Grass Valley M-2100 SDTV/HDTV Digital Master Control System

Simultaneous control of SDTV and HDTV channels from the same panel
Supports multiple DTV formats:
- SDTV 270 Mbits/sec
- HDTV 1080i, 720p (59.94/60 Hz)

Completely Configurable System for Greater Value
Designed for the Future with True Multichannel Multipanel Functionality
Integrated SqueezeBack™ Effects and Profile® PDR Clip Stacker
Unmatched Digital Audio Capabilities
Extensive, Flexible Keying Functionality
Routing System Interface and Control

The Grass Valley M-2100 Digital Master Control System addresses the requirements of today’s standard definition component digital facilities, as well as emerging high definition broadcast needs. Simple expansion to multichannel, multiformat operation from a single control panel makes the M-2100 system ideally suited for facilities increasing their reach with additional channels and services. In addition to multichannel operation, the system offers extensive keying flexibility, separate and embedded internal digital audio processing, and a wide range of software-enabled options.

Designed as a true multichannel system, the M-2100 prepares your facility for the future. Your configuration options can be as compact as a single audio/video/control (A/V/C) processing frame or as complex as multiple control panels with multiple SDTV and/or HDTV A/V/C processing frames. Up to 16 on-air channels can be controlled from a single panel. Multiple panel operations are efficiently connected via the Manual Control Panel (MCP) network. This means greater facility utilization, increased revenue opportunities, and cost and space savings for your broadcast operations.

The M-2100 system employs component serial digital video processing to provide superior picture quality. The highest possible audio quality is achieved using 48 kHz AES/EBU digital audio processing. The SDTV system incorporates 270 Mbit/s data rates to provide compatibility with 4:3 or 16:9 picture aspect ratios. The HDTV system incorporates 1.485 Gbits/sec rates supporting both 720p and 1080i.

Compatible with Windows® 95 and NT operating systems, the M-2100 is easily configured via a PC-based Graphical User Interface. For multiple frame operations, a single PC with LAN connection can be used to communicate with all frames.

User-Defined Configuration
An economical building block approach lets you configure your M-2100 system with the exact features you want. Later, you can easily upgrade and expand your system as your needs and budget require. Locally enabled options allow you to “try before you buy” many system options.
**SqueezeBack™ Effects available on SDTV and HDTV**

SqueezeBack effects provide an exclusive integrated DVE squeeze and tease effect, positioning and compressing pictures. This allows you to move a picture to a preset location at a user-selectable rate. SqueezeBack effects also open an external background input for promotion of your next event during program credits. This function includes protected setups and operator recalls of four preset positions. By integrating an effects system directly into the M-2100, the need for a separate, costly DVE is reduced.

**Profile Clip Stacker**

Another unique feature of the M-2100 system is the Profile PDR Clip Stacker. Integrated clip stacking offers single point control for viewing, stacking, and playing-to-air of clips stored on a Profile PDR. With integration via an Ethernet LAN, this feature provides linked inputs, clip name transition logging, and clip name and duration displays. Profile PDR control is integrated into the main master control panel for ease of operation.

**Grass Valley Controls**

Familiar Grass Valley button-per-function controls are another M-2100 system exclusive. Color differentiated function areas, large LED displays, and traditional grouped function layout make M-2100 operation a snap. Operators familiar with the industry-standard Grass Valley Master 21 system will quickly pick up the new features and functions.

**Digital Audio Capabilities**

One digital audio module, providing a single AES/EBU 48 kHz digital audio stream, is standard on both the SDTV and HDTV processing frames. This enables Lt, Rt (Left total, Right total) surround sound capability. SDTV processing is scalable from one to four digital audio streams. The SDTV system allows embedded audio processing. This exclusive feature provides greater system flexibility and lower system cost.

The HDTV processing frame allows up to two additional audio processing modules supporting six channels for ultimate AC-3 high quality audio.
Hot Pluggable, Front Removable SDTV and HDTV Modules

We understand your need for uninterrupted reliability, so we have included another Grass Valley exclusive: hot pluggable, front removable modules.

Extensive Keying Capabilities

Extensive, flexible keying capabilities are scalable to meet your system’s needs.

Configure your SDTV system by choosing optional keyer boards that each contain dual luminance linear keyers with Borderline® and drop shadow functionality. Two of the optional keyer boards can be added to your SDTV system allowing four luminance linear keyers. The optional chroma keyer will allow the dual keyer module to become a single luminance linear keyer with chroma keyer.

Configure your HDTV system with dual luminance linear keyer functionality: up to four luminance linear keyers or frame store keyers with single luminance linear keyer in place of one or both of the dual keyer modules.

Software-Enabled Options

A number of optional capabilities can be accessed from the convenience of your own facility. Software options (such as wipe transitions, key borders, SqueezeBack effects, embedded audio processing, transition logging and serial tally) can be unlocked for immediate demonstration or permanently enabled when purchased.

Integration with Grass Valley Series 7000 SD and HD Routing Systems

Any combination of router source selections can be easily accomplished from the 21000-RPS control panel option. For proper transition logging, source names are carried from the Series 7000 assignments to the master control panel displays above the Program bus. Unique attribute programming allows groups of devices with identical control parameters (including parallel or serial control, serial protocols, and preroll times) to have parameters defined and adjusted for the entire group.

Additional M-2100 Options

The M-2100 includes Integrated Machine Control functionality for easier operation. The M-2100 Device Control Engine enables RS-422 serial machine control of up to 30 dedicated or router linked Sony or Ampex protocol VTRs.

