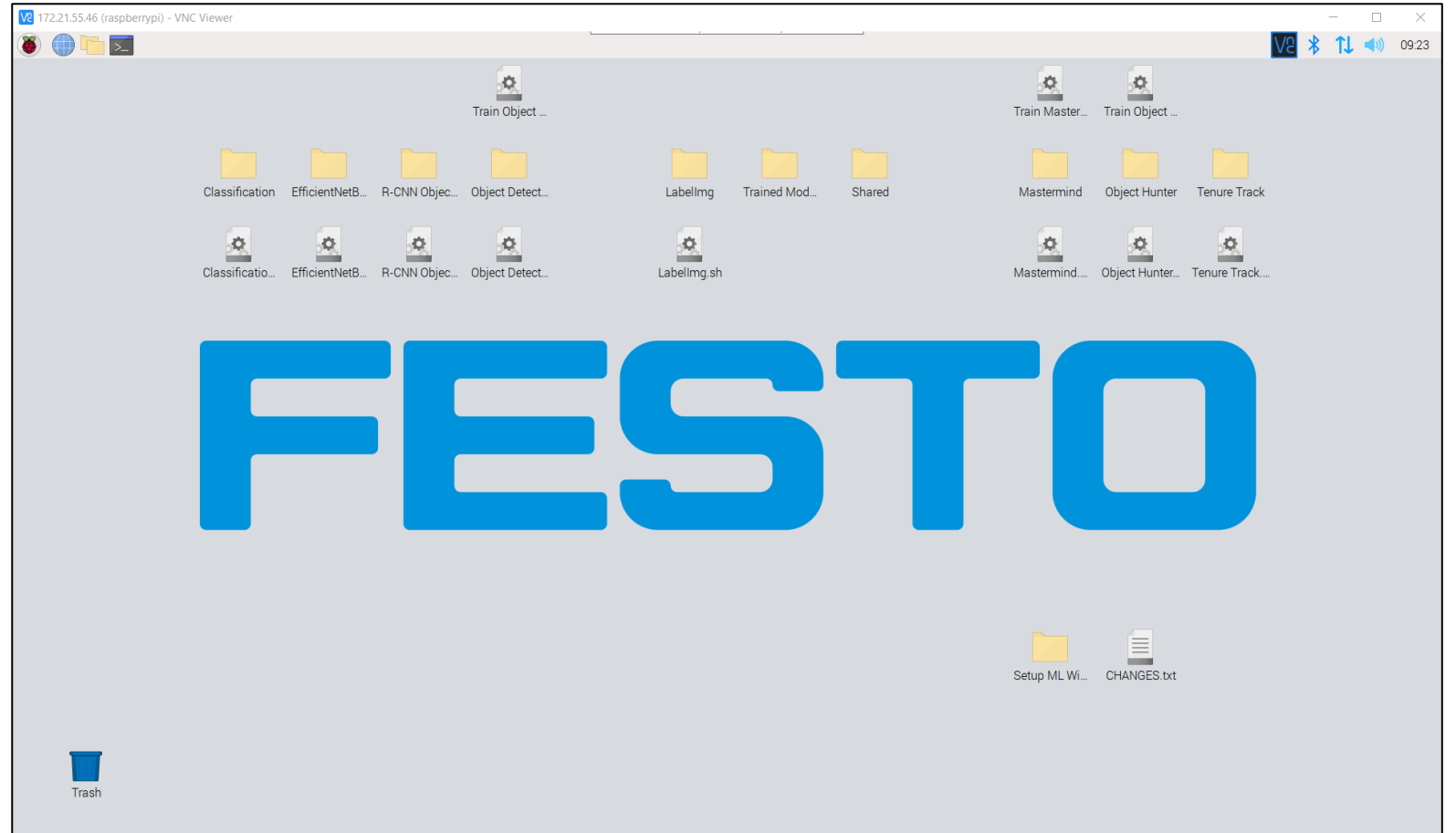


How to write a Raspberry Pi Image to a Micro-SD Card?



How to write a Raspberry Pi Image to a Micro-SD Card?

- Flashing a Micro-SD card mainly consists of four steps
 1. Download a predefined Raspberry Pi image
 2. Request the file's password → services.didactic@festo.com
 3. Unzip the compressed file
 4. Flash the image to a Micro-SD card
- Required hardware
 - Windows PC
 - 32 GB Micro-SD card
 - Micro-SD card adapter (e.g., “Micro-SD to USB”)
 - 25 GB free hard disk space
- Required software tools
 - 7-Zip → <https://www.7-zip.org>
 - Win32DiskImager → <https://sourceforge.net/projects/win32diskimager/>

How to write a Raspberry Pi Image to a Micro-SD Card?

1. Download the provided image

- The image itself is available as a compressed, password-protected 7-Zip file at <https://ftp.festo.com/public/DIDACTIC/ML/>
- It is based on the “Raspbian Bullseye 64-Bit” operating system and contains
 - Python core & libraries
 - Apache2 server
 - Node-RED
 - Several machine learning algorithms
 - ...

