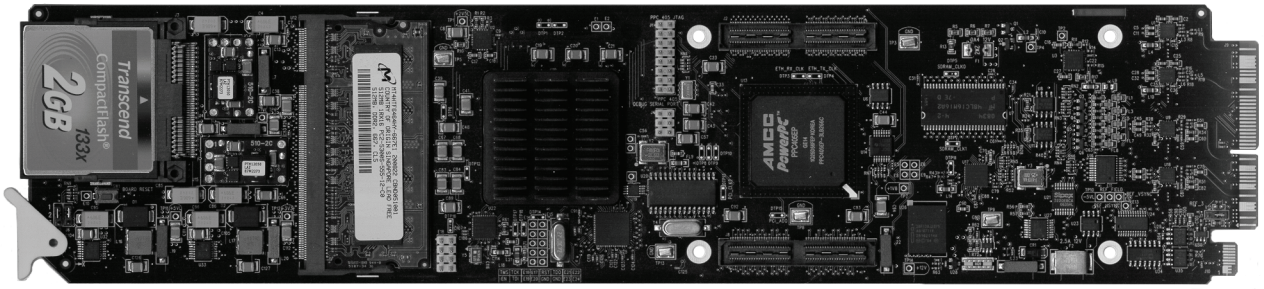
Ross Video Limited

MDK-111A-M and MDK-111A-K

Multi-Definition Digital Keyers
Owner's Manual



ROSS
Live Production Technology

openGear

MDK-111A-M and MDK-111A-K • Multi-Definition Digital Keyers Owner's Manual

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Before using this product and any associated equipment, refer to the "**Important Safety Instructions**" listed below to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.

Warning — *The symbol with the word "**Warning**" within the equipment manual indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*

Caution — *The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

Notice — *The symbol with the word "**Notice**" within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.*

ESD Susceptibility — *This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.*

Important Safety Instructions

Caution — *This product is intended to be a component product of the DFR-8300 series frame. Refer to the DFR-8300 series frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.*

Warning — *Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cards from the chassis' rear appliance connectors before servicing this area.*

Warning — *This product includes an "Ethernet Port" which allows this product to be connected to a local area network (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.*

Warning — *Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cards from the chassis' rear appliance connectors before servicing this area. Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.*
This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.
To reduce the risk of fire, replacement fuses must be the same time and rating.
Only use attachments/accessories specified by the manufacturer.

EMC Notices

United States of America
FCC Part 15

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 is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.*

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appariel numerique de la classe "A" est conforme a la norme NMB-003 du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.

Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Maintenance/User Serviceable Parts

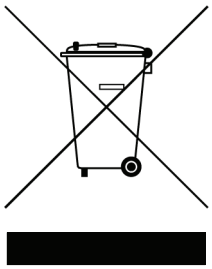
Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All openGear products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.

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Contents

Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagrams
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on your purchase of the Ross Video MDK-111A-M or MDK-111A-K Multi-Definition Digital Keyer. The MDK-111A-M and MDK-111A-K are part of a full line of Ross Video digital products which are backed by over 25 years of engineering and design expertise. You will be pleased at how easily your new card fits into your overall working environment. Equally pleasing is the product quality, reliability, and functionality.

Should you have a question pertaining to the installation or operation of your MDK-111A-M or MDK-111A-K, please contact us at the numbers listed in the section "**Contact Us**" located at the back of this manual. Our technical support staff is always available for consultation, training, or service.

Overview

The MDK-111A-M and MDK-111A-K are high quality HD/SD-SDI video keyers with four internal static/animation playout channels and one external key/alpha channel. An excellent device for keying external devices such as character generators, graphic systems and EAS devices into a program feed and/or keying with four internal logo channels. The built in bypass relay from Input A to Output 1 protects your on-air feed when the device is taken off-line and ensures critical program content is not lost.

The card offers full key control with shaped and unshaped keying, self key or auto key, and gain and clip control. The Background A and B inputs allows for background dissolves and V-Fades behind the external key source. All four inputs have line synchronization, locked to an external analog reference, to ease system timing requirements. Four independent outputs for Program, Preview, and Clean Feed offer independent Proc-Amp control with Fade to Black capability.

The card processes embedded audio on the Background A and Background B inputs. Any audio groups present on the inputs are carried through to the outputs. During transitions, the audio ramps smoothly between A and B sources, matching the video transition.

The card offers a wide range of control that includes M-2100 serial control, and full DashBoard control and monitoring. Eight bi-directional GPI/O ports are also available which can be programmed for GPI inputs or Tally outputs.

