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GV I/O 4.0 — Third-party Control

VDCP and AMP Support

by Damon Hawkins, April 2021

VDCP

Introduction

In GV I/O release v4.0 support for VDCP (Video Disk Control Protocol) has been implemented to allow third-party control of the GV I/O video server as required by many of our customers.

The Video Disk Control Protocol (VDCP) is a broadcast industry standard, developed more than 10 years ago to support remote control of video servers. It is a serial interface similar to the Sony 9-pin format used to control VTRs and is still widely used to control video servers.

As GV I/O has no serial RS-422 port VDCP control is over IP via a Perle IOLAN SDG Serial RS-422 to IP converter device that needs to be purchased by the customer.

Requirements

The Perle IOLAN SDG4 detailed below has been validated by Grass Valley engineering in the testing of VDCP being used as a RS-422 to IP converter.

	Description	Power Cord	Product Part Number
	IOLAN SDG4 Device Server: 4 x RJ45 connectors with software selectable RS-232/422/485 interfaces, 10/100/1000 Ethernet, advanced data encryption, user authentication and event management security features included, IPv6, COM port redirector, 15kv ESD	USA	04031854
		UK	04031851
		EU	04031852
		AUS	04031856
		None	04031858

Once the Perle box is connected, then "VDCP" needs to be selected as the control protocol under *Channel Configuration* within the new Web UI.
See Appendix 1 for details on the Perle configuration.

Remember this is a per channel configuration. The channel will now be ready to receive VDCP commands from third-party automation devices.

GV I/O 4.0 — Third-party Control VDCP and AMP Support
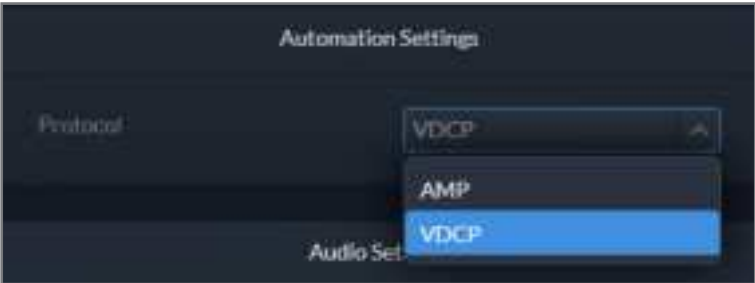
VDCP Command Set

There are several VDCP commands that are not applicable to GV I/O as they are not supported server functions.

The following table details the VDCP commands supported by GV I/O 4.0.

VDCP Compatibility Matrix

Command	Description	Supported on GV I/O	Comments
0x.0C	Local Disable	✘	To be implemented
0x.0D	Local Enable	✘	To be implemented
0x.14	Delete From Archive	✘	Not supported in GV I/O or K2
0x.15	Delete Protect ID	✔	
0x.16	UnDelete Protect ID	✔	
1x.00	Stop	✔	
1x.01	Play	✔	
1x.02	Record	✔	Note that back-to-back record is NOT supported but GV I/O allows you to cue a record (Record Init command) while a current record is in progress – in which case the current record will be prematurely terminated (this is consistent with K2 behavior).
1x.03	Freeze	✘	Not supported in GV I/O or K2
1x.04	Still	✔	
1x.05	Step	✔	
1x.06	Continue	✔	
1x.07	Jog	✔	Currently a Play after a Jog plays from the beginning of the clip. With a Jog and the Eject the clip position does not go back to 00:00:00:00
1x.08	Variable Play	✔	
1x.09	Unfreeze	✘	Not supported in GV I/O or K2
1x.0A	EE mode	✘	Not supported in GV I/O or K2
2x.1D	Rename ID	✔	
2x.1E	Preset Std Time	✘	Not supported in GV I/O or K2
2x.1F	New Copy	✔	
2x.20	Sort Mode	✔	
2x.21	Close Port	✔	
2x.22	Select Port	✔	

