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Smartto touch screen transfer protocol

Huang Tingjian2019.04.01

- Customized the touch screen transmission protocol of Jietai Technology Co., Ltd., the data format received by the screen refers to the Gcode format, using L
  The beginning of the letter is used as a type identifier. LCD still uses Gcode commands to process the command request to the motherboard.
  Add part of the touch screen return parameter function to the corresponding gcode instruction; that is, the data interaction format of Jietai touch screen:
  Request (G, M, T) instruction, return (L) instruction.
- Instructions are continuously expanding according to functional requirements.

1. Format description:

letter	definition
Lnnn	L code command, as the identifier of the command received by the touch screen
Pnnn	Command parameters, such as file list file name number
Tnnn	Command parameters, such as extrusion head number
Snnn	Command parameters, such as temperature
Xnnn	Usually the X-axis coordinate of the printer is nnn mm
Ynnn	Usually the Y-axis coordinate of the printer is nnn mm
Znnn	Usually the Z-axis coordinate of the printer is nnn mm
Fnnn	Usually the speed at which the print head moves, min/mm
Ennn	Usually the length of the extruded material (mm)
Nnnn	Line number. Together with the check code, it is used as the identification and verification of an instruction. You can consider making mistakes in th Retransmission by mistake.
***nnn**	Check code. Used to check communication errors.
\r\n	'\r' or'\n' is the end of the command

2. Touch screen data receiving and sending format:

data block	1	2	3	4	5
definition	Line number: Nnnn	Command number: L/G/M/Tnnn	Command parameters, according to the command Make the number different	*16 bit CRC check	End character: \r\n

Touch screen command receiving format: "Nnnn Lnnn XXXXXXXXXXXXXXXXXX*nnn\r\n". "Nnnn" is the start of the order
Start, where "nnn" represents the current number of lines of the command, currently the default value -1 is used. "Lnnn" stands for the command number, where "nnn"

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Is the numbered number. "*Nnn" represents the start of the checksum, "nnn" is the number of the checksum, and the check code starts from the character "Nnnn"

Up to the 16-bit checksum before the'*' character, it is checked by OR and, for example:

```
while(Buf[Strchr] !='*'&& Strchr<512)//Take command checksum from'N' to'*'
{// N(number==-0) (command) *(16bit checksum)
    Checksum16 = checksum16^( Buf[Strchr]);
    Strchr++;
}
```

The commands sent by the touch screen to the printer main board are sent by Gcode commands, and the command format is: "Nnnn G/M/Tnnn XXXXXXXXXXXXXXXXXX*nnn\r\n". The verification method is the same as above.

3. L command analysis

Touch screen to receive commands/ Touch screen request command	**Illustrate**
L1/M114, G1, G28	Upload the current position and speed (mm/s) of the XYZE axis. Return: L1 Xnnn Ynnn Znnn Ennn Fnnn\r\n
L2/M105, M104, M140	Upload the current temperature and set temperature of the extruder and hot bed. " B: " and " T0: " represent the temperature status of the extruder and hot bed respectively, and the corresponding characters are continuous Before and after the two' / 's are the actual temperature/set temperature/enable state respectively. By default, there are hot bed B and A default extruder T0 , if there are multiple extruders, add Tn after it ; SD stands for the status of SD card and U disk (the upper 8 bits are U disk status, and the lower 8 bits are SD card status Status: 0x00: SD ok 0x01: SD remove 0x02: SD fail; 0x00: U-disk ok 0x10: U-disk remove 0x20: U-disk error) ; F0 represents the blower fan speed; F2 represents the motherboard fan speed; R represents the printing speed; FR stands for the current speed of the slice (mm/s); L2 B:nnn /nnn/nnn T0:nnn /nnn/nnn [Tn:nnn/nnn/nnn]SD:nnn F0:nnn F2:nnn R:nnn FR:nnn\r\n
L3/M27, M2101	The print status is uploaded. PS stands for printing status (0:idle, 1:printing, 2:paused, 3:recovery, 4:finish), VL Represents the selected print file disk character (0: SD card, 1: U-disk) , MT represents click to unlock Status (0: unlock, 1: lock), FT consumable status (0: exhausted, 1: remaining, 0xFF: not opened), AL auto-leveling enable state (0: close, 1: open), ST (sensor type auto-leveling sensor Sensor type: 0-capacitive proximity switch, 1-3Dtouch, 0xFE-currently a single-use capacitive Proximity switch control interface), WF (whether wifi module exists, 0 does not exist, 1 exists), MR Mixing ratio, FN printing file, PG printing percentage, TM printing elapsed time, LA The current printing layer number, the total printing layer number of LC ; L3 PS:nnn VL:nnn MT:nnn FT:nnn AL:nnn ST:nnn WF: nnn MR:nnn FN:nnn PG:nnn TM:nnn LA:nnn LC: nnn\r\n L3 PS:nnn VL:nnn MT:nnn FT:nnn AL:nnn ST:sensor type WF: wifi_exist_flag MR:MixerRate FN:filename PG:precent TM:time LA:layer LC: layer_count\r\n
L4/M2131	Wifi status upload. WT stands for wifi enable state (0:close, 1:open) , CF stands for automatic connection function

	(0:close, 1:open) , AP enters the routing configuration state (0: exit, 1: enter) , SS Server connection status (0:close, 1:open,2:success) , RS wifi signal strength (0 Is no signal, 1-5 is the signal strength value, the five is the strongest) , the RE router assigns the IP status (0:close, 1:open,2:success) , IP address assigned by RI router, RA route SSID, SA server IP address or domain name; Command M2131 Pnnn Snnn\r\n Snnn represents parameters P0 WT stands for wifi status (S0:close, S1:open) P1 CF stands for automatic connection flag (S0:close, S1:open) P2 AP enters the routing configuration state (S0: exit, S1: enter) When the command M2131 \r\n has no parameters, it returns status information: L4 WT:nnn CF:nnn AP:nnn SS:nnn RS:nnn RE:nnn RI:routerip: RA:ssid SA:serverip:\r\n
L5/M220	Upload the set printing rate

L5 Snnn\r\n

L6/M106 Fan status upload, which fan P represents (0: hotend, 1: control)

L6 Pnnn Snnn\r\n

P0 Extruder 1 blower fan

P1 Main control box fan 1

Snnn represents the parameter value

L7/M20 LCD Upload file list;

File list: nnn in nnn represents which disk letter it is.

L13/M2115 disk selection command completes the selection of SD card or U disk, and then use this

The instruction can read the corresponding file list accordingly

Pnnn is used as the serial number of the file name, and the receiving format of the touch screen is as follows:

L7 begin file list:nnn\r\n

L7 P0 filename1\r\n

L7 P1 filename2\r\n

…

L7 Pn-1 filenamen\r\n

L7 end file list:nnn \r\n

L8 Upload the file to the screen SD card (see Ymode protocol for details)

Reserved, consider adding pictures and other uploads;

Upgrade consideration is integrated into BootLoader. Currently in the A30/E180 series

As the upgrade file upload trigger mark inside, upload the corresponding file name.

L9/M115 Query current firmware version information, upload information as a string list

DN: DEVICE_NAME, //device series name

DM: DEVICE_MODE, //device model

SN: SERIAL_NUMBER, //Serial number

FV: FIRMWARE_VERSION, //firmware version

PV: PRINTING_VOLUME, //Print size

HV: HARDWARE_VERSION, //hardware version number

L9

DN:name;DM:name;SN:name;FV:name;PV:name;HV:name;\r

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L10/M2107 Manual leveling control, the sent M2107 is with parameters: M2107 Snn

The format of M2107 is as follows:

S0: request homing and move the extruder to the specified position, and upload the z-axis position

Return M2107 Z:%3.2f\n

S1: Move to the first point and return to M2107 ok\n or M2107 fail\n

S2: Move to the second point

S3: Move to the third point

S4: Move to the fourth point, it is zero on the delta

S5: Move to the fifth point

S6: Z axis rises by 0.5mm and returns to M2107 Z:%3.2f\n

S7: Z-axis down 0.5mm

S8: Save parameter Z and return to M2107 save success\n

S9: The Z axis descends by 0.05mm, the delta is 0.1mm

S10: The Z axis rises by 0.05mm, the delta is 0.1mm

S11: Exit leveling, exit leveling motor state

S12: Set the endstop_adj parameter of the delta

S13: Homing on the delta

Return: "L10 Snnn Xnnn Ynnn Znnn Hnnn Onnn Rnnn Dnnn
Fnnn\r\n" or "L10 Snnn\r\n"; S stands for Z value, X/Y/Z stands for
The endstop adj of the three axes of the delta, H stands for printing depth, O stands for
delta radius error, R stands for delta radius, D stands for delta diagonal
rod, F stands for smooth rod offset.

L11/M2120 Automatic leveling control, the sent M2120 is with parameters: M2120 Pnnn Snn

The format of M2120 is as follows:

P0: Enable control. S0 (auto-leveling disabled) S1 (auto-leveling enabled, at this time
Upload Z offset value L11 P0 Snnn nnn is Zoffset)
P1: Servo control. S0 (probe up) S1 (probe down) S2 (alarm release)
P2: Correct and save the Z offset. Snnn (nnn is the new Z offset value, at this time
Upload Z offset value L11 P0 Snnn nnn is Zoffset)
P3: Z-axis rising Snnn mm (Snnn is the unit, S0=10mm S1=1.0mm
S2=0.1mm S3=0.05mm)
Need to upload Z axis parameters (L1 Znnn)
P4: Z axis descends by Snnn mm (Snnn is the unit, S0=10mm S1=1.0mm
S2=0.1mm S3=0.05mm)
Need to upload Z axis parameters (L1 Znnn)
P5: Request Zoffset value, return L11 P0 Snnn (nnn is Zoffset)
P6: Position movement S0 (the nozzle moves to the center) S1 (the probe moves to the center)
Need to upload XYZ axis parameters (L1 Znnn)
P7: S0 (the sensor moves to the center and measures the Z value)
Need to upload XYZ axis parameters (L1 Znnn)
P9: 3dtouch and capacitance detection switch switch, S1 is to open 3dtouch, S0
For closing

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return:
L11 P0 Snnn (nnn is Zoffset)
Return to the save value successful interface prompts that it has not been added;

L12/M2105

Extrusion head discharge and return M2105 Snnn

The format of M2105 is as follows:
S0: Extrusion head feed 10mm
S1: Extrusion head withdraws 10mm
S2: The extrusion head keeps feeding
S3: Extrusion head keeps returning material
S4: The extruder keeps feeding and retreating and stops
S5: Multi-extruder switching discharge control

return:
L12 P0 Snnn (nnn is Zoffset)

L13/M2115

Disk selection instruction

The format of M2115 is as follows: = GCOFileRead.Volume
S0: SD card
S1: U Disk

Return: L13 Disk select success

L14/M117

M117 can be used to update the printing progress display during serial port printing, and also used for uploading some Print prompt information, etc.
L14 message\r\n

L15 /M2106

Switch control such as consumables detection

The format of M2106 is as follows:
Snnn: nnn is the parameter value
Filament_Detector_control;//Disconnection detection switch
S0=closed, S1=open
Return L3 data

L16/M2130

Power-off resume control M2130 Pnnn Snnn

The format of M2130 is as follows: M2130 Pnnn Snnn
Pnnn: parameter object
Snnn: parameter value
P0: Resume to resume failure to control refresh flag
S0: Cancel the resumption, S1: Refresh the file
P1: Restart S0: Restart the LCD screen

Status upload L16 Pnnn Snnn\r\n

L17/M2111 Motor movement control

The M format is as follows:

S0: Motor enable
S1: Motor disabled
S2: Relative movement X axis, format: M2111 S2 Xnnn, nnn is the moving distance
Off length
S3: Relative movement Y axis, format: M2111 S3 Ynnn, nnn is the movement distance
Off length
S4: Relative movement Z axis, format: M2111 S4 Znnn, nnn is the movement distance
Off length

No return parameters, only reserved

L18/M2133 Abnormal situation LCD interface switching

The M format is as follows:
S0:
S1:
The current state of the enumeration type is as follows, there will be subtle differences depending on the version
NO_FILAMENT_PAGE = 0,/*Err0: No filament detected*/
SD_REMOVE,/*Err1: Sd card remove*/
RESUME_PRINT, /*Err2: resume*/
NO_FIND_FILE_PAGE,/*Err3: can't find the gcode file*/
/*Abnormal temperature*/
HEATING_NOZZLE0_PAGE,
HEATING_BED_PAGE,
SDPRINT_NOZZLE0_PAGE,
SDPRINT_BED_PAGE,
PCPRINT_NOZZLE0_PAGE,
PCPRINT_BED_PAGE,
OPEN_FILE_FAIL_PAGE,
SERVO_CHECK_ERR,
HOTEND_TOO_CLOD,
PRINTING_HIT,
END_EXCEPTION_PAGE

return;
"L18 P%d S%d\r\n", P stands for interface type number, S stands for detailed sub-field
noodle,

L19/M2132 LCD instructions for controlling Steppercontrol (servo motor control board).

The format of M2132 is as follows: M2132 Pnnn Snnn
P0 Cnnn Dnnn: C motor selection, this command corresponds to the motor is D on
Turn on (1) and turn off (0) the custom servo control mode.
P1: P1 Cnnn Dnnn Ennn Fnnn CDEF respectively represents the C command code
No., D parameter 1, E parameter 2, F parameter 3, temporarily only use CD; this parameter
Transparent transmission to the servo control board;

C0: Run calibration
C1: testcal test calibration, the motor will rotate one circle for test calibration, return
Maximum error angle value, no parameters.
C2: enable dir effective level when the motor is enabled, 0 is high level, 1 is low
Level C3: dirpin query/set the direction of dir pin
C4: microsteps get or set the microstep subdivision of the stepper motor driver
Value.
C5: maxcurrent This will set the maximum current of the drive motor.
C6: holdcurrent For simple position PID mode, the minimum current (ie no
The current with position error) is the holding current.

Follow-up instructions need to be improved, these parameters can be put into the custom parameter set
C7: readpos reads the current 16-bit data angle value
C8: spid query/set Kp, Ki, and Kd—for `simple position PID` control
Device.
C9: The maximum acceptable error difference of errorlimit, when the error pin is set to
When an error is output, it will be output to the error pin when it exceeds the error range.
errorlimit 1.8 Set the error limit to 1.8 degrees.
C10: factoryreset will erase calibration and other system and motor parameters to
The device is reset to the factory state. After the order, the unit will need
Calibrate to the motor again.
C11: setzero This command will get the current motor position and set it to absolute
To zero angle. Note that if you move in the middle, it will take the command
Position and use it, so it is recommended to stop moving or wait before issuing setzero
To be completed.

P2: SM:nnn TC:nnn ED:nnn DI:nnn MS:nnn MC:nnn HC:nnn
SM: selected motor; TC: test calibration; ED: motor enable power
Level; DI: motor dir pin direction; MS: motor subdivision number; MC:
Maximum current; HC: hold current. Request when entering the interface, type
When the motor control mode is turned on, the corresponding data will be returned.

return;
"L19 P%d S%d\r\n", P stands for command number, S stands for status or parameter

L20/M2100

The PC triggers the LCD firmware upgrade command through the main board, which can only be triggered by the PC

※Reserved for temporary deletion, because
In order to try
Inside BootLoader
Currently, the M2100 can only
Triggered by PC or LCD
Automatic trigger on error

The format of M2100 is as follows: M2100 Snnn
S0: The LCD firmware upgrade control flow can only be triggered by the PC serial port
Upload to LCD screen format: L20 S0
S1: Tell the motherboard that the LCD firmware upgrade is ready
S2: LCD tells the motherboard that the firmware upgrade is complete or an error occurs and returns to normal control
state
S4: LCD firmware failed during the upgrade process, prepare to upgrade again
S5: LCD bootloader starts normally, if it is a normal start caused by the PC

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L21/M2134

Request and download LCD information

The format of M2134 is as follows: M2133 XX:nnn YY:nnn ZZ:nnn
XX,YY,ZZ: parameter object
nnn: parameter value, which can be a number or a string
M2134 FW: nnn LCD firmware version version number nnn updated to the main control board
The format of L21 is as follows: L21 P0 Snnn
S0: Request LCD version number
S1:...
No return parameters, only reserved

L22/T0~T3,M2135 -M2138

T command function

The format of Tnnn is as follows: Tnnn or Tnnn

Pnnn/Snnn/Annn/Bnnn/Cnn/Dnnn

T0/1/2: switch to T0/T1/T2 mixing setting tool;

M2135 Pnnn Snnn: Pnnn (extruder T0/1/2), Snnn (mixing
Proportion value), set the mixing ratio of T0/T1/T2, set T0 or T1 among them
One, T2 will allocate the remaining proportion;

M2136 Snnn: Select the mixing template;
TEMPLATE_1/TEMPLATE_2 (set T0/T1 mixing, mixing height respectively
2mm, from the max percentage of T0/T1 to the end of min percentage);
TEMPLATE_3/TEMPLATE_4 (set T0/T1 mixing, mixing height respectively
10mm, from the max percentage of T0/T1 to the min percentage);
TEMPLATE_5/TEMPLATE_6 (set T0/T1 mixing, mixing height respectively
20mm, starting from the percentage of max of T0/T1 to the percentage of min);
TEMPLATE_7/TEMPLATE_8 (set T0/T1 mixing, mixing height respectively
Is 50mm, starting from the percentage of max of T0/T1 to the percentage of min);
CUSTOM_1 to CUSTOM_6 use the set mixing start and mixing ratio
For example, set the mixing start height and mixing end height to set the mixing;

M2137 Annn Bnnn Cnnn Dnnn: set the layer height and knot
The layer height of the bundle mixture, from the min percentage of T0 to the max percentage
bundle;
A- T0 is the mixing percentage at the beginning, and the remaining proportion is automatically allocated to other extrusio
machine
B- Percentage of mixing at the end of T0
C- the height of the mixture layer at the beginning
D- The height of the mixture layer at the end

M2138 Snnn: Multiple extruder mode selection.
High 8-bit-1: fixed ratio mixing, 2: template designation, 3: designated ratio position mixing
material;

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The lower 8 bits are the corresponding mode type;

L23/M2139 Set up some custom additional functions

P0 Snnn: Sound switch control, S0/1 represents close/open;
P1 Snnn Ennn: Snnn represents backlight control, S0/1 represents off/on
On, Ennn represents the brightness percentage;
P2: lock screen control, S0/1 represents close/open, Wnnn lock screen password,
Ennn represents the lock screen time;
P3: Extruder temperature deviation control, Annn thermal head temperature deviation value, Bnnn
Center deviation point; return HE:nnn represents the enable switch, HO:nnn represents the thermal head
Temperature deviation value, HC: nnn represents the center deviation point.

Returned format: L23 SE:nnn BE:nnn BP:nnn CE:nnn HE:nnn SP:nnn
ST:nnn HC:nnn HO:nnn \r\n.
SE:nnn represents the sound enable switch; BE:nnn represents the backlight enable switch,
BP: nnn represents the brightness percentage; CE: nnn represents the lock screen enable switch,
SP:nnn represents the lock screen password, ST:nnn represents the time to enter the lock screen;