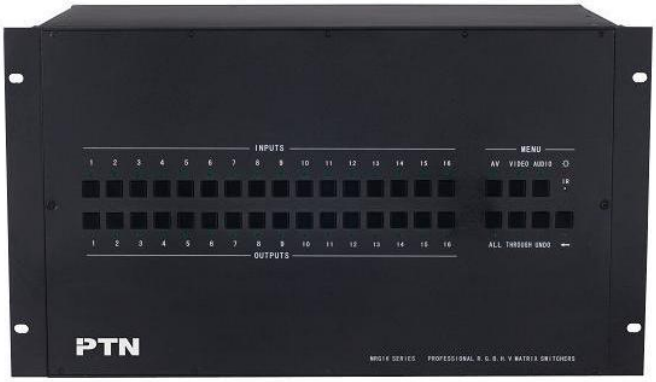
USER MANUAL

MRG1616A

PTN RGBHV/Stereo Audio Matrix Switcher 16x16



Version: MRG1616A2013V1.1

NOTICE: Please read this user manual carefully before using this product.

This manual is for operation instruction only, not for any maintenance usage. The functions described in this version are updated till May 2013. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

All product function is valid till 2013-05-29.

Update History

Version	Date	Update Content
1.0	2010.01.01	First Version.
1.1	2013.05.29	Modified the system diagram.

Table of Contents

1. Introduction

1.1. Introduction of MRG1616A

MRG1616A is a 16x16 RGBHV matrix switcher following with stereo audio. It supports audio follow and audio breakaway switching. With bandwidth up to 450MHz (-3db), it supports cross-point switching. It shows a good application in broadcast room, television teaching room, commanding center etc.

1.2. Package Contents

- 1 x MRG1616A
- 1 x Power cord
- 1 x IR remote (The cell battery is not included)
- 32 x Captive screw connectors
- 4 x Plastic cushions
- 1 x RS232 cable
- 1 x User manual

1. Features

- Video bandwidth up to 350MHz.
- Audio follow or audio breakaway switching.
- Fast switching speed in 200ns.
- Power-fail protection, allows switcher restore to previous settings.
- 10 presets to save and recall switching patterns.
- Front panel lockout.
- Controllable via button, IR & RS232.

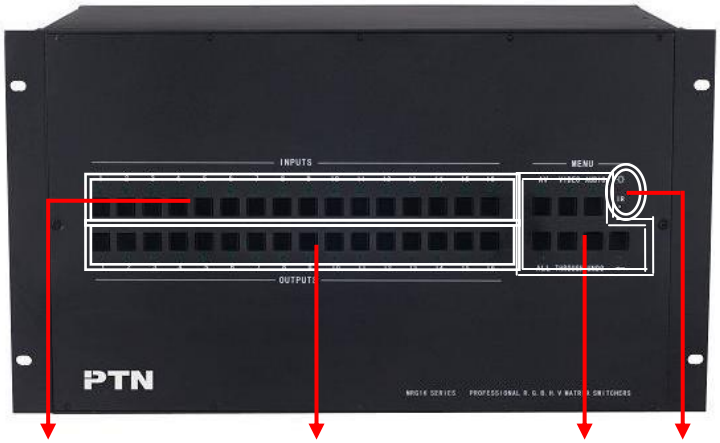
2. Specification

Video Input		**Video Output**	
Input	16 RGBHV	Output	16RGBHV
Input Connector	Female BNC	Output Connector	Female BNC
Return Loss	<-30dB@5MHz	Return Loss	-30dB@5MHz
Input Level	0.5 ~ 2.0Vp-p	Output Level	0.5 ~ 2.0Vp-p
Input Impedance	75Ω/510Ω(switchable)	Output Impedance	75Ω/510Ω(switchable)
DC Offset	1.5V	Switching Type	Vertical interval
Video General			
Gain	0 dB	Bandwidth	450MHz (-3dB), fully load
Video Signal	RGBHV, RGBS,	Video Type	RGBHV, RGBS,