Command	Description	Supported on GV I/O	Comments
2x.23	Record Init	✔	
2x.24	Play Cue	✔	
2x.25	Cue with Data	✔	
2x.26	Delete ID	✔	
2x.27	Get From Archive	✘	Not supported in GV I/O or K2
2x.29	Clear	✘	Not supported in GV I/O or K2
2x.2A	Send to archive	✘	Not supported in GV I/O or K2
2x.2B	% to signal full	✔	
2x.2C	Record init with data	✔	Does not work with media that already exists
2x.2D	Select logical drive	✘	Not supported in GV I/O or K2
2x.2E	System delete ID	✘	Not supported in GV I/O or K2
2x.30	Preset	✘	Not supported in GV I/O or K2
2x.31	Vid Compr Rate	✘	Not supported in GV I/O or K2
2x.32	Aud. Sample Rate	✘	Not supported in GV I/O or K2
2x.33	Aud. Comp. Rate	✘	Not supported in GV I/O or K2
2x.34	Audio IN Level	✘	Not supported in GV I/O or K2
2x.35	Audio OUT Level	✘	Not supported in GV I/O or K2
3x.37	Vid Compr Param	✘	Not supported in GV I/O or K2
2x.38	Select Output	✘	Not supported in GV I/O or K2
2x.39	Select Input	✘	Not supported in GV I/O or K2
2x.3A	Record Mode	✘	Not supported in GV I/O or K2
2x.41	SubCarrier Adjust	✘	Not supported in GV I/O or K2
2x.42	Horiz Sync Timing	✘	Not supported in GV I/O or K2
2x.43	Disk Preroll	✔	
2x.50	Copy File To	✘	Not supported in GV I/O or K2
2x.51	Delete File From	✘	Not supported in GV I/O or K2

VDCP Compatibility Matrix (cont.)

Command	Description	Supported on GV I/O	Comments
2x.52	Abort Copy File To	✘	Not supported in GV I/O or K2
2x.53	Set Working Folder	✔	Not part of the standard VDCP command set – added by Grass Valley
3x.01	Open Port	✔	01 = Player; 81 = Recorder. The channel has to be configured accordingly
3x.02	Next	✔	
3x.03	Last	✔	
3x.05	Port Status Request	✔	
3x.06	Position Request	✔	Outstanding issue – clip position needs to be 00:00:00:00 or error after Jog + Eject rather than some old position
3x.07	Active ID Request	✔	
3x.08	Device Type Request	✔	
3x.10	System Status Request	✔	
3x.11	ID List	✔	
3x.12	Get Working Folder	✔	Not part of the standard VDCP command set – added by Grass Valley
3x.14	ID Size Request	✔	

Command	Description	Supported on GV I/O	Comments
3x.15	IDs Added to Arch	✘	Not supported in GV I/O or K2
3x.16	ID Request	✔	
3x.17	Compr. Settings Request	✘	Not supported in GV I/O or K2
3x.18	IDs Added List	✔	
3x.19	IDs Deleted List	✔	
3x.25	Multi Port Status Request	✘	Not supported in GV I/O or K2
5x.60	Abort Macro#	✘	Not supported in GV I/O or K2
5x.61	Active Macro List	✘	Not supported in GV I/O or K2
5x.62	Macro Status	✘	Not supported in GV I/O or K2
5x.63	Copy File To	✘	Not supported in GV I/O or K2
5x.64	Get From Archive	✘	Not supported in GV I/O or K2
5x.65	Send to Archive	✘	Not supported in GV I/O or K2
5x.66	Prepare ID To Play	✘	Not supported in GV I/O or K2
5x.67	Close ID from play	✘	Not supported in GV I/O or K2

AMP

Introduction

AMP commands are a list of commands specified in the "Video Disk Recorder Command and Control Specification" from Odetics Broadcast Corporation as well as new and extended commands that have been added by Grass Valley.

The Advanced Media Protocol (AMP) is an extension of the Odetics protocol.

AMP Command Set

There are several AMP commands that are not applicable to GV I/O as they are not supported server functions.

The following table details the AMP commands supported by GV I/O 4.0.

