PROSTICK64

User Manual

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Chapter 1

Introduction

1.1 Preface

Thanks for purchasing a ProStick64 module and support this project! This manual includes everything you need to know in order to enjoy all the possibilities offered by this product. This manual is divided into two parts: "Basic knowledge" and "Advanced features". If you just want to replace your stick and keep on playing you don't need to read the "Advanced features" part. On the other hand if you want to really get involved in programming and upgrading your module you're highly advised to read the full manual.

1.2 Features

Every ProStick64 module is fully calibrated and tested before shipping so it's ready to be mounted on your N64 controller and deliver you countless hours of fun! If you start experiencing precision issues or other wear-related problems, don't worry! ProStick64 is equipped with a calibration feature that will allow you to correct any wear that components might eventaully get during usage. Other notable features are:

- Fully programmable STM32 processors
- Extended range mode
- Interchangeable thumbstick and dust filters

Keep reading this manual to learn how to use all the features this stick has to offer!

1.3 Removing the old stick

The first step you'll need to take in order to install the ProStick64 is to remove the old stick from your N64 controller. This process is very easy to do and require just a small Philips screwdriver. There is a good step-by-step guide available on ifixit.com: N64 stick replacement guide

1.4 Installing ProStick64

Once the old stick is removed from the controller, installing your ProStick64 is very simple: just follow all the steps of the linked guide in the opposite order, from the last one to the first. Before closing the controller case be sure that every cable is in place and nothing blocks the screw holes. The ProStick64 connector is modified by hand in order to fit into the OEM controller port. Due to this it might require a bit more strength in order to properly slide in position.

Chapter 2

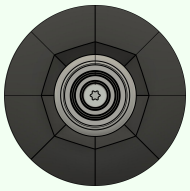
Basic knowledge

2.1 Extended range mode

By default the ProStick64 module will emulate as close as possible the OEM stick. There are situations however where you might enjoy a slightly increased maximum range from the stick. This DOES NOT increase the maximum value that the controller can output but rather allow the stick to reach that value faster when you move it in a certain direction.

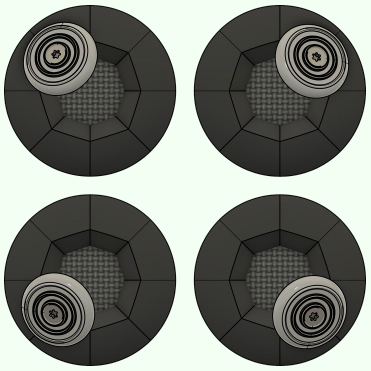
- Default range: 83
- Extended range: 100

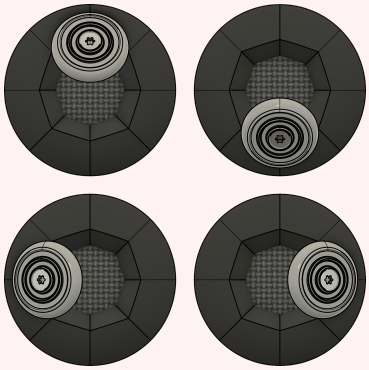
The range mode is selected according to the stick position when the controller is powered up.



If the stick is centered at the time the controller is powered up the default range mode will be used. This range is the same of a brand new OEM stick.

If the stick is pushed into one of the four diagonal gates at the time the controller is powered up the extended range mode will be used.





If the stick is pushed up/down or left/right at the time the controller is powered up the two axis will behave differently. If the stick is pushed up/down the vertical axis will use extended range mode while the horizontal axis will use default range mode. If the stick is pushed left/right the horizontal axis will use extended range mode while the vertical axis will use default range mode. This behaviour is a side effect of having two independent processors for the two axis and it is not an intended operation mode. Moreover it's unclear if this discrepancy in the two axis behaviour is tolerated or not in competitive play so it's highly recommended not using it.

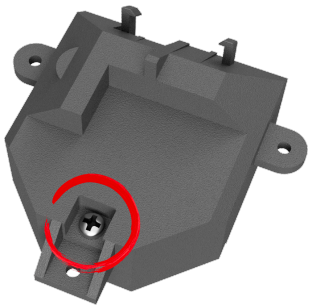
2.2 Replacing the thumbstick cap

ProStick64 features an interchangeable thumbstick cap. Replacing it is very simple, just unscrew the T6 screw in the center of the cap and then separate it from the shaft by pulling. Be careful not to lose the small T6 screw and its nut. THE NUT IS NOT SYMMETRICAL! If you look closely you will notice that two of the nut sides are painted red. Those two sides must be facing outside (towards you) when you slide the nut into the shaft opening.

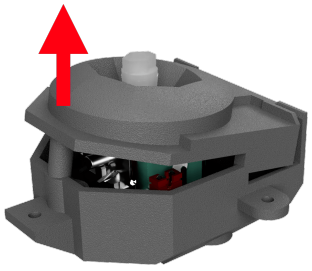
2.3 Stick calibration

Every ProStick64 module is calibrated and tested before shipping. Extensive use will however cause wear on the components and this might directly affect both precision and consistency of the stick. In order to increase longevity and reliability ProStick64 features a calibration routine that should address most wear-related issues and restore your stick to its brand new reliability. Once a calibration routine is completed the old one will be discarded and will not be recoverable. Since there is no limit to the number of calibration cycles a stick can undergo, the user can repeat the calibration process if the previous one was not satisfactory.
In order to begin a calibration cycle the user must switch position of a jumper located on the ProStick64 main board. The following steps will guide you through the process:

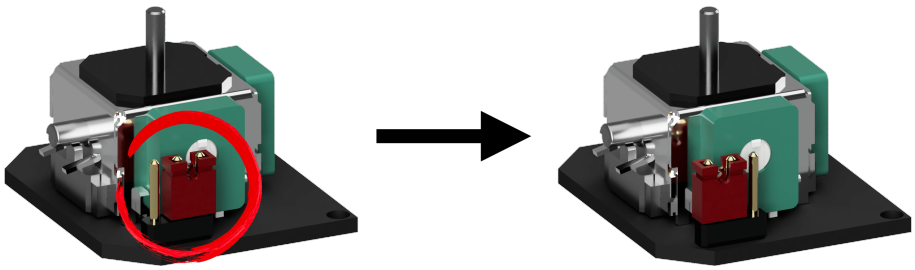
1. Remove the ProStick64 module from the controller as explained in section 1.3 of this manual
2. Remove the thumbstick as explained in section 2.2 of this manual
3. Unscrew the small PH1 screw on the bottom of the ProStick64 module



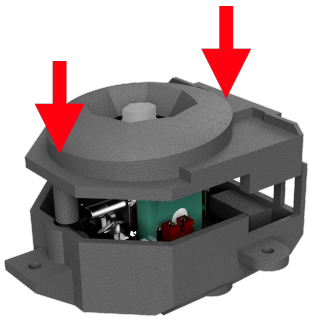
4. Lift the front side of the top case until it separates from the bottom part



5. With the top case removed you should see a red jumper over a 3 pin connector on the main board. The jumper have 2 valid positions, connecting the central pin to one of the external ones. Every time the controller is powered up a check on the jumper position is performed and if its position have changed a calibration cycle is triggered. Change the jumper position in order to calibrate the stick on the next power up.



6. Reassemble the top case by aligning it to the bottom part and pushing straight down as shown in the following picture



7. Follow the instructions in reverse order from step 3 to step 1 to restore your ProStick64 module in place

8. In order to proceed in with the actual calibration you will need a way to visualize the controller output. The way to achieve this depends on your setup. If you're using a real N64 console you will need a game that shows the cursor on screen ("Super Mario 64" and "Goldeneye 007" are shown as examples in the following picture but you can use any game that allows you to visualize the stick movements).

Even if the stick will not work until the calibration is completed, you can use all the other buttons in the controller to reach the main menu where you can see the cursor on screen.

If you connect your controller to a USB adapter you can use windows default USB controller status page to visualize the stick position. If you're not on windows you can use this online gamepad tester to display the controller values.

You should not proceed to the next step if you can't see the stick movements on screen.

9. Unplug the controller and plug it back after a couple of seconds

10. After approximately 5 seconds you should see the cursor moving diagonally on the screen and then stopping again. If the cursor moved diagonally and then stopped go to the next step. If the cursor doesn't move at all after 30 seconds or doesn't move diagonally, unplug the controller and plug it back. If this fixes the problem proceed to next step, otherwise keep trying another couple times. If the cursor still doesn't move it means something went wrong in the previous instructions and you have to restart from step 1

11. In this phase the module is calibrating its neutral position. Move the stick as far as you can to the right, wait 1 second and then let the stick go allowing it to return centered. Leave it centered for another second and then repeat the same movement for the other 3 directions (down, left, up) paying attention to leave at least 1 second between each movement. Keep repeating the "move, wait, let go, wait" procedure in every direction until you see the cursor moving diagonally again on the screen. This step can take several minutes to complete because the module is averaging every reading and will proceed only if the average is precise enough. Usually 8 to 10 movements for every direction are enough. Proceed to the next step if you see the cursor moving diagonally.

12. Once the cursor stops moving start moving the stick in a slow circle motion, paying attention to push it as far as you can in every of the 8 gates. This steps is needed in order to calibrate the maximum readings from the stick. Keep rotating the stick until you see the cursor moving diagonally again. This shouldn't take more than 10 to 20 seconds.

13. If everything went fine the cursor should continue moving diagonally on the screen indefinitely. This indicates the calibration is over and the new data has been saved to the module's internal flash memory. You can now unplug the controller and plug back again. The stick should work properly again at this point. If you experience any issue or you don't feel like the calibration is on point feel free to start again from the beginning.

Chapter 3

Advanced knowledge

3.1 Replacing the stick shaft and dust filter

The ProStick64 stick shaft consists of two parts permanently glued together: the potentiometer metal shaft and the 3d printed plastic shaft. It could happen that the plastic part of the shaft accidentally breaks. Included in every ProStick64 box you can find a replacement shaft ready to be glued in place. Follow the next steps in order to replace the stick shaft:

1. Be sure that the metal shaft is completely free of any plastic residue. If the plastic part is still glued to the metal shaft you can get rid of it by crushing with a pair of pliers.
2. Pick the replacement plastic shaft and double check that the metal shaft correctly fits into the bottom hole. Due to 3d printing residues it might be necessary to clean the hole first. For this task I highly recommend using the included T6 screwdriver bit since its diameter is exactly 2mm.
3. In case you want to replace the dust filter aswell, this is the right moment to do that. Simply remove the small plastic frame on top of the potentiometer by pulling and then replace the old dust filter with the new one included in the ProStick64 box. Restore the small plastic frame by pushing it in place.
4. Once you are sure that the plastic shaft part can be easily inserted into the metal shaft, place one small drop of glue inside the plastic hole and join the two parts by sliding the metal shaft into the plastic part hole. I highly recommend using a 2-part epoxy glue in order to achieve a permanent joint.
5. Leave the glue 24 hours to cure

3.2 Programming the STM32 processors

This task is not user friendly and requires an external STM32 programmer. I will write this section soon.