	RGsB, RsGsBs, component video, S-video, and composite video.		RGsB, RsGsBs, component video, S-video, and composite video .
Switching Speed	200ns (Max.)	Crosstalk	<-80dB@5MHz
Audio Input		**Audio Output**	
Input	16 stereo, balanced/unbalanced	Output	16 stereo, balanced/unbalanced
Input Connector	Captive screw connectors, 5 pole	Output Connector	Captive screw connectors, 5 pole
Input Impedance	>10KΩ	Output Impedance	50Ω
Audio General			
Frequency Response	20Hz ~ 20KHz	CMRR	>90dB@20Hz~20KHz
Stereo Channel Separation	>80dB@1KHz	THD + Noise	0.03%@1KHz at nominal level
Control Parts			
Serial Control Port	RS232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
IR Remote	Default IR remote	Front Panel Control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	40W
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%
Case Dimension	W483 x H270 x D266mm (6U high, full rack wide)	Product Weight	9.3Kg

3. Operations of the Control panel and the Remote Controller

4.1. Operation of the Control Panel



① Input Channel ②Output Channel ③Function Buttons ④Power indicator & IR

F4-1 Front Panel

Detailed Description:

Buttons	Function Description
INPUTS	Input buttons, ranging from "0" to "9". 16 channels in total.
OUTPUTS	Output buttons, ranging from "0" to "9".16 channels in total.
AV	AV synchronal button: To transfer video and audio signal synchronously by the switcher. Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4. Operation: Press buttons in this order “AV”, “3”, “4””.
VIDEO	Video button: To transfer only video signals from input channel to output channel Example: To transfer video signals from input channel No.3 to output channel No.4. Operation: Press buttons in this order “VIDEO”, “3”, “4”.
AUDIO	Audio button: To transfer only audio signals from input channel to output channel Example: To transfer audio signals from input channel No.2 to output channel No.3. Operation: Press buttons in this order “AUDIO”, “2”, “3”
ALL	All button: To transfer an input channel to all output channels. Example1: To transfer video and audio signals from input

	channel No.7 to all output channels. Operation: Press buttons in this order “7”, “ALL”. Example2: To transfer all input signals to the corresponding output channels respectively. In another word, to switch to this status: 1->1, 2->2, 3->3, 4->4……16->16. Operation: Press buttons in this order “ALL”, “THROUGH”.
UNDO	Undo button: To resume to the status before the command just performed.
⇦	Backspace button: To backspace the latest input button.
THROUGH	Through button: To transfer the signals directly to the corresponding output channels. Example: To transfer the signals from input channel No. 3 to their corresponding output channels. Operation: Press buttons in this order “3”, “THROUGH”.

Note: With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.

“Switch Mode” +“Input Channel” +“Output Channel”

1) “Switch Mode”: “AV”, “VIDEO”, “AUDIO”

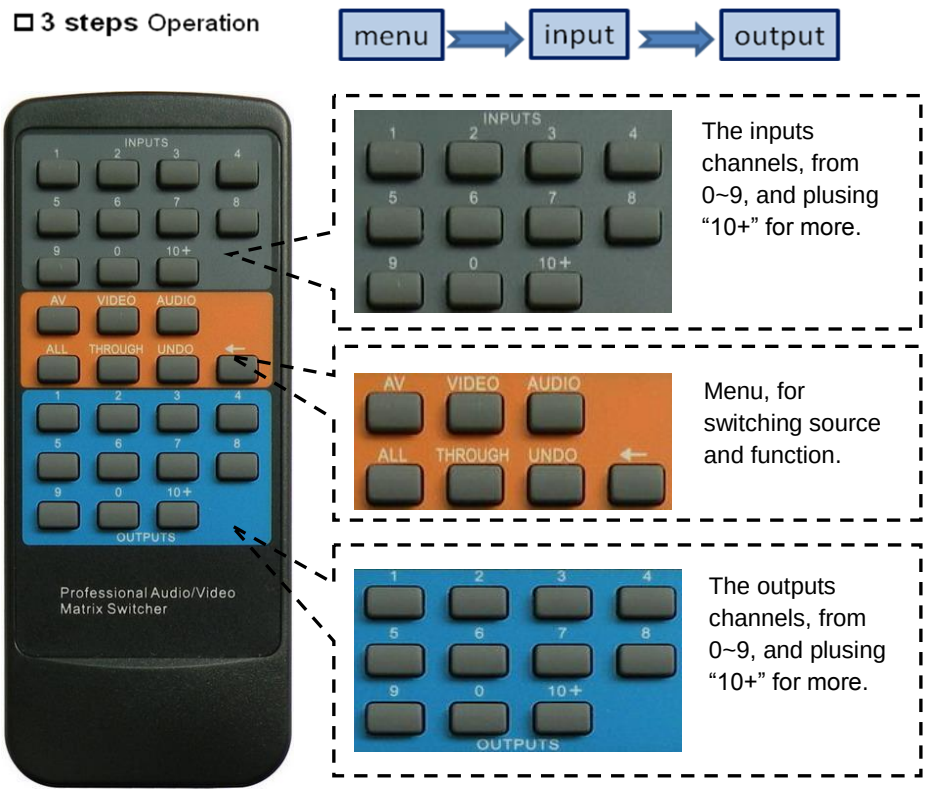
2) “Input Channel”: Fill with the number of input channel to be controlled.

