

Firmware Upgrade Notice

27 April 2020

Description

A new release (v2.70) for CATx USB Extenders is now available.

This production release introduces additional touch screen support.

You may also want to refer to the notes for v2.5 regarding the introduction of a scaling feature for touch screens to help correct for non-linear screens where the error between touch position and actual cursor position increases away from the screen centre.

Support has been added for some newer wireless KB/Mouse devices and a new command added to remotely reset the Local Unit.

All extender products have a version number label on the base in the following format:

xxSyy/zz where **xx** = Hardware Version, **yy** = Firmware Version & **zz** = Daughterboard Version

For the following products this release version is known as 2.70

- Current Remote Unit Production Firmware Version: 2.52 (Released April 2013)
- Current Local Unit Production Firmware Version: 2.4 (Released January 2011)

ACU6001A, ACU6022A, ACU6201A, ACU6222A

Note 1: The upgrade procedure is detailed at the end of this document.

Note 2: This document contains details of all firmware fixes and enhancements since these products were released. Newer features (v2.3+) described in these notes might not necessarily be described in the User Guide.

Version 2.70 Release Notes (April 2020)

Additional Touch Screen Support

1. Added support for eGalax touch screen controllers that have very long HID Report Descriptors.
2. Added special handling for ELO touch screens (such as the ET1739L) which have strict polling requirements.
3. Added basic calibration support for PenMount touch screen controllers from Dialogue that have an HID interface.
4. Added support for 'right button clicks' from eGalax touch screen controllers.

All supported touch screens may be calibrated and, if required, scaled.

To enable support please follow the instructions relating to ELO Touch support added in v2.3. Also refer to the new scaling function introduced in v2.5 (if required).

Additional Command to Transpose Touch Screen X/Y Data

Some controllers (notably from eGalax) have been found to transpose their X/Y report data compared to that declared in the HID descriptors. To address this a new command has been added to transpose these reports if the cursor direction is incorrect AFTER calibration.

Prior to using this feature you must register and calibrated the touch screen

To transpose touch reports you first need to enter Command Mode:

<Left Control> + <Left Shift> + <F10>

The following command then applies:

<Left Shift> + <F5>: Toggle whether calibrated touch reports X/Y data are transposed

Additional Command to Reset Local Unit (Re-Enumerate)

This command forces the Local Unit to re-enumerate (just like hot-plugging the USB cable). It should be used in rare cases where USB communication has been lost or locked-up (this can happen on some machines under Windows 7 or 8 when switching users or coming out of deep sleep).

To reset the Local Unit first need to enter Command Mode:

<Left Control> + <Left Shift> + <F10>

The following command then applies:

<Left Shift> + <F9>: Reboot Local Unit (to force USB re-enumeration)

Note: Please do not confuse with <Left Control> + <F9> which will, in addition, reset the extender to factory default setting.

Issues Addressed in v2.70

1. Added support for newer Logitech wireless mice using the 'Unifying' receiver.
2. Added support for new Dell wireless KB/Mouse (specifically, Model KM632).
3. Some users have reported occasional keyboard/mouse lockup when switching users or coming out of sleep under Windows 7/8 on specific machines. A new command (see above) has been added to reset the Local Unit if this rare condition occurs. Contact support should you require further assistance.

Recent Release Firmware History

Version 2.5 Release Notes (April 2013)

Additional Touch Screen Support

This release adds basic support for certain touch screens from eGalax that have an HID interface. To enable support please follow the instructions relating to ELO Touch support added in v2.3.

Touch Screen Scaling (Linearization)

After calibrating some touch screen models (notably the eGalax) it is apparent that the touch accuracy decreases as you move away from the centre. i.e. The on-screen cursor position is not in exactly the same location as touched. This is due to the screen being slightly non-linear, and a simple two point calibration routine cannot correct it.

A new touch screen scaling feature has been added which will help correct for much of this linearity error. Using keyboard commands up to eight levels of positive or negative scaling may be independently applied to the X or Y axis. The selected scaling multiplier is progressively applied as you move away from the screen centre.

