C6810
JPEG Module w/UART Interface

User Manual

(Note: this user manual apply for the firmware version of V2.00)

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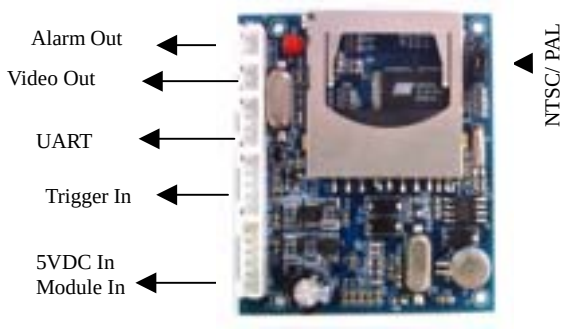
Hardware

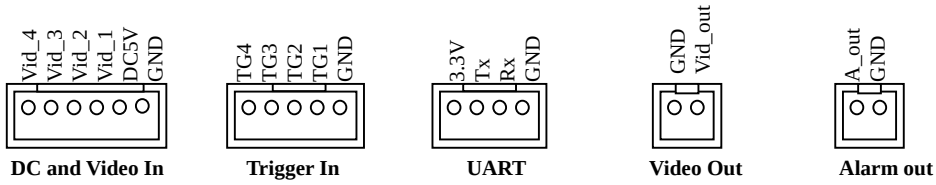
1. Understanding the connectors

J2- Video output: 2 pin connector, connect to TV video input
J3- Video and DC input: 6 pin connector, 4 for 4 channel video signal input, DC input 5V.
J4- Trigger input: 5pin connector, 4 channel, active low, common ground
J5- UART port: 4 pin connector, 3.3VDC, Tx, Rx, GND
J6- Alarm output: 2 pin connector, active low output

Note: need to apply the short bar to select TV system, PAL/NTSC before power up



1.1 Pin description of the connectors



2. Module Specification

On Board SD Ram	64 Mb (8 Mbytes)
Storage	External SD card up to 4GB
Display Connector	Composite video out
Video Capture	320 × 240 (up to 15fps)
Photo Resolution	640 x 480 JPEG format
UART Baud Rate	9600 bps
Video Input	4Ch, Composite video 1V p-p
Trigger Input	4Ch, active low
Alarm Output	Active low
Power Input	DC 5V, 500mA
Board size	55 x47 mm

2.1 Electrical Characteristics (at 5VDC)

Condition	Min.	Typ	Max.	Units
Preview	264	267	270	mA
CaptureJPG(Peak @ capturing)	268	273	282	mA
CaptureAVI(Peak@ recording)	295	298	312	mA
Playback JPG	312	270	272	mA
Playback AVI	278	280	282	mA
Data transmit	265	270	275	mA

Note: if SD card is used, current consumption will be bigger, about 10-20mA, depends on the memory size as well as the brands.

Software

3. Send Commands to the Module

First of all, one needs to setup the communication between the host machine to the module. Please follow the format described below to send the commands. Otherwise, the module will not response correctly.

3.1 Definitions of Commands

The commands are string of the hexadecimal number, it consists **synchronization bit** and **check bit**. There are 2 types of commands: **ID Command**, and **ACK Command**.

Synchronization byte (0xaa), is placed at the front of command, used for the synchronization between the host machine and the Module.
Checksum Byte is equal to the lowest 8 bit of the summation of all the other bytes in the command. It is used for the verification of the command.

3.1.1 ID Command is a variable length command containing the sync byte, length of the command, command ID and Checksum. The format of ID command is shown in the following.

Format)	Sync Byte (8 bits)	Length of the command (8 bits)	Command ID in HEX (8 bits)	Parameter N (8 bits x N)	Checksum (8 bits)
Example (display ch3)	0xaa	0x03	0x12	0x03	0xc2

Explanation:
Sync Byte: 0xaa, as described before
Length of the command: this is to tell the module how many bytes to be followed. In the example, there are 3 bytes following the 2nd byte, so, we tell the module there are 3 bytes to be followed in this command, we assign 0x03 for this byte.
Command ID: refer to the command list in this document. In the example, the command ID 0x12 is for channel selection.
Parameter: each command may follow different numbers of parameters, may be 0 or many. In this case, one parameter, Channel #3. If there are more parameters, the 2nd byte, length of command will be different.
Checksum: The sum of the command is AA+03+12+03=c2 so Checksum is 0xc2

3.1.2 ACK Command is a variable length command containing the acknowledgement and the results returned for the ID command. Similar to ID command, it contains also the length of the results and check bit for verification. The format of ACK Command is shown in the following.

