Electronics Research Inc. Visual Data Monitor (VDM)
ORSG45

The VDM is a state-of-the-art multi-channel high resolution (16 bit) data acquisition system that displays, monitors, records and communicates vital information regarding broadcast system performance characteristics. The unit is user-friendly and comes with a multitude of features to save costs and simplify data acquisition in broadcast systems. It offers unbeatable ease of integration and performance when used with all types of sensors such as RF Power Detectors, Zone Temperature Sensors, Pressure Transducers, etc.

VDM Overview

Compact and easy to use
The VDM measures only 5.87” x 7.69” x 5.55” deep, allowing two units to be mounted side-by-side with optional rack mounting equipment (1). The fully integrated and well-designed system provides a convenient way of simultaneously displaying up to 20 channels of information per unit. All VDM functions are controlled from one navigational control knob and four soft keys. The operating instructions are built-in and provided on ERI’s website.

Integrated alarm and set point management
With a 20 channel unit, up to five programmable set points are freely designated as alarms or warnings with each channel. The set point values (when reached) are descriptively recorded on the display and to memory. In addition, when an alarm or warning is reached, it can trigger 1 of 6 on-board relays (2) for external control of transmitter interlocks. Two channels and a relay can be used as a station transmitter reflectometer with transmitter interlock control. For example, in the event of high VSWR, the VDM can send text message warnings and when an intolerable set point is reached, shut down the transmitter. The measured values can be monitored for warning or alarm set point violation. Up to 100 set points can be allocated for monitoring channels and attached sensors.

Optional Sensor power supply
An imbedded 250mA, 24V sensor supply enables you to power 2-wire current loop sensors or 4-wire sensors without the need for external power supplies and additional wiring. For ease of installation and removal, sensors and relays connect to the VDM’s back panel using quick-wire lock-style plug-in connectors.

Digital memory: Automatically records data and events
The VDM has an internal memory and is available with an industrial-grade SD memory card to store large amounts of data and ensures minimum operation intervention in retrieving archived data. The SD card can be accessed using the communication ports available and secured (locked) against unauthorized removal. The VDM’s USB port and memory stick can also be used as memory mediums. The VDM can save recorded data in secure Reporting Software format or “Comma Separated Values” (CSV) or both, and open into other programs such as MS Excel. Simply select your preference in the set-up menu.

Self-contained, flexible display modes
The VDM unit is self-contained and operates totally independent from a PC. The 7” color TFT graphic displays multi-channel numerical values, bar-graph and chart-recorder screens. It can be used as a replacement for computerized monitoring packages and recording equipment running a Microsoft operating system and custom application software with poor support.

Data accessibility
A USB port is available for one-to-one communication (key board file transport, etc.), while an RJ-45 connection is available for simple multi-unit networks. A GSM modem sends text messages to notify you that a problem exists. Ethernet communications provide networking for LAN, WLAN, and WAN capabilities. The embedded web server allows for browsing of real time measurements using any standard web browser via a simple password log-in. By assigning the VDM an IP address, monitoring processes becomes as simple as browsing the Internet!
Visual Data Monitor System

The importance of maintaining a master broadcast antenna system ON-AIR needs no explanation.

If the current monitoring equipment for your multi-million-dollar master FM or TV antenna system isn’t keeping a watchful eye over your RF equipment, then you may want to consider replacing it with one that does—an ERI brand VDM system.

ERI’s VDM (Visual Data Monitoring) system provides rapid detection, response, and mitigation of system anomalies that pose threats to your broadcast going OFF-AIR—or even up in smoke!

ERI has put together a standard VDM package, built using world-renowned quality industrial devices, to monitor your antenna, transmission line, and filter/combiner units. The following points highlight some of the VDM’s main features:

Individual VDM units govern over specific areas of a large system. This is accomplished with industrial grade units, which are self-contained systems that monitor your RF equipment without a PC or operating system requirement. The VDM offers numerous and powerful features such as:

1. Generating an on-screen schematic of its affiliated area of concern then associates actual measurements on-screen
2. Collects all information which is then viewable with standard internet browsers
3. Issuing warnings and alarms utilizing multiple means of notification via cell phone text message and Email
4. Generating multiple displays as bar-graphs, digital read-outs, station group charts for comparison and digital snapshots for archiving
5. Providing printable, periodic reports with statistical information
6. Providing time-stamped log of main to auxiliary antenna switch and any abnormal activity detected
7. Warning of system malfunction and then taking mitigative action (provided the action has been activated by an authorized user)
8. Requiring responses to warnings or alarms by an authorized person and then the VDM logs the event

Unit 1 is typically assigned to monitor all aspects of the transmission feed distribution complex with overlay measurement readings. (e.g. FWD/RFL input and output power to a dual feed system, line pressure, temperatures, etc.)

