ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

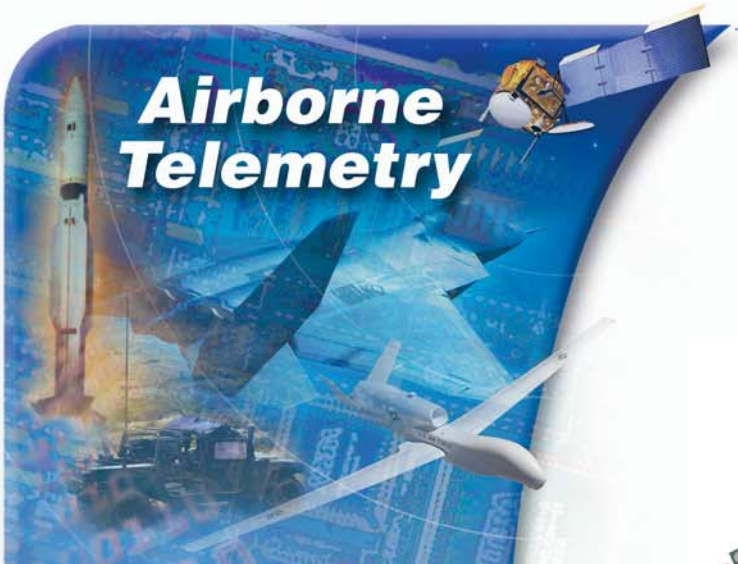
Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *L-3 Communications VEU700* at our website: *Click HERE*



Real Time Color Video Compression System

VCS700

- Compression of Full-Motion Video with no Visible Image Degradation
- Programmable Compression Ratios to 350:1
- User-Programmable Video Format via RS-232 Port
- NTSC and PAL Color
- Composite or Y/C Compatibility
- Compact 20 Cubic-Inch Airborne Video Compression Unit
- Options for Multiple Video Inputs, Telemetry Data Inclusion, Audio available
- Embedded Encryption available



The VCS700 is a miniature state-of-the-art programmable video compression and expander system. It may be used in a multitude of applications, and is ideal for monitoring, targeting and surveillance applications. The design employs programmable gate arrays and surface mount techniques in a modular configuration to satisfy customer specific requirements in an extremely small package. The VCS700 utilizes a wavelet compression algorithm to provide compressed full motion video with superior video quality.

