User Manual

MS44-18G

4x4 HDMI2.0 Matrix

4K2K @ 60Hz YCbCr 4:4:4

SY Electronics Ltd., 7 Worrall Street, Salford, Manchester, M5 4TH, UK
Tel: +44 (0)161 868 3450 – Fax: +44 (0)161 868 3459
Web: sy.uk

The SY-MS44-18G is a true 4K 4x4 true HDMI 2.0 matrix, that can display any source (Blue-Ray player, HD DVD player, satellite receiver, game system, etc.) to any of its four output displays simultaneously.

Each HDMI output is amplified and equalized to ensure optimal HDMI signal transmission through long cables (up to 15m @ 1080p) without any loss of quality.

The SY-MS44-18G offers solutions for digital entertainment centres, HDTV retail and show sites, data centre control, information distribution, conference room presentation, school and corporate training environments.

Features

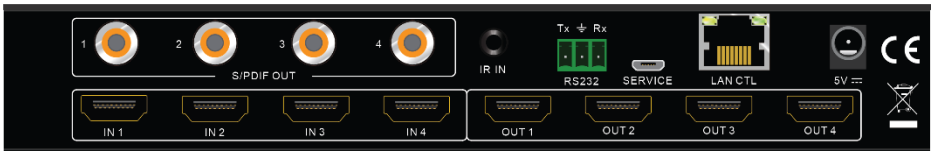
- 4x HDMI 2.0 Inputs
- 4x HDMI 2.0 outputs
- 4x de-embedded S/PDIF audio outputs
- Supports 4K2K@60Hz YUV4:4:4
- Bandwidth up to 18Gbps
- Compliant to HDCP 2.2 and HDCP 1.4 (output follows input)
- Supports HDR 10
- Supports 3D
- Supports Dolby True HD and DTS-HD master audio
- Controllable from front panel, IR, RS232, IP, and web interface

Panel Descriptions

Front Panel

Item	Description
IR	IR Sensor for remote control
Out Groups	Contains the input select button and associated LEDs
Numbered LEDs	Indicates currently selected HDMI input for the given output group
Select Button	Changes the input selection

Rear Panel



Item	Description
S/PDIF OUT	Coaxial S/PDIF digital de-embedded audio outputs
IN1 to IN4	HDMI video input connectors
OUT1 to OUT4	HDMI video output connectors
IR IN	Input from IR EYE sensor
RS232	RS232 control port
Service	For system upgrade & engineering diagnostics only
LAN CTL	LAN control or access to the built-in web interface
5V DC	5V DC input

System Connection

Usage Precautions

This HDMI matrix switcher should be installed in a clean environment that has adequate ventilation, temperature and humidity control.

All switches, plugs, sockets and power cables must be insulated and safety approved. All devices should be connected before powering on.

Connection Procedure

- Connect the HDMI source devices to the HDMI IN connectors of the switcher.
- Connect display devices to the HDMI output connectors as required.
- Connect the 5V DC PSU provided with your switcher to the DC input connector.

Using the MS44-18G

Manual Selection

To change the displayed image for any output, press the appropriate **Select** button on the front panel, to select the required input. The numbered LED on the front panel will light to indicate the current input selection for that output.

IR Remote Control

The IR remote control provided with the switcher may also be used to select the images, by first pressing an output number or the ALL button in the **Output** group (1-4), and then an input number in the **Input** group (1-4).

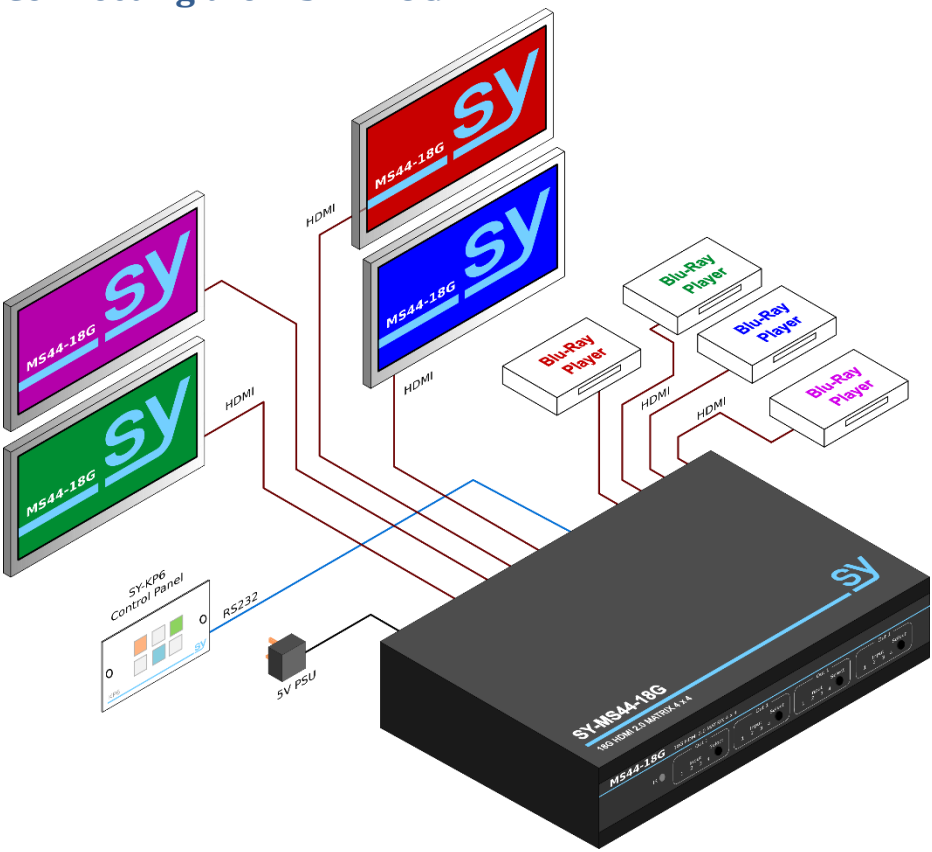
The **PTP** button on the IR remote will make the following selections: 1 → 1, 2 → 2, 3 → 3 and 4 → 4.

Press **X** button to cancel operation and **power** button for standby mode. All other buttons are to be ignored.

IP and Web Control

The matrix switcher also provides a built-in web interface as well as IP control. The IP control commands are identical to the RS232 commands.

Connecting the MS44-18G



RS232 and IP Commands

All RS232 commands are sent with the following settings:

115200 baud, 8 bits, no parity and 1 stop bit.

All commands are stated in ASCII notation and must be used as given in the following tables. The spaces shown in the commands are required and the command must only contain the values given in the Description column.

Commands can also be sent to the LAN CTL port using the following default IP settings:

Host IP Address:	192.168.1.168
Subnet Mask:	255.255.255.0
Router IP Address:	192.168.1.1
TCP Port:	5001

Input Selection

Command	Description
@W op in **#**	**Set matrix switch routing for video selection:** **op** is **00** to **03** for outputs 1 to 4, or **04** for all outputs **in** is **00** to **03** for inputs 1 to 4
@W 04 00 01 02 03 #	**Mirror inputs and outputs** Thus, 1 -> 1, 2 -> 2, 3 -> 3 and 4 -> 4 This command can also be used to set all the outputs to any input

Power Mode

Command	Description
@W 0F 00 #	**Enter Standby mode**
@W 0F 01 #	**Exit standby mode**

System Commands

Command	Description
@W 50 #	**Reboot** Mimics repowering the matrix switcher
@W 51 #	**Restore Factory Settings** Removes all previously programmed settings

EDID Settings

Command	Description	
@W XX AA BB **#**	**XX** is the Input Number **XX** is **05** for input 1 **XX** is **06** for input 2 **XX** is **07** for input 3 **XX** is **08** for input 4	**AA** is the Video Mode **AA** is **00** for 1080p **AA** is **01** for 4K2K@30 **AA** is **02** for 4K2K@60 (YC420) **AA** is **03** for 4K2K@60 (YC444)

For the EDID setting command, **BB** is a bit mask (7,6,5,4,3,2,1,0) that allows multiple options to be set at the same time. For the colour depth settings, the values for bits 4 to 6 may be used in any combination to enable all desired colour depth modes. Bit 1 to select the number of audio channel, but only one bit must be set for these audio bits.

Bit 7 (**HDR** mode) and bit 0 (**3D** mode) can be used independently of all the other bits.

Bit(s)	Function	Mode when Set (1)	Mode when Clear (0)
7	HDR	HDR On	HDR Off
6, 5 & 4	Colour Depth	654 **xx1** = Enable 30 bit colour **x1x** = Enable 36 bit colour **1xx** = Enable 48 colour **x** = bit may **0** or **1** as required	654 **xx0** = Disable 30 bit colour **x0x** = Disable 36 bit colour **0xx** = Disable 48 colour **x** = bit may **0** or **1** as required
3, 2, & 1	Audio Channels	321 **001** = 2ch audio **010** = 5.1h audio **100** = 7.1ch audio All other bit patterns are not allowed	321 **000** = Not allowed
0	3D	3D Mode	2D Only

When sending the EDID setting command, the binary bits in the above table will need to be converted to their hexadecimal form as sent as two ASCII characters, for example:

To set the EDID for input 1 to **4K2K@60 (YC444), HDR, 48 bit colour, 7.1ch audio & 3D** the binary bit pattern from the above table would be: **11001001**, which is **C9** in hexadecimal.

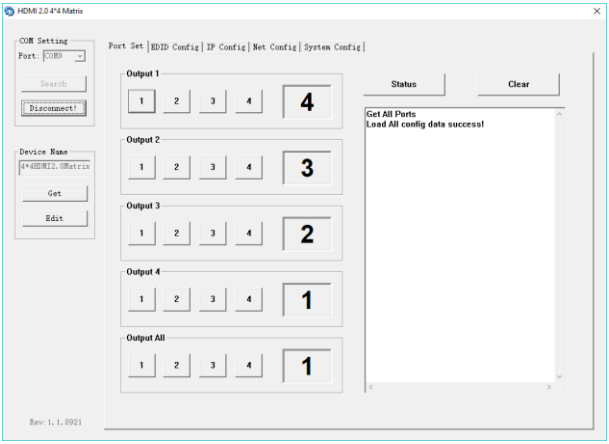
Also, **XX** = **05** for Input 1 and **AA** = **03** for 4K2K@60 (YC444).

The completed EDID command is: **@W 05 03 C9 #**

RS232 Control Software

The SY-MS44-18G can also be controlled via RS232 using PC software. The PC must be connected to the matrix switcher to allow the PC software to function correctly. Up on starting the software select the PC serial port from the drop-down list and click on the **Connect** button in the **COM Setting** panel.

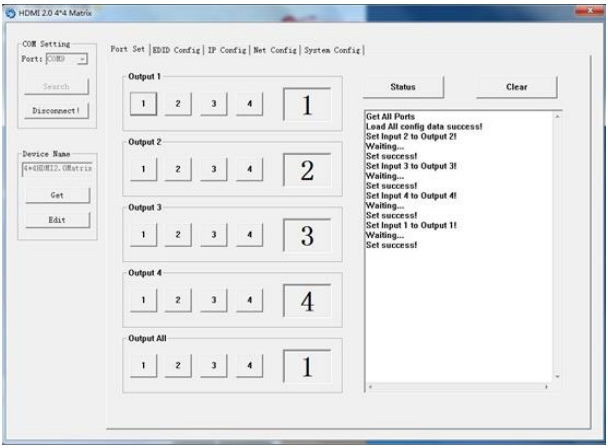
After clicking the **Connect** button, the software will read the current status from the matrix switcher.



Clicking the **Edit** button in the **Device Name** panel will allow the user to set a unique name for the matrix switcher that can aid in device identification when installed in a network system.

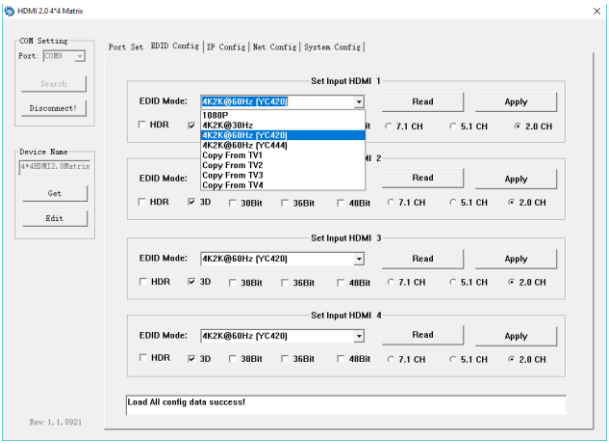
Port Set Panel

The **Port Set** panel allows for video selections. Click on any numbered button to select that input for the chosen output group. The **Output All** group will set all outputs to the chosen input number.



EDID Config Panel

The **EDID Config** panel allows the EDID settings for each input to be configured as required. Note that the HDR, 3D, 30Bit, 36Bit and 48Bit options may be used in any combination, whereas only one audio mode can be selected. Whenever any of the **Copy From TV1** to **Copy From TV4** options are selected, the option buttons below that selection box are not available.



After making any changes, click the relevant **Apply** button to store them in the matrix switcher.

The **Read** button for each input group reads the data from the current EDID mode of the respective input on the matrix switcher.

IP Config Panel

The **IP Config** panel allows the current IP settings to be viewed or changed. Note that the **DHCP** checkbox should be unchecked to enable the **IP Address Setting** controls. Once changes to the settings are complete, click on the **Save IP Config** button and then reset the matrix switcher by either power-cycling the unit or clicking on the **Reset** button on the **System Config** panel.

This panel can also be used to determine the IP address of any SY-MS44-18G matrix switcher that is connected to the RS232 port.

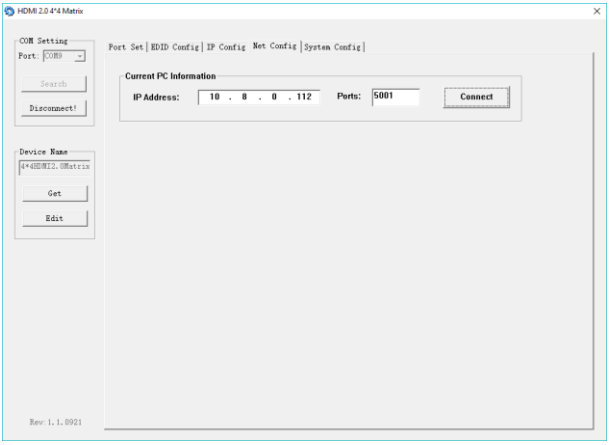
Note that the MAC address is fixed and cannot be changed.

Net Config Panel

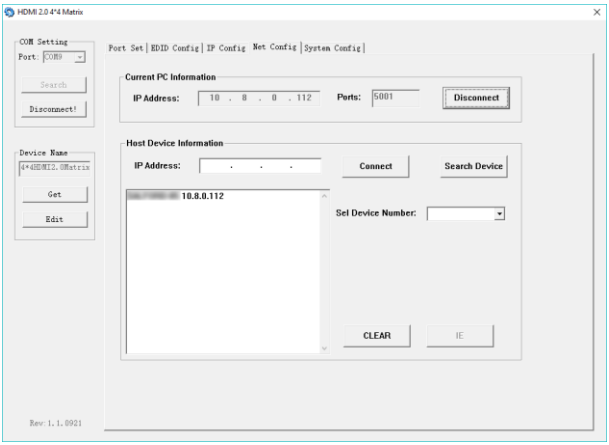
The Net Config panel provide the following features:

- Determine how many SY-MS44-18G matrix switchers are on the local network and their IP settings.
- Allow a web browser to be opened for the selected matrix switcher.

On the first panel, the **IP Address** is that of the controlling PC.



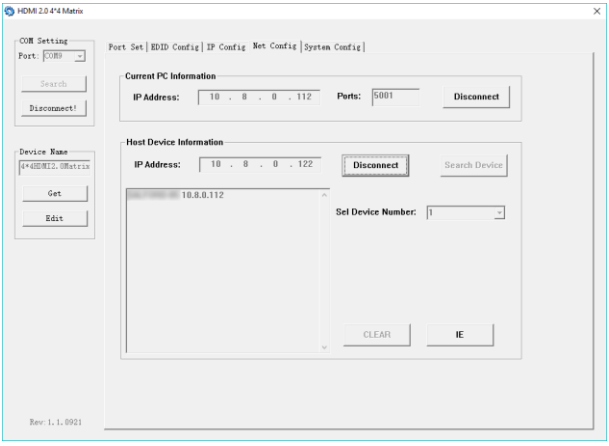
Click the **Connect** button in the **Current PC Information** section:



Click the **Search Device** button to obtain a list of all SY-MS44-18G units on the local network.

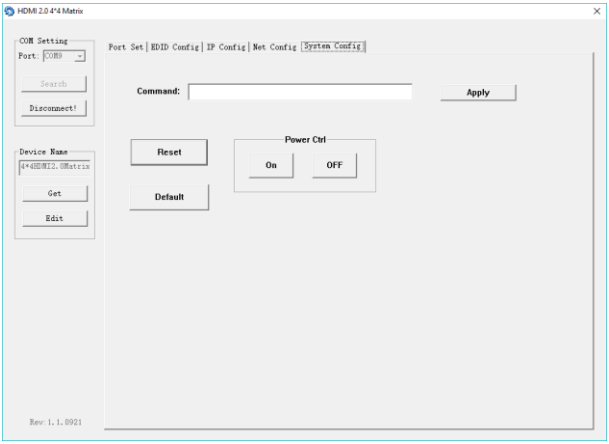
Use the **Set Device Number** list to choose the desired matrix switcher.

Click the **Connect** button in the **Host Device Information** section:



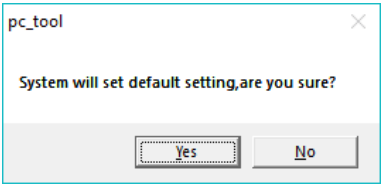
Click **IE** button to open the web interface in the default browser.

System Config Panel



The **System Config** panel provides the following features:

- Specific commands can be sent to the matrix switcher when the **Apply** button is clicked.
- The matrix switcher can be reset to its current power on status. This will be required whenever the IP settings are changed.
- Turn the matrix switcher ON or OFF.
    - The OFF state is a standby mode that will only respond to the power ON command. While in this mode the HDMI outputs and the front panel of the matrix switcher are turned off.
- Restore the matrix switcher to factory defaults. This will reset all settings back to their factory defaults – use with caution when the following window appears:



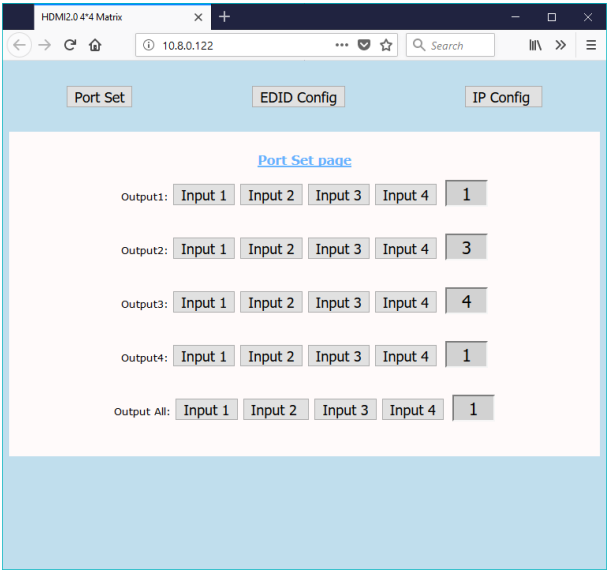
Web Interface Control

The built-in web interface provides control for input selection, EDID management and IP Configuration. The following browser screens are available after entering the Host IP address in the address bar of a web browser.

If the IP settings are not known, then use the RS232 control software to determine the current IP settings of the SY-MS44-18G as described for the **IP Config** panel in the **RS232 Control Software** section given above.

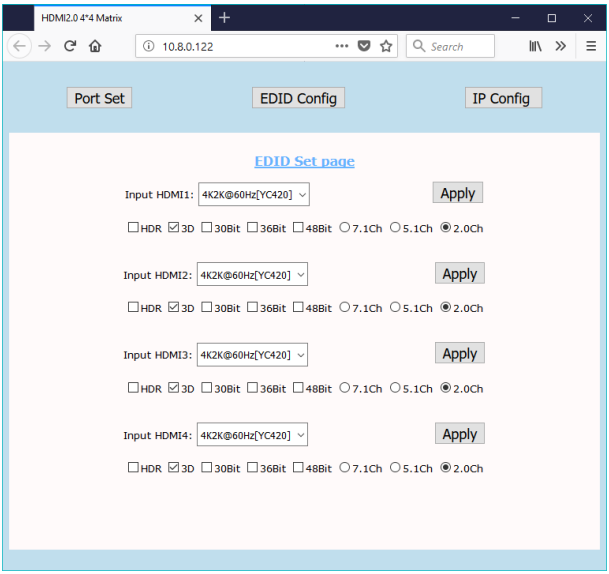
HDMI Selection (Port Set)

The **Port Set** page allows the user to make video selections for each individual output or for all outputs simultaneously.



EDID Config

The **EDID Config** page allows the user to set up the EDID options for each of the four inputs. Note that the HDR, 3D, 30Bit, 36Bit and 48Bit options may be used in any combination, whereas only one audio mode can be selected.



Each drop-down list provides the following EDID options:

1080p
4K2K@30Hz
4K2K@60Hz YCbCr 420 (shown as YC420)
4K2K@60Hz YCbCr 444 (shown as YC444)
Copy From TV1
Copy From TV2
Copy From TV3
Copy From TV4

Note that the last four options (**Copy From TV1** to **Copy From TV4**) do not allow any changes to the option buttons below the respective selection box.

Be sure to only choose the options that are best suited to HDMI source equipment, or use the Copy commands to make the HDMI input signal fully compatible with the display device.

Click the respective **Apply** button to set the new EDID option for that input.

IP Config

The **IP Config** page allows the user to configure new IP settings for the SY-MS44-18G. Any changes to these settings will only take effect after clicking on the **Apply** button.

Changes to the IP settings are only allowed when the DHCP box is not checked. Note that the MAC address cannot be changed at all.

The Device Name box will allow the user to set a unique name for the matrix switcher that can aid in device identification when on a network system.

Specifications

General

HDMI Video Input/output	VESA and SMPTE 480p to 2160p with 3D. All HDMI resolutions to 3840x2160p @60Hz 4:4:4 480p@60Hz 576p@50Hz 720p@60Hz 1080p@24Hz 1080p@50Hz 1080p@60Hz 4K@24Hz 4K@30Hz 4K@60Hz YUV4:2:0 4K@60Hz YUV4:4:4 All PC resolutions to 1920x1200@60Hz
Bandwidth	18 Gbps max.
HDMI Audio Input / Output	Pass through: All HDMI audio formats including Dolby D (TrueHD) / DTS (HD-Master Audio) / PCM. Channel count: from 2-8 (2.0 to 7.1) Sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz and 192 kHz
De-embedded Audio Out	S/PDIF digital audio from HDMI output onto RCA connectors
Control	RS232, IP & IR RS232 – 115,200 Baud, no Parity, 1 Stop bit IP default address: 192.168.1.168
Power Supply	5V DC @ 3.0A max.
Power Consumption	13W max.

Environmental

Operating Temperature	0 to +45°C (+32 to +113°F)
Operating Humidity	10 to 90 % RH (non-condensing)
Weight	720g

Physical

Dimensions	216 x 105 x 34mm
Case Material	Aluminium chassis

Safety Instructions

To ensure reliable operation of this product as well as protecting the safety of any person using or handling this device while powered, please observe the following instructions.

1. Use the power supply provided. If an alternate supply is required, check the voltage, polarity and that it has sufficient power to supply the device it is connected to.
2. Do not operate this product outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation to allow this product to operate efficiently.
4. Repair of this product should only be carried out by qualified professionals as this product contains sensitive devices that may be damaged by any mistreatment.
5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with this product.

After Sales Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting SY Technical Support.
2. When calling SY Technical Support, the following information should be provided:
   - Product name and model number
   - Product serial number
   - Details of the fault and any conditions under which the fault occurs.
3. This product has a two year standard warranty, beginning from the date of purchase as stated on the sales invoice. For full details please refer to our Terms and Conditions.
4. SY Product warranty is automatically void under any of the following conditions:
   - The product is already outside of its warranty period
   - Damage to the product due to incorrect usage or storage
   - Damage caused by unauthorised repairs
   - Damage caused by mistreatment of the product
5. Please direct any questions or problems you may have to your local dealer before contacting SY Electronics.