Format	Sync Byte (8 bits)	Length of the command (8 bits)	Return (variable)	Checksum (8 bits)
Example (Request the system clock)	0xaa	0x08	0x07 0xd5 0x04 0x0c 0x11 0x36 0x00 (2005-04-12 11:54:00)	0xe5

If the ID command is received correctly and proceed to action, the module will send 0xaa 30 to acknowledge host. Means the module has received the command, tell host to wait for further ACK command.
There are 3 types of fail message return from the module:

1. If the checksum of the ID command is not received correctly, the module will acknowledge the fail message 0xaa 02 01 ad. Such case, no 0xaa 30 will be sent before the acknowledgement.
2. If the ID command is received correctly but the module cannot execute correctly, it will send 0xaa 30 before the error code 0xaa 02 01 ad
3. If the command is correct but not valid for the operation, it will return mode error 0xaa 50 to acknowledge host. For instance, at playback mode you ask it to do a snap shot, it will return mode error.
4. The worst case, if there is not the correct command format or command not existed, it will **NOT** ack anything.

Note: some commands need to take time for execution, so, need to make sure it is available before sending the other command. Otherwise, it will encounter the machine hang problem. If motion detect ON, need to turn it OFF before sending other command. Otherwise, it will be always activated and not response to other command.

4. Get Data from the Module

Before getting image data from the module, one needs to get the relative file information: the total files and which file want to down load. Then set the desired file to current, get the file information such as file name, size. After that, one can set the packet size and calculate the no of packet to get the data accordingly.
Below is the flow of the operation. Note this operation is valid at playback mode only.

Host	**Module**
Get system file information ➔ 0xaa 02 30 dc	
	←0xaa 30 aa 05 p1p2 p3p4 checksum (p1p2= total no of file, p3p4= no of current file)
Get current file information ➔0xaa 02 31 dd	
	←0xaa 30 aa 12 p1…p17 checksum (p1..p13=file name in ASCII, p14..17=file size)
Set Packet size ➔0xaa 04 35 p1 p2 checksum	
	←0xaa 30 aa 02 00 ac (ack)
Download 1st packet ➔0xaa 04 36 00 00 e4	
	←0xaa 30 aa 00 00 d0…..dn checksum aa (d0..dn=data, aa after checksum is sync bit)
Download 2nd packet ➔0xaa 04 36 00 01 e5	←0xaa 30 aa 00 01 d0…dn checksum aa
Download nth packet ➔0xaa 04 36 nn nn checksum	
	←0xaa 30 aa nn nn d0..dn checksum aa

Detail explanation of command and return from module can be referred to the command list in the following pages.

5. Summary of Commands

System Configurations		
ID in Dec	**ID in Hex**	**Function**
00	00	Get module status
01	01	Set the system clock
02	02	Request the system time
03	03	Select the TV Standard – NTSC/PAL
04	04	Format the storage media
05	05	Motion Detect set – on or off
06	06	MD sensitivity set – HML
07	07	GPIO Input – enable or disable
08	08	GPIO Output – enable or disable
10	0a	Get Version
Operation		
16	10	Set operation mode – preview or playback
17	11	Request current mode
18	12	Channel select – select ch1 to 4
19	13	Manual capture – JPG or AVI
JPG Capture		
32	20	Set the compression ratio - HML
33	21	Set Intervals between MD – 1-99 sec
34	22	Set number of shot per trigger – 1-9
AVI Capture		
37	25	Set the compression ratio of the AVI recorded
38	26	Set the duration of AVI capture – 1-99sec
39	27	Set frame rate : 1-15fps
File Management		
48	30	Get current file information
49	31	Get current file content
50	32	Select a particular file
51	33	Select the Previous / Next file
52	34	Playback the current AVI
53	35	Set packet size
54	36	Download current file from the Module
55	37	Delete file –current or ALL

