

## THIS MANUAL INCLUDES:

- 1) IPROGRAM FIRMWARE VERSION 60 UPDATE: WHY AND HOW
- 2) INSTRUCTIONS FOR UPDATING YOUR EASEL MOTHERBOARD REV3&4\* FOR “BOTH MODE” ON IPROGRAMCARD VERSION 60 AND HIGHER.
- 3) INSTRUCTIONS FOR UPDATING YOUR IPROGRAMCARD FIRMWARE.

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### IPROGRAM FIRMWARE VERSION 60 UPDATE: WHY AND HOW

**Why:** Scaling bug fixes and “Both Mode” detection.

iProgramCard Version 60 Firmware improvements to include:

- 1) Corrected scaling for the sequencer output. (It was only 50% full scale.)
- 2) Corrected scaling for the fader on frequency and pitch CV inputs.
- 3) The addition of a “Both” Mode for new or modified Easels\*.

\*See the following pages on how to modify your Easel.

**Why not?:** You don’t need any more sonic possibilities and you are content working around the bugs. We won’t judge.

**What is “Both Mode” you ask?.**

“Both Mode” allows the user to use the card slot for patching, while also keep the local signals patched and faders active. This can lead to interesting results.

The switch setting exists on all Easels made by Buchla, though Don Buchla decided not to simply not label the setting in the recent revisions due to unpredictable behavior with the iProgramCard. So Both Mode was not mentioned.

The problem was due to potential confusion with the switch settings. But by making the software aware of the “both” mode switch setting, we now disable the iProgramCard’s switch interference.

To make the iProgramCard aware of the Both Mode switch setting, we needed to send another signal to the card slot. But all the pins are used! So we stole one. See below for answers about this and instructions on how to modify your Easel. Remember to consult a professional technician if needed.



If you have a recent Easel, you may already have a modified Easel ready to go. Modified Easels should have a small blue dot between the “remote” and “local” labels to indicate the Easel has been modified.

Rev5 says “Ready for Both Mode”. Rev 5 includes directions on the silkscreen for an optional cut to Undo “Both Mode”. Then a jump from SQ5B testpoint to BOTH test point will restore restore the Sequencer 5<sup>th</sup> stage signal to the Card slot.

## INSTRUCTIONS FOR UPDATING YOUR EASEL MOTHERBOARD REV3&4\* FOR "BOTH MODE" ON IPROGRAMCARD VERSION 60 AND HIGHER.

\*This modification is possible with Rev 2 motherboards as well, but this manual doesn't cover that. Rev5 Motherboards come modified from the factory. See your dealer for more info.

### FAQs: Should I do the modification?

**Is this Modification useful if you don't have an iProgramCard?** Not really. But if you have friends who might plug in their iProgram card or you later decide to get an iProgramCard, then yes.

**Is this Modification OK if you are soldering resistors to be used on sequencer stage 5 on Retro Program Cards?** No.

The nitty gritty: All 56 pins on the cards are already dedicated, so we are stealing this rarely used signal. If you use the original 1974-style Program Cards and want to use cards with soldered resistor values for the 5<sup>th</sup> stage of the sequencer, you may not want to make the change. We admire your adherence to historical possibilities.

Note: If you don't mind if the 5<sup>th</sup> stage is 0v--no resistor--you can still make a 5<sup>th</sup> stage sequence

**Is this Modification useful if you use an AuxCard?** The AuxCard does not care if you do or do not do this modification.

The AuxCard's "to Card" connections only work in Both or Remote Mode, but it does not respond any differently whether the Motherboard is modified or not.

**Can I restore the original connection if I change my mind?** Yes.

You can undo your connection and restore the connection. There is an alternative way to make this modification if you want it to be easily restorable. See "Alternative Method" on the following pages. (Rev5 and higher are made with the modification already done and with solder points for easy restoration too.)

**What if I use earlier iProgramCard Firmware versions (such as Vers 46) in a modified Easel?** THIS IS OK! It is still safe to modify your Easel. You will not have the firmware improvements, but the iProgramCard will work the same as before.