3) “Output Channel”: Fill with the number of output channels to be controlled.

4.2. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel.

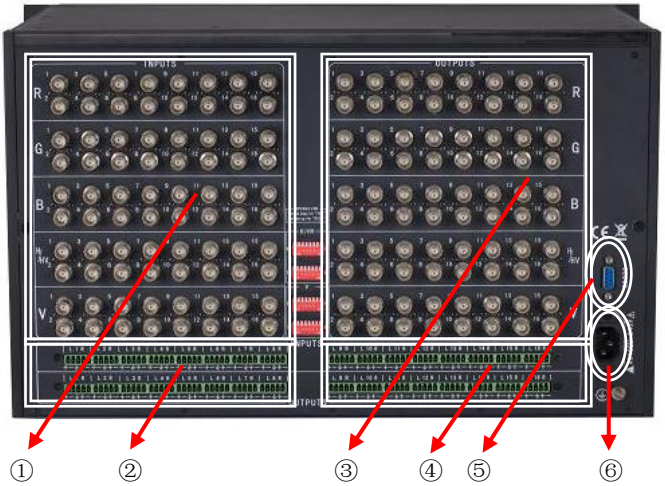
Operations of the remote controller are showed as follows.



F4-2 Panel of the Remote Controller

5. External Connection

5.1. Interface Introduction



F5-1 Rear panel

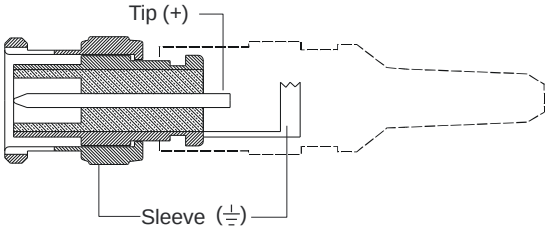
Detailed description:

No.	Name	Description
①	RGBHV INPUTS	RGBHV input channels, 16 in total. Female BNC connector.
②	AUDIO INPUTS	Audio input channels, 16 in total. 5-pole captive screw connector.
③	RGBHV OUTPUTS	RGBHV output channels, 16 in total. Female BNC connector.
④	AUDIO OUTPUTS	Audio output channels, 16 in total. 5-pole captive screw connector.
⑤	RS232	Serial control port, 9-pin female connector.
⑥	AC100V~240V	Alternating current for power supply.

5.2. RGBHV connection

The MRG matrix switchers support the Composite Video, Component Video (YPbPr), Super Video (YC) and VGA signal source. RGBHV signal output terminals or YC output terminals are needed in AV device; RGBHV signal output terminals are needed in VGA device.

The BNC connector is shown as the figure below.



BNC Connector

If the VGA device doesn't with RGBHV output terminals, please convert the signals with a VGA to RGBHV switcher for getting high quality MRG output effects.

Please use the special five core RGBHV signal cord to connect the input and output devices and connect the BNC connector R(red)、G（green）、B（blue）、H（horizontal）、V（vertical）carefully.

Attention:

Please make sure the RGBHV connectors from the source and to the destination should be in the same order, otherwise it world cause color loss or no output signal at all.

5.3. Audio Signal Connection

Audio connection is little complicated than video. It has two kinds of connection: balanced and unbalanced.

The balanced connection transmits a pair of balanced signals with two signal cords. Because interferences will have the same intensity and the opposite phases on the two signal cords, it will be counteracted in the end. For the low frequency extent of the audio signal, it would be easily interfered under long distance transmission. Therefore, as an anti-interference connection, it is mostly used in audio connection of special device.

