

# Chapter I Introduction

## 1.1 Features

1. **No multi-media card needed**, but directly connected DVI interface, fair price and good performance.
2. **Single network cable transmission**: one pair of network cable transmits double-color 1280\*512 (grey level 1024\*1024), full-color 800\*256 (grey level 1024\*1024\*1024)
3. **Intelligence tracking function**: can use mouse to drag LED show area, display locking.
4. **Super loading capacity**: double-color sending card is 1280\*1024, receiving card 1280\*512, full-color sending card is 800\*512, and receiving card is 800\*256.
5. **One for multiple function**: one sending card can support multiple receiving cards (One screen can be cut into multiple displays)
6. **Perfect picture**: Any  $\gamma$  and brightness regulation can be performed to the red, green and blue colors separately.
7. **One card for multiple function**: a set of control cards can be used both for indoor display and outdoor display, and can conduct 1/16、 1/8、 1/4、 1/2 and static scanning.
8. **Brightness regulation**: the receiving board has 8 levels brightness regulation interface, which can regulate the brightness through hand operation or automation except for 256 levels software regulation.
9. **Network control**: remote control, any computer can turn on and turn off display, control display content, and adjust display brightness, etc.
10. **Remote transmission**: adopting advanced data transmission technology and using kilomega high speed data communication chip to prevent static and lightning. Supporting remote transmission without relaying card. The communication distance of synchronous video display is over 100m. (actual measure is 130m)
11. **Board scope of application**: because clock shift, data polarity and OE polarity are adjustable, and hub card is separate, systems are suitable for all kinds of market popular specification display boards.
12. **Stability and dependability**: adopting international newest technology, and using world popular super scale FPGA device to improve the stability and dependability of control system, and supporting on-line updating.
13. **Powerful software compatibility**: because of using hardware real time synchronous technology, the entire process doesn't need to download any software, possessing the software development type structure. Display can operate under DOS, WINDOWS98, WINDOWSNT and WINDOWS2K operation systems. Users can program themselves, and edit, make and broadcast programs at well through using various popular excellent showing, picture, cartoon, video and slide production software. At the same time, offering a set of super showings context play software. Supporting hundreds of display modes, and editing all kinds of video and showing text at well, and playing automatically.
14. **Free technical guidance**: offering all kinds of specification display boards (3.75mm, 5mm), and supplying production guidance.

## 1.2 Package list

### **L2003D model (double-color)**

A piece of data collecting sending card ( : D6A) (used to install in the computer)

A piece of data receiving display drive card ( D6B) (used to install in the back of display)

A DVI connecting line

A RS232 (serial) connecting line

A copy of manual

A copy of Certification of Quality (See the back of the book)

A piece of LED Studio software CD

### **L2003T model (full-color)**

A piece of data collecting sending card ( :T6A) (used to install in the computer)

A piece of data receiving display drive card (:T6B) (used to install in the back of display)

A DVI connecting line

A RS232 (serial) connecting line

A copy of manual

A copy of Certification of Quality (See the back of the book)

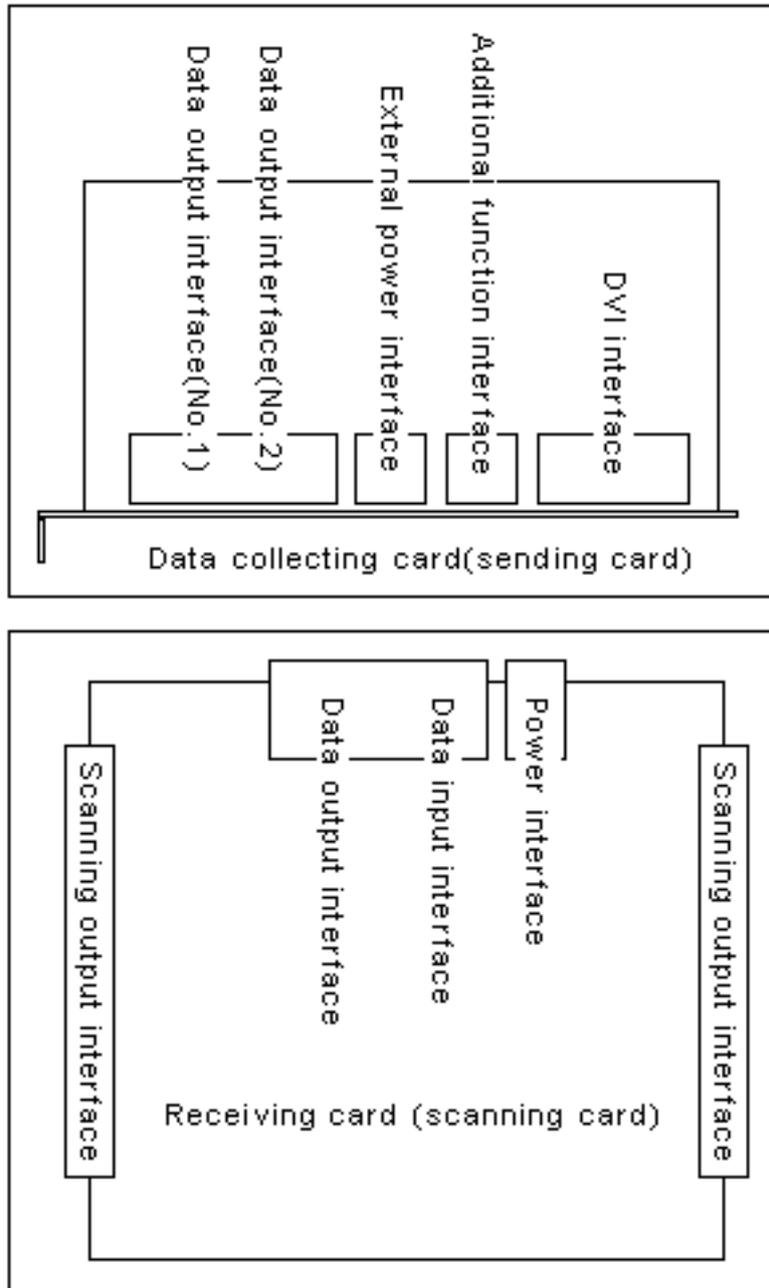
## Chapter II System install and setup

### 2.1 Main technology parameter

Model	L2003D	L2003T
Grey level	red: 1024 blue:1024	red: 1024 green:1024 blue:1024
Exhibitory color index	156*256= 65535	256*256*256=16M
Supporting display mode	640*480 800*600 1024*768 1280*1024	640*480 800*600 1024*768
Supporting graphic card	DVI interface display card	DVI interface display card
The quantity of matching card	A piece of data collecting card Two piece of display drive cards	A piece of data collecting card Two piece of display drive cards
Control scope	1280*1024	800*512
Brightness regulation	Software: level 16 Hardware: level 256	Software: level 16 Hardware: level 256
Shift frequency	16Mhz、 12Mhz、 8Mhz、 6Mhz (adjustable)	16Mhz、 12Mhz、 8Mhz、 6Mhz (adjustable)
Vertical frequency	>90HZ	>90HZ
Shift register chip	74HC595 6B595 etc	74HC595 6B595 etc
Scanning model	1/16,1/8,1/4,1/2, static (adjustable)	1/16,1/8,1/4,1/2, static (adjustable)
The quantity of input interface		
Communication line	A extra 5 network line	A extra 5 network line
Communication transmission distance	High speed >100M (without relaying card)	High speed >100M (without relaying card)
Supply power	Single: +5V	Single: +5V

### 2.2 Port definition

Sending card and receiving card, as shown in right figure.



### 2.2.1 Data collecting card data input interface (DVI interface)

The interface is DVI interface; pin definition and showing card are one-to-one correspondence. Using DVI line offered to connect is ok.

### 2.2.2 Additional function interface

The interface is telephone line of 6P, and can supply the additional functions of  $\gamma$  regulation, controlling grey level, turning on and turning off large display, locking display, and showing the area setup, etc through using DVI line offered to connect with RS232 (serial).

### 2.2.3 External power interface

The interface is 5V power interface, and is used when sending card is put outside.

### 2.2.4 Data collecting card data output interface

The interface is double- network- card interface of 8P, connecting with receiving card through network line. Every interface outputs 512 rows data. Data output interface 1 is 1-512 rows, and data output interface 2 is 512-1024 rows.

### 2.2.5 Display drive card data input interface

The interface is double- network- card interface of 8P, connecting with receiving card through network line.

### 2.2.6 Display drive card output interface

The output interface definition of double –color display drive card 50P is as follows:

Signal name	Pin number	Description
A	42	The lowest bit of row address
B	41	The second lowest bit of row address
C	40	The second highest bit of row address
D	39	The highest bit of row address
RCLK	43	Latch of row
CLK	44	Clock
OE	45	Enable
RD	8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38	Red data
GD	7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37	Green data
VCC	2,4,47,49	+5V power output
GND	1,3,5,46,48,50	Grounding
NC	6	Keeping not using

The output interface definition of full-color display drive card 50P is shown below:

Signal name	Pin number	Description
A	42	The lowest bit of row address
B	41	The lower bit of row address
C	40	The higher bit of row address
D	39	The highest bit of row address

RCLK	43	Latch of row
CLK	44	Clock
OE	45	Enable
RD	8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38	Red data
GD	7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37	Green data
BD	8,12,16,20,24,28,32,36	Green data
VCC	2,4,47,49	+5V power output
GND	1,3,5,46,48,50	Grounding
NC	6	Keeping not using

## 2.3 Hardware install

Install steps are as follows:

1. Making data collecting card insert to empty PCI slot.
2. Using DVI line to connect data collecting card with showing card.
3. Connecting control line with serial (Rs232) (optional)
4. Using a network line to connect receiving card.
5. Connecting showing drive card with Hub one-to-one correspondence through 50P flat wire.
6. Connecting +5V power with showing drive card.
7. Setup or testing after checking unmistakable connection.