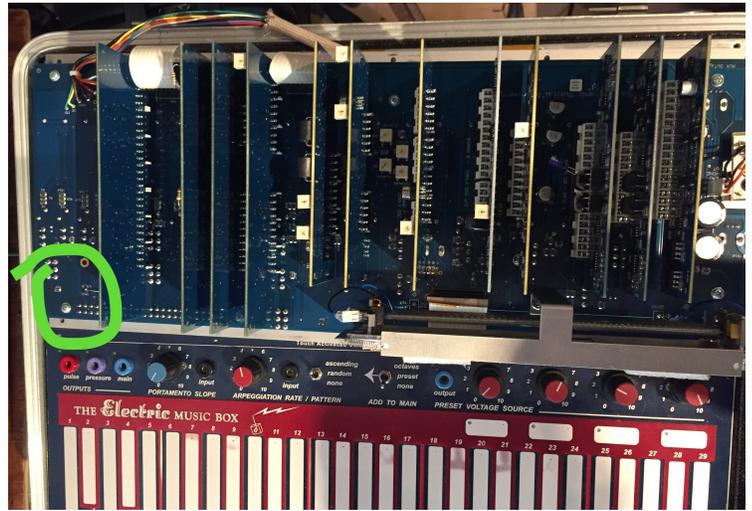
**Doesn't the iProgramCard need the Sequencer 5 stage signal?** It does not. The sequencer values come from the app.

**What if I use iProgramCard Firmware version 60 in an unmodified Easel?** Local mode will be unaffected, but in Remote mode pulses will freeze up in a virtual Both Mode every time the sequencer gets to stage 5 until you use local mode to get out of stage 5. As long as you don't use card "performances" with 5 stage sequences, you'll be fine.

***Long-story-short: Unless, you use the original 1974-style "Retro" Program Cards for 5 stage sequences, this modification can only be a good thing.***

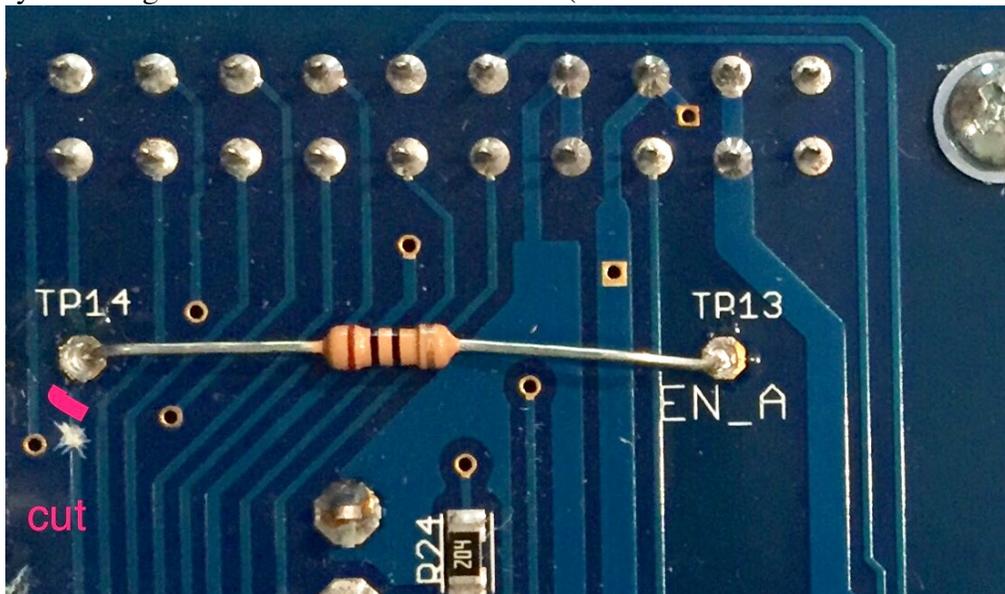
**Can I do this myself?** If you are comfortable lifting the 208 out of its case and you can solder a through-hole resistor and are deft with an Xacto-knife, then Yes. If not, find a technician.

**Here's how:** Remove the 208 and turn over. Take the five top and bottom screws that hold the 208 in its housing and pull up on the panel, taking care to go slowly so the Reverb unit does not snag on the lip of the housing. Make sure the Easel is unplugged. It is not necessary to remove the internal power connection. It is OK to rest the Easel lightly on its power cables if the cables are covered by the sleeve. (See picture.)



1) Find TP13 and TP14 in the section to the left on the panel (as circled in green) near the card slot.

2) **“The Jump”:** Connect TP13 and TP14 by soldering a wire or a small value resistor (100 ohms or less. Pictured here with a 10 ohm resistor.)



3) **“The Cut”:** Cut the trace below TP14 as pictured.

It can be cut anywhere along that trace so long as you avoid cutting nearby traces. This can be done with a fine tip blade by digging into the trace at two locations and carving it out as pictured. (This is only a 2-layer board, so you will not risk cutting into any signals inside the board. But there is a risk of cutting nearby traces if the cut is too long.)

Alternative method:

If you are a deft solderer and seriously think you might want to restore the cut: you could consider soldering directly from TP13 (“EN A”) to the card pin ABOVE TP14 and then cut the trace between this pin and TP14 (“SEQ5”). Then restoring it only requires moving/restoring this connection back to TP14 from TP13.