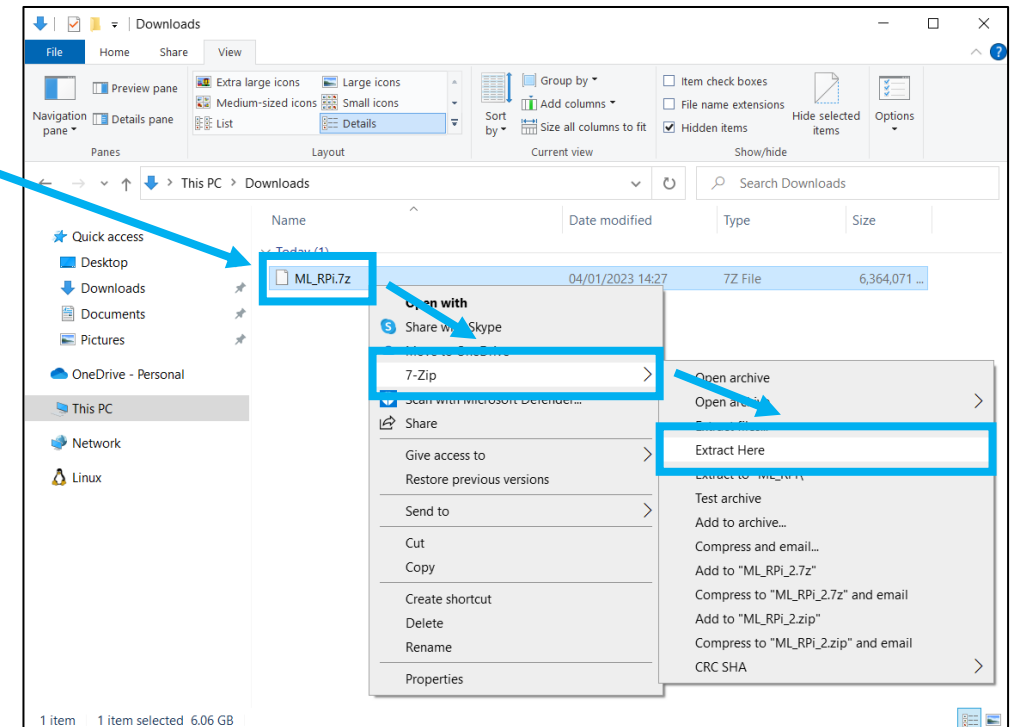
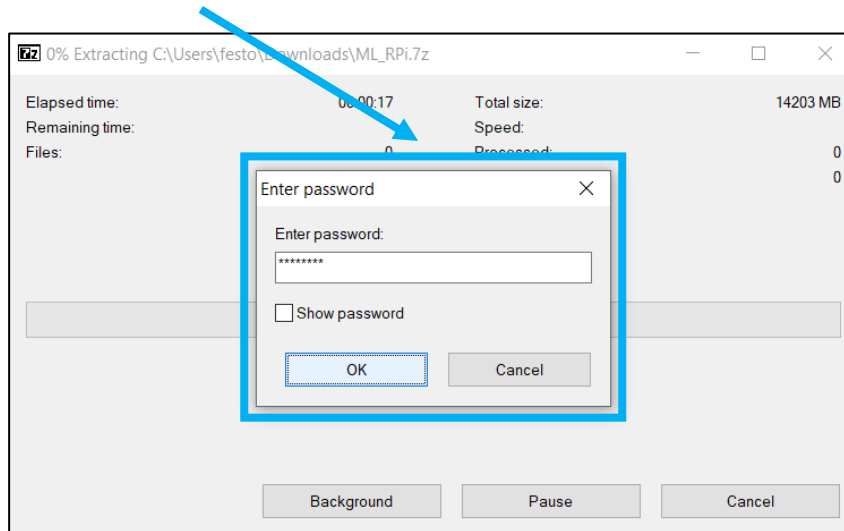
The screenshot displays the FESTO ML web interface. At the top left, a 'Camera Stream' shows a red and black object on a conveyor belt with green bounding boxes. The interface includes a 'Setup' section with a 'Number of slides (objects)' dropdown set to 2, a 'Load pretrained neural net' button, and 'Training Data / Ground Truth' settings for two classes. Below this is the 'Training Process' section with a 'Maximum number of epochs' dropdown set to 30 and a 'Data augmentation' dropdown set to 2 variations per image. The 'Classification Results & Statistics' section shows a table of metrics:

Class:	2 / 3
Coefficients:	185000 / 185000
Processing time:	229ms
Neural net:	2022/12/15, 19:41:47
Training process:	100%
Test data accuracy:	91.1% (2/18 of 250 images)

Two line graphs are shown: 'Accuracy vs. Epochs' and 'Loss vs. Epochs'. The accuracy graph shows training and validation accuracy both rising to approximately 0.95 over 30 epochs. The loss graph shows training and validation loss both decreasing from 4.0 to near 0.0 over 30 epochs. At the bottom, there are buttons for 'Download images & neural net', 'Upload images & neural net', and 'Delete images & neural net'.