Clock Displays of segment and remaining time are displayed on the MCP and can be remotely displayed via a clock driver connection on the back of the panel. Remote Clock Display provides greater flexibility and convenience by allowing viewing from locations around the control room.

As-Aired transition logging, configuration setups, error reporting and diagnostics, chroma keyer setup, and software download are all accessible or configurable from an external PC compatible computer running Windows 95 or NT operating systems.

Open automation protocol enables complete control of the processing frame with or without the MCP.
M-2100 Digital Master Control System

Inputs — SDTV System

Video System
All Inputs — 270 Mbit serial digital, 75 Ω BNC
16 Primary — Pgm, Pst, Aux
4 Key Source
4 Key Fill
1 SqueezeBack Background

Audio System
All Inputs — 48 kHz AES3
16 Primary — Pgm, Pst, Aux
4 Only

External Reference
1 Looping Video Reference — NTSC/PAL color black
1 Terminating Audio Reference — 48 kHz clock/signal
1 Timecode Input — Longitudinal TC (LTC)

Inputs — HDTV System

Serial Digital Video
Type of Connectors — 75 Ω BNC, (SMPTE 292M)
Cable Equalization — Automatic for up to 100 meters of Belden 1694A @ 1.5 Gbps
Return Loss (1 Mhz to 1500 Mhz) — 15 dB minimum

External Reference
Tri Level Sync (SMPTE 240M) 59.94HZ/60HZ
Connector — 75 Ω BNC, looping
Nominal Amplitude — ± 300 mV pp
Line Rate — 1080i: 33.7 KHz, 720p: 45 KHz
1 Terminating Audio Reference — 48 kHz clock/signal

Outputs — SDTV/HDTV Systems

Video System
All Outputs
75 Ω BNC
2 Program
2 Look Ahead Preview
2 Clean Feed
4 Aux Buses with Dual Outputs

Audio System (per module)
All Outputs — 48 kHz AES3
2 Program
2 Preset
2 Clean Feed
4 Aux Buses with Dual Outputs
Monitoring Outputs
1 Monitor #1
1 Monitor #2
Meter Drives
1 Program
1 Preset
1 Off-Air

HDTV Video Standards

1080i — 59.94/60 Hz (SMPTE 274M)
720p — 59.9/60 Hz (SMPTE 296M)
(Switch selectable)

Interfaces

Processing Frame
GPI — Fully configurable 4 inputs/12 outputs, each with individual removable “phoenix” connectors
Alarms — 4 dry contact programmable
Router Control — RS-422 9-pin female “D” connector
Automation Control — RS-422 9-pin female “D” connector
Tally Expansion Port — RS-422 9-pin female “D” connector

Manual Control Panel
Alarms — 2 dry contacts

Timecode Outputs
2 XLR Connectors
Segment and Remaining

Physical Dimensions

Manual Control Panel (SDTV/HDTV)
Height 15.5 cm 6.12 in.
Width 68.5 cm 27.0 in.
Depth 43.8 cm 17.25 in.
Weight 21.8 kg 48 lb

SDTV Processing Frame
Height 26.0 cm 10.25 in.
Width 48.26 cm 19.0 in.
Depth 47.0 cm 18.5 in.
Weight 25.45 kg 56 lb

HDTV Processing Frame
Height 26.67 cm 10.5 in.
Width 48.26 cm 19.0 in.
Depth 47.0 cm 18.5 in.
Weight 26.31 kg 58 lb

HDTV Crosspoint Matrix
Height 18.0 cm 7.0 in.
(4 RU)
Width 43.0 cm 17.0 in.
Depth 49.0 cm 19.25 in.
Weight 17.69 kg 39 lb

Power Consumption

SDTV Frame
400 W (maximum)
200 W (typical)

HDTV Frame
400 W (maximum)
300 W (typical)

Control Panel
200 W (maximum)
100 W (typical)

Environmental Characteristics

SDTV and HDTV Systems
Note: The frame requires forced air cooling. Use of SMS7000 fan assemblies is suggested.

Operational Temperature
0° to 40° C
(32° to 104° F)

Storage Temperature
-25° to 85° C
(-13° to 185° F)

Full Specifications Met At:
20° to 30° C
(68° to 86° F)
After 30 minute warm-up

Relative Humidity
Up to 95% (non-condensing)
**Warranty**

Products offered by Tektronix are manufactured to provide the highest level of reliability and performance. Tektronix warrants these products against defects in materials and workmanship in accordance with the warranty statement applicable with each product. If any product fails during the warranty period, Tektronix will provide the remedy set forth in the applicable warranty. A copy of the warranty applicable to a particular product offered by Tektronix may be obtained from your nearest Tektronix office.

**Technical Support**

Time is money. Tektronix Customer Services saves you both — with a comprehensive portfolio of software and hardware support services designed to ensure maximum performance from your Tektronix Video and Networking Products. Services include Installation Services, Complimentary Support, Advance Exchange, Technical Phone Support, Extended Services, On-Site Support, Customer Training and Software Maintenance. Financing options available. Custom service packages can be developed to meet specific organization and system needs.

**Additional Information**

For additional information on these products, please request the following literature:

- M-2100 Ordering Guide (2WW-9302)
- M-2100 Installation Planning Guide (2WW-9303)
- M-2100 Poster (2WW-9355)