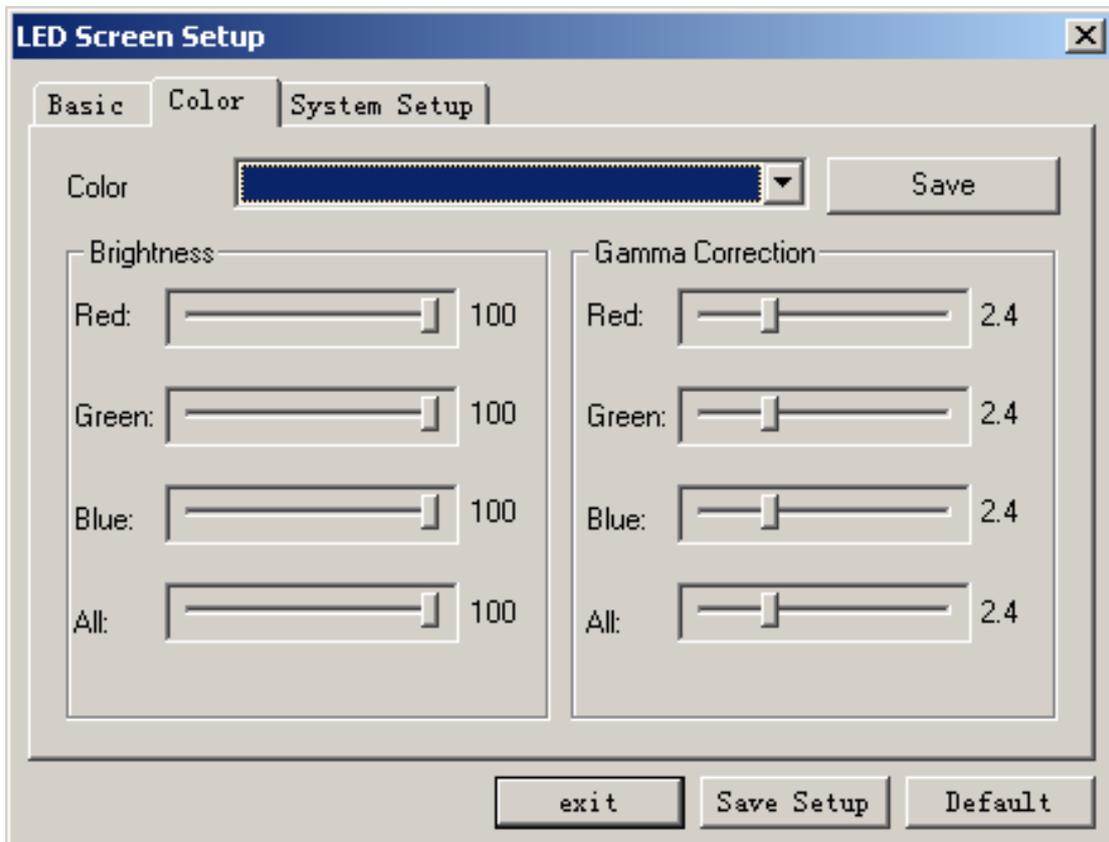
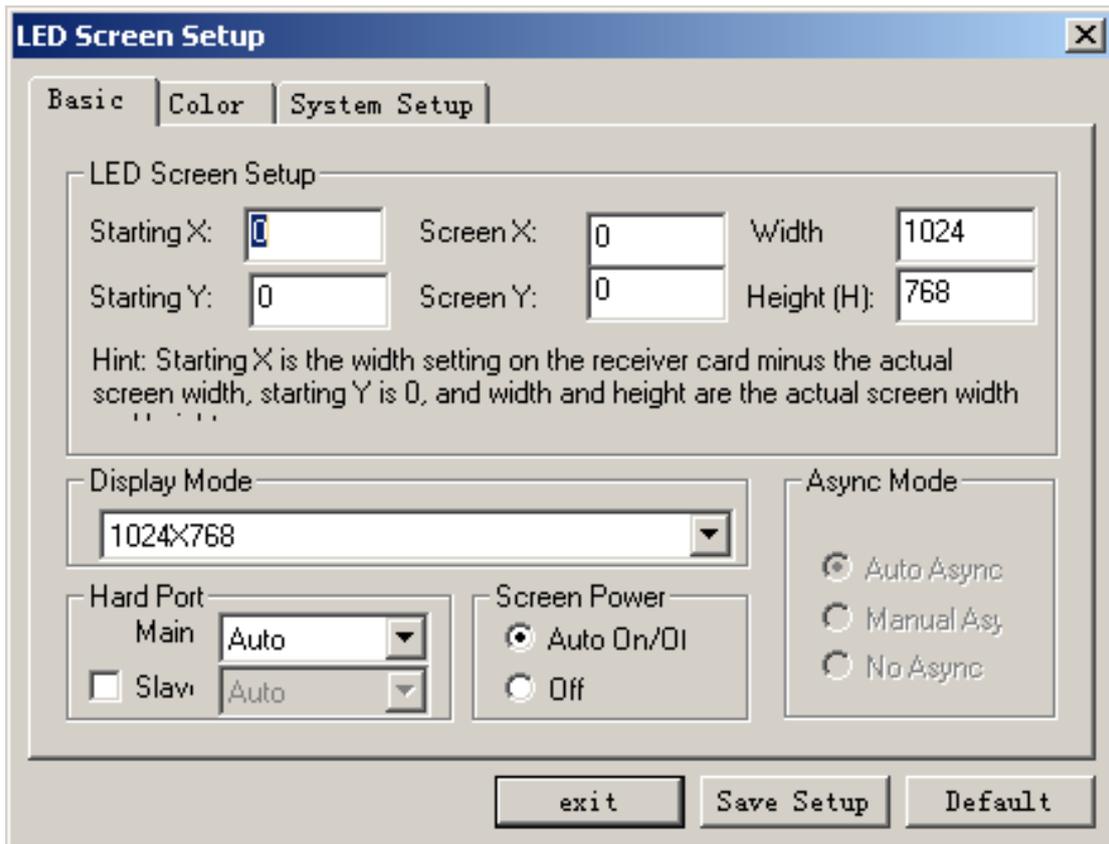
## 2.4 Software install

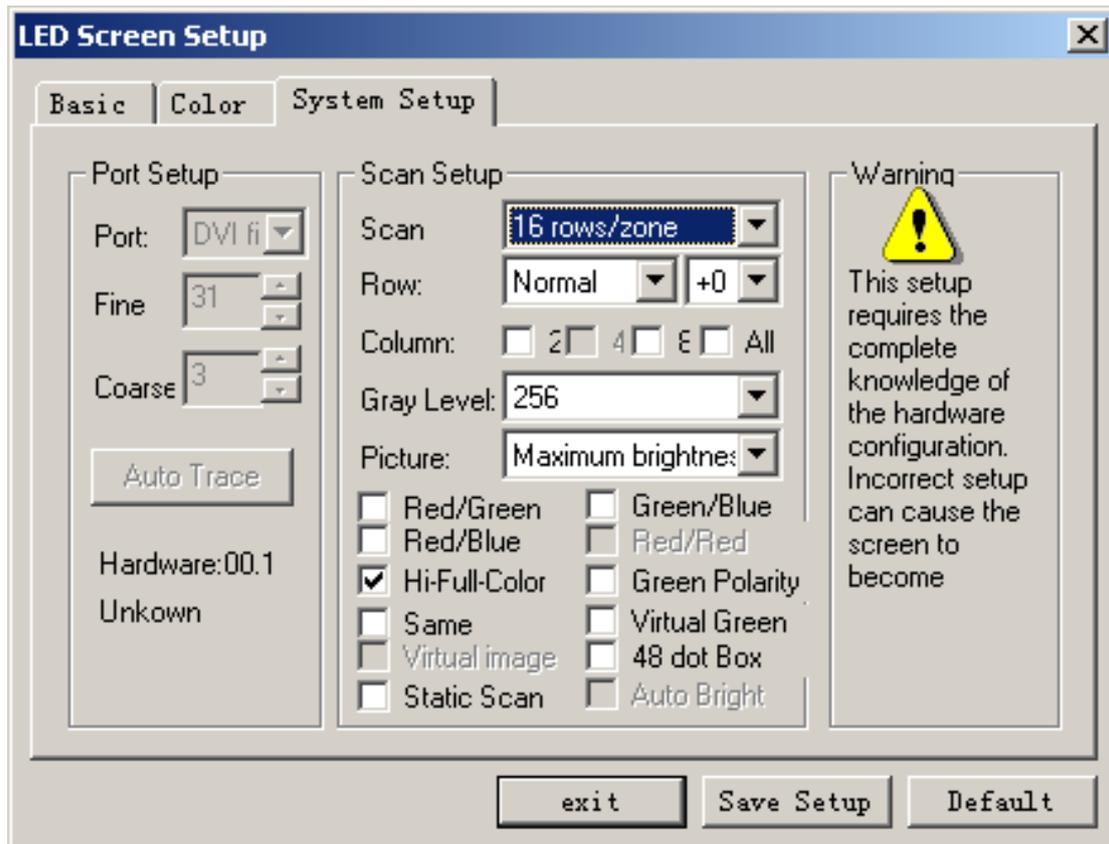
The control system free sends play and setup software---LED Studio especially for large display, which can meet most of LED displays users' require, playing graph, text and VCD.

Putting CD offered into CD driver, then automatically entering the installment condition. Please follow the install steps.

## 2.5 Data collecting card/sending card setup (optional)

Carrying on setting up Led display through software, such as remote turning on and turning off power, locking display, showing area setup, regulating brightness, correcting  $\gamma$ , setting up grey level, and switching red and blue data, and so on..





## 2.6 Display drive card/receiving card setup

### 2.6.1 Scanning model switch

Display the 5<sup>th</sup> to 7<sup>th</sup> of drive card JP2 switch

The definition is as follows:

When the switches are all “off”, the scanning models is 1/16; when 1/8 switch is “on”, and other switches are “off”, the scanning model is 1/8; when 1/4 switch is “on”, and other switches are “off”, the scanning model is 1/4; when 1/2 switch is “on”, other switches are “off”, the scanning model is 1/2; when all the switches are “on”, the scanning model is static.

### 2.6.2 Shift clock switch

Display 8<sup>th</sup> of drive card JP2 switch

6.0-6.3 editions are applicative.

Display the 8<sup>th</sup> and 9<sup>th</sup> of drive card JP2 switch

“Off” is 12.5Mhz, “on” is 16.7 Mhz.

Above 6.4 editions is suitable

8=off, 9=off----- 12.5 MHz

8=on, 9=off----- 16.7 MHz

8=off, 9=on----- 6.25 MHz

8=on, 9=on----- 8.33 MHz

### **2.6.3 Multi-display-drive-card initial position switch**

The 1<sup>st</sup> to 4<sup>th</sup> of scanning card JP2 switch

The definition is below:

1 is +64; 2 is +128; 3 is +256; 4 is +512

For example:

The starting point 384 (=128+256): +128, +256, the two switches are set up as “on”, and the other 8 switches are set up as “off”.

The starting point 832 (=+512+256+64): +64, +256, +512, the three switches are set up as “on”, and the other 8 switches are set up as “off”.

### **2.6.4 Display drive card width**

Display the 3<sup>rd</sup> to 8<sup>th</sup> of drive card JP1 switch

The starting point cardinal number is 32; when switch is “on”, the cardinal number adds jumper subject weights; when “off”, not adding subject weights. Subject weights definition is as follows: 2 is +32; 4 is +64; 5 is +128; 6 is +256; 7 is +512; 8 is 1024

For example:

When switch is “off”, the cardinal number doesn't add subject weights.

Width 384 (=32+32+64+256): +32, +64, +256, the three switches are set up as “on”, the other switches are set up as “off”.

Width 832 (=+512+256+32+32): +32, +256, +512, the three switches are set up as “on”, the other switches are set up as “off”.

Width 1280 (=+1024+128+64+32+32): +32, +64, +128, +1024, the four switches are set up as “on”, the other switches are set up as “off”.