AMP Compatibility Matrix

General Access

No.	Command	Description	Supported on GV I/O	Comments
1		Channel Less mode	✔	
2		Generic Socket interface	✔	

Device Management

No.	Command	Description	Supported on GV I/O	Comments
6	00.0C	Local Disable (Standard)	✘	Not supported
7A	0X.1D	Local Enable (Standard)	✘	Not supported
7B	0X.1D	Local Enable (Extended)	✘	Not supported
8	00.11	Device Type Request	✔	Returns Category 0xD8 Model 0x06
9	20.04	Standby Off	N/A	
10	20.05	Standby On	N/A	
11	20.60	EE Off	✘	Not supported
12	20.61	EE On	✘	Not supported
13	21.62	Set Mute Mode	✘	Not supported (The command listed from the protocol causes an error. The number of bytes is invalid)
14	A8.20	Set Device ID	✔	
14	A0.21	Device ID Request	✔	
15	A0.2C	Device Name Request	✔	
16	01.30	Set Channel Definition	✘	Not supported
17	00.31	Get Channel Definition	✘	Not supported (Returns a channel definition not listed in the document)

Transport Controls

No.	Command	Description	Supported on GV I/O	Comments
18	2X.00	Stop	✔	Stop works. Scheduled Stop is not supported.
19	2X.01	Play	✔	Play works. Scheduled Play is not supported.
20	2X.02	Record	✔	
21	20.0F	Eject	✔	
22	20.10	Fast Forward	✔	
23	2X.11	Jog Forward	✔	
24	2X.12	Variable Forward	✔	
25	2X.13	Shuttle Forward	✔	
26	20.20	Rewind	✔	
27	2X.21	Jog Reverse	✔	
28	2X.22	Variable Reverse	✔	
29	2X.23	Shuttle Reverse	✔	
30	2X.31	Cue Up With Data	⚠️	Using 24.31 jumps to the incorrect timecode and positions to half the value. Using variant 2E.31, all works correctly. 2C.31 does not work
31	20.52	Tension Release	✘	
32	40.20	InReset	✔	
33	40.40	Auto Mode OFF	✔	
34	40.41	Auto Mode ON	✔	
35	41.42	Set Loop Playback Mode	✔	

No.	Command	Description	Supported on GV I/O	Comments
36	41.36	Timecode Mode Preset	✔	
37	41.43	Set Widescreen Mode	✔	
38	40.45	Get Stop Mode	✔	
39	41.44	Set Stop Mode	⚠️	StopMode is set, but only stop mode OFF works for back-to-back playing with AUTO MODE ENABLED.
40	44.05	User Bits Preset	✘	Send: 4405000000FA Recv: NAK Being investigated
41	60.0B	State Change Latency Request	✔	
42	61.0C	Current Time Sense	⚠️	When tested with a recorder channel, the Current Time Sense command always returned a timecode of 00:00:00,00, regardless of which timecode format was requested. Works with player channel, but user bits are not supported (see User Bits Preset 44.05).
43	61.20	Status Sense	✔	
44	AX.02	Record Cue With Data	✔	Works, but providing timecode data has no effect in GV I/O

Attaching a List of Clips to a Timeline

No.	Command	Description	Supported on GV I/O	Comments
45	4X.14	InPreset	✔	Multiple clips can't be attached
46	4X.15	Out Preset	✔	Multiple clips can't be attached
47	4X.21	Out Reset	✔	Multiple clips
48	4F.16	Append Preset	✘	Returns ACK, but the clip is not added to the timeline
49	A0.06	Preview In Reset	✔	Multiple clips
50	AX.07	Preview Out Reset	✔	Multiple clips
51	44.31	Pre-Roll	✔	

Managing Clips on the Timeline

No.	Command	Description	Supported on GV I/O	Comments
52	AX.04	Preview In Preset	✔	Multiple clips can't be attached
53	AX.05	Preview Out Preset	✔	
54	AF.0A	Append Preview Preset	✘	Returns ACK, but the clip is not added to the preview timeline
55	A1.32	Set Ganging	✘	Handled at the protocol level, but is not supported
56	A0.33	Get Ganging	✘	Handled at the protocol level, but is not supported
57	AX.34	Set Ganging Information	✘	Not supported
58	A0.35	Get Ganging Information	✘	Not supported
59	A8.11	Erase Segment	✔	Works, but the last frame is off by one: EraseSegment (in="01:09:03,00", out="01:09:13,00") results in (in="01:09:03,00", out="01:09:13,01", length="00:00:10,01")
60	A0.16	ID Loaded Request	✔	
61	AX.01	Auto Skip	✔	

