HCS-II CPU Upgrade Instructions – v1.1
Creative Control Concepts
http://www.cc-concepts.com/

Congratulations on purchasing the HCS-II CPU Upgrade Kit. Upgrading your HCS-II will result in a performance increase of about 2.5! All without any circuit board modifications. By following these easy instructions, you should have your system upgraded in less than 30 minutes!

The HCS-II upgrade can be performed on both older RTC180 boards as well as the current HCS2-DX. The upgrade replaces the bulk of the silicon on the board. Since the new CPU and firmware will double the operating speed of the board, the glue logic ICs must be upgraded to handle the faster system speed. Overall current draw will increase slightly since 74F ICs draw more current than 74LS ICs. A bigger heatsink is included for HCS2-DX boards that utilize an onboard 7805 Regulator. You should ensure your power supply can handle an additional 75mA or so to be safe. You should use a voltmeter to check the current before and after if you are unsure about your power supply's current capability.

If you have any unanswered questions after reading these instructions, check out the FAQ on our website at http://www.cc-concepts.com/. You can also contact our support department toll free (US Residents only) at (877) 795-5383 or email us at support@cc-concepts.com

Check the contents of your upgrade kit to ensure you have all the necessary parts:

1   Z8S18020VSC CPU (PLCC) (U1)
1   v4.x XPRESS Firmware EPROM (U9)
2   62256 32K 70ns RAM ICs (DIP) (U10 & U11)
2   74F245 ICs (U2 & U3)
1   74F14 IC (RTC180-U7, HCS2DX-U8)
1   74F32 IC (RTC180-Not Used, HCS2DX-U12)
1   74F139 IC (RTC180-Not Used, HCS2DX-U13)
1   Large 7805 Heatsink (HCS2-DX only)
1   DIP IC Extraction Tool (Yellow Handle)
1   PLCC IC Extraction Tool (Black Handle)
1   Disposable Static Strap
1   HCS-II Software Floppy

Once you've ensured you have all the proper parts, you are ready to upgrade your system.

First, power down your HCS-II controller and open whatever enclosure it is in (if any). Remove the static strap from its package and follow the directions for putting it on. Ensure you attach the copper end to a clean, grounded, metal surface.

Remove any daughter boards installed on your HCS-II controller (you can remove the whole stack instead of doing it one by one if you like). It is not necessary to remove the HCS-II controller board from its enclosure though it may make things easier. You will need direct access to Sockets U1, U2, U3, U8, U9, U10, U11, U12, and U13.

Remove the backup battery from its holder B1 **OR** slide a thick piece of paper between the top of the battery and the retaining clip.

Using the DIP extraction tool, remove the RAM and EPROM chips U9, U10, and U11 from their sockets. Also remove the 74x245 bus drivers (U2 & U3) along with the 74x14 inverter IC (U7-RTC180 or U8-HCS2DX). If you have an HCS-2DX board, also remove the 74x32 IC (U12) and 74x139 IC (U13).

Some of you may not have a log RAM IC in position U10 which is fine. After you finish the upgrade you will. To use the DIP extraction tool, insert the catches underneath the chip at each end (NOT the socket), gently squeeze and pull the DIP from the socket. A gentle rocking motion may help.

If you have an RTC-180 board, you will likely have to pull the SmartSocket out along with the RAM IC. Simply use a small flat-head screwdriver to remove the RAM IC and then reinstall the SmartSocket, ensuring proper polarity.

If you have an HCS2-DX board, you will need to upgrade the onboard heatsink to handle the higher current draw. Carefully unscrew the small screw holding the 7805 to the heatsink. Do not try to loosen the nut, as it will not turn since it hits the 7805 regulator body. You must loosen the screw from the bottom of the board. Gently remove the heatsink by bending the 7805 up slightly and swinging the heatsink to the right and off the board.

Take the new heatsink and install it so the notch faces the leads of the 7805. Align the holes and the heatsink. When installed, the bottom and right side of the heatsink should be flush with the edge of the board. Reinstall the screw and nut. Tighten the screw to ensure good contact between the 7805 and heatsink.

Install the new DIP ICs. The XPRESS firmware EPROM should be installed in socket U9. The RAM chips should be installed in sockets U10 & U11. They are identical chips. Install the faster 74Fxxx logic and bus driver ICs. Remember that RTC180 users will not use the 74F32 and 74F139. You may find it beneficial to slightly bend the pins inward on each IC by pressing them into a flat, hard surface first. Once installed, make sure no pins were bent and that all pins are firmly seated in their sockets. It can be very difficult to see if a pin has bent underneath an IC. This type of misinsertion can cause intermittent problems, which are very hard to troubleshoot.

Remove the CPU from socket U1 using the PLCC extraction tool. Do this by inserting the hooks into the two small slots in the socket near two opposing corners. Once the hooks are inserted, squeeze the handles together on the tool and the CPU should pop up to the top of the socket.

Install the new CPU in socket U1. You will notice that the CPU has one corner that is flat. This should be aligned with the corner of the socket that is also flat. Place the CPU on top of the socket and ensure the CPU lies flat and the plastic ridges in the socket line up BETWEEN the CPU pins. When they do, gently press down on the chip until it snaps into place. **BE CAREFUL!** Misaligned chips can break PLCC sockets, which are VERY difficult to replace!

The hardware upgrade is now complete. Reinstall the battery or remove the insulating paper. Reinstall any daughter boards you removed and power up the controller.

Connect the HCS-II to your PC and launch the new HOST from the software floppy included with the upgrade kit. Set the real-time clock using the Alt-C, T command. If the clock then begins to increment, the upgrade is a success! Note you may have to attempt the clock set command a few times before it works.

Using the new compiler, recompile your XPRESS program and upload it using HOST. Your upgrade is complete! No XPRESS changes are needed.

If you encounter any problems, email us at support@cc-concepts.com or call our support department at 919-304-3107 (Toll Free 877-795-5383).