6. List of Commands

0 – 0x00 – Get status of the module

ID	0x00
Description	Get status of the module
ID Command	0xaa 02 00 ac
Operation Mode	Preview/playback mode
Parameter	n/a
Return from the Module	0xaa 0d p1 p2 p3 p4 p5 p6 p7 p8, p9, p11, p12 checksum P1: motion detect on (1), off(0) P2: MD sensitivity Hi(2), Mid(1), Low(0) P3: GPIO Input on(1), off(0) P4: GPIO Output on(1), off(0) P5: Channel Select:ch1(1), ch2(2), ch3(3), ch4(4) P6: Jpeg Ratio Hi(2), Mid(1), Low(0) P7: Interval P8: Capture Num P9: AVI Ratio Hi(2), Mid(1), Low(0) P10: Frame Rate P11: Duration P12: Set TV standard NTSC(0), PAL(1) 0xaa 01: Failed /

Example,
Get status of the module

Host:
0xaa 02 00 ac
Wait for reply

Module:
0xaa 0d 00 02 01 01 01 00 05 03 01 05 05 01 d3

1 – 0x01 – Set the system clock

ID	0x01
Description	Set the system clock
ID Command	0xaa 09 01 P1 P2 P3 P4 P5 P6 P7 Checksum
Operation Mode	Preview mode
Parameter	P1,P2: Y_3Y_2 Y_1Y_0: Year (in hex) P3: M_1M_0: Month (in hex) P4: D_1D_0: Day (in hex) P5: H_1H_0: Hour (in hex) P6: Mi_1Mi_0: Minutes (in hex) P7: S_1S_0: Second (in hex)
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Set the system clock to 2004/11/19 18:10:00

Host:
0xaa 09 01 07 d4 0b 13 12 0a 00 c9
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

2 – 0x02 – Request the system time

ID	0x02
Description	Request the system time
ID Command	0xaa 02 02 ae
Parameter	n/a
Operation Mode	Preview mode
Return from Module	0xaa 08 P1 P2 P3 P4 P5 P6 P7 Checksum P1 P2: Y_3Y_2 Y_1Y_0: Year (in hex) P3: M_1M_0: Month (in hex) P4: D_1D_0: Day (in hex) P5: H_1H_0: Hour (in hex) P6: Mi_1Mi_0: Minutes (in hex) P7: S_1S_0: Second (in hex) / 0xaa 01 : Failed

Example,
Request the system time

Host:
0xaa 02 02 ae
Wait for Response

Module:
0xaa 30
0xaa 08 07 d5 04 0F 17 1e 05 DB *aa 02 00 ac*
 # Length of the command = 8 bytes;
Return = 0x07d5 (Year: 2005), 0x04 (Month: 04),
0x0f (Day: 15), 0x17 (Hour: 23),
0x1e (Minute: 30); 0x05 (Second: 05)
(2005/04/15 23:30:05);
Checksum= 0xdb

3 –0x03 – Select the TV Standard

ID	0x03
Description	Select the TV Standard Parameter: NTSC / PAL
ID Command	0xaa 03 03 p1 Checksum
Parameter	P1: 0x00: NTSC, 0x01: PAL (Default)
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Select NTSC as the TV standard

Host:
0xaa 03 03 00 b0
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

4 – 0x04 – Format the storage media

ID	0x04
Description	Format the storage media
ID Command	0xaa 02 04 b0
Parameter	n/a
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error / 0x03: External memory card write-protect

Example
Format the external memory

Host:
0xaa 02 04 b0
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

5 – 0x05 – Motion Detect Set

ID	0x05
Description	Enable or disable Motion detect
ID Command	0xaa 03 05 p1 checksum
Parameter	P1: 0x00 –off, 0x01 - on
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Enable the motion detect

Host:
0xaa 03 05 01 b3
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

6- 0x06 – Motion Sensitivity Set

ID	0x06
Description	Set sensitivity for Motion detect
ID Command	0xaa 03 06 p1 checksum
Parameter	P1: 0x00 - low 0x01 – medium 0x02 – high
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Set sensitivity to High