The unbalanced connection transmits signals only with a signal cord. Without counteraction, it can be interfered more easily. Accordingly, it is adopted for household appliance or some cases with low technical demand.

The two kinds of connection are shown below.

Unbalanced Input　Unbalanced Output　Balanced Input　Balanced Output

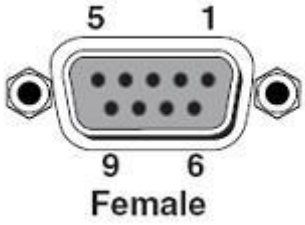
Balanced/unbalanced Connection on Captive Screw Connector

The connection should be selected is up to the interface of the device. When available, the balanced connection is the first choice. Before connection, please read the command or relevant demand in the user manual carefully. In some cases, maybe there

is balanced in source signal end but unbalanced in the destination end. If in a nonstandard case, it is done to connect balanced for the balanced end and unbalanced for unbalanced end. But if in a standard one, the converter must be used to switch the signals as the same, balanced or unbalanced.

5.4. Connection with RS232 Communication Port

Except the front control panel, infrared remote controller (Optional) and the Ethernet control (Optional), the MVG matrix switcher can be controlled from far-end control systems via the RS232 communication port. This RS232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.



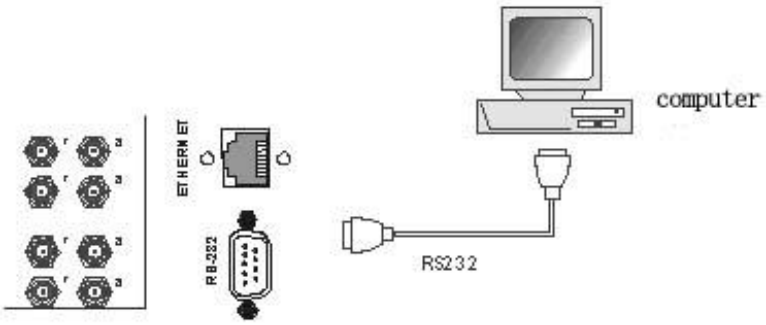
No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

F5-2 9HDF

5.5. Connection with Computer

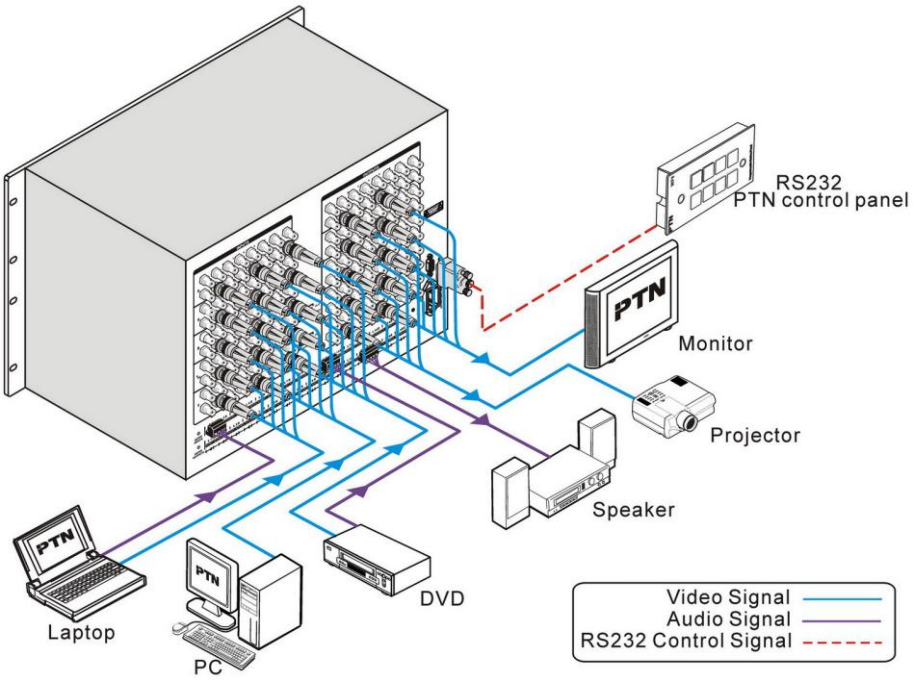
When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

To control the switcher, users may use the RS232 software.



F 5-3 Connection between MRG matrix switcher and the computer

6. System Diagram



F6-1 MRG1616A system connection

7. Communication Protocol and Command Codes

Communication protocol: RS232 Communication Protocol

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:Message Off;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:Message On;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.