### **2.6.5 Data polarity switch**

Display the 2<sup>nd</sup> of the drive card JP1 switch, “on” is negative polarity, and “off” is polarity.

### **2.6.6 OE polarity switch**

Display the 1<sup>st</sup> of drive card JP1 switch, “on” is negative polarity, and “off” is polarity

## **2.7 Multi-media software usage**

LED Studio usage, referring to LED Studio Manual.

## Chapter III Graphic card setup

At present, the popular graphic cards in the market are two main chip groups.

- 一、The series of ATI' RADEON are 7000,7500,8500,9000,9100,9200.....
- 二、The series of NVIDIA' MX are 400,440,5200.....

### 3.1 NVIDIA graphic card setup

1. Click on right key on the blank of desktop, there will be "Option", as shown in figure 3-1.



图 3-1

Click "Properties" button: there will be a "Properties" dialog box (as shown in figure 3-2);

click on "Option", then click on "Advanced" button, appearing "Advanced" dialog box, as shown in figure 3-3; After click on "GeForce4..." , there will be a menu, and then click on "nView" in the menu, as shown in figure 3-4, select copy in the nView mode, then click on "Apply" button is ok.

If playing video, click on "Troubleshoot" or "Performance" property page in the "Advanced property" as shown in figure 3-5, setting hardware as preliminary acceleration or no hardware acceleration; then click on "Apply" button is ok..

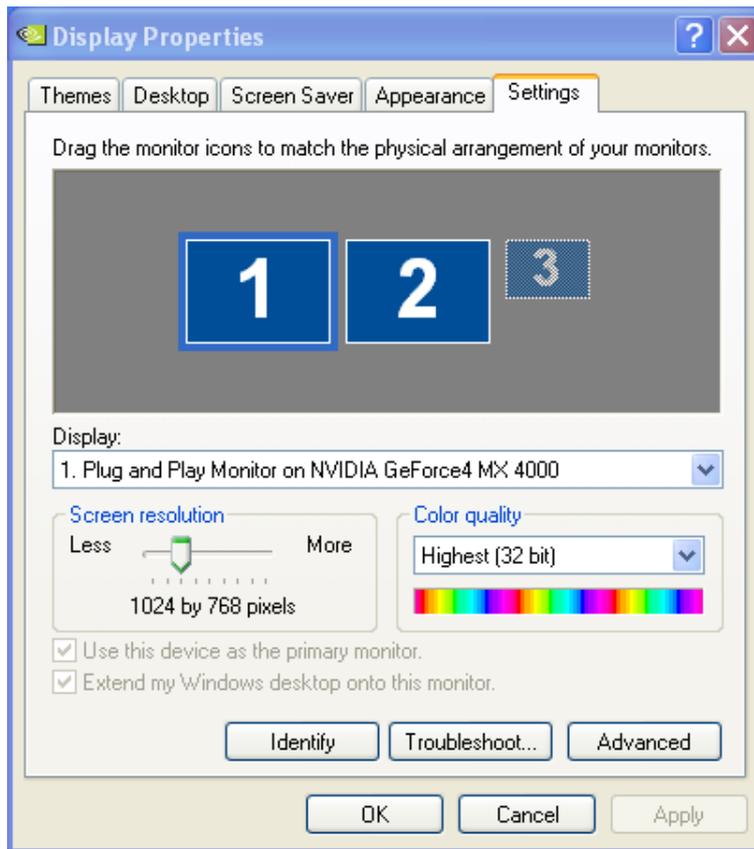


图 3-2

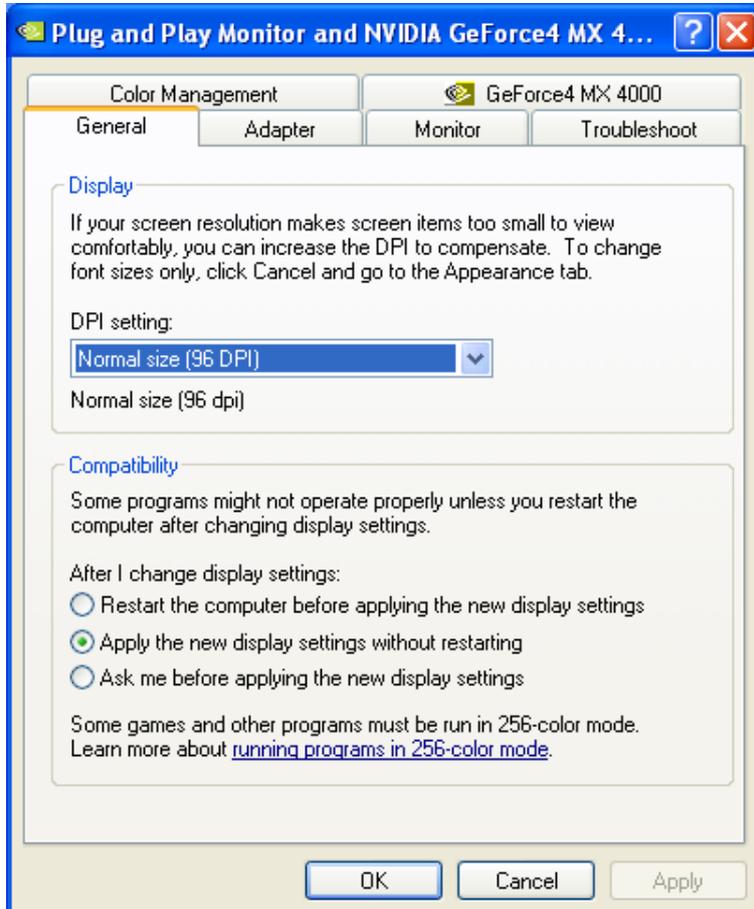


图 3-3

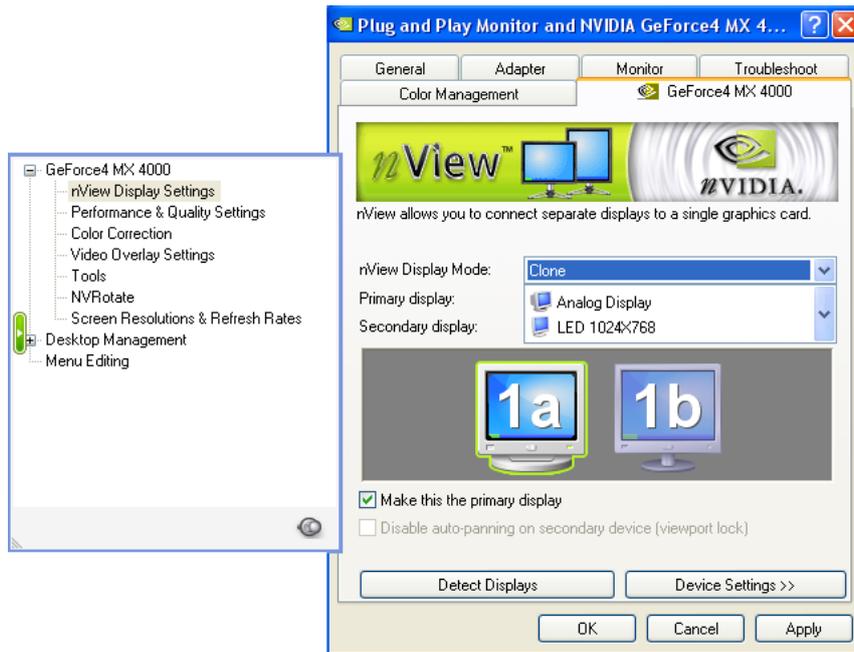


图 3-4

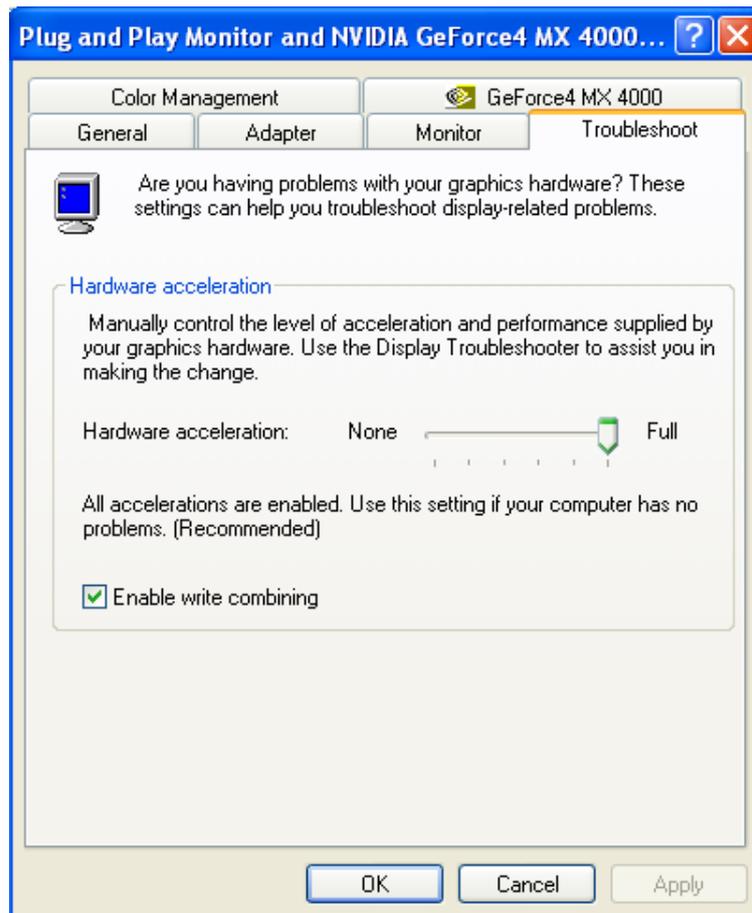


图 3-5

### 3.2 ATI graphic card setup

Click on right key on the blank of desktop, there will be “Option”, as shown in figure3-6.

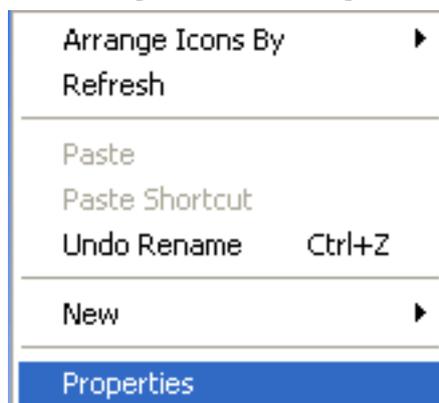


图 3-6

Click on “Property”: there will be “Property” dialog box (as shown in figure 3-7); click on “Option”, then click on “Advanced” button, after appearing “Advanced” dialog box, click on “Display” button, as shown in figure 3-8, there will be a red triangle button beside the left of FPD, after click on it, the color becomes green, then click on “Apply” button is ok.

If playing video, click on “Overlay” button in the Advanced property as shown in figure 3-9; click on “Copy mode options”, as shown in figure3-10, select “Same on all”, then click on “Apply” button is ok.