Managing Stored Clips

No.	Command	Description	Supported on GV I/O	Comments
62	A0.26	ID Count Request	✔	
63	AX.14	List First ID	✔	
64	AX.15	List Next ID	✔	
65	AX.18	ID Status Request	✔	
66	A2.0E	Set Working Folder Request	✔	
67	A0.0F	Get Working Folder Request	✔	
68	A0.12	IDs Changed List Request	✔	
69	AX.10	Erase ID	⚠	A810: The short version of the method is working as expected with clips with names of exactly 8 characters. No more, no less. AA10: The extended version, however, does not work correctly – to be addressed
70	A0.2A	List First Folder	✔	
71	A0.2B	List Next Folder	⚠	The command lists a set of folders correctly, but when there is no more folders to list, it returns 802b instead of 802a like the protocol is indicating
72	AX.1C	Total/Available Storage Request	⚠	The A11C02 returns the same amount of data as the other A11C commands, but the protocol document is listing it differently
73	A4.1D	Set Record Duration	⚠	When executing the command, the duration passed is halved and the record will be shorter than expected. To be addressed
74	A2.31	Create Folder	✔	
75	A2.28	Rename Folder	✘	To be addressed
76	A2.29	Delete Folder	✔	
77	A2.25	ID Start Time Request	✔	
78	A2.17	ID Duration Request	✔	
79	AE.30	Replace Edit	✘	Not supported

Managing stored clips (cont.)

No.	Command	Description	Supported on GV I/O	Comments
80	AX.2D	Stripe Timecode	✔	
81	AX.2E	Set Mark In	✔	
82	AX.2F	Set Mark Out	✔	
83	AX.1A	Get Aspect Ratio Conversion Override	✔	
84	A2.1B	Set Aspect Ratio Conversion Override	⚠️	Upconversion works, down conversion doesn't. To be addressed
85	AE.1E	Set Audio Gain	✘	Not supported. Can't set the audio gain
86	AA.1F	Get Audio Gain	✘	Not supported. Audio gain is always returning 0
87	C0.28	Abort Transfer ID	✘	To be addressed
88	C1.27	Transfer ID Status Request	✔	
89	C2.26	Transfer ID	✘	This command is obsolete. The Extended Transfer ID (C2.25) should be used. The method doesn't transfer the requested clip even when the command is accepted
90	C2.25	Extended Transfer ID	✔	
91	C2.29	Network Delete	✔	The command requires the host name to be specified. Working as expected

Clip Data Information

No.	Command	Description	Supported on GV I/O	Comments
92	AA.08	Set Clip Data	✔	
93	AA.13	Clip Data Request	✔	

Create a Sub-Clip

No.	Command	Description	Supported on GV I/O	Comments
94	AX.19	New Copy	⚠️	Deep copying does not work: Deep copy with no marks → shallow copy is made Deep copy with marks → no copies are made
95	AX.22	Get Audio Track Labels	✘	To be implemented
96	AX.23	Set Audio Track Labels	✘	To be implemented
97	A0.36	Get Audio Input Tags	✘	To be implemented
98	AA.37	Set Audio Input Tags	✘	To be implemented
99	A0.38	Get Audio Output Tags	✘	To be implemented
100	AA.39	Set Audio Output Tags	✘	To be implemented
101	A2.3A	Get AFD Setting	✔	
102	A2.3B	Set AFD Setting	✘	To be addressed
103	A2.09	Get Thumbnail	✔	

Appendix — Configuration of the Perle Converter Box for VDCP

Introduction

The Perle box is an RS-422 to IP converter. It is used to connect VDCP controllers or automation devices to the GV I/O, even though GV I/O machines do not have automation RS-422 ports available.