	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
	[x1]All.	Transfer signals from the input channel [x1] to all output channels.
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
Operation Command （PTN2.0 Command System）	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1) [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.

2) In above commands, “[”and “]” are symbols for easy reading and do not need to be typed in actual operation.

3) Please remember to end the commands with the ending symbols “.” and “;”.

Detail Examples:

1、Transfer signals from an input channel to all output channels: [x1]All.

Example: “3All.” to transfer signals from the input channel No.3 to all output channels.

2、Transfer all input signals to the corresponding output channels respectively: All#.

Then the status of it will be: 1->1, 2->2, 3->3, 4->4…, 16->16.

3、Switch off all the output channels: All$.

Then there will be no signals on all the output channels.

4、Check the version of the firmware: /^Version;

To check the version of the firmware.

5、Switch off the detail feedback command from the COM port: /:MessageOff;

It will leave the “switch OK” as the feedback, when you switch the matrix.

6、Switch on the detail feedback command from the COM port: /:MessageOn;

It will show the detail switch information when send the commands.

7、Transfer signals from an input channel to the corresponding output channel: [x]#.

Example: “4#.” to transfer signals from the input channel No.4 to the output channel No.4.

8、Switch off an output channel: [x]$.

Example: “4$.” to switch off the output channel No.4.

9、Switch both video and audio signals synchronously: [x1] B[x2].

Example: “2B2,3,4.” to transfer signal from the input channel No.2 to the output channel No.2,3,4.

10、 Inquire the input channel to the output channel [x]: Status[x].

Example: “Status3.” to inquire the input channel to the output channel No.3.

11、 Inquire the input channel to the output channels one by one: Status.

Example: “Status.” to inquire the input channel to the output channels one by one.

12、 Save the present operation to the preset command [Y]: Save[Y].

Example: “Save7.” to save the present operation to the preset command No.7.

13、 Recall the preset command [Y]: Recall[Y].

Example: “Recall5.” to recall the preset command No.5.

14、 Clear the preset command [Y]: Clear[Y].

Example: “Clear5.” to clear the preset command No.5.

8. Safety Operation Guide

In order to guarantee the reliable operation of the equipments and safety of the staff, please abide by the following proceeding in installation, using and maintenance.

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

1) Do not put the switcher in a place of too hot or too cold.

2) As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.

3) Cut off the general power switch in humid weather or left unused for long time.

4) Before following operation, ensure that the alternating current wire is pull out of the power supply:

- Take off or reship any components of the equipment.
- Take off or rejoin any pin or other link of the equipment.

5) As to non-professional or without permission, please DO NOT try to open the casing of the equipment, DO NOT repair it on your own, in case of accident or increasing the damage of the equipment.

6) DO NOT splash any chemistry substance or liquid in the equipment or around.

9. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the MRG Matrix has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When user cannot control the switcher by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

3) When switching , there is no output image:

- Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
- Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
- Make sure the destination device is exactly on the controlled output channel.
- If it is still the same after the above checking, maybe there is something wrong in the switcher. Please send it to the dealer for fixing.

4) If the **POWER** indicator doesn't work or no respond to any operation, please make sure the power cord connection is good.

5) If the output image is interfered, please make sure the system is earthed well.

6) If the static becomes stronger when connecting the video connectors, it may be due to the incorrect earthling of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher.

7) If the Matrix cannot be controlled by the keys on the front panel, RS232 port or remote controller, the unit may has already been broken. Please send it to the dealer for fixing.

10. After-sales Service

1) If there appear some problems when running the switcher, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.

2) You can email to our after-sales department or make a call, please tell us the following information about your cases.

- Product version and name.
- Detailed failure situations.
- The system connections.

3) We offer products for all three-year warranty, which starts from the first day you buy this product (The purchase invoice shall prevail).

4) Any problem is same with one of the following cases listed, we will not offer warranty service but offer for charge.

- Beyond the warranty.
- Damage due to incorrectly usage, keeping or repairing.
- Damage due to device assembly operations by the maintenance company non-assigned.
- No certificate or invoice as the proof of warranty.
- The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
- Damage caused by force majeure.

Remarks: For any more questions or problems, please try to get help from your local distributor, or email PTN at support@PTN-electronics.com.