
MPEG-1



VBrick 1000-2000-3000 Version 2.5.1
VAdministrator Version 3.2.5.10
Users Guide

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Quick Start

Easy Video Networking

NOTE:

Ethernet VBricks (Models 1200, 2200, 3200) are shipped with a factory default IP address of **172.16.2.148**.

You **CANNOT** have multiple VBricks with this address, and this address may already be used in your network!

To set the IP address of an Ethernet VBrick, please use a local terminal or use VAdmin connected to the VBrick's serial port.

1. Unpack two VBricks.
2. Using standard "RCA" cables, connect a video source, such as a video camera or VCR output, to the composite Video In connector on the front of the VBricks¹. Also connect audio Left and Right from the source to the VBrick Audio In connectors.
3. Connect a video monitor to the Video Out connector on the front of the VBrick. Make sure the TV monitor is set to video mode if necessary (to insure the TV monitor is in the right mode, you may wish to connect the video source directly to the TV monitor). Also connect the VBrick Left and Right Audio Out connectors to the monitor or to amplified speakers.
4. Connect the two VBricks to each other². For Ethernet³, connect via an Ethernet Switch, unused hub, or via a "cross over" cable. For ATM (25M or 155M UTP), you may use a "cross over" cable (where the send and receive pairs are swapped end-to-end). For OC3, be sure to connect the Tx fiber of one VBrick to the Rx fiber of the other VBrick.

NOTE: The default ATM VPI/VCI is VPI=0, VCI=50. Connecting two VBricks via an ATM switch is equally simple⁴. For EIA-530 interface, connect via a pair of CSU/DSU's.
5. Insert power connector into the receptacle on the rear of the VBrick and plug the power supply into a source of conventional 110/220 VAC.
6. The green power LED on the VBrick will illuminate, and the yellow LED will flash during self-test and boot-up (approx. 1.5 minutes). During a portion of the power-on sequence, a color test bar will appear on the monitors.
7. Each monitor will display the VBrick logo in the lower right corner⁵, and audio/video will be presented end-to-end.
8. Connect an ASCII terminal (e.g. Windows HyperTerminal) to the serial port on the rear of the VBrick. Use 9600, 8-bit, 1-stop, no parity. From the **Start** menu, Programs/Accessories/Communications/HyperTerminal. The VBrick is a "DCE" and will connect directly to a terminal without needing a "null-modem" cable or adapter. If you ordered VBrick Accessory kit, use the provided cable.
9. Pressing "Enter" will display the VBrick menu. Make configuration changes as desired⁶.
 - Assign the IP Address and Subnet Mask, leaving the Gateway IP blank.
 - Write to Codec.
 - Assign the Gateway IP Address.
 - Write to Codec.

¹ S-Video output may be used without configuration change. S-Video input requires entry of CEV:9:2 on a terminal, or selection in the VBrick Administrator program.

² Ethernet models are shipped factory configured for loopback. This means that your video input can be viewed on a TV monitor instantly.

³ Set the IP addresses for both units. The destination address of one VBrick should be the IP address of the other VBrick (unicast).

⁴ For example, to configure FORE Systems switches log into the switch and enter CONFIGURE VCC. If configuring a PVC between port A1 and A2, you would enter "new a1 0 50 a2 0 50" and "new a2 0 50 a1 0 50". Other switches are typically configured in a similar way, or with a GUI configuration tool.

⁵ To turn the logo off, you will enter CDV:8 on a terminal.

⁶ "Hyperterm" shipped with Windows 95/98.

If you attempt to write the IP Address, Subnet Mask and Gateway IP Address at the same time, the Gateway Address gets validated first and sees the old address (172.16.2.148) and reports a bad argument. The above steps keep this from occurring.

10. A single VBrick 3000 is a full duplex encoder/decoder, and the video can be viewed with the VBrick in loopback. Loopback can be done externally (via a loopback cable, or by connecting the fiber input to the output) or by terminal command. To start a loopback, enter TLP (Test Loop). To remove the loopback, enter TSP (Test StoP). To loopback an Ethernet VBrick, it is easy to simply set the Destination Address to equal the VBrick's IP address.

A slight delay, approx. ¼ second, is normal. Delay will depend on various configuration settings.

All VB1000-2000-3000 Series VBricks can be managed with the VAdministrator program, which is shipped with each appliance. It is recommended that after the initial set up, VAdministrator be used for further settings and configurations.

ICON KEY



Important
Information

1: Introduction

Video Networking Simplified

Congratulations on your purchase of VBrick Systems MPEG video networking product. Whether your application is true TV-quality video conferencing, distance learning, video streaming to the desktop, or remote monitoring, video and audio networking over switched networks is easy with VBrick! You will experience excellent quality video and high quality audio using as little as 1 Mbps of your network bandwidth.

How to Use This Users Guide

VBrick continues to add to the catalog of models and features to meet growing industry needs, but that doesn't change the most powerful attribute. The best equipment is the kind that you can turn on and it works right out of the box, the first time. The **Quick Start Guide** in the beginning of this users guide will help you set up and get started.

Video and Network Basics

Chapter 2 covers some basics of video and audio compression and network considerations. As with television, it isn't necessary to understand all of the theory in order to plug in a VBrick and watch video. This section has information directed towards a network administrator.

Applications

Whether your application is true TV-quality video conferencing, distance learning, video streaming to the desktop, or remote monitoring, VBrick Systems enables companies of any type and size, in industries too numerous to list, to provide high quality video and audio over networks using minimum network bandwidth. These applications are covered in **Chapter 3**. Application notes and case studies are available as examples of these and other VBrick configurations. Please visit www.vbrick.com.

Models

Since there are multiple slots in each appliance, the functionality can be mixed, such as dual encoders, dual decoders, or a combined encoder/decoder. Also, the interfaces may be mixed.

VBrick appliances accommodate a variety of configurations. The configuration choices provide flexibility; but in some extreme cases, configurations can exceed the normal processing capacity of the unit causing it to not perform optimally. There is a section in the beginning of **Chapter 4** which also covers performance constraints and features:

- RTP
- ATM
- Dual OC-3
- Serial Interface
- Data Port Passthrough

Other Features

Some VBrick appliance functions can be accomplished with the IR Remote Control device, which is shipped with the unit. The IR Remote Control unit is covered in **Chapter 5**.

Management

There are several ways to manage VBrick 1000, 2000, 3000 series appliances, including:

- Once setup is complete, the primary method of configuring any model VBrick appliance is through VAdministrator Software, or VAdmin (**Chapter 6**).
- Serial Command Line Interface (**Chapter 7**).
- Telnet (**Chapter 8**).
- VBDirectory. See separate VBDirectory Users Guide.
- SNMP. See separate SDK Users Guide.

Upgrade Information

Chapter 9 contains information on how to upgrade VBrick units through the use of the Intelligent Download function or VBDirectory (contained in a separate Users Guide).

- **Chapter 10** contains reference information.
- Specifications are listed in the **Appendix A**.
- More information concerning Categories are in **Appendix B**.

2: Basics

Video, Audio and Network Basics

Video

Video Source

It is important that the source of the video to be encoded and networked be of the highest possible quality in order to avoid using unnecessary bandwidth to transport source video artifacts, distortion, etc. If using a camera, exercising common sense, good lighting and a steady camera will improve overall performance. Cameras, VCR tape players, DVD players, and live television broadcast feeds from a TV tuner can all be used as video sources.

VBrick supports standard video via BNC connectors, or S-Video via mini-DIN connectors. BNC-to-RCA adapters are readily available if RCA type cables are used.

NOTE: Where possible, VBrick recommends using S-Video. S-Video output from the VBrick to S-Video Input on the monitor on the yields the best video quality and makes the Billboard, Program and Conference Guides most clearly readable.

MPEG Encoder Compression

Understanding I, B, P Frames, Delay, and Synchronization

I, B and P Frames



In compressed video, each frame is compressed using a “lossy” compression scheme that takes advantage of the fact that the human eye does not detect certain types of visual information loss. MPEG compresses files based on I, B, P frames, which contain information from previous pictures and predictions about future pictures in a Group of Pictures (GOP).

An **I-Frame (Intra-picture)** is a full video picture. Because it is likely that a future frame will be similar to a past frame (for example, it is likely that the sky will still be on the top of the frame and that it will still be blue), it is possible to predict portions of a future frame. **P-Frames (Predictive)** reference the nearest previous I-frame. Video data that contains only I and P frames requires less bandwidth than video that contains only I-Frames for comparable quality.

With I-Frames and P-Frames being generated, it is possible to place the P-Frame some number of frames away from its reference I-Frame, and calculate the contents of the frames in between using both the I-Frame and the P-Frame as references. These frames are called **B-Frames (Bi-directional)**. They are based on a predicted future frame and on a past frame). Also note that B-Frames are based only on I-Frames and P-Frames, never on past B-Frames, so errors are not propagated.

VBricks can be configured to produce I-Frames only, I and P-Frames only, or I, B and P-Frames. In terms of bandwidth usage, I-Frames use the most, B-Frames require the least. It follows then that I-Frames contain the most information and B-Frames contain the least information.

Group of Pictures (GOP)

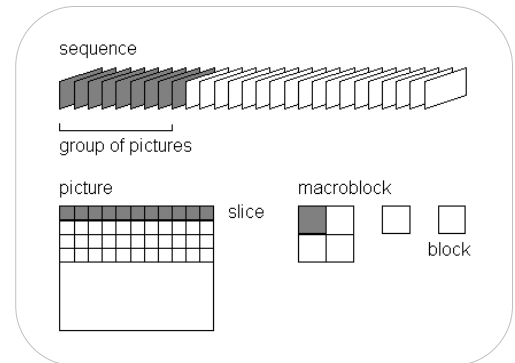
The collection of I, B, and P frames makes up a Group of Pictures (GOP). The selection of GOP parameters is a trade-off between bandwidth usage, picture quality, sensitivity to transmission errors, and delay. An extended GOP will be more sensitive to transmission errors than a small GOP because any error can affect the entire GOP⁷. It is possible to configure the GOP several ways, for example, I only, IP, IBP, IBBP, etc.

Reference Distance

The “Reference Distance” defines the number of consecutive B pictures there are between an I or P picture and then next I or P picture:

- 1 – No B picture
- 2 – One B picture between I and P pictures
- 3 – Two B pictures between I and P pictures

The “Intrapicture Distance” can be set between 1 and 9. The value refers to the number of P or B frames between I frames and defines the Group of Pictures (GOP).



Interrelationship

The table illustrates various combinations Reference Distance settings (up to 3) and GOP Length (up to 9). The GOPs are shown in display order.

More P and B frames increase the compression ratio, but also increase the overall delay. In general, it is best to choose the highest compression ratio and then try lower ratios (e.g. lower reference distance) if the video experiences transmission problems.

GOP LENGTH (N)	REFERENCE FRAME DISTANCE		
	1	2	3
1	(1)	(1)	(1)
2	IP	(1)	(1)
3	IPP	IBP	(1)
4	IPPP	BIBP	IBBP
5	IPPPP	IBPBP	(1)
6	IPP...PP	BIBPBP	BBIBBP
7	IPP...PP	IBP...BP	IBBPBBP
8	IPP...PP	BIBP...BP	(1)
9	IPP...PP	IBP...BP	BBI...BBP

NOTE: (1) Undefined.

In operation, a P-Frame will be generated and transmitted before the B-Frame. An MPEG decoder must, therefore, reorder the incoming frame to display the I-B-P frames in the correct order. This is done using “presentation time stamps” created by the MPEG encoding and multiplexing process. This reordering process requires one or more frames be held in the decoder buffer, waiting its turn for display, therefore increasing the delay. At 30 frames per second, each frame requires approximately 33 m/sec.

The synchronized audio is also compressed using MPEG, and is multiplexed with the video to create an MPEG System Stream.

Audio

High-quality Stereo or Mono audio, fully synchronized with video, may be instantly transported across the network. VBrick supports 48 KHz⁸ sample rates, which are higher than the “default” rate used by many video capture cards. As a result, it may not be possible

⁷ The VBrick Administration Program provides a rough guide for selection of “Robustness” and “Quality”

⁸ 44.1K Sample rate will be supported in a future software release.

to mix video that has a 44.1K audio sample rate within a MPEG editor. If you experience this, please be sure to encode other material at 48K audio sample rate. Data rates are supported between 64 and 192 Kbps. For applications where audio is not required, it can be disabled (more bandwidth may then be available to improve video quality).

Audio input and output is standard line-level, as found on a conventional VCR.

VBrick offers AudioMate for high quality conference room audio with integral echo cancellation. For video conferencing applications, appropriate audio conference equipment such as amplifiers, microphones, and echo control equipment is required.

Audio/Video Synchronization

MPEG provides a means to synchronize audio/video via time stamping, which VBrick supports for both MPEG encoding and decoding. Due to differences in decoders, slight out-of-sync can occur at certain audio bit rates. If this is detected, VBrick recommends trying a different audio bit rate (192 Kbps is the default), and/or resetting the VBrick decoder.



When playing video on a PC (via Windows Media Player through StreamPlayer or StreamPlayer Plus), it is possible that some PC's may display a certain "jerkiness" in the video after some period. This is usually due to the differences in the clock rate between the encoder (VBrick) and the decoder (PC). If this occurs, it may be necessary to restart the decoder on the PC.

Payload Rates

The rate at which the MPEG encoder delivers data to the network interface is equal to the sum of the video rate plus the audio rate, plus overhead. For example, video encoding at 1 Mbps + Audio at 64 Kbps + Overhead = 1.288591 Mbps. For ATM connections, additional overhead (the cell header) must be added such that the rate at which ATM cells are generated would be 1.88591 Mbps. For ATM networks, the Peak Cell Rate (the VBrick traffic shaping parameter) must be greater than this number⁹. For non-ATM interfaces (EIA-530, Ethernet), only the total data rate needs to be considered.

⁹ It is not necessary to calculate these numbers manually! VBrick automatically calculates your payload rate and displays it in response to the "SS" (System Status) command or by viewing status with VAdmin.

Network

A number of features address video stream handling across networks, including:

- Assigning multicast addresses.
- Insuring network Quality of Service by controlling the level of priority a service or source receives while traveling through a network (DiffServ).

Assigning Multicast Addresses



Many factors must be considered when designing a multicast address infrastructure since Ethernet switch implementations can significantly vary between vendors. Furthermore, multicast addressing techniques rely on an Ethernet to IP Address mapping rule, which does not guarantee a unique physical address. In fact, it is possible to create multicast addresses that differ from an IP perspective, but overlap when presented to the Ethernet network. Addresses created in this situation can cause significant network and operational problems. Specifically, multiple IP Addresses are mapped into the same physical layer address as follows:

All IP multicast addresses with the same first octet and the second octet differing by exactly 128 map to the same physical address. For example, 226.5.5.4, 227.5.5.4, 228.133.5.4 all map to the same physical address. Another factor is that 224.x.x.x is a range with many reserved addresses particularly in the range 224.0.0.x. Examples are 224.0.0.1, which is the 'all hosts' multicast address, 224.0.0.2, which is the 'all routers' reserved address. Other 224.0.0.X numbers are reserved for RIP, OSPF, DVMRP, etc. Here are some recommended rules for multicast IP Address assignment:

11. Do not use 224 in the first octet, lots of reserved 224 addresses.
12. Use a digit between (225-239) for the first octet and standardize on it for each network.

In the second octet, either use numbers from 1-127, OR 129-255, do not mix the ranges on a given network.

IP Differentiated Services (DiffServ)



VBrick supports setting the IP Type of Service (TOS) in accordance with RFC-791, RFC-1112 and RFC-2474 (Differentiated Services Field in the IPv4 and IPv6 Headers). The user may set the Type of Service field in the IP header to any value, decimal 0 to 255. For example, to set the Type of Service to all 0's enter 0. To set the Type of Service to all 1's, enter 255. The IP Differentiated Services redefines how the historical TOS field is used. DiffServ will allow IP networks to provide certain Quality of Service features.

Precedence -- Bits 0 - 2

111 - Network Control
 110 - Internetwork Control
 101 - CRITIC/ECP
 100 - Flash Override
 011 - Flash
 010 - Immediate
 001 - Priority
 000 - Routine

Bit 3: 0 = Normal Delay, 1 = Low Delay.
 Bits 4: 0 = Normal Throughput, 1 = High Throughput.
 Bits 5: 0 = Normal Reliability, 1 = High Reliability.
 Bits 6-7: Reserved for Future Use.

Historical IP Type Of Service Field Definition

If you are uncertain if your network supports TOS or DiffServ, VBrick recommends setting the TOS to the default value of 0.

3: Applications

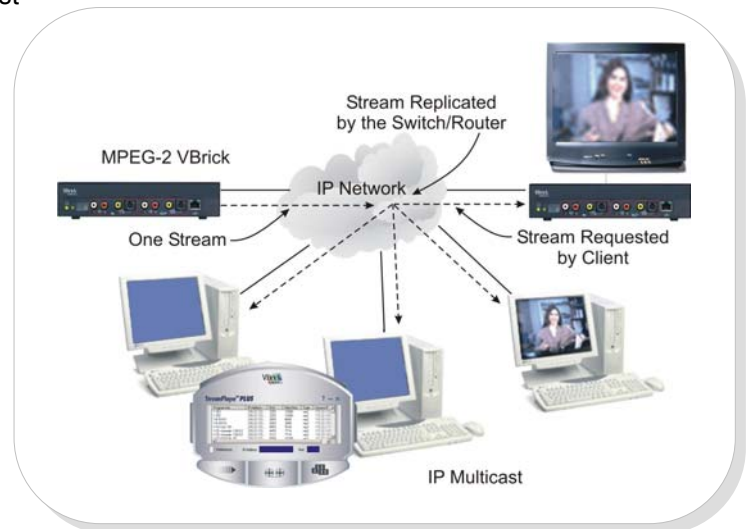
Ethernet IP Interface



Ethernet VBricks operate over standard 10BaseT Ethernet. Unlike ATM or private T1/E1 networks where QoS is assured, it is important that the network is engineered to accommodate the constant payload such that data is delivered between VBricks without delay, and that the load does not degrade network performance. In general, operating over Ethernet Switches that are not oversubscribed provides adequate bandwidth and QoS. For streaming video (e.g. one-way “broadcast”) applications, latency in the network is much less of an issue than for two-way full duplex conference applications.

VBricks send and receive MPEG video via UDP/IP at 1 to 3 Mbps¹⁰ (plus overhead). Assuming each VBrick is on its own Ethernet segment, even a full duplex VBrick operating on half duplex Ethernet will use less than 75% of the segment’s capacity.

Video can be transmitted point-to-point between VBricks for two-way conferencing or video can be broadcast to an unlimited number TV’s and PC’s via VBrick StreamPlayer using IP Multicast (the network must be IP Multicast capable).

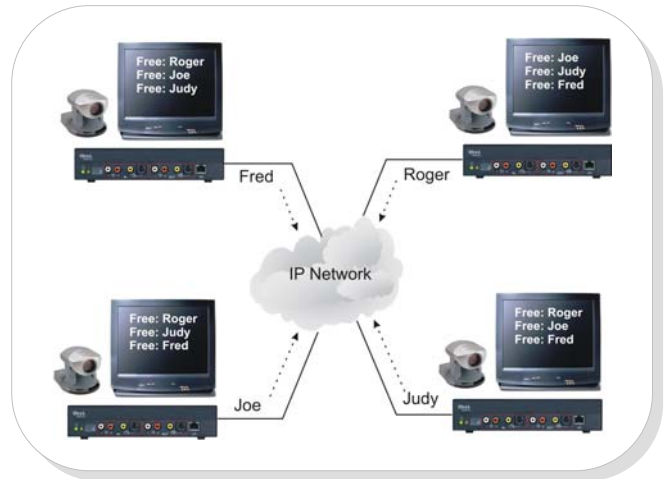


¹⁰ The total bandwidth for all send and receive video, audio, and data, must not exceed approximately 5 Mbps through the Ethernet port. For example, if a VBrick is playing a 2.5 Mbps stream, the total encoder payload should not exceed 2.5 Mbps (i.e. 2.3 Mbps video plus 192K audio, plus overhead). If you experience difficulty, try lowering the encoder rate.

Video Conference

VBrick 3200's enable automatic two-way television via IP unicast. Each VBrick in your network will automatically announce its "name" to all of the other VBricks in your network and will display a conference guide on your TV screen. The conference guide shows what is available for a conference such that you need only select that person's name to instantly establish a two-way video session.

The previous illustration shows how the conference system works. In this example, four VBricks are connected to an IP network and each VBrick is given a Calling Name (Fred, Roger, Joe, Judy). Each VBrick sends its name along with certain IP address information into the network. Each VBrick also receives all the names from the network. Using an IR Remote Control, each VBrick will display a list of VBricks in the network along with their status (Free or Busy). To place a call, you simply select the party you wish to connect to and a two-way, private, unicast videoconference is instantly established.



Because the advertisements are small and only sent periodically, they have practically no impact on your network. The advertisements are typically sent to a default multicast address, but may be configured to be sent as a broadcast or sent to any valid IP address.

Once the call is established, the calling party may "ring" the other end to get their attention, if desired.

Several configuration options are available.

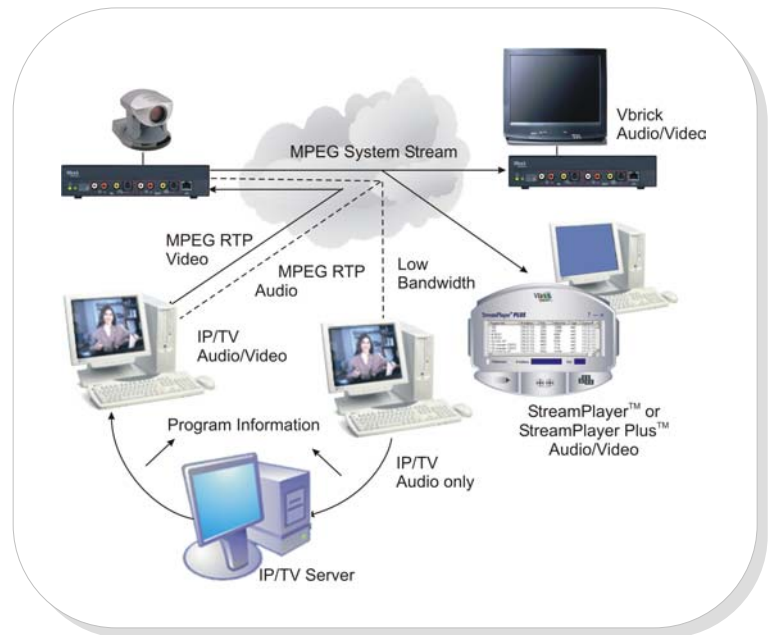
- Enable/Disable Conference
- Enable/Disable Ringer
- Auto-answer
- Auto answer – the party receiving the call does not have to answer. The VBrick automatically receives the call and two-way video is instantly available.
- Manual Answer – the party receiving the call must answer it before the call is established
- How often to advertise the Call Name
- The address on which to advertise the Call Name

Cisco IP/TV

VBrick can stream directly to Third party viewers such as Cisco's IP/TV. Depending on the system, client viewers may obtain program information directly from the VBrick, or the client may obtain program information from a server. In either case, the VBrick transmits the SAP/SDP and the receiving party learns the address and other information directly from the VBrick advertisement.

Any program that is encoded by a VBrick configured to stream both RTP and a standard MPEG System Stream may be detected and simultaneously played by IP/TV, VBrick's StreamPlayer and StreamPlayer Plus, and by VBrick appliances for viewing on TV

The illustration shows a VBrick multicasting a MPEG-1 System Stream to both a VBrick decoder and to StreamPlayer. At the same time, an audio and a video stream are multicast to an IP/TV viewer. Another IP/TV viewer with lower bandwidth is receiving only audio. In this illustration, an IP/TV server is receiving the program guide (SAP) information from the VBrick and then delivering the program guide to the IP/TV viewers (it is possible for the viewer to receive the guide directly from the VBrick).



NOTES:

- If two VBricks are in videoconference mode (via unicast), it is still possible to configure the VBrick to also multicast the audio/video via RTP.
- If a third party viewer, such as Cisco IP/TV displays the SAP but cannot display the stream, check that the Audio Encoder on the unit is enabled. Enabling the Audio Encoder allows a third party viewer to function properly.

4: Product Overview

VBrick network appliances are low cost, high quality audio and video encoders/decoders. VBricks enable the transmission and delivery of true television quality video and audio signals over standard switched networks. VBricks are MPEG compliant, and support both NTSC and PAL video and stereo audio.

Network Interfaces

VBrick appliances contain the following network interfaces:

- Ethernet (10Base-T)
- UDP/IP
- RTP
- 25 Mbps ATM
- 155 Mbps ATM UTP
- 155 Mbps ATM OC3 MM/SM Fiber
- Dual 155 Mbps ATM OC3
- RS-422
- T1/E1 (through external DSUs)

Accessories

- IR Remote Control. (Shipped with unit).
- Conference Microphone.
- Video Camera with pan, tilt & zoom.
- 19" Rack Mount Adapter (2 across).

Program Guide: VBrick full duplex and decoders detect and display a Program Guide on a TV screen. VBricks connected to an IP network provide the program name that appears on the Program Guide listing. The program can then be accessed through the IR remote control unit.

Conference Guide: The combined encoder/decoder VBrick automatically detects and displays a Conference Guide on the TV screen, allowing the instant setup of two-way television through the IR remote control unit.

Billboard: VBricks can display full screen high quality text that can be sent to the VBrick from a central location. The text can be viewed through the use of the IR remote control unit, or displayed automatically at a scheduled time.

RTP, Dual Streaming and Third Party Viewers

VBrick 1200 and 3200 encoders support the streaming of the MPEG audio/video payload via the Real Time Protocol (RTP). A VBrick does not decode or display RTP streams.

A single VBrick can actually transmit three simultaneous streams via UDP/IP:

- MPEG-1 System Stream.
- MPEG-1 Video Stream via RTP.
- MPEG-1 Audio Stream via RTP.

The MPEG-1 system stream can be delivered most efficiently directly over UDP or, alternatively, over RTP.

At the same time, the VBrick can receive an MPEG-1 System Stream from another VBrick, from StreamPump, or from another source. While a single VBrick can encode/decode a MPEG-1 Audio/Video System Stream at more than 3 Mbps, the limitations of the various combinations, as specified in the charts on the following pages.



NOTE: If a third party viewer, such as Cisco IP/TV displays the SAP but cannot display the stream, check that the Audio Encoder on the unit is enabled. Enabling the Audio Encoder allows the viewer to function properly.

Closed Captioning Performance Restraints

RAW UDP System Stream

Standard, No Closed Captioning*

SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X			3.0 Mbps	192 Kbps
	X		3.0 Mbps	192 Kbps
X	X		2.5 Mbps	192 Kbps
		X	2.2 Mbps	192 Kbps
X		X	1.6 Mbps	192 Kbps
X	X	X	1.3 Mbps	192 Kbps

***NOTE:** These are maximum rates when playing ideal material. Certain video source inputs require lower rates. Also, when the network option "Join Own Multicast" is enabled, the maximums may need to be reduced by about 0.2 Megabits.

Closed Captioning: Encode ON + Decode OFF

SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X			3.0 Mbps	192 Kbps
X	X		2.4 Mbps	192 Kbps
X		X	1.4 Mbps	192 Kbps
X	X	X	1.1 Mbps	192 Kbps

Closed Captioning: Encode OFF + Decode ON

SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
	X		3.0 Mbps	192 Kbps
X	X		1.8 Mbps	192 Kbps
X	X	X	1.0 Mbps	192 Kbps

Closed Captioning: Encode ON + Decode ON

SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X	X		1.5 Mbps	192 Kbps
X	X	X	No Support	No Support

Do not set the rate too high or the video stream will become unstable!

RTP delivers the video stream on one IP address and the audio stream on another IP address. RTP includes certain timestamps and controls that cause the two streams to be in synchronization when played. One advantage of RTP is the ability for users on low-

bandwidth connections to play the audio even if they do not have sufficient bandwidth to view the video.



RTP System Stream

Standard, No Closed Captioning*

RTP SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X			2.6 Mbps	192 Kbps
X	X		1.8 Mbps	192 Kbps
X		X	1.2 Mbps	192 Kbps
X	X	X	No Support	No Support

Closed Captioning: Encode ON + Decode OFF

RTP SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X			2.6 Mbps	192 Kbps
X	X		1.4 Mbps	192 Kbps
X		X	1.2 Mbps	192 Kbps
X	X	X	No Support	No Support

Closed Captioning: Encode OFF + Decode ON

RTP SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X	X		1.4 Mbps	192 Kbps
X	X	X	No Support	No Support

Closed Captioning: Encode ON + Decode ON

RTP SYSTEM STREAM TRANSMIT	SYSTEM STREAM RECEIVE	DUAL STREAM RTP TRANSMIT	MAXIMUM VIDEO RATE	MAXIMUM AUDIO RATE
X	X		1.4 Mbps	192 Kbps
X	X	X	No Support	No Support

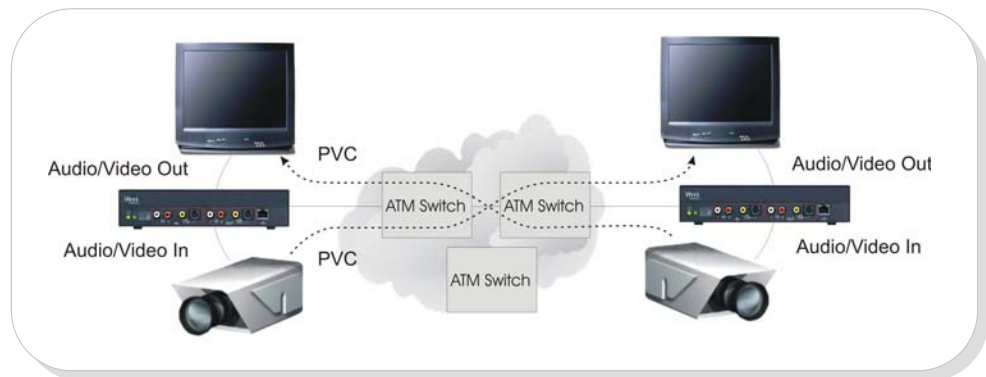
Do not set the rate too high or the video stream will become unstable!

Asynchronous Transfer Mode (ATM)

ATM has unique and valuable features that make it an ideal networking technology and transport media for digital video. Among the most important is ATM's ability to provide a guaranteed Quality of Service (QoS). For interactive, two-way video, it is important that the digital information arrive at the other end without delay. ATM networks can hardly help but to provide this, much like a dedicated point-to-point circuit.

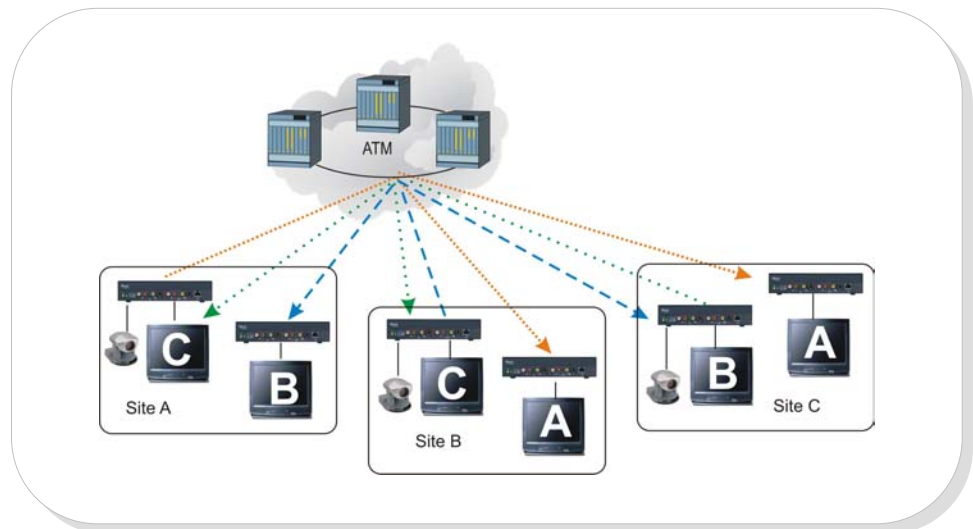
Permanent Virtual Circuits (PVC)

An ATM network can be easily set up to provide a PVC between any two points on the network. The ATM convention is to designate a port of an ATM switch with a Virtual Path Identifier (VPI) and a Virtual Circuit Identified (VCI). The VPI/VCI on a particular port can be easily connected to a VPI/VCI of any other port on any switch in the network, thus establishing a PVC through the network. VBrick can operate using any legal VPI/VCI address (VPI=0 to 255, VCI=0 to 65535).



The ATM VPI/VCI for the transmit and receive path can be set independently.

NOTE: Practically all ATM switches support “point-to-multipoint” (PTM) operation.



PTM allows one VBrick to send audio/video to an unlimited number of VBrick receivers. Because the Transmit and Receive VPI/VCI is set independently, if multiple VPI/VCI's are sent to a VBrick, a viewer can “change the channel” by selecting which VPI/VCI to “watch” without disturbing that VBrick's transmit VPI/VCI. PTM also provides a simple means to interconnect multiple locations without needing complex MCU's.

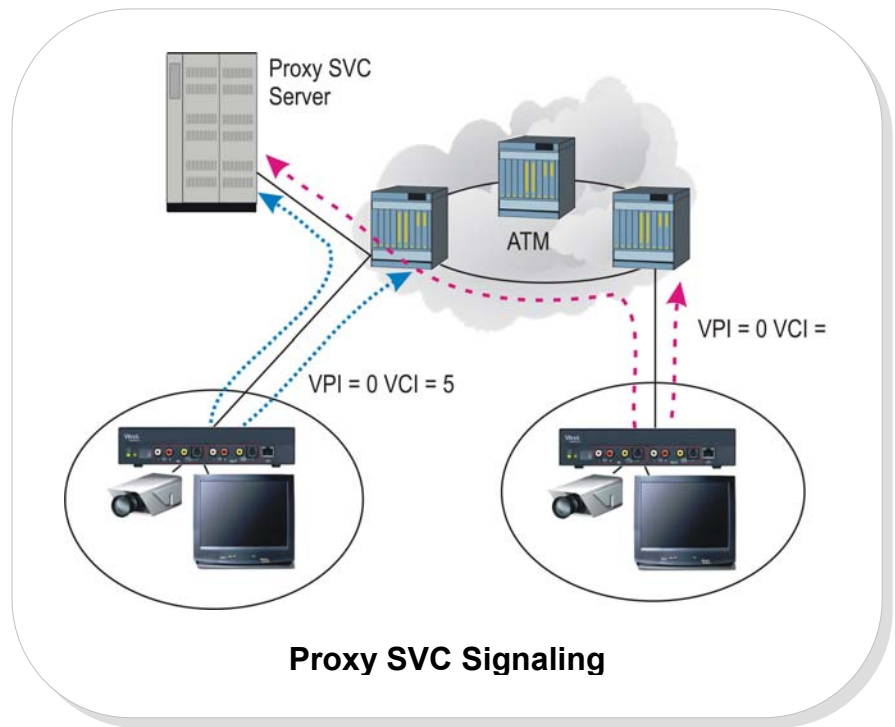
Switched Virtual Circuits (SVC)

Switched Virtual Circuits offer flexibility to instantly set up and tear down calls on demand. Your product supports SVC's via Proxy.

Proxy SVC

VBricks can be easily configured to switch traffic between any two Virtual Circuits on the ATM interface. This capability provides support for "Proxy SVC", where a PVC can be designated between a central server and a remote VBrick. The VBrick will then switch this traffic back toward the network on another Virtual Circuit. If this traffic is switched to the standard ATM SVC signaling channel (VPI=0, VCI=5), the server can set up standard Switched Virtual Circuits by sending the signaling information on the designated PVC. In this case, the ATM switch "thinks" the call setup message is coming from the VBrick.

Since video calls are typically of long duration (as opposed to data traffic where call set and tear down times are an important consideration), and because conference scheduling is typically centralized, proxy SVC signaling is an easy and efficient method to provide any-to-any connectivity without cost or complexity.



Traffic Shaping

VBricks provide ATM traffic shaping on a cell-by-cell basis, maintaining average data transfer rate and ensuring peak cell rate (PCR) is controlled. Traffic shaping helps to ensure even traffic flows through congested ATM switches, eliminates the need to over-provision CBR connections, and allows VBR connections. With traffic shaping, you can be assured that VBrick will not burst data beyond your pre-configured rate.

AAL

VBrick uses AAL-0, native ATM for audio/video delivery*. ATM switches do not examine the adaptation layers and there need be no concern about compatibility with any ATM switch on the market today.

* VBrick software version dependent.

Physical I/O

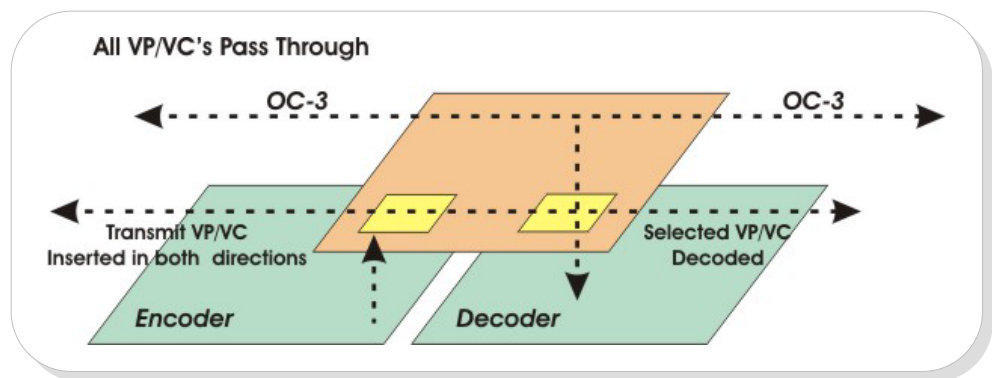


VBrick supports standard 25.6 Mbps ATM, 155 Mbps UTP Cat 5 copper, or 155 Mbps multimode or single mode fiber (OC3). VBrick's single mode fiber is available for either 15 Km or 40 Km distances. VBrick also supports dual 155 Mbps interfaces with optional VC switching between ports, allowing a large number of VBricks to be "daisy chained".

NOTE: When factory configured with a 155 Mbps Interface, the 25.6 Mbps ATM interface, if present, is not functional.

Dual OC3 Interface

The Dual OC3 is an internal 3-port ATM switch built into the VBrick. Two ports are available for interface with the network, and one port connects to the VBrick encoder/decoder. The function of the Dual OC3 is fully transparent and no additional configuration is required.



Dual OC3 Functional Diagram

The Dual OC3 passes all ATM VPI/VCI's between OC3 ports, and preserves the VPI/VCI addresses. For example, if VPI/VCI number 100/128 were present on one port it would automatically appear on the other port. In other words, the ATM switch behaves like a transparent fiber. At the same time, the VPI/VCI's that the VBrick encoder generates are injected into the switch and delivered on both ports¹¹. On the receive side, which ever VPI/VCI the VBrick has been set to receive is delivered to the decoder and is also passed through to the other OC3 port. The Dual OC3 allows the "daisy chaining" of a large number of VBricks, eliminating the need to run fiber from each location back to a centrally located ATM switch. Because each VBrick may send its MPEG payload on a unique VPI/VCI (which is passed though every VBrick in the chain), and because each VBrick may independently select the receive VPI/VCI, it is easy to construct a network of VBricks and distribute a large number of video channels without even using an ATM switch.

This illustration shows an example where four VBricks are used.



Connecting VBricks in a chain

¹¹ This includes the MPEG payload VPI/VCI, management VPI/VCI, etc.

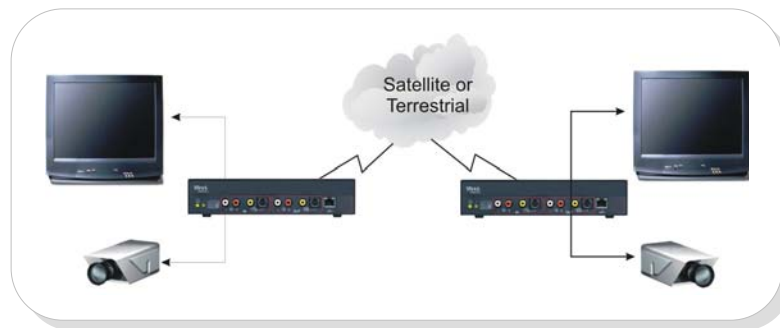
Each VBrick is sending video on a unique VPI/VC1 (0/50, 0/51, 0/52, 0/53), and these VPI/VC1's are "seen" by all the VBricks in the chain. Any VBrick can select any stream to view at any time by simply "changing the channel".

NOTE: The Dual OC3 is capable of supporting the full line rate (155 Mbps). The Single OC3 does NOT contain an ATM switch and CANNOT support a large number of VC's. In a chain of more than six VBricks, it is highly recommended that ALL of the VBricks be Dual OC3.

Do not put single OC3 units at the ends of a large chain.

Serial Interface

For T1/E1, Satellite, Microwave, and other applications, VBricks support a standard EIA/TIA-530 (RS-422) serial interface and transports the audio/video payload via HDLC. This interface is configured as a standard DTE and may connect directly to any standard DCE such as a T1 CSU/DSU¹². VBrick's TIA/EIA-530 interface operates at rates up to 2.048 Mbps (E1).



The payload rate (audio + video) must be set to a value less than the network interface rate. For example, if operating on a T1 line, the network data rate is 1.536 Mbps (this is the clock rate that would be provided by a CSU/DSU to the VBrick). If operating on an E1, the data rate is 1.920 Mbps. The total audio/video payload rate should be set to a combination less than the line rate. Depending on several factors, full IBP framing should be configured at this rate to insure high quality video¹³.

NOTES:

- TIA/EIA-530 is, in effect, RS-422 implemented on a DB-25 connector. Generally, control leads are not required for normal operation. RS-422 is electrically identical to X.21.
- TIA/EIA-530 can usually interoperate with V.35 interfaces. This is particularly true since many vendors actually use TIA/EIA-530 but deliver it on old "Winchester" V.35 connectors.
- With good quality cable of reasonable length, TIA/EIA-530 should interoperate with V.35 however, VBrick makes no claim regarding compatibility.

¹² The Network DCE normally provides timing, typically referenced to a highly accurate source. For E1 applications, the DCE normally provides clock at 1.920 Mbps. VBrick can provide external clock at 1.536 Mbps or 1.920 Mbps via hardware option (not user selectable).

Serial Data Rates



VBrick produces MPEG video and audio that is delivered over the serial interface with HDLC framing. By nature, MPEG is somewhat “bursty”, which a constant bit rate circuit cannot accommodate. VBrick uses internal data buffers to link the MPEG audio/video stream to the serial interface and uses HDLC framing which requires that the total MPEG payload rate is less than the line rate by at least 4%.

The MPEG data rate is equal to the sum of the video rate, the audio rate, plus MPEG overhead plus system overhead. Changing the video or audio rates will change the total payload, and the user must insure that the total does not exceed the available line rate. The following examples illustrate audio/video configurations:

T1 Line Rate Example

Video Encoder Rate:	1,250 Kbps
Audio Encoder Rate:	96 Kbps
Average Line Rate:	1,474,142 bps
4% Margin	58,966 bps
Total:	1,533,208 bps

Good configuration, Total is less than 1.536M

E1 Line Rate Example

Video Encoder Rate:	1,590 Kbps
Audio Encoder Rate:	96 Kbps
Average Line Rate:	1,842,674 bps
4% Margin	73,707 bps
Total:	1,916,381 bps

Good configuration, Total is less than 1.920M

NOTE: The Average Line Rate for a given configuration can be viewed under System Status (*SS command*).

¹³ At 1 Mbps, VBrick recommends a large GOP

Bit Error Rate Considerations

VBricks depend on the reliable delivery of error-free data from an encoder to a decoder. In real world applications, the transmission error rate will be less than perfect. A single bit error can cause the video to “jump” or “skip” one or more video frames.

Transmission errors on the order of 1×10^{-6} may be acceptable for certain conference applications, but it is recommended that VBricks operate in error-free environments. The following table illustrates error rates at 1.536 Mbps (T1) and assumes an even distribution of transmission errors.

ERROR RATE	TIME BETWEEN ERRORS
1×10^{-5}	67 millisecond
1×10^{-6}	670 millisecond
1×10^{-7}	6.7 seconds
1×10^{-8}	67 seconds

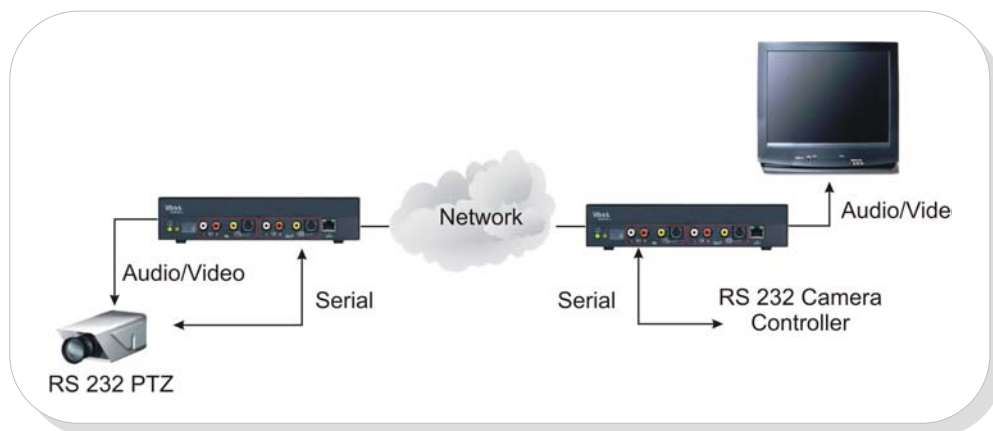
For example, if transmission errors occur at a rate of 1×10^{-8} , one or more video frames would be lost every 67 seconds. *Because audio is less of an aggregate component than video, audio tends to be much less affected by transmission errors.*

Internal and External Clock

VBricks are designed to connect to a DCE that provides transmit and receive clock. VBrick EIA-530 interface can also provide 1.536 Mbps (T1) or 1.920 Mbps (E1) clock for external timing. The selection of these two rates is a factory-installed option.

Data Port Passthrough

VBricks provide full duplex, end-to-end transparent Passthrough of user data from one VBrick to another, or (for Ethernet VBricks) to IP devices. The RS-232 port, used for local configuration, can be placed *into* data Passthrough mode by entering CPT:5. To place the port *out of* Passthrough mode, enter FIVE CONSECUTIVE “Termination” characters. The serial port operates at its configured baud rate and stop bits (e.g. 110 to 115.2K bps). Passthrough mode can be used to pass control information from one VBrick to another, and may not support sustained data at the higher data rates.



Entering Passthrough mode at one VBrick automatically causes the remote VBrick to enter Passthrough mode. Applications include:

- Remote control of camera pan-tilt-zoom
- Remote control of security door lock
- Low speed data transport
- Data collaboration between PC's



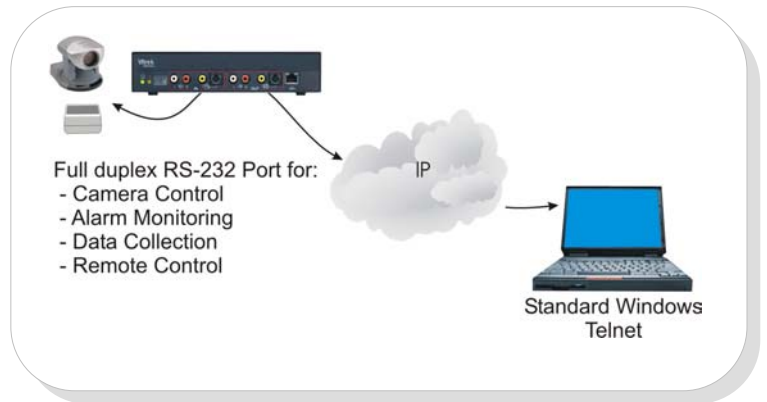
IMPORTANT NOTES:

- When using the Serial Command Line Interface, CPT 5 Switches into Passthrough mode.
- When in Passthrough mode, typing the User-Defined Character five (5) times at the Command Line Interface switches to local mode. The default setting is Control-Shift-Underscore, ASCII 31. Set the port baud rate and stop bits as described in the following chapter.
- Serial Passthrough is optimized for low speed, bursty data. Continuous high-speed data transfer can affect video. If you experience this, reduce the data rate or the video rate.
- **At the Serial Command Line Interface, you can regain local control from Passthrough by holding down control-shift-underscore during VBrick power-on sequence.**
- For additional information, please refer to the discussion on serial port in the administrator section of this Users Guide.

Serial Port Passthrough – Telnet

The serial port can be accessed via standard Telnet for Ethernet VBricks. The VBrick will respond to a connection request to TCP port number 4439 (by default) from a standard Telnet client. Any data present on the VBrick serial port will be sent to the connected PC, and any data sent by the PC will be delivered out of the RS-232 port.

In addition, if multiple Telnet sessions are active to one VBrick (VBrick supports up to 64 sessions), the data from the VBrick will be sent to all connected PC's, and the data received by the VBrick from the PC's will be delivered on the RS-232 port. If multiple Telnet sessions are active and each is sending data to the VBrick, the data delivered by the RS-232 port will be a mix of characters presented in the order they were received (e.g. the data from all the senders is bridged together).



This is a useful feature so that alarm or other information from one VBrick location can be broadcast to multiple locations.

Once a client initiates a session to the VBrick serial port, the serial port will remain in Passthrough mode until it is commanded to enter local mode by entering the termination characters (e.g. Control-Shift-Underscore) locally, or via control from the VAdmin program.

Commanding Serial Passthrough via Telnet Management

If you are managing an Ethernet VBrick via Telnet on port 4429, you can command the VBrick to go into or out of Passthrough. CPT 5 puts the VBrick into Passthrough mode, and CPT 6 takes it out of Passthrough mode.

5: VBrick IR Remote Control

Overview

The VBrick appliance supports features provided through optional hand held IR (Infrared) Remote Controls. The VB3000 series supports two different types of remote control units, each of which supports different functions. Both IR remotes enable users to enable and disable Billboard, establish two-way videoconferences through the use of the Conference Guide, and select any multicast stream by viewing a Program Guide on the TV screen. The difference between the units is support for VBrick's Video on Demand functionality.

NOTE: The IR Remote Control Unit version selection is specified in the VOD tab settings.



IMPORTANT: For VoD operation, if VAdmin software is in control of a VB3000 appliance through an IP port connection, it is not possible to access the appliance using the remote control unit. It will appear as if the unit is not responding. It is necessary to log out of VAdmin, select a VOD stream and log back in each time a new VBVoD stream is selected.

IR Remote Control Unit Type One

This IR remote enables users to establish two-way video conferences or select any multicast stream by viewing a Program Guide right on the TV screen. Users can also turn the Billboard On/Off.

NOTE: Access to the Program Guide and Billboard via IR Remote can be enabled or disabled via configuration option (see "Billboard" and "SAP" configuration options).

VBrick One Remote Control Keys

The VBrick IR remote control, which was shipped with the unit, provides instant control of videoconference setup, program viewing, and billboard functions (see illustration):

- **Reset** – Resets the VBrick.
- **Encoder** – Off/On – turn the encoder off for privacy.
- **Billboard Auto** – Cycle through pages.
- **Billboard** – Display Billboard.
- **Con Guide** – Display Conference Guide.
- **Pro Guide** – Display Program Guide.
- **Up** – Move cursor up when selections are displayed. Otherwise, selects an available program to preview.
- **Down** – Move cursor down when selections are displayed. Otherwise, selects an available program to preview.
- **Left** – Not currently used.



- **Right** – Not currently used.
- **Select** – Select the item highlighted by cursor.
- **Prev Page** – Go to previous page.
- **Next Page** – Go to next page.
- **Conference:**
- **Ans Call** – Answer a conference call.
- **Rej Call** – Reject a conference call.
- **Ring RMT** – Ring the remote end of a conference call.
- **Ring DIS** – Disable local ringer.
- **Ring ENB** – Enable local ringer.
- **Hang Up** – Disconnect a conference call.
- **Previous** – Toggle to the previous conference call.
- **Aux 1 to 4 (keypad)** – Not currently used.

IR Remote Control Unit Type Two

The only difference between this and the other remote control is VBrick Video On Demand functionality. It works the same as the original VBrick IR Remote Control in regard to all other features.

NOTE: Access to the Program Guide and Billboard via IR Remote can be enabled or disabled via configuration option (see “Billboard” and “SAP” configuration options).

VBrick Remote Two Control Keys

- **Reset** – Reset the VBrick. The unit will reboot.
- **Encoder Off/On** – Turns the encoder off for privacy.
- **Slot 1 Slot 2** – VBrick 3000 series not supported.
- **Pip** – VBrick 3000 series not supported.
- **Local Edit** – VBrick 3000 series not supported.
- **Camera** – VBrick 3000 series not supported.
- **Hard Drive** – VBrick 3000 series not supported.
- **Billboard** – Display Billboard.
- **Con Guide** – Displays the Conference Guide.
- **Pro Guide** – Displays the Program Guide.
- **Up** – Move cursor up when selections are displayed. Otherwise, selects an available program to preview.
- **Down** – Move cursor down when selections are displayed. Otherwise, selects an available program to preview.
- **Left** – Not currently used.
- **Right** – Not currently used.
- **Select** – Not currently used.
- **Zoom In / Prev Page** – (Zoom not supported)/Go to previous page.



- **Zoom Out / Next Page** – (Zoom not supported)/Go to previous page.
- **<< [] > || >>** – Stop and Pause/Play work with VBOD VBrick operation.
Rewind and Fast Forward do not work in the current release.
- **Record** – VBrick 3000 series not supported.
- **Send** – VBrick 3000 series not supported.

Conference

- **Previous** – Toggle to previous conference call.
- **Ans Call** – Answer a conference call.
- **Rej Call** – Reject a conference call.
- **Ring RMT** – Ring the remote end of a conference call.
- **Ring DIS** – Disable local ringer.
- **Ring ENB** – Enable local ringer.
- **Hang Up** – Disconnect a conference call.
- **Aux 1 through Aux 4 (Keypad)** – Not currently used.

IR Remote and On Screen Display Guidelines

The Program Guide, Conference Guide, and Billboard display are “written” on the screen in real time. It is normal for it to take a few moments to fill the screen.

- Do not press remote control buttons while the On Screen Display is being written.
- Do not press remote control buttons too quickly.
- Use Encoder “On” and Encoder “Off” to turn your video encoder on and off for privacy.
- If there are more programs than can be displayed on one screen, a “NEXT PAGE” line will automatically appear. Selecting “NEXT PAGE” will display the next page.
- The LED on the front of the VBrick will flash when it has detected the IR signal. This indication tells you that IR energy has been received, but it does not necessarily mean it is a valid signal. If the LED flashes when you press a button but nothing happens, try moving closer, use a more powerful remote control device, or check to be sure you have your controller programmed properly.
- The Program Guide is a “Snapshot” of the SAP’s the VBrick has detected. The Program Guide page is not updated while it is displayed. If programs come and go, it is possible that you can select a program that is no longer available. To refresh the Program Guide, turn it off and then on.
- The Program Guide and Billboard support upper and lower case ASCII (a to Z), numbers 0 to 9, and the following punctuation: # ! \$ and () - = ; : , . + * ‘ / _
- VBrick sends an IGMP “leave” message when leaving a stream, and an IGMP “join” message when joining a new stream. If the network does not stop sending the “old” stream in response to the “leave” message, multiple streams can appear at the VBrick causing over subscription. In some cases, unwanted streams will time-out after some seconds. You can see evidence of poor network behavior if, after changing streams, the “new” stream is jerky but becomes smooth after some time (e.g. the “old” stream timed-out rather than responding to the IGMP leave message). For proper operation it is important that the network properly supports IGMP version 2.
- Pressing Reset will reset the IP parameters to the last saved state. For example, if the VBrick is multicasting and you then use the IR remote to set up two-way videoconference sessions, upon disconnecting the VBrick will NOT be in the original state (it will not be receiving or transmitting). To return it to the previous state, press Reset.
- A VBrick answering a Conference Call via Autoanswer will display the calling party and other information on the bottom of the screen. This can be removed from the screen by pressing the Conference Guide button.

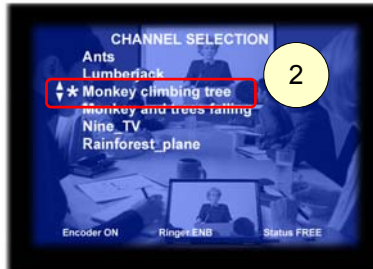
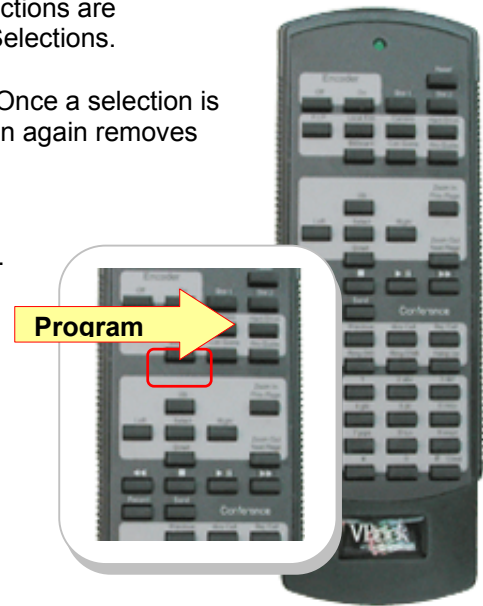


Upon disconnecting from a conference call the calling VBrick will be in local loopback (you will see your own video, slightly delayed).

Program Guide and VoD

If VBVoD is installed on the system, VBrick IR Remote Control Unit Two supports selections from the VoD server. Selections are displayed on the screen using the Program Guide Selections.

- ❑ **Pro Guide** – Displays the Program Guide. Once a selection is made, depressing the Program Guide button again removes the menu from the screen.
- ❑ **Up** – Scroll up through the selections.
- ❑ **Down** – Scroll down through the selections.
- ❑ **Left** – Moves up a level if in a subdirectory; otherwise it has no effect.
- ❑ **Right** – No effect.
- ❑ **Select** – To select the program.
- ❑ **Prev Page** – Page up.
- ❑ **Next Page** – Page down.

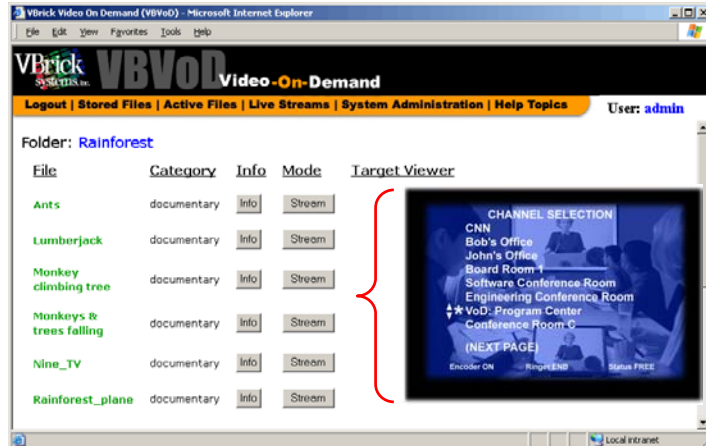


Example: Navigate through the on-screen menu, using select, up and down keys (or page up and page down).

NOTE: MPEG-2 content does not appear on VB3000 series screens since it is not possible to play MPEG-2 content on VB3000 series devices.

Computer Menu and Corresponding Monitor Display

The selection displayed on the VBrick VB3000 appliance corresponds to the folders on the Video on Demand screen. This is a menu screen from the VBVoD application and the corresponding menu displayed on a monitor connected to a VB3000 series unit:



6: VAdmin

VBrick Administrator Operation

Installation, Configuration and Use with VAdmin Software

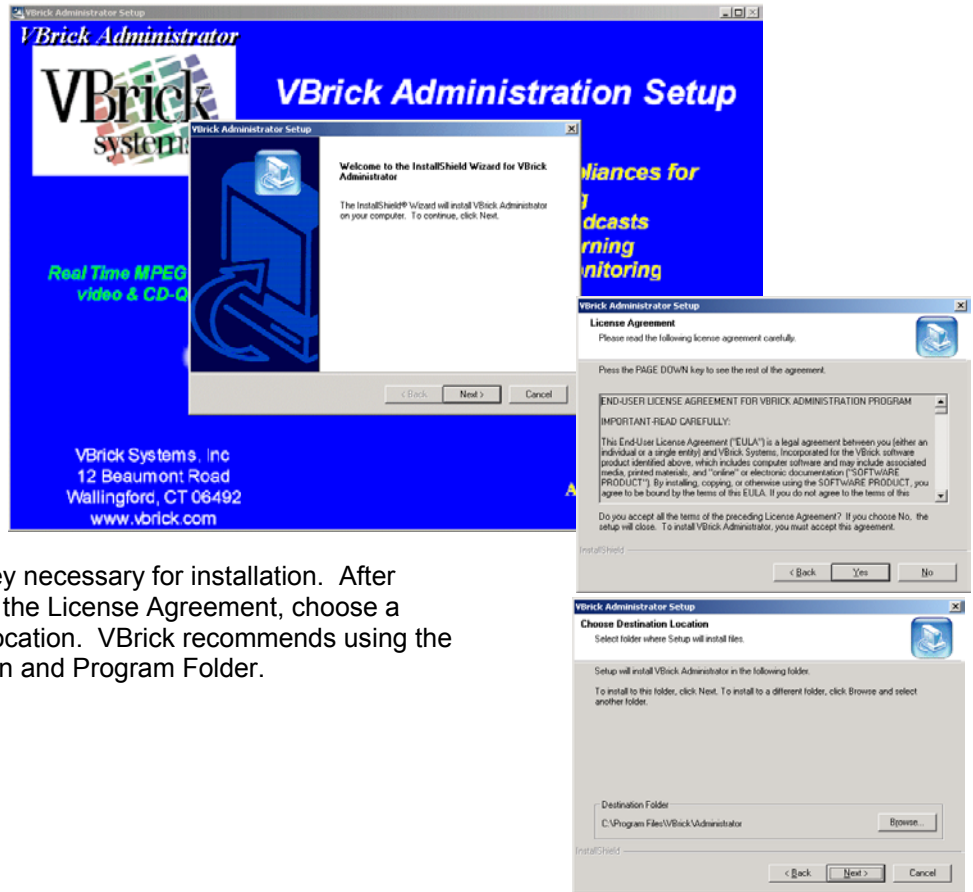
VBrick's Administrator software is an optional program that runs under Windows 95/98/NT/2000/ME/XP and provides a simple yet comprehensive means to configure, manage, and install software upgrades into a VBrick. After launching the program, the user is presented with a window with a series of Tabs, described in the following pages.

The program allows you to:

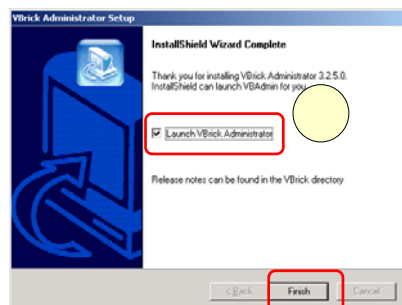
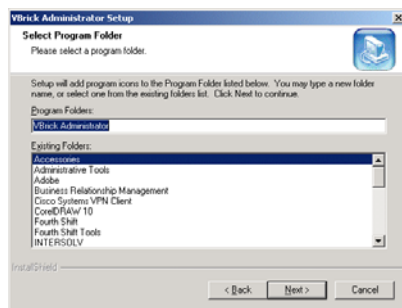
- Create a configuration
- Send a configuration to a VBrick
- Retrieve a configuration from a VBrick
- Save a configuration to disk
- Retrieve a configuration from disk
- Perform diagnostics
- Work on-line or off-line

VAdmin Installation

There are different installations for the VBrick Appliance code and for VAdministrator. Install VAdministrator from VbrickAdministrator_3_2_5_00.exe. To upgrade the VBrick software, please refer to the Upgrade section in Chapter 9, or to the release notes.



There is no key necessary for installation. After responding to the License Agreement, choose a Destination Location. VBrick recommends using the default location and Program Folder.

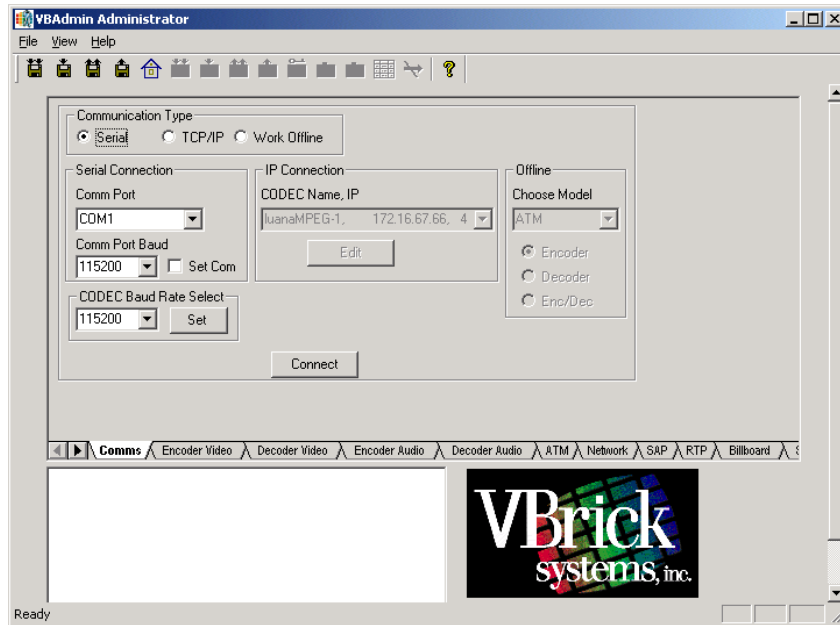


When Installation is complete, it is possible to launch the program from InstallShield ① or from the Start menu, Programs, VBrick, VBrick Administrator ②.



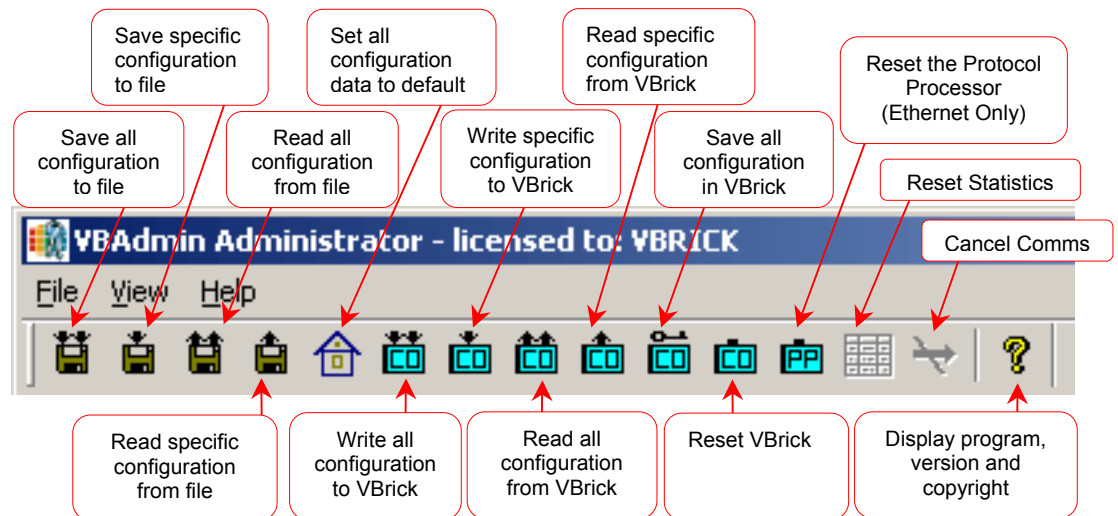
VBrick Administrator

The first screen permits connection with a VB1000-2000-3000 Series appliance.



Getting Started

VAdmin lets you connect to a VBrick via local Serial Port for all VBrick models, and also over an IP network for the VBrick 3200, 2200 and 1200 through the Ethernet Network port. The menu bar allows you to navigate through the menu choices. The menus on individual screens will differ depending on which model to which you are connected.



Saving, Restoring, and Copying Parameters

The VBrick parameters can be stored in non-volatile memory in the VBrick itself by pressing the “Save All or Save Specific VBrick Config” button. You can also save any number of configurations to disk for backup storage, or for use in duplicating a configuration in many VBricks.

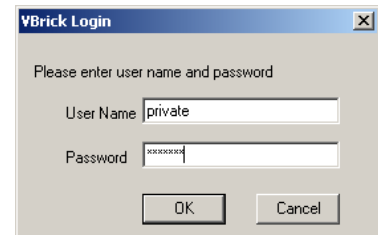
Save/Restore to Disk

You may save one screen to disk by pressing the “Save Specific to File” button, or save the complete configuration disk file by pressing the “Save All to File” button. Files are saved with a .cdc file extension, and you may give the file any name you wish. For example, you might save a file as “Config1.cdc”. Once on disk, you can send that file to additional VBricks by retrieving the file into VBAAdmin (“Read from File), and then choosing “Write All or Write Specific To VBrick”.

Login and Passwords

Network access to configure Ethernet VBricks (Models 1200, 2200, 3200) is protected by the use of passwords. That is, Telnet access on port 4429, and VBAAdmin access over TCP/IP require the use of a login name and password; in addition, SNMP access is controlled using configurable community strings.

For Telnet and VBAAdmin there is one login name allowed called the “Administrator Login Name”. This is configurable with the default set to (case sensitive) “**private**” and its associated Administrator Password default also set to (case sensitive) “**private**”. The Administrator Login Name has Read and Write access to all VBrick configuration parameters.



For SNMP, the Administer Login Name is used as a community string with Read and Write access, while the configurable parameter SNMP Read Community can be used as a community string with read-only access. The default for the SNMP Read Community is set to “**public.**”

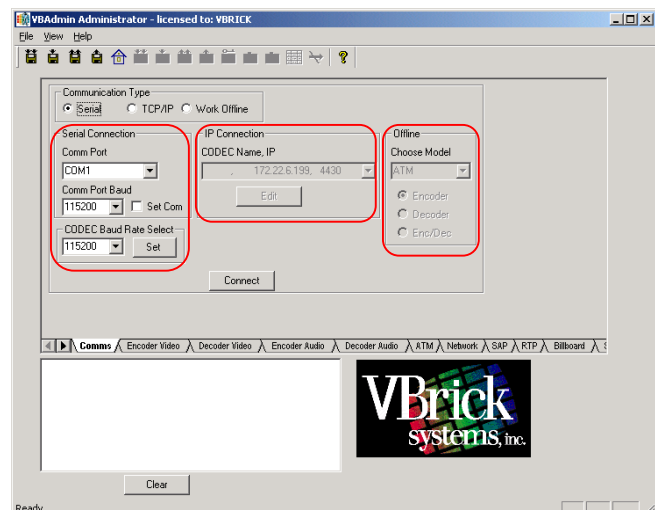
NOTE: The use of CLI and VBAAdmin over the serial port does not employ the use of passwords. Physical connection with the serial port is sufficient to restrict access.

Tabs and Configuration Settings

Communications

The Communications tab selects how VBAAdmin will communicate with the target VBrick. The program also provides off-line configuration capabilities. Upon successful connection to a VBrick, that VBrick’s configuration is automatically retrieved and displayed¹⁴.

- Serial Connection
- IP Connection
- Offline



¹⁴ This feature may be enabled/disabled by selecting View – Fetch Data.

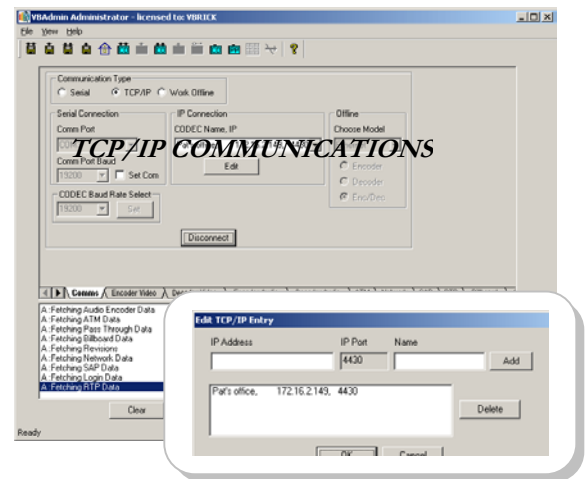
Serial

For serial communications, VBAAdmin provides for selection of the local Com port and data rate used for communications between the PC and the VBrick. The default VBrick data rate is 9600 bps. The user should select the appropriate COM port and then press the connect (or disconnect) button. The lower window displays responses and status messages between the VBrick and the program. You may select a different serial port rate, but keep in mind that if you configure the PC's COM port for a different rate than the VBrick, communications is not possible. To change the serial port rate, FIRST select the new rate for the VBrick, press SET, and then select the rate for the local COM port. If a software upgrade is necessary, VBrick recommends using a high data rate to minimize download time.

TCP/IP



Any IP (Ethernet) connected VBrick can be managed remotely via VBAAdmin. Upon selecting TCP/IP as the communications type, the IP Connection field is enabled. Selecting Edit brings up the IP Address dialog box, which allows the entry of the IP address of a target VBrick and a name. The name may be any 20-character string, such as "Camera #1", "CNN Video", etc. The name is simply a convenient way to associate a VBrick with an IP address (so the user does not have to remember which IP address goes with which VBrick). Note that a TCP port number is displayed, but may not be changed. This is for information only.



Offline

The user can explore the software options without actually being connected to a VBrick.



Troubleshooting Connection Problems

Serial Port

- Are you using the right Com port?
- Is the cable connected? For local connection, a "straight" cable (NOT a "null modem" cross-over cable) is required.

TCP/IP

- Are you sure of the IP address?
- Can you "ping" or Telnet to the VBrick from the same PC?
- Is there a firewall preventing connection?
- Does your PC have Winsock2 (for windows 95) installed?
- Are your PC and VBrick configured with any necessary gateway addresses?

VAdmin Settings

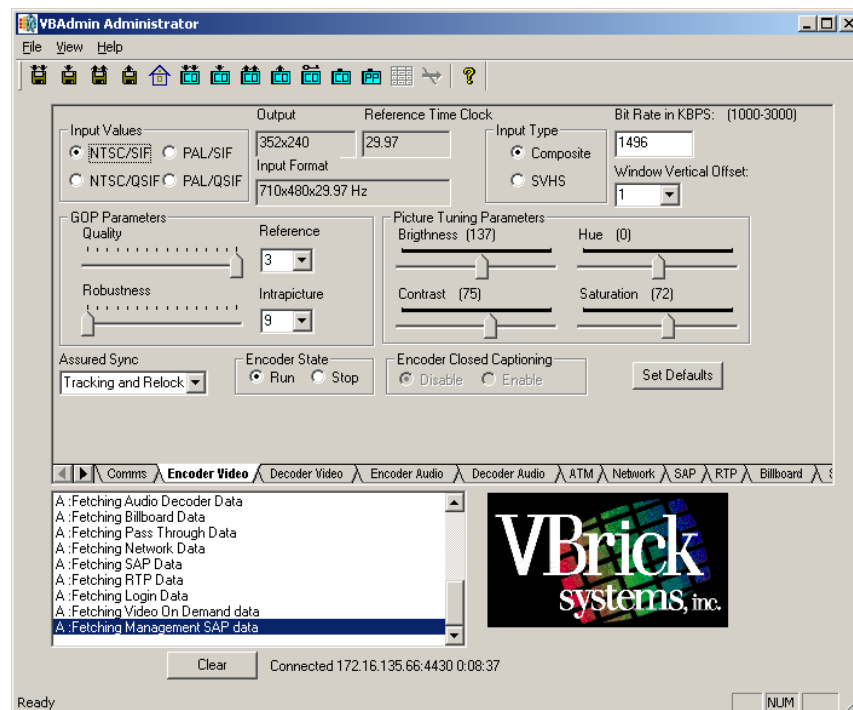
Encoder Video

The Encoder Tab displays available options for the MPEG video encoder.

NOTE: No action is taken until the configuration is sent to a VBrick by selecting “Write to VBrick,” which sends only the current screen, or “Write All to VBrick,” which sends the entire configuration.

Changing the Encoder State (Run or Stop) takes effect immediately, as do input values.

NOTE: Changing the input values (i.e. NTSC, PAL, QSIF) will cause the VBrick appliance to reboot.



Input Values – NTSC/SIF; NTSC/QCIF; PAL/SIF; PAL/QCIF.

Output – Actual output, not adjustable.

Input Format – Actual output, not adjustable.

Reference Time Clock – Actual, not adjustable.

Input Type – Composite, SVHS.

Bit Rate in KBPS – 1000 to 3000 KBPS.

Window Vertical Offset – -8 to +32.

GOP Parameters

Quality – Low to High, sliding scale adjustment.

Robustness – Less to More, sliding Scale adjustment.

NOTE: The Quality and Robustness slider adjustments set Reference Distance and Intrapicture distance simultaneously.

Reference Distance – Values are 1 to 3. The default is 3. Enables a user to set the difference between consecutive reference frames within a group of pictures (GOP).

Intrapicture Distance – Adjustable, 1 to 9. The default is 9. Enables the user to set the distance between consecutive I frames within a Group Of Pictures (GOP).

Picture Tuning Parameters

Brightness – Adjustable, 0 to 255. The default is 137. Sets varying light intensity of an image.

Hue – Adjustable, -128 to 127. The default is 0. The hue is the attribute by which a color may be identified within the visible spectrum. Hue refers to the spectral colors of red, orange, yellow, green blue and violet.

Contrast – Adjustable, 0 to 127. The default is 75. Range of light-to-dark values of an image, proportional to the voltage differences between the black and white levels of the signal.

Saturation – Adjustable, 0 to 127. The default is 72. The saturation is the spectral purity or intensity of a color.

Other Parameters

Assured Sync – Disable; Relock; Tracking; Tracking and Relock. These settings control audio/video synchronization. The default is Tracking and Relock.

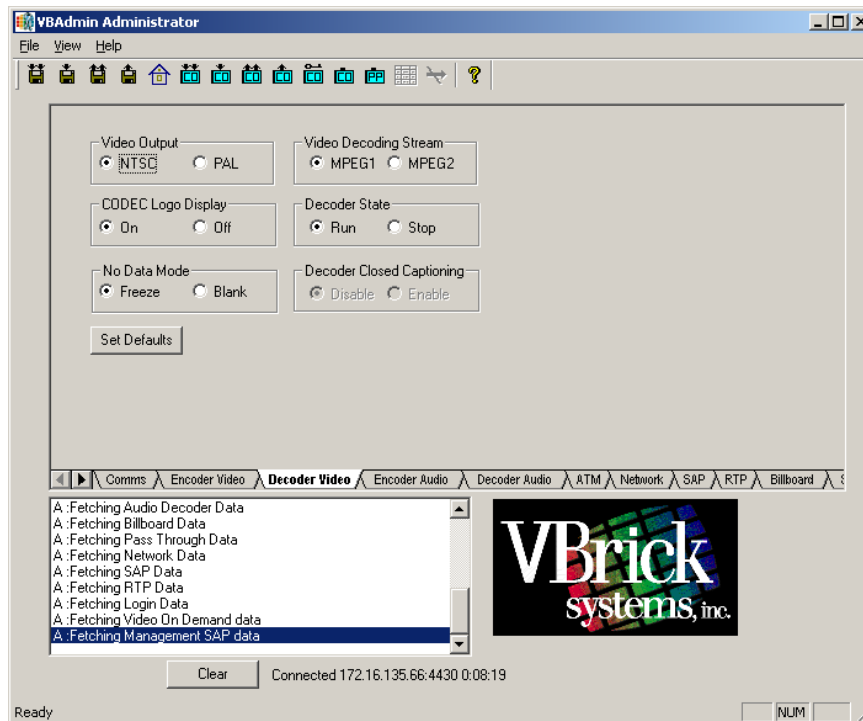
Encoder State – Run; Stop.

Encoder Closed Captioning – Disable, Enable.

Set Defaults – Reset to default values.

Decoder Video

The Decoder Video Tab displays available options for the video decoder.



Video Output – NTSC; PAL. The default is NTSC.

Codec Logo Display – On; Off. The default is On.

No Data Mode – Freeze or Blank. When streaming video data is lost, the decoder will either freeze at the last frame (Freeze) or blank the screen (Blank), depending on this setting. The default is Freeze.

Video Decoding Stream – MPEG1, MPEG2.

NOTE: The MPEG2 selection is used only for special MPEG2 video streams and generally should not be selected. The default is MPEG1.

Decoder State – Run or Stop. The default is Run. Turns the decoder on (Run) or off (Stop).

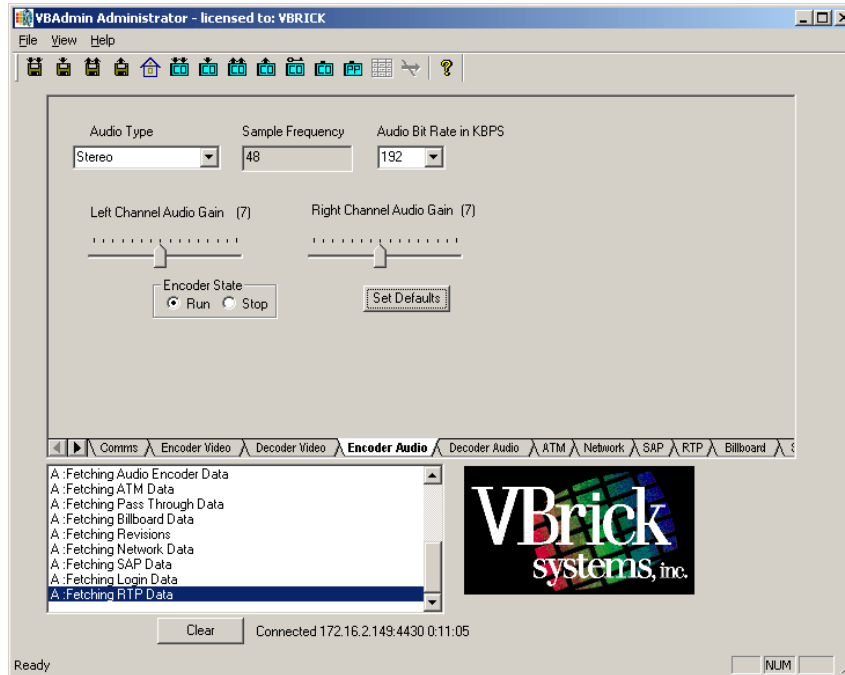
Decoder Closed Captioning – Enable, Disable.

NOTE: This selection might be grayed out, depending on the hardware revision.

Set Defaults – Reset to default values.

Encoder Audio

The Encoder Audio Tab displays available options for audio encoding.



Audio Type – Mono, Stereo, Dual Channel, Joint Stereo Mode 0, 1, 2, 3. The default is Stereo.

Sample Frequency – Actual, not adjustable.

Audio Bit Rate in KBPS – 64; 96; 112; 128; 160; 192. The default is 192.

Left Channel Gain – Adjustable, 0 to 15. The default is 7.

Right Channel Gain – Adjustable, 0 to 15. The default is 7.

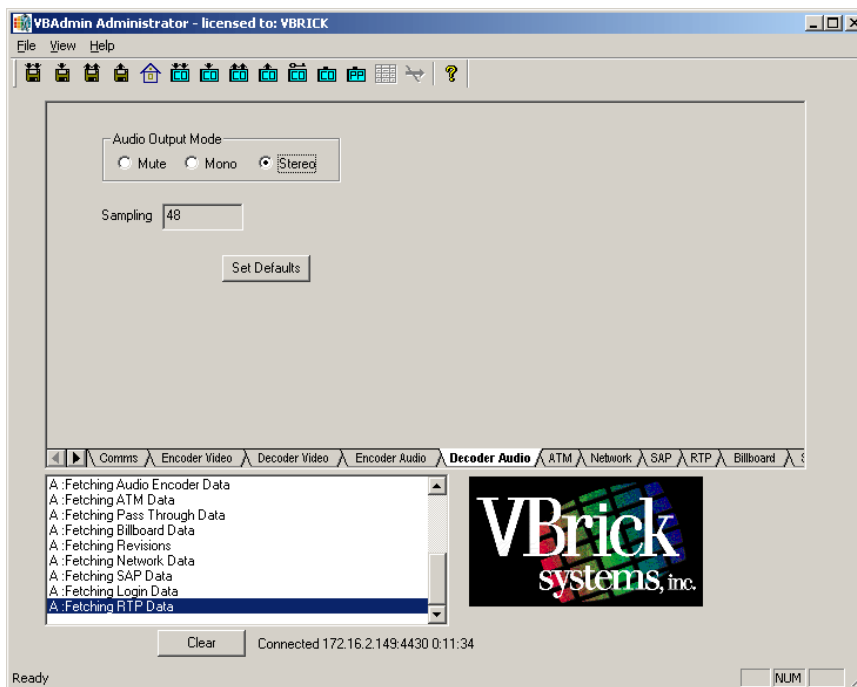
Encoder State – Run or Stop. The default is Run.

Set Defaults – Reset to default values.

NOTE: If a third party viewer, such as Cisco IP/TV displays the SAP but cannot display the stream, check that the Audio Encoder on the unit is enabled. Enabling the Audio Encoder allows a third party viewer to function properly.

Decoder Audio

The Decoder Audio Tab displays the available options for audio decoder.



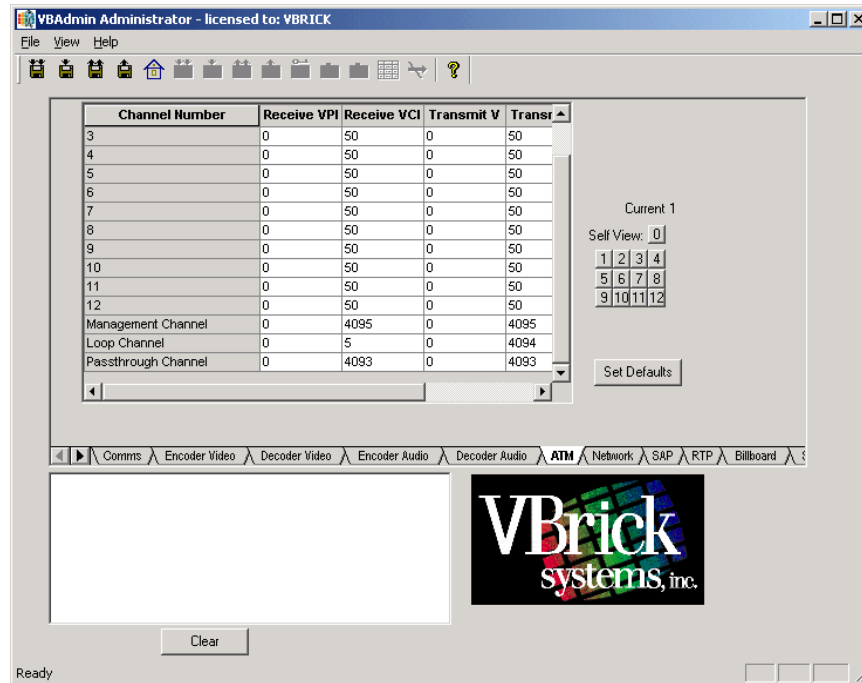
Audio Output Mode – Mute, Mono, Stereo. The default is Stereo.

Sampling (in KHz) – Actual, not adjustable.

Set Defaults – Reset to default values.

ATM

The configure ATM tab displays the available options for ATM configuration.



The window to change channels contains these settings:

Channel Number – 0 through 12. The channels are used to describe ATM network connection points, known as PVCs (Permanent Virtual Connections). Each channel provides configuration for one bi-directional PVC, which is described by the Transmit and Receive VPI/VCI (Virtual Path Identifier/Virtual Channel Identifier) values. The VBrick appliance can be operated using all legal VPI/VCI values, ranging from 0 to 255 for the VPI and 0 to 65535 for the VCI.

Please note that VCI values below 32 are not recommended for general use since they are used for administration purposes as defined by the ATM Forum.

NOTE: The program automatically updates the Transmit VPI and VCI values to match the Receive VPI and VCI values. For independent operation, configure the Receive VPI and VCI values first, then adjust the Transmit VPI and VCI values accordingly.

Management Channel: The default VPI/VCI value for channel 13 is 254/4095. It may be changed to any valid value to suit your application. Optionally, VBrick uses channel 13 as a dedicated PVC for management and administration purposes.

Loop Channel: The default VPI/VCI value for channel 14 is 254/4094. It may be changed to any valid value, to suit the application. Channel 14 is used to support the proxy-SVC (Switched Virtual Connection) feature. All cell traffic received on this channel is re-routed to the standard signaling channel (VPI=0/VCI=5). This feature allows the VBrick unit to “proxy” on behalf of a remote ATM signaling device.

Passthrough Channel – The default is VPI=254 VCI=4093. This can be changed for both transmit and receive. The Passthrough channel sets the VPI/VCI that the system will use to pass transparent data between RS-232 ports on two VBricks.

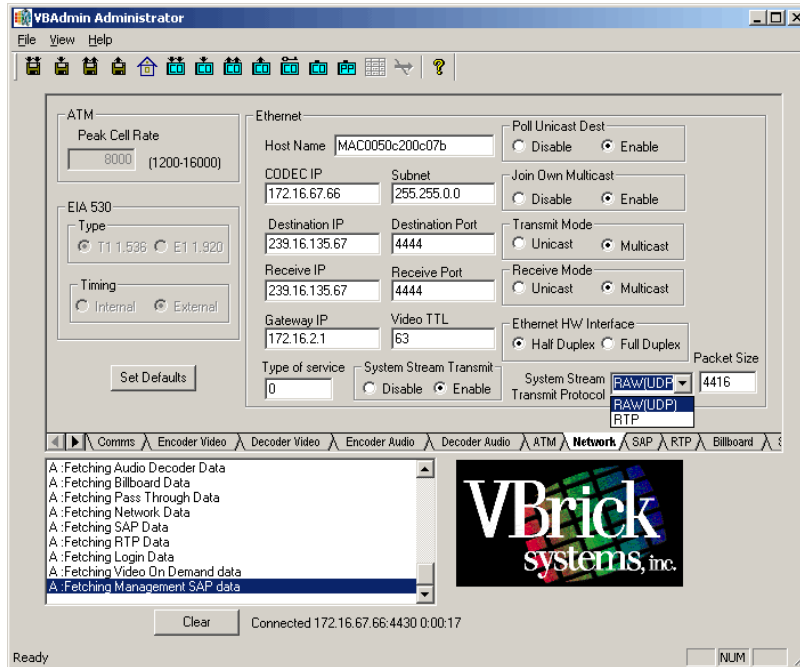
Current – Current channel.

Self View – Changes the channel by pressing buttons 1 to 12. Channel “0” is a “self view” channel. By selecting channel 0, the VBrick is put into an internal loopback mode where the local video is sent through the encoder/decoder and displayed.

NOTE: This is not an “analog” loopback; therefore the coding delay will be present.

Network

The Network Tab displays certain network configuration data.



To configure a network:

1. Assign IP address and Subnet Mask, leaving the gateway IP blank.
2. Write to Codec.
3. Assign Gateway IP address (if applicable).
4. Write to Codec.

Peak Cell Rate:

For ATM, the peak cell rate should be set to a value higher than the total payload rate. For T1 or E1 applications, the peak cell rate is set automatically.

For serial EIA-530 (RS-422), select either 1.536 Mbps (T1) or 1.920 Mbps (E1) and select either internal or external timing.

Type – T1 1.536 or E1 1.920 data transmission.

Timing – Internal or External.

Set Default – Reset to default values.



Host Name – The Host Name defaults to a name derived from the Media Access Control (MAC) address, a hardware address that uniquely identifies each node of a network. On Ethernet models, the VBrick's Host Name acts to identify the VBrick to various network applications including DHCP, SNMP and VBrick application tools.

NOTE: The Host Name can be a maximum of 18 characters; the first character must be a letter and the last character a number. The middle characters can be letters, numbers or hyphens.

For Ethernet, the IP address parameters should be set.

NOTE: Attempts to set features that are not supported by a particular VBrick will be indicated by an error in the command window.

Codec IP – In all cases, the VBrick must be configured with an IP address. This is the address of the VBrick itself. Typically, once set it should not be changed since this is the address VBrick Administrator will use to talk to the VBrick. It is also the destination address that another VBrick would use to send video to this VBrick.

For Unicast, the Destination IP address and UDP port number should be set to the IP address of the VBrick to which video is being sent.

NOTE: For streaming video to the desktop using VBrick StreamPlayer and StreamPlayer Plus, the Destination IP address is the IP address of the PC.

Subnet Mask – The mask for a particular IP subnet, generally 225.225.0.0. Automatically resets to default when the IP address is changed.

Destination IP Address – An IP address to which video will be sent. If multicast, then the multicast address range (class D) is 224.0.0.1 to 239.255.255.254.

NOTE: See information in the section on Product and Features for additional information on setting the multicast address.

Destination Port – The default is 4444. A port number, generally greater than 2000. Valid ports are numbered 1040 to 65535.

NOTE: When System Stream is set to RTP, the Destination port must be set to an even number.

Receive IP Address – For multicast applications -- the IP address from which the video will be received. In the case of Unicast, it is the "Preferred Address". If two sources are sending video to the same VBrick at the same time, the VBrick will decode the one who's *source address* is entered here.

Receive Port Address – The port number of a video stream.

Gateway IP Address – The IP address of a gateway router, if required.

Video TTL (Time to Live) – The default is 63. This parameter defines the Time To Live value.

Type Of Service – The default is 0. Decimal entry for DiffServ and packet priority.

System Stream Transmit – Enable, Disable. This is NOT the same as encoder enable/disable. This stops system stream packets from being sent out the Ethernet port. Disable VBrick transmit if RTP is enabled and you do NOT also wish to transmit a MPEG-1 system stream.

Poll Unicast Dest – Enable, Disable. This feature should generally be enabled. When set, a VBrick will request permission before sending to a designated destination. A VBrick will grant permission if the receive address matches the IP address of the requesting VBrick.

Join own Multicast (Not available for decoder only model) – Enable or Disable. This feature is used to deal with a common switch limitation. Certain switches may spontaneously broadcast traffic if no client is listening to the multicast. When enabled, the VBrick will become a client to his own multicast stream.

Transmit Mode – Unicast or Multicast. The default is Unicast.

Receive Mode – Unicast or Multicast. The default is Unicast.

Ethernet Hardware (HW) Interface – The default is Half Duplex. Select Half Duplex Ethernet (conventional) or Full Duplex Ethernet. Must match the network.

System Stream Transmit Protocol – RAW (UDP) or RTP. Generally, RAW mode should be used. It is more efficient for use in most networks. The RTP option should be used only if a decoder requires RTP with system streams.

NOTES:

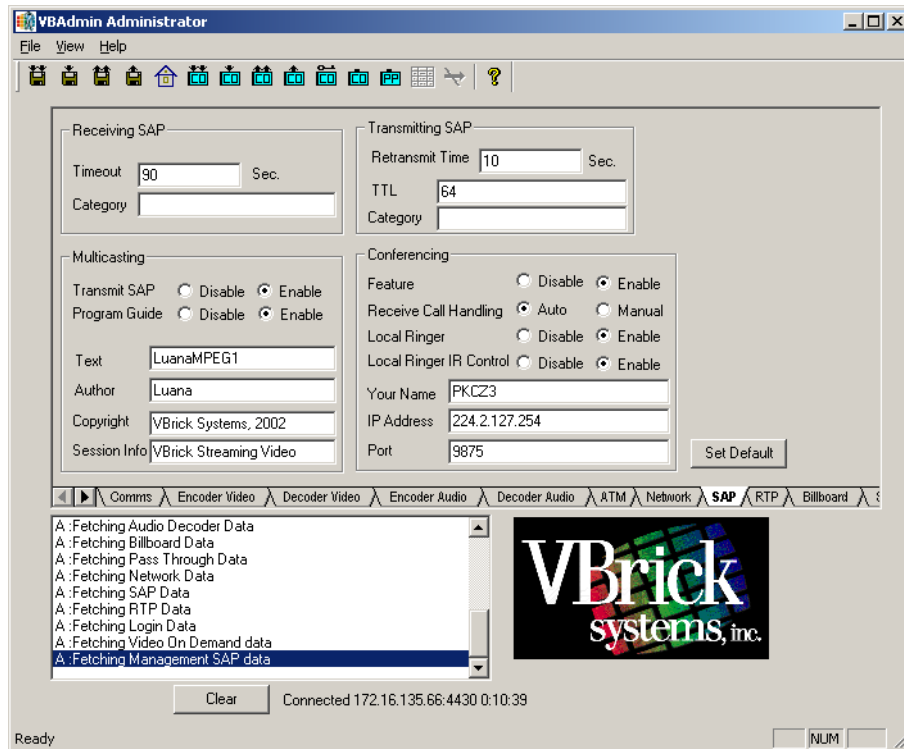
- RTP with separate audio and video streams , as required by Cisco IP/TV and the VBrick Apple Video Player is controlled in the RTP menu.
- There is an interoperability issue with older code. Sending an RTP System Stream from a box containing 2.5.0 code to a box that is running 2.4.0 (no RTP support) causes an error message to be displayed on the shell window and the video will not display properly.

Packet Size – Range 1400 to 4450. When the System Stream is RTP, packet size is fixed at 1460. When Stream is RAW, the default is 4416.

NOTE: It is highly recommended that the default settings be used since smaller sizes impose a significant performance penalty.

SAP

The SAP TAB (Session Advertisement Protocol) sets the parameters for the Program Guide and Conference Guide features.



Receiving SAP (Session Advertisement Protocol)

Timeout – Default is 90 seconds. The time in seconds that will pass before a program name is removed from the list of programs if an identical SAP is not received.

Category – Keywords that will be used to filter which Programs will be displayed in the Program Guide. A wildcard (*) is permitted at the end of words. Case is ignored. Enter multiple words separated by a space.

NOTE: Please refer to the appendix for more information about Categories and the interrelationship between VBrick appliances and StreamPlayer.

Multicasting

Transmit SAP – Disable, Enable. The default is Enable. Disabling the transmission of a SAP means that the program will not appear on a VBrick, StreamPlayer or StreamPlayer Plus. To play a disabled stream the user must then know the multicast address and port number and manually enter it in the receiving device.

Program Guide – Disable, Enable. The default is Enable. Disabling the Program Guide disables the user's ability to use the IR Remote Control to select programs.

Session Information

This is descriptive text about the video. Defaults to "VBrick Streaming Video."

Text – The text broadcast by the VBrick, which identifies itself as a unique multicast video stream.

Author – The text displayed in the Author field of StreamPlayer/Media Player.

Copyright – The text displayed in the Copyright field of StreamPlayer/Media Player.

Session Information – Information text displayed on StreamPlayer/Media Player.

Set Default Button – Restores the default values for the transmission of SAPs.

Transmitting SAP

Retransmit Time – Default is 10 seconds. The time interval between SAP transmissions by the VBrick. Should be less than the SAP Receive timeout.

TTL – Default is 64. Time To Live for the SAP packets. The number of hops between routers in which a Management SAP is valid on the network.

Category – Keywords transmitted by the VBrick and used by the Receive Category for filtering.

NOTE: Please refer to the Appendix for more information about categories and the interrelationship between StreamPlayer and VBrick appliances.

Conferencing

Feature – Enable, Disable. The default is Enable. If disabled, Conference Guide will not appear.

Receive Call Handling – Auto, Manual. The default is Auto. If Auto, the VBrick will automatically answer incoming calls. If Manual, incoming calls will be accepted only accepted by the user pressing the **Ans Call** IR Remote Control button.

Local Ringer – Disable, Enable. The default is Enable. If disabled, the VBrick will not ring when a caller signals.

Local Ringer Control – Disable, Enable. The default is Enable. If disabled, the local IR Remote Control cannot disable the local ringer.

Your Name – The name displayed on the Conference Guide listing screens.



IP Address – The IP address used for advertising the Program Guide and Conference Guide. The default setting is a standard multicast address used for SAPs. You can change it to any address (such as an all subnets address, broadcast address, etc.).

Port – The default setting is a 9875, but it can be changed. The port used for advertising of the Program Guide and Conference Guide.

NOTE: VBrick recommends that the IP Address and Port be changed from the default.

Set Default – Reset to default values.

RTP

The RTP selection Tab set the parameters for Real Time Protocol operation.

NOTE: The RTP protocol controlled by this screen is RTP using separate audio and video streams.

RTP Transmit – Enable, Disable. The default is Disable. Enable for RTP streaming.

Transmit Mode – Unicast, Multicast. The default is Multicast.

Administrator Name, Telephone, and E-mail – Entries transmitted by RTP.

SAP Retransmission Time – The default is 100 seconds. Sets how often the RTP SAP is transmitted.

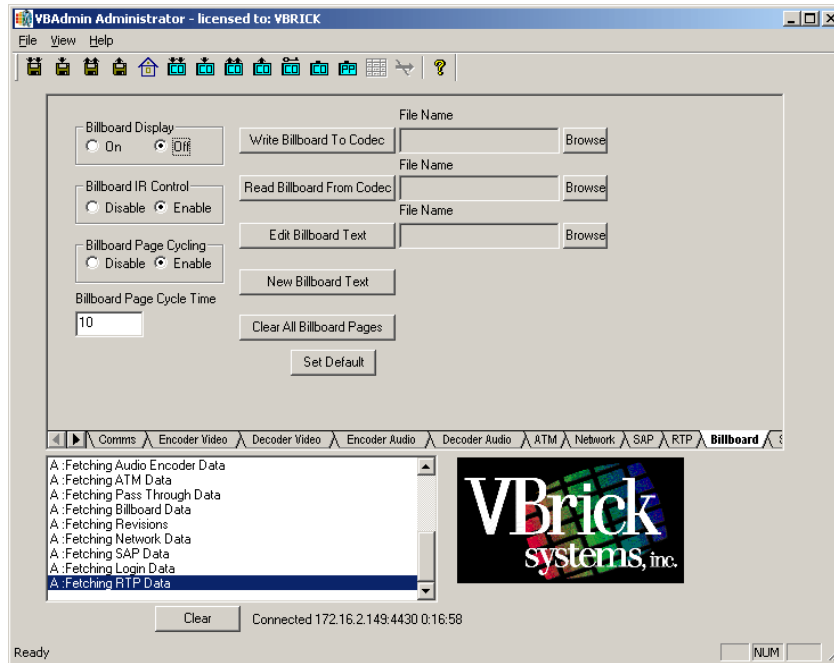
Video Destination and Port – The default is Multicast. The address and port (usually multicast) that will be used for video. There must be only one source on this address in any one network.

Audio Destination and Port – The default is Multicast. The address and port (usually multicast) that will be used for audio. There must be only one source on this address in any one network.

Set Defaults – Reset to default values.

Billboard

The Billboard TAB provides Billboard configuration.



Billboard Display – On, Off. The default is Off.

Billboard IR Control – Enable/Disable. The default is Enable. Enable or disable control of the Billboard via local IR control.

Billboard Page Recycling – Enable/Disable. The default is Enable. Enable or disable Billboard page recycling.

Billboard Page Cycle – The default is 10 seconds. Sets the time each page will be displayed.

Write Billboard to Codec – Sends the text file to the VBrick.

Read Billboard from Codec – Reads a Billboard file from a VBrick and saves it to disk as a file.

Edit Billboard Text – Reads a Billboard file from a VBrick and launches an editor.

New Billboard Text – Launches an editor with default template.

Clear All Billboard Pages – Removes all Billboard pages from the VBrick.

Set Default Button – Restores the default values for Billboard Settings.

Using Billboard

The Billboard is organized as a standard text file that may have up to 255 lines with up to 35 characters per line. Pages are identified as sets of 14 lines. Therefore if a text file with many lines is created and sent to a VBrick, line 1 would appear on the Billboard page 1, line 1. Line 15 would appear as line 1 of page 2, etc.

There are 18 pages in the custom billboard. Each page has 14 lines. Each line has at most 35 characters. The tab can be used in text to line up columns, but each tab counts as two characters. There are special characters that can be used in the text.

\1 - colors all the text following characters red.

\2 - colors all the text following these characters yellow.

\3 - colors all the text following these characters white.

\9 - this combination is translated into the tab on your billboard.

If there is an ^P at the beginning of the line, then all the following lines are skipped to the end of the page. ^P causes the next line to start on the next page.

^REM at the beginning of the line is a comment and will not be displayed on the billboard. Since the comments are ignored the number of lines in the text appears more than 14 lines.

Once the billboard is created, save it as a text file. Click on the File menu and select "Save As.". Select "Text Document" in "Save as type". Select the desired folder, and enter the file name, for instance: MyBillboard.txt.

To save text as a formatted file, select "Word for Windows" in "Save as type". When Billboard is retrieved from the VBrick it is saved as the text file. To restore the format of the billboard copy the contents of the text and then paste it over the template.

Sample Billboard text is included with VBAdmin.

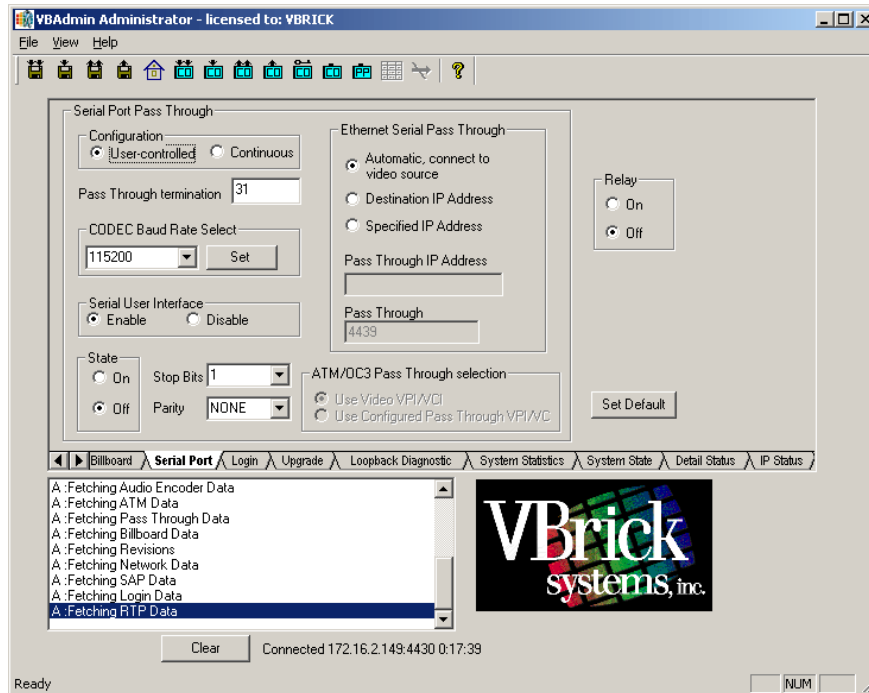
```

\3      VBRICK SYSTEMS WELCOMES YOU
\2      LEARNING SOLUTIONS 2000
\3      DISTANCE LEARNING CONFERENCE
\1      W E D N E S D A Y
\2      Building Vision
        Across Your Network
^P
\2      TECHNOLOGY SESSIONS WEDNESDAY
\310:15 - 11:00 Distance Learning
        The Big Picture
\211:00 - Noon IP Multicast &
        Interactive Video
        in Educational
        Networks
\31:00 - 1:45 Live On-Line
        Learning
        What you need to know
2:00 - 2:45 Trends in Web-based
        Learning
^P
\2      EDUCATION SESSION WEDNESDAY
\310:15 - 11:00 Health Online
11:00 - Noon Realizing the
        Promise of Distance
        Learning
1:00 - 1:45 Striking the Balance:
        Mixing Web-Based
        Instruction
2:00 - 2:45 Checklist for Choosing A Distance
        Learning Package

```

Serial Port

VBricks provide end-to-end serial port Passthrough. This feature can be either continuous, or user-controlled.



Serial Port Passthrough

Sets the behavior of the Serial Port

User-Controlled – The user may enter a specified ASCII character five times to gain local access to the VBrick. In this mode, it is possible that the data being passed may contain the selected character, so care should be taken to choose a character that is unlikely to appear in the data stream.

NOTE: Any ASCII character, entered in Decimal. Default is 31 (Control-Shift-Underscore). Must enter this character five times to exit Passthrough mode.

Continuous – The VBrick serial port is put into permanent Passthrough mode and may not be accessed locally. Use this mode if long strings of binary data are being sent (to prevent the data from “looking like” a termination character).

Passthrough Termination – A character, (i.e. a decimal number) representing an ASCII character (e.g. A = 41).



IMPORTANT: If in User Controlled mode, entering this character five times will take the VBrick out of Passthrough mode and into local terminal mode.

Codec Baud Rate – Sets the rate and stop bits for the VBrick serial port. The default is 9600.

Serial User Interface – Enable or Disable. The default is Enable. Disable means that the VBrick will not respond to local serial port commands (e.g. it is in permanent Passthrough mode).



IMPORTANT: If disabled, the VBrick cannot be managed through the serial port.

State – On/Off. The default is Off. Sets (or indicates) the current state of Passthrough. The On state means the VBrick is in Passthrough mode.

Stop bits – 1 or 2. The default is 1.

Parity – None, Odd, Even. Default is none.

Ethernet Serial Port Passthrough

Sets the behavior for the initiation of the serial port Passthrough feature (Ethernet only). The default is Automatic:

Automatic – The serial port will send data **TO** whatever address it is receiving video **FROM**.

Destination – The serial port will send data to the same address to which it is sending video (e.g. use the Destination IP address).

Specified – The serial port will send data to a specified IP address and TCP port number.

Passthrough IP Address – If “Specified” is selected.

Passthrough Port – If “Specified” is selected.

Relay – Off, On. The default is Off.

ATM/OC3 Passthrough

Selects the mode of operation:

Use Video VPI/VCI – Use the same VPI/VCI for serial data as is used for video.

Use Configured VPI/VCI – Use the VPI/VCI that has been configured on the ATM tab. Any VPI/VCI can be configured.

Notes About Serial Passthrough

Typically, Passthrough is used to control a remote device such as a camera that is connected to a VBrick encoder. Therefore, the decoder typically initiates Passthrough mode, where the camera control is located, and the encoder responds.

VAdmin allows you to connect to any VBrick in your network and you might be tempted to put two VBricks into serial Passthrough mode for end-to-end connectivity. *This is not necessary and should be avoided.* Rather, you should only tell the decoder to initiate Passthrough, and the remote encoder that is connected to your decoder will automatically respond and enter Passthrough mode.

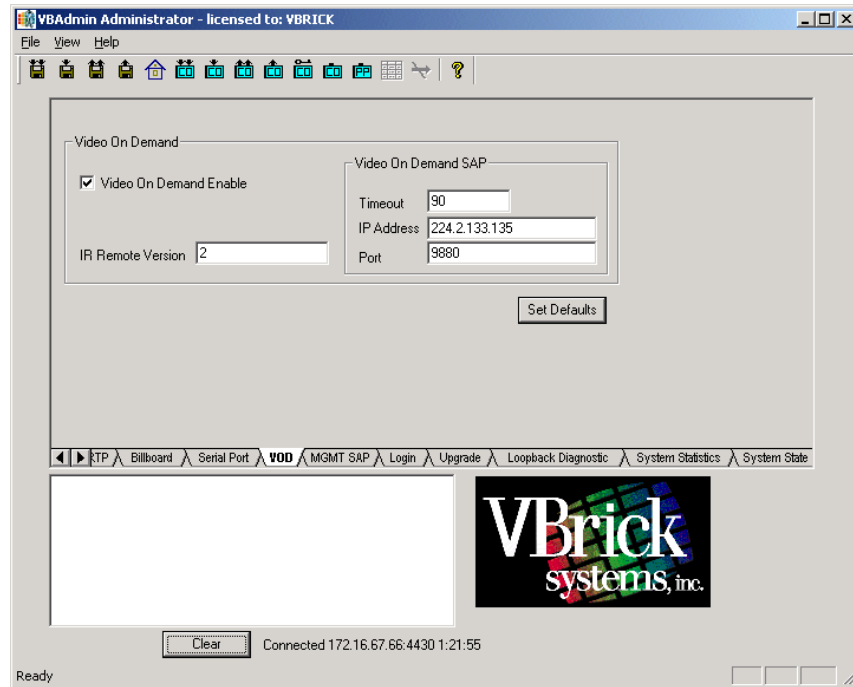
Some devices will produce continuous streams of data. If you connect such a device to a VBrick, and the User Interface is not disabled, the VBrick acts as if this data is local commands and attempts to understand it. **This can cause the VBrick to fail to boot after a power cycle or cause other anomalous behavior! Please be sure to configure the User Interface for “disable” in such cases.**



NOTE: If you change the escape character (the default is ASCII 31, “Control Shift Underscore”). **Be sure to write it down in a safe place!**

IMPORTANT: If control of a VBrick is lost, it is possible to gain local access via the serial port, by entering Control-Shift-Underscore (ASCII 31) five times or continuously during the power-on sequence. **It is necessary to know the escape character and baud rate.**

VOD



Video On Demand Enable – The default is checked. Enabled if the box is checked; otherwise disabled.

IR Remote Version – 1 or 2. The default is 2. The VBrick IR Remote currently being used.

Video On Demand SAP (Session Advertisement Protocol)

Timeout – The default is 90 seconds. The time in seconds that will pass before a Video On Demand SAP is removed from the list of servers if an identical SAP is not received.

IP Address – The default is 224.2.133.135.

Port – The default is 9880.

Set Default Button – Set the Video on Demand SAP to default values.

Management SAP

Management SAPs are used to inform VBDirectory, or other VBrick management applications, of the existence and configuration of VBricks on the network.

Group Name – If included as part of a group.

Unit Number – The default is 1. The unit number within the group.

SAP

SAP Transmit Enable – The default is checked. Enabled if the box is checked; otherwise Disabled.

Retransmit Time – The default is 10 seconds. The time in seconds that will pass before a Video On Demand SAP is removed from the screen if an identical SAP is not received.

Time to Live – Default is 64. For the Management SAP.

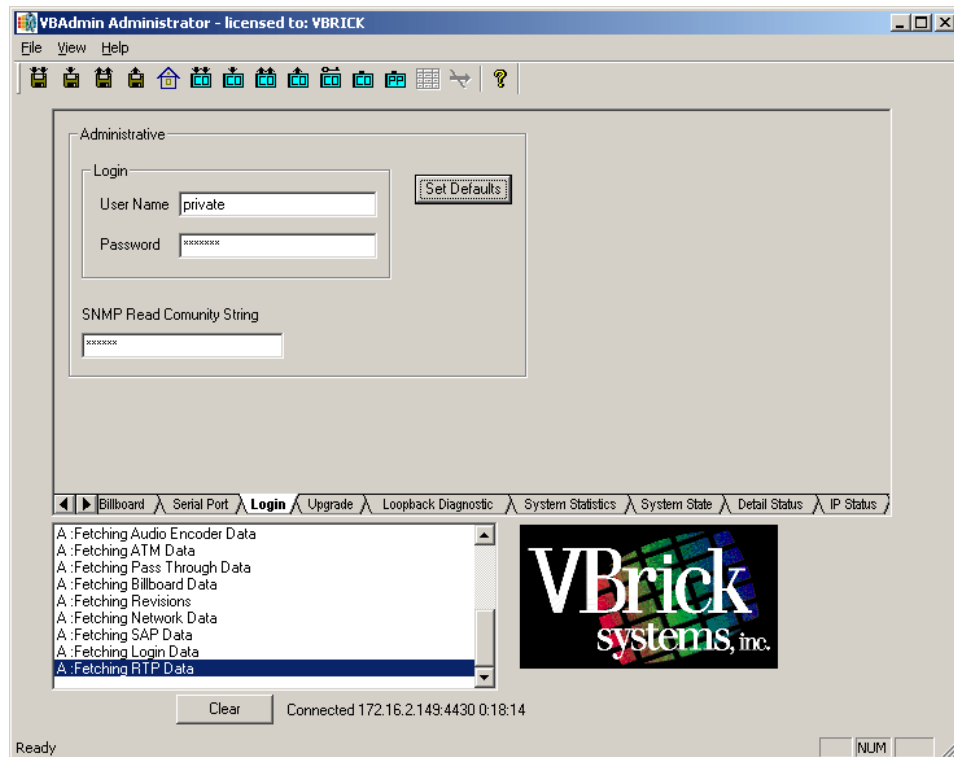
Type of Service – Adjustable, 0 – 255. The default is 0. Decimal entry for DiffServ and packet priority.

IP Address – The default is 224.2.133.134.

Port – The default is 9876.

Set Default – Set SAP information to default values.

Login



User name – The default is (case sensitive) **private**. The user name used for VAdmin, telnet and SNMP write access.

Password – The default is (case sensitive) **private**. The password used for VAdmin, telnet and SNMP write access.

SNMP Read Community String – The default is (case sensitive) **public**. The string used to provide SNMP read access.

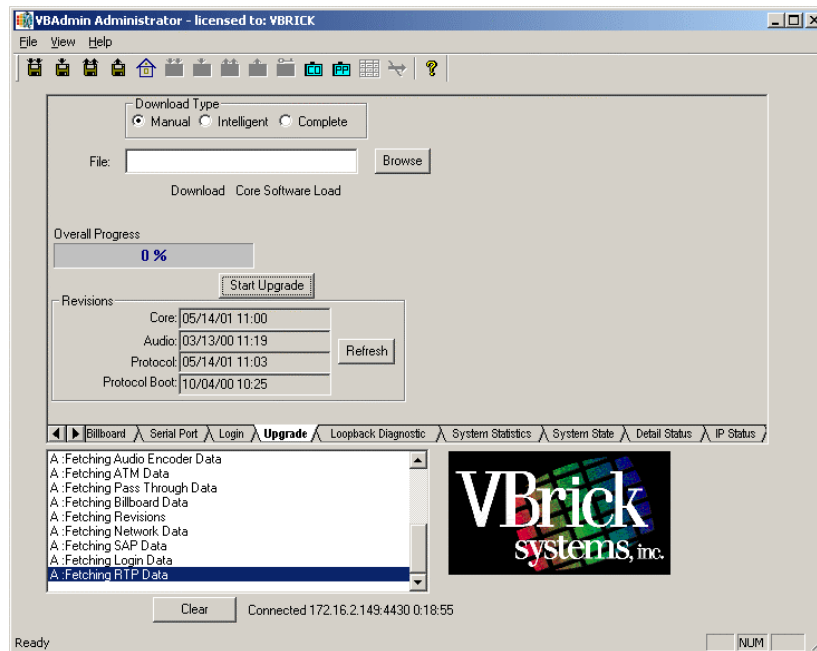
Set Default Button – Sets the default values for the Login information.

Upgrade

VBricks may be software upgraded by using the Upgrade Tab. The user may select Manual Upgrade (the components are selected), Intelligent (VAdmin will only upgrade the required components, saving time), or Complete (VAdmin will upgrade all software). This menu also displays the current software revision in the VBrick appliance.

Software upgrade instructions are provided with VBrick software release notes. For more information, please refer to the upgrade instructions in Chapter Nine.

Software above version 2.0 is distributed in a self-extracting file which normally installs a new directory called "Release x" under C:/Program Files / VBrick / Administrator / Download. Within the "Release x" directory are all of the files needed by the VBrick along with compatibility information.



Download Type

Three options:

Manual – You manually select the files for upgrade the software. Enter the file name (or browse for it on your PC) and hit start. A progress bar will indicate that the download is in process.

Intelligent – VAdmin downloads only needed files. Select the Revision from the Revision dialog box (this box will display the "Release x" directory names). The revision of each software component will be shown in Red (needs upgrade) or Green (does not need upgrade) is displayed. Press Start to begin the download of needed components. A progress bar will indicate the progress of each component and of the overall progress.

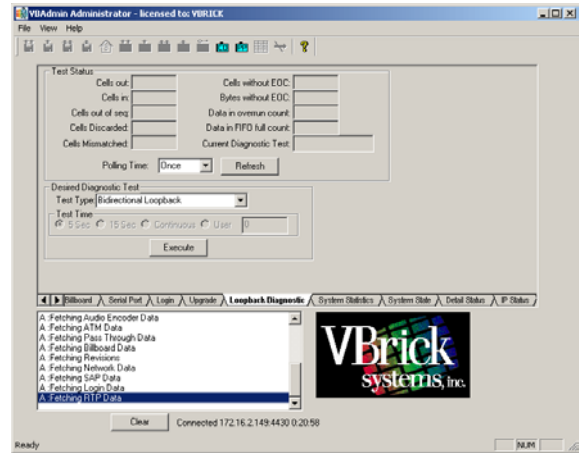
Complete – VAdmin will download the entire release (all components).



NOTE: Follow the instructions in the release notes, provided with each software release. For faster download, turn off the video encoder.

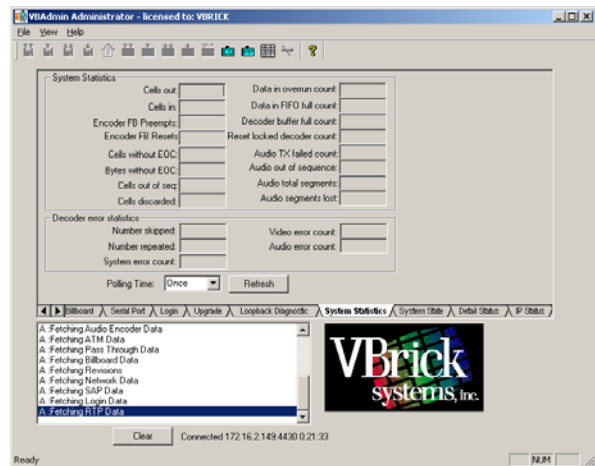
Loopback Diagnostics

The Loopback Diagnostics Tab provides access to various diagnostics and diagnostic results.



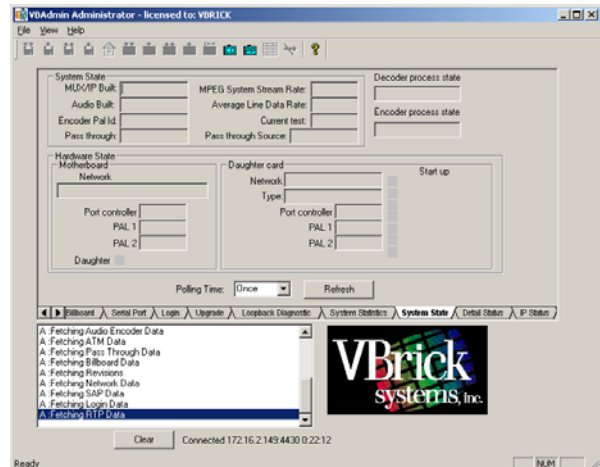
System Statistics

The System Statistics Tab displays various audio, video, and network status.



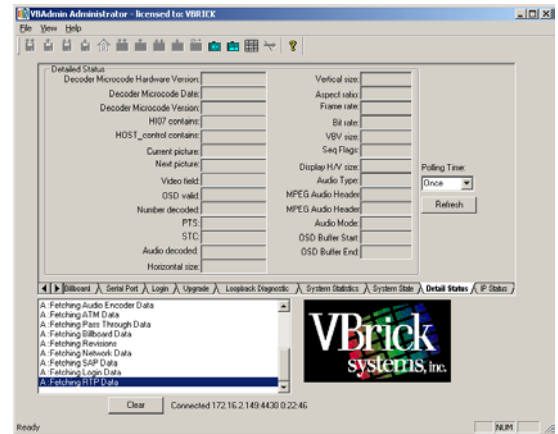
System State

The System State Tab displays various revision levels as well as the state of the encoder and decoder.



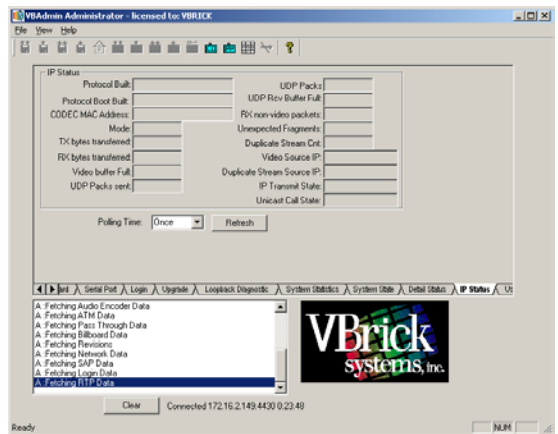
Detailed Status

The Detailed Status Tab displays various MPEG system statuses and other information.



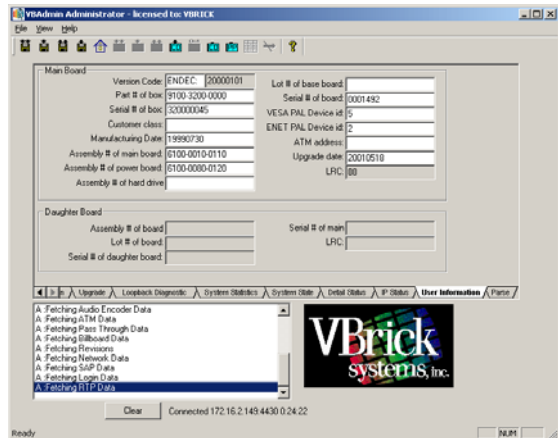
IP Status

The IP Status Tab displays various UDP/IP statistics and status.



User Information

The User Information Tab displays information about the VBrick configuration as shipped.

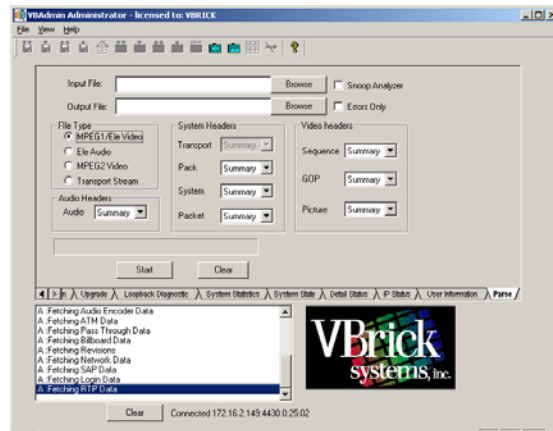


Parse File

The Parse File tab is a useful utility that allows the user to peek inside an MPEG System, Program or Elementary file that has been saved to disk.

Various options are available to view summary or detail information.

NOTE: The Parse File utility is an unsupported free bonus and VBrick makes no claim as to the accuracy of the analysis.



7: VBrick Operation Using Command Line Interface

Installation, Configuration, and Use with Command Line Interface

VBricks are easily configured using a standard ASCII terminal or terminal emulator program connected to the serial port on the rear of the unit. Simple English commands configure all functions and features.

Upon application of power, the VBrick will perform a self-test during which the yellow front panel LED will flash and a color bar pattern will be displayed on a local monitor. The power-up and self-test routine may take several minutes (**See Quick Start Chapter**).

Depending on the VBrick model (Encoder, Decoder, Full Duplex, ATM, Ethernet, etc), not all configuration options are available and certain configuration options may be displayed but will have no effect. For example, a VBrick used for T1/E1 applications does not use ATM, and therefore ATM related configuration options are not relevant.

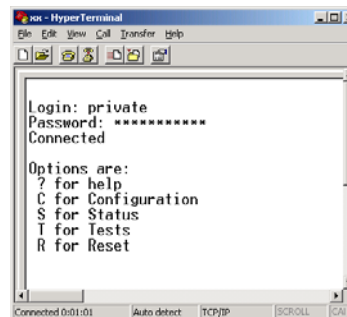
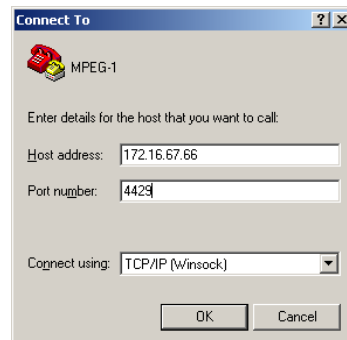
Command Line Interface



VBrick's command line interface is simple, intuitive, and menu driven. Upon connection to an ASCII terminal, (i.e. HyperTerminal (START/ Program/ Accessories/ Communications/ HyperTerminal). Connect using your TCP/IP (Winsock). Enter the IP address of the VBrick and port (4429). Login using the default "private" and password "private". Entering "c" will cause a menu will be displayed¹⁵. The general format is *Command : Option : Option* (Upper or Lower Case). You can substitute a space for the colon if desired. Entering a question mark (?) at any level will display available options. First level command options are:

- C – Configure
- S – Status
- T - Test
- R - Reset

Entering C:? displays available configuration options.
Entering S:? displays available status options, etc.

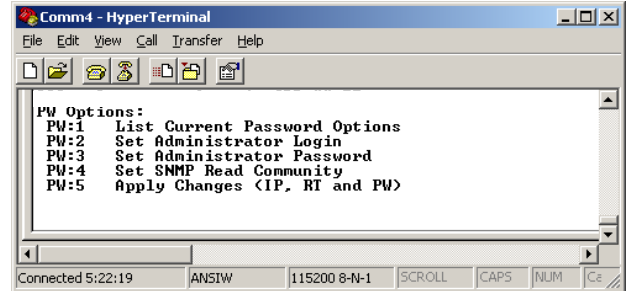


¹⁵ Ethernet VBricks also support Telnet. The display is identical to that of a local terminal.

Passwords

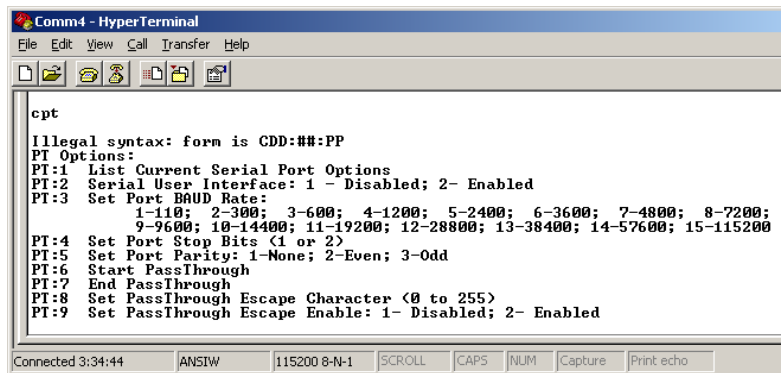
The use of CLI and VAdmin over the serial port does not employ the use of passwords. Physical connection with the serial port is sufficient to restrict access.

For the CLI the **cpw** command is used to manage passwords.



Port Baud Rate Selection

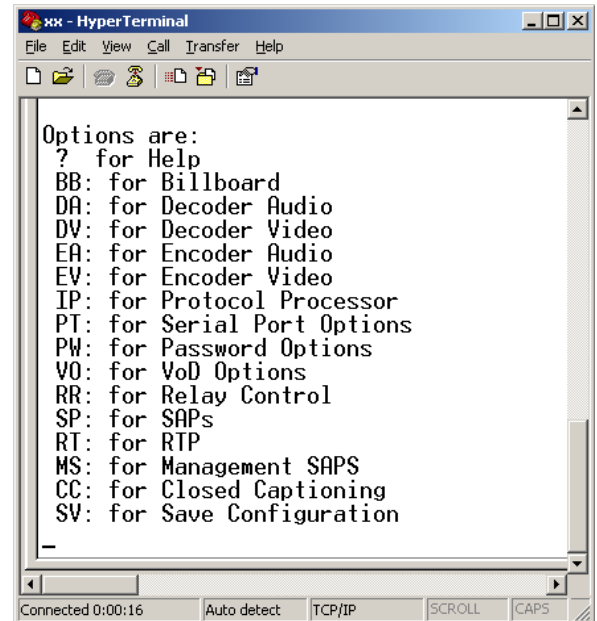
The serial port on the rear of the VBrick is shipped configured for 9600 bps. The port can be changed to any standard rate between 110 and 115.2 Kbps. Obviously, the port rate must match the terminal rate and once you have made a change you will not be able to communicate with the VBrick until you reconfigure the terminal.



Configuration Options

Entering C? displays the configuration options, each of which is described in the following pages. Choices will be different for different models (e.g. ATM models do not display IP choices, and Ethernet models do not display ATM choices).

- **CC (ATM Models)** – Configure Channels: Sets the ATM PVC send and receive addresses.
- **NT (ATM Models)** – Configure Network: Sets the PCR for ATM networks.
- **BB** – Configure Billboard: Sets the Billboard Parameters (IP Units Only).
- **DA** – Configure Decoder Audio: Sets the decoder for stereo/mono, etc.
- **DV** – Configure Decoder Video: Sets the decoder for NTSC/PAL, etc.
- **EA** – Configure Encoder Audio: Sets the encoder for rate, mono/stereo, etc.
- **EV** – Configure Encoder Video: Sets the encoder for rate, GOP, brightness, etc.
- **IP** – Configure IP: Sets the IP network parameters.
- **PT** – Configure Serial Port: Sets the Serial Port options.
- **PW** – Set and Change Passwords.
- **VO** – Sets up the Video on Demand options.
- **RR** – Set Relay Control.
- **SP** – Configure SAP: Sets the Program Guide and On Screen Display (IP Units Only).
- **RT** – RTP.
- **MS** – Management SAPs.
- **CC** – Closed Captioning.
- **SV**: Configure Save: Saves all parameters in non-volatile memory.



Configure Example: Encoder Parameters

To configure the video encoder, enter **CEV:?** to display the available options and current settings. CEV:1 displays the current configuration, CEV:2 starts the encoder, CEV:3 stops the encoder, etc.

For example, the encoding bit rate is set using CEV:5:NNNN, where NNNN is the bit rate in Kbps. To set the encoder for 3.0 Mbps simply enter CEV:5:3000.

The figure at right shows a typical video-encoding configuration (which is also the default configuration).

The VBrick has been set to encode video at 3 Mbps, and is generating MPEG frames with the GOP set to full I-B-P¹⁶.

```

Comm4 - HyperTerminal
File Edit View Call Transfer Help
-----
EU Options:
EU:1 List Current Video Encoder Options
EU:2 Start Encoding Video
EU:3 Stop Encoding Video
EU:4 Set Video Format: 1-NTSC/SIF; 2-PAL/SIF; 3-NTSC-QSIF; 4-PAL/QSIF
EU:5 Set MPEG Bit Rate <kbps>;
    Range for SIF is 1000-3000 <1-3 Mbps>
    for QSIF 256-496 <256-496 Kbps>
EU:6 Set Reference Distance <1 to 3>
EU:7 Set IntraPicture Distance <1 to 9>
    <Reference Distance Must Divide This>
EU:8 Set Window Vertical Offset <-8 to 32>
EU:9 Set Video Input Type: 1- Composite; 2- S-UHS
EU:10 Set Brightness <0 to 255>
EU:11 Set Contrast <0 to 127>
EU:12 Set Hue <-128 to 127>
EU:13 Set Saturation <0 to 127>
EU:14 Set Assured Sync: 1- Disabled; 2- R; 3- T; 4- R+T
    
```

```

Comm4 - HyperTerminal
File Edit View Call Transfer Help
-----
cev 1
Encoder Video Options
Video Format:          NTSC/SIF
Input Type:           Composite
Bit Rate:             1496000
Window Vertical Offset: 1
Reference Distance <M>: 3
Intra-Picture Distance <N>: 9
Brightness:           137
Contrast:              75
Hue:                  0
Saturation:            72
Assured Sync:         R+T
Command Complete
    
```



NOTES:

- ❑ Entering `csv saves` all configuration parameters in non-volatile memory, and the VBrick will restore these values again upon power-up.
- ❑ Changing between SIF, QSIF, PAL and NTSC auto-saves and causes the unit to reboot!

¹⁶ See Discussion of GOP configuration elsewhere in this guide.

Configure Channel



ATM model VBricks can be configured to automatically select preprogrammed Transmit and Receive VPI/VCI's as "channels".

"Channel 1" can be one VPI/VCI pair, "Channel 2" may be another VPI/VCI pair, etc. "Channels" are simply a table of transmit and receive VPI/VCI's.

To select a pre-configured VPI/VCI pair, you enter the channel number:

CCH:2:x

Where x is 1 to 12. Channels 13 and 14 are described later in this section. Note that CCH:1 displays the "Current Channel". Unless you are streaming multiple PVC's to a VBrick, you need only use one channel (e.g. "Channel 1").

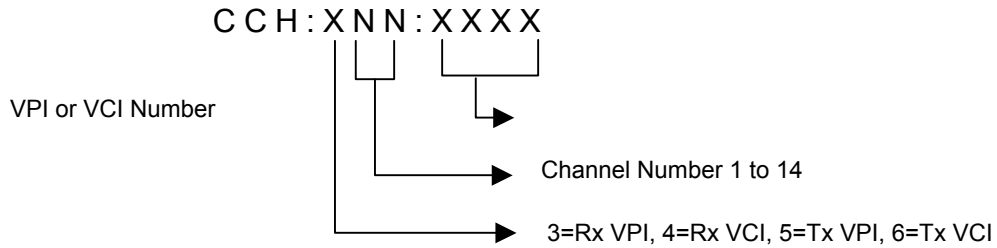
NOTE: VBricks are shipped with a default configuration of VPI=0 and VCI=50 for all channels.

```
Comm4 - HyperTerminal
File Edit View Call Transfer Help
CH Options:
CH:1 List Current Channel Options
CH:2:xx Select Video Channel (0 to 12)
CH:3xx Set Receive UPI for Channel xx (0 to 255)
CH:4xx Set Receive UCI for Channel xx (0 to 65535)
CH:5xx Set Transmit UPI for Channel xx (0 to 255)
CH:6xx Set Transmit UCI for Channel xx (0 to 65535)
Channel 0 is for Self-Viewing
Channels 1 to 12 are Video Channels
Channel 13 is the Management Channel
Channel 14 is the Looped Channel
Channel 15 is the PassThrough Channel
-
Connected 4:11:54 ANSIW 115200 8-N-1 SCROLL CAPS NUM
```

```
Comm4 - HyperTerminal
File Edit View Call Transfer Help
Channel Options
Current Channel = 1
Channel RCU UPI / UCI XMT UPI / UCI
1 0 50 0 50
2 0 50 0 50
3 0 50 0 50
4 0 50 0 50
5 0 50 0 50
6 0 50 0 50
7 0 50 0 50
8 0 50 0 50
9 0 50 0 50
10 0 50 0 50
11 0 50 0 50
12 0 50 0 50
13 <Management> 0 4095 0 4095
14 <Looped> 0 5 0 4094
15 <PassThrough> 0 4093 0 4093
Command Complete
Connected 4:18:18 ANSIW 115200 8-N-1 SCROLL CAPS NUM
```

Configuring Channels

To configure channels, select **3** to set the receive VPI, **4** for the receive VCI, **5** for the transmit VPI, and **6** for the transmit VCI¹⁷. For example, to set Channel 1 to receive video on VPI=0 and VCI=51, you would enter CCH:301:0, then enter CCH:401:51.



To set Channel 12 to transmit video on VPI=34 and VCI=56, you would enter: CCH:512:34 and CCH:612:56.

In a typical application, multiple PVC's are streaming video to a single VBrick, and the user will want to simply "change the channel" to view different programs. In this case, the transmit VPI/VCI for each channel may all be identical while the receive VPI/VCI would be different. Once set, the user enters CCH:2:nn, where nn is the channel number 1 to 12.

Simplicity TIP:

Assuming you are only using channel #1, set the PVC address as follows:

Receive VPI	CCH 301 NNN
Receive VCI	CCH 401 NNNNN
Transmit VPI	CCH 501 NNN
Transmit VCI	CCH 601 NNNNN

Self View Channel

Channel "0" is a "self view" channel. By selecting channel 0, the VBrick is put into an internal loopback mode where the local video is sent through the encoder/decoder and displayed.

NOTE: This is not an "analog" loopback; therefore the coding delay will be present.

Management Channel

VBrick uses optional PVC for management information between VBricks, and for downloading new software. Using the above procedure, and selecting Channel 13, you may set the VPI/VCI used for management. The default is VPI/VCI=254/4095.

Proxy SVC Channel

Channel 14 is the proxy-signaling channel. Setting the Transmit and Receive VPI/VCI causes any traffic received on one VPI/VCI to be "looped back" to the other VPI/VCI on a full duplex basis ("Transmit" and "Receive" do not really have meaning since the connection is two-way). The default is VPI/VCI = 254/4094 which is switched to VPI/VCI = 0/5.

Passthrough Channel

The Passthrough channel sets the VPI/VCI that the system will use to pass transparent data between RS-232 ports on two VBricks. The default is VPI=254 VCI=4093. This can be changed for both transmit and receive.

¹⁷ For convenience, changing the Receive VPI/VCI automatically changes the Transmit VPI/VCI to the same value. To set different Receive and Transmit values, set the Receive values first (changing the Transmit values does not change the Receive values).

Configure Network Configuration Selections

The following table illustrates the ATM network configuration selections available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
CNT:1	Display Current Configuration	Displays the Peak Cell Rate settings
CNT:2	Set all values to VBrick default	PCR=8000
CNT:3	Set Traffic Shaping Peak Cell Rate. Default = 8000	1200 to 16000 Kbps NOTE: Should be set to a number approx. 10% higher than the average line rate. The payload is equal to the video and audio encoder rates plus overhead, and is displayed by entering SS.
CNT:4	Clocking	Internal or External

ATM NETWORK SELECTION TABLE

NOTE: The VBrick Default configuration is VPI=0 and VCI=50 (see CC: Configuration Channels section).

Configure Billboard

VAdmin provides the capability to download text files for the display on the VBrick Billboard. The command line interface provides these controls:

SELECTION	DESCRIPTION	OPTIONS
CBB:1	Display Current Billboard Configuration	
CBB:2	Turn Billboard On	
CBB:3	Turn Billboard Off	
CBB:4	Set Billboard IR Control	1 – Disable, Billboard cannot be displayed via IR. 2 – Enable, Billboard can be displayed via IR (Default).
CBB:5	Set Billboard Cycle	1 – Disable, Billboard does not auto cycle. 2 – Enable, Billboard auto cycles between pages (Default).
CBB:6	Set Billboard Cycle Time	1 to 999 Seconds for display of each page
CBB:7	Clear All Billboard Pages	
CBB:8	Write a Line to Billboard	Syntax is: linenumber; text (up to 22 characters)
CBB:9	Show all Billboard lines	
CBB:10	Show one Billboard line	CBB:10:linenumber

BILLBOARD SELECTION TABLE

Configure Audio Decoder Selections

The following table illustrates the audio decoding configuration selections available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
CDA:1	Display Current Configuration	
CDA:2	Set all values to VBrick default	
CDA:3	Set Audio Output Mode	1- Mute 2- Mono 3-Stereo (Default).

AUDIO DECODING SELECTION TABLE

NOTE: Mixing stereo audio (encoder) and mono audio (decoder), or visa-versa, is allowable.

Video Decoder Configuration Selections

The following table illustrates the decoder configuration selections available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
CDV:1	Display Current Configuration	
CDV:2	Start the Video Decoder	
CDV:3	Stop the Video Decoder	
CDV:4	Set all Video Decoding values to VBrick Default	
CDV:5	Set all Video Output	1=NTSC (Default) 2=PAL
CDV:6	Set the Video Decoding Stream	1=MPEG1 (Default) 2=MPEG2
CDV:7	Set the On Screen Display On	Turns on the VBrick logo (NTSC ONLY) (Default).
CDV:8	Set the On Screen Display Off	Turns off the VBrick logo
CDV:9	Set No Data Display Mode	1=Video will Freeze at last picture upon loss of data (Default). 2=Video will blank upon loss of data.

VIDEO DECODING SELECTION TABLE

Configure Encoder Audio Selections

The following table illustrates the audio encoding selections available from the command line interface

SELECTION	DESCRIPTION	OPTIONS
CEA:1	Display Current Configuration	
CEA:2	Start the Audio Encoder	
CEA:3	Stop the Audio Encoder	
CEA:4	Set all Audio Encoding values to VBrick Default	Default values shown below
CEA:5	Set all Audio	1=Mono (Default) 2=Stereo (Default) 3=Dual Channel 4= Joint Stereo Mode 0 5= Joint Stereo Mode 1 6= Joint Stereo Mode 2 7= Joint Stereo Mode 3
CEA:6	Set the Audio Bit Rate	4=64, 5=80, 6=96 (Default), 7=112, 8=128, 9=160, 10=192 (default)
CEA:7	Set the Left Channel Audio Gain	0 to 15 (Default = 7)
CEA:8	Set the Right Channel Audio Gain	0 to 15 (Default = 7)

AUDIO ENCODING SELECTION TABLE

Configure Encoder Selections

The following table illustrates the encoder configuration selections available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
CEV:1	Display Current Configuration	
CEV:2	Start the Video Encoder	
CEV:3	Stop the Video Encoder	
*CEV:4	Set all Video Input values	1=NTSC/SIF (Default) 2=PAL/SIF 3=NTSC/QCIF (<i>see note</i>) 4=PAL/QCIF (<i>see note</i>)
CEV:5	Set the Video Encoding Bit Rate Default=1496.	1000 to 3000 Kbps SIF 250 to 500 Kbps QCIF (<i>see note</i>)
CEV:6	Set the Reference Distance Sets the number of B-Frames –1 contained in the GOP.	1, 2 or 3 (Default=3) Selection must be an even multiple of the Interpicture Distance
CEV:7	Set the Intrapicture Distance Sets the size of the GOP. Default=9	1 to 9 (Default=9) Selection must be divisible by the Reference Distance selection
CEV:8	Vertical Offset Determines on which line begins active video	-8 to +32 Default=1
CEV:9	Composite/SVideo Selects video input	1=Composite (Default) 2=S-Video
CEV:10	Sets Brightness Level	0 to 255 Default = 137
CEV:11	Set Contrast Level	0 to 127 Default = 75
CEV:12	Set Hue	-128 to +127 Default = 0
CEV:13	Set Color Saturation	0 to 127 Default = 72
CEV:14	Assured Sync	1=Disabled; 2=Relock, 3=Tracking, 4=Relock+Tracking (Default)

VIDEO ENCODING SELECTION TABLE

Assured Sync automatically resets the video encoder if the video input is removed or if the video frequency is abnormal (such as when fast-forwarding a VCR). This feature ensures audio/video sync is always maintained.

S-Video or composite must be selected as an input source for video. On the output decoder, both S-video and composite are present without needing a configuration change.

NOTES:

QCIF is only used for streaming to a desktop, not to a VBrick. Reference Distance and Interpicture Distance should both be set to 1 (all I-Frame) for best performance.

* Changing between SIF, QCIF, PAL and NTSC auto-saves and causes the unit to reboot.

Encoder Default Selections – NTSC or PAL

The following details the available options under the Configure – Encoder – Video – Defaults. Selecting NTSC (1) sets the defaults for NTSC video, and selecting PAL (2) sets the defaults for PAL video.

To select NTSC or PAL, you MUST enter CEV:4:n, then you may edit the parameters as needed.

SELECTION	(1)	(2)
Name	NTSC/SIF	PAL/SIF
Input	710x480x29.97	710x576x25
Output	352x240	352x288
Ref time	29.97	25
Offset	-4	-4
Vbv buffer	327680	327680
Reference distance (m)	3	3
Intra-picture distance (n)	9	9
Input type	Composite	Composite
Brightness	139	170
Contrast	75	100
Hue	0	0
Saturation	72	77

VIDEO ENCODER SELECTIONS

NOTE: VBrick does not recommend converting NTSC to PAL or PAL to NTSC via VBrick. However, it is possible to configure the encoder and decoder independently and the result may be acceptable in certain applications.

Configure IP

The following illustrates the IP configuration parameters.

SELECTION	DESCRIPTION	OPTIONS
CIP:1	Display Current IP Configuration Options	
CIP:2	Set Dynamic Host Configuration Protocol	1 – Disable, 2 – Enable (<i>Future</i>)
CIP:3	Set VBrick IP Address	Must be valid address in conventional form, e.g. 172.16.2.101. Host portion of address cannot be all 1's or all 0's. (e.g. 176.16.2.0 or 172.16.2.255 not allowed)
CIP:4	Set Subnet Mask	Must be valid mask in conventional form, e.g. 255.255.0.0. Resets to default when IP address is changed.
CIP:5	Set Gateway IP Address	Must be valid address in conventional form, e.g. 172.16.2.146
CIP:6	Set Ethernet Hardware Interface	1 – Half Duplex Ethernet (Default), 2 – Full Duplex Ethernet
CIP:7	Set Transmit Mode	1 – Unicast; 2 – Multicast
CIP:8	Set Destination IP Address (<i>Must be class A,B,C when in unicast. Must be class D when in multicast</i>)	Must be valid address in conventional form, e.g. 172.16.2.146. For multicast, should be 224.0.0.1 or higher
CIP:9	Set Destination UDP Port Number	Range 1040 to 65535
CIP:10	Set Receive Mode	1 – Unicast; 2 – Multicast
CIP:11	Set Receive IP Address (Multicast)	Must be valid address in conventional form, (e.g. 225.1.1.1)
CIP:11	Set Receive IP Address (Unicast)	In the Unicast case, if the Receive Address is set it acts as the "Preferred Address" that VBrick will receive <i>from</i> in case there is more than one stream.
CIP:12	Set Receive UDP Port Number	Range 1040 to 65535.
CIP:13	Set Passthrough Destination	1 – Encoder, automatic, from video source; 2 – Decoder, same as Destination Address; 3 – Dedicated, specified
CIP:14	Set Passthrough IP Address	Must be valid TCP/IP Address. Only used if CIP:13 is set to 3.
CIP:15	Set Passthrough TCP Port	Must be valid TCP port number. Only used if CIP:13 is set to 3.
CIP:16	Set Video Time To Live (TTL)	Range 0 to 255 (Default 63)
CIP:17	Set Type of Service (TOS)	Range 0 to 255 (Default 0)
CIP:18	Poll Unicast Destination	1 – Disable; 2 – Enable.
CIP:19	System Stream Transmit ²	1 – Disable; 2 – Enable.
CIP:20	Join Own Multicast	1 – Disable; 2 – Enable.
CIP:21	Set Codec Host Name	The Host Name syntax can be a maximum of 18 characters, the first character must be a letter and the last character a number. The middle characters can be letters, numbers or hyphens.
CIP:22	System Stream Transmit Protocol	1 – RAW (UPD); 2 – RTP ³ .
CIP:23	Set Transmit Datagram Size	Range 1400 to 4450. When the System Stream is set to RTP, size is fixed at 1460. When System Stream is set to RAW, the default is 4416 ⁴ .
CIP:24	Apply and Save all IP Port Changes	Applies all IP, RT, PW, MS and VO Parameters. Resets VBrick for approx. 10 seconds.

IP SELECTION TABLE

NOTES:

1. The default configuration is for half duplex Ethernet and VBricks do not auto-negotiate. You must manually configure both your VBrick and your Ethernet switch for full duplex.
2. Disable VBrick transmit (CIP:19) only if you are ONLY streaming RTP, with separate audio and video streams.
3. When System Stream is set to RTP, the Destination port must be set to an even number. It is highly recommended that the default settings be used since smaller sizes impose a significant performance penalty.
4. It is highly recommended that the default settings be used since smaller sizes impose a significant performance penalty.

Configure Serial Port

The following table illustrates the available serial port configuration options

SELECTION	DESCRIPTION	OPTIONS	
CPT:1	Lists Current Serial Port Options		
CPT:2	Serial User Interface Enable/Disable	1=Disabled (CAUTION!) 2=Enabled (Default)	
CPT:3	Serial Port Baud Rate	1=110 2=300 3=600 4=1200 5=2400 6=3600 7=4800 8=7200	9=9600 10=14400 11=19200 12=2800 13=38400 14=57600 15=115200
CPT:4	Set Stop Bits	1 or 2	
CPT:5	Set Port Parity	1 = none, 2 = even, 3 = odd	
CPT:6	Start Passthrough Mode		
CPT:7	End Passthrough Mode	Used only when VBrick is managed with Telnet	
CPT:8	Set Passthrough Escape Character	Any ASCII character, entered in Decimal. Default is 31 (Control-Shift-Underscore). Must enter this character five times to exit Passthrough mode.	
CPT:9	Passthrough Escape Enable/Disable	1 = Disable – no data will be detected to stop passthrough mode 2 = Enable (Default) – exit passthrough when five of the designated escape characters are detected.	

SERIAL PORT SELECTION TABLE

Configure Passwords

For the Command Line Interface, the “cpw” command is used to manage passwords.

SELECTION	DESCRIPTION	OPTIONS
CPW:1	Lists Current Password Options	
CPW:2	Set Administrator Login	Default “private.” Rules: At least 1 character, less than 21 characters, no blanks allowed.
CPW:3	Set Administrator Password	Default “private.” Rules: At least 1 character, less than 21 characters, no blanks allowed.
CPW:4	Set SNMP Read Community	
CPW:5	Apply Changes	IP, RT, PW

PASSWORD SELECTION TABLE

Configure Video on Demand

These settings are used to configure Video on Demand.

SELECTION	DESCRIPTION	OPTIONS
CVO:1	Lists Current VoD Options	
CVO:2	Set IR Remote Version	1 – Version 1 2 – Version 2
CVO:3	VoD	1 – Disable 2 - Enable
CVO:4	Set IP Address for VoD SAPs	
CVO:5	Set Port for VoD SAPs	
CVO:6	Set VoD SAP Timeout in seconds	90 to 9999
CVO:7	Apply Changes	IP, RT, PW, VO

VIDEO ON DEMAND SELECTION TABLE

Configure Relay

VBrick model 3200 includes a relay that you may command to open or close on command. The relay is very useful to control external devices such as door locks, alarms, or similar items. The relay can also be controlled over the network via a VBrick ActiveX control (contact VBrick for more information).

SELECTION	DESCRIPTION	OPTIONS
CPR:1	Lists Current Relay Options	
CPR:2	Relay On	
CPR:3	Relay Off	

RELAY SELECTION TABLE

To configure the relay, enter CRR as shown above.

The contacts of the relay appear on pins 6 and 9 of the RS-232 (DB-9) connector on the rear of the VBrick, and there is continuity between these pins when the relay is “on”.

Configure SAP

The following illustrates the Service Advertisement Protocol (“Program Guide”) configuration selections available from the command line interface:

SELECTION	DESCRIPTION	OPTIONS
CSP:1	Display Current SAP Configuration	
CSP:2	Program Guide Display	1 – Disable, No On Screen Program Guide. Local IR control is disabled. 2 – Enable, On Screen Program Guide Displayed and can be turned on with local IR remote control.
CSP:3	Set Receive SAP Timeout	90 to 999 seconds after last SAP received. After timeout, program will be removed from the program list
CSP:4	Set Receive SAP Keyword String	ASCII text, * as a wildcard allowed at the end of the text. If the received SAP matches, it will be displayed on the Program Guide, otherwise it will not be displayed in the Program Guide.
CSP:5	Transmit My SAP Enabled/Disabled	1 – Disable, Program Guide is not transmitted; 2 – Enable, Program Guide is transmitted.
CSP:5	Set My SAP Text	Program Guide Text, up to 19 characters.
CSP:6	Set SAP transmit Time	1 to 999 seconds. Sets how often a SAP is transmitted.
CSP:7	Set My SAP Retransmit Time	1 to 9999 Seconds. Sets how often a SAP Program Guide is transmitted. Should be greater than SAP Receive Timeout CSP:3.
CSP:8	Set My SAP Time-to-Live (TTL)	0 to 255. Sets the size of the SAP network (Each router will decrement the number).
CSP:9	Set my SAP Keyword String (ascii, no *, case ignored)	ASCII text. Sets the keywords that the VBrick will transmit. Multiple Keywords allowed.
CSP:10	Unicast Call Setup: 1- Disable; 2- Enable	1 – Disable; 2 – Enable. If Disabled, VBrick will not allow conference set up.
CSP:11	Set Call Accept: 1- Automatic; 2- Manual	1 – Automatic; 2 – Manual. If Automatic, VBrick will autoanswer incoming conference calls.
CSP:12	My Local Ringer: 1- Disable; 2- Enable	1 – Disable; 2 – Enable. If Disabled, local ringer will not operate.
CSP:13	Ringer Control: 1- No IR Control; 2- Local IR Control	1 – No IR Control; 2 – Local IR Control. If set for no IR control, the user cannot disable the ringer.
CSP:14	Set my Identifying Call Name	Text. Set’s the name that will appear as the calling party.
CSP:15	Set IP Address for Unicast Call Setup SAPs	Default is standard SAP address. May be set to any valid IP address. NOTE: setting .255 will broadcast to all ports on a subnet which is useful if the network does not support multicast).
CSP:16	Set Port for Unicast Call Setup SAPs	Default is standard SAP port. May be set to any port number.
CSP:17	Set My Author text	Text. This text will appear in StreamPlayer as the Author.
CSP:18	Set My Copyright text	Text. This text will appear in StreamPlayer as the Copyright.
CSP:19	Set My Session Information	Text: This text will appear in emitted SAPs following “i = “.

SAP SELECTION TABLE

NOTE: Please refer to the Appendix for more information regarding Categories.

Configure Management SAP

The following are the Management SAP selection parameters:

SELECTION	DESCRIPTION	OPTIONS
CMS:1	List Current Management SAP options	
CMS:2	Transmit Management SAPs	1 – Disable; 2 – Enable.
CMS:3	Set Management SAP retransmit time	The time in seconds that will pass before a Video On Demand SAP is removed from the screen if an identical SAP is not received. 1 to 9999 (in seconds). Default is 90 seconds.
CMS:4	Set Management SAP TTL (Time To Live)	0 to 255. Default is 64.
CMS:5	Set Management SAP TOS Type of Service	0 to 255. Decimal entry for DiffServ and packet priority.
CMS:6	Set IP address for Management SAPs	Valid IP unicast or multicast address. Default is 224.2.133.134.
CMS:7	Set Port for Management SAPs	Valid port number 1040 to 65534. Default is 9876.
CMS:8	Set Group Name for Management SAPs	
CMS:9	Set Unit Number for Management SAPs	0 to 65535
CMS:10	Apply Changes	IP, RT, PS, MS and VO

MANAGEMENT SAP SELECTION TABLE

Configure Closed Captioning

The following are the Closed Captioning selection parameters:

SELECTION	DESCRIPTION	OPTIONS
CCC:1	Display Current Closed Captioning Options	
CCC:2	Encode Closed Captioning for Transmit	1 – Disable; 2 – Enable.
CCC:3	Decode Closed Captioning on Receive	1 – Disable; 2 – Enable.

CLOSED CAPTIONING SELECTION TABLE

Configure RTP

The following are the RTP selection parameters:

SELECTION	DESCRIPTION	OPTIONS
CRT:1	Display Current RTP Configuration	
CRT:2	RTP Transmit	1 – Disable; 2 – Enable (VBrick will transmit RTP)
CRT:3	Set RTP Transmit Mode	1 – Unicast; 2 – Multicast
CRT:4	Set Video Destination Address	Valid IP unicast or multicast address
CRT:5	Set Video Destination Port	Valid port number 1040 to 65534
CRT:6	Set Audio Destination Address	Valid IP unicast or multicast address
CRT:7	Set Audio Destination Port	Valid port number 1040 to 65534
CRT:8	Set My SAP Retransmit Time	1 to 9999 Seconds. Sets how often a SAP Program Guide is transmitted.
CRT:9	Set RTP Administrator Name	Text sent via RTP
CRT:10	Set RTP Contact Telephone	Text sent via RTP
CRT:11	Set RTP email	Text sent via RTP
CRT:12	Apply Changes	Applies both IP and RTP parameters

RTP SELECTION TABLE

Test Configuration Selections

The following table illustrates the test configuration selections available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
TCT	ATM Cell Test	TCT:x:yyy runs an ATM cell test. x – 1, there is loopback; x – 2 there is no loopback at the PHY; yyy is test time in seconds, (0 – continuous)
TDT	Destructive Tests Performs hardware tests. Reloads the software (reboot) upon end of test.	CAUTION! FOR ADVANCED USE
TLL	Line Loopback Test Loops input data from the line through the line interface hardware and back to the line. Data does not enter the encoder/decoder.	Test will run until stopped by entering TSP
TLP	Bi-directional Loopback Test Loops data through the encoder to the decoder via the line interface; also loops data from the network back to the network.	Test will run until stopped by entering TSP
TSP	Stop Test	

TEST SELECTION TABLE

Status Selections

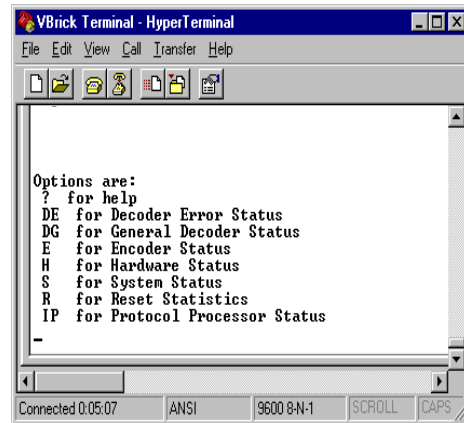
The following table illustrates the status messages available from the command line interface.

SELECTION	DESCRIPTION	OPTIONS
SR	Reset Status	
SDE	Status of Decoder Displays all decoder status	
SDG	General Decoder Status	
SE	Status of Encoder Displays that encoder is running or not running	
SH	Status of Hardware Displays internal revision codes	
SIP	Displays the IP status	
SS	Status of System Displays status of overall system	NOTE: This selection will display the configured average line rate, which includes video, audio, and overhead. PCR should be set to a higher number to accommodate some bursting

STATUS SELECTION TABLE

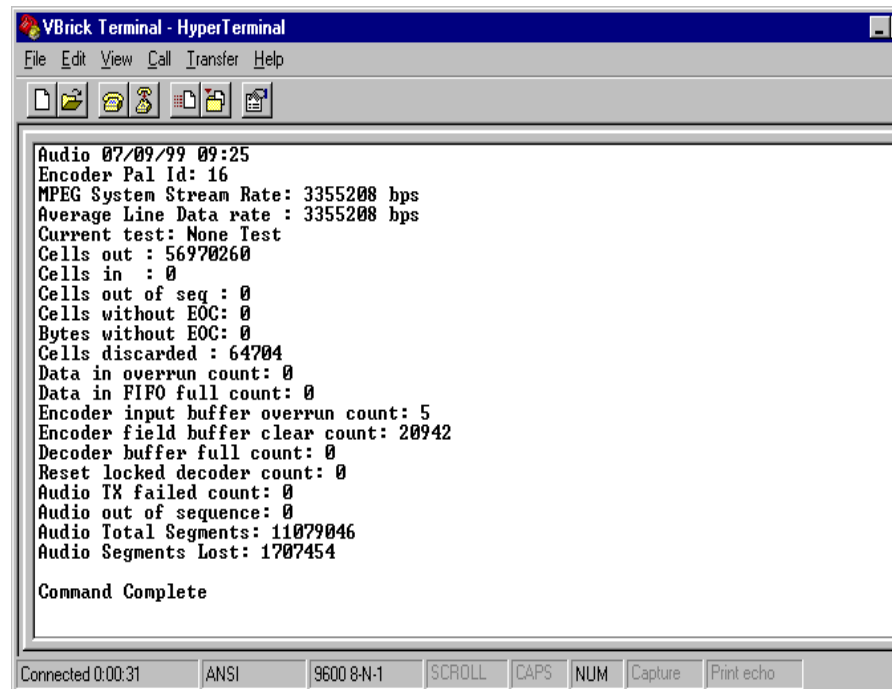
Status Screen

- Command – SS
- ? Help
- DE Decoder Error Status
- DG General Decoder Status
- E Encoder Status
- H Hardware Status
- R Reset Statistics
- IP Protocol Processor Status



Status Menu

NOTE: The status screen may be different depending on the VBrick model.



MPEG System Stream Rate: The combined total of the video + audio + MPEG overhead

Average Line Data Rate – The total payload rate including overhead

Encoder input buffer overrun count – running total of buffer overruns

Cells Out – The number of ATM cells generated

Cells In – The number of ATM cells received

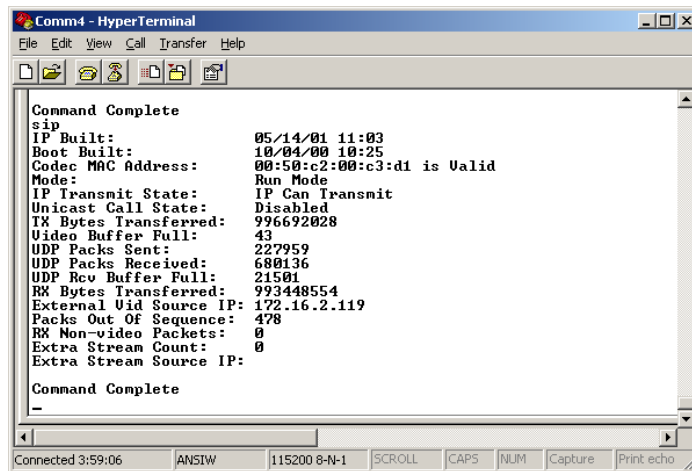
Cells out of seq – The number of cells received that were out of sequence

Cells discarded – The number of cells received but not processed

NOTE: This number will increment for all cells received on any VPI/VCI that the VBrick is not currently set to receive.

The other status displays are for VBrick factory support.

Example of
Status IP
(SIP) Screen



```
Comm4 - HyperTerminal
File Edit View Call Transfer Help
Command Complete
sip
IP Built:          05/14/01 11:03
Boot Built:       10/04/00 10:25
Codec MAC Address: 00:50:c2:00:c3:d1 is Valid
Mode:            Run Mode
IP Transmit State: IP Can Transmit
Unicast Call State: Disabled
TX Bytes Transferred: 996692028
Video Buffer Full: 43
UDP Packs Sent: 227959
UDP Packs Received: 680136
UDP Rcv Buffer Full: 21501
RX Bytes Transferred: 993448554
External Vid Source IP: 172.16.2.119
Packs Out Of Sequence: 478
RX Non-video Packets: 0
Extra Stream Count: 0
Extra Stream Source IP: 0
Command Complete
-
```

Connected 3:59:06 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

8: Other Management Options

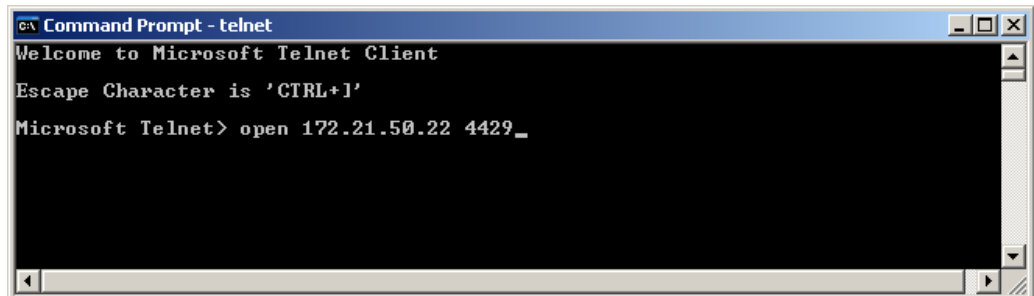
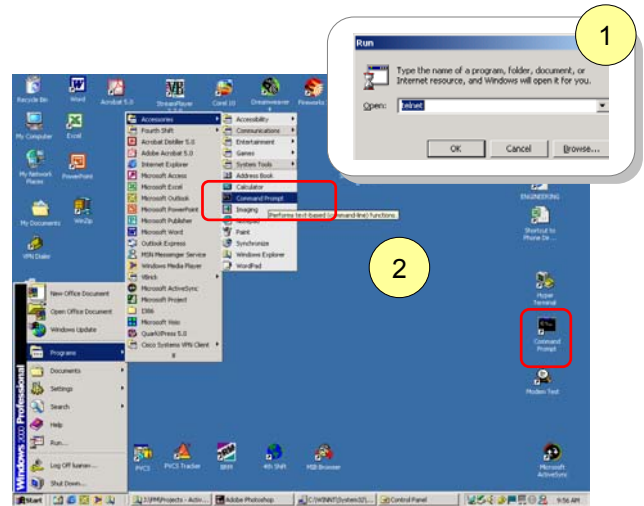
Telnet

Ethernet VBricks can be managed remotely via industry-standard Telnet. The same suite of menus that are displayed on a local terminal are instantly available over an IP network. To enhance security, rather than using the standard Telnet port, VBrick uses port number **4429**.

Launch Telnet. If it is not in the start/program menu, use Run and enter Telnet. Once the Telnet screen appears, ? provides the list of commands. The command is: Open xxx.xxx.xxx.xxx<space>4429, where the x's are the IP address and 4429 is the port.

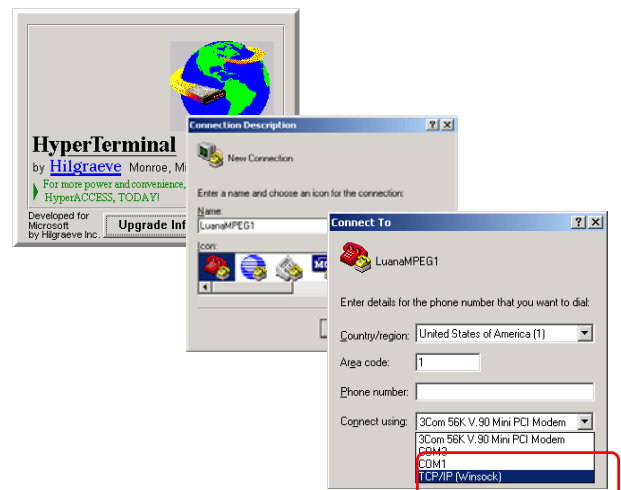
From Windows 2000

Telnet can be opened through the Start Menu, run, enter telnet (1); or it can be opened through start, programs, accessories, command prompt (2). Enter the **IP address** of the VBrick and enter port **4429** as shown:



Command Line Access through HyperTerminal

- Find HyperTerminal through the Start Menu, Programs, Accessories, Communications, HyperTerminal.
- Connect using TCP/IP.

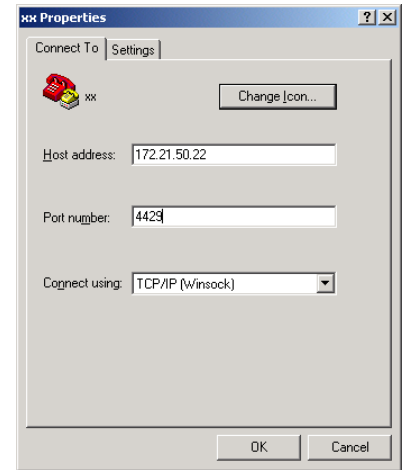


- Enter the IP address of the VBrick and enter port **4429** as shown:

NOTE: Serial Port parameters cannot be set via Telnet (e.g. PBR, etc.).



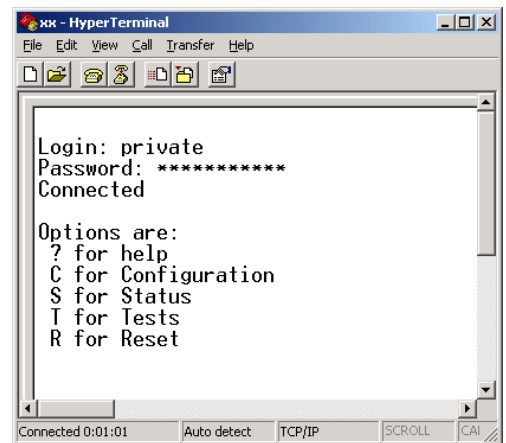
Do not use the default Telnet Port! Use port 4429 for management access.



Login and Passwords

Network access to configure Ethernet VBricks (Models 1200, 2200, 3200) is protected by the use of passwords. That is, Telnet access on port 4429, and VAdmin access over TCP/IP require the use of a login name and password; in addition, SNMP access is controlled using configurable community strings.

For Telnet and VAdmin there is one login name allowed called the "Administrator Login Name". This is configurable with the default set to "**private**" (case sensitive) and its associated "Administrator Password" default also set to "**private**" (case sensitive). The Administrator Login Name has read and write access to all VBrick configuration parameters.



VBDirectory

VB3000 software (Release 2.4.0 and higher) ships with VBDirectory, an application that facilitates finding and accessing all VBricks on a network. It is not backward compatible to releases prior to 2.4.0. To access VBDirectory, go to Start, Programs, VBrick, VBDirectory.

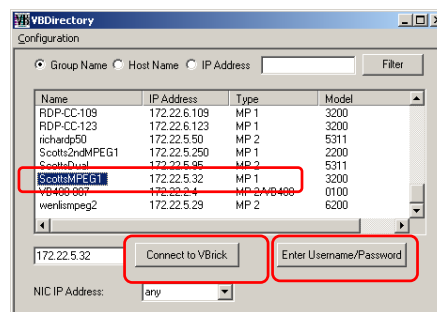
VBDirectory detects all VBrick appliances that are configured to emit management SAPs to an address accessible to the VBDirectory application. The default address from which Management SAPs are read is from 224.2.133.134, port 9876. For more information, please see the VBDirectory Users Guide.

Connecting to VB3000 Series VBricks

To select an individual VBrick, double click on the Name field or use the "Connect to VBrick" button. The default is to connect to VBricks through VBAAdmin. Where VBAAdmin is not available, the connection will be made through Telnet.

Login

It is possible to enter the Username and Password for a VBrick, allowing a user to Login to the VBrick unit automatically, by-passing the Login Page. To set a username and password, use the Set Username/Password pop up menu. Set the Username and Password and then select the Connect to VBrick button.



NOTE: When running the software installation or upgrade VBDirectory must be closed to avoid an error being reported. If the file is open, just close the file and complete the installation.

For more information on VBDirectory, please refer to the VBDirectory Users Guide.

9: Upgrade Instructions

This release allows full upgrade of the VBrick via FTP through the Ethernet port.

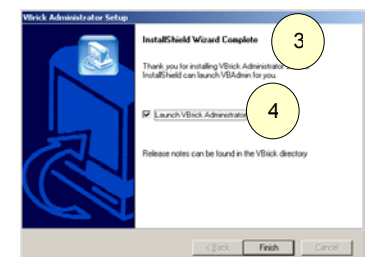
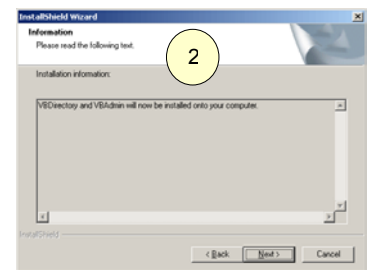
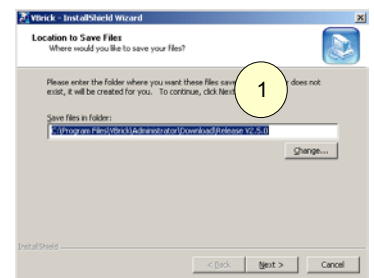
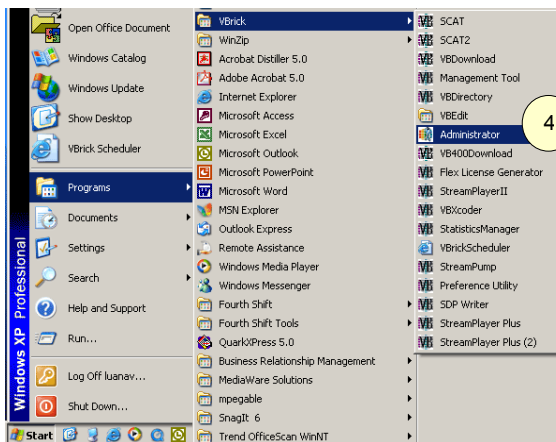
NOTES:

- As with all software installations, close all applications. When running the software installation or upgrade (SetupVB3000_2_5_1.exe) VBDirectory must be closed to avoid an error being reported. If the file is open, just close the file and complete the installation.
- **NOTE:** There is an interoperability issue with older code. Sending an RTP System Stream from a box containing 2.5.0 code to a box that is running 2.4.0 (no RTP support) causes an error message to be displayed on the shell window and the video will not display properly.

Upgrade Process

Follow these steps to upgrade the VBrick Appliance

1. Extract the self-extracting release, SetupVB3000_2_5_1.exe, package file to a pc directory. VBrick recommends using the default directory ①.
2. The setup program for the VBrick VBDownload Utility will automatically run after the files have been extracted ②. Follow the on screen instructions to complete the installation ③.
3. Launch VBAdministrator from Install Shield, or from Start, Programs/VBrick/VBAdministrator ④.

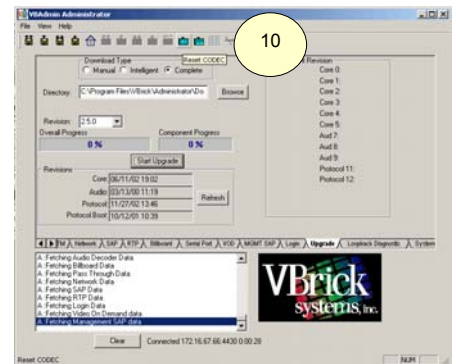
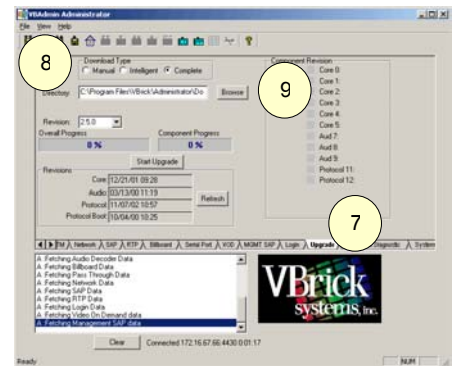
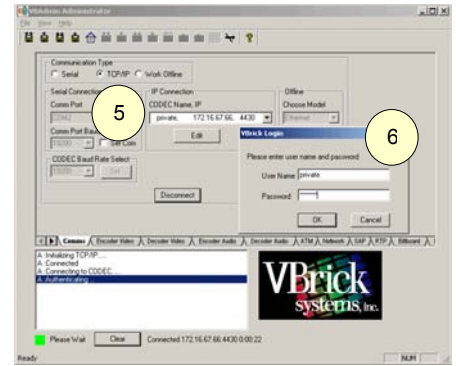


4. Connect to your VBrick, using the VBrick's IP Address, login name, and password ⑤. (Case sensitive default login name is private and default password is private) ⑥.
5. Go to the VBAdmin tab for Upgrade ⑦.

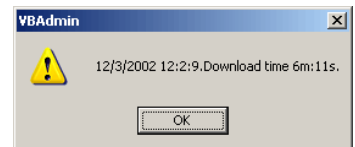
The download can be **Intelligent**, **Manual** or **Complete**. **Intelligent** download automatically decides which components need to be downloaded and downloads into the appliance only those components, which have changed. **Manual** download allows the user to choose the components to download into the appliance. **Complete** download downloads the entire release into the appliance. The default is **Intelligent** download ⑧. For additional information please refer to the Upgrade menu selection in Chapter Five.

If the default location was used, Intelligent Download will direct you to the files, otherwise browse to the correct location ⑨.

6. Press **Start Upgrade** to start VBDownload.
7. When the download completes, reboot the VBrick using the management interface or hardware intervention ⑩.



When the download is complete this message will be returned:



VBDirectory

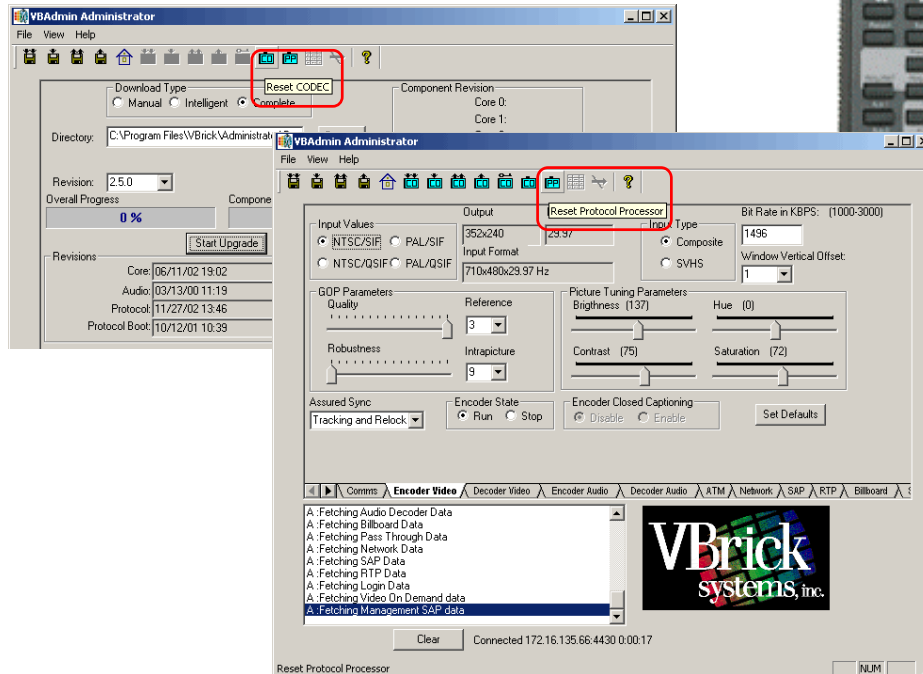
Upgrade can also be accomplished using VBDirectory to connect and upgrade VB1000-2000-30000 Series network appliances. Please refer to separate VBDirectory Users Guide.

Resetting or Rebooting the VBrick

To reset the VBrick appliance:

Power the VBrick appliance up and down by removing and reinserting the power cord.

Use the Reset option in the Upgrade menu. There is a Reset Codec icon (on the left) and a Reset Protocol Processor icon (on the right). The IR Remote Control reset button corresponds to the Reset Protocol Processor selection on the menu.



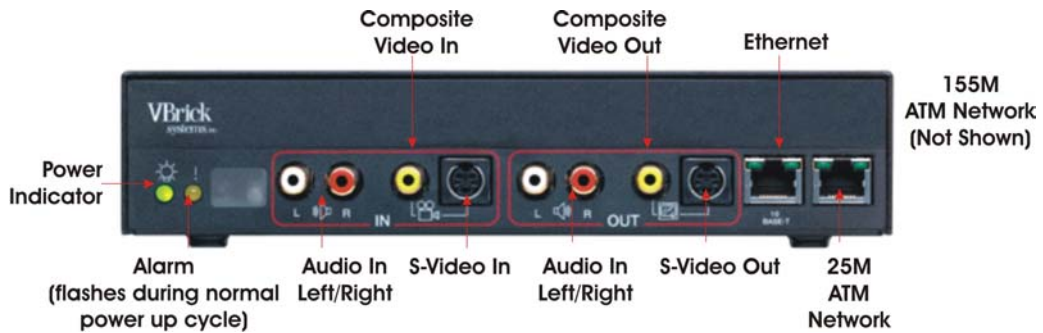
10: Reference

I/O, Pin Out, Electrical And Mechanical

This chapter will provide the interface detail for audio, video, network, and control interfaces.

General

VBricks are available for encode only, decode only, or full duplex encode/decode. In addition, several network and protocol configurations are available.



Interfaces

Serial Port Interface

The serial port, located on the rear of the VBrick, presents a standard DCE interface on a DB-9 connector. The Serial Port is used to configure the VBrick. A straight-through cable may be used to connect directly to serial ports on most laptop PCs. The serial port operates at a default rate of 9.6Kbps Async, 8-Bit, No Parity.

PIN	FUNCTION	DIRECTION
1	Data Term Ready	IN*
2	Send Data	OUT
3	Receive Data	IN
4	Carrier Detect	OUT*
5	Ground	Common
6	Relay Contact	OFF = Open
7	Clear To Send	OUT*
8	Request To Send	IN*
9	Relay Contact	OFF = Open

* Not implemented in 2.1 Software Release. All control lead outputs are in the LOW state.

NOTE: VBrick does not support RS-232 control leads. Devices that require control leads may require special wiring.

25M ATM Interface

The 25.6 Mbps ATM interface is wired per the ATM Forum standard.

PIN	DESCRIPTION	DIRECTION
1	TRANSMIT DATA -	OUT
2	TRANSMIT DATA +	OUT
--		
7	RECEIVE DATA -	IN
8	RECEIVE DATA +	IN
--		
13	SHIELD	
14	SHIELD	

To interconnect VBricks without an ATM switch, a "cross over" cable or adapter is required.

EIA/TIA-530 Interface

The EIA/TIA-530 synchronous serial interface presents a standard DTE interface and does not mandate the use of any control signals (clock and data only).

PIN	SIGNAL	DIRECTION
1	GROUND	
2	TRANSMIT DATA +	OUT
3	RECEIVE DATA +	IN
--		
7	GROUND	
8		
9	RECEIVE CLOCK -	IN
10		
11	EXTERNAL CLOCK -	OUT
12	TRANSMIT CLOCK -	IN
13		
14	TRANSMIT DATA -	OUT
15	TRANSMIT CLOCK +	IN
16	RECEIVE DATA -	IN
17	RECEIVE CLOCK +	IN
--		
24	EXTERNAL CLOCK +	OUT

To wire two EIA-530 VBricks for back-to-back operation, set the VBrick for internal clock and use the following wiring:

Internal vs. External Clock

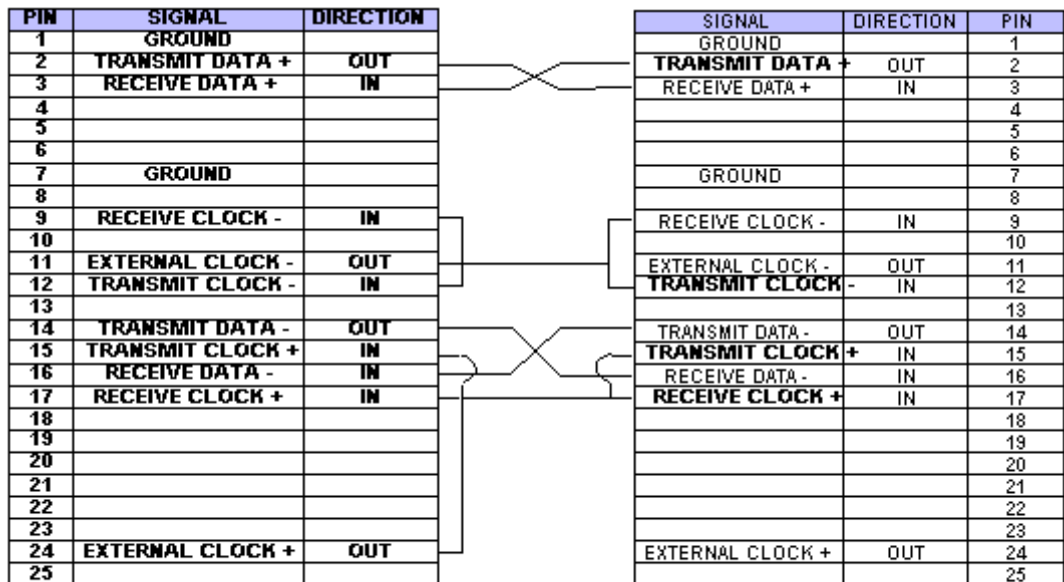


Fig 1. Single Source Timing

VBricks are designed to operate with external (DCE supplied) transmit and receive clock. Each VBrick outputs a continuous 1.536 Mbps (T1) or 1.920 Mbps (E1) clock that can be used for external timing if desired.

Power Entry Interface

The power entry interface supplies 24VDC to the VBrick from an external power supply.

S-Video Interface

The S-Video interface is a standard mini-DIN connector.

PIN	DESCRIPTION
1	GROUND
2	GROUND
3	LUMA
4	CHROMA
5	GROUND
6	GROUND
7	GROUND

Signal Levels

The audio and video input and output levels are standard unbalanced, "line level".

SIGNAL	DESCRIPTION
Audio	1 V P-P
Video	1 V P-P

MPEG-1 Optical Loss Budget

MPEG-1	RECEIVER SENSITIVITY	TRANSMIT POWER
MM (maximum reach 3 km)	-33dBm	-20 to -14dBm
SM (intermediate reach 15 km)	-33dBm	-15 to -8dBm
SM (long reach 1335nm 40 km)	-38dBm-34 dBm	-5 to 0 dBm

MPEG-1 Connectors

MPEG1 uses the ST type connector on both multi-mode and single mode transceivers.

Specifications

Functional

VIDEO ENCODER	
SIF Resolutions Supported	352 x 240 NTSC 352 x 288 PAL
	1 Mbps to 3 Mbps
QSIF Resolutions Supported (optional)	176 x 112 30 Hz 176 x 144 25 Hz
	201K to 500 Kbps
Accuracy	Half-pel, Two-Stage motion estimation search +/-30 pel horiz; +/-15 pel vertical
AUDIO ENCODER	
Compression	MPEG ISO/IEC 11172-3
Layer	MPEG-1 Layer 2
Modes	Mono, Stereo, Dual Channel, Joint Stereo Mode 0, 1, 2, 3
Audio Sample Rates	48 KHz
Audio Bit Rates	32, 48, 56, 64, 80, 96, 112, 128, 160, 192, Kbps
SYSTEM	
	MPEG SYSTEM STREAM
DECODER (END-TO-END PERFORMANCE)	
Video	
Output Level	1 Volt into 75 Ohm
Output Resolutions	720 x 480, 30 Hz NTSC 720 x 576, 25 Hz PAL
Sampling Rate	13.5 MHz
Compressed Input Resolutions	MPEG-1 352 x 240, 30 Hz MPEG-1 352 x 288, 25 Hz
Quantization	8 bit
Frequency Response	0.35dB to 1 MHz: -4.5dB at 2MHz
Signal to Noise Ratio	-48 dB; p-p signal to RMS noise
Input-to-Output cross talk	-58 dB
Kpb Factor	-6%
Chrominance to Luminance Delay	140 nsec
Field Time Distortion	1%
Line Time Distortion	0.2%
Luminance Non-Linear Distortion	-10 IRE on diff stair-step
Differential Gain	4%
Differential Phase	3 deg
Sync & Burst	Re-inserted
Proc Amp Calibration	Brightness, Contract, Chroma saturation, Chroma Phase
Audio	MPEG-1, MPEG-2, Layer I & II

Mechanical

PHYSICAL	
Length	10 inches
Width	8 ¾ inches
Height	2 1/8 inches
Weight	5 pounds
Power	24 Volts DC via VBrick-approved supply 35 Watts (max)
Environmental	Operational: 0 to 40 degrees C 90% humidity non-condensing Storage: -10 to 50 degrees C 90 % humidity non-condensing
POWER SUPPLY	
Length	4 inches
Width	2 5/8 inches
Height	1 ¾ inches
Weight	6 ounces
Input	100 to 250 VAC, 50/60 Hz
Output	24 VDC
SHIPPING	
Carton	16 5/8 L x 14 ¼ W x 4 ¼ H
Weight	7 Pounds

OC3	MULTIMODE	SINGLE MODE 15KM	SINGLE MODE 40 KM
Launched Power (Average)	-14 to -20 dBm typical	-8 to -15 dBm	-0 to -5 dBm
Center Wavelength	1270 nm	1260 nm	1335 nm
Receive Sensitivity	-33 dBm typical	-33 dBm typical	-38 dBm typical

Compatibility

- VBricks with Software Release 2.5.0 must be managed by VAdmin version 3.2.5.
- VBrick Software Release version 2.5.0 is generally compatible with earlier software releases for those features common to both releases.
- VBrick Software Release version 2.5.0 requires that the VBrick contains Port Controller version 48 or higher for all features. You can determine the version of the Port Controller you have by examining the VBrick's System State.
- Because VBrick Software version 2.5.0 contains new features, earlier versions of VAdmin cannot manage this release.
- In order to use Closed Captioning decoding the VBrick must contain Port Controller version 49 or higher and must have the appropriate hardware revision.
- In order to use Closed Captioning encoding the VBrick must contain Port Controller version 49 or higher.
- Refer to the Release Notes for VAdmin 2.5.0.

About Passwords and Categories

VBrick MPEG appliances and VBrick Video on Demand announce their content by sending several items in a single Service Announcement Protocol (SAP) message. Included in this SAP is a "Category". The Category may contain nothing at all, a word, or several words. There is no restriction to the category except that all words are case sensitive.

The transmission of SAP information is enabled or disabled in Configuration: Encoder – SAP menu options of IWS.

If desired, an Administrator can make a VBrick appliance behave like StreamPlayer. If the same Category is entered on both StreamPlayer and a VBrick appliance, both behave the same. The implementation is equivalent, even though VBrick and the StreamPlayer categories operate differently.

StreamPlayer Category controls and setting are available to the end user versus centrally administered category controls found in the VBrick appliance. The IR remote control function in VBrick appliances prohibits remote users from modifying category controls. Enhanced category control exists in the VBrick appliance versus StreamPlayer and includes such features as string wildcards matching and unrestricted viewing. By clearing all words in the category field, a VBrick appliance will display all available programs without regard to categories.

The following clarifies the matrix:

INCOMING STREAM	VBRICK APPLIANCE		
	CATX	CATY	BLANK
"CATX"	Displayed	Blocked	Displayed
"CATY"	Blocked	Displayed	Displayed
Blank	Displayed	Displayed	Displayed

StreamPlayer reads the Category field and only displays the Program Guide for a particular stream if there is no entry in the SAP category field or if the category is present and it matches StreamPlayer's category list.

INCOMING STREAM	STREAMPLAYER		
	CATX	CATY	BLANK
Y	Displayed	Blocked	Blocked
"CATY"	Blocked	Displayed	Blocked
Blank	Displayed	Displayed	Displayed

StreamPlayer also controls the recording of a stream based on category. The following table illustrates StreamPlayer actions upon receipt of a stream from a VBrick appliance or VBVD Server containing the Transmit Category shown:

TRANSMITTED CATEGORY	STREAMPLAYER PLUS ACTION
(none)	Program is displayed in Program Guide and recording is allowed.
norecord	Recording disallowed.
norecord=password	Recording allowed with password entry.
abcdef	Program shown in Program Guide only if abcdef is in StreamPlayer Plus category list.

Table, continued.

TRANSMITTED CATEGORY	STREAMPLAYER PLUS ACTION
norecord abcdef	Program shown in Program Guide only if abcdef is in StreamPlayer Plus category list. Recording not allowed.
norecord=password abcdef	Program is shown in Program Guide only if abcdef is in StreamPlayer Plus category list. Recording allowed with password.
abcdef vwxyz	Program shown in Program Guide only if abcdef or vwxyz is in StreamPlayer Plus category list.

VBRICK CATEGORY SPECIFICATIONS:

Characters are ASCII and no matter what is entered, the selection is entered as lowercase. The total characters contained in all the keywords in the string is 36 characters including spaces.

The SAP Category entry can contain one or more keywords to limit the video streams displayed. Keywords should be separated by spaces.

Tip: Categories can act as passwords. Category entries may be simple English such as “marketing”, “sales”, and “finance”, but if someone knows that “marketing” is a category, they might figure out that “sales” is another category. If random words, such as “gold”, “music”, and “bird” are used, it is more difficult to guess the right category to view private streams.

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