Here is how it works:

- VDCP controllers or automation connect to a serial port on the Perle box itself, then
- a TruePort virtual COM port on the GV I/O machine connects to the Perle box as well to complete the connection

Pinouts

The pinouts on the Perle converter box are as listed below — you can use the 8-pin RJ45 connector to make the connection to the RS-422 controller.

Connecting Serial Devices

1-10
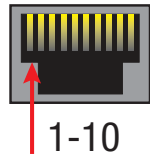
Ensure you have the appropriate cable for connecting your serial devices to the serial ports on the IOLAN.

Pinout	EIA-232	EIA-422	EIA-485 Full Duplex	EIS-485 Half Duplex
1	Power In	Power In	Power In	Power In
2 (in)	DCD			
3 (out)	RTS	TxD+	TxD+	TxD+/RxD+
4 (in)	DSR			
5 (out)	TxD	TxD-	TxD-	TxD/RxD-
6 (in)	RxD	RxD+	RxD+	
7	GND	GND	GND	GND
8 (in)	CTS	RxD-	RxD-	
9 (out)	DTR			
10	Power Out	Power Out	Power Out	Power Out

If the VDCP controller supports a 9-pin D-type serial connector, then a RJ45 9-pin D-type connector will be needed. If using 8-pin RJ45 male connector on the IOLAN SDG side, the number and pinouts from Perle side are as follows:

IOLAN SDG

RJ45 8-pin	EIA-422 VDCP controller
2 TX+	Rx (+)
4 TX--	Rx (--)
5 RX+	Tx (+)
7 RX--	Tx (--)

The pinouts number on the controller side should be provided by the user, and the Tx and Rx should match the above table. Please refer to the Perle user manual for more detailed information.

Configuration

The Perle box is configured through the Web-Manager portal, hosted by the Perle converter. Once the VDCP controller or automation device is connected to the Perle box with a serial RS-422 connection, here is how you can configure the converter device itself:

Access the portal at the IP address of the Perle device (e.g., http://12.34.56.78)
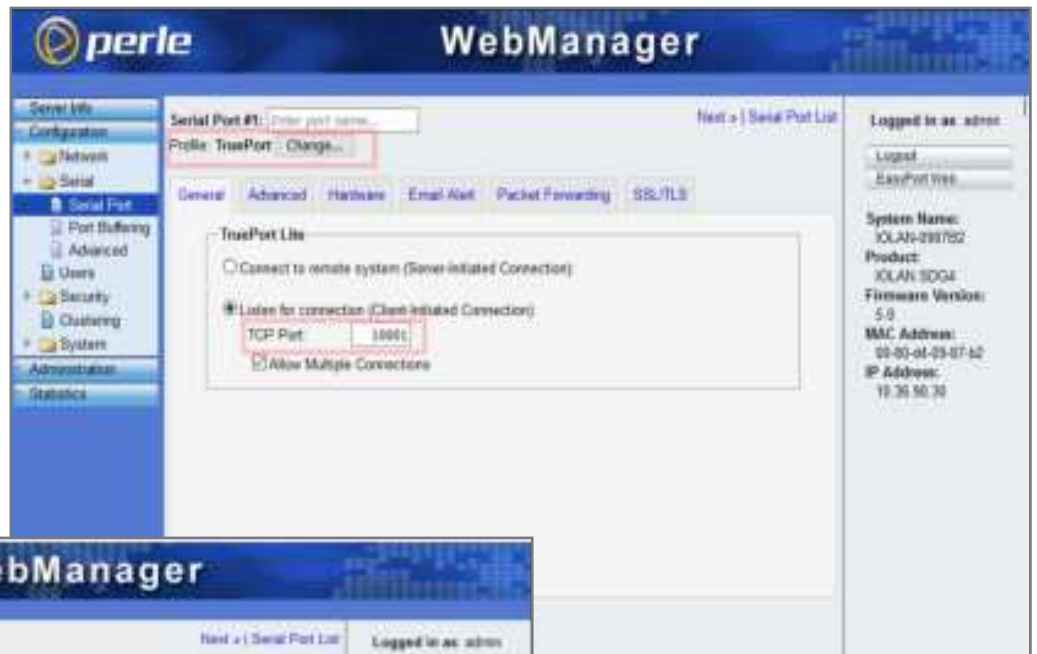
Log in:
- default user is **admin**
- default password is **superuser**

In the **Configuration** section navigate to Serial → Serial Port

Select the port that is connected to the VDCP controller/automation device and click on Edit...