The MDK-111A-K offers four background inputs and four internal static/animation playout channels. The four internal keyers are dedicated, one to each of the four program outputs.

Features

The following common features are included for both cards:

- Compliance with SDI SMPTE 292M (1.485Gbps) and SMPTE 259M (270Mbps)
- Four separate stills/animations in use at any time (Logos 1 to 4); each logo may also have an optional Alpha channel (Alpha 1 to 4)
- Supports RossLinq™ for uploading still images from XPression™ to the Logo channels
- 2GB of DDR playout memory with support for TGA, PNG and JPG formats
- Multi-Definition support of popular formats such as 1080i, 720p, 480i, and 576i
- Eight bi-directional ports that are user programmable to be a GPI or a Tally
- Bypass relay from BKGD A (BNC 3) to Output 1 (BNC 5)
- User selectable card analog reference
- Supports SMPTE 12M Linear Timecode (LTC) on the serial port or via the GPI port
- Specify how the input signal timing is reported (relative to the reference or the output)
- Report status and configuration remotely via the DashBoard Control System™
- Remote serial control of the card using the M2100 protocol
- Ethernet 10/100 Mbit connectivity for easy upgrades in the field
- Independent Proc-Amp control on outputs
- Support keyer controls such as clip and gain, key invert, box mask, and transparency
- Supports SNMP alarms for the input and reference signals
- Fully compliant with openGear specifications and installs in the DFR-8321 series frames
- 5 year transferable warranty

MDK-111A-M Features

In addition to the common features listed above, the MDK-111A-M also includes:

- A/B Mix, V-Fade, Take-Fade, Fade-Take or Cut with external key
- Four SDI inputs that include two background inputs (A, B), External Key Video, and External Key Alpha
- Fade to Black function
- Four SDI outputs that may be configured as PGM, Preview, or Clean Feeds
- Passes audio, on the Background, to the Program and Preview outputs

MDK-111A-K Features

In addition to the common features listed above, the MDK-111A-K also includes:

- Four SDI inputs (Background A to D) allow you to input four background sources into the MDK-111A-K
- One internal keyer for each of the four program outputs

Functional Block Diagrams

This section includes the block diagrams for the MDK-111A-M and MDK-111A-K.

MDK-111A-M Functional Block Diagram

The MDK-111A-M is a single card broadcast quality digital keyer designed specifically for broadcast or production situations. **Figure 1.1** is a functional block diagram of the MDK-111A-M.