Prior to using this feature you must register and calibrated the touch screen (see v2.4 below).

To apply scaling you first need to enter Command Mode: <Left Control> + <Left Shift> + <F10>

The following commands then apply:

<U> + <Left Arrow>:	Increase X-axis scaling by one level (Max: +8)
<V> + <Left Arrow>:	Increase Y-axis scaling by one level (Max: +8)
<U> + <Right Arrow>:	Decrease X-axis scaling by one level (Min: -8)
<V> + <Right Arrow>:	Decrease Y-axis scaling by one level (Min: -8)
<Left Control> + <U>:	Set X-axis scaling to positive mid-level (i.e. 4)
<Left Control> + <V>:	Set Y-axis scaling to positive mid-level (i.e. 4)
<Left Control> + <Alt> + <U>:	Set X-axis scaling to negative mid-level (i.e. -4)
<Left Control> + <Alt> + <V>:	Set Y-axis scaling to negative mid-level (i.e. -4)
<Left Shift> + <U>:	Clear X-axis scaling (i.e. 0)
<Left Shift> + <V>:	Clear Y-axis scaling (i.e. 0)

1. The touch screen will not be active whilst you are in Command Mode.
 2. Positive scaling is applied for scaling levels above 0, and negative for levels below.
 3. You may enter multiple combinations of the above commands whilst in Command Mode.
 4. Once complete press <ESC> to exit Command Mode and save scaling level.
 5. The scaling values are cleared each time the touch screen is recalibrated.
 6. Initial scaling level is zero.
- Positive scaling needs to be applied if the cursor is closer to the edge of the screen than the touch position.
 - Negative scaling needs to be applied if the cursor is closer to the centre of the screen than the touch position.
 - **Hint:** Some experimentation may be required. Use the 'Mid-level' commands in the first instance. E.g. eGalax screens appear to be corrected by simply setting both X & Y to mid-level.

Issues Addressed in v2.5

1. 'Channel 0' (all channels) may no longer be selected on single-head devices. This prevents an issue during DDC transfer where the non-existent 'Channel 2' cannot be programmed.
2. Fixed issue where LED indicators on certain keyboards were not being updated correctly.
3. Added workaround to support a generic keyboard manufactured by CIL that would crash on enumeration.

Version 2.4 Release Notes

Added support for certain Logitech Laser Mice (also supplied by Dell and Fujitsu). Movement was erratic with previous firmware

Added support for certain keyboards with non-standard report formats such as the Tipro KMX096A.

This release adds basic support for certain touch screens from KEP that have an HID interface. To enable support please follow the instructions relating to ELO Touch support added in v2.3.

Issues Addressed in v2.4

1. A bug was inadvertently introduced in v2.3 which caused DDC (EDID) transfers to be corrupted if more than one HID device was connected to the Remote at the time of transfer (i.e. anything more than a KB). The invalid EDID was then stored in the Local Unit and would not be accepted by the CPU. This issue has now been fixed and, in addition, further checks have been added to the Local Unit firmware to ensure that an invalid EDID cannot be stored.

Version 2.3 Release Notes

Enhanced Elo Touch Screen Support (including calibration)

In Firmware v2.0 Generic HID device support was added. This allowed touch screens (which could operate using OS native HID support) to be used through the extender in a basic mode. The extender cannot utilise any vendor driver supplied with a touch screen for calibration/enhanced options etc. Operation in basic mode may not be suitable for all applications.

We have found that many Elo Touch screens require calibration to scale reports to the full screen area, and also correct X or Y-axis reversal. For example, you might touch the upper right-hand corner and the cursor will move to the lower right-hand corner, or the cursor may not move exactly to the location you touch.

Calibration and axis reversal is normally sorted out in the calibration sequence via the vendor driver. When operating through the extender the vendor calibration routine is not available and so the following command has been added to effect basic calibration.