- Ensure that **Profile** is set to **TruePort**. Use the **Change...** button if needed
- Configure a TCP port on which the box will listen for incoming connections

Configure the Advanced Tab as follows, check the **Enable TCP Keepalive** option.

Configure the Hardware tab as shown at right:

At this point, the TruePort driver can be installed and configured on the GV I/O machine.
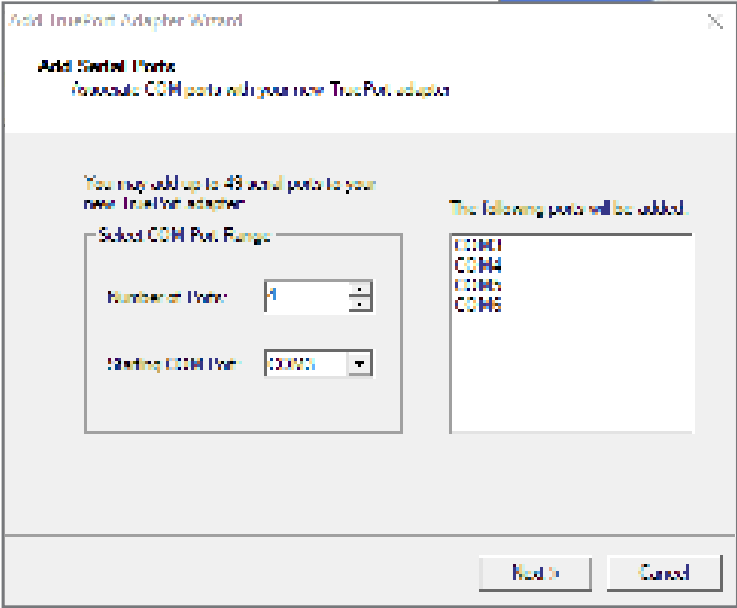
TruePort Management Tool Installation

On the GV I/O machine, we need to configure virtual COM ports, which will connect to ports on the Perle box. The first stage is to install the TruePort driver on the GV I/O machine:

• Run the TruePort driver installer; e.g., *trueport6.9-setup-w10-x64.exe*
• Go through the setup wizard using the default settings

TruePort Configuration

Here is how to configure the virtual COM ports on the GV I/O machine:

• Launch the *TruePort Management Tool*
  – The *TruePort Adapter Wizard* will open
• Enter the IP of the Perle box in the *Device Server Network Location* section
• Create the desired number of ports and choose a starting port number
  – For 4 channels, 4 COM ports are needed
  – COM ports 3 to 6 are mapped to channels 1 to 4

When the TruePort wizard completes, in Device Manager the TruePort COM ports that were configured should be listed. **Note that the configured ports start with COM3 and end with COM6.**
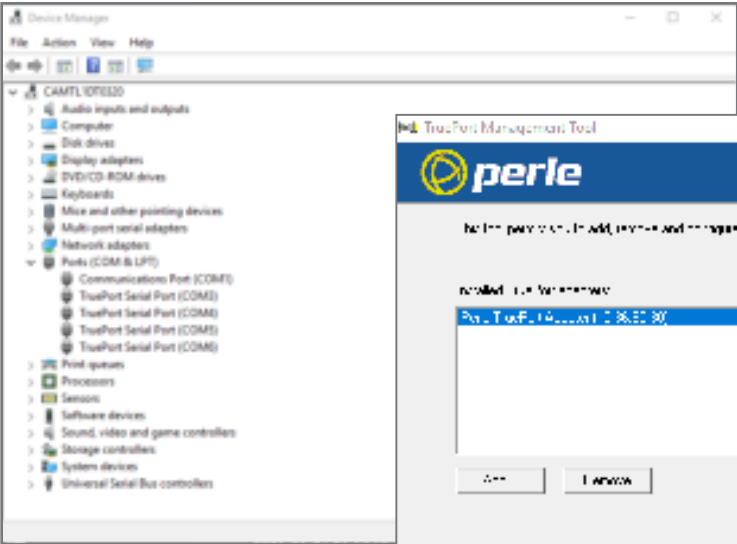

Also, a *TruePort Management Tool* should open, listing the configuration that was just done in the *Installed TruePort* adapters list.