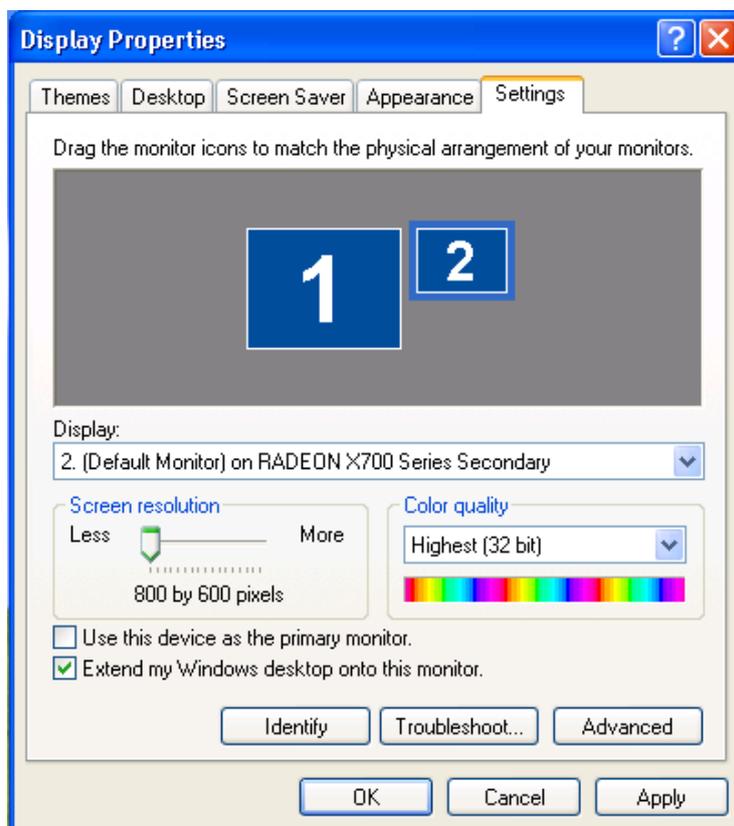


图 3-7

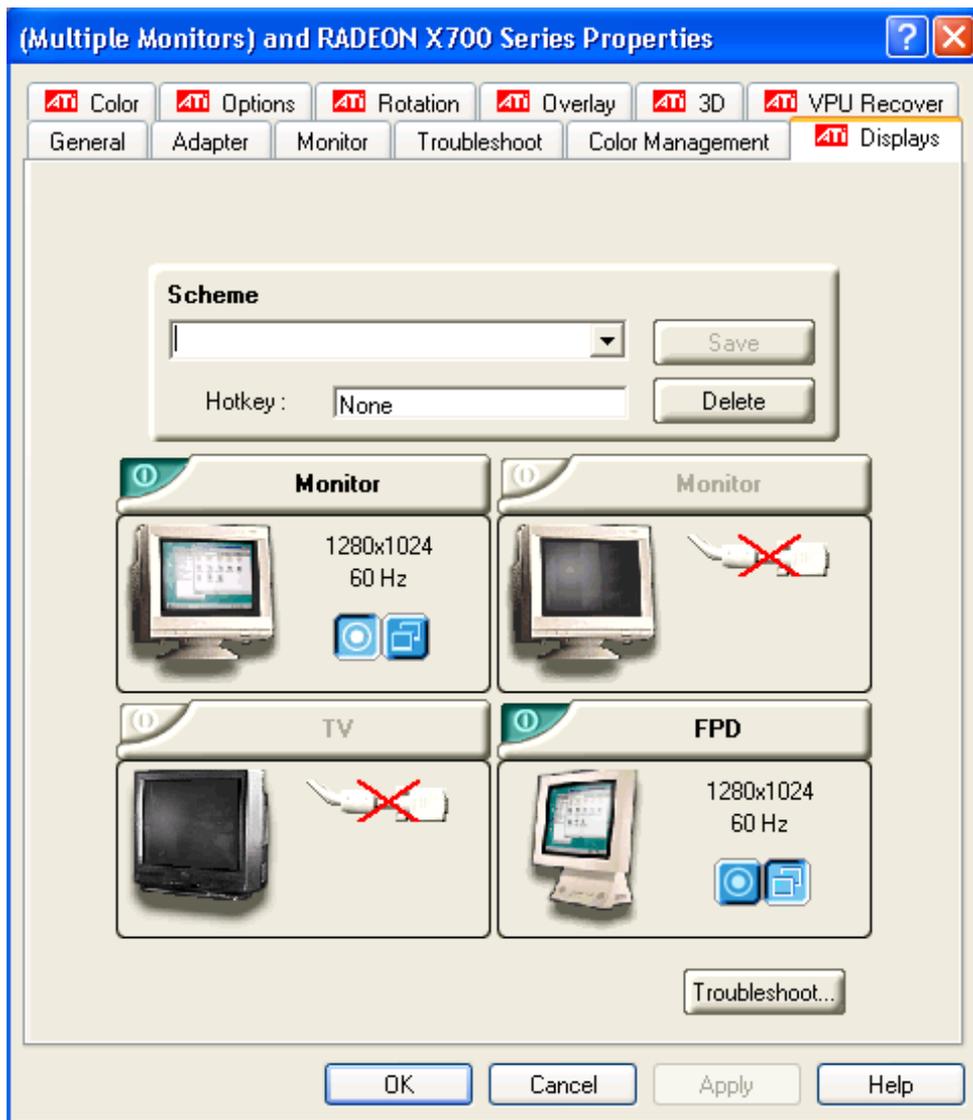


图 3-8

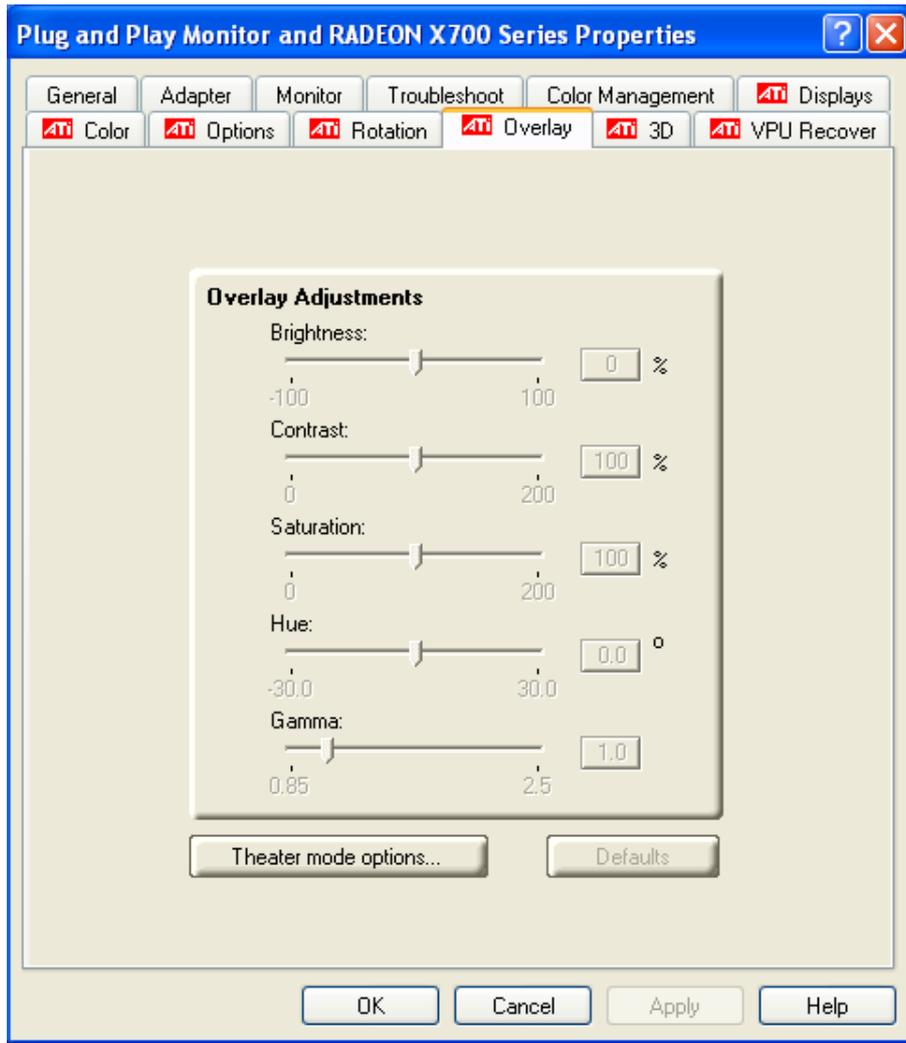


图 3-9

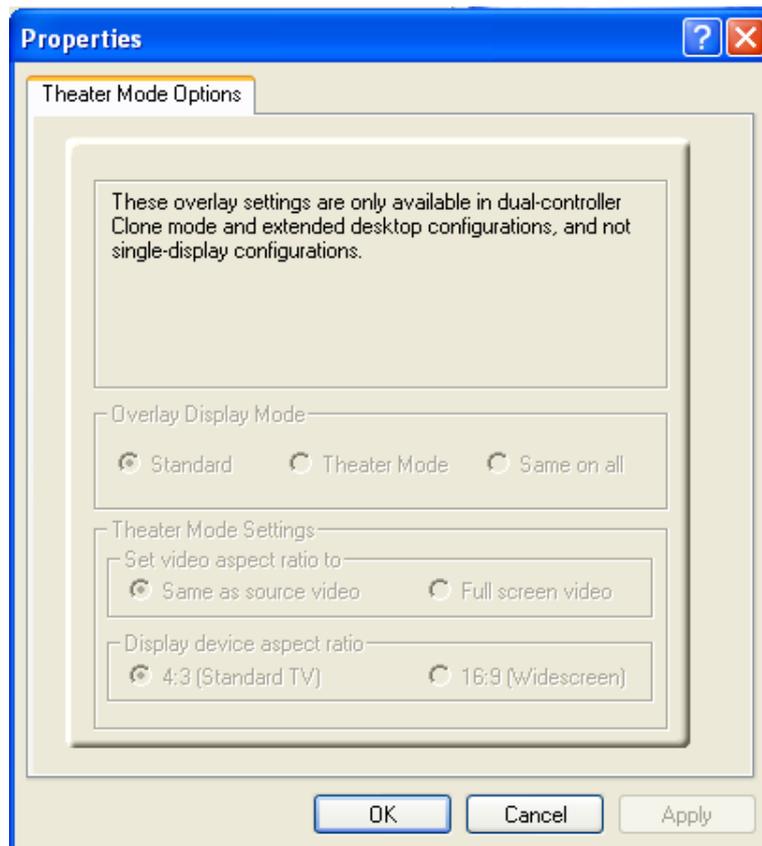
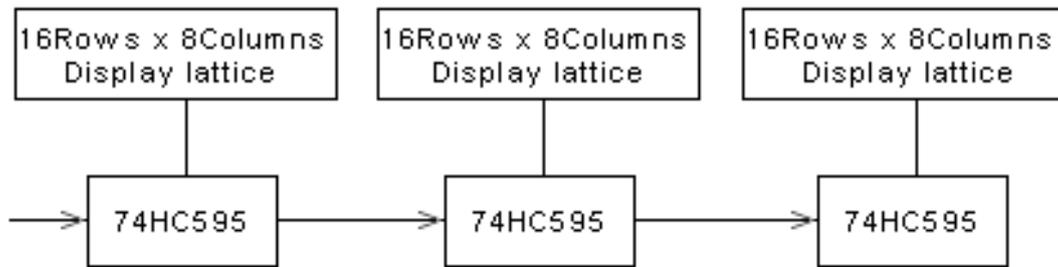