You first need to register the Elo Touch Screen with the extender system:

1. Connect the Elo monitor and a keyboard to the Remote Unit
2. Enter Command Mode: <Left Control> + <Left Shift> + <F10>
3. Enter the registration command <Left Control> + <F4>
4. The extender will now re-enumerate and allow basic touch screen operation

Note: See firmware release notes for v2.1 (available on-line) for further information regarding generic device support

The cursor should now move as you touch the Elo monitor. However, the direction of movement may be reversed, and the cursor might not travel over the entire screen area.

You now need to calibrate the touch screen:

1. Enter Command Mode: <Left Control> + <Left Shift> + <F10>
2. Enter the Elo Calibration command: <Left Control> + <F5>
3. The KB LEDs will flash twice and then light (after a further 1.5 secs).
4. Touch the Elo screen once right in the UPPER LEFT-HAND CORNER** (within 10 seconds).
5. The KB LEDs will clear.
6. After a second the KB LEDs will flash twice and then light (after a further 1.5 secs).
7. Touch the Elo screen once right in the LOWER RIGHT-HAND CORNER** (within 10 seconds).
8. The KB LEDs will clear and then flash twice after two seconds if the calibration was successful.
9. The extender will now quit Command Mode.
10. The touch screen is now calibrated and any reversed axes are automatically adjusted.

- You only need to perform the above operation once. The settings are saved in EEPROM.
- If you want to connect further touch screens then all touch screens MUST be the same model.
- You should re-calibrate whenever you register additional (or replacement) generic HID devices.
- If there were any problems during calibration the extender will quit Command Mode and resume normal operation after the time-out period.

** Ultimate calibration accuracy depends on how tightly into the screen corners you touch.

Issues Addressed in v2.3

1. Command Mode will now time-out after 15 seconds if there are no further keys pressed. Previously it would (incorrectly) stay in Command Mode.
2. The enumeration process for HID connected to the Remote Unit has been simplified enhancing compatibility with certain 'low-end' KVM USB devices that have limited USB support.
3. Fixed a couple of minor issues in the Remote Unit to do with enumeration of composite devices.
4. Improved Remote Unit USB device error handling.
5. Fixed a bug in the Remote Unit's Hub Driver which could cause the extender response to become very intermittent leading to jerky mouse movements and a slow keyboard. This occurred because a flag was not being cleared under all circumstances causing the Remote Unit to continually attempt to re-enumerate the affected hub port. This flag could be set by some hubs when subjected to EMI. Some low-end USB 1.1 hubs have also been discovered where the same flag is set for no apparent reason whenever a device is detached and quickly re-attached.
6. Fixed bug where mice devices without a scroll wheel (such as certain trackballs) were not being handled correctly leading to normal mouse/ball movement causing windows to scroll.
7. Increased write delay time to account for the fact that the write time on certain batches of EEPROMS exceeds the manufacturers stated maximum. This may have affected storage of video settings and/or calibration data.

Version 2.2 Local Unit Maintenance Release Notes (July 2009)

Issues Addressed in v2.2 (Local Unit)

1. We have found that the required write time on certain batches of EEPROMS used to hold the DDC emulation exceeds the manufacturers stated maximum. This means that many units produced over the last few months may not always provide a valid EDID to the computer (because the memory chip might not program correctly).

This issue has now been addressed by increasing the memory write time to a value way in excess of the worst-case quote by the device manufacturer.

Note: After upgrading the LOCAL firmware from v2.1 you should issue the following command to ensure the DDC is reset.

- a. Enter Command Mode: <Left Control> + <Left Shift> + <F10>
- b. Press <Left Control> + <F9> to reset the extender to a default state.

After a few seconds the extender will be reset and the EEPROMS programmed with the default DDC emulation. You may now transfer the Remote monitor EDID (if required).

If you have also registered additional HID devices you will now need to perform this operation again.

Note: You do not need to carry out the above procedure if your Local Unit has v2.2 (or higher) firmware factory installed.

2. When the keyboard language ID is transferred the extender should immediately re-enumerate with the changed ID. Unfortunately a bug in v2.0 onwards meant that the updated ID was only sent to the CPU after a subsequent power cycle (of the Local Unit), or after issuing a "Reset to Default" command from the Remote Unit. This issue has now been fixed.