Unit 2 provides for up to ten stations with FWD and RFL input power monitoring needs

The Main-to-Auxiliary Antenna Switch triggers a systematic switching between a primary “main” and a stand-by “auxiliary” antenna. Security measures are taken to ensure that switching is done in the absence of transmitter power. A supplemental power level indicator is placed on the switch panel. All notifications for shutdown and transmitter restart (at reduced power) are conveyed via relay contact closures and recorded in the event log.

The Redundant System Power Supply is backed-up with a battery

A Diagram of your master antenna system showing the layout and location of all transducers is displayed in reproducible (VISIO) wall-mounted graphic.

The Transmitter Interlock Control Unit provides a 1-2-3 shutdown sequence which is activated from VDM alarms or other system-independent devices. Built using discrete modules (e.g. time-delay relays and T-Bar relays).
Sensor Interface Panel with all transducers, regardless of their function, are interfaced via the 4-20 mA protocol panel. The quick disconnect RJ-11 plugs and sockets used throughout the system provide for quick, easy, and inexpensive installation.

Radio Station Barrier Strips are hardwired to global T-Bar warning and alarm relays.

Extra Conic Detectors are interchangeable with any directional coupler found within a system.

**Conic Detector Features**
The use of the Conic Detector simplifies RF monitoring deployment. It attaches to the transmission line’s directional couplers and via a simple 4-20 mA transmission protocol, the Conic Detector sends information to the VDM cabinet (its cable length is unrestricted). Another important feature of the Conic Detector is its internal ability to attenuate a directional coupler’s signal. Built within the Conic Detector is a bank of six switches which allows for up to 30 dB of padding to be applied in ½ dB increments, thus reducing the coupler’s signal to safe levels.

The Pull-Out Tray stores instruction manuals, spare parts and calibration equipment.

Cellular modem and Network Hub provide communication in alarm instances and control/operation from any pc with a web browser.
• Measures and reports on antenna performance
• Monitors several combiner modules in shared master broadcast systems
• Monitors and controls ice detectors and heaters for TV and FM antennas
• Displays and records critical parameters in analog and IBOC systems (i.e. ERI All Pass)
• Monitors antenna pressure and gas flow rate
• Monitors dummy load temperatures using a zone temperature infrared sensor
• Monitors lock-out/tag-out switches and records events into history log
• Calculates and displays VSWR from forward and reflected measured values
• Ideal for monitoring ERI's Master Antenna System patching complexes and power distribution
• Measures the temperature of combiner zones with infrared sensors
• Provides text message and email alerts on triggered alarms and warnings
• Adaptable to pre-existing systems already equipped with directional couplers
• Worldwide, 24/7 help (phone) support for the VDM monitor
• Uses power tested RF diode detectors that are linearized with ERI directional couplers
• Self-contained operation totally independent from a PC
• Built-in web server provides online visualization of operating conditions
• Communicates via Ethernet, RS232/485 and optional GSM/GPRS modem
• Informative brilliant 7"TFT display uses four soft-keys and one control knob
• Displays digital measurements, charts, histograms, bar graphs, and curves
• Channels can be configured as forward or reflected power indicators, temperature, pressure, and more
• Controls up to ten stations with multi-contact form C relays
• Data can be stored for analysis using USB thumb drive or SD card
• Analyzing capabilities for every channel, search for highest and lowest measured values
• Sensors interface with VDM through easily removable connectors
• Can be rack-mounted or mounted using an optional wallmount enclosure cabinet accommodating up to four VDMs
• Auto recycle reset option (“three strikes and you’re out”) interlock control option
• Customized configurable with station call letters and Email addresses
• Generates a displayed system schematic with measured placed values
• Creates and prints reports on a user-set schedule to PC attached printer
• View multiple VDM units on an attached PC and display monitor
• Organizes saved weekly or monthly reports to attached PC hard drive
• Retrieves and saves data in CSV format for Excel presentation
• A PC or keyboard provides an alternative way to set alarm/warning limits
• Site owners can view the operating conditions at all owned sites
• Optional PC provides a back-up for the complete VDM monitor and setup (can be used for restoring operation)
• All relevant information monitored is available at a glance on the large 7” display
• An integrated web server enables remote viewing of instantaneous measured values
• Fast 100 ms scan rate for all channels and a high seep memory cycle of 100 ms with intelligent alarm and limit management
• Information exchange using standard interfaces such as USB and Ethernet
• Modular: simple expansion to 20 channels, 14 digital inputs and 12 relays
• Highest data security: an assigned administrator enables and assigns security
• Alarm and warning management: pertinent events require time stamped acknowledgment before being logged historically
• Records high and low values associated with each measured channel for analysis
• Provides a logged history tracking
• Warns of AC power disruption

Figure 5 VDM Rear View Showing Connector Arrangement of Typical 16 Channel Connector Arrangement

- 1st row of standard connectors: AC Power, 6 Relays, I/O Connections
- 2nd – 6th row: Expansion Relay and I/O Cards, Channel Expansion Cards (i.e. 4 channels per card)
- 7th Row: Standard Communication Ports (i.e. Ethernet, USB, RS232/RS485 and Profibus)