NewLayout
/data - ARM Android 5.1 GApps, if desired

In TWRP:

Reboot -> System

The first boot can take several minutes. The tested device successfully reached the Android setup wizard.

20. ROOT ACCESS

Enable Developer options: Settings -> About phone -> tap Build number seven times.

Then: Settings -> Developer options -> Root access -> Apps and ADB

Enable Android/USB debugging.

Check:

```
adb devices
```

Enter shell:

```
adb shell
```

Then:

```
su
```

A successful root prompt changes from:

```
shell@endeavoru:/ $
```

to:

```
root@endeavoru:/ #
```

Verify:

```
id
```

The tested phone returned:

```
uid=0(root) gid=0(root) context=u:r:su:daemon:s0
```

21. WHY “su” DOES NOT WORK IN WINDOWS CMD

This is wrong:

```
C:>su
```

```
su is on Android, not Windows.
```

Use:

```
adb shell
```

then:

```
su
```

22. TROUBLESHOOTING

ADB works in TWRP but not after installing CM: Enable Developer options and Android debugging again. A new ROM resets USB debugging configuration and authorisations.

MTP works but adb devices is empty: Check Device Manager, reconnect USB, and run:

```
adb kill-server adb start-server adb devices
```

Fastboot displays ??????????: Do not flash. Reconnect USB, re-enter FASTBOOT USB and fix drivers until the actual serial appears.

TWRP says /data is 0 MB: Check:

```
adb shell blkid /dev/block/mmcblk0p14
```

On a VERIFIED endeavoru/NewLayout setup, if p14 is still vfat, the old HTC Storage filesystem has not been converted.

which mkfs.ext4 returns nothing: The tested recovery did not contain mkfs.ext4. It contained /sbin/mke2fs.

```
su returns 255: Set Settings -> Developer options -> Root access -> Apps  
and ADB.
```

ADB sideload says connection failed: closed: Start TWRP's Advanced -> ADB Sideload mode first. adb devices should report "sideload".

23. KEEP A PERMANENT RECOVERY KIT

Recommended archive:

boot-clean.img system-clean.img userdata-clean.img SHA256.txt
twrp-3.1.1-0-endeavoru.img twrp2853-BiG.img
cm-12.1-20160721-UNOFFICIAL-endeavoru.zip boot.img Open GApps ARM 5.1
Pico ZIP HTC Unlock_code.bin

Verified NewLayout recovery:

twrp2853-BiG.img Size: 8,284,160 bytes MD5:
ce7f41b7caa6e5048b4904d550230178 SHA-256:
40413d0a72dd88d9f01175b60000f08f3f5d9644cfd38e73f75642d53f0aea44

24. FINAL WORKING CONFIGURATION

HTC One X Codename: endeavoru SoC: NVIDIA Tegra 3 Recovery: TWRP
2.8.5.3.BiG NEW LAYOUT ROM: CyanogenMod 12.1 Android: 5.1.1 /data:
mmcblk0p14, ext4, approximately 25 GB /xtradata: mmcblk0p15 Google Apps:

ARM / Android 5.1 / Pico Root: CyanogenMod su, uid=0(root)

FINAL SAFETY NOTE

DO NOT copy the p14 formatting command merely because a phone says “HTC One X”.

Verify: fastboot getvar product

It must identify the intended Tegra 3 device as endeavoru.

Then independently verify the by-name partition mapping and NewLayout recovery fstab before formatting anything.

The command:

```
adb shell /sbin/mke2fs -t ext4 /dev/block/mmcblk0p14
```

was appropriate only after verifying on the tested endeavoru that:

ISD -> mmcblk0p14

and NewLayout expected:

mmcblk0p14 -> /data -> ext4

Make backups first and verify the device before destructive operations.

END OF GUIDE