

S-CAB Throttle Firmware Update

Version 2.5, dated April 2020

Version History

- **Version 2.2:** The original and oldest firmware. Microprocessor chip is labeled "CAB-v2.2b, 03/11". To check, press 'FG2', '8'. Display blank indicates version 2.2.
- **Version 2.3:** Microprocessor chip is labeled "CAB-v2.3, 05/12". To check, press 'FG2', '8'. Display indicates "2.3".
- **Version 2.4:** Microprocessor chip is labeled "CAB-v2.4, 01/19". To check, press 'FG2', '8'. Display indicates "2.4". This version introduced with change of LED display caused by unavailability of original part. This is not an upgrade path for version 2.3.
- **Version 2.5.h:** This is an upgrade path for version 2.4. Microprocessor chip is labeled "CAB-v2.5.h, 04/20". To check, press 'FG2', '8'. Display indicates "2.5".
- **Version 2.5.x:** This is an upgrade path for version 2.3. Microprocessor chip is labeled "CAB-v2.5.x, 05/20". To check, press 'FG2', '8'. Display indicates "2.5".

Hardware Versions

As a result of discontinued component availability, 2 hardware changes were necessary in 2019:

- Replacement of the radio module.
- Use of a larger LED display. The character height of the original display is 10 mm, the newer display is 16 mm.

All throttles with the original Linx Technologies radio use firmware version 2.3. All throttles with the new radio use firmware version 2.4. There are a few throttles (less than 10) released with larger displays and original radio, but that has been discontinued.

Firmware Version 2.5 (There are 2 variants)

- Throttles with version 2.4 must use 2.5.h upgrade.
- Throttles with version 2.3 must use 2.5.x upgrade.
- Throttles that have never been upgraded must use version 2.5.x.

For most users, display size is a good indicator of upgrade choice; small display, use 2.5.x; large display, use 2.5.h. Another check is use 'FG2', '8' to read version number. For a definitive check of installed firmware, open throttle and read label on microprocessor chip.



This is pin1.

Be sure to orient the chip correctly before inserting into socket

Version 2.5 Improvements

Both variants of version 2.5 have identical functionality and are only necessary to handle hardware differences.

This is the first upgrade of functionality since version 2.3. Here is a summary:

- **Changed start-up default to function control.** When throttle is turned on, it is no longer necessary to press 'FG1' before using number keys to operate functions. It is selected by default.
- **Changed operation of the 'ALL' button.** It is used in both control and CV mode and its purpose is address a message to all active decoders. Selection is now consistently confirmed by LED display of "A" and remains selected until number keys are reassigned for alternative use; loco ('Loco#'), function ('FG1', 'FG2') or speed control ('Speed').
- **Added All Battery-Off command.** The added command is 'ALL', '5' where '5' is the number key assigned for an S-CAB battery-off command. For example, 'FG1', '5' turns off the battery of an active loco, 'ALL', '5' turns off batteries in all active locos.
- **Fixed an obscure loco ID bug.** Since the S-CAB throttle displays only 2 digits, loco addresses are limited from 1 to 99. In rare circumstances, a 2-digit address could not be reset to a 1-digit address. Such a situation was identified when address 99 could not be changed to address 3. Similarly, address 98 would not change to address 2. This problem is fixed.
- **Changed programmable CV list.** In CV mode, S-CAB throttle can program 8 configuration variables (CVs). The new list is CV1, CV2, CV3, CV4, CV5, CV29, CV128, CV120. CV6 is eliminated. By default, its value is always zero. CV65 is no longer used. *CV128 and CV120 are SoundTraxx vendor-specific CVs for adjusting sound volume and horn/whistle selection for SoundTraxx decoders.* Displaying 3-digit numbers on a 2-digit display requires a little creativity. The decimal point is used to indicate that "1" is the third and most significant digit. "2.8" indicates "128". "2.0" indicates 120. CV128, sound volume, is defined in percent.



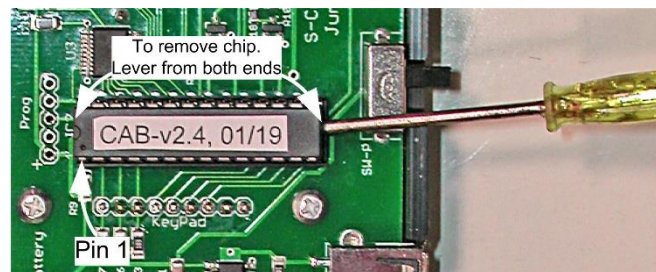
Installing the Upgrade

The upgrade is distributed on a replacement microprocessor chip.

Install the upgrade as follows:

1. Remove S-CAB throttle's rear cover.
2. Remove the existing microprocessor chip from its socket.

Warning: The chip is a tight fit and must be eased out of the socket with a small screwdriver



or knife blade between chip and socket. Work alternately from each end of the chip to pry it loose.

3. Insert the new chip, being careful to align pins with the socket before applying pressure to seat the chip securely in the socket. Look for the pin 1 marking on the chip and be sure to orient correctly.
4. Check that S-CAB works before replacing the rear cover.

Using New Features

1. Version 2.5 starts with number keys assigned to function control. No need to press 'FG1'.
2. In control mode, the 'ALL' button initiates the following 3 commands:
 - 'ALL', 'HALT' All loco emergency stop
 - 'ALL', '0' All loco reset (zero speed, forward direction)
 - 'ALL', '5' All batteries off
3. In CV mode, the 'ALL' button initiates global addressing, which is the radio equivalent of using a Programming Track and must be used to program CV values of SoundTraxx decoders
4. CVs 128 and 120 only work for SoundTraxx decoders and their use requires the following procedure:
 - Be sure to turn off all decoders except the one to be programmed
 - Switch the throttle to CV mode. Display will show "C" blank.
 - Press 'ALL'. Display will show "CA".
 - To adjust sound volume, press 'FG1(CV#)' multiple times as display cycles through CVs; C1, C2, C3, C4, C5, 29, until "2.8" is displayed.
 - Press 'FG2(CV=)' and display will show "70". This is a prompt suggesting 70% of maximum sound volume.
 - Press 'Enter/Send' if 70% is acceptable. If not, use number keys to enter an alternative (for example, '5','0' to select 50%) before 'Enter/Send'. Display will show "50", but actual value transmitted to decoder will be one-half maximum volume.
5. CV120 is horn/whistle select. SoundTraxx decoders include a selection of sound files and experimenting with different horn/whistle sounds is an interesting way to add some uniqueness to a loco roster. The procedure is similar to CV128. Press 'FG1(CV#)' repeatedly until display shows "2.0", Then press 'FG2(CV=)' and enter a number from SoundTraxx list. Default choice is zero.
6. 'ALL', '5' All batteries off. This command has been added as a convenience for operators with a large roster of battery powered locos. However, it only works when a decoder function output has been wired to the BPS battery-off terminal (which is default wiring for an S-CAB system). Again, by default, keypad button '5' operates the correct function output. 'ALL' addresses the message to all locos and every active decoder will respond if the message is repeated a few times (3 is usually enough). Once pressed, 'ALL' is latched, so '5' button repeats the command.