图 3-10

## Chapter V Scanning mode

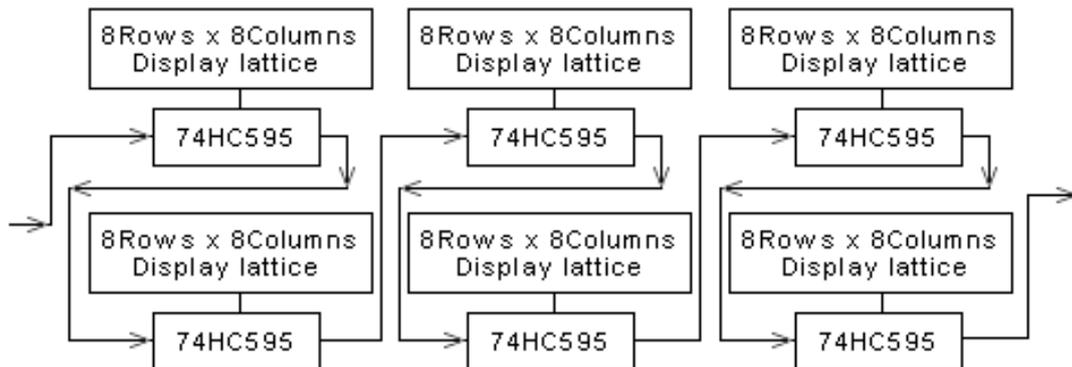
### 4.1 1/16 scanning mode (one mode)

Signal is as follows, the mode is default setting of leave factory.

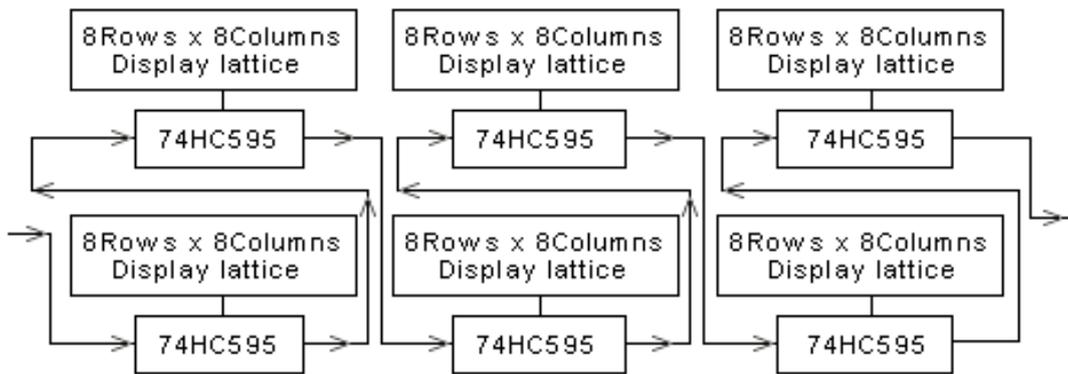


### 4.2 1/8 scanning mode (three modes)

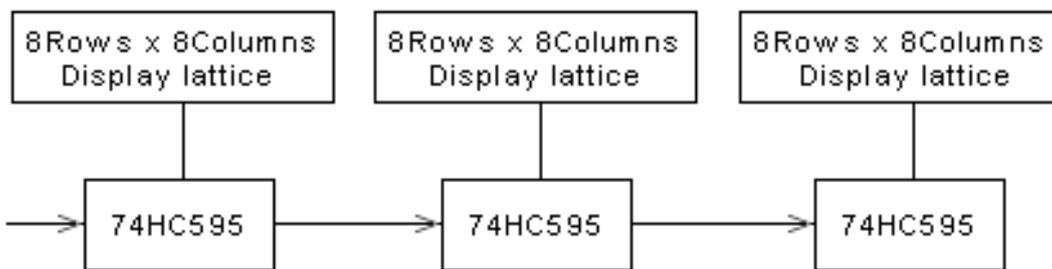
**Mode A: 16 rows/zone:** the signal is shown below; setup method: put the 5<sup>th</sup> switch (1/8) of the receiving card's JP2 on, and keep other switches stay.



**Mode B: 16 rows/zone:** the signal is shown below; setup method: put the 5<sup>th</sup> switch (1/8) of the receiving card's JP2 on, and keep other switches stay; changing sending card's setup: hardware setup---system setup---row order---reverse per 8 rows, other setups keep default setting.

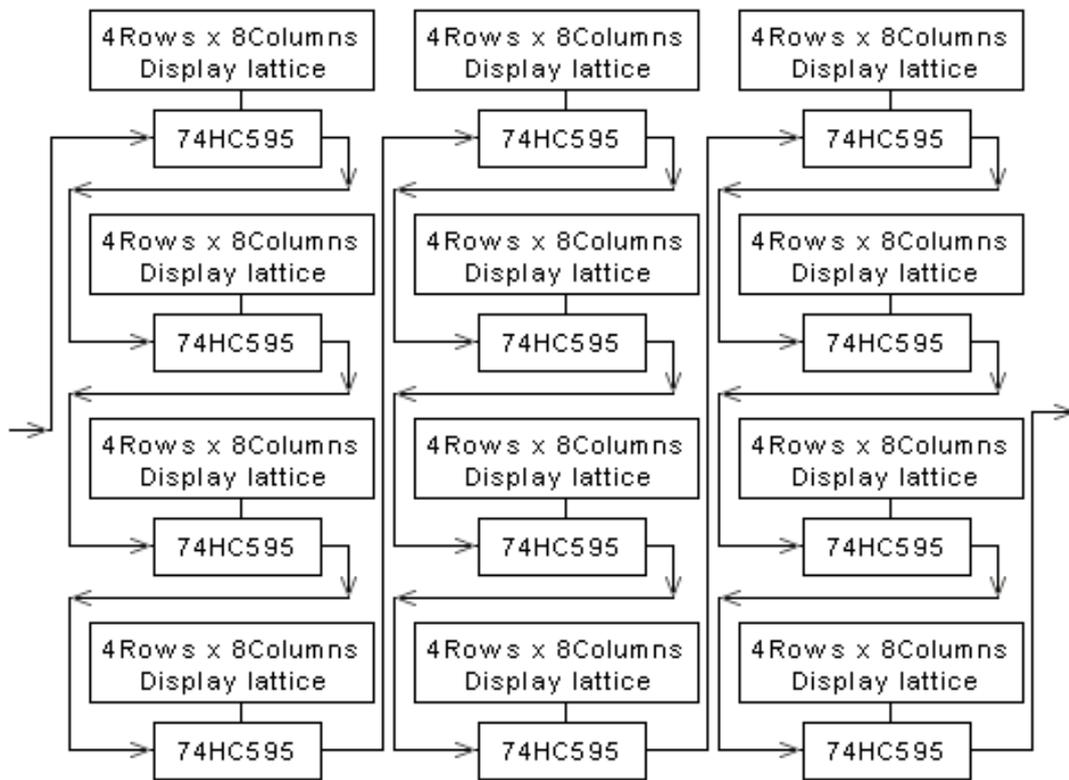


**Mode C: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, setup method: the 5<sup>th</sup> switch (1/8) of the receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone, and other setups keep stay.

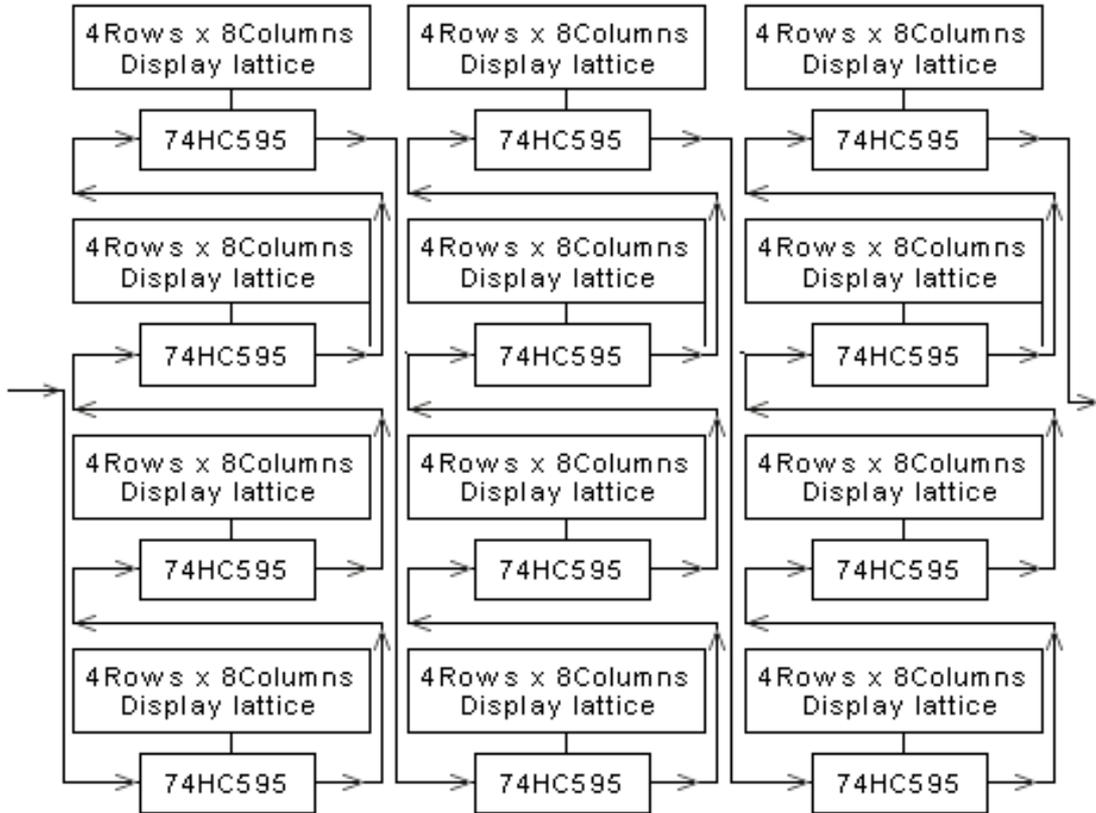


### 4.3 1/4 scanning mode (five modes)

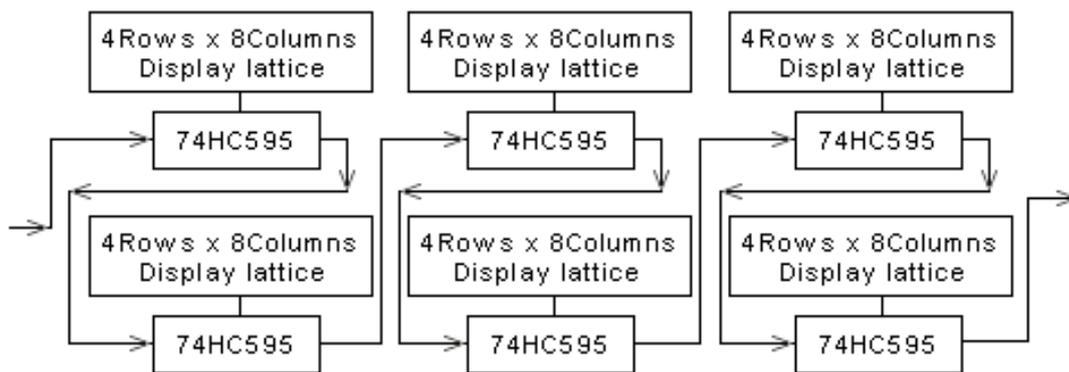
**Mode A: 16 rows/zone:** the signal is shown below; setup method: put the 6<sup>th</sup> switch (1/4) of the receiving card's JP2 on, and keep other switches stay.



