T2-1000AC Controller instructions V3.0

一、 **Features and advantages**

✓   2-channel output, each channel carries 1024 points, and the maximum load of a single controller is 2048 points.

✓   It supports high voltage, cascade and two mixed synchronous modes, and can carry 512 and TTL lamps.

✓   When the SD card is not inserted, the built-in effects are played. There are 98 kinds of built-in effects, and the functions of full broadcast, unicast and anycast are supported.

✓   When inserting the SD card, play the effect files in the SD card. The SD card can store up to 32 effect files. Each effect file can contain up to 100 programs, and the total number of programs does not exceed 100. The programs support full broadcast and unicast functions, and the SD card capacity supports 128mb-8gb.

✓   It can be equipped with our "gps-sync synchronization controller" for cluster synchronization.

✓   The LED digital tube is used to display the controller information, which is resistant to low temperature and is not affected by ambient temperature.

✓ The controller provides 5 entity keys for setting various parameters, which is simple and reliable.

✓ The fully enclosed aluminum shell is lighter than the old one, and is especially suitable for outdoor engineering construction.

✓ AC 220V power supply, with a 2-pin plug, makes the test and construction extremely convenient.

✓ Each controller is presented with a 2-inch slotted screwdriver, which completely solves the trouble of finding suitable tools during wiring.

二、 **Controller parameters**

2.1、 **Component description**

① Led nixie tube

② Entity key

③ The upper green is the operation indicator light, which flashes when the controller works; When the power is on, the red indicator light is below.

④ SD card slot

⑤ The left two bits are synchronous input ports; The two bits on the right are synchronous output ports.

⑥ 2-channel output port

⑦ AC 220V power line, 50cm long, with a 2-pin plug.

⑧ Power switch

2.2、Controller parameters

Working voltage：AC220V 50Hz

Rated power：<1W

Weight：1.1KG

Product size：160mm x120mm x 55mm

Enclosure type：Fully enclosed rainproof aluminum shell

Output port：2-way TTL output port (supporting DMX512 lamps)

Number of loaded lamps：1024 lights / way, 2 ways, 2048 lights in total

SD card type：SDHC

SD card capacity：128MB-8GB

Effect file format：FAT32

Effect file type：*.LED

三、Wiring diagram

The controller can be used by a single machine or multiple machines. When a single machine is used, it only needs to supply power to the controller and connect lamps.

The use of multiple machines means that two or more controllers work synchronously, and the controllers are required to work in step. T2-1000ac supports three synchronization modes: simple high-voltage synchronization, highly reliable cascade synchronization, and GPS / BD distributed synchronization. It also supports the mixed use of three synchronization modes. The installation and connection of the controller are different due to different synchronization modes, which are introduced below.

The controller comes with built-in effect. When the card is not inserted, the effect file in the SD card will be played automatically when the SD card is inserted and then turned on. When a single machine is used, you can freely choose which effect to play, but when multiple machines are used, all controllers involved in synchronization must choose the same, either all the built-in effects or all the SD card effects. When the SD card is exported from the same project, the effect must be the same as that of the SD card. Failure to do so will result in synchronization failure.

T2-1000ac supports lamps with various TTL signals, such as through-hole lamps, point light sources, line lamps, lamp strips, and DMX512 lamps. Whether to support specific lamps, please ask the lamp manufacturer for lamp parameters and ask our business personnel or agents.

