VScom Universal PCI Industrial RS-232/422/485 Board

The VScom uPCI-400i Universal PCI Industrial I/O controller offers four independent RS-232/422/485 serial ports. This Industrial I/O board supports both 3.3V and 5V PCI bus, and it's compatible with 32-bit PCI, 64-bit PCI and PCI-X bus. All serial ports are built by 16550A-compatible UARTS with 16 byte FIFO. Each port may be used in different configurations of RS232, RS422 or RS485. Each RS-422/485 port is protected by surge protector to withstand electrostatic discharge and power surges up to 25KV ESD.

The VScom uPCI-400i board provides connectivity to RS-232/422/485 communication devices for factory automation equipments, multi-drop data collection devices, barcode readers, time clocks, scales, data entry terminals, PC to PC long distance communications and serial communication in harsh environments. The board provides industrial solution for applications requiring single node or multi-drop communications over short and long distance.

Hardware Installation

1. With the uPCI-400i, there is one jumper for speed setting. It is located near the crystal, and named JP2.



2. Two speed modes are available, "Enhanced" and "Compatibility". Configure the speed setting according to your requirements.

Connect pins	Max. speed (bps)	Remarks
2 and 3	921600	Enhanced speed option, recommended (Default)
1 and 2	115200	Compatibility speed for direct port access

3. Each port may be used in different modes. These are defined by setting the configuration via the switches. Depending on your application, select the desired operation mode.

Switch S1 (COM-A) to S4 (COM-D), operation modesDIP Switch			ch	
Mode	Typical use	1	2	3
RS-232	Point to Point	Off	On	On
RS-422	Point to Multipoint	On	On	On
RS-485 Full Duplex	Transmit on Tx+/-, Receive on Rx+/-	On	On	Off
RS-485 Half Duplex with Echo	Transmit and Receive on Rx+/-	On	Off	On
RS-485 Half Duplex no Echo	Transmit or Receive on Rx+/-	On	Off	Off

Warning: mismatched operation modes between the communicating devices can cause serious damage. Especially, if only one of the partners is configured for RS232 and the other uses RS422 or RS485. This is caused by differing electrical specifications.

4. Sometimes, when operating in RS422 or RS485, it is necessary to configure termination and biasing of the data transmission lines. Generally this must be done in the cabling, since this depends on the installation of the connections. For convenience the uPCI-400i boards provide options to do this. Since this is pure electrical items, it is done via jumpers. The jumpers are color-coded for better visibility. Close to activate the option. Here is the list of the available options.

Configuration Header J1 (COM-A) to J4 (COM-D), RS422/485 termination and biasing			
Termination TxD	120 Ω Tx+ to Tx-	1-2	0 0
Bias Tx+	750 Ω Tx+ to VCC	3-4	0 0
Bias Tx-	750 Ω Tx- to GND	5-6	0 0
Termination RxD	120 Ω Rx+ to Rx-	7-8	0 0
Bias Rx+	750 Ω Rx+ to VCC	9-10	0 0
Bias Rx-	750 Ω Rx- to GND	11-12	0 0
Termination CTS	120 Ω CTS+ to CTS-	13-14	0 0

- 5. Before applying the option, check your cable specification for proper impedance matching.
- 6. Switch off the computer.
- 7. Insert the VScom uPCI-400i controller into a free PCI-Bus slot.

Windows 95/98/ME Driver Installation

- 1. Switch on the computer and start Windows 95/98/ME.
- 2. Windows will automatically detect the PCI Serial Controller.
- 3. The Add New Hardware Wizard dialog box appears and searches for new drivers for PCI Serial Controller.
- 4. Click on "Next".
- 5. From the listed box, choose "Search for the best driver for your device".
- 6. Click on "Next".
- 7. If not done already, insert the driver CD into the CD-ROM drive.
- 8. From the generated choices, choose "Other location".
- 9. Select the directory "\Win95\PCI_Driver" ("\Win98\PCI_Driver", "\WinME\PCI_Driver") as the target. Click on "OK", and on "Next".
- 10. Windows searches for the driver, and detects the .inf-file on the CD. It is ready to install the driver for VScom I-Series Controller. Click on "Next".
- 11. If asked again for the driver disk, point to the same directory again.
- 12. Click on Finish.
- 13. Windows now detects the COM ports on the I-Series board.
- 14. If Windows requests the driver disk again, point to the "\Win95\PCI_Driver" ("\Win98\PCI_Driver", "\WinME\PCI_Driver") directory.
- 15. Windows will copy and install the driver for the new PCI ports.
- 16. Press "Yes" If asked if you want to restart your computer.
- 17. Computer restarts to finish the installation.

Checking installation

You can now verify the installation by looking at the "VScom Multi IO cards" section of the Device Manager (Go there by Start - Settings - Control Panel - System - Device Manager). There you will find the new device "VScom 400LIU PCI Controller"

listed. Select this, and open the properties. In the "advanced" tab, click the button verify the speed setting from the hardware installation.

You may also rename the serial ports here.

To Uninstall Driver

To remove installed files and Windows registry information

- 1. Go to the "\Win95\PCI_Driver" ("\Win98\PCI_Driver", "\WinME\PCI_Driver") directory as described above.
- 2. Double click "VSCLEAN.EXE", and reboot your computer when asked to.

