Application Notes

AN13 - How to Upgrade the IPC Bootloader over Radio

Background

The IPC contains two separate software images: The 'bootloader' and the 'application'. The bootloader is located in the first 8kB of memory, and the application uses the remaining memory.

The EP3 can communicate with the bootloader when the EP3 has the 'Firmware Upgrade' window open and the bootloader is ACTIVE (the LED is blinking quickly). While the IPC bootloader is ACTIVE the EP3 can send it a new application image over the radio.

The bootloader is normally programmed into the IPC via the ISP port from the test rig, but the ISP port isn't accessible after the IPC has been potted. In order to reprogram the bootloader, the application image is replaced with a 'Meta-loader', which the EP3 can communicate with to upgrade the bootloader. This process operates similarly to upgrading the application, but the image is being programmed into the bootloader memory region instead.

Process

1. Find the IPC in the IPC list and get its status. Check that the charge is >= %70.
2. Put the IPC into bootload ACTIVE mode using the magnet. The LED will be blinking continuously.
3. In the EP3 Firmware Upgrade section, select and 'Load' the meta-loader file (IPC-Meta-vx.xx.bin).
4. Press the 'Poll' button. You should get 'Response OK" and the bootloader name and revision will be shown in the last status line. You are communicating with the old bootloader that we want to upgrade.
5. Press 'Flash'. Check that it erases and completes the programming process.
6. Press 'Check'. Bootloader version < 1.06 will respond with "Unsupported", but newer ones should say "Firmware OK".
7. Press 'Reset'. The IPC should now be running the Meta-loader.
8. Now go back to the Firmware Files list and select 'Load' the new bootloader file (IPC-Boot-vx.xx.bin).
9. Press 'Poll'. The EP3 should now show 'metaloader' and its revision on the last status line.
10. Now 'Flash' and 'Check'. It should be a bit quicker as the bootloader small.
11. Now 'Reset'. This stage actually copies the bootloader image into the boot region so it's important that the IPC doesn't loose power here!
12. The IPC should have now rebooted into the new bootloader, which should then have jumped back to running the Meta-loader.
13. (Optional) Press 'Poll' again and EP3 will show 'Metaloader'.
14. Now we need to flash the IPC application back into the IPC instead of the Meta-loader. So put the IPC back into Bootloader ACTIVE mode using the magnet and 'Load' the IPC application firmware file (IPC-App-vx.xx.bin).
15. Now if you press 'Poll' you should see that the bootloader revision has changed.
16. Program the application firmware as normal.
17. Once that is complete, go to the pod list, and get the status of this IPC. You should see that the revision has changed.

For more information email support@waterinsight.co.nz