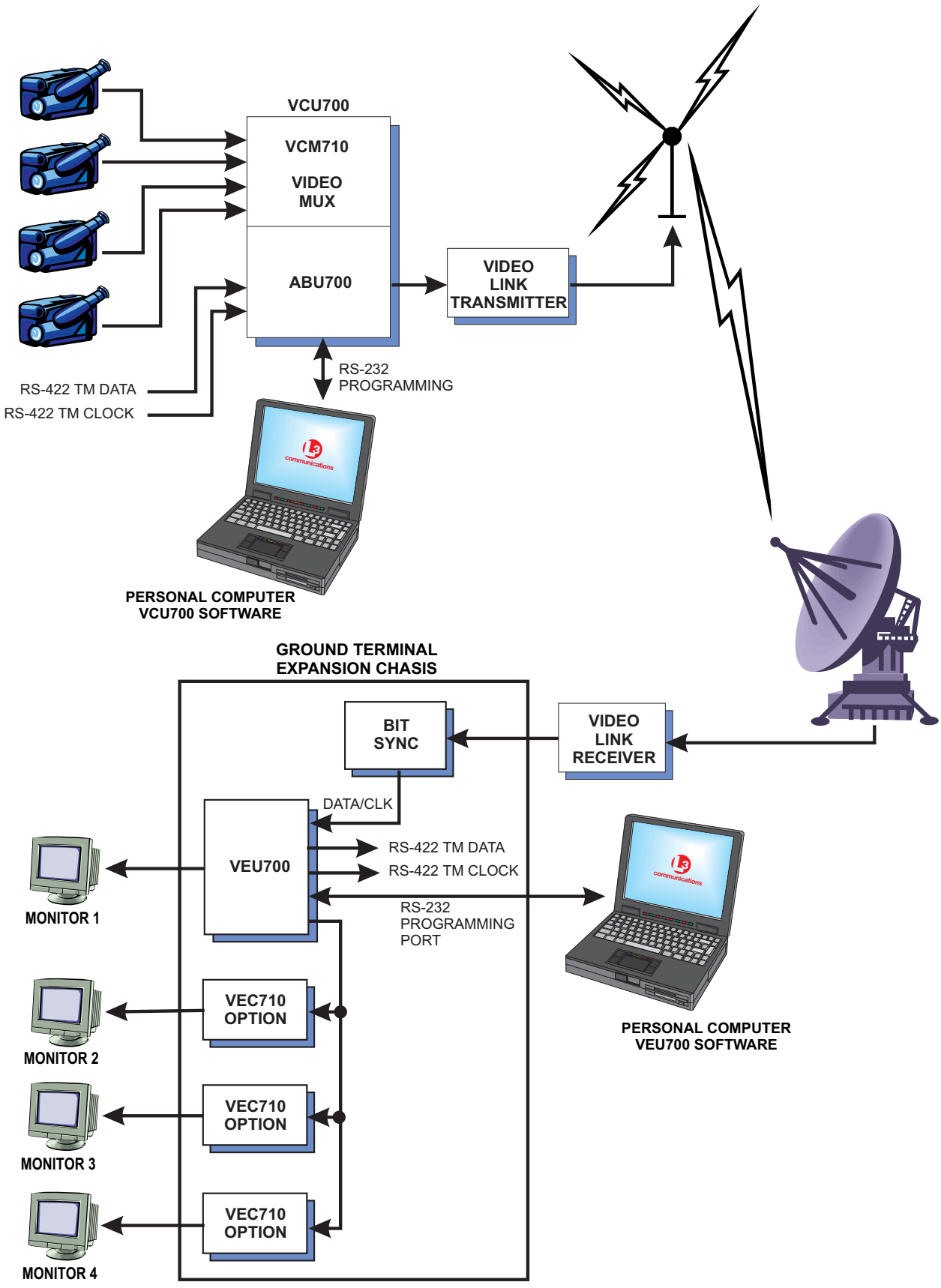
The VCS700 system is comprised of a VCU700 air unit, which provides the video compression and multiplexing of multiple videos and telemetry data, and the VEU700 expansion unit, which reconstructs the video and telemetry data.

The design of the VCU700 air unit allows for various configurations with up to 8 modules in addition to the base unit. Standard building blocks are used in configuring the VCU700 with almost all features being user programmable, but each unit may be custom tailored to a customer's specific application as needed. A variety of modules may be provided for the VCU700 air unit, including multiple video input modules and audio input modules. Custom modules can also be created to meet specific customer needs, which may not be addressed by any of the currently available modules.

The VEU700 ground unit is a standard PCI card, which provides for a reconstructed video output. Additional video output cards (VEC710's) may be connected to the VEU700 to provide as many as four simultaneous video outputs.

L3 communications
Telemetry–West

Excellence You Can Measure



Typical VCS700 System Application

VCU700 Air Unit

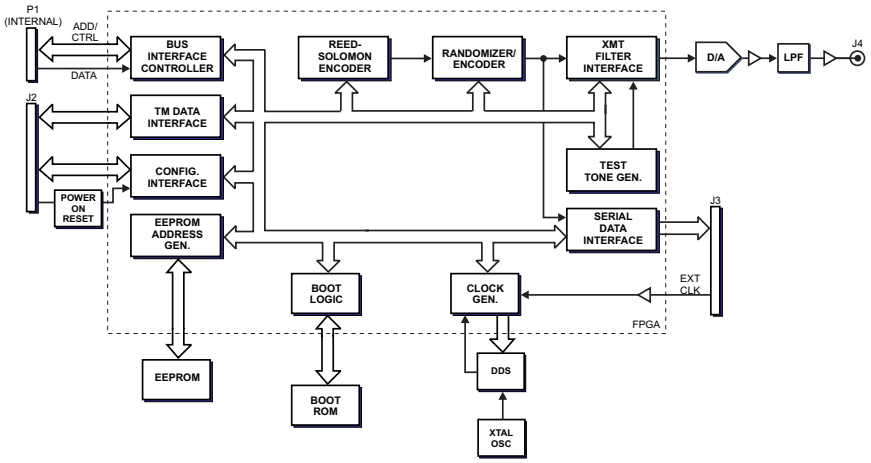
The VCU700 air unit consists of a base unit (ABU700) plus some number of video interface or option modules. For a single video multiplex module (VCM710) mounted on the base unit, vertical and horizontal mounting is available. With additional modules mounted on the base unit, horizontal mounting is required for thermal reasons. Mounting configurations are shown towards the back of this brochure. Available module types for the VCS700 are listed and described below.