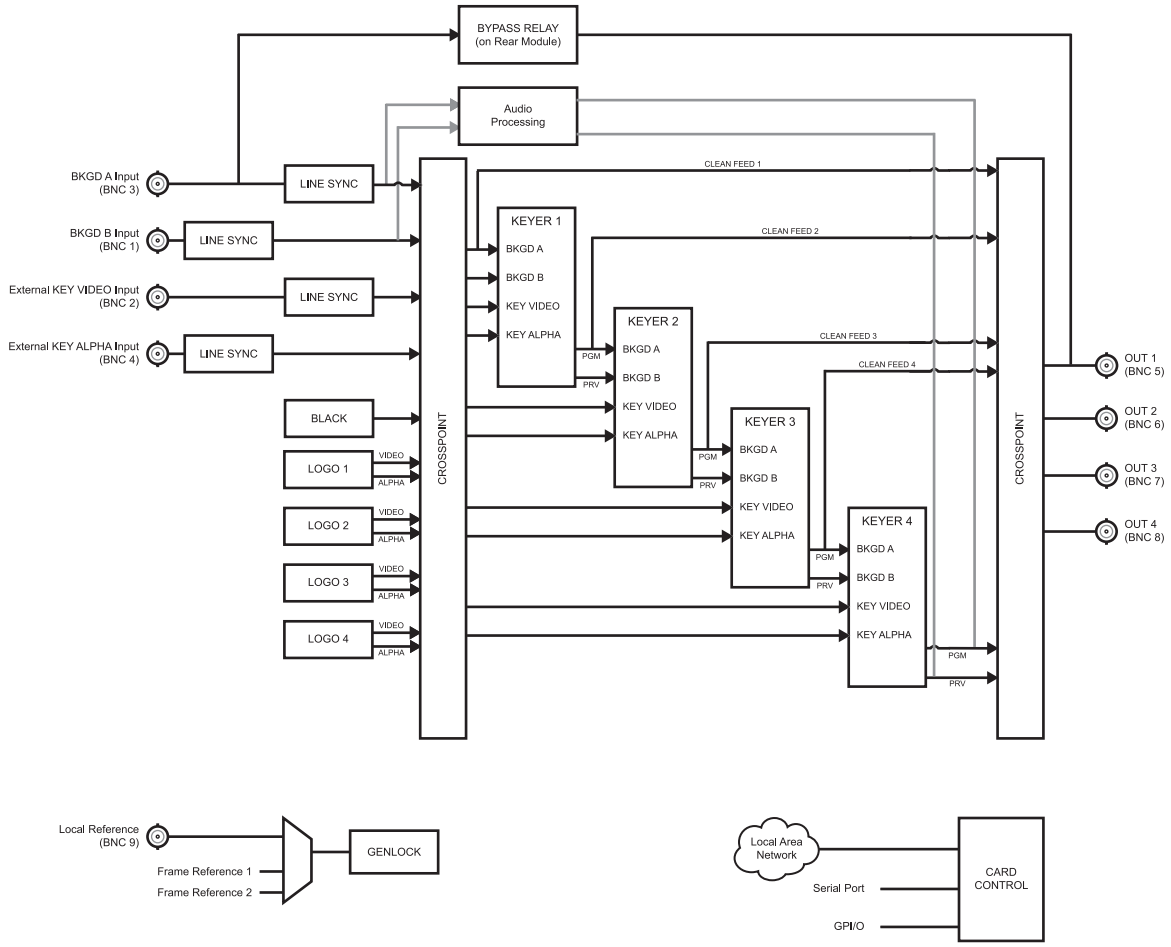


Figure 1.1 *MDK-111A-M Block Diagram*

MDK-111A-K Functional Block Diagram

The MDK-111A-K is a single card broadcast quality digital keyer designed specifically for broadcast or production situations. **Figure 1.2** is a functional block diagram of the MDK-111A-K.

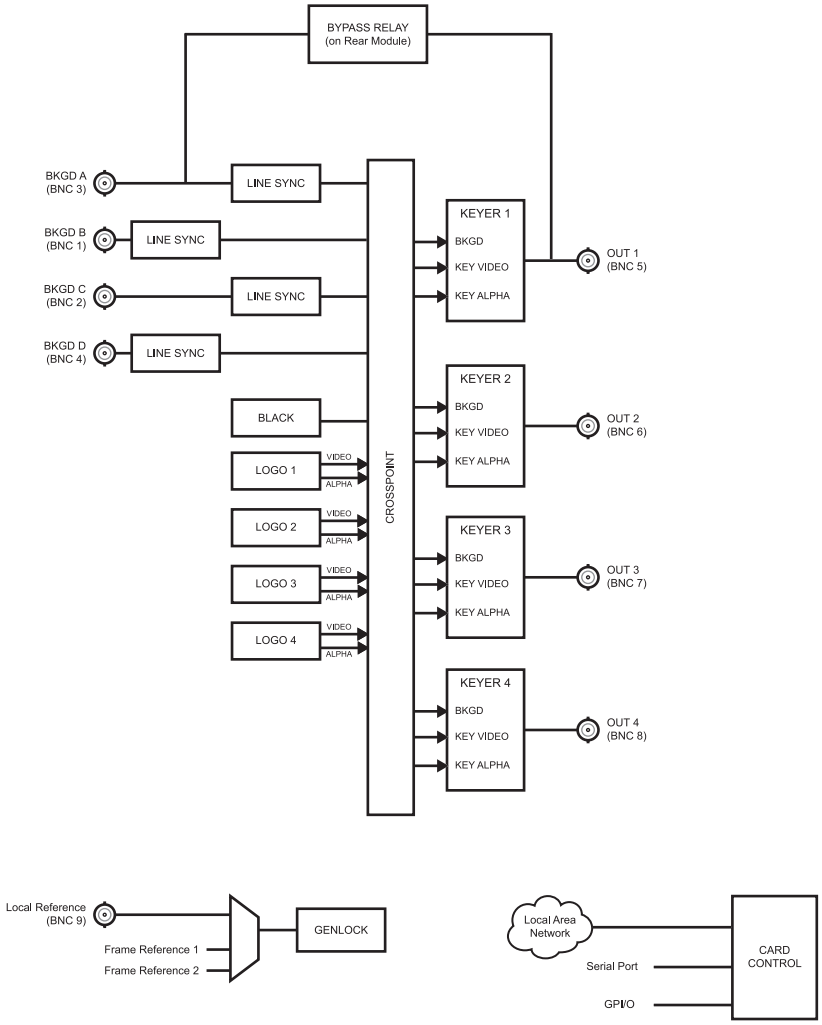


Figure 1.2 *MDK-111A-K Block Diagram*

Documentation Terms and Conventions

The following terms are used throughout this manual:

- All