

WASP 2040 3D printer firmware user guide for Arduino IDE and Marlin

In this document:

- **1.** Installing and configuring Arduino Integrated Development Environment (IDE) for the **WASP 2040 3D printer** with **pneumatic clay extruder**.
- 2. Configuring and flashing firmware for the WASP 2040 3D printer controller.

Installing and configuring the Arduino Integrated Development Environment (IDE) for Wasp 2040 3D printer with pneumatic clay extruder.



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| 🥯 Arduino Setup: Installation Options - 🗆 X | Arduino USB driver is needed to connect |
|--|---|
| Check the components you want to install and uncheck the components you don't want to install. Click Next to continue. | the printer with the computer |
| Select components to install: | , Next |
| Space required: 254.9MB | |
| Cancel Nullsoft Install System v2,46 < Back Next > | |

| 💿 Arduino Setup: Installation Folder | _ | | \times | Install |
|--|---------------------------------------|----------------------------|----------|---------|
| Setup will install Arduino in the following folde folder, click Browse and select another folder installation. | r. To install in . Click Install t | a different o start the | | |
| Destination Folder | | | | |
| C:\Program Files (x86)\Arduino | | Browse | | |
| Space required: 254.9MB | | | | |
| Space available: 34.2GB | | | | |
| Cancel Nullsoft Install System v2.46 | < Back | Instal | F | |

| 💿 Arduino Setup: Completed | — | | \times | Close |
|--------------------------------------|--------|------|----------|-------|
| | | | | / |
| Show details | | | | |
| | | | | |
| Cancel Nullsoft Install System v2.46 | < Back | Clos | se | |



| 🕹 Open an Arc | duino sketch | | | Navigate to the Navigate fold | NASP 2040 er |
|---------------|--|------------------|--------------|-------------------------------|----------------------------|
| Look in: | 📕 Marlin | G 🌶 📂 🛄 - | | | C1. |
| _ | Name | Date modified | Туре | Open file labeled | f 'Marlin'. |
| | dogm_font_data_marlin | 11.05.2014 14:34 | H File | | |
| uick access) | dogm_lcd_implementation | 11.05.2014 14:34 | H File | 21 KB | |
| | DOGMbitmaps | 11 05.2014 14:34 | H File | 7 KB | |
| | / fastio | 11.05.2014 14:34 | H File | 70 KB | |
| Desktop | /// language | 11.11.2013 20:04 | H File | 66 KB | |
| _ | LiquidCrystalRus | 11.05.2014 14:34 | CPP File | 11 KB | |
| | LiquidCrystalRus | 11.05.2014 14:34 | H File | 4 KB | |
| Libraries | ////////////////////////////////////// | 11.05.2014 14:34 | H File | 7 KB | |
| | 💿 Marlin 🖌 | 11.05.2014 14:34 | Arduino file | 2 KB | |
| _ | Marlin_main | 11.05.2014 14:34 | CPP File | 95 KB | |
| This PC | MarlinSerial | 11.05.2014 14:34 | CPP File | 8 KB | |
| | MarlinSerial | 11.05.2014 14:34 | H File | 6 KB | |
| 1 | motion_control | 11.05.2014 14:34 | CPP File | 7 KB | |
| Network | motion control | 11 05 2014 14-34 | H File | 2 KR | |
| | File name: Marlin | | | | ✓ Open |
| | Files of type: All Files (* *) | | | | Cancel |