ABU700 - Airborne Base Unit (30W & 60W)

The Airborne Base Unit is a general-purpose on-demand data mux allowing both burst and continuous data transfer. The ABU700 consists of a DC-DC converter section plus Program Control electronics that are the brains of the unit.

The DC-DC conversion is handled by a power supply sub-assembly within the base unit, converting a +28 Vdc input to the regulated DC voltages required by the VCU700 internal circuits. 30W and 60W versions of the power supply are offered, depending on the overall VCU700 configuration.

The Program Control sub-assembly performs various functions critical to the operation of the VCS700. Program Control circuitry includes dedicated synchronous and asynchronous data port interfaces and up to 8 additional external data interface modules. Baseband data rates, coding format, forward error correction (FEC) check bytes, output level and DC offset are programmable via a Windows GUI. All configuration and program information are stored in non-volatile memory and can be updated using the GUI through the UART interface.



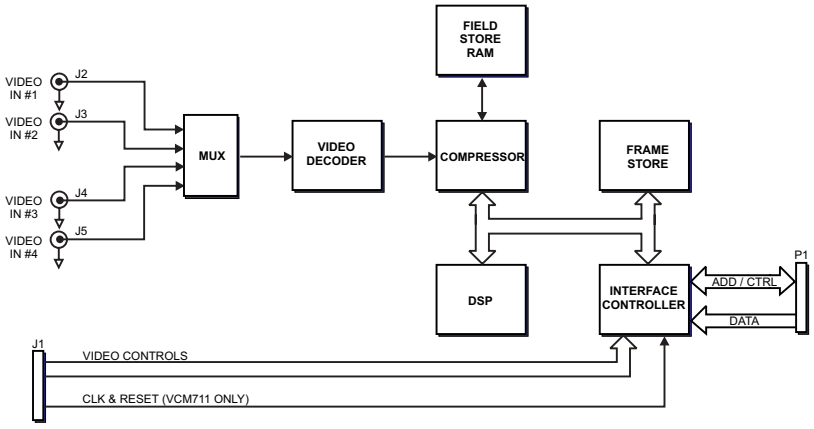
Block Diagram
ABU700 Program Control

VCM710 - Video Mux Module
VCM711 - Video Mux Module with Time Stamp

The VCM710 Video Compressor Module provide a video interface to the ABU700 Airborne Base Unit employing wavelet compression to transmit the images through the available bandwidth of the link. Analog NTSC or PAL is clamped, gain controlled, digitized and decoded into component video. The component video is compressed using a wavelet transform filter bank, variable equalization, run-length coding, and Huffman coding. The compressed video is transferred to a frame buffer under control of a digital signal processor (DSP). The DSP also does real time computation of image statistics to control the compression ratio. The output of the frame buffer is an interface to the ABU700.

The VCM710 can be programmed via the GUI to switch between video inputs on a dwell basis or the video channels can be externally selected via J1. The VCM711 video channel selection is via J1 external controls only. Channel selection/dwell times are not programmable on the VCM711 via the GUI.

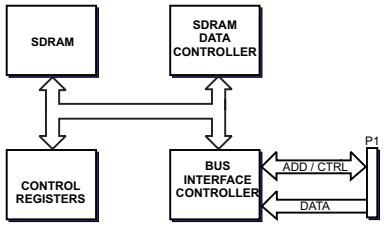
Time stamp clock and reset are input on J1 for the VCM711. The time stamp clock is a pulse at 50 Hz that is used as the basic counter input. The counter is a 24 hour counter with 20 millisecond resolution and a reset input. The counter information is inserted in the header location for each video frame. When using a VCM711, a VEU701 ground unit is required.