Host:
0xaa 03 06 02 b5
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

7 – 0x07 – GPIO input

ID	0x07
Description	Enable or disable GPIO input
ID Command	0xaa 03 07 p1 checksum
Parameter	P1: 0x00 –off, 0x01 - on
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Enable GPIO input

Host:
0xaa 03 07 01 b5
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

8 – 0x08 – GPIO output

ID	0x08
Description	Enable or disable GPIO output, If the active channel has a motion detected, it will output an active low signal to Alarm Out, user can connect it to trigger external device such as siren. Note, this feature is only active at motion detect on
ID Command	0xaa 03 08 p1 checksum
Parameter	P1: 0x00 –off, 0x01 - on
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Enable GPIO output

Host:
0xaa 03 08 01 b6
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

10 – 0x0a – Get Version

ID	0x0a
Description	Get the firmware version of the module
ID Command	0xaa 02 0a b6
Parameter	n/a
Operation Mode	Preview mode
Return from Module	0xaa 0a p1… p9 checksum(p1…p9 is the version of the module in ASCII)

Example,
Get the version

Host:
0xaa 02 0a b6
Wait for Response

Camera:
0xaa 30
aa 0a 36 38 31 30 20 76 31 30 31 f7
Command Length : 0a
36 38 31 30 20 76 31 30 31 version of the module
f7 checksum

16 – 0x10 – Select the operation mode

ID	0x10
Description	Select the operation mode, preview or playback Note: all system configuration and capture function is operated within preview mode. File management is operated under playback mode. If operate under wrong working mode, it will feed back by mode error.
ID Command	0xaa 03 10 p1 checksum
Parameter	P1: 0x10 – preview 0x11 - playback
Operation Mode	Preview/playback mode
Return from Module	0x00: OK / 0x01: Failed

Example,
Select Playback as the operation mode

Host: *Module:*
0xaa 03 10 11 ce *0xaa 30 aa 02 00 ac;* *OK*
Wait for OK

17 – 0x11 – Request the current operation mode

ID	0x11
Description	Request the current operation mode
ID Command	0xaa 02 11 bd
Parameter	n/a
Operation Mode	Preview/playback mode
Return from Module	0x10 : preview mode / 0x11: playback Mode Follow the status 0x00: OK / 0x01: Failed

Example,
Request the current operation mode

Host: *Module:*
0xaa 02 11 bd *0xaa 30 aa 02 10 bc*
Wait for Response *(10: preview/ 11:playback Mode)*
aa 02 00 ac ;OK

18 – 0x12 – Channel Select

ID	0x12
Description	Set channel # as operation channel
ID Command	0xaa 03 12 p1 checksum
Parameter	P1: 0x01 – ch1 0x02 – ch2 0x03 – ch3 0x04 – ch4
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Set channel to #3

Host:
0xaa 03 12 03 c2
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

19 – 0x13 – Manual Capture

ID	0x13
Description	Snap shot a JPG or Capture AVI as per setting
ID Command	0xaa 03 13 p1 checksum
Parameter	P1: 0x00 – JPG 0x01 – AVI
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Perform a snap shot

Host:
0xaa 03 13 00 c0
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

32 – 0x20 – Set compression ratio for JPG

ID	0x20
Description	Set compression ratio for photos
ID Command	0xaa 03 20 p1 checksum
Parameter	P1: 0x00 – low 0x01 – medium 0x02 – high Note: compression ratio low means better image quality and bigger file size.
Operation Mode	Preview mode
Return from Module	0x00 : ok/ 0x01: failed 0x50: Mode error

Example,
Set compression ratio to High

Host:
0xaa 03 20 02 cf
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

33 – 0x21 – Set interval between MD

ID	0x21
Description	Set interval between triggers by motion detected when MD enabled. It means during this period, the trigger is ignored. Note: this is only effective for the still picture capture, not for video recording.
ID Command	0xaa 03 21 p1 checksum
Parameter	P1: 0xnn nn= 1-99sec in hex
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Set interval to 5 sec