Windows XP/2000/2003 Driver Installation

You need to have administrator privileges to install any new drivers under Windows 2000 & Windows 2003. To install the driver or update the configuration please log on to Windows as "Administrator" or ask your system administrator to install the VScom I-series PCI card and driver. Please proceed with the following steps to install the driver:

- 1. Switch on the computer and start Windows 2000/XP/2003.
- 2. Log on as "Administrator"
- 3. Windows will automatically detect the PCI Serial Controller.
- 4. The Add New Hardware Wizard dialog box appears and searches for new drivers for PCI Serial Controller.
- 5. Click on "Next".
- 6. From the listed box, choose "Search for the best driver for your device".
- 7. Click on "Next".
- 8. If not done already, insert the driver CD into the CD-ROM drive.
- 9. From the generated choices, choose "CD-ROM drive".
- 10. Windows searches for the driver, and detects the .inf-file on the CD. It is ready to install the driver for VScom I-Series Controller. Click on "Next".
- 11. Click on Finish.
- 12. Windows now detects the COM ports on the I-Series board.
- 13. If Windows requests the driver disk again, point to the "\Win2000\PCI_Driver" ("\WinXP\PCI_Driver") directory.
- 14. Windows will copy and install the driver for the new PCI ports.
- 15. Press "Yes" If asked if you want to restart your computer.
- 16. Computer restarts to finish the installation.

Checking installation

You can now verify the installation by looking at the "VScom Multi IO cards" section of the Device Manager (Go there by Start - Settings - Control Panel - System - Hardware - Device Manager). There you will find the new device "VScom 400LIU PCI Controller" listed. Select this, and open the properties. In the "advanced" tab, click the button to verify the speed setting from the hardware installation.

You may also rename the serial ports here.

To Uninstall Driver

To remove installed files and Windows registry information

- 1. Go to the "\Win2000\PCI_Driver" directory as described above.
- 2. Double click "VSCLEAN.EXE", and reboot your computer when asked to.

Windows NT4.0 Driver Installation

You need to have administrator privileges to install any new drivers under Windows NT 4.0. To install the driver or update the configuration please log on to Windows NT 4.0 as "Administrator" or ask your system administrator to install the VScom I-series PCI card and driver. Please proceed with the following steps to install the driver:

- 1. Switch on the computer and start Windows NT 4.0.
- 2. Insert the supplied CD-ROM into the drive.
- 3. If your system is configured for Auto-start of CD-ROM, go to the products page, find your product and select driver. You'll find a link to the NT4 drivers directory.
- 4. Otherwise double click on "My Computer", and choose CD-ROM drive (D:)
- 5. Double Click "WinNT4".
- 6. Double Click "PCI_Driver".
- 7. Double click "install.exe".
- 8. Install.exe starts and requests confirmation of installation. You may change the target directory for the software. If there is a space in the name, please use the short name (e.g. PROGRA~1) instead.
- 9. Click "Yes", and Reboot when requested.
- 10. Log on to NT as "Administrator" again. The "A new VScom Card was found." dialogue appears. Click "Configure".
- 11. The next panel shows the detected hardware. Click on "OK".
- 12. The installation is finished.
- 13. To install more boards, plug them into the computer, and log on as Administrator again. Proceed as above.

Checking installation

You can now verify the installation by looking at the "Administrative Tools" section of the "Windows NT Diagnostics (also called WinMSD" (Go there by Start - Setting - Windows NT Diagnostics - Administrative Tools - Resources). There you will find new device "vscnt" listed.

Double click on it, you will see the IRQ and I/O information.

Click on the right tab, you can see all the detailed information of IRQ, Input/Output & Memory Range used by PCI Ports.

Open "VScom PCI" in the control panel (Go there by **Start - Setting - Control panel**). Open "VS Cards" and double click on the detected controller to open the properties. In the

"advanced" tab, click the button restauction to verify the speed setting from the hardware installation. You may also rename the serial ports here.

To Uninstall Driver

To remove installed files and Windows registry information

- 1. Go to the Control Panel.
- 2. Open the "Add/Remove programs" applet.
- 3. Select "Vscom drivers for ...".
- 4. Click "Remove".
- 5. "VScom install" requests to confirm the uninstall, click "Yes".
- 6. Reboot the computer when requested.

RS-422 Signal Pin-outs of DB-9 Male

Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND
Pin 6	RTS- (A)
Pin 7	RTS+(B)
Pin 8	CTS+(B)
Pin 9	CTS- (A)

RS-422 Signal Wiring

• Point- to -Point 4 Wire Full Duplex



RS-422 Device

- 2 $TxD+(B) \leftarrow RxD+(B)$ 1 $TxD-(A) \leftarrow RxD+(B)$
- $1 \qquad TxD-(A) \iff RxD-(A)$ $3 \qquad RxD+(B) \iff TxD+(B)$
- $4 \quad \text{RxD-}(A) \longleftarrow \text{TxD-}(A)$
- 5 GND \leftarrow GND

• RS-422 with Handshaking

UPCI-400i RS-422 Device $TxD+(B) \iff RxD+(B)$ 2 $TxD-(A) \iff RxD-(A)$ 1 $\begin{array}{cccc} RxD+(B) & \longleftarrow & TxD+(B) \\ RxD-(A) & \longleftarrow & TxD-(A) \end{array}$ 3 4 $\begin{array}{ccc} \text{GND} & \longleftarrow & \text{GND} \\ \text{RTS+(B)} & \longleftarrow & \text{CTS+(B)} \end{array}$ 5 7 $\mathbf{RTS-(A)} \longleftrightarrow \mathbf{CTS-(A)}$ 6 $CTS+(B) \iff RTS+(B)$ $CTS-(A) \iff RTS-(A)$ 8 9

RS-485 4 Wire (Full duplex) Signal Pin-outs of DB-9 Male

Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND

RS-485 2 Wire (Half duplex) Signal Pin-outs of DB-9 Male

Pin 1	Data- (A)
Pin 2	Data+(B)
Pin 5	GND

RS-485 Signal Wiring

• Point-to-Point 4 Wire Full Duplex

UPCI-400i



• Multidrop RS-485 2-Wire Half-duplex

UPCI-400i

RS-485 Device

RS-485 Device