Block Diagram
VCM710 / VCM711

DSM710 - Video Storage Module

The Video Storage Module, DSM710, is a subassembly of the Video Compression Unit, VCU700. The main function of the DSM710 is to capture and store video data from a Video Compression Module, VCM710, and transmit the stored video data by interfacing to the Program Control Unit in the Airborne Base Unit, ABU700. This module is useful in applications where the user needs to transmit one video source while also capturing another video source for later transmission. This technique can be used if the customer has limited bandwidth available and wants to maintain a certain video quality/rate.



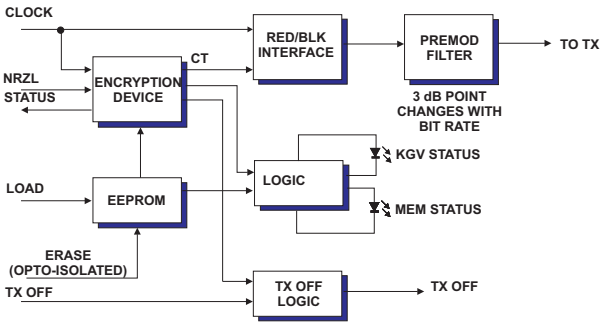
Block Diagram DSM710

CEM630 & BLK610 - Encryption Option

Embedded encryption is avaialble for the VCS700 for specific programs. The use of the CEM630 is typically for use on U.S. programs only, and is always subect to approval for use by NSA. This option is typically not available for foreign applications.

The CEM630 and BLK610 modules are typically provided as a set in order to provide all required isolation. The CEM630 module provides the actual encryption and key management functions, while the BLK610 provides primary power filtering for the transmitter.

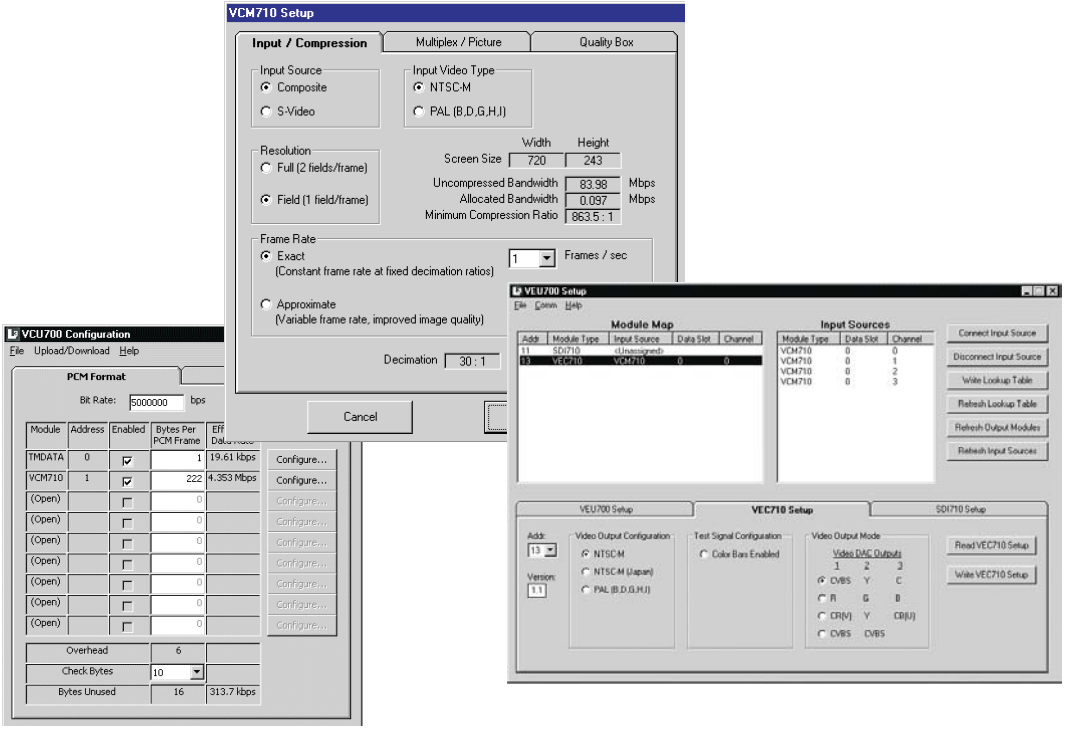
All usages of the embedded encryption module must be co-ordinated with NSA in advance of any sale of hardware.