Note: If you ever restore the connection back to Sequencer 5, you should also downgrade your iProgramCard back to firmware version 46.

# INSTRUCTIONS FOR UPDATING YOUR IPROGRAMCARD FIRMWARE.

See Appendix A in the iProgramCard manual for instructions on how to update your iProgramCard to Version XX.

A quick summary:

## **Appendix A**

### **Updating Card Firmware:**

The iProgram Card has a dedicated MCU for USB communication. When the card is shipped, this comes pre-flashed with firmware that allows the card to communicate with the iPad app via MIDI over USB. This would be useful in a case where there is no wireless network available. Because of this, in order to upload new firmware, the USB MCU must first be flashed with USB to serial firmware.

### **Things required:**

- iProgram Card
- Mini USB Cable (the “mini-USB” is bigger than the “micro-USB”)
- Apple Computer with Mac OS X 10.7 or later
- Tweezers/paper clip/other metallic object

### **Available at <http://buchla.com/>**

- Buchla Firmware Utility 1.6 or later
- Latest iProgram Card firmware “iProgramCard\_Buildxx.hex”
- USB to serial firmware “USBSerial.hex”
- USB to MIDI firmware “MIDIv2.hex”

- Using a mini USB cable, connect the iProgram Card to a computer.  
(Though the manual describes this as powered from the Easel, this is easier done unplugged from the Easel and powered through USB if the display does not attempt to power.)
- Take a pair of tweezers and short the two leftmost pins on the header labeled ICSP1 at the bottom left of the iProgram Card as shown.
- Keeping the pins shorted for 2 seconds puts the USB chip into DFU mode.
- Open Buchla Firmware Utility.
- Under the “Easel” menu at the top, select “Change USB Mode Firmware...”
- Navigate to hex file called “USBSerial.hex” on your hard drive and click “Open”
- The window displays the programming and the “Validating. . .”:

```
Erasing USB interface chip. [etc. then]
hex file: /Path/to/USBserial.hex
Validating...
7414 bytes used (60.34%)
Done!
```

- Close the Buchla Firmware Utility and reopen it. IMPORTANT.
- Under the “Easel” menu at the top, select the device listed from “USB Serial Ports”  
(It will then be check marked. Note: if no device is listed, then the previous procedure failed or you did not restart the firmware utility.)
- Select, from the same “Easel” menu “Upload iProgramCard Firmware...” and open iProgramCard\_v\*\*.hex where \*\* is the current firmware version downloaded from <http://buchla.com/>  
NOTE: Known issue: THIS FILE MUST IN A FOLDER PATH WITH NO SPACES. e.g. “Users/apple/Documents/Firmware-folder; not “Users/apple/Documents/Firmware folder”
- The window displays:

```
avrdude USB serial... please wait.
avrdude: AVR device initialized and ready to accept instructions
Reading | ##### | 100% 0.03s
avrdude: Device signature = 0x1e9801
avrdude: reading input file "/Path/to/iProgramCard_v**.hex"
```

```
avrdude: writing flash (37414 bytes):  
Writing | ##### | 100% 5.41s  
avrdude: 37414 bytes of flash written  
avrdude done. Thank you.
```

13. At this point you could disconnect USB. But most users will want to restore MIDI mode.

To restore direct "MIDI" connection

- 1) Close the Buchla Firmware Utility and reopen it.
- 2) Repeat steps 3 through 6 using the "MIDIv2.hex" file for the USB to MIDI firmware instead of the USB to serial firmware

The MIDI via USB functionality of the mini USB port has been restored, the iProgram Card has the latest firmware, and is ready for use. The iProgramCard will display the new firmware build number upon boot up.

### GETTING STARTED: Hints for working in Both Mode:

You are combining the fader settings and CV inputs. The combined faders and CV's are additive.; not an average.

Both Mode only uses the real panel switch settings. The iProgramCard switch settings are disabled.

If you want to start with your patches as saved on the card, then copy its switch settings to the panel and bring all the faders down. Then Both Mode and Remote should sound the same.

For instance, the Pulser is very sensitive to the combined signals. If you want to keep the pulsing of the Card the same, leave the local fader at the bottom when switching between Remote and Both Mode.

There are actually 2 Both Modes on the iProgramCard:

- 1) when switching modes from the "Remote Mode" it behaves as described.
- 2) when switching modes from "Local Mode", the signals are sent to the card slot, but the iProgramCard patch is not engaged. This is useful for people with CardDoublers and AuxCards or their own special cards.

The display suggests what mode you are in. The patch is only engaged when it is displayed.

One great use for Both Mode is setting up patches in the iProgramCard, but doing additional live control of faders.

Have fun!