MEYERTECH LIMITED
Office Block One
Southlink Business Park
Oldham OL4 1DE

Tel: +44 (0)161 628 8406
Fax: +44 (0)161 628 9811
Email:
technical@meyertech.co.uk
http://www.meyertech.co.uk

SERIES 3 VIDEO MATRIX

ARCHITECTURAL AND ENGINEERING SPECIFICATION

CONTENTS

REVISION RECORD

ISSUE	DATE	ORG	CHKD	PAGE(S)	REVISION(S)
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1. Reference Documents

2. Product Reference

2.1. The ZoneVu Series 3 is a modular video matrix system which can be expanded from its base size of 128 video inputs by 16 video outputs to its maximum size of 4,096 video inputs by 2,048 video outputs. The five modules, which make up the system, are:

2.1.1. ZVS3-VRM video routing module
2.1.2. ZVS3-VOM video output module
2.1.3. ZVS3-VTM videotext module (OSD)
2.1.4. ZSC-1000 video matrix manager
2.1.5. ZVS3-PSU power supply module

2.2. **ZVS3-VRM** video routing module. Fully carded each ZVS3-VRM can route 128 video inputs to any or all 128 video outputs. Designed to fit into a 19-inch equipment cubicle, the ZVS3-VRM is supplied in a 5U 19-inch enclosure. The design of the ZoneVu Series 3 Video Matrix System uses the latest video crosspoint technology available to offer superior performance over conventional video matrix designs. Each ZVS3-VRM can optionally accommodate a video loss module to actively monitor each video input.

2.3. **ZVS3-VOM** video output module. Processing and amplifying each routed video output from the ZVS3-VRM modules. It's the final matrix module that the video passes through before exiting back to the outside world when OSD is not required. Fully carded, each ZVS3-VOM can process 128 video outputs. Designed to fit into a 19-inch equipment cubicle, the ZVS3-VOM is supplied in a 3U 19-inch enclosure.

2.4. **ZVS3-VTM** video text module. Text module version of the ZVS3-VOM when OSD is required. Fully carded, each ZVS3-VTM can process 128 video outputs. Designed to fit into a 19-inch equipment cubicle, the ZVS3-VTM is supplied in a 3U 19-inch enclosure.

2.5. **ZSC-1000** matrix manager. The ZSC-1000 is responsible for controlling all data storage and communication aspects of the Series 3 video matrix system. Video matrix configuration data can be uploaded and downloaded using Mpower and a PC.

2.6. **ZVS3-PSU** power supply module.
Provides DC power to the ZVS3-VRM, ZVS3-VOM, ZVS3-VTM and ZSC-1000. A 1U 19-inch module the ZVS3-PSU has been designed to fit into a 19-inch equipment cubicle. From a universal AC mains supply (99VAC to 264VAC 50Hz) the ZVS3-PSU provides +12VDC and –12VDC.

3. Product Requirement

3.1. General

3.1.1. The video matrix shall be a true 'non-blocking' modular design, which offers high levels of video performance and control. It shall be compact in size and have low power requirements.
3.1.2. The video matrix shall be easily expandable in the field through the addition of additional modules, which shall all be generic in nature and incorporate no bespoke elements.
3.1.3. The video matrix shall incorporate on-board diagnostics for each module for service and maintenance purposes. The video matrix shall be fully configurable in the field and shall include a facility to back-up and restore ALL configuration data to portable media.
3.1.4. It shall be possible to control the operation of the video matrix from third party equipment.
3.1.5. The design of the video matrix shall be such that it will demonstrate a high level of tolerance to faults and exhibit high MTBF figures.
3.1.6. The video matrix shall have the capability of being supplied with either buffered video outputs or outputs with OSD functionality.
3.1.7. The video matrix shall also have the capability of being supplied with video loss monitoring for all matrix video inputs.

