SIMLATUS

HD-212

2 x 2 Digital Protection Switch

Simlatus Corporation
175 Joerschke Drive, Suite A
Grass Valley, CA 95945
Phone: 530-205-3437 Fax: 530-273-8482
sales@simlatus.com
www.simlatus.com

SIMLATUS

Statement of Warranty

Simlatus Corporation warrants its products for a period of three (3) years from the date of shipment to be free from defects in materials and workmanship and meets applicable published specifications. Equipment which has been operated within its ratings and has not been subjected to mechanical or other abuse or modification by the purchaser, its agents, and/or employees, will, at the option of Simlatus, be replaced or repaired if it is returned, freight prepaid, to Simlatus. Equipment that fails under conditions other than described herein will be repaired at the price of components and labor in affect at the time of repair.

This warranty is in lieu of all other warranties, expressed or implied, with respect to the condition or performance of any Simlatus product, its merchantability or fitness for a particular purpose. Simlatus Corporation is not liable for any consequential damages.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area could cause harmful interference in which case the user will be required to correct the interference at his own expense.

Copyright

May 2016
Part Number **71-0038**

Table of Contents

Important Safeguards and Notices

Information on the following pages provides important safety guidelines for both Operator and Service personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear here. Please read and follow the important safety information, noting especially those instructions related to risk of fire, electric shock or injury to persons.

WARNING

Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Symbols and Their Meaning in This Manual

The lightning flash with arrowhead symbol, within an equilateral triangle, alerts the user to the presence of “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This symbol represents a protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.

The fuse symbol indicates that the fuse referenced in text must be replaced with one having the ratings indicated.

Important Warnings and Cautions

Warnings

- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water.
- Disconnect ac power before installing any options.
- This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting the product inputs or outputs.
- Route power cords and other cables so that they are not likely to be damaged.
- Disconnect power before cleaning. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.
- Do not wear hand jewelry or watches when troubleshooting high current circuits, such as the power supplies.
- During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.
- To avoid fire hazard, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacements to qualified service personnel.
- To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.
- Have qualified personnel perform safety checks after any completed service.

Warnings (continued)

- If equipped with redundant power, this unit has two power cords. To reduce the risk of electrical shock, disconnect both power supply cords before servicing.
- This equipment may employ laser(s). If it does, they comply with the current construction requirements of the code of Federal regulations, title 21, chapter I, subchapter J, sections 1010.2 and 1010.3 and sections 1040.10 and 1040.11.
- Do not attempt to view light output of the laser transmitter, eye damage may result. Always use an optical power meter to verify laser output.
- To prevent injury:

  Never install telephone wiring during a lightning storm.

  Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

  Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

  Use caution when installing or modifying telephone lines.

Cautions

- When installing this equipment, do not attach power cord to building surfaces.
- To prevent damage to equipment when replacing fuses, locate and correct the trouble that caused the fuse to blow before applying power.
- Verify that all power supply lights are off before removing power supply or servicing equipment.
- Use only specified replacement parts.
- Follow static precautions at all times when handling this equipment.

Cautions (continued)

- Leave the back of the frame clear for air exhaust cooling and to allow room for cabling. Slots and openings in the cabinet are provided for ventilation. Do not block them.
- Front door is part of fire enclosure and should be kept closed during normal operation.
- This product should be powered on as described in the manual. To prevent equipment damage select the proper line voltage at the ac input connector as described in the Installation documentation.
- To prevent damage to this equipment read the instructions in this document for proper input voltage range selection.
- To reduce the risk of electric shock, ensure that the two power supply cords are each plugged into a separate branch circuit.
- Circuit boards in this product are densely populated with surface mount and ASIC components. Special tools and techniques are required to safely and effectively troubleshoot and repair modules that use SMT or ASIC components. For this reason, service and repair of RJM products incorporating surface mount technology are supported only on a module exchange basis. Customers should not attempt to troubleshoot or repair modules that contain SMT components. RJM assumes no liability for damage caused by unauthorized repairs. This applies to both in- and out-of-warranty products.

North American Power Supply Cords

This equipment is supplied with molded grounding plug (NEMA 5-15P) at one end and molded grounding connector (IEC 320-C13) at the other end. Conductors are CEE color coded, light blue (neutral), brown (line) and green/yellow (ground).

Operation of this equipment at voltages exceeding 130 VAC will require power supply cords which comply with NEMA configurations.

Note:

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference, in which case the user will be required to correct the interference at his own expense.

SECTION 1

HD-212

General description

The Simlatus HD-212 functions as an input transfer system that can switch between two high definition or SDI digital video input signals, A and B. This is accomplished automatically using the internal signal detect, or manually using either the local or remote select A/B switch. A transfer module occupies one-half of a 1RU frame. The 1RU frame is designed to house a maximum of two RTU units. Each unit operates independently from the other. They do share a common power supply.