Host:
0xaa 03 21 05 d3
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

34 – 0x22 – Set no of shots per trigger

ID	0x22
Description	Set number of snap shots per trigger when motion detection. It can do multi shots when it is activated by MD.
ID Command	0xaa 03 22 p1 checksum
Parameter	P1: 0xnn nn= 1-9 (default is 1)
Operation Mode	Preview mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Set 5 shots per trigger

Host:
0xaa 03 22 05 d4
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

37 – 0x25 – Set compression ratio for AVI

ID	0x25
Description	Set compression ratio for video clip
ID Command	0xaa 03 25 p1 checksum
Parameter	P1: 0x00 – low 0x01 – medium 0x02 – high Note: compression ratio low means better image quality but bigger file size.
Operation Mode	Preview mode
Return from Module	0x00 : ok/ 0x01: failed 0x50: Mode error

Example,
Set compression ratio to High

Host:
0xaa 03 25 02 d4
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

38 – 0x26 – Set Duration of recording AVI

ID	0x26
Description	Set duration of video clip per trigger.
ID Command	0xaa 03 26 p1 checksum
Parameter	P1: 0xnn nn= 1-99sec in hex
Operation Mode	Preview mode
Return from the Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Set duration to 15 sec

Host:
0xaa 03 26 0f e2
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

39 – 0x27 – Set frame rate of AVI

ID	0x27
Description	Set frame rate of video clip
ID Command	0xaa 03 27 p1 checksum
Parameter	P1: 0xnn nn= 1-15 in hex (default is 5) note: there is the limitation for the frame rate to duration of recording
Operation Mode	Preview mode
Return from the Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Set frame rate to 15fps

Host:
0xaa 03 27 0f e3
Wait for Response

Module:
0xaa 30 aa 02 00 ac ;OK

48 - 0x30 – Request System File information

ID	0x30
Description	Get system file information, which includes total no of files and number of current file
ID Command	0xaa 02 30 checksum
Parameter Command	n/a
Operation Mode	Preview/Playback mode
Return from Module	Preview: 0xaa 03 p1 p2 checksum Playback: 0xaa 05 p1 p2 q1 q2 checksum p1 p2 : total no of file q1 q2 : the number of current file follow with the status: 0x00: OK / 0x01: Failed

Example,
in the playback mode get current files in memory

Host:
0xaa 02 30 dc
Wait for Response

Module:
0xaa 30 aa 05 00 04 00 04 b7
(total file is 4, current fie is 4)
aa 02 00 ac ; OK

49 - 0x31 – Get Current File information

ID	0x31
Description	Get current file information, which includes file's name and file size in of particular file. Note: this command MUST send before Download current file
ID Command	0xaa 02 31 dd
Parameter Command	n/a
Operation Mode	Playback mode
Return from Module	0xaa 12 P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 checksum (P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13:file name in ASCII; P14 P15 P16 P17:file size) Follow the status: 0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Get current files in memory

Host:	*Module:*
0xaa 02 31 dd	*0xaa 30 aa 12 49 4D 47 30 30 30 31 2E 4A 50 47 00 00 00 06 0A AB 24*
Wait for Response	*(49 4D 47 30 30 30 31 2E 4A 50 47 00 00 :file name)*
	(00 06 0A AB: file size395947)
	aa 02 00 ac ; OK

50 – 0x32 – Select a particular file

ID	0x32
Description	Select a particular file as current file
ID Command	0xaa 04 32 p1 p2 checksum
Parameter	P1: higher byte of file no P2: lower byte of file no Note : max no of file is 1024 if SD card is existed
Operation Mode	Playback mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Select the file of that the ID is 01 (1st file)

Host:	*Module:*
0xaa 04 32 00 01 e1	*0xaa 30 aa 02 00 ac ;OK*
Wait for OK	

51 – 0x33 – Select the Previous / Next file

ID	0x33
Description	Select the Previous / Next file
ID Command	0xaa 03 33 p1 checksum
Parameter	P1: 0x00: Previous, 0x01: Next
Operation Mode	Playback mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example
Select the next file