3.2. Modular Design and Construction

3.2.1. The video matrix shall be modular in design to enable system expansion without module redundancy.
3.2.2. It shall employ the same generic modules throughout the system permitting designs to be realised of 4,096 video inputs by 2,048 video outputs.
3.2.3. The video matrix shall comprise the following system modules:
Video routing module
Video output module.
3.2.4. Video matrix control module with embedded CPU. A PC based video matrix controller will not be accepted.
3.2.5. The modules shall be housed in 19-inch Euro sub-rack enclosures, fully enclosed and incorporating ventilation.
3.2.6. The video routing module shall incorporate a fan to circulate air through the video matrix system.
3.2.7. Video PSU module

3.3.Video Matrix Architecture

3.3.1.A separate video matrix control module shall be employed to manage communications with the video routing and video output modules.
3.3.2.All modules employed in the video matrix shall communicate using serial data. Parallel data busses will not be accepted.
3.3.3.The design of the video matrix shall be 100% non-blocking. I.E. any input can be routed to any input or any number of inputs without limitation.
3.3.4.The design of the video matrix system shall employ separate PSU modules to power the Video Routing and Video Output modules.
3.3.5.Each video matrix input shall be buffered prior to the crosspoint matrix circuitry.
3.3.6.To minimise system response times E.G. X-point switch, and to eliminate single point failure each video routing module will employ a dedicated 16-bit CPU.
3.3.7.It shall be possible to populate the Video Output Module with either straight-buffered outputs or buffered outputs with text insertion (OSD) or, a combination of both in the same module.
3.3.8.All video inputs and outputs of the video matrix shall be AC coupled to eliminate the undesirable effects from other equipment / systems connected to it.

3.4.Diagnostics

3.4.1.All video matrix modules shall incorporate diagnostic LED's on the front panels of the modules
3.4.2.The following system diagnostic LED's shall be provided.
3.4.3.Communication network fault LED to indicate when communications with the system matrix controller has been lost.
3.4.4.Communication network termination LED to indicate which matrix module(s) are terminated with respect to their network communications port.
3.4.5.Communication network data received LED to indicate when data has been correctly received from the video matrix controller.
3.4.6.Communication network data transmitted LED to indicate when data has been correctly transmitted to the video matrix controller.
3.4.7.Communication network data received LED to indicate when data has been correctly received from the video matrix controller.
3.4.8.Video Loss Alarm LED to indicate when a video input has lost its video signal.
3.4.9.X-point switch confirmation LED's to indicate when the video matrix has executed a x-point switch.
3.4.10. Power LED's to indicate a module is receiving power.

3.5.Video Matrix I/O Connections

3.5.1.All inputs and outputs to and from the video matrix shall be via the rear panel.

3.5.2.Video Routing Module

The video routing module shall have two hundred and fifty-six industry (256) standard BNC connectors. One hundred and twenty-eight (128) BNC connectors for video inputs to connect the video source signal and one hundred and twenty-eight (128) loop-through BNC connectors for connection to further Video Routing Modules or other equipment. Miniature BNC, ribbon cables or any other form of connection to the video matrix will not be permitted.
Each video input shall be Hi-Z impedance (high impedance).
75-ohm termination of each video input shall be via a standard 75-ohm termination plug. Links to terminate and de-terminate video inputs shall not be permitted.
Auto-termination of video inputs shall not be permitted.
Dual RJ45 connectors located on the back panel shall be provided to loop through the data-comms from on module to the next using standard RJ45 'patch-leads'.
A single Power Connector shall be used to provide power to the Video Routing Module.

3.5.3. Video Output Module

The video routing module shall have one hundred and twenty-eight (128) industry standard BNC connectors to allow the video output to connect to destination equipment.
The nominal impedance of each video output shall by 75R.
A single Power Connector shall be used to provide power to the Video Output Module.

3.5.4. PSU Module

Mains power to the PSU module shall be via a IEC connector.
A plug-socket connector shall be used to distribute DC power to the video matrix modules.