Version 2.1 Maintenance Release Notes (Feb 2009)

Issues Addressed in v2.1

- 1. If the keyboard and mouse are used simultaneously one of them may stop responding and require a hot-plug to restore operation. This issue was recently introduced in v2.0 and is now fixed.**

You only need to upgrade the Remote Unit firmware to correct this problem.

- 2. Changed maximum size reported in keyboard and mouse endpoint descriptors.**

This works around a bug in HP-UX where the OS itself generates spurious KB characters if these endpoints declare a maximum size of more than eight bytes. This descriptor change might also fix a similar key repeat issue observed when the extender is used in conjunction with Rose USB Host to PS/2 converters.

- 3. Some 'poor' KB/Mouse type devices continually send null data (even when requested not to). Filtering has now been added in the Remote Unit firmware to ensure this null data is removed. Previously this excessive data would swap the link affecting the response time of other devices and/or cause spurious mouse/KB data.**

Version 2.0 Release Notes (Jan 2009)

Enhanced Keyboard & Mouse Support

In previous releases only basic USB keyboards and mice were supported. In v2.0 the HID parser has been extended to handle newer laser mice and combination wireless KB/Mouse devices that often use 'non-standard' report formats.

The firmware has been structured to enable support to be easily added for any 'quirky' devices discovered in the future.

Support has also been added for mouse pan/tilt (horizontal scrolling) for those operating systems that support it within their native HID drivers (e.g. Vista).

Generic HID Device Support

Previously only KB and mouse type devices (including bar code scanners) were supported. Additional keys on multi-media keyboards could be handled through a Remote Unit command: <Left Control> + <F4>.

In this firmware release a wider range of generic HID devices is supported subject to certain restrictions.

Firmware v2.0 now supports almost any HID device which only sends data to the CPU, and does not require a vendor driver (i.e. it uses the HID drivers of the operating system).

Supported generic devices include additional keys on multi-media keyboards, basic joysticks, and some touch screens (basic mode) and card reader.

Up to four generic devices (in addition to the KB & mouse) may be connected.

To handle these devices you need to register them (once only) as follows:

1. Connect all the generic HID devices (e.g. a joystick, or KB with multimedia keys) you wish to register to the Remote Unit.
2. Enter Command Mode: <Left Control> + <Left Shift> + <F10>.
3. Register the devices by requesting USB Descriptor transfer: <Left Control> + <F4>.

The Remote unit will now read the USB descriptors from the generic devices and copy them to the Local Unit. After a few seconds the Local Unit will then re-enumerate as a composite device with several HID interfaces. The registration process is only required once because the descriptor data is permanently stored within the Local Unit, and the Remote Unit has logged the VID/PID of all registered devices.

Registered devices may be disconnected and re-connected to the Remote Unit without the need to register again.

Note: Each time a registration is requested (<Left Control> + <F4>), all previous registration data is overwritten; so you must ensure that all devices to be registered are connected. If you need to restore the extender to its default state with only basic KB/Mouse emulation, simply request a registration without connecting any generic devices (or, issue the system reset command: <Left Control> + <F9>).

Important: USB devices connected to the Remote Unit cannot be associated with any particular vendor driver.

You do not normally need to register keyboard or mouse type devices. If however, you are having problems getting a KB/Mouse to work, you could try registering it in case it has 'non-standard' descriptors.

Private Mode

In previous releases the only Private Mode option was to blank the monitors connected to the Local Unit. Firmware v2.0 enhances Private Mode to provide similar functionality to that on our dual-head PS/2 extenders.

Operation is now as follows:

Remote Private Mode

- In this mode monitors connected to the Local Unit are blanked.
- It is not possible to disable the Local KB/Mouse because they are connected directly to the CPU.
- To enable Remote Private Mode enter Command Mode (<Left Control> + <Left Shift> + <F10>), and then press <Scroll Lock>.
- All Local monitors are now blanked, and the yellow LED on the Remote Unit will now flash at double speed (as an indication).
- To exit Remote Private Mode, issue the same command sequence again.
- The current Remote Private Mode state is stored in EEPROM, and is restored on power-up.