Host:	*Module:*
0xaa 03 33 01 e1	*0xaa 30 aa 02 00 ac ;OK*
Wait for OK	

52 – 0x34 – Playback the current AVI

ID	0x34
Description	Playback the current AVI, if current file is AVI
ID Command	0xaa 02 34 e0
Parameter	n/a
Operation Mode	Playback mode and the current file is AVI
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error /

Example,
Play the current AVI

Host:
0xaa 02 34 e0
Wait for OK

Module:
0xaa 30 aa 02 00 ac ;OK

53 – 0x35 – Set the packet size

ID	0x35
Description	Set the packet size before Download current file. It can be any size, but note the connection should be affordable, if the size is too big.
ID Command	0xaa 04 35 p1 p2 checksum
Parameter	p1p2: packet size
Operation Mode	Playback mode
Return from Module	0x00: OK / 0x01: Failed / 0x50: Mode error

Example,
Set packet size :61000

Host:
0xaa 04 35 ee 48 19
Wait for OK

0xaa 30 aa 02 00 ac ;OK

54 – 0x36 – Download Current File

ID	0x36
Description	Down load current file.
ID Command	0xaa 04 36 p1 p2 checksum
Parameter	p1p2 : package number
Operation Mode	Playback mode
Return from Module	0xaa p1 p2 d0…dn checksum(16bit), 0xaa p1p2 packet number, d0…dn is image data. Note there is the sync byte 0xaa follow the checksum, to indicate the end of data return. Also note that d0..dn is one packet data, equal to the packet size set in 0x35 0x01: Failed / 0x50: Mode error /

Example,
Download first packet of current file

Download package 1

Host:
0xaa 04 36 00 00 e4
Wait for OK

Module:
0xaa 30 aa 00 00 ff d8……20 43 4f 2e aa
(note last aa is the sync byte)

55 – 0x37 – Delete file

ID	0x37
Description	Delete file(s)
ID Command	0xaa 03 37 p1 df
Parameter	P1: 0x00 current file 0x01 all files
Operation Mode	Playback mode
Return from the Module	0xaa 05 p1 p2 q1 q2 checksum (p1 p2:the current file's number; q1 q2:the total file's number) Follow the status: 0x00: OK / 0x01: Failed / 0x50: Mode error

Example,
Delete all files

Host:
0xaa 03 37 01 e5
Wait for OK

Module:
0xaa 30 aa 05 00 00 00 00 b1
(00 00,the current file's number)
(00 00,the total file number)
aa 02 00 ac ; OK

Appendix: ASCII code table

Dec	Hex	Character	062	03E	>	093	05D	]
032	020	SP	063	03F	?	094	05E	^
033	021	!	064	040	@	095	05F	_
034	022	"	065	041	A	096	060	`
035	023	#	066	042	B	097	061	a
036	024	$	067	043	C	098	062	b
037	025	%	068	044	D	099	063	c
038	026	&	069	045	E	100	064	d
039	027	'	070	046	F	101	065	e
040	028	(	071	047	G	102	066	f
041	029	)	072	048	H	103	067	g
042	02A	*	073	049	I	104	068	h
043	02B	+	074	04A	J	105	069	i
044	02C	,	075	04B	K	106	06A	j
045	02D	-	076	04C	L	107	06B	k
046	02E	.	077	04D	M	108	06C	l
047	02F	/	078	04E	N	109	06D	m
048	030	0	079	04F	O	110	06E	n
049	031	1	080	050	P	111	06F	o
050	032	2	081	051	Q	112	070	p
051	033	3	082	052	R	113	071	q
052	034	4	083	053	S	114	072	r
053	035	5	084	054	T	115	073	s
054	036	6	085	055	U	116	074	t
055	037	7	086	056	V	117	075	u
056	038	8	087	057	W	118	076	v
057	039	9	088	058	X	119	077	w
058	03A	:	089	059	Y	120	078	x
059	03B	;	090	05A	Z	121	079	y
060	03C	<	091	05B	[	122	07A	z
061	03D	=	092	05C	\			

Document Change Log

1. first released on June 5th 2007.
2. V2.0 released on July 3 2007.
   2.1 change data download method, add packet size
   2.2 add get module status
   2.3 add operation mode to the command description
   2.4 add ASCII code table
3. V2.01 released on July 13 2007
   3.1 Add note for some commands