Now to connect the ports to the Perle box:
- With the correct TruePort adapter selected, click the **Properties** button
- In the newly opened window, go to the **Configuration** tab
- Click the Settings button

In the settings window that opens, the TCP connection port for each of the virtual COM ports needs to be configured:
- Set the port number to match a port number on which the Perle box is listening for connections
- Ensure that the Connection Mode is set at "**Lite Mode**" *(Note: the default "Full Mode" should be changed!)*
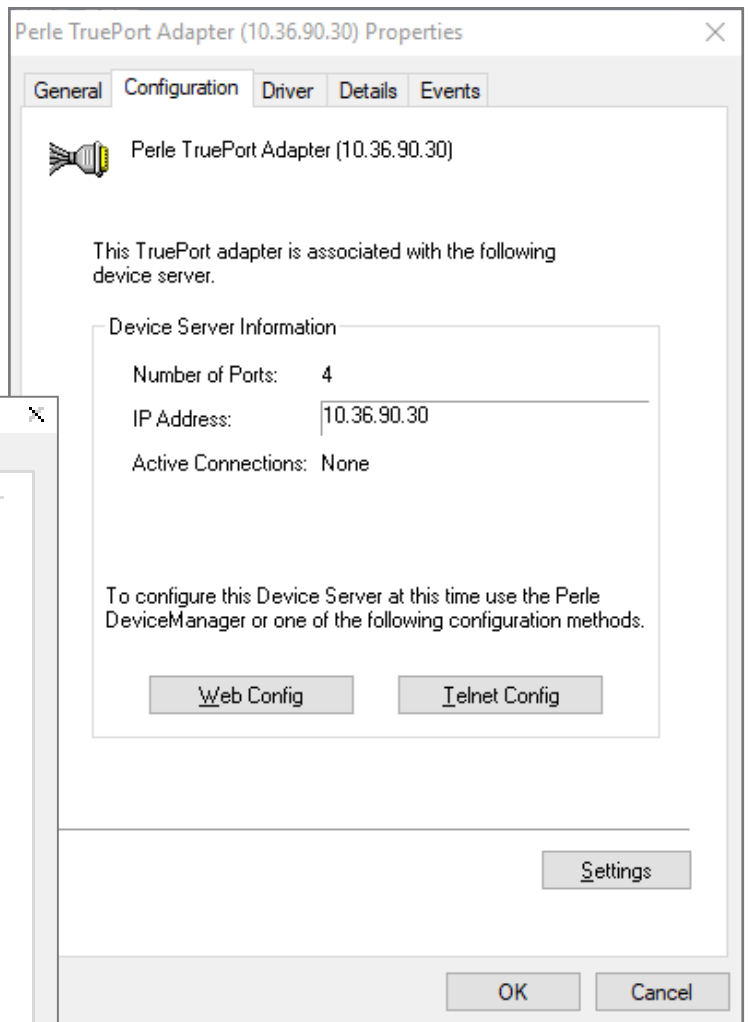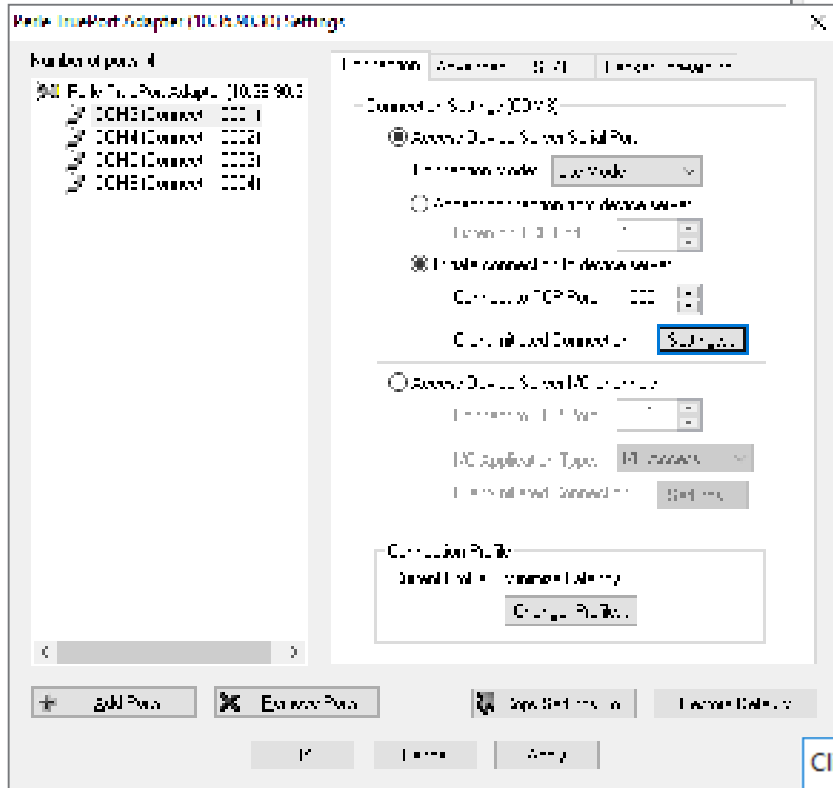
Click the Settings... button next to "Client Initiated Connect," and apply the settings at right:

This is all that needs to be done in order to connect a TruePort virtual COM port to a matching serial port on the Perle device.
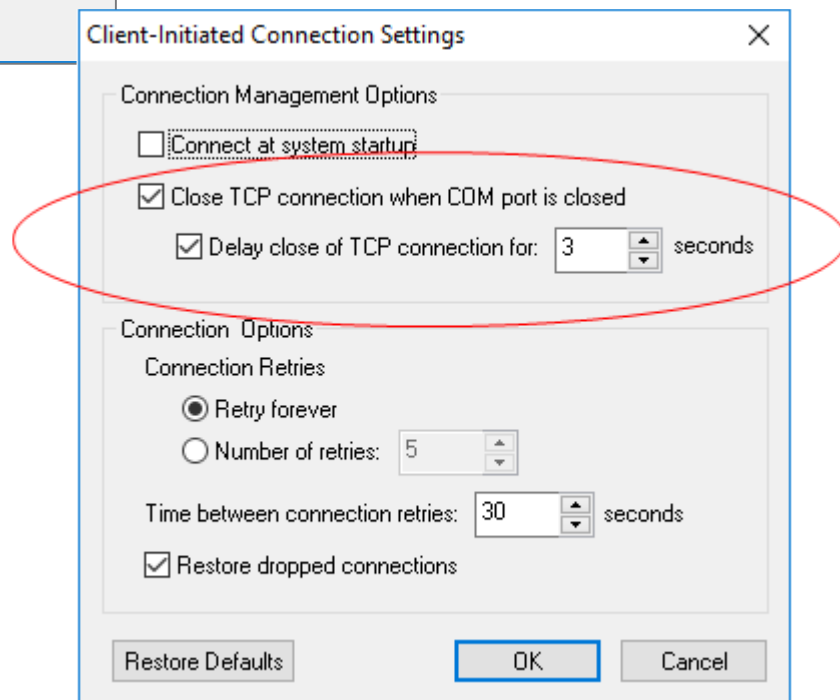
GV I/O Configuration

Each channel of the GV I/O is using a predefined COM port.

- Channel 1 → COM3
- Channel 2 → COM4
- Channel 3 → COM5
- Channel 4 → COM6

GV I/O Configuration Tool Approach

Use the GV I/O web portal to configure the automation protocol for each channel:

- Open the GV I/O configuration portal hosted by the GV I/O at port 3000 (e.g., http://12.34.56.78:3000)
- Log in using the administrator username and password
- Go to the *Channels* tab
- Click the *Configure* button for one of the channels
- In the *Automation Settings* card, select *VDCP* as the automation protocol
- Apply the configuration

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