| | | | Dis | splay line numbers | s for better navi | gation |
|------------|---|--|--|---------------------|-------------------|----------|
| 00 | Marlin Arduino 1.0.6 | | | | | |
| File | Edit Sketch Tools Help | | | | | |
| | New | Ctrl+N | | | | <u>.</u> |
| | Open | Ctrl+O | | | | |
| | Sketchbook | > | tore.cpp ConfigurationStore.h | Configuration_adv.h | DOGMbitmaps.h | uic |
| | Examples | > | | | | ^ |
| | Close | Ctrl+W | | | | |
| | Save | Ctrl+S | | | | |
| | Save As | Ctrl+Shift+S | | | | |
| | Upload | Ctrl+U | 1 Settings ==================================== | | | |
| | Upload Using Programmer | Ctrl - Shift+U | | | | |
| | Page Setup | Ctrl+Shift+P | | | | |
| | Print | Ctrl+P | nt lines (linear interpolatio | on). | | |
| | Preferences | Ctrl+Comma | e corners (not enough segmen (pensive sqrt calls). | ts) | | |
| | Quit | Ctrl+Q | | | | |
| 77 | Center-to-center dista | nce of the h | oles in the diagonal push ro | ds. | | |
| #d | efine DELTA_DIAGONAL_RO | D 240.0 // m | <u>n</u> | | | |
| 11 | Horizontal offset from | . middle of p | rinter to smooth rod center. | | | |
| #d | fine DELTA_SMOOTH_ROD_ | OFFSET 177.5 | // mm | | | |
| | | | | | | |
| // #di | Horizontal offset of t fine DELTA FEFECTOR OF | he universal FSFT 28 34 / | joints on the end effector. | | | |
| <i>#</i> , | TIME DEBIN_DITECTOR_OF | 1001 20104 / | , <u></u> | | | |
| | | | 1 - 1 - 1 | | | |
| 77 | Horizontal offset of t | he universal | joints on the carriages. | | | |
| // #d | Horizontal offset of t efine DELTA_CARRIAGE_OF | he universal FSET 21.0 // | joints on the carriages. mm | | | |
| // #di | Horizontal offset of t efine DELTA_CARRIAGE_OF Effective horizontal d | he universal FSET 21.0 // istance brid | joints on the carriages. mm ged by diagonal push rods. | | | |

| Preferences − □ × | Display the line numbers |
|--|--------------------------|
| Sketchbook location: C: \Users \Dell \Documents \Arduino Browse Editor language: English (English) (requires restart of Arduino) Editor font size: 12 (requires restart of Arduino) | |
| Show verbose output during: compilation upload | |
| ✓ Display line numbers | |
| Use external editor | |
| Update sketch files to new extension on save (.pde -> .ino) Automatically associate .ino files with Arduino | |
| More preferences can be edited directly in the file C: \Users \Dell\AppData \Roaming \Arduino \preferences.txt (edit only when Arduino is not running) OK Cancel | |

| | Select the board type: |
|---|---|
| 💿 Marlin Arduino 1.0.6 | 1. Tools |
| File Edit Sketch Tools Help | 2. Board |
| Auto Format Ctrl+T | 3. Arduino Mega 2560 or |
| Archive Sketch | inega ADK |
| Marlin Cor Fix Encoding & Reload | urationStore.h Configuration |
| 1 #ifndef (Serial Monitor Ctrl+Shift+M | |
| 2 #define (| |
| 3 Board > • # | Arduino Uno |
| 5 // Advance Serial Port > | Arduino Duemilanove w/ ATmega328 |
| 6 // BASIC | Arduino Diecimila or Duemilanove w/ ATryega168 stop configu |
| 7 Programmer / | Arduino Nano w/ ATmega328 |
| 8 // User-s Burn Bootloader | Arduino Nano w/ ATmega168 idow during |
| 9 // startup. Implementation of an idea by Pr | Arduino Mega 2560 or Mega ADK |
| 10 77 build by the user have been successfully | Arduino Mega (ATmega1280) |
| 12 #define STRING CONFIG H AUTHOR "(jcrocholl, | Aduite Leasede |
| 13 | Arduno Leonardo |
| 14 // SERIAL_PORT selects which serial port sh | Arduino Esplora |
| 15 // This allows the connection of wireless a | Arduino Micro |
| 16 // Serial port 0 is still used by the Ardui | Arduino Mini w/ ATmega328 |
| 17 #define SERIAL_PORT 0 | Arduino Mini w/ ATmega168 |
| 19 // This determines the communication speed | Arduino Ethernet |
| 20 #define BAUDRATE 250000 / | Arduino Fio |
| 21 //#define BAUDRATE 115200 | Arduino BT w/ ATmega328 |
| 22 | Arduino BT w/ ATmega169 |
| 23 //// The following define selects which ele | that matche |
| 24 // IU = Gen7 custom (Alfons3 Version) "http:// | IIIyPad Arduino USB |
| 25 // 12 = Gen7 v1.3 | ilyPad Arduino w/ ATmega328 |
| 27 // 13 = Gen7 v1.4 | ilyPad Arduino w/ ATmega168 |
| 28 // 3 = MEGA/RAMPS up to 1.2 = 3 | Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328 |
| 29 // 33 = RAMPS 1.3 / 1.4 (Power outputs: Ext / | Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega168 |
| 30 // 34 = RAMPS 1.3 / 1.4 (Power outputs: Ext | Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega328 |
| 31 // 35 = KANPS 1.3 / 1.4 (Power outputs: Ext 32 // 4 - Duemilenous w/ hTWere328D min secie | Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega168 |
| 33 // 5 = Gen6 | Arduino NG or older w/ ATmega168 |
| < | Arduino NG or older w/ ATmega8 |
| | Arduine Robot Control |
| | Adding Rebet Mater |
| | Arduino Kobót Motor |

