

Contents

1	overview	2
2	functional requirements.....	2
2.1	The working principle of the rotating advertising screen	Error! Bookmark not defined.
2.2	Hanging full-color screen for ads.....	Error! Bookmark not defined.
2.3	Editing software	Error! Bookmark not defined.
3	The performance requirements.....	Error! Bookmark not defined.
3.1	Work environment requirements	Error! Bookmark not defined.
3.2	Store environmental requirements	Error! Bookmark not defined.
3.3	Protection grade.....	Error! Bookmark not defined.
3.4	Salt spray test	Error! Bookmark not defined.
3.5	EMC requirements	8
3.6	Environmental testing requirements.....	Error! Bookmark not defined.
3.7	Size	Error! Bookmark not defined.
4	Advantages comparison.....	Error! Bookmark not defined.
4.1	Price comparison	Error! Bookmark not defined.
4.2	performance comparison.....	Error! Bookmark not defined.

Dot-matrix full-color array rotating advertising screen specifications

1 overview

This screen can display the 128*128 (192*192) dot matrix picture or video via rotate the LED light bar, be available for advertising etc.

This screen can be supply by AC 220V or DC 24V, inside use high-power non-contact wireless power supply module driver. The advertisement material can be edit by upper computer software and send to the data storage unit which inside the screen via SD card or wireless way, come true real time material upgrade.

rotating advertising screen schematic diagram as figure 1



Figure 1 rotating advertising screen schematic diagram

The advertising screen has two versions, unilateral and trilateral, unilateral has one LED light bar, and trilateral has three LED light bars. unilateral and trilateral LED bars as figure 2 and figure 3 shows.



Figure 2 unilateral rotating advertising screen external view

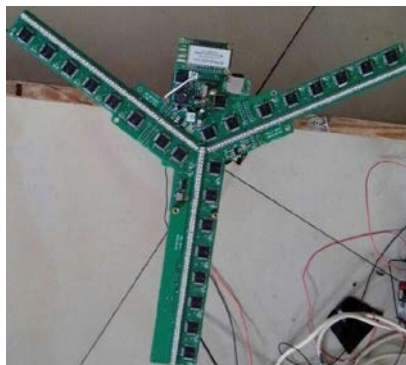


Figure 3 trilateral rotating advertising screen external view

2 functional requirements

rotating advertising screen schematic diagram block diagram as figure 4

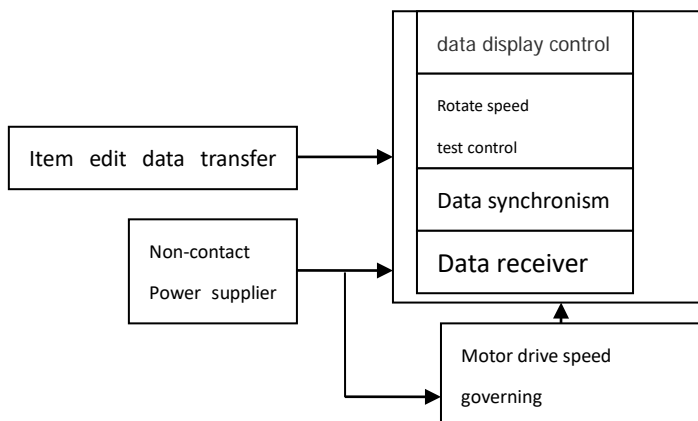


Figure 4 rotating advertising screen schematic diagram block diagram

2.1 The working principle of the rotating advertising screen

2.1.1 The picture display

Every frames picture be break up into ray data(LED light bar data), break up way: use the center of the picture as center of the circle, Radius is half length picture, North as the starting line, each 2.5 degree take a ray data, then one picture will be obtained 144 ray data, Each frame size for the time being as 128 x 128 pixel, then each ray data is 64 pixel color data. In order to better display color effect, each Pixel Dot color RGB channel are 256 class manage, then the pixel has $2^5 \times 2^6 \times 2^5 = 65536$ different color. 16 bit color occupy 2 byte, the red, green and blue according to the following definitions RRRRRGGGGGBBBBB(565), that means each dot use two byte corresponding one color value. Each ray corresponding data is : from center to outskirts total has 64 dots, each dot RGB channel hold 2 bytes, each ray data is 128 bytes, all picture has 144 ray, total has data $144 \times 128 = 18432$ bytes.

Test use picture 00.bmp, the resolve result schematic diagram as figure 5 show

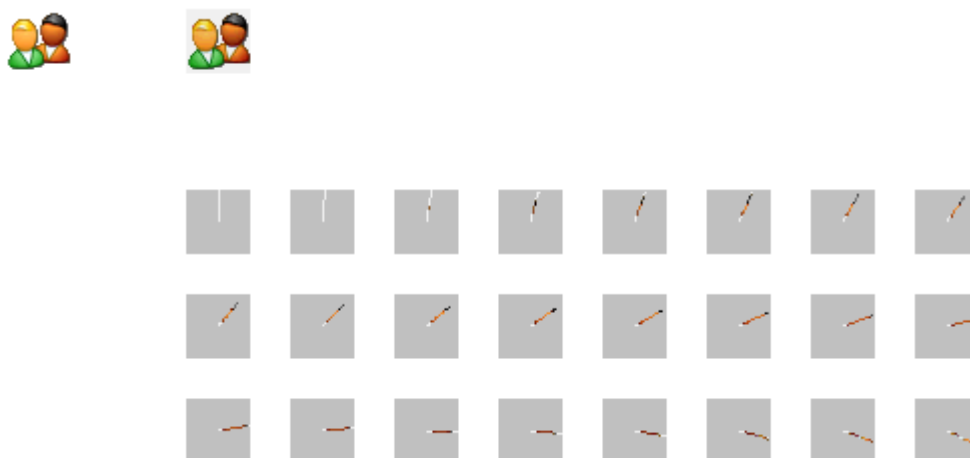


Figure 5 picture breakdown result schematic diagram

2.1.2 Graphic display

rotating advertising screen can display roundness 128*128 (192*192) lattice graph, rotating LED according to 120 degree configuration 3 LED light bars, each light bar has 64 (96) pcs three-color LED chips. Normal a graph according to center of polar coordinates configuration, and according to 2.5 degree interval, each pixel dot according to 16 bit get color, when display the graph, high-speed rotating LED light bar detected the initial position, then start according to in advance measured light bar rotating speed real time send each graph data to LED via the controller for display, if the rotating light bar rotating speed has change, the software can adaptive control the LED display time for ensure the display frame stabilization. rotating advertising screen **graphic display** schematic diagram as figure 6.



Figure 6 rotating advertising screen **graphic display** schematic diagram

2.1.3 Video display

rotating advertising screen as well can display dynamic video, the theory same as image display, the different is the dynamic video is a series metabolic graph, the SD card stored a series graph data follow, when display video, the controller need read the video frame number in advance, then control the data follow in specific time for change the graph, then the audience can see a dynamic video.

rotating advertising screen **graphic display** schematic diagram as figure 6

2.1.4 Item dispose

rotating advertising screen supply a powerful software for program to customer, the customer can do as their wish for arrange and amend their advertisement program, and can download to the advertisement place simple and easily, for some hang on high place advertisement screen, rotating advertising screen support wireless data transmission, this make change the advertisement program be more simple and efficient. rotating advertising screen item edit software interface schematic diagram as figure 7

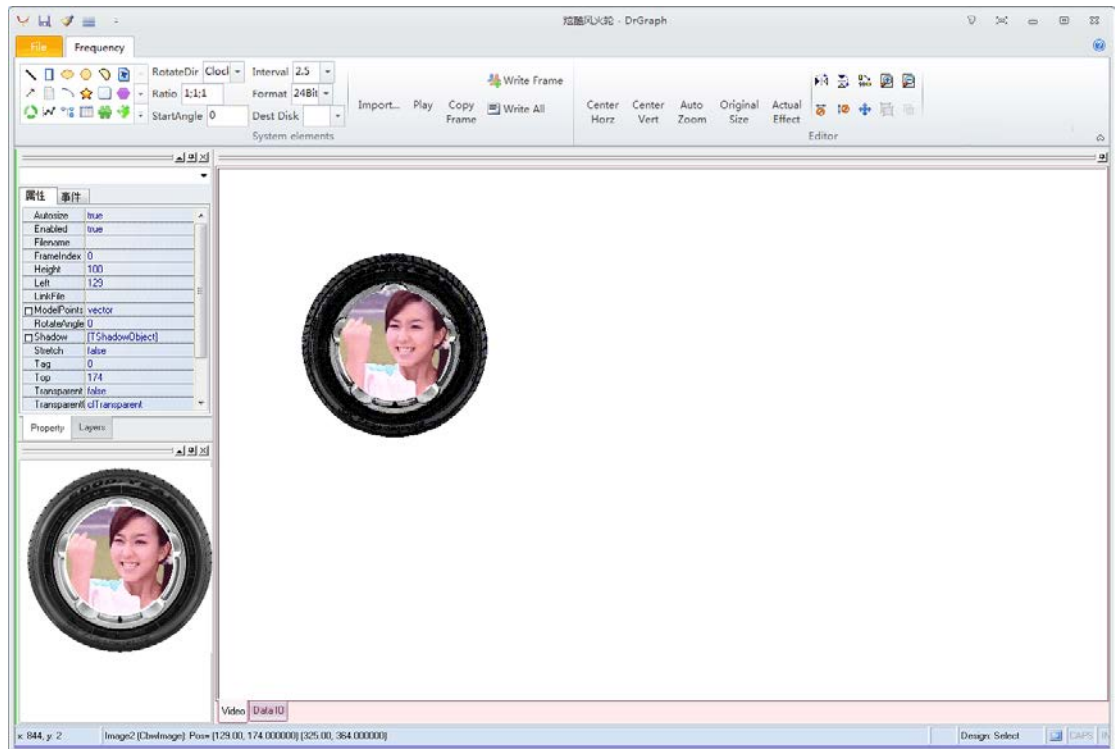


Figure 7 rotating advertising screen item edit software interface schematic diagram

2.1.5 Data storage

Graphic and video data saved in SD card, the data memory capacity in SD card calculate as follows.

Each ray (LED light bar) has 64 chips, RGB component hold 2 bytes, total hold 128 bytes, each section 1024 bytes, each frame picture has 144 rays, hold 18432 bytes, will hold 36 sections, total 18KB, each second(20 frame) will hold 720 sections, total 360KB. Each minute hold $60 \times 360\text{KB} = 21.6 \text{ MB}$, each hour hold $60 \times 21.6\text{MB} = 1296\text{MB}$.

2.2 Hanging full-color screen for ads

Hanging full-color screen structure diagram as figure 8 show

display resolution: size 1 (128*128 dot-matrix) size 2 (192*192 dot-matrix)

display density: 15200p/m²

rated input voltage: AC110V/220V or DC 24V

wireless power supplier : 30W

Max Current Consumption: size 1 ~220V/0.15A, size 2~220V/0.20A

Rated power cost: 20W, 24W

rotational speed: 3-15RPM/s

memory specification: 1~8G



Figure 8 Hanging rotating advertising screen structure diagram

2.3 Editing software

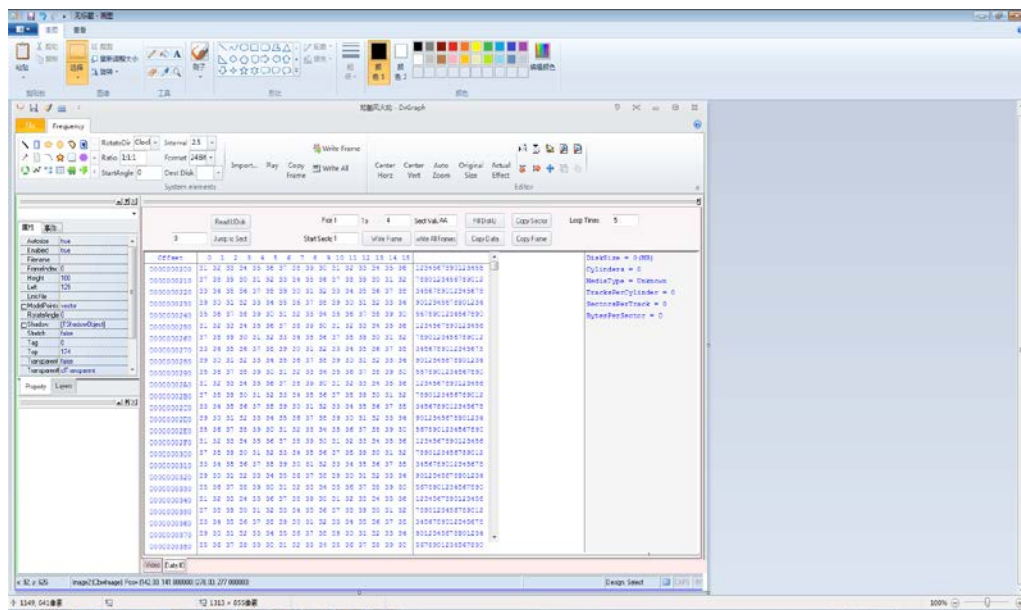


Figure 10 software operation interface

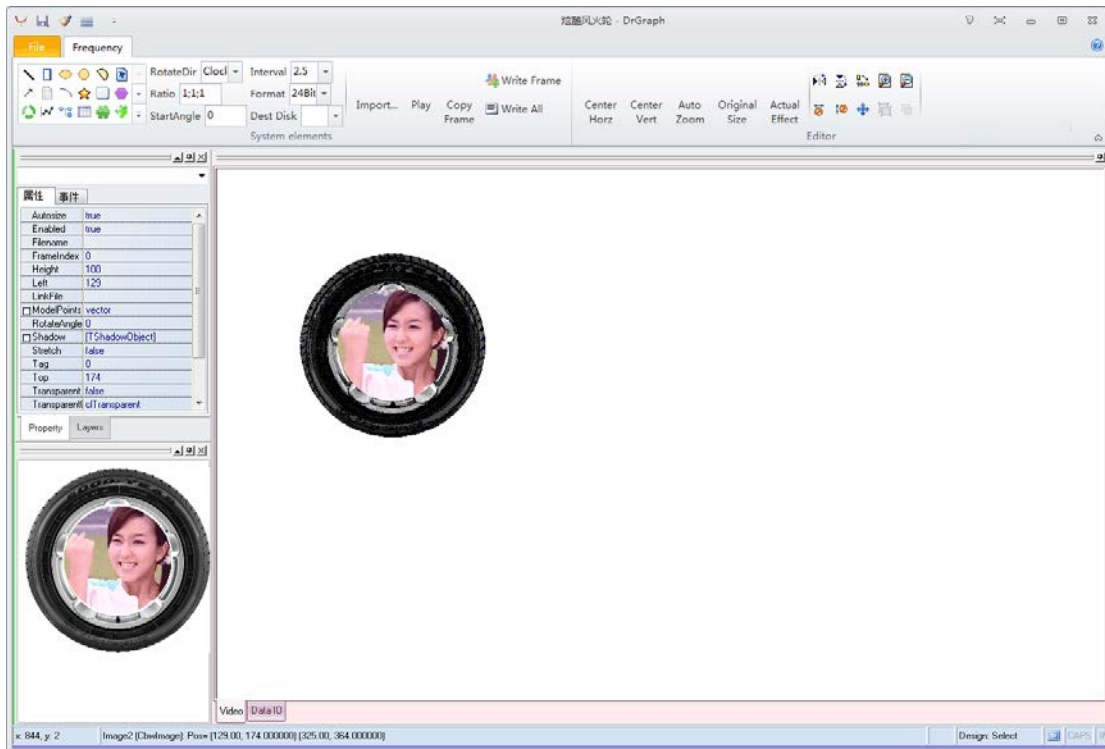


Figure 11 program edit interface

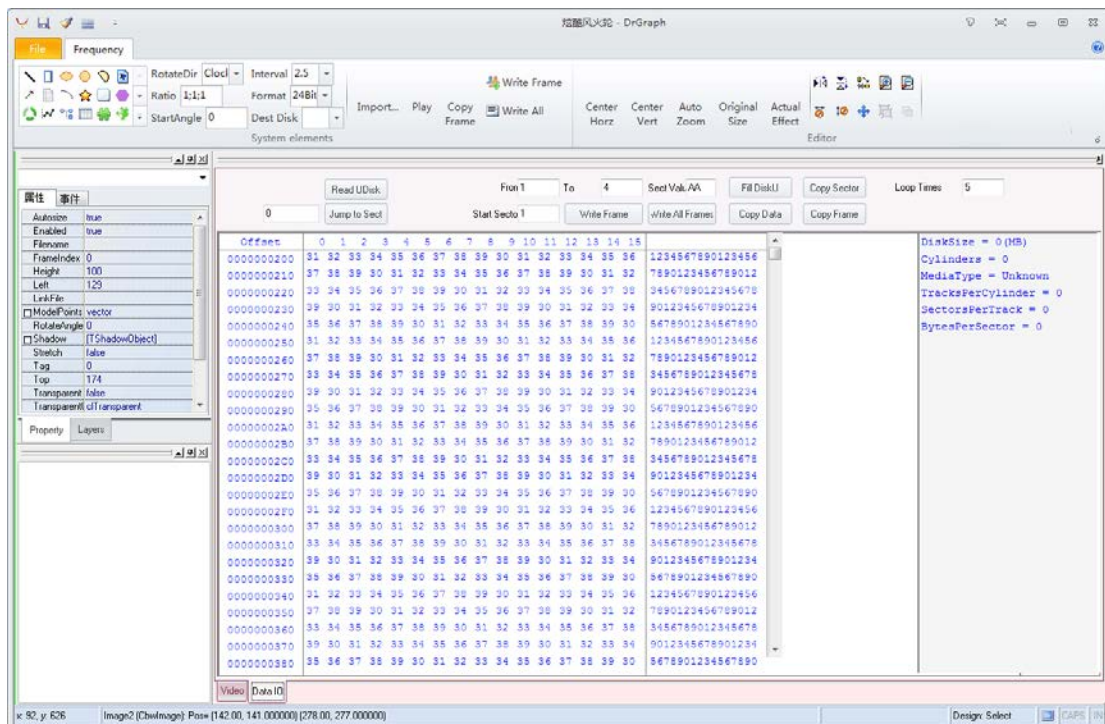


Figure 12 data transmission interface

3 The performance requirements

3.1 Work environment requirements

The controller has 2 different version depends on the working temperature, indoor version and outdoor version.

Outdoor version parameter as follows:

Working environment temperature range: 0°C-- +50°C
 Working condition relative humidity: 5%---95%
 altitude: ≤4000m
 barometric pressure: 70kPa—106kPa
 indoor version parameter as follows:
 Working environment temperature range: -20°C-- +60°C
 Working condition relative humidity: 5%---95%
 altitude: ≤4000m
 barometric pressure: 70kPa—106kPa

3.2 Store environmental requirements

Store, transportation temperature range: -55°C—85°C
 relative humidity: 5%----95%
 altitude: ≤4000m

3.3 Protection grade

Screen body IP66, power connection part IP67。

3.4 Salt spray test

Power supplier salt spray resistance and specification as follows, depends on GB/T 2423.18-2000 severity (2) conduct a test, the power supplier should can working on nominal working range after test.

Table 1 Salt fog adaptability requirement

item	Salt fog
Spray cycle /h	2
spray temperature /°C	15 – 35
Wet and heat storage period /h	20 – 22
storage temperature /°C	40±2
Storage Humidity /%	93 ⁻³ ₊₂

3.5 EMC requirements

table 2 EMC request

No.	item	Specifications	standard
1	static (ESD)	Criterion B, contact discharge 6KV ; air discharge 8KV	IEC61000-4-2
2	Electrical fast transient burst EFT)	Criterion B , LEVEL 3	IEC61000-4-4
3	SURGE	Criterion B line—line: ±6KV; line—ground: ±6KV; (1.2/50+8/20uS combination wave)	IEC61000-4-5

Note: Criterion B: partial function can degradation or lose for a moment, can self-recovery, but the output voltage should keep on normal limits when testing.

3.6 Environmental testing requirements

Table 3 Conventional environment experiment table

No.	item	technical index	note
1	Work in low temperature test	-25 °C	Rated load, 24 hours, inspect ON/OFF, stabilized voltage precision, output noise etc.
2	Work in high temperature test	+60 °C	
3	high-temperature storage	-55 °C	different index
4	low-temperature storage	+85 °C	
5	Alternating hot and humid test	25 °C~50°C	non-condensing
6	temperature cycling test	-25 °C ~ +60°C	
7	vibration test	5~9Hz, amplitude 3.5mm; 9~200Hz, accelerated speed 10m/s; 3 axis each direction scanning frequency vibration 5 times.	Check : componments, appearance, different index.
8	shock	accelerated speed 250m/s ² , pulse width 6ms,3 axis 6 direction impact 3 times each.	Check : componments, appearance, different index

3.7 size

Hanging rotating advertising screen size (128*128): 1000x1000x350 (WXDXH)
 (192*192): 1200x1200x380 (WXDXH)

4 Advantages comparison

4.1 Price comparison

Tradition LED screen engineering price calculate as follows:

engineering price =screen price*screen area+ control system cost +frame structure cost+ transportation and installation cost+ power distribution system cost include data cables+ steel frame and civil engineering cost+ taxes.

according to indoor dot-matrix 1 SQM full color advertising Screen cost as example as follows:

table 4 advertising Screen price comparison

Product name	Display density (/M ²)	module Resoluti on ratio	Module size	color	Scannin g mode	Whole screen price (USD/ M ²)
Indoor full color screen	40000	32*32	160*160	1R1G1B	Dynamic constant current	5000
Indoor full color screen controller						930
total						5930
outdoor full color screen	6944	32*16	192*96	1R1G1B	Dynamic constant current	725
outdoor full color screen controller						1255
total						1980
rotating advertising screen body	27648	96*96	R (450)	1R1G1B	Dynamic constant current	451
rotating advertising screen controller						500
total						951

From the price comparison we can see, same as rotating advertising screen the indoor full color LED screen 1 SQM cost is about 5930USD, and not include construction

and accessories cost, even if the outdoor full color LED screen price is not so high, but because outdoor use, the display density is low, if the size is small, can't not arrive the effect. rotating advertising screen cost is low and display density can arrive 70% of the indoor full color LED screen, and the cost just about 18.4 of the indoor full color LED screen, install and adjust is very simple, the display effect suitable for outdoor secondary visual range use.

4.2 performance comparison

under normal conditions, main LED screen index include maximum brightness, uniformity, angular property, mean free error time, dimension, contrast, frame frequency etc. In the above the main technical index, the max brightness and frame frequency disadvantage is significant in contrast, another index the uniformity advantage is the most significant, because the LED chips is little in the rotating advertising screen, so the uniformity is more better. Residue index almost same as LED screen.

Currently, the brightness of rotating advertising screen can meet outdoor publicity basic requirements, so no need excessive impose the brightness, Meet customer demand is OK.

As regards frame frequency, because use 3 arms rotating, and influenced by the screen body, the frame frequency max can arrive 20Hz, this is lower than some high grade LED screen which is 60Hz, the frame frequency incarnate is the degree of scintillation screen, usually, 20Hz or more less is enough for outdoor advertisement, The use of the actual terms depends on the customer's real experience.

Table 5 advertisement performance comparison

name	luminance (cd)	uniformity	Visual range (m)	Operating temp. (°C)	Angle of view (°)	mean time to failure (h)	Power cost (W/m ²)	Brightness adjustment	Working life (h)	Controller system	contrast	Frame frequency (Hz)
indoor full color screen	≥1800	common	1.5~30	-20~+50	Level 160 vertical 110	10000 hours	Average 300 Peak 600	Software 16 grade	100K hours	Computer control	8192 grade	60
outdoor full color screen	≥1800	common	1.5~100	-20~+50	Level 160 vertical 110	10000 hours	Average 300 Peak 600	Software 16 grade	100K hours	Computer control	8192 grade	60
rotating advertising screen	≥600	better	1.5~40	-20~+50	Level 160 vertical 110	5000 hours	Average 15 Peak 30	Software 16 grade	100K hours	independent control and Computer control	8192 grade	20