3.6. Configuration

3.6.1. The manufacturer shall provide a system configuration tool that runs on a Windows XP PC platform.
3.6.2. The configuration tool shall permit the setup of all configuration settings of the video matrix. Configuration by link settings or any other methods will not be permitted.
3.6.3. It is a requirement that ALL video matrix configuration data can be backed-up onto a portable medium such as CD and restored if required.

3.7. Video Performance

3.7.1. The video matrix shall support fast switching of X-points I.E. a X-point switch will be achieved in under 1µs. Slower methods of switching X-point's E.G. vertical interval switching will not be accepted.
3.7.2. The video matrix shall have a minimum Bandwidth (–3dB) of 32MHz.
3.7.3. The video matrix shall have a minimum Bandwidth (0.1dB) of 10.5MHz.
3.7.4. The video matrix shall have a minimum Slew rate of 160V/uS.
3.7.5. The video matrix shall have a Differential gain error of < 0.1%.
3.7.6. The video matrix shall have a Differential phase error of < 0.5%
3.7.7. The video matrix shall have a minimum X-talk (all hostile) @ 6MHz of > -60dB
3.7.8. The video matrix shall have a minimum Output isolation @ 6MHz of > -90dB
3.7.9. The video matrix shall have a minimum Signal to Noise of > -63dB

3.8. Expansion Capabilities

3.8.1. The video matrix controller will be capable of controlling a video matrix of any size (from its minimum configuration to its maximum configuration) without requiring firmware or software upgrades.
3.8.2. Expansion of video matrix modules shall be achieved through the addition of routing and output cards.
3.8.3. Video inputs shall be expanded in a minimum block size of one hundred and twenty-eight (128) inputs.
3.8.4. Video outputs shall be expanded in a minimum block size of sixteen (16) outputs.
3.8.5. Expansion of the video matrix system shall be achieved through the addition of video routing and video output modules and associated PSU modules.

3.9.Power Requirements

3.9.1. The video routing and video output modules of the video matrix shall contain no voltages above +12V DC for Health and Safety reasons.
3.9.2. The video matrix system PSU modules shall have a universal mains input I.E. (99VAC to 264VAC 50Hz)
3.9.3. The video matrix system PSU modules shall provide +12VDC and –12VDC.
3.9.4. The video matrix system PSU modules shall be switched mode type, which are significantly more efficient than linear PSU's.
3.9.5. The video matrix system shall be extremely power efficient. I.E. a video matrix system with 256 video inputs and 128 video outputs shall require less than 200W.

3.10.Physical Size

3.10.1. The design of the video matrix shall be extremely compact and make efficient use of cubicle space.
3.10.2. The video matrix system shall fit into a cubicle of 600mm maximum depth.
3.10.3. The video matrix shall achieve or better the ratio of 3,276 X-points per 1U size.
3.10.4. The video matrix shall achieve or better the ratio of 1024 inputs x 128 outputs in 43U cubicle.

3.11.Third Party Control

3.11.1. The video matrix system shall support a high level Interface by third party control systems.
3.11.2. The third party control interface shall be a RS232 serial port.
3.11.3. The third party control port shall support fast X-point switching I.E. from the start of transmission of data from a third party controller the video matrix will complete a X-point switch command in less than 50ms.
3.11.4. It shall be possible for multiple third party controllers to control the video matrix system simultaneously.

3.12.Video Matrix Functions

3.12.1. The video matrix shall support monitor blanking I.E. video outputs can be switched off to display a black screen.
3.12.2. The video matrix shall support 'power-up restore' I.E. the video matrix will power-up and restore all X-points to their state prior to power-down.
3.12.3. The video matrix shall support zonal switching I.E. multiple X-point switches via single command.

3.13.Fault Tolerance and Redundancy

3.13.1. The video matrix shall be fault tolerant and employ a high level of redundancy in its design.
3.13.2. Each video matrix module shall have its own dedicated PSU module.