Block Diagram CEM630

DCM610 - Spacer Module

The DCM610 is a spacer module containing no electronics, and can physically replace the CEM630 in applications where encryption is not required, but where the same footprint is required for encrypted and unencrypted systems. Connectors are provided on the DCM610 so that harnessing may be the same in both applications. Typical application is for FMS sales of hardware typically used on U.S. government programs.



VCS700 GUI Displays

VEU700 Ground Unit

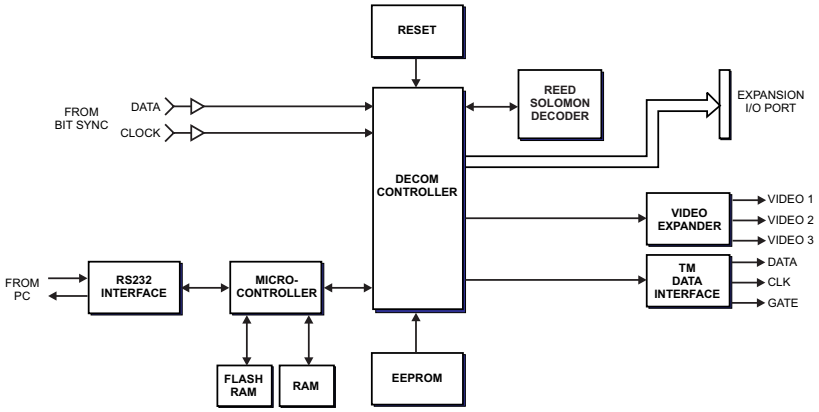
The ground unit for a VCS700 video compression system consists of either a VEU700 or VEU701, plus up to three VEC710 expansion units. If the user requires only one video to be displayed, a single VEU700 or VEU701 is provided. If more than one video must be viewed simultaneously, then VEC710 cards are required to complement the VEU700 or VEU701. All of these types of cards are PCI cards that fit inside of any personal computer (PC) that has PCI slots available.

VEU700 - Video Expansion Unit

The VEU700 Video Expansion Unit receives TTL data and clock from a bit sync, synchronizes the data to the system clock, and separates the data into a predefined input format. This decomposition consists of acquiring framing sync pattern and setup bytes, performing error correction, and demultiplexing blocks of data. Additionally, the VEU700 has one telemetry data output and one video output.

The VEU700 provides several video output options that can be configured to display a full motion video source from the Video Compression Unit (VCU700) or a multiplexed video source. Additional video sources are supported with additional Video Expansion cards (VEC710's) connected to the VEU700.

Compressed digital video is decompressed and converted to BT656 compliant digital video which is then sent to a video encoder. In addition, composite data (compressed video and other data such as TM data and/or audio) is provided to on board interface connector that can mate to optional digital video output cards (VEC710), thereby allowing them to provide additional analog video outputs. The video encoder converts the digital video into several analog formats (composite, Y/C, YUV, or RGB video). The output video standard follows the input standard (i.e., NTSC or PAL).



Block Diagram
VEU700

VEU701 - Video Expansion Unit

The VEU701 provides the same basic video capability as the VEU700 with the exception that RS-232 telemetry data output is not provided. Instead, the RS-232 output is used to provide a time stamp interface to an external on-screen character generator. The VEU701 is compatible with Decade Engineering's Bob-II Video Text Overlay System, part number BNAB-ASY-NTSC. The VEU701 is the companion to the VCM711 video compression module. It is also required to be the ground unit when using a CVA700 air unit.

VEC710 - Video Expansion Card

The VEC710 is esssentially the same as the VEU700, except that it does not have any of the demultiplexing functions populated. The VEC710 is used when multiple videos need to be displayed simultaneously.

The VEU700 and VEC710's are interconnected within the PC using a ribbon cable. Up to three VEC710's may be connected to a VEU700.

Wavelet differs significantly from JPEG and MPEG in the way it achieves compression. JPEG and MPEG compress 8x8 blocks of pixels within a frame, while Wavelet operates on an entire frame. At high compression ratios, Wavelet degrades more gracefully than does JPEG and MPEG, as can be seen from the pictures below. Note the blotches in the JPEG image, which is a direct result of the compression of individual 8x8 blocks of pixels. The Wavelet image has degraded more gracefully, with some degradation in edge definition. In a high noise environment, Wavelet is a better choice than MPEG, as MPEG sends a reference frame periodically, followed by change of information. If data gets corrupted in an MPEG image, the image may be unrecognizable until the next reference frame updates the image.