The frame has space for two power supplies for redundancy, with the output of the supply voltage diode OR'd on the main module with the output of the other supply. Each supply has its own AC line connection. If either supply fails or its AC line fails, then the other supply will keep the unit running.

The switchover is determined by the presence of video on the in-use video input. If video is interrupted on the selected (in-use) input and if video is present on the non-selected input, then a switch to the non-selected input will occur. If no video is present on the non-selected input then no switch will occur. In the digital HD-212 loss of video is not the loss of the data stream, but actually the loss of the SMPTE TRS (EAV-SAV). The presence/absence detector can be set to SD-only, HD-only or AUTO detection of either. When in the AUTO mode, the unit will also detect DVB-ASI.

A toggle switch is provided on the module to allow the unit to operate in either automatic or manual mode. The unit can be operated manually at any time by pushing the red button located inside the hole in the front cover, or by providing an external GPI closure to ground.

Once a switchover has been completed from one input to the other, the system will not automatically return to the first input upon restoration of signal. If it is desired that the unit be operated from that first source, then the return must be accomplished manually. This is true if the switch has occurred from the B input to the A input. If the switch has occurred from input A to input B, then there is an additional feature that allows the unit to return-to-A upon re-activation of the A signal.

Upon loss of power to the changeover unit or the removal of the processor module, relays are provided that will allow the A Input signal to be re-routed to the #1 On-Line output, thereby bypassing the changeover function.

The video inputs terminate in 75 ohms.

When power is applied, the A signal input is selected as the default mode.

The output of the HD-212 can be either the A or B input. There are three 75Ω BNC connectors for the On-Line output and one BNC connector for the Off-Line output.

There is an EXT CONTROL connector, which is a female 9 pin 'D'. The External Control provides for external A/B transfer and also A/B signal and power supply health monitoring of the HD-212. Refer to page 9 for the proper pinout.

A second EXT CONTROL connector is provided, which is an RJ-45. This connector is only utilized if the optional Ethernet Interface module is included. The connector provides a path from the interface module to an external network connection.

SECTION II

HD-212

Specifications

Video:

Inputs:

Number	2
Input type	75Ω, BNC per IEC 169-8
Signal level	800mV ±10%
Return loss	>13dB at 270Mb
Data rate	270Mb or 1.485Gbps
Equalization	Automatic >300 meters Belden 1694A @270Mb >100 meters Belden 1694A @1.485Gbps

Outputs:

Number	3 – On-line 1 – Off-line
Impedance	75Ω, BNC
Signal level	800mV ±10%
Return loss	>15dB at 270Mb

Specifications:

Jitter	HD – 125ps SDI – 150ps

Temperature:

Performance	0 to 40 degrees centigrade
Operating	0 to 50 degrees centigrade
Humidity	90% non-condensing

Power requirements: 115/230VAC, 50/60 Hz, 20W

Size: 1.75” x 19” x 10”

Weight: ≈7 lbs 3 kg

* Specifications and design are subject to change without notice.

SECTION III

HD-212

Installation

The HD-212 input transfer unit is a one rack-unit frame designed to be mounted in a standard 19" equipment rack. There are no special cooling requirements though care should be taken to ensure that extremely hot equipment not be installed directly beneath. It is also recommended that, if possible, one rack-unit of space be left above the unit.

Unless specified at the time of order, the HD-212 is shipped from the factory for nominal 117VAC 60Hz power. The unit comes shipped with a 120V type AC plug. If it is desired to operate at 230VAC 50Hz, a selector switch must be set on the power supply. The supply is removed from the frame, the switch set to 230VAC, and the supply replaced in the frame.

The two HD/SDI video inputs A and B are internally terminated at 75Ω. The On-Line and Off-Line outputs are 75Ω. Unused outputs should be terminated with precision 75Ω terminations.

Switches and jumpers

When the unit is in the automatic mode, if the signal fails on the A input the unit switches to the B input. A rotary switch **(SW4)** is provided on the module to allow the user to define whether the unit returns to the A input upon return of the A signal or that the unit remains on the B input until it is manually returned to the A input. The return-to-A-signal mode can be delayed by an adjustment of this switch from position 1 to 5 to allow from 1 to 5 seconds after the return of the A signal before the unit switches back to the A input. The zero (0) position of the switch defeats the return function and dictates that the signal remain-on-B after a switchover. The switch is set at the factory for 0 (do not return) operation.

A toggle switch **(SW2)** is located near the front of the module. This switch permits selection of the unit in either the automatic (AUTO) or manual (MAN) mode of operation. Placing the switch in the DOWN position places the module in the AUTOMATIC mode of operation. Placing the toggle switch in the UP position places the module in the MANUAL mode.

The HD-212 can automatically detect whether the input signals are HD or SDI. A 4-pin jumper **(JP1)** is provided to allow the unit to automatically or manually set the standard. If the jumper is placed between pins 1 & 2, the standards detection will be automatic. Placing the jumper between pins 2 & 3 will set the unit to SD only and placing the jumper between pins 3 & 4 will set the unit to HD only. The jumper is set at the factory to AUTO.