3.14.Serviceability and Maintenance

3.14.1. All service and maintenance access to the video routing and video output modules shall be via the front panels only.
3.14.2. The video matrix system modules shall be on line serviceable I.E. it is possible to remove and replace modules without the need to power the system down or take it off line.
3.14.3. It shall be possible to interchange modules within a system by only having to reconfigure them.
3.14.4. It shall be possible to replace any sub-module within a module in under 20 minutes.
3.14.5. It shall be possible to completely restore a video matrix module or system's configuration using removable and a software configuration tool provided by the manufacturer.

3.15.MTBF Requirements

3.15.1. The video matrix system will exhibit a high MTBF figure.
3.15.2. Each video matrix module will have a minimum MTBF of 70.000 Hours.

4. Product Options

4.1.Video Loss Monitoring

4.1.1.The video matrix shall support video loss monitoring on all video inputs.
4.1.2.A loss of video on any input will generate a unique video loss alarm, which shall be reported to the matrix controller.
4.1.3.The maximum time to scan 128 inputs shall be 2.5 seconds.
4.1.4.The matrix controller shall have the ability to manage video loss alarms locally, report them remotely or report them to a third party control system.
4.1.5.It shall be possible to enable or disable video loss monitoring on an individual video input basis using the software configuration tool.

4.2.On Screen Display - OSD

4.2.1.The video matrix shall offer an option to provide text insertion for each video output channel.
4.2.2.The text shall be multiplexed into the video output source providing a superimposed OSD.
4.2.3.The video matrix shall support 4096 camera captions of 28 characters.
4.2.4.The video matrix shall support 128 monitor captions of 28 characters.
4.2.5.Each caption shall have the following configurable parameters:

- Text justification
- Line number
- Enabled / disabled
- Flashing

4.2.6.Additionally each monitor output shall have the capability to display the text either translucent or opaque.

4.3.Default caption

4.3.1.The video matrix shall support default captions to assist in the initial configuration and set-up of the matrix.
4.3.2.Both monitor and camera default captions shall be supported.
4.3.3.The default caption is used by the module whenever a specific caption has not been configured. The module takes the default caption and appends either the monitor or camera number onto the end of the caption text.

E.g
Default camera text set to “Cam”
Module automatically displays:

“Cam1” on camera 1’s video
“Cam104” on camera 104’s video

4.4.Time and Date

4.4.1.The video matrix system shall have the ability to display the time and date on any or all monitors.
4.4.2.The format of the time and date shall be configurable to the following minimum configurations:

HH:MM:SS	e.g 12:30:01
HH:MM	e.g 12:30
DD/MM/YY	e.g 01/07/03
DD/MM/YYYY	e.g. 01/07/2003

4.5.Local Keyboard Operation

4.5.1.The video matrix will support the operation of a local CCTV control keyboard to allow service and maintenance functions to be carried out.
4.5.2.The optional ZoneVu ZVK-77D can be supplied for this purpose. The ZVK-77D connects into the ZVK port of the ZSC-1000 matrix manager.

5. Specification

5.1.The video matrix shall meet or exceed the following specifications.

5.2.Operating Temperature

5.2.1.Storage -10º to +60ºC
5.2.2.Operational 0º to +50ºC
5.2.3.Humidity 10% to 95% non-condensing

5.3.Enclosure

5.3.1.Eurorack standard 19" rack. Aluminium and mild steel construction.
5.3.2.Maximum depth of Eurorack 380mm

5.4.**AC Power Input** 99 to 264VAC 50Hz.
5.5.**DC Power Output** +12VDC, -12VDC.

5.6.**Bandwidth –3dB** 32MHz
5.7.**Bandwidth 0.1dB** 10.5MHz
5.8.**Slew rate** 160V/uS
5.9.**Differential gain error** < 0.1%
5.10.**Differential phase error** < 0.5%
5.11.**X-talk (all hostile) @ 6MHz** > -60dB
5.12.**Output isolation @ 6MHz** > -90dB
5.13.**Signal to Noise** > -63dB

5.14.Camera Captions

5.14.1. 4096 captions 28 characters per caption;
5.14.2. Caption justification Left, Centre or Right;
5.14.3. Camera text line selection 1-11;
5.14.4. Text Flashing, On or Off,
5.14.5. Default caption configuration