ORIGINAL IMAGE 720 X 243 16BPP 350KB



JPEG COMPRESSION 140:1 2.5KB



WAVELET COMPRESSION 140:1 2.5KB



In determing the level of compression required, it is important to understand the requirements of the mission and the amount of degration tolerable to achieve success. Note the pictures below of ships in a harbor. All pictures have Wavelet compression, at various compression ratios. If the mission is to count ships, then a very high compression ratio will provide acceptable results. If the mission is to identify types of ships, then the compression ratio must be reduced to achieve success. If the intent of the mission is to identify what is on the deck of these ships, then a much lower compression would be required. Depending upon the type of motion that needs to be captured, there are tradeoffs that must be considered between compression ratio and frame rate. For example, a slow moving object could be sampled at a low frame rate, resulting in better picture clarity. A fster moving object would not be well represented by a slower frame rate, and therefore may not have as much clarity as a system configured for a slower moving object. All aspects of the mission requirements must be considered to optimize the video system performance.

ORIGINAL IMAGE 720 x 243 16BPP 350KB



WAVELET COMPRESSION 27:1 13KB



WAVELET COMPRESSION 70:1 5KB

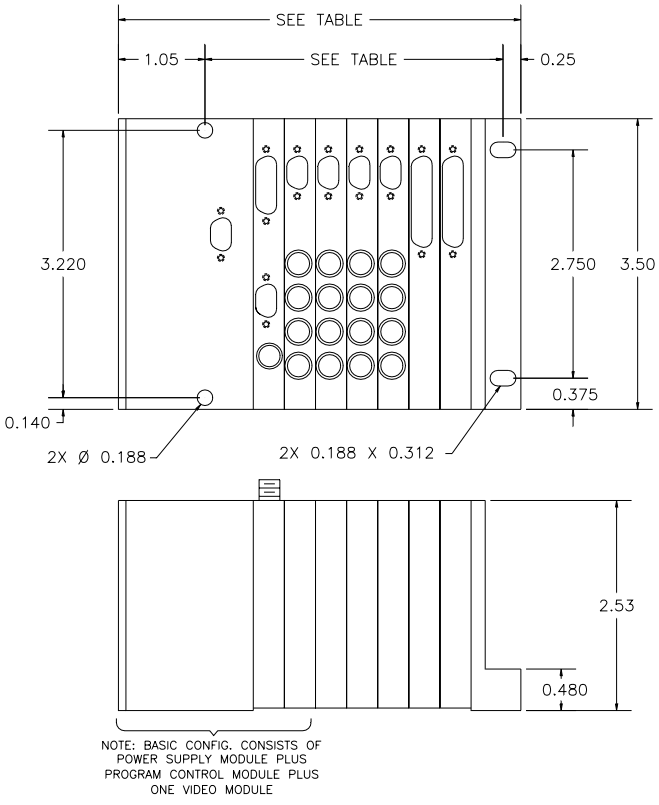


WAVELET COMPRESSION 150:1 2.3KB



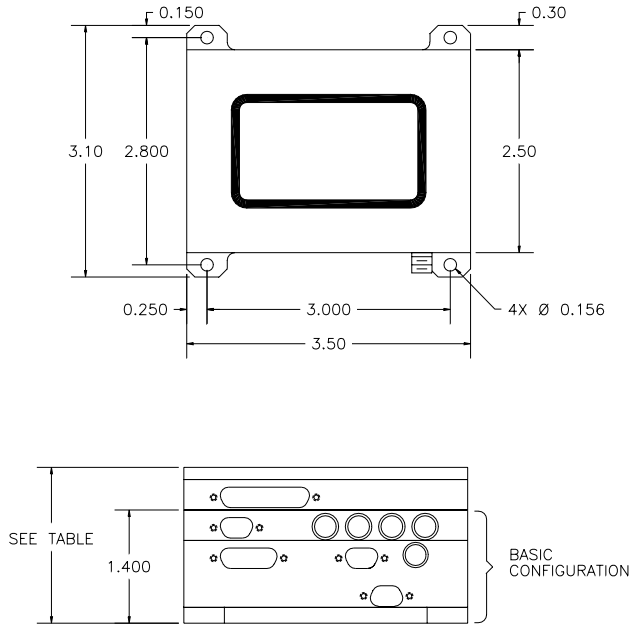
60 W BASE - HORIZONTAL MOUNT

BASE MODULE & COVER			
	LENGTH (INCHES)	MTG CENTERS	WEIGHT (OUNCES)
BASIC CONFIG.	3.010		24
ADDITIONAL MODULES			
1	3.385	2.085	27
2	3.760	2.460	30
3	4.135	2.835	33
4	4.510	3.210	36
5	4.885	3.585	39
6	5.260	3.960	42
7	5.635	4.335	45
8	6.010	4.710	48
9	6.385	5.085	51
10	6.760	5.460	54
CEM630+BLK610	+1.235	+1.235	+10



30 W BASE - VERTICAL MOUNT

BASE MODULE & COVER		
	HEIGHT (INCHES)	WEIGHT (OUNCES)
BASIC CONFIG.	1.550	13
ADDITIONAL MODULES		
1	1.925	16
2	2.300	19
3	2.675	22
4	3.050	25
CEM630+BLK610	+1.235	+10



VCS700 Specifications

VCU700 Air Unit

Video Input

Black and White	PAL, RS-170 or CCIR (8 bits/pixel)
Composite	PAL, NTSC 8 bits/pixel luminance; 8 bits/pixel chrominance; CCIR 8 bits/pixel luminance; 8 bits/pixel chrominance
Input Impedance	75Ω standard
Level	1.0V p-p
DC Offset	±2.5V maximum
