

M5Stack Chain Encoder Protocol								All packets start with 0xAA 0x55 and end with 0x55 0xAA				V1 (Version)			
		Byte		0	1	2	3	4	5	6	7	8	9	10	
Instruction set	instruction format	Length_low		Length_high		Index		Cmd		Data1		Data2		Data7	
		Length_low		Length_high		Index		Cmd		Data1		Data2		Data7	
Get the encoder value	Command packet format	0x03	0x00	Index_id	0x10	CRC									
	Response packet format	0x05	0x00	Index_id	0x10	Encoder_low	Encode_high	CRC							
	Command Details	(1) Function Description: Get encoder value. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Encoder value (4) Instruction Code: 0x10 Note 1: Encoder = (int16_t)((Encode_high < 8) Encode_low) Value range: -32768 ~ 32767 Default: 0													
Get encoder increment value	Command packet format	0x03	0x00	Index_id	0x11	CRC									
	Response packet format	0x05	0x00	Index_id	0x11	Encoder_low	Encode_high	CRC							
	Command Details	(1) Function Description: Get encoder increment value. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Encoder value (4) Instruction Code: 0x11 Note 1: Encoder = (int16_t)((Encode_high < 8) Encode_low) Value range: -32768 ~ 32767 Default: 0 Note 2: Will be cleared to 0 after reading.													
Reset encoder value	Command packet format	0x03	0x00	Index_id	0x13	CRC									
	Response packet format	0x04	0x00	Index_id	0x13	Operation_status	CRC								
	Command Details	(1) Function Description: Reset encoder value. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Operation status (4) Instruction Code: 0x13 Note 1: Operation_status Operation status 0: Operation failed 1: Operation successful Note 2: The encoder value is cleared to 0 after reset.													
Reset encoder increment value	Command packet format	0x03	0x00	Index_id	0x14	CRC									
	Response packet format	0x04	0x00	Index_id	0x14	Operation_status	CRC								
	Command Details	(1) Function Description: Resets encoder increment value. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Operation status (4) Instruction Code: 0x14 Note 1: Operation_status Operation status 0: Operation failed 1: Operation successful Note 2: After successful reset, the encoder increment value is cleared to 0.													
Set AB status	Command packet format	0x05	0x00	Index_id	0x15	Encoder_direct	Save_to_flash	CRC							
	Response packet format	0x04	0x00	Index_id	0x15	Operation_status	CRC								
	Command Details	(1) Function description: Set AB state. By setting different AB states, you can control whether the encoder value increases or decreases when rotating clockwise. (2) Input parameters: Index_id (device subscript ID), Encoder_direct (encoder direction), Save_to_flash (whether to save to internal Flash) (3) Return parameter: Operation_status (4) Instruction code: 0x15 Note 1: Encoder_direct Encoder direction 0: Clockwise increase (default state) 1: Clockwise decrease Note 2: Operation_status Operation status 0: Operation failed 1: Operation successful Note 3: Save_to_flash Whether to save to internal Flash 0: Do not save 1: Save Note 4: Set to take effect immediately Note 5: Save to internal Flash The page needs to be erased, which takes a long time (about 20ms). During this time, the serial port interrupt will be turned off, and frequent operation will affect the life of the device.													
Get AB state	Command packet format	0x03	0x00	Index_id	0x16	CRC									
	Response packet format	0x04	0x00	Index_id	0x16	Encoder_direct	CRC								
	Command Details	(1) Function Description: Obtain AB status. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Encoder_direct (4) Instruction Code: 0x16 Note 1: Encoder_directs Encoder direction 0: Clockwise increase (default state) 1: Clockwise decrease													
Set RGB values	Command packet format	0x05+Num*3	0x00	Index_id	0x20	Index	Num	R	G	B	...	CRC			
	Response packet format	0x04	0x00	Index_id	0x20	Operation_status	CRC								
	Command Details	(1) Function Description: Sets RGB values. (2) Input Parameters: Index_id (Device ID), Index (RGB light start coordinates), Num (Number of RGB lights to be set), RGB value (3) Return Parameter: Operation status (4) Instruction Code: 0x20 Note 1: Operation status Operation status 0: Operation failed 1: Operation successful Note 2: Index is the RGB light start coordinate, starting from 0. The Encoder device has only one RGB light, so Index = 0, Num = 1													
Get RGB values	Command packet format	0x05	0x00	Index_id	0x21	Index	Num	CRC							
	Response packet format	0x04 + Num * 3 / 0x04	0x00	Index_id	0x21	Operation_status	R	G	B	...	CRC				
	Command Details	(1) Function Description: Get RGB values. (2) Input Parameters: Index_id (Device ID), Index (RGB light start coordinates), Num (Number of RGB lights to be read) (3) Return Parameters: RGB values (4) Instruction Code: 0x21 Note 1: Operation_status Operation status 0: Operation failed 1: Operation successful Note 2: Index is the RGB light start coordinate, starting from 0. The Encoder device has only one RGB light, so Index = 0, Num = 1 Note 3: Operation failure returns a data packet that does not contain RGB values.													

Set RGB light brightness	Command packet format	0x05	0x00	Index_id	0x22	Light	Save_to_flash	CRC						
	Response packet format	0x04	0x00	Index_id	0x22	Operation_status	CRC							
	Command Details	(1) Function description: Set the brightness of RGB lights (2) Input parameters: Index_id (device index ID), Light (RGB brightness, 0~100, default 40), Save_to_flash (whether to save to internal Flash) (3) Return parameters: Operation_status (4) Instruction code: 0x22 Note 1: Operation_status Operation status 0: Operation failed 1: Operation successful Note 2: Save_to_flash Whether to save to internal Flash 0: Do not save 1: Save Note 3: The setting takes effect immediately upon success Note 4: Saving to internal Flash requires erasing the page, which takes a relatively long time (about 20ms). During this process, the serial port interrupt will be turned off, and frequent operation will affect the lifespan of the device. If you need to frequently adjust the brightness, please avoid saving to internal Flash every time.												
Get RGB light brightness	Command packet format	0x03	0x00	Index_id	0x23	CRC								
	Response packet format	0x04	0x00	Index_id	0x23	Light	CRC							
	Command Details	(1) Function Description: Get the brightness of the RGB light. (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Light (RGB brightness) (4) Instruction Code: 0x23												
Button press	Command packet format	None												
	Response packet format	0x05	0x00	Index_id	0xE0	Status	0x00	CRC						
	Command Details	(1) Function Description: Chain device presses, actively sends (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Status (Button Trigger Status) (4) Instruction Code: 0xE0 Note 1: Status Button Status 0: Single Click 1: Double Click 2: Long Press Note 2: This data packet is only sent in active reporting mode. After the data packet is sent, the RGB light will have an effect superimposed on the lighting effect set by the user. - Single Click superimposes green (G) - Double Click superimposes blue (B) - Long Press superimposes red (R) The color channel value superimposed each time is 255, and it gradually decays within 1 second with a period of 10ms, and finally the superimposed value drops to 0, restoring the color effect set by the user. Example: The user sets the RGB light to purple (R=128, G=0, B=128) and the brightness to 50%. After brightness compression, the actual display is: R=64, G=0, B=64. - When the user clicks, the G channel is overlaid with 255: displayed as R=64, G=255, B=64. Within 1 second, the overlay G value gradually decays to 0, eventually returning to R=64, G=0, B=64. - When the user double-clicks, the B channel is overlaid with 255: originally B=64, after overlay, values exceeding 255 are treated as 255, resulting in R=64, G=0, B=255. Within 1 second, the overlay B value gradually decays to 0, eventually restoring to R=64, G=0, B=64. - When the user long-presses, the R channel is overlaid with 255: originally R=64, after overlay, values exceeding 255 are treated as 255, resulting in R=255, G=0, B=64. Within 1 second, the overlay R value gradually decays to 0, eventually restoring to R=64, G=0, B=64.												
Check button status	Command packet format	0x03	0x00	Index_id	E1	CRC								
	Response packet format	0x04	0x00	Index_id	E1	Status	CRC							
	Command Details	(1) Function description: Query button status (2) Input parameter: Index_id (Device index ID) (3) Return parameter: Status (4) Instruction code: 0xE1 Note 1: Status Button status 0: Not pressed 1: Pressed												
Set button interval	Command packet format	0x05	0x00	Index_id	E2	Double	Long	CRC						
	Response packet format	0x04	0x00	Index_id	E2	Operation_status	CRC							
	Command Details	(1) Function Description: Set the key data interval (2) Input Parameters: Index_id (Device Index ID), Double (Double-click time interval), Long (Long-press time interval) (3) Return Parameter: Operation_status (4) Command Code: 0xE2 Note 1: Double: Double-click time interval (default 1) (Double+1)*100ms 0~9 (100ms~1000ms) Note 2: Long: Long-press time interval (default 0) (Long+3)*1s 0~7 (3s~10s) Note 3: Operation_status Operation status 0: Operation failed 1: Operation successful												
Get key press interval	Command packet format	0x03	0x00	Index_id	E3	CRC								
	Response packet format	0x05	0x00	Index_id	E3	Double	Long	CRC						
	Command Details	(1) Function Description: Get key data interval (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Double, Long (4) Instruction Code: 0xE3 Note 1: Double double-click interval 0~9 (100ms~100ms) Note 2: Long long-press interval 0~7 (3s~10s)												
Set button mode	Command packet format	0x04	0x00	Index_id	E4	Mode	CRC							
	Response packet format	0x04	0x00	Index_id	E4	Operation_status	CRC							
	Command Details	(1) Function Description: Set button mode (2) Input Parameters: Index_id (Device Index ID), Mode (Button Mode) (3) Return Parameter: Operation_status (4) Instruction Code: 0xE4 Note 1: Mode (Default 1) 0: Non-active reporting 1: Active reporting Note 2: Operation_status Operation status 0: Operation failed 1: Operation successful												
Get key mode	Command packet format	0x03	0x00	Index_id	E5	CRC								
	Response packet format	0x04	0x00	Index_id	E5	Mode	CRC							
	Command Details	(1) Function Description: Get button mode (2) Input Parameter: Index_id (Device Index ID) (3) Return Parameter: Mode (4) Instruction Code: 0xE5 Note 1: Mode (Default 1) 0: Non-active reporting 1: Active reporting												