Local Private Mode

- In this mode all Remote HID devices are disabled, and (optionally) all monitors connected to the Remote Unit are blanked.
- **The Local Private Mode feature is inhibited by default and has to be explicitly enabled (as described below).**
- **If Local Private Mode is allowed, the Remote Console enable/disable state is toggled by pressing Caps Lock or Scroll Lock, eight times within two seconds on any keyboard connected directly to the CPU.**
- The Remote Unit is now disabled, all three KB LEDs on the Remote KB are lit, and the yellow LED on the Local Unit will now flash at double speed (as an indication).
- To exit Local Private Mode, issue the same command sequence again.
- The current Local Private Mode state is stored in EEPROM, and is restored on power-up.

A further Remote command has been added to control whether the Remote monitors are blanked in Local Private Mode. The default setting is to blank them.

To toggle the Remote Monitor blank state:

1. Enter Command Mode
2. Press <Left Control> + <Scroll Lock> to toggle the state
3. The setting is saved in EEPROM, and the unit will quit Command Mode.

Local Private Mode Inhibit

This feature is inhibited by default. To enable/disable this feature:

1. Enter Command Mode
2. **Enable:** Press <Left Control> + <F7> , or, **Disable:** Press <F7>
3. The setting is saved in EEPROM, and the unit will quit Command Mode.

Note: Local Private Mode is inhibited by default because it operates by sensing a sequence of KB Indicator changes. To prevent any possible conflict with 3rd party equipment (e.g. KVM switches) that may toggle the LEDs too often this feature is disabled unless the user specifically requires it.

Issues Addressed in v2.0

1. If three external hubs were connected in series to the Remote Unit (exceeding the two hub layer limit) then extender operation would cease or become erratic. This has now been addressed and the additional hub is ignored.
2. Fixed a buffer overflow issue in the Remote Unit which could theoretically occur under rare circumstances requiring the Remote to be re-powered.
3. Firmware v2.0 includes all previous bug fixes
4. Bootloader: small enhancement (v2.0 factory programmed units only)

Compatibility with v1.x Firmware

Due to the large number of changes v2.0 firmware is not 100% compatible with v1.0. In particular, the mouse will not operate (by design) if a v1.x Local/Remote is used a v2.x local/Remote Unit. Please ensure that both Local & Remote Unit have the same major version firmware.

Upgrading Older Units

Around 10% of units with old firmware (v1.0) may not be able to enter Upgrade Mode (due to a processor hardware issue which was addressed in later revision firmware). If you cannot enter Upgrade Mode (after several attempts) your extender will need to be returned for a factory firmware upgrade.

Firmware Upgrade Procedure

PLEASE REFER TO WARNINGS & NOTES AT THE END OF THIS SECTION

The extender's firmware may be upgraded via USB. In addition, the current extender configuration may be saved and restored.

On entering Upgrade Mode the extender detaches itself from the USB and re-enumerates as a removable disk drive allowing upgrades to be made.

Preparation

The Local and Remote Units must both be connected and powered even if you only wish to upgrade one of them.

Connect a mouse & monitor directly to the CPU as the Remote KB & Mouse will not function in Upgrade Mode. Alternatively, connect the Local Unit to a laptop.

Entering Upgrade Mode

1. From the REMOTE KB first enter Command Mode
2. Now enter <Left Control> + <Left Shift> + <Right Shift> + <F9>

The yellow LED on both the Local & Remote units will light to indicate Upgrade Mode has been entered. If the KB LEDs are still flashing then try entering the command again. If the Local Unit yellow LED is not lit then try hot-plugging it.

If all is well, your PC should indicate a flash drive called EXTENDER is attached. Under many operating systems a window showing the contents will pop up. If the drive contents window does not appear, then you will need to manually open the drive folder.

Operating Upgrade Mode

When in Upgrade Mode you must use a KB/mouse directly attached to the PC.