Camera Mux	4 into 1 Video Multiplexer; Programmed via RS-232

Telemetry Data Input

	Rate subject to output bit rate RS-232 and RS-422 inputs
Power Input	
Voltage	28 Vdc, ±6V
Power	dependent on module complement (11 Watts minimum)
Ground Isolation	1 MΩ minimum between signal, power and chassis
Overvoltage	±40 Vdc

Composite Output

Encryption	Optional
Digital Output	Clock and Serial Data (RS-422)
Output Rate	10 kbps to 10 Mbps programmable
Filtered Output	Linear phase filter, programmable amplitude 250 kbps to 10 Mbps programmable (Standard) 10 kHz to 400 kHz programmable (Optional) 0.5 to 4V p-p into 1 kΩ load 0.25 to 2Vp-p into 75Ω load
Output impedance	75Ω nominal

RS-232 Port Programming Control

Frame Rate	Frame Size
Bit Rate	Output Amplitude
Compression Ratio	Contrast/Brightness
Quality Box	Hue/Saturation

Environmental

Temperature (Operating)	-20°C to +85°C (standard) -40°C to +85°C (optional)
Storage	-55°C to +125°C
Vibration	20g rms, 20 to 2000 Hz, 3 axes
Shock	100g, half-sine, 11 ms, 3 axes
Acceleration	110g, 3 axes
Humidity	0 to 98% relative

Mechanical

Dimensions	See outline drawing
Weight	See outline drawing

VEU700 Air Unit

IBM PC; Compatible Card Requires 1/2 PCI Slot

Video Output

Video Output	BNC Connector Most Parameters Automatically Programmed
RS-170 or CCIR	Black & White
NTSC or PAL	Composite Color

Telemetry Data Output

Clock, Data, Gate	RS-422
Data	RS-232

Power Input

Power	+5V	1.5 Amp

Input from Bit Sync

Data and clock	Single ended TTL/CMOS (RS-422 optional; consult factory)
Input impedance	50/75 ohm load, factory set

RS-232 Port Programming Control

IBM Interface	RS-232 to Serial PC Port

Environmental

Operating Temperature	0°C to 50°C

U.S. Headquarters
9020 Balboa Avenue
San Diego, CA 92123-3507
858-694-7500 800-351-8483
Fax: 858-279-0693

This document and any attachments hereto are subject to the written restrictions on the cover page.

L3 communications
Telemetry–West

Printed in USA / ML502 Rev. A
Cleared for Public Domain Release by Directorate for Freedom of Information and Security Review (DFOISR), dated 7/19/04, reference number 04-S-1863.
Specifications subject to change without notice. Call for latest revision. All trade names and product names referenced are trademarks, registered trademarks, or trade names of their respective holders.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP