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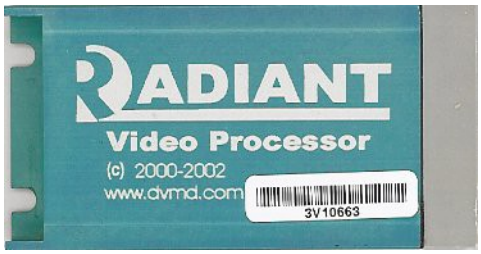

(Actual Size is 1.35" X 2.5" X .35")

Video Processor Module

The Video Processor Module is the brain within a new generation of products for the security market based on Intelligent Video Processing. It incorporates adaptive digital processing technology to achieve highly sensitive detection in a wide range of operating environments with very low false alarm rates. This technology is especially good at handling noisy video sources such as infrared and light-intensified cameras. It allows the module to adapt to changes in lighting or weather that have traditionally caused video motion detectors to fail. Because it works with many types of cameras, it greatly enhances the effectiveness of video-based security systems twenty-four hours a day.

Inside the Video Processor Module, signal processing routines executed by its onboard Digital Signal Processor (DSP) allow it to rapidly learn (within 1 second) what is normal in a scene and then to detect significant changes, such as intrusions. It's adaptability means that it works without camera-specific setup or configuration. It is well suited for monitoring in outdoor environments. Because it adapts so rapidly, it can handle panning cameras with preset dwell positions, as well as fixed cameras.

The module is shown at its actual size. It is smaller, uses less power, is more reliable, and costs less than previous generations of video motion detectors. It brings a new level of intelligent processing to video security.

Benefits

Simple Setup
Low Cost
Highest Performance
Easy Embedded Design

Adapts to most Video Sources
Probability of Detection > than 96% *
Nuisance Alarm Rate less than 2 per day *

Features

Very Small, High Density SMD Package
Low Power Consumption
Very Low EMI
ESD Protected
On -Screen Display

NTSC/PAL
Video Loss Detection
Software Upgrades
Commercial Temp Range

2395 Kenwood Drive **Boulder CO 80305** **(303) 543-0440**

Video Processor Module Technical Specifications

Size	1.35” x 2.5” x .35” Weight: 1.1 oz.
Package	Aluminum extrusion filled with black non-conductive resin
Number of Channels	One video channel per module
I/O Connector	One 20 pin DIN header
Fasteners	Two 4:40 mounting screws
EMI Abatement	
Radiated	Black Anodized Aluminum Shield
Power Supply	Onboard regulators
Video Section	
Luma Processing	30 fields/second continuous
Video Standards	NTSC, PAL
Video Capture Resolution	720 pixels x 525 (NTSC) or 625 (PAL) Even Field Used
Video Output	Drives 75 ohm back terminated coax
Local Video	DSP generates local video. Alarm when no input video is present.
Digital Processing Section	
DSP	75 MIP 16 Bit Fixed Point DSP
Memory	EEPROM storage for software and configuration
Overlay	
Static Information	Channel Number, Time, Date, Module Address
Dynamic Information	Target Outline, PAN/LRN, ALARM logo
Serial I/O	
Host Format	NRZ 19.2K baud 5 volt logic compatible
PTZ Format	NRZ 19.2K baud (optional)
ESD Protection	
Serial I/O	TVS clamped and RC filtered
Video I/O	TVS clamped and RC filtered
Address I/0 (IIC)	TVS clamped and RC filtered
Alarm Output	TVS clamped and RC filtered NFET Open Drain
Auxiliary Input	TVS clamped and RC filtered
Addressing	
Local Address	Up to 16 addresses
Extended Address	Up to 4096 addresses
Performance	
Probability of detection **	>96%
Nuisance Alarm Rate**	< 2 per Day
Power	
Older +5VDC Black Modules	200 mA at +5VDC (1W typical)
+3.3VDC	130 mA at +3.3VDC (1/2 W typical)
+VBAT	100uA (Max) at 3.0VDC (Max)
Temperature	
Min/Max	0 deg C Min Max 55 deg C

* **Technical specifications and or physical layout of the product may vary from photo.**
* **Radiant reserves the right to make changes without prior notice.**
** **Radiant tested the DVMD1 against a tape library made of 12 SVHS tapes (Available from Sandia National Laboratories) depicting various outdoor conditions, targets and ranges in a variety of environments.**
** **Radiant performs ongoing tests in outdoor environments.**

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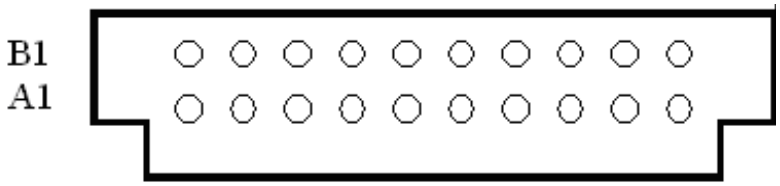
Video Processor Module Electrical Specifications

Pin #	Type	Name	Description
A1	O	TXD1	Serial Data to Host (NRZ 19.2K baud)
B1	I	RXD1	Serial Data from Host (NRZ 19.2K baud)
A2	I USER	IN0	Local Address Bit 0 (0000 is address "0")
B2	I USER	IN1	Local Address Bit 1
A3	I USER	IN2	Local Address Bit 2
B3	I USER	IN3	Local Address Bit 3 (MSB)
A4	O	SCL	Serial Clock for IIC Bus (extended address)
B4	OD PU	SDA	Serial Data for IIC Bus (extended address)
A5	O	TXD2	Serial Data to PTZ (optional)
B5	I	RXD2	Serial Data From PTZ (optional)
A6	I	AUXIN*	Input from Opto-Isolated Input (active low)
B6	OD PU	ALARM	Open Drain Output to Relay MUST USE EXTERNAL CATCH DIODE
A7	I	MR*	Internally Generated Reset* (Connect to 3.3V if not used)
B7	3.3V	+V	3.3V 130mA (typical) Blue modules
A8	3.0V	+VBAT	+3.0 (MAX) VDC For RTC @ 100uA (Max) **(NOTE)**
B8	+5V	+V	+5VDC @ 200mA (typical) (Older Black modules)
A9	GND	GROUND	DC Return
B9	GND	GROUND	DC Return
A10	VIDEO IN	Video Input	Terminated in 75 ohms to GND
B10	VIDEO OUT	Video Output	75 ohm resistor after 2X gain Video Driver

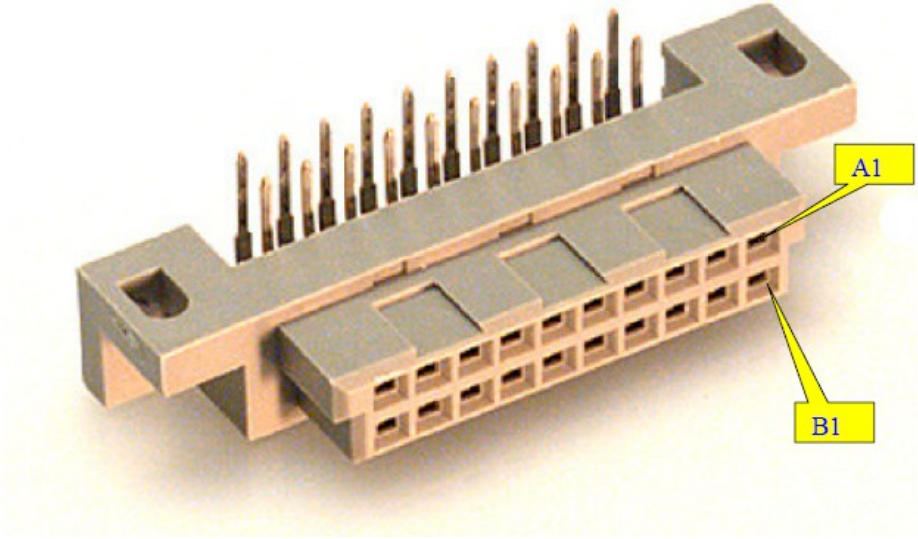
Code	Defined	Notes
*	Protected	See Note Below
OD	Open Drain	Internal 100mA Max 2N7002
OD PU	Open Drain Output	2N7002 w/ 1K pull up to +V
USER	User Must Drive high or low during power on reset to insure correct address is read by DSP	+ Supply or Ground by switch or hardwire

NOTE: Battery Recommendations:
Use a Panasonic BR1225 (Digi P183) for single and dual channel designs.
Use a Panasonic CR2477 (Digi P120) for 8 and 16 channel designs.

MODULE CONNECTOR
Hirose makes the 20-pin DIN connector used on the DVMD module. It is Hirose Part Number PCN10-20P-2.54DSA. It is Digikey part number H2020. We modify it for this product.



MOUNTING CONNECTOR
You will need to supply the Right Angle PCB mount mating connector. It is Hirose Part Number PCN10C-20S-2.54DS Digikey part number H2120, and costs approximately $3.00.



Video Processor PCB Layout

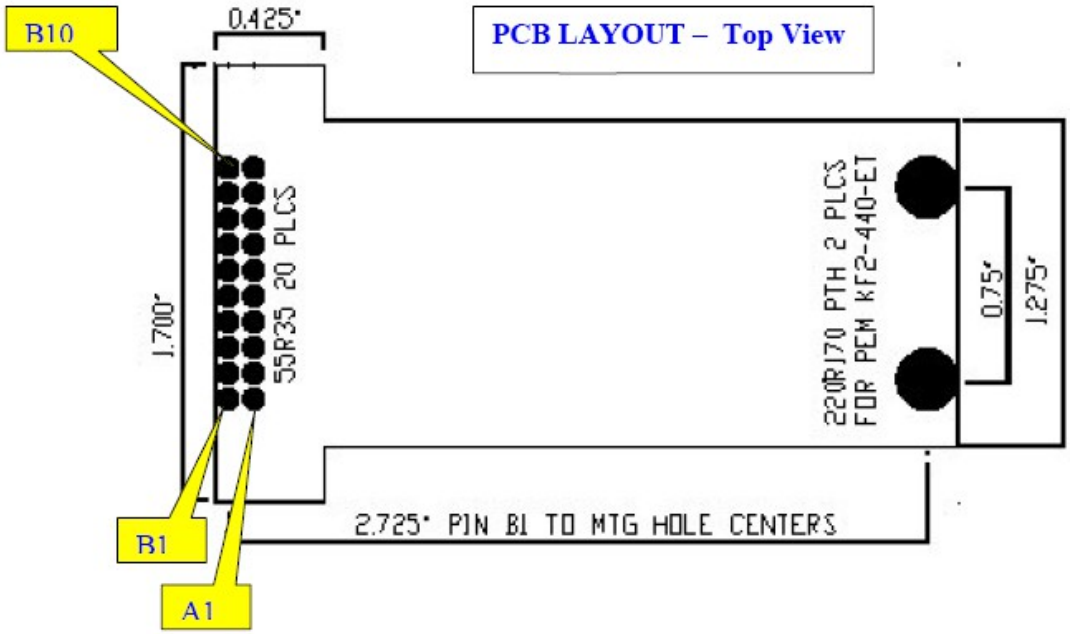
The Module connects to the PCB with a right angle 20 pin connector (Digikey H2120) and two PEM nuts (PEM KF2-440-ET) designed for 1/16" FR4. The module is secured with two pan head screws 4:40x3/16".

The PEM nut holes are .170" plated through with .220" pads to support the PEM shoulders and maintain an appropriate keep-out zone for routing. The top-side PCB should be a partial copper pour with many vias to a copper pour on the bottom of the PCB. The bottom copper pour should allow direct contact with a heat conductor to the case.

Reducing the temperature differential between the case and the Video Processor module increases the usable temperature operating range of the device.

ORCAD PCB LAYOUT LIBRARY

Contact Radiant to obtain the Orcad library with the part below. The module mounts with 4:40 hardware using PEM KF2-440-ET.



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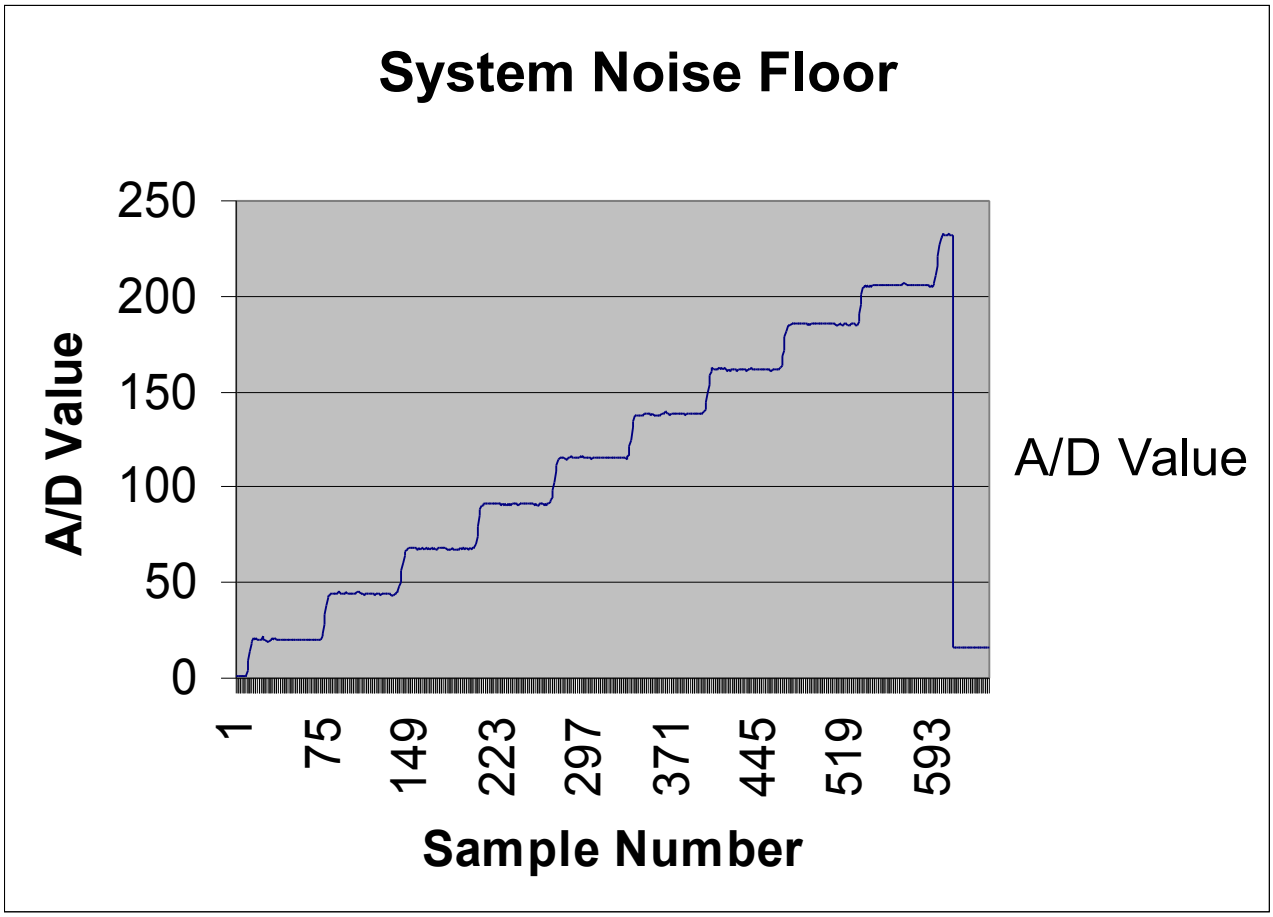
Video Processor Noise Floor
All DSP based system have noise generated by the active devices. The video decoders are affected by the system noise on the ground and analog power supplies. Isolation techniques on the PCB are used to reduce the system noise and each DSP based product has different noise floors inherent in the design.

The following chart shows the A/D noise from the Video Processor from a single line of gray-scale data generated by a generator. You can see the single A/D bit of system noise on the 8-bit luma data.

Lower noise floors are needed to detect low contrast targets without causing a high variance in each cell of the low-level image processing routines. This allows the system to accurately measure the noise inherent in a variety of video devices ranging from a video generator, to any type of video camera, IR or thermal camera. The system noise plus the camera noise determines the lowest contrast targets that can be detected.



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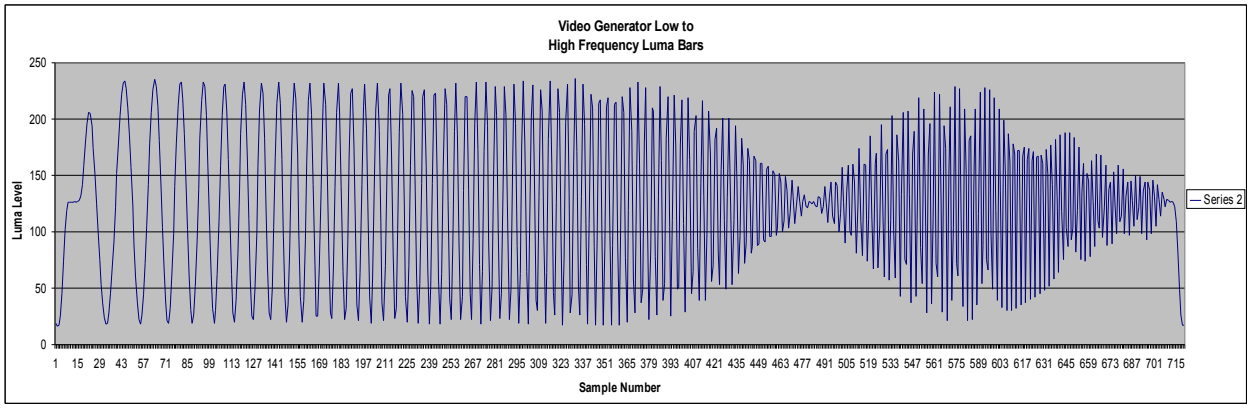
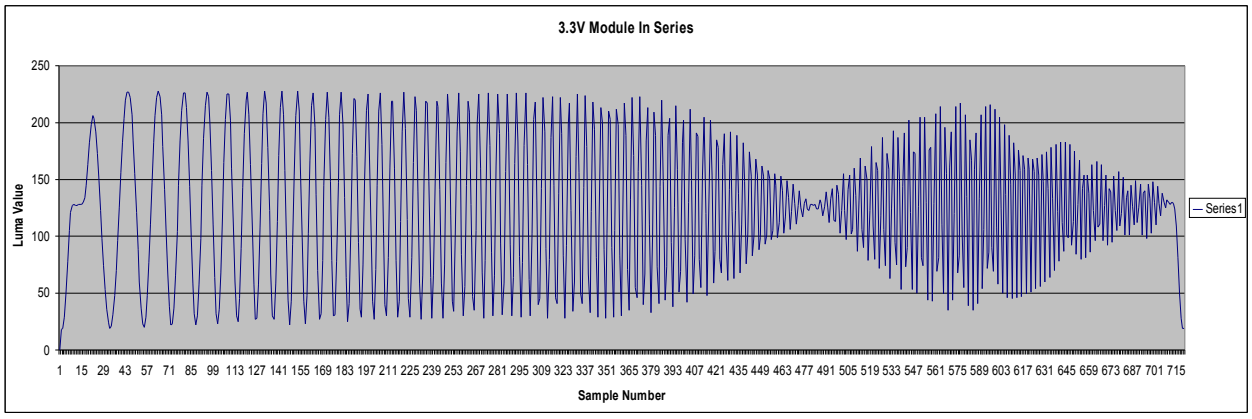
Frequency Response of Video Generator and Video Decoder (Luma)

This graph shows the A/D values from a video generator producing high frequency vertical bars. The video was captured with an ADV1783B video decoder in CCIR656 NTSC mode. Each CCIR video line contains 720 pixels. The data clearly shows the effects on luma of the notch filter at 3.58MHZ (NTSC). This provides chroma separation with the digital filters in the decoder. The chirp goes up to about 5 MHZ.



Frequency Response of Video Processor in Series with Video Generator (Luma)

This graph shows a slight high-frequency degradation of A/D values AFTER going through one 3.3V Video Processor on a DVMD1 mounting card. The video was captured with the same ADV1783B video decoder in CCIR656 NTSC mode. There is a slight processing delay in the Video Processor analog path due to AGC, Overlay Mux, and Buffer Amp, however it is less than one sample time at 27MHZ. There is no degradation in the low frequency response. The 3.58MHZ notch is still quite clear. The high frequency response is phase shifted and slightly reduced over the original data sampled previously. It is hard to see degradation with an oscilloscope at 5MHZ but there is some.



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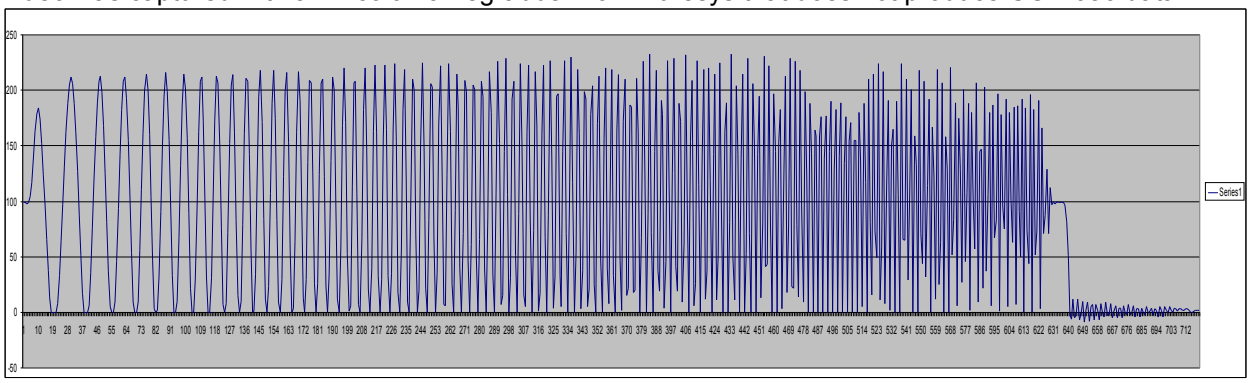
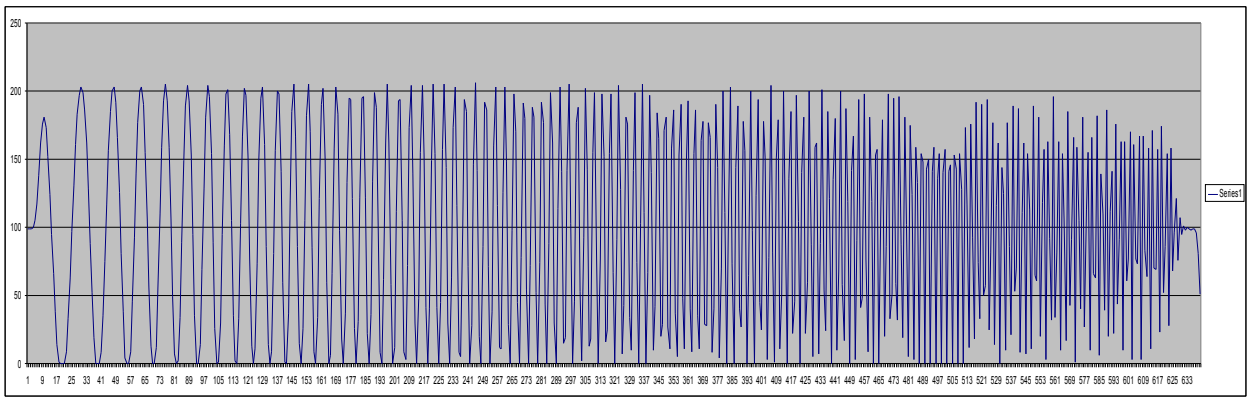
Frequency Response of Video Generator and Video Decoder (Luma)

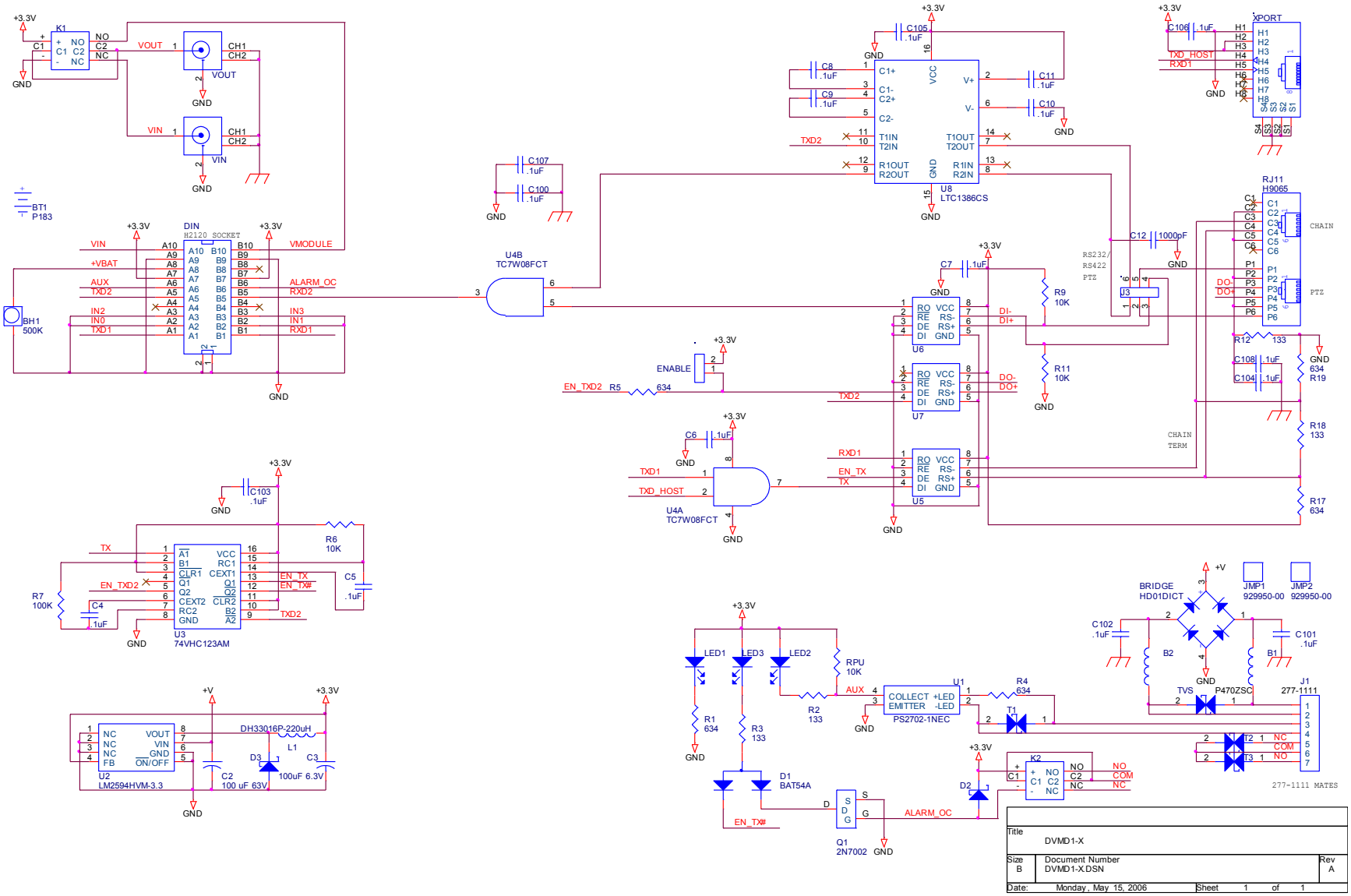
This graph shows the A/D values from a video generator producing high frequency vertical bars. The video was captured with an Picolo framegrabber from Euresys that does not produce CCIR656 data.



Frequency Response of Video Processor in Series with Video Generator (Luma)

This graph shows the slight high-frequency degradation of A/D values AFTER going through one 3.3V Video Processor on a DVMD1 mounting card. The video was captured with the Picolo Framegrabber.




K1
VOUT
VIN
CH1
CH2
GND
+3.3V
BT1
P183
BH1
500K
DIN
H2120 SOCKET
VIN
+VBAT
AUX
TXD2
IN2
IN0
TXD1
VMODULE
ALARM_OC
RXD2
IN3
IN1
RXD1
U4B
TC7W08FCT
C107
C100
.1uF
U8
LTC1386CS
C105
C8
C9
C11
C10
C12
1000pF
TXD2
T1OUT
T2OUT
R1OUT
R2OUT
R1IN
R2IN
XPORT
TXD_HOST
RXD1
RJ11
H9065
CHAIN
PTZ
RS232/
RS422
U6
U7
U5
R9
10K
R11
10K
R12
133
R18
133
R17
634
R19
C108
C104
DI-
DI+
DO-
DO+
ENABLE
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R5
634
C6
TXD1
TXD_HOST
U4A
TC7W08FCT
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TX
CHAIN
TERM
C103
R6
10K
R7
100K
C4
C5
U3
74VHC123AM
EN_TX#
U2
LM2594HVM-3.3
DH33016P-220uH
L1
D3
C3
C2
100 uF 63V
100uF 6.3V
LED1
LED3
LED2
RPU
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634
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R2
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PS2702-1NEC
COLLECT
EMITTER
+LED
-LED
R4
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Q1
2N7002
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K2
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NO
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