3.1、All adopt high voltage synchronization

When all high-voltage synchronization is adopted, all controllers must be connected to the same pair of 220V AC lines, or ensure that all controllers are powered on at the same time. High voltage synchronous construction is convenient and easy to operate, but limited by the synchronization principle, it is easy to be disturbed, resulting in synchronization failure. The following figure is the schematic diagram of high voltage synchronous wiring.
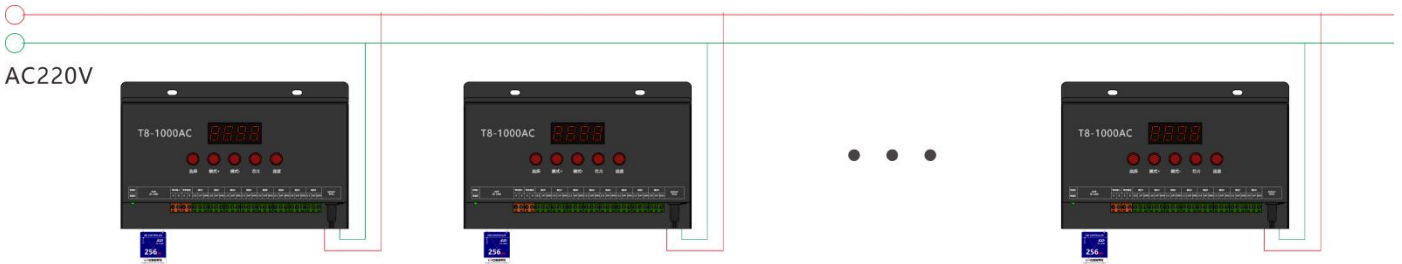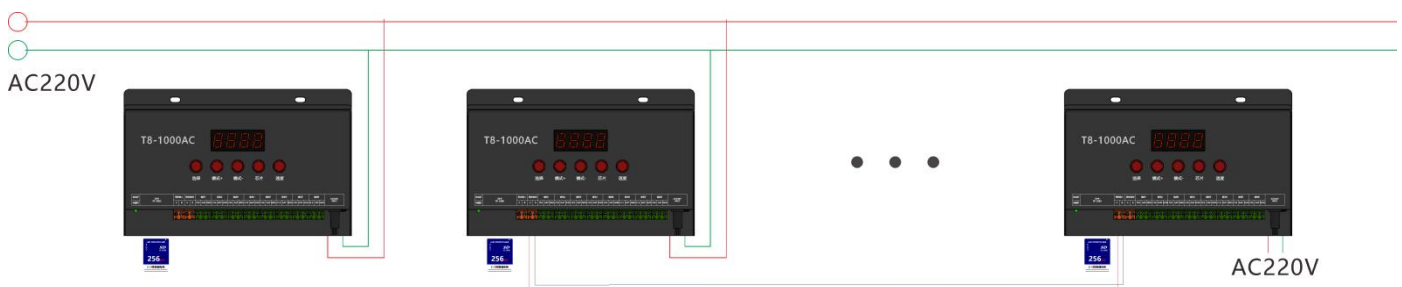
3.2、All adopt cascade synchronization

When cascade synchronization is adopted, the controller power supply does not need to be connected together or powered on at the same time, but the synchronization line needs to be connected. It is recommended to use shielded pure copper twisted pair (such as network cable) for the synchronization line. The connection mode of the synchronization line is: connect the synchronization output port of the controller 1 to the synchronization input port of the controller 2, and the synchronization output port of the controller 2 to the synchronization output port of the controller 3, Connect to the synchronization input port of the last controller in turn, and a is connected to a and B is connected to B, as shown in the figure below.

After the synchronization line is correctly connected, the nixie tube of controller 1 displays p-0.0 (display f-0.0 when playing the built-in effect.), The decimal point is displayed after the number, indicating that it is the host. The nixie tube of all other controllers displays p-00 (f-00 is displayed when playing the built-in effect). The decimal point is not displayed after the number, indicating that it is the slave. At this time, if the input lines of the two controllers are not synchronized, it means that the two controllers need to be connected synchronously.

3.3、High voltage synchronization and cascade synchronization are mixed

When the cascade controller is not synchronized with the field controller, the problem can be solved by using any of the two methods, that is, when the cascade controller is not synchronized with the field controller. The following figure is the schematic diagram of hybrid synchronous wiring.

During hybrid synchronization, all controllers using high-voltage synchronization comply with the requirements of

high-voltage synchronization, and they are all hosts; All controllers using cascade synchronization meet the requirements of cascade synchronization, and they are slaves.

3.4、GPS / BD synchronization and cascade synchronization are mixed

When GPS / BD synchronization is used, cascade synchronization must be adopted between controllers. After being connected to multiple remote / near GPS controllers, large-scale synchronization can be realized without any connection between multiple remote / near GPS controllers. The wiring mode is shown in the figure below:

四、Nixie tube display meaning

Display content	Meaning
P-00	SD card effect
F-00	Built in effect
1903	Chip model
L-00	Playback speed
AH.00	Extension address
A.001	Address at the beginning of code writing: indicates the number of lights to write code from
AL.01	Write address offset
AP.01	Field mode: AP01 = 1 field; AP02 = 2 field; AP03 = 3 field; AP04 = 4 field
AE.00	RGBW order

AF.01	Test effect
- - - -	Select key operation type
V3.0	Controller firmware version
E-01	Error message

五、 **Operating instructions**

5.1、 **Power on status**

After the controller is powered on, it displays: version number - > chip type - > playback speed - > playback content, as shown in the following figure:

1、 Controller version number: the version will be upgraded if the controller changes the problem or updates the function. Users can query the function and status of the controller according to the version number.

2、 Chip type: refers to the chip model used for the effect to be played, which must be consistent with the lamp.

3、 Playback speed: refers to the speed to be played. The higher the value, the faster the speed.

4、 or Playback content: f-0.0 Indicates the built-in effect of playback; P-0.0. Indicates playing SD effect.

5.2、 **Play SD card effect**

To play the SD card effect, you must first insert the SD card and then power on to make the controller enter the card reading mode. Inserting or pulling out the SD card halfway will cause card reading failure, and then the SD card effect cannot be played.

When playing the SD card effect, the controller first sorts all programs contained in all files in the SD card, and then plays them in order. The sorting rule is based on the copy order of files and program serial number.

The key functions when playing SD card effect are as follows:

1、 The "select" key is used to test the function. After pressing, the nixie tube displays af.01 and the value part flashes, and the controller starts playing the first test effect. After that, press once to switch one test effect. After switching to af.08, press again to return to af.01. If there is no new key operation, the controller will always play the current test effect. If you need to exit the test state, you can press any other key or restart the controller. There are 8 kinds of test

effects, as shown in the table below:

Sequencing effect table			
Display content	Effect description	Display content	Effect description
AF.01	All black	AF.02	All white
AF.03	Black and white gradient	AF.04	All red
AF.05	All green	AF.06	All blue
AF.07	Red, Green and Blue jump	AF.08	Brush red, green, blue, white and black

2、"Mode +" and "mode -" keys are used to switch programs. After pressing, the nixie tube displays p-00 (the specific value is determined by the last set value) and the value part twinkle. The numerical value represents the program serial number. Each time you click to switch a program, the "mode +" key switches forward and returns to the first one after switching to the last one. The "mode -" key switches backward and jumps to the last one after switching to the first one.

P-00 means to play all programs in a loop, and others mean to play only the current program. The software can set the number of program playback. For example, the number of program 1 playback is set to 5. During full broadcast, program 1 is played 5 times and then program 2 is played. When the controller is in the program setting state, if there is no key operation within 30s, it will automatically return to the normal playing state.

3、The "chip" key can only view the chip type and cannot be set. After pressing, the nixie tube displays the chip type, which is shown in the following table:

Chip type table			
Display content	Chip name	Display content	Chip name
6703	SM16703	1914	TM1914
1903	UCS1903	8206	GS8206
9883	P9883	2811	WS2811
2818	WS2818	1814	TM1814
6704	SM16704	1916	1916
512H	DMX512-500K	512L	DMX512-250K
512A	DMX512-750K		

4、The "speed" key is used to adjust the playback speed. After pressing, the nixie tube displays l-00 (the specific value is determined by the last set value) and the value part flashes. The value indicates the speed level. The higher the value, the faster the speed. Switch to a speed level with each click, and return to l-00 after switching to L-16. When playing SD card effect, l-00 indicates to use the speed set in SD card. The relationship between speed and frame rate is as follows:

Speed and frame rate correspondence table			
Display content	Frame rate	Display content	Frame rate
L-00	SD card frame rate or 25 frames / sec	L-01	5 fps
L-02	6 fps	L-03	7 fps

L-04	8 fps	L-05	9 fps
L-06	10 fps	L-07	12 fps
L-08	14 fps	L-09	16 fps
L-10	18 fps	L-11	20 fps
L-12	21 fps	L-13	22 fps
L-14	23 fps	L-15	24 fps
L-16	25 fps		

5.3、Play built-in effects

To play the built-in effect, you must not insert the SD card, and then power on. Inserting an SD card halfway does not affect the built-in playback effect.

The controller has 98 built-in effects, and each effect is no less than 360 frames. The playback duration is calculated according to the set frame rate (playback speed). The calculation formula is: playback duration (unit: Second) = number of frames / frame rate. The built-in effect supports the functions of full broadcast, unicast and anycast: the nixie tube displays f-00 for full broadcast, which is played circularly in the order of F-01 to F-98; The nixie tube displays F-01 to F-98, indicating unicast, cyclic playback and single effect; The nixie tube displays f-99, indicating anycast. The built-in effect is suitable for line application scenarios, such as building outline and so on.

The key functions when playing SD card effect are as follows:

1、"Select" key is used for Anycast setting: when the nixie tube displays any value from F-01 to F-98 and the value part flashes, press this key, and the two points behind the value are not displayed, indicating that the current effect is not selected; Press the button again, and the two points behind the value will resume to display, indicating that the current effect is selected. When the nixie tube displays f-99, only the effect with points after the value is played.

2、he "mode +" and "mode -" keys are used to switch built-in effects. After pressing, the nixie tube displays f-00 (the specific value is determined by the last set value) and the value part flashes. The numerical value represents the serial number of built-in effects. Each click switches one built-in effect. The "mode +" key switches forward and returns to the first one after switching to the last one. The "mode -" key switches backward and jumps to the last one after switching to the first one. The built-in effect is shown in the following table:

ID	Effect	ID	Effect
F-00	Loop play	F-50	Two way 6 color trailing
F-01	All red	F-51	Backward wave interval 2 white dot running
F-02	All green	F-52	Run at two o'clock on purple, yellow and green
F-03	All blue	F-53	Two way 7-color gradient running

F-04	All yellow	F-54	Backward 6-color line segment interval running
F-05	Quan Qing	F-55	7 color jump
F-06	All purple	F-56	Back to the coloring, run at 1 points.
F-07	All white	F-57	Backward combination of line segments and white line running
F-08	Two way 6 color gradual trailing	F-58	Red wave running
F-09	First 6 colors black interval running	F-59	Green wave
F-10	7 color gradient	F-60	Blue wave
F-11	Forward 3 colors running at 1 points.	F-61	Yellow wave
F-12	Forward combination color line segment interval white line segment running	F-62	Cyan wave
F-13	Red tail	F-63	Purple wave
F-14	Green tail	F-64	White wave
F-15	Blue tail	F-65	Brush back in 7 colors
F-16	Yellow tail	F-66	Run back at 1:00 in 6 colors
F-17	Cyan tail	F-67	Forward 6 color line segment white interval running
F-18	Purple tail	F-68	Trailing white interval 2
F-19	White tail	F-69	Forward red and green tail
F-20	Brush 7 colors forward	F-70	Forward green blue 2 color trailing
F-21	Backward 3 colors running at 1 points.	F-71	Forward red and blue tail
F-22	Backward 3 colors running at 1 points.	F-72	Two way 6 color interval 2 white dot trailing
F-23	Forward coloring interval 2 white dot trailing	F-73	Forward yellow and purple, running 2 points each.
F-24	Run forward in red and green waves	F-74	Forward 3-color wave run
F-25	Run forward in green and blue waves	F-75	Backward 3-color wave run
F-26	Run forward in red and blue waves	F-76	Backward 6 color gradual trailing
F-27	Bidirectional 6-color interval 2 white dot trailing	F-77	Forward color combination tail
F-28	Forward red, green and blue, running 2 points each.	F-78	Backward composite color trailing
F-29	Forward red, green and blue 3-color tail	F-79	Forward 7-color wave run
F-30	Forward red, green and blue 3-color tail	F-80	Backward 7-color wave run
F-31	Forward 6-color gradient trailing	F-81	Backward 3 color interval 2 white dot trailing
F-32	Forward combo wave run	F-82	Run forward at 2 o'clock on blue, red and green
F-33	Backward combination color wave	F-83	Forward blue wave interval 2 Green Point running
F-34	Forward 7 color tail	F-84	Backward 6-color white tail

F-35	Backward 7-color tail	F-85	Forward 3 colors wave interval 2 white spots running
F-36	Forward 3-color interval 2 white dot trailing	F-86	Run forward with 2 blue dots between the red waves
F-37	Forward 6 colors running at 1 points.	F-87	Run forward with blue waves and 2 green dots apart
F-38	Run forward with green waves and 2 red dots apart	F-88	Run forward by 1 point in each combination color
F-39	Forward 6-color white tail	F-89	Forward 3 color line segment interval white line running
F-40	Backward 3 color wave interval 2 white spots running	F-90	7 color gradient running forward
F-41	Run forward with 2 green dots between the red waves	F-91	Backward 6-color white head tail
F-42	Run forward with blue waves and 2 red dots apart	F-92	Forward 6 color line segment without gap running
F-43	Run forward with blue waves and 2 yellow dots apart	F-93	Backward white line interval running
F-44	Run forward at 2 o'clock on green, red and blue	F-94	Two way 6-color wave running
F-45	Backward 7-color gradient running	F-95	Forward combined color wave interval 2 white spots running
F-46	Backward 3 color interval white line running	F-96	2 points running forward, yellow and purple.
F-47	Forward 6-color white head tail	F-97	Purple green wave interval 2
F-48	Backward 6-color segment running without interval	F-98	Forward red wave interval 2 Green Point running
F-49	Run forward at intervals of white line segments	F-99	Play the selected effect

3、The "chip" key is used to set the chip type. Each click switches a chip type, and the controller plays according to the newly set value. See chip type table in Section 5.2 for chip type.

4、The "speed" key is used to adjust the playback speed. The operation mode is the same as when playing SD card effect, except that l-00 represents 25 frames / second when playing built-in effect.

5.4、Advanced settings

How to enter the advanced setting: the controller is turned on → unplug the SD card → press and hold the "select" key and don't release it → the nixie tube displays "-" (4 horizontal lines) → press the "speed" key again → the nixie tube displays "ae.00". At this time, the controller enters the advanced setting state.

The advanced setting has four setting items: RGB sequence, extension address, test function and high-voltage synchronous switch. The following are introduced respectively.

1、Enter the advanced setting state for the first time or press the "select" key, and the nixie tube

displays AE 00 indicates that RGBW order is being set. After that, each time you press the "select" key to switch one RGBW sequence value, long press the "select" key to switch directly to the last one. The RGBW sequence set here is only applicable to the built-in effect, and the RGBW sequence of SD card effect is set in the upper computer software. The meaning of setting RGBW order is to sort the four colors of red, green, blue and white. By default, the controller is in the order of red, green, blue and white. However, the order in which different chips and lamps receive the four colors is inconsistent, so they must be adjusted to be consistent in order to display the colors correctly. The RGBW sequence values are shown in the following table (the last value represents the RGB sequence, and the penultimate value represents the position of W):

RGBW sequence table			
Display content	RGBW order	Display content	RGBW order
AE.00	RGBW	AE.10	RGWB
AE.01	GRBW	AE.11	GRWB
AE.02	RBGW	AE.12	RBWG
AE.03	GBRW	AE.13	GBWR
AE.04	BRGW	AE.14	BRWG
AE.05	BGRW	AE.15	BGWR
AE.20	RWGB	AE.30	WRGB
AE.21	GWRB	AE.31	WGRB
AE.22	RWBG	AE.32	WRBG
AE.23	GWBR	AE.33	WGBR
AE.24	BWRG	AE.34	WBRG
AE.25	BWGR	AE.35	WBGR

   2、Press the "mode +" key, and the nixie tube displays ah 01 indicates that the controller extension address is being set. Extension address value range ah 01-AH. 99, up to 99 extensions. T2-1000ac extension address is mainly used to communicate with the third party. The host selects which controller to send data to. Each time you press the "mode +" key, the extension address will be + 1. Long press the "mode +" key, and the extension address will be set to the maximum value ah 99。

   3、Press the "mode -" key, and the nixie tube displays af.01, indicating that the test function is being executed. The test function is the same as that described in the "select" key of playing SD card effect in Section 5.2.

   4、Press the "chip" key, and the nixie tube displays A0 00 indicates that high voltage synchronization is enabled, and then press the "chip" key, and the nixie tube displays A0 01 indicates that high voltage

synchronization is disabled. After the high-voltage synchronization is enabled, the controller will play

a frame effect only after receiving the high-voltage synchronization signal. If the signal is not received,

the controller will constantly detect the signal without playing any effect. In order to avoid the

phenomenon that the signal cannot be received due to the failure of the signal detection circuit or other

reasons, resulting in the false crash of the controller, the high-voltage synchronization function can

be turned off here.

5、Press the "speed" key to exit the advanced setting.

5.5、**Write code using controller**

Enter the method of using the controller to write code: the controller is turned on → unplug the SD card → press

and hold the "select" key without loosening → the nixie tube displays (4 horizontal lines) → press the "chip" key again

→ the nixie tube displays the DMX512 chip model. At this time, the controller enters the DMX512 write code state.

The controller can only write equidistant addresses. There are four setting parameters: field mode

(AP. 01), address offset (al. 01), write header address (a000) and DMX512 chip class. If you need to

write chip parameters or more flexible and complex addresses, please edit the code writing file in the

software of full color controller software editing system for code writing operation.

1、When entering the DMX512 code writing state for the first time or pressing the "chip" key, the

nixie tube displays the DMX512 chip model and flashes, indicating that the chip type is being set. After

that, press the "chip" key every time to switch a chip model, and long press the "chip" key to switch

to the last one. The DMX512 chip models supported by the controller are shown in the table below:

DMX512 chip type table			
Display content	Chip name	Display content	Chip name
512b	UCS512A、UCS512B	512C	UCS512CN、TM512AC
12C4	UCS512C4	512d	UCS512D、TM512AD
512E	UCS512E	6512	SM16512、SM16511
6522	SM16522	7500	SM17500
7512	SM17512	8522	SM18522
8512	GS8512		

2、Press the "select" key, and the nixie tube displays AP 01 and the digital part flashes, and the

controller enters the setting field mode state. After that, press the "select" key once to switch to

one field mode, and long press the "select" key to switch to the last one. A lamp needs several bytes

of data, which is several fields. For example, only one color needs one byte of data, which is 1 field,

and two colors need two bytes of data, which is 2 field. The nixie tube displays ap01 for 1 field, ap02 for 2 field, ap03 for 3 field and ap04 for 4 field.

3、Press the "mode +" key, the nixie tube displays al.01 and the digital part flashes, and the controller enters the state of setting address offset. After that, each time you press the "mode +" key, the address offset is + 1, and long press the "mode +" key to set the maximum address offset al.99. Address offset refers to the difference of several fields between two adjacent lamps. For example, in the 3-field mode, the address offset is set to 5. If the address of the first lamp is 0, the address of the second lamp is 15.

4、Press the "mode -" key, the nixie tube displays a.000 and the digital part flashes, and the controller enters the state of setting the first address of the code. After that, each time you press the "mode -" key to write the first address + 1, and long press the "mode -" key to write the first address, set the maximum value of a.999. The first address of code writing refers to the address of the first chip connected to the controller. The default is 0, and the maximum is 999. If the address exceeds 999, you need to edit the code writing file and write the code with software. You can write the single lamp address by writing the first address of the code, or continue to write the code from the place where the code fails.

5、When the nixie tube displays the DMX512 chip model and flashes, press the "speed" key, and the controller starts to write the code according to the set parameters. During the code writing process, the nixie tube displays the rotating screen. After the code writing, the nixie tube displays the DMX512 chip model and is always on (not flashing). At this time, press the "chip" key again. When the nixie tube displays the chip type and flashes, you can write the code again.

5.6、Write code using software

1、 Software operation: open the full color controller software → select the "edit (E)" menu → select the "DMX code writing file production" menu item → open the "DMX512 code writing file generation tool", as shown below.
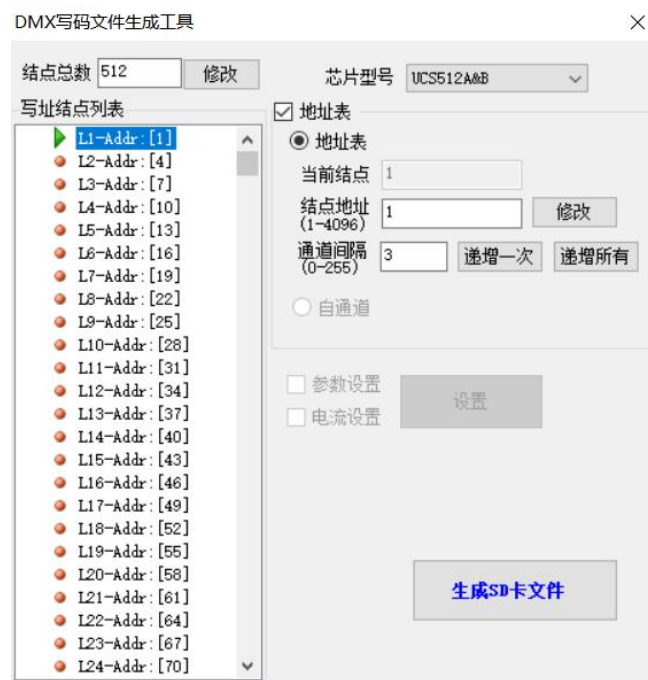
The left side of the "DMX512 code writing file generation tool" window is the node information, and a node represents a DMX512 chip. The number of nodes can be set through the input box after "total number of nodes". After setting, the "node list" will be refreshed automatically, and "[]" is the address of each node. The number of nodes shall be consistent with the number of DMX512 chips actually used.

The right side of the window is the parameter setting area. Select the chip through the "chip type" drop-down box. Different chips support different functions. See the following table for details:

Functions supported by DMX512 chip				
Chip name	Conventional code writing	Self channel code writing	Write parameters	Write current
UCS512A、UCS512B	√			
UCS512CN、TM512AC	√		√	
UCS512C4	√		√	
UCS512D、TM512AD	√	√		
UCS512E	√	√	√	√
SM16511、SM16512	√			
SM16522	√			
SM17500	√	√	√	√
SM17512	√	√	√	√
SM18522	√	√	√	√
GS8512	√	√	√	√

（1）、Conventional code writing is to write the address of each DMX512 chip in turn, which is the basic function of DMX512 chip.

2、One click code writing operation: copy the "dmxset. Led" code writing file into the SD card, and insert the SD card into the SD card slot of the controller. Power on the controller again, and the nixie tube displays in turn: version number → DMX512 chip type → playback speed → DMX512 chip type. The chip type displayed by the nixie tube is the chip type set in the "dmxset. Led" code writing file, indicating that this type of chip is written.

When the nixie tube displays the DMX512 chip type and flashes, press the "speed" key, the controller starts the code writing operation, and the nixie tube displays the rotation effect. During code writing, the nixie tube always displays rotation until the end of code writing. The nixie tube displays the chip type and constant (not flashing).

When the nixie tube displays the DMX512 chip type and constant (without flashing), press any key other than the "write code" key, and the nixie tube displays the chip type and flashes. At this time, press the "speed" key to write the code again.

六、 Points for attention

1、Before copying the file to the SD card, the SD card must be formatted. It needs to be formatted before each copy. Format parameters: file system = FAT32, allocation unit size = default configuration size, or directly click "restore device default value (d)".

2、The SD card cannot be hot unplugged. You must first disconnect the power supply of the controller and then unplug the SD card.

3、The controller is rainproof and not waterproof. Please install it vertically.