Arduino Uno on COM1

| | | Select the Serial Port: |
|------|---|-------------------------------|
| 0 | Marlin Arduino 1.0.6 | 1.Tools |
| File | Edit Sketch Tools Help | 2 Serial Port |
| | Auto Format Ctrl+ I | 3 Port for the printer (port |
| 2 | | number appears automatically |
| Ma | In Cor Exceeding & Paland ConfigurationStore.h Configuration_a | dwh |
| 1 | #ifndef (Social Marian Chill Shift 1 | when you connect the printer |
| 2 | #define (| USB) |
| 3 | Board > | |
| 4 5 | // Inis Serial Port > COM6 | Note: Turn off other programs |
| 6 | // BASIC Programmer emperature sensor type, axis sce | that are using the printer |
| 7 | Programmer / | before connecting to the port |
| 8 | // User-{ Burn Bootloader to display in [Pronterface, etc | |
| 10 | // startup. Implementation of an idea by Prof Braino to inform user that any // build by the user have been successfully unloaded into firmware | Changes made to this |
| 11 | #define STRING VERSION CONFIG H DATE "" TIME // build date and time | |
| 12 | #define STRING CONFIG H AUTHOR "(jcrocholl, Mini Kossel)" // Who made the ch | langes. |
| 13 | | |
| 14 | // SERIAL_PORT selects which serial port should be used for communication wi | th the host. |
| 15 | // This allows the connection of wireless adapters (for instance) to non-def | ault port pins. |
| 16 | <pre>// Serial port 0 is still used by the Arduino bootloader regardless of this</pre> | setting. |
| 17 | #define SERIAL_PORT 0 | |
| 19 | // This determines the communication sneed of the printer | |
| 20 | #define BAUDRATE 250000 | |
| 21 | //#define BAUDRATE 115200 | |
| 22 | | |
| 23 | //// The following define selects which electronics board you have. Please of | hoose the one that matche |
| 24 | <pre>// 10 = Gen7 custom (Alfons3 Version) "https://github.com/Alfons3/Generation // 10 = Gen7 when where a statement of the statement of the</pre> | 1_7_Electronics" |
| 26 | // 11 = Gen7 v1.1, v1.2 = 11 // 12 = Gen7 v1.3 | |
| 27 | // 13 = Gen7 v1.4 | |
| 28 | //3 = MEGA/RAMPS up to 1.2 = 3 | |
| 29 | // 33 = RAMPS 1.3 / 1.4 (Power outputs: Extruder, Fan, Bed) | |
| 30 | // 34 = RAMPS 1.3 / 1.4 (Power outputs: Extruder0, Extruder1, Bed) | |
| 31 | // 35 = RAMPS 1.3 / 1.4 (Power outputs: Extruder, Fan, Fan) | |
| 34 | // 4 = Duemilanove W/ Alkega328P pin assignment | |
| | (| > [*] |
| | | |
| | | |
| Clip | | |
| | | |
| | | |
| 1 | A venter | Maas 2560 of Maas ADV on COM1 |
| 1 | Arduno | mega 2000 of Mega ADK on COM1 |