You will see four *virtual* files listed:

BOOT	Delete this file to return to normal extender operation.
LOC_xx	This shows the firmware version in the Local Unit. If the version is reported as 'LOC_BAD' the upgrade was not successful – try again
REM_xx	This shows the firmware version in the Remote Unit. If the version is reported as 'REM_BAD' the upgrade was not successful – try again.
CONFIG	This file contains the current extender configuration. You may save this file and use it setup another extender by dragging it onto the file window and overwriting it.

Upgrading a Local Unit

Drag the Local firmware file provided onto the window. After a few seconds the window display should refresh and the new firmware version displayed by file 'LOC_xx'

If the window does not refresh (will not on some OS,) and the dragged upgrade file is still shown, then refresh the folder window (F5), or re-power the Local Unit (by disconnecting the USB cable) and view the drive folder again.

If the 'LOC_xx' file displays as 'LOC_BAD' the upgrade was not successful. Try again or call technical support.

If the upgrade was successful and you only want to upgrade the Local Unit, delete the file BOOT. The extender drive will disconnect itself and normal extender operation will resume.

Note: If the upgrade was not successful, you will not be able return to normal operation and the extender will remain in Upgrade Mode.

Upgrading a Remote Unit

You need to drag each of the EIGHT the firmware files provided onto the window. Simply highlight them all and drag in one operation. After approx 50 seconds the window display should refresh and the new firmware version displayed by file 'REM_xx'

If the window does not refresh (will not on some OS), and the dragged upgrade files are still shown, then refresh the folder window (F5), or re-power the Local Unit (by disconnecting the USB cable) and view the drive folder again.

If the 'REM_xx' file displays as 'REM_BAD' the upgrade was not successful. Try again or call technical support.

If you have finished upgrading both units delete the file BOOT. The extender drive will disconnect itself and normal extender operation will resume.

Note: If the upgrade was not successful you will not be able return to normal operation and the extender will remain in Upgrade Mode.

Important Notes

- This upgrade feature is not guaranteed to work correctly with all operating systems. It was designed for Windows but has successfully been tested on Mac OS X and some Linux distributions. [See note at end regarding Windows 10.](#)
- The feature functions best if write caching is switched off for flash drives. This done by default on XP SP2, Vista and OS X. If write caching is not disabled then file writes or deletes may take up to 45 seconds to complete. For example, under Windows 2000 or Linux if you delete the BOOT file to return to normal operation, it may take 30 seconds before the file is actually deleted and the EXTENDER drive reported as removed.
- Do not attempt to drag any other kinds of file onto the Extender drive. It is a virtual storage device.

Consult Technical Support if you have any issues regarding upgrading.

Upgrading Tips

If you have a number of installed units to upgrade you may not need to move them in order to upgrade.

Example: To upgrade a number of Local Units installed in a rack you may find it much faster to bring a Remote Unit & USB KB into the same room as the Local Units. To upgrade each Local Unit in turn simply connect a patch cable from the Remote to the Local Unit and then enter the Upgrade Mode entry sequence on the Remote KB. Now, with the aid of a flash drive (or upgrade file located on a shared drive), you may simply upgrade the Local Unit (by dragging the file on to the extender drive) and then delete the BOOT file before moving on to the next unit.

Example: To upgrade a number of Remote Units you may find it much faster to use a patch cable to connect (in turn) each Remote Unit to a nearby notebook which has a Local Unit connected.



When upgrading a number of units, ensure the BOOT file is deleted after *each* upgrade is complete. If you forget to do this and are left with a Local or Remote Unit that is stuck in Upgrade Mode (orange LED lit), simply re-power the unit to which it is connected. Both units will now re-enter Upgrade Mode to enable you to delete the BOOT file and return to normal operation. If you forget to do this, then it is possible for Upgrade Mode to propagate as you connect more units!



Windows 10: When upgrading you may receive an 'Interrupted Action' error. Should this occur choose 'Skip' and NOT 'Try Again'. The upgrade should now complete. Refresh the EXTENDER drive window to verify that LOC_xx and REM_xx are reported with the upgraded firmware version numbers.