The 6-pin header **(JP2)** is for factory use only.

LED lamps are provided on the module to provide certain operating indications. Each LED block contains three lamps. In all cases the center lamp is not used. D301 indicates the presence of the A signal and the B signal. It can be viewed through light pipes in the front cover of the frame. D302 indicates whether the A input or the B input is on-line. This also can be viewed through light pipes in the front cover of the frame. Elements of D303 indicates the presence of +5 volts from each of the two on-board +5V regulators. The front cover must be removed to observe these LEDs.

Reset Default Settings

The Ethernet Processor module can be restored to factory default settings. To accomplish this, proceed as follows:

1. Remove the RTU module from the frame.
2. Along the left-hand side of the module, locate the black jumper at **JP1**.
3. Remove the jumper.
4. Just to the left of the Ethernet Processor sub-module, locate a 2-pin header **JP3**.
5. Place the black jumper on **JP3**.
6. Re-insert the RTU module in the frame and allow it to power up.
7. Remove the module and remove the jumper from **JP3**.
8. Replace the jumper on **JP1**.
9. Replace the RTU module in the frame.
10. The IP address will return to the default number. The processor must be re-programmed with the appropriate IP address.

SECTION IV

HD-212

Circuit Description

Video Path:

Each of the two inputs (A & B) connects to an automatic cable equalizer (U101 & U201), which compensates for high frequency cable attenuation. Each equalizer output connects to the input of two Gennum 1560 de-serializers (U103 & U203). Each 1560 has two inputs; one from each of the equalizers. The 1560 locks an oscillator (U102 & U202) to the input data stream, and also detects and locks to SMPTE TRS framing words in the signal. It then outputs a LOCK signal when a valid input signal is present. The 1560 also re-clocks the serial data and outputs a regenerated serial stream.

One 1560 drives the on-line output drivers (U1 & U2) and the other drives the off-line output driver (U3).

Logic:

A Xilinx CPLD (U205) contains all logic to switch the Gennum 1560 inputs to the proper output, based on the LOCK (video present) signals. The CPLD outputs status information to the front panel LEDs, the remote control connector and the Ethernet interface, if installed.

Status Outputs:

Status is available for different functions on the External Control GPI connector. Each output is an open collector output. There are five such outputs. The first one is A input health and A video present, which will go to a high state if input health is bad or video is not present. The second output is the same as the first but for the B input health and B video present. The third output indicates the health of the power supplies in the frame. If either supply goes down then the output goes high. The fourth status output is for switch selection status. A low on this output indicates that the A input is selected and a high indicates that the B input is selected. The final output indicates that a switchover has occurred. It provides a momentary low. An external alarm can be connected to this output.

Power Supply / Regulators:

The unregulated voltage to the voltage regulators on the main board comes from either of two power supplies that can be removed at the front of the RTU frame for service and replacement. Each unregulated supply has an input fuse and a 115/230VAC selector switch, and contains the circuitry that monitors the positive output. A dual color LED on the front of the power supply displays its health. Green indicates normal operation, or healthy condition. Red indicates either no AC present, or a problem with that supply. The output of the supply is diode OR'd to its respective supply bus.

There are four regulators on the main board. U401 regulates the +5 volts from power supply A, U402 the +5 volts from power supply B. The two outputs are diode OR'd to provide the main +5 volts to the module. U403 regulates the +3.3 volts and U404 regulates the +1.8 volts.

The outputs of U401 and U402 are fed to separate voltage monitors, U405 and U406. The outputs of these monitors are connected together and provide the PS Health signal to the External Control connector.

SECTION V

HD-212

Diagrams

External Control Connector Pin Assignments

HD-212
EXTERNAL CONTROL CONNECTOR
9-PIN 'D'

1	Power Supply Health (Low = Healthy)
2	Input B Video Present/Input Health (Low = Video Present and Input Healthy)
3	Switch-occurred Alarm (Momentary Low)
4	Select Input A (Active Low, Momentary Pulse)
5	GND
6	Input A Video Present/Input Health (Low = Video Present and Input Healthy)
7	Input Selection Status (Low = Input A Selected)
8	n/c
9	Select Input B (Active Low, Momentary Pulse)

SECTION VI

HD-212

Ethernet Interface

A core processor is included to allow the HD-212 to communicate through an Ethernet interface to an external control device. This communication allows for status monitoring and switchover control.

The installation consists of installing the processor sub-module into the mating connector on the HD-212 with the RJ-45 facing forward. Then connect the supplied cable between the RJ-45 connector on the processor sub-module and the RJ-45 connector on the HD-212.

The jumper **(JP3)** is provided to reset the processor to the default parameters.
To reset, remove the module from the frame, short the two pins on JP3 and plug the module into the frame. This will reset the processor. Remove the module and remove the short to return to normal operation.