5.15.Monitor Captions

5.15.1. 128 captions configurable for any monitor in the range 1-2048, 28 characters per caption;
5.15.2. Caption justification Left, Centre or Right;
5.15.3. Camera text line selection 1-11;
5.15.4. Text Flashing, Opaque, Translucent or Off,
5.15.5. Three configurable messages per monitor

5.16.Time and Date Captions

5.16.1. Date format DD:MM:YYYY, DD:MM:YY or Off
5.16.2. Time format HH:MM:SS, HH:MM orOff
5.16.3. Caption justification Left, Centre or Right;
5.16.4. Camera text line selection 1-11;
5.16.5. Text Flashing, Opaque, Translucent or Off

5.17.**Video input connectors** Standard BNC
5.18.**Video output connectors** Standard BNC
5.19.**Video input** 1V p-p nominal
5.20.**Video output** 1V p-p nominal
5.21.**Video input impedance** 75R nominal
5.22.**Video output impedance** 75R nominal
5.23.**Video Routing Module size** 128 input by 128 output expandable in blocks of 128 inputs and 16 outputs
5.24.**Video Output Module size** 128 outputs expandable in blocks of 4 outputs
5.25.**Maximum expansion capability** 4096 inputs by 2048 outputs
5.26.**Module MTBF** 70,000 Hours

6. Manufacturer

6.1.Meyertech Limited

Office Block One
Southlink Business Park
Oldham
OL4 1DE
Lancashire
United Kingdom
Tel: +44 (0)161 628 8406
Fax: +44 (0)161 628 9811
Email: technical@meyertech.co.uk
http://www.meyertech.co.uk

6.2.A Company who has attained ISO9001:2000 quality system accreditation shall manufacture the product.

6.3.The video matrix specified shall be the ZoneVu Series 3 Video Matrix manufactured by Meyertech Limited.

7. ZoneVu Series 3 Product and Part Codes

7.1. System

7.1.1. **ZVS3-XXXYYY ZoneVu Series 3 system** Includes ZVS3-VOM or ZVS3-VTM modules, ZVS3-VRM modules, ZVS3-PSU modules, ZVS3-RJVRM cards, ZVS3-RJ-VOM cards and ZSC-1000 Series 3 site controller.

7.2. System Modules

7.2.1. **ZVS3-VOM** ZoneVu Series 3 video matrix buffered output module 128 channel.
7.2.2. **ZVS3-VTM** ZoneVu Series 3 video matrix On Screen Display output module. 128 channel.
7.2.3. **ZVS3-VRM** ZoneVu Series 3 video matrix video routing module. 128 inputs by 128 outputs.
7.2.4. **ZVS3-PSU** ZoneVu Series 3 module PSU.
7.2.5. **ZSC-1000** ZoneVu Series 3 matrix manager.

7.3. System Options and Expansion Parts

7.3.1. **ZVS3-VRC-VRM** ZoneVu Series 3 video routing card. 128 input x 16 output.
7.3.2. **ZVS3-VLC-VRM** ZoneVu Series 3 video input loss detection card. 128 channel.
7.3.3. **ZVS3-VOA-VOM** ZoneVu Series 3 video output amplifier card.
7.3.4. **ZVS3-OSD-VTM** ZoneVu Series 3 video output card with On Screen Display.
7.3.5. **ZVS3-BC1-VRM** ZoneVu Series 3 video input bridging cable. Standard BNC connectors, mini-coax 1 metre length.
7.3.6. **ZVS3-T75-VRM** ZoneVu Series 3 video input 75Ohm termination plugs.
7.3.7. **ZVS3-RJ-VRM** ZoneVu rack jumper card for expanding inputs between ZVS3-VRM modules.
7.3.8. **ZVS3-RJ-VOM** ZoneVu rack jumper card for connecting ZVS3-VRM module video outputs to a ZVS3-VOM or ZVS3-VTM.