**Mode B: 16 rows/zone:** the signal is shown below; setup method: put the 6<sup>th</sup> switch (1/4) of the receiving card's JP2 on, and keep other switches stay; changing sending card's setup: hardware setup---system setup---row order---reverse per 4 rows, other setups keep default setting.

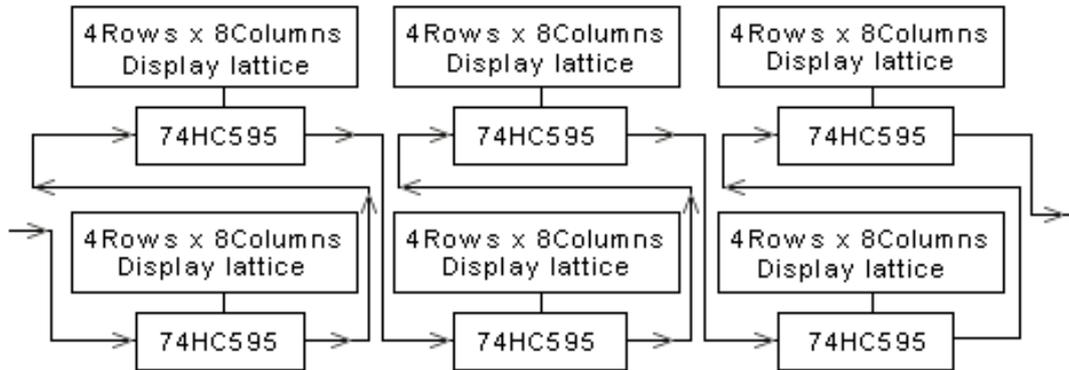


**Mode C: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, setup method: putting the 6<sup>th</sup> switch (1/4) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone, and other setups keep stay.

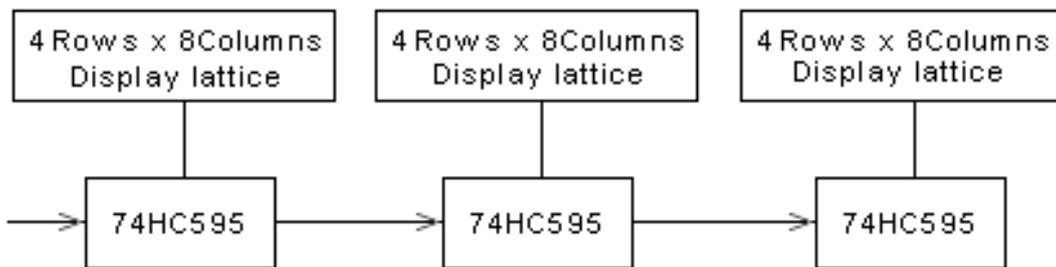


**Mode D: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, setup method: putting the 6<sup>th</sup> switch (1/4) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone; hardware setup---system setup---row order

r---reverse per 4 rows, and other setups keep stay.



**Mode E 4 rows/zone:** the signal is shown below; every receiving card can only drive 128 rows height, setup method: putting the 6<sup>th</sup> switch (1/4) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 128rows; on the contrary, the position is low 128 rows, and other switches keep stay; changing card's setup: hardware setup ---system setup---scanning output---4 rows/zone; and other setups keep stay.



#### 4.4 1/2 scanning mode (seven modes)

**Mode A: 16 rows/zone:** the signal is shown below; setup method: put the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, and keep other switches stay.

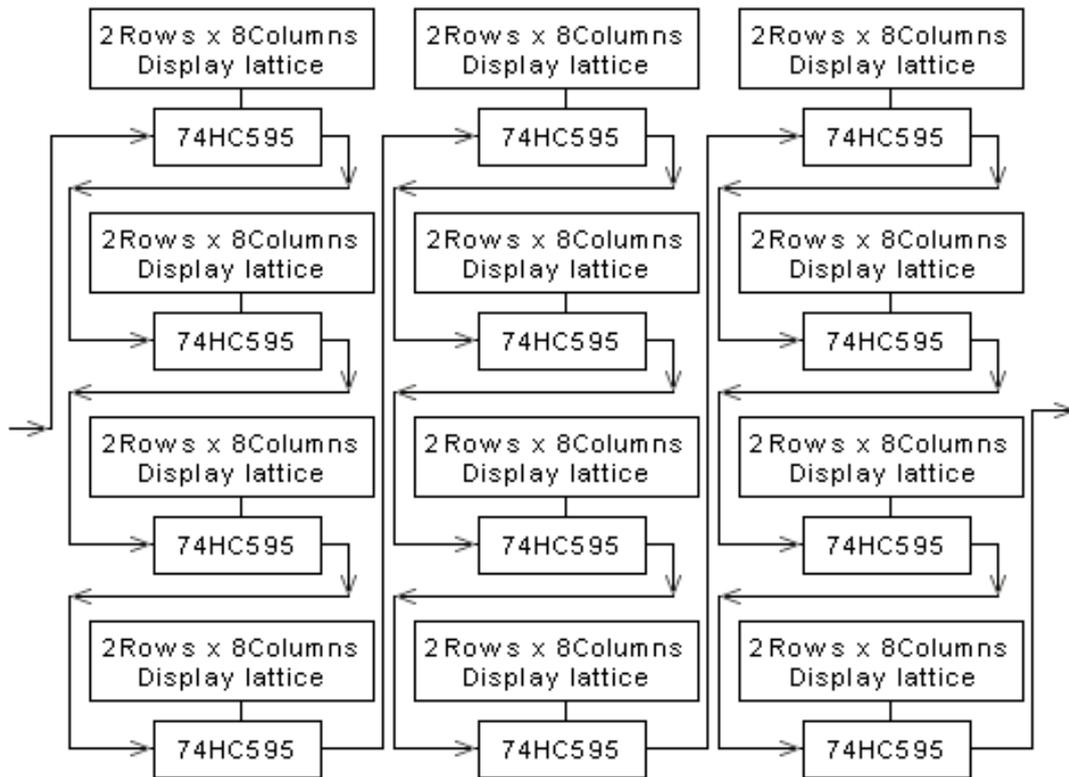


**Mode B: 16 rows/zone:** the signal is shown below; setup method: put the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, and keep other switches stay; changing sending card's setup: hardware setup---system setup---row order---reverse per 2 rows, other setups keep default setting.



**Mode C: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, the maximal display is 1024 rows height; setup method: putting the 7<sup>th</sup>

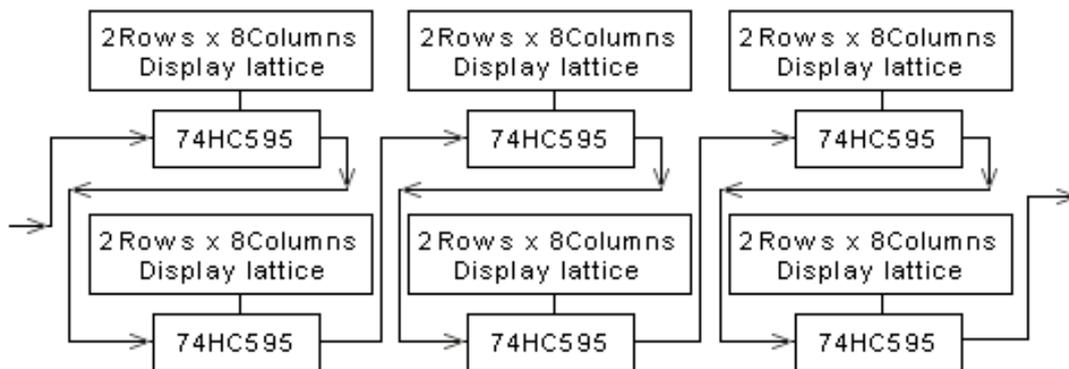
<sup>h</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone, and other setups keep stay.



**Mode D: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, the maximal display is 1024 rows height; setup method: putting the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone, hardware setup---system setup---row order---reverse per 2 rows; and other setups keep stay.

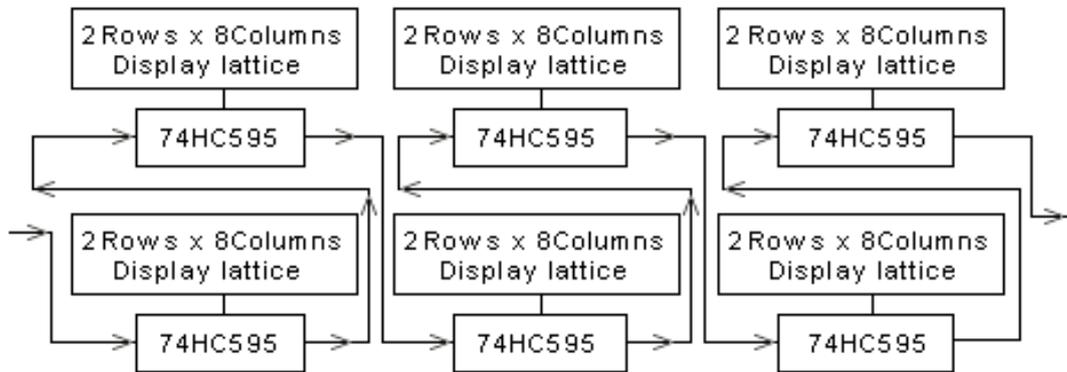


**Mode E 4 rows/zone:** the signal is shown below; every receiving card can only drive 128 rows height, the maximal display is 1024 rows height; setup method: putting the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 128rows; on the contrary, the position is low 128 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---4 rows/zone; and other setups keep stay.

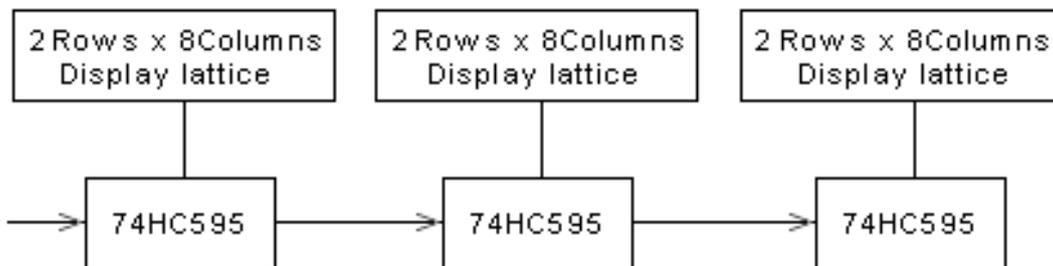


**Mode F 4 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, the maximal display is 1024 rows height; setup method: putting the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep

stay; changing card's setup: hardware setup---system setup---scanning output---4 rows/zone, hardware setup---system setup---row order---reverse per 2 rows; and other setups keep stay.

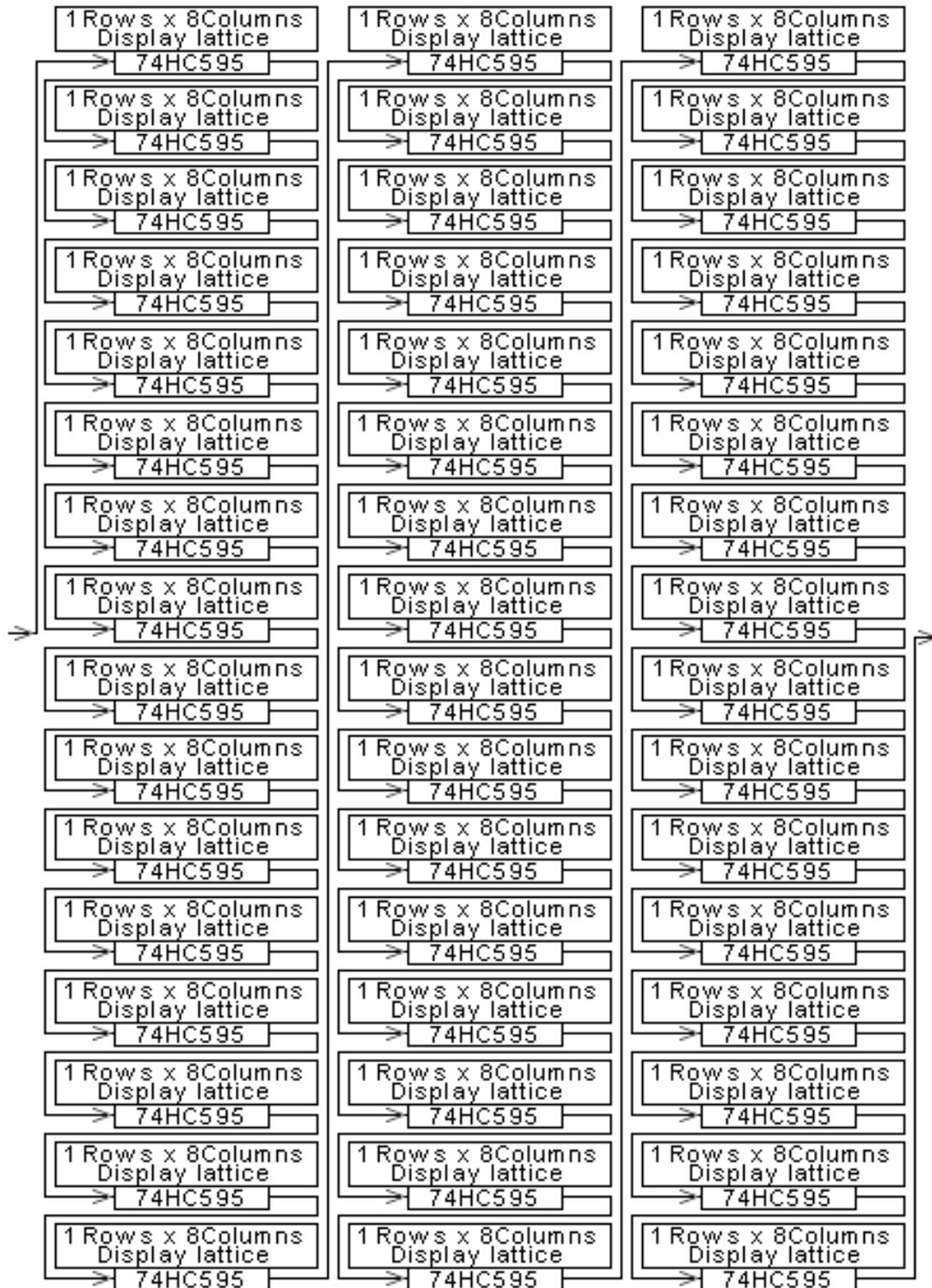


**Mode G 2 rows/zone:** the signal is shown below; every receiving card can only drive 64 rows height, the maximal display is 256 rows height; setup method: putting the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is up per 64 rows; on the contrary, the position is low 64 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---2 rows/zone; and other setups keep stay.

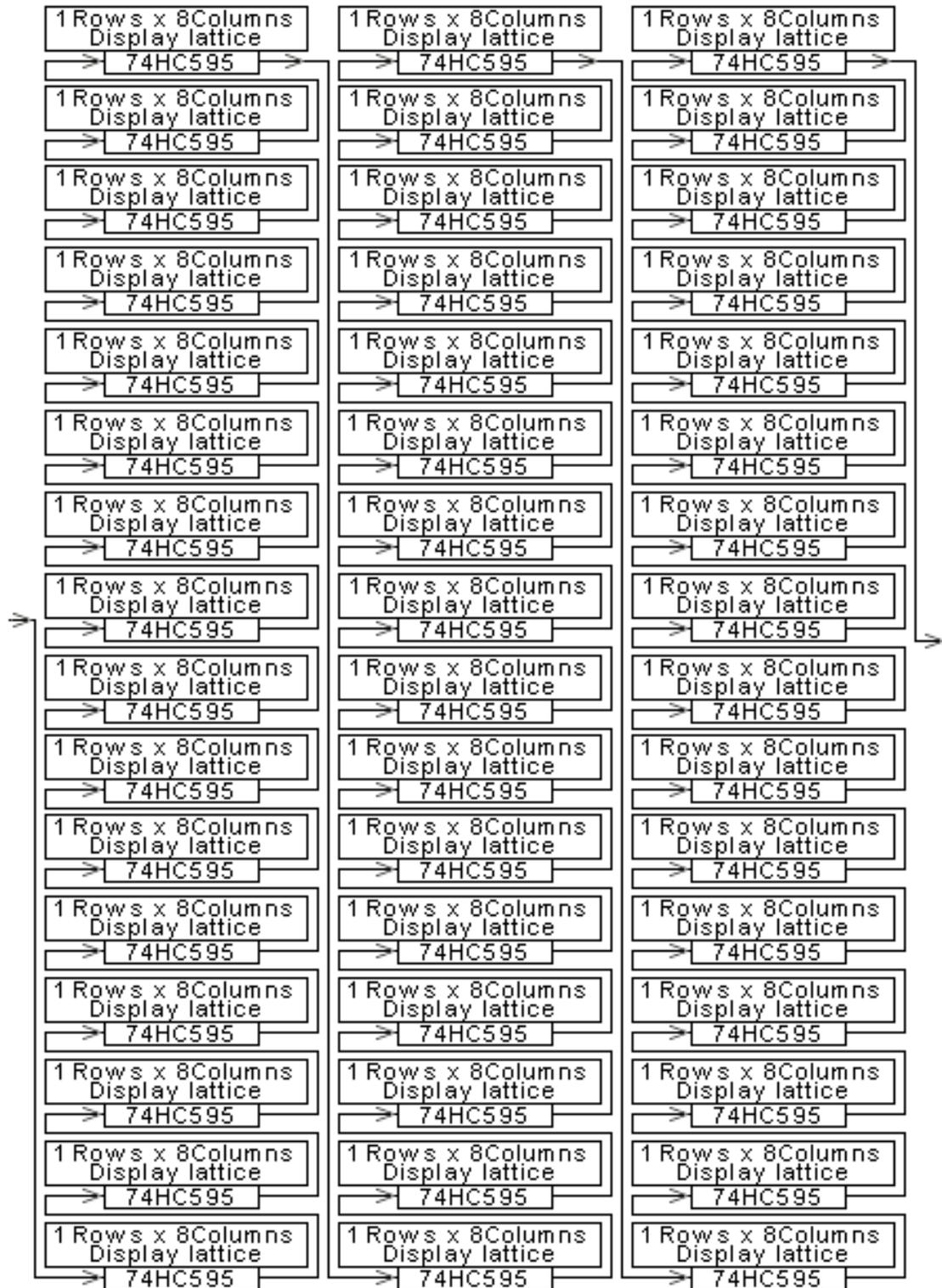


#### 4.5 Static scanning mode (seven modes)

**Mode A: 16 rows/zone:** the signal is shown below; setup method: put the 6<sup>th</sup> and 7<sup>th</sup> switches (1/2) of the receiving card's JP2 on, and keep other switches stay.



**Mode B: 16 rows/zone:** the signal is shown below; setup method: put the 6<sup>th</sup> and 7<sup>th</sup> switches(1/2) of the receiving card's JP2 on, and keep other switches stay; changing sending card's setup: hardware setup---system setup---row order---all reverse, other setups keep default setting.



**Mode C: 8 rows/zone (recommended use):** the signal is shown below; every receiving card can only drive 256 rows height, the maximal display is 1024 rows height; setup method: putting the 6<sup>th</sup> switch (1/4) and the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup-

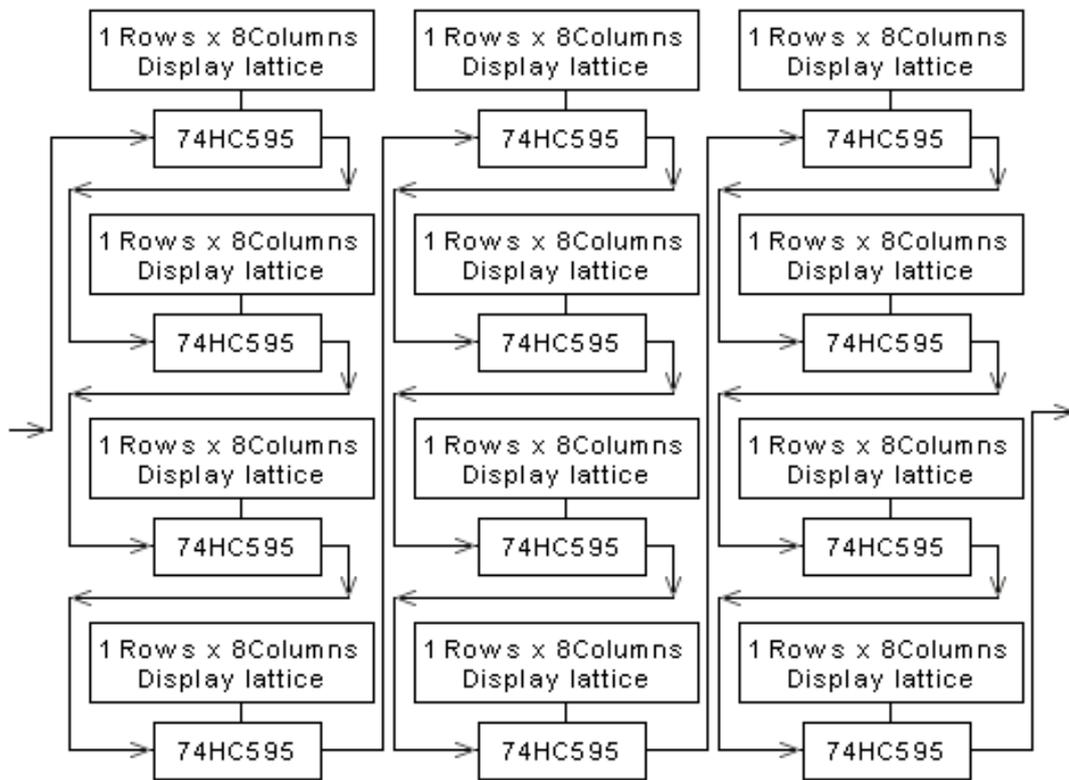
--system setup---scanning output---8 rows/zone; and other setups keep stay.



**Mode D: 8 rows/zone:** the signal is shown below; every receiving card can only drive 256 rows height, the maximal display is 1024 rows height; setup method: putting the 6<sup>th</sup> switch (1/4) and the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper 256 rows; on the contrary, the position is low 256 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---8 rows/zone; hardware setup---system setup---row order---all reverse; and other setups keep stay.



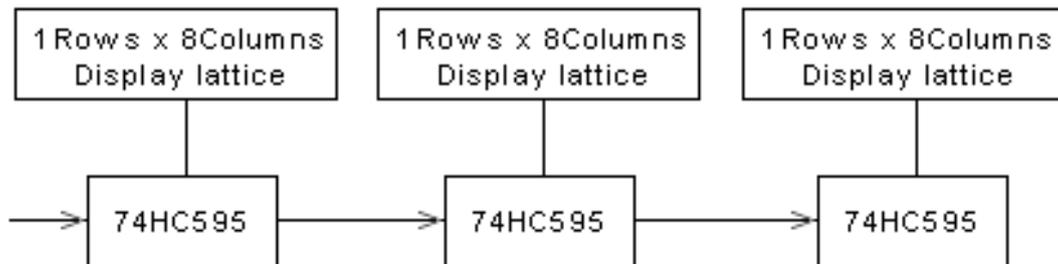
**Mode E 4 rows/zone:** the signal is shown below; every receiving card can only drive 128 rows height, the maximal display is 512 rows height; setup method: putting the 6<sup>th</sup> switch (1/4) and the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper128 rows; on the contrary, the position is low 128 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---4 rows/zone; and other setups keep stay.



**Mode F 4 rows/zone:** the signal is shown below; every receiving card can only drive 128 rows height, the maximal display is 512 rows height; setup method: putting the 6<sup>th</sup> switch (1/4) and the 7<sup>th</sup> switch (1/2) of the receiving card's JP2 on, the 5<sup>th</sup> switch (1/8) of receiving card's JP2 is used to select receiving card vertical position, when the switch is "on", the position is upper128 rows; on the contrary, the position is low 128 rows, and other switches keep stay; changing card's setup: hardware setup---system setup---scanning output---4 rows/zone; hardware setup---system setup---row order---all reverse; and other setups keep stay.



**Mode G 1 row/zone:** the signal is shown below; every receiving card can only drive 1 28 rows height, the maximal display is 512 rows height. The mode can't be setup switch, and it needs to alter program and use special hub card to carry out.



## Chapter VI Test procedure

**First step:** check sending card's green light whether it glitters regularly; if glitters, please enter the third step; if not, please restart the computer; before entering Win98/2K/xp, please check sending card's green light whether it glitters regularly, if so, please enter the second step, and check DVI line whether it is connected well. If the problem still exists, there must be something wrong among sending card, graphic card and DVI line, please alter them, then redo following the first step.

**Second step:** please follow the Chapter IV to set, or install again, then set; if the green light can't glitter regularly after doing so, please redo following the first step.

**Third step:** check receiving card's green light (data light) whether it and sending card's green light glitter synchronously. If so, please enter the fifth step, and check red light (power) whether it is on; if so, please enter the fourth step, if not, please check yellow light (power protection) whether it is on; if not, please check power whether it is connected wrong or no power output; if the power is on, please check the supply voltage whether it is 5V; if so, please turn off the power, and move the hub card and 50P lines, then retry. If the problem still exists after doing above, please change the receiving card, and redo following the third card.

**Fourth step:** check network line whether it is connected well, or whether it is too long; check network line whether it is produced following standard. The method of network line production refers to Chapter VII. If the problem still exists after doing above, please change the receiving card, and redo the third step.

**Fifth step:** check display power light whether it is on, if not, please enter the fourth step; check hub card interface definition line whether it matches with unit board.

## Chapter VII Overview

### 6.1 Service and support

May free provide customers with principle diagram of unit board, relative to controller, including two kinds of unit board: 3.75mm and 5mm. (You can download them through logging our website: [www.Linsn.com](http://www.Linsn.com) or [www.led168.com](http://www.led168.com) ) And free offering play software--LED Studio.

### 6.2 Appendix

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### 6.3 Switch definition help

Due to the upgrade of hardware, some switches for lower edition maybe not available.

1.OE Switch (JP1 first position),to justify the polarity of the cell boards. When the polarity is incorrect, luminance will decrease.

2.Data Switch (JP1 second position),to justify the polarity of the data. When error occurs, picture display will become negative.

3.W16,W32,W64,W128,W256,W512,W1024 (JP1 11th,3rd,4th, 5th, 6th, 7th, 8th position) , to justify the width of the receiving card.

4.ClkDly switch (JP1 9th position), to justify the properties of displacement clock. When there is problem with unit cell step-connection, please justify this switch.

5.Row Switch (JP1 10th position), to set whether translate code when quartet sweep and double sweep display, or the polarity of row-serial-row output.

6.S16,S32,S64,S128,S256,S512,S1024(JP2 the 11th, 12th, 1st, 2nd, 3rd, 4th position and JP1 12th

position), to justify the horizontal starting point of the screen.

7.1/8,1/4,1/2 switch (JP2 the 5th, 6th,7th position) ,to justify the scanning method or vertical starting point.

8. ClkHi,ClkLo switch (JP2 the 8th,9th position),to justify the slide-point clock. When CLkHi is on and ClkLo is off the frequency is 16.7Mhz; When ClkHi,ClkLo are both off, the frequency is 12.5Mhz; When CLkHi、 ClkLo are both on, the frequency is 8.33Mhz; When ClkHi is off but ClkLo is on, the frequency is 6.25Mhz.

9.Delay Switch(JP2 the 10th position), to justify the delay clearing of a whole row. If there is horizontal dark/bright difference, justify this switch.

## 6.4 Display width help

The switch code from left to right corresponds JP1 3, 4, 5,6,7,8 separately. 0 stands for the switch in the “on” position, and 1 stands for the switch in the “off” position.

Display width	Switch code	Display width	Switch code
32	000000	64	100000
96	010000	128	110000
160	001000	192	101000
224	011000	256	111000
288	000100	320	100100
352	010100	384	110100
416	001100	448	101100
480	011100	512	111100
544	000010	576	100010
608	010010	640	110010
672	001010	704	101010
736	011010	768	111010
800	000110	832	100110
864	010110	896	110110
928	001110	960	101110
992	011110	1024	111110
1056	000001	1088	100001
1120	010001	1152	110001
1184	001001	1216	101001
1248	011001	1280	111001
1312	000101	1344	100101
1376	010101	1408	110101
1440	001101	1472	101101
1504	011101	1536	111101
1568	000011	1600	100011
1632	010011	1664	110011
1696	001011	1728	101011

1760	011011	1792	111011
1824	000111	1856	100111
1888	010111	1920	110111
1952	001111	1984	101111
2016	011111	2048	111111

## 6.5 The method of producing communication line

Notice: producing communication line is different from producing network line, and standard network line can't substitute the communication line. Please make it following below steps.

- 1、 Removing the 3mm skin of twisted pair wire.
- 2、 Connecting the wires:

Guarantee the wires: 1,2 is a pair of winding wires; 3,4 is a pair of winding wires;5,6 is a pair of winding wires; 7,8 is a pair of winding wires; The same method should be used at both ends of the cable. The pairs of wires are arranged according to colors. (For example: 1, White-orange; 2, Orange; 3, White-green; 4, Green; 5, Blue; 6, White-blue; 7, White-brown; 8 Brown).

After connecting the wires well, keep the twisted pair wires in order, then cut the bare part of them with special-purpose pliers, remaining approximately the 15mm length only. Twist the thread to the same length, and put every twisted pair wires into the pin of the RJ45's splice. The wire with light orange color should be put into the first pin, then the others should be put in accordance with the color order, after securing every wire is put in the correct location, the RJ45 pressing pliers can be used to joint the RJ45 splice.

The connection of other end of RJ45 splice's pin is the same as the above-mentioned method. The both ends of RJ45 splice must be completely consistent. Finally, using the tester to test them. The RJ45 splice is finished.

### Manufacture's Certificate of Quality

Model	
Sequence number	
Quality assurance zero date	
Quality assurance deadline	
Agency/dealer name	
Customer name	
Customer telephone	

Thank you for purchasing the series of Linsn products. In order to be responsible for you

and guarantee to provide you with high-quality service, please read the book carefully, and fill it well.

Quality service clauses:

- 1、 Customers can enjoy free maintenance in Linsn Company or Linsn agency/dealer during the period of quality assurance.
- 2、 If products need maintenance, please fill the book in time, and post it to Linsn Company with the products.
- 3、 During the period of guaranteed maintenance (Guarantee period for one year is counted from label date on the Control Card ), Linsn Company repairs goods free of charge. However, Linsn Company will come down on customers for information fee or repair fee in accordance with actual circumstances if the situation belongs to any condition shown below.
  - (1). Consumers use and repair the goods improperly, and operate abnormally.
  - (2). Users repaired the goods themselves.
  - (3). Users operate improperly, making main chip damaged or burned.
  - (4). Chip and circuit board are crushed or broken because of improper packing when being posted back.
- 4、 After the quality assurance deadline, if products still need maintenance, Linsn Company will charge customers for information fee or repair fee in accordance with actual circumstances.
- 5、 The quality certificate is only suitable for Chinese Mainland and Hong Kong.