GC3355 USB Mining Machine Communication Protocol Specification

Version 1.1
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1. General communication protocol

In the USB miner, MCU serves as the communication bridge between host(cgminer etc.) and GC3355 chips. It dispatches the commands to the GC3355 chips and reports the BTC/LTC nonce, which from the GC3355 chips, to the host.

command format: 4 bytes command header + data

4 bytes command header content: 0x55AA + GRP_ID + Reg_addr

Description of GRP_ID

	GRP_ID[bit7:bit4]	GRP_ID[bit3:bit0]
Description	0x0 BTC command	0-7 forward the command to the sub chip which chip id matched
	0x1 LTC command	0xF broadcast the command to all of GC3355 chips
	0xE CPM configuration command	
	0xC PC -MCU interactive command	

When the command is BTC/LTC/CPM, Reg_addr represents the register address of GC3355, and the register description could be found in the datasheet of GC3355, otherwise Reg_addr set to 0x00.

Report data format: 4 bytes header + 4 bytes data1 + 4 bytes data

4 bytes command header content: 0x55 + 2 bytes RET_ID + 0x00

Description of RET_ID

	RET_ID
Description	0x1000 the return nonce of BTC task
	0x2000 the return nonce of LTC task
	0xaac0 the interaction result between PC and MCU

Note：all of transfer data using little-endian

2. Communication protocol detail

1). BTC task command

Command: BTC task command consists of 4 bytes command header, 44 bytes task data and 4 bytes BTC_TASK_ID, totally 52 bytes. BTC_TASK_ID is the shake-hand flag between PC host and MCU, and it will not be send to GC3355.

For example: BTC_TASK_ID set to 1a2b3c4d

55aa0f014a548fe471fa3a9a1371144556c3f64d2500b4826008fe4bbf7698c94eba7946ce22a72f4f6726141a0b3287 1a2b3c4d

Return: While GC3355 hit the valid BTC nonce, MCU responses to report the nonce to PC host, and the report format: 4 bytes command header + 4 bytes nonce + BTC_TASK_ID.

For example: The return BTC nonce matched above task id

55100000 a2870100 1a2b3c4d

2). LTC task command

Command: LTC task command consists of 4 bytes command header, 148 bytes task data and 4 bytes LTC_TASK_ID, totally 156 bytes. LTC_TASK_ID is the shake-hand flag between PC host and MCU, and it will not be send to GC3355.

For example: LTC_TASK_ID set to abcdef12

55aa1f000000000000000000000000000000000000000000000000000000000000fcff0f0000be521441d7a4ddc3a2a01dbec44a0e10e715d4e383dcaf876f0dddb909fded740000000204918f1e66487d1098a60b8f9b94c7714389dd2c00a2b0e9822c3c9023d8f5b5ac94536d7a7884f7b897f9a161adae47a7425e7ce45e86d440ad329856d935e2529ca58d1b25ca6600000000ffffffff abcdef12

Return: While GC3355 hits the valid LTC nonce, MCU responses to report the nonce to PC host, and the report format: 4 bytes command header + 4 bytes LTC nonce + LTC_TASK_ID

For example：The return LTC nonce matched above task id

55200000 4ce548f9 abcdef12

3）. CPM configuration command

CPM configuration command, without return data，forwards to GC3355 directly by MCU.

For example：Power down all BTC modules

55AAEF020000000000000000000000000000000000000000

4）. PC-MCU interactive command

Command：The command consists of 4 bytes command header, 4 bytes address, 4 bytes value and 4 bytes length.

Return：The return command consists of 4 bytes command header, 4 bytes address and 4 bytes return value.

For example：

A．Reset the GC3355 command，no return

55aac000 e0e0e0e0 00000000 01000000

B．Get the firmware version，return the version: 15011401

downstream command：55aac000 90909090 00000000 01000000

upstream return：55aac000 90909090 15011401

C．Set the number of sub chips(5 chips)，no return

55aac000 c0c0c0c0 05000000 01000000

D. Set the uart baudrate(115200bps) between MCU and GC3355，no return

55aac000 b0b0b0b0 00c20100 01000000

5) BTC initial nonce distribution command

If a mining machine with N sub GC3355 chips, set 2^32/N==NonceN，then the initial nonce of the sub chips are: 0，NonceN*1，NonceN*2，…，NonceN*(N-1). The distribution is done by PC host, and MCU just forwards the command to every GC3355 chip.

For example：5 sub chips BTC initial nonce distribution command

55aa000000000000
55aa010033333333
55aa020066666666
55aa030099999999
55aa0400cccccccc

6) LTC initial nonce distribution command

When PC host sends the LTC task command to MCU with NONCE_MIN and NONCE_MAX parameter, MCU will divide the nonce equally, according to the valid sub chips number，and then distribute the new initial nonce to every sub GC3355 chips.

For example: If the USB mining machine carry with 2 GC3355 sub chips, the downstream task command is distributed two commands.

Downstream command：

55aa1f00000000000000000000000000000000000000000000000000000000fcff0f0000be521441d7a4ddc3a2a01dbec44a0e10e715d4e383dcaf876f0dddb909fded740000000204918f1e66487d1098a60b8f9b94c7714389dd2c00a2b0e9822c3c9023d8f5b5ac94536d7a7884f7b897f9a161adae47a7425e7ce45e86d440ad329856d935e2529ca58d1b25ca6600000000ffffffff abcdef12

MCU forwards the original task command as two commands with new initial nonce, the first command is send to chip id==0 and the last command is send to chip id==1.

1． 55aa1000000000000000000000000000000000000000000000000000000000fcff0f0000be521441d7a4ddc3a2a01dbec44a0e10e715d4e383dcaf876f0dddb909fded740000000204918f1e66487d1098a60b8f9b94c7714389dd2c00a2b0e9822c3c9023d8f5b5ac94536d7a7884f7b897f9a161adae47a7425e7ce45e86d440ad329856d935e2529ca58d1b25ca66 000000007fffffff

2． 55aa1100000000000000000000000000000000000000000000000000000000fcff0f0000be521441d7a4ddc3a2a01dbec44a0e10e715d4e383dcaf876f0dddb909fded740000000204918f1e66487d1098a60b8f9b94c7714389dd2c00a2b0e9822c3c9023d8f5b5ac94536d7a7884f7b897f9a161adae47a7425e7ce45e86d440ad329856d935e2529ca58d1b25ca66 80000000ffffffff