2. Configuring and flashing firmware for the Wasp 2040 3D printer controller.

Uploading the firmware code to the printer



Printer test codes (Source: marlinfw.org):

| GO-G1: Linear Move | M82: E Absolute | M290: Babystep |
|---|---|---|
| G2-G3: Controlled Arc Move | M83: E Relative | M300: Play Tone |
| G4: Dwell | M85: Inactivity Shutdown | M301: Set Hotend PID |
| G5: Bézier cubic spline | M92: Set Axis Steps-per-unit | M302: Cold Extrude |
| G10: Retract | M100: Free Memory | M303: PID autotune |
| G11: Recover | M104: Set Hotend Temperature | M304: Set Bed PID |
| G12: Clean the Nozzle | M105: Report Temperatures | M350: Set micro-stepping |
| G20: Inch Units | M106: Set Fan Speed | M351: Set Microstep Pins |
| G21: Millimeter Units | M107: Fan Off | M355: Case Light Control |
| G26: Mesh Validation Pattern | M108: Break and Continue | M360: SCARA Theta A |
| G27: Park the nozzle | M109: Wait for Hotend Temperature | M361: SCARA Theta-B |
| G28: Auto Home | M110: Set Line Number | M362: SCARA Psi-A |
| G29: Mesh Bed Leveling | M111: Debug Level | M363: SCARA Psi-B |
| G29: Automatic Bed Leveling | M112: Emergency Stop | M364: SCARA Psi-C |
| G29: Unified Bed Leveling | M113: Host Keepalive | M380: Activate Solenoid |
| G30: Single Z-Probe | M114: Get Current Position | M381: Deactivate Solenoids |
| G31: Dock Sled | M115: Firmware Info | M400: Finish Moves |
| G32: Undock Sled | M117: Set LCD Message | M401: Deploy Probe |
| G33: Delta Auto Calibration | M118: Serial print | M402: Stow Probe |
| G38.2-G38.3: Probe target | M119: Endstop States | M404: Set Filament Diameter |
| G42: Move to mesh coordinate | M120: Enable Endstops | M405: Filament Width Sensor On |
| G90: Absolute Positioning | M121: Disable Endstops | M406: Filament Width Sensor Off |
| G91: Relative Positioning | M122: TMC Debugging | M407: Filament Width |
| G92: Set Position | M125: Park Head | M410: Quickstop |
| MO-M1: Unconditional stop | M126: Baricuda 1 Open | M420: Bed Leveling State |
| M3: Spindle CW / Laser On | M127: Baricuda 1 Close | M421: Set Mesh Value |
| M4: Spindle CCW / Laser On | M128: Baricuda 2 Open | M428: Home Offsets Here |
| M5: Spindle / Laser Off | M129: Baricuda 2 Close | M500: Save Settings |
| | | |
| M17: Enable Steppers | M140: Set Bed Temperature | M501: Restore Settings |
| M17: Enable Steppers M18-M84: Disable steppers | M140: Set Bed Temperature M145: Set Material Preset | M501: Restore Settings M502: Factory Reset |
| M17: Enable Steppers M18-M84: Disable steppers M20: List SD Card | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units | M501: Restore Settings M502: Factory Reset M503: Report Settings |
| M17: Enable Steppers M18-M84: Disable steppers M20: List SD Card M21: Init SD card | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units M150: Set RGB(W) Color | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents |
| M17: Enable Steppers M18-M84: Disable steppers M20: List SD Card M21: Init SD card M22: Release SD card | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units M150: Set RGB(W) Color M155: Temperature Auto-Report | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD |
| M17: Enable Steppers M18-M84: Disable steppers M20: List SD Card M21: Init SD card M22: Release SD card M23: Select SD file | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units M150: Set RGB(W) Color M155: Temperature Auto-Report M163: Set Mix Factor | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD print | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units M150: Set RGB(W) Color M155: Temperature Auto-Report M163: Set Mix Factor M164: Save Mix | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD print | M140: Set Bed Temperature M145: Set Material Preset M149: Set Temperature Units M150: Set RGB(W) Color M155: Temperature Auto-Report M163: Set Mix Factor M164: Save Mix M165: Set Mix | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD position | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed Temperature | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode M665: Delta Configuration |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print status | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament Diameter | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode M665: Delta Configuration M665: SCARA Configuration |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD write | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max Acceleration | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustments |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD write | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max Feedrate | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsets |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD writeM30: Delete SD file | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting Acceleration | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode M665: Delta Configuration M665: SCARA Configuration M666: Set Delta endstop adjustments M666: Set dual endstop offsets M851: Z Probe Offset |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD writeM30: Delete SD fileM31: Print time | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced Settings | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew Compensation |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and Start | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Home Offsets | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance Factor |
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| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard Sorting | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Home OffsetsM207: Set Firmware RetractionM208: Set Firmware Recovery | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor Current |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Set Pin State | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Home OffsetsM206: Set Firmware RetractionM207: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto Retract | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode M665: Delta Configuration M666: Set Delta endstop adjustments M666: Set dual endstop adjustments M666: Set dual endstop offsets M851: Z Probe Offset M852: Bed Skew Compensation M900: Linear Advance Factor M906: TMC Motor Current M907: Set Motor Current M908: Set Trimpot Pins |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Set Pin StateM43: Debug Pins | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Home OffsetsM207: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto RetractM209: Set Auto RetractM209: Set Auto RetractM211: Software Endstops | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print Values |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM43 T: Toggle Details (Debug Pins) | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM207: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend Offset | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM910: Commit DAC to EEPROM |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM43: T: Toggle Details (Debug Pins)M48: Probe Accuracy Test | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Home OffsetsM207: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM220: Set Feedrate Percentage | M501: Restore Settings M502: Factory Reset M503: Report Settings M504: Validate EEPROM contents M540: Endstops Abort SD M600: Filament Change M603: Configure Filament Change M605: Dual Nozzle Mode M665: Delta Configuration M666: Set Delta endstop adjustments M666: Set Delta endstop adjustments M666: Set dual endstop offsets M851: Z Probe Offset M852: Bed Skew Compensation M900: Linear Advance Factor M906: TMC Motor Current M907: Set Motor Current M908: Set Trimpot Pins M909: DAC Print Values M910: Commit DAC to EEPROM M911: TMC OT Pre-Warn Condition |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Set Pin StateM43 T: Toggle Details (Debug Pins)M48: Probe Accuracy TestM73: Set Print Progress | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM2201: Set Flow PercentageM221: Set Flow Percentage | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM911: TMC OT Pre-Warn ConditionM912: Clear TMC OT Pre-Warn |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Ster Pin StateM43 T: Toggle Details (Debug Pins)M48: Probe Accuracy TestM73: Set Print Job | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM207: Set Firmware RetractionM208: Set Firmware RetractionM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM220: Set Flow PercentageM221: Set Flow PercentageM226: Wait for Pin State | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM911: TMC OT Pre-Warn ConditionM912: Clear TMC OT Pre-WarnM913: Set Hybrid Threshold Speed |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Set Pin StateM43 T: Toggle Details (Debug Pins)M48: Probe Accuracy TestM75: Start Print JobM76: Pause Print Job | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM207: Set Firmware RetractionM208: Set Firmware RecoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM220: Set Feedrate PercentageM221: Set Flow PercentageM226: Wait for Pin StateM226: Wait for Pin StateM240: Trigger Camera | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM911: TMC OT Pre-WarnM913: Set Hybrid Threshold SpeedM914: TMC Bump Sensitivity |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM43: SDCard SortingM42: Set Pin StateM43: Debug PinsM43: Troggle Details (Debug Pins)M48: Probe Accuracy TestM73: Set Print JobM76: Pause Print JobM77: Stop Print Job | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM208: Set Firmware RetoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM221: Set Flow PercentageM226: Wait for Pin StateM226: Wait for Pin StateM240: Trigger CameraM250: LCD Contrast | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM911: TMC OT Pre-WarnM913: Set Hybrid Threshold SpeedM914: TMC Bump SensitivityM915: TMC Z axis calibration |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM25: Pause SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM43: Debug PinsM43: Troggle Details (Debug Pins)M48: Probe Accuracy TestM76: Pause Print JobM77: Stop Print JobM78: Print Job Stats | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Starting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM208: Set Firmware RetoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM220: Set Feedrate PercentageM220: Set Flow PercentageM221: Set Flow PercentageM226: Wait for Pin StateM240: Trigger CameraM250: LCD ContrastM260: I2C Send | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM906: TMC Motor CurrentM907: Set Motor CurrentM908: Set Trimpot PinsM909: DAC Print ValuesM910: Commit DAC to EEPROMM911: TMC OT Pre-WarnM913: Set Hybrid Threshold SpeedM914: TMC Bump SensitivityM915: TMC Z axis calibrationM928: Start SD Logging |
| M17: Enable SteppersM18-M84: Disable steppersM20: List SD CardM21: Init SD cardM22: Release SD cardM23: Select SD fileM24: Start or Resume SD printM26: Set SD positionM27: Report SD print statusM28: Start SD writeM29: Stop SD writeM30: Delete SD fileM31: Print timeM32: Select and StartM33: Get Long PathM34: SDCard SortingM42: Set Pin StateM43 T: Toggle Details (Debug Pins)M48: Probe Accuracy TestM73: Set Print JobM76: Pause Print JobM78: Print Job StatsM80: Power On | M140: Set Bed TemperatureM145: Set Material PresetM149: Set Temperature UnitsM150: Set RGB(W) ColorM155: Temperature Auto-ReportM163: Set Mix FactorM164: Save MixM165: Set MixM190: Wait for Bed TemperatureM200: Set Filament DiameterM201: Set Print Max AccelerationM203: Set Max FeedrateM204: Set Sarting AccelerationM205: Set Advanced SettingsM206: Set Firmware RetractionM208: Set Firmware RetoveryM209: Set Auto RetractM211: Software EndstopsM218: Set Hotend OffsetM220: Set Feedrate PercentageM221: Set Flow PercentageM226: Wait for Pin StateM240: Trigger CameraM250: LCD ContrastM260: I2C SendM261: I2C Request | M501: Restore SettingsM502: Factory ResetM503: Report SettingsM504: Validate EEPROM contentsM540: Endstops Abort SDM600: Filament ChangeM603: Configure Filament ChangeM605: Dual Nozzle ModeM665: Delta ConfigurationM666: Set Delta endstop adjustmentsM666: Set dual endstop offsetsM851: Z Probe OffsetM852: Bed Skew CompensationM900: Linear Advance FactorM908: Set Trimpot PinsM909: DAC Print ValuesM910: Commit DAC to EEPROMM911: TMC OT Pre-WarnM913: Set Hybrid Threshold SpeedM914: TMC Bump SensitivityM915: TMC Z axis calibrationM928: Start SD LoggingM999: STOP Restart |

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