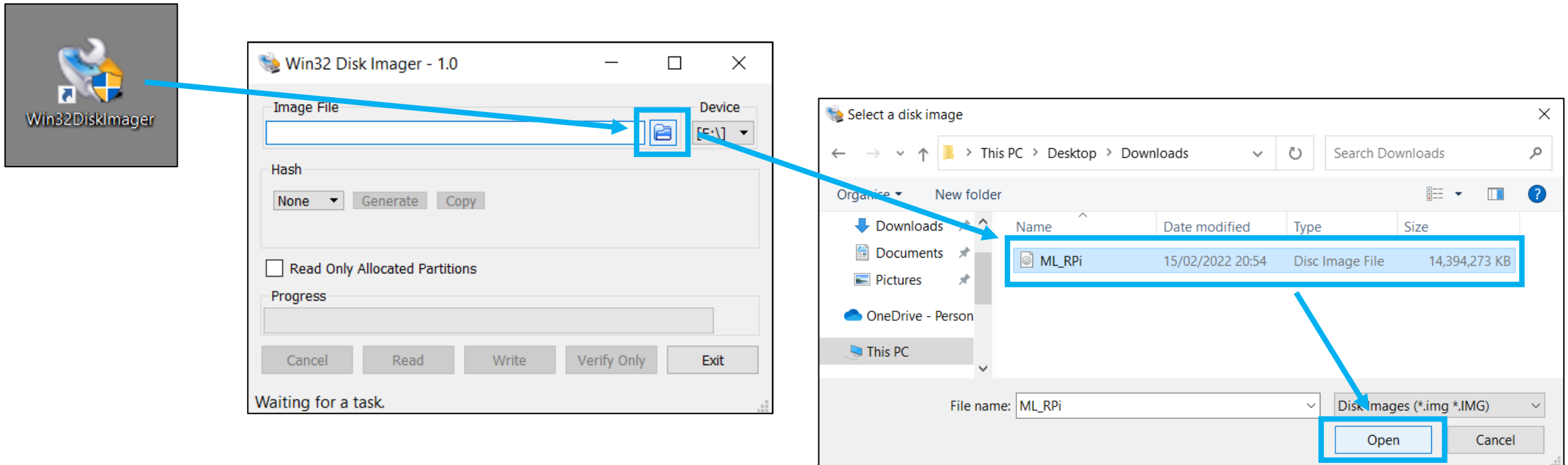
How to write a Raspberry Pi Image to a Micro-SD Card?

2. Request the password for the 7-Zip file by sending an email to services.didactic@festo.com
3. Decompress the image
 - Select “ML_RPi.7z” and press the right mouse button
 - Navigate to “7-Zip” and select “Extract Here”
 - Enter the password and confirm with “OK”



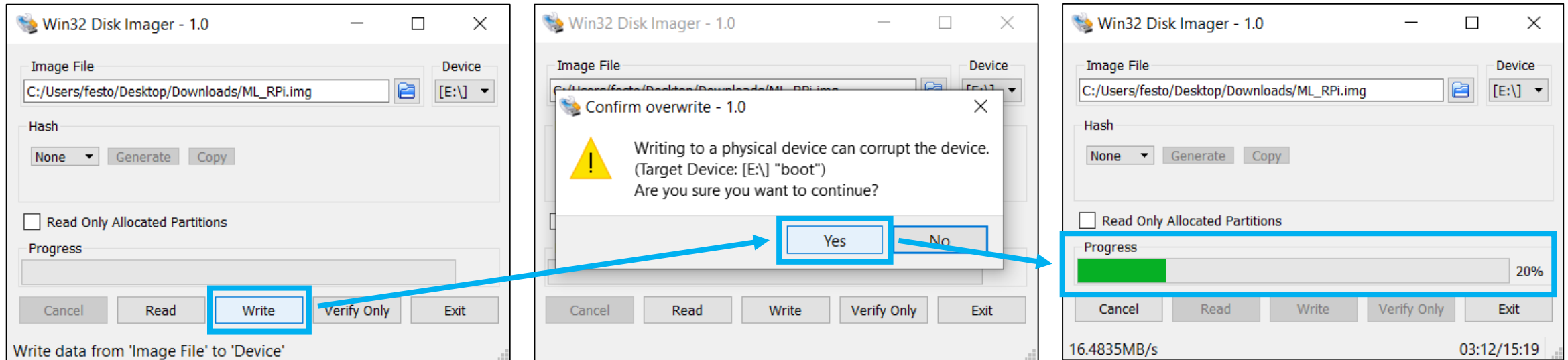
How to write a Raspberry Pi Image to a Micro-SD Card?

4. Connect the Micro-SD card to the PC – if necessary, using a suitable adapter – in order to flash it
 - Open “Win32DiskImager” and select the image file “ML_RPi.img” that has been generated in the step before



How to write a Raspberry Pi Image to a Micro-SD Card?

4. Connect the Micro-SD card to the PC – if necessary, using a suitable adapter – in order to flash it
 - Press “Write”, confirm overwriting, and wait until the Micro-SD card has been written successfully



- Note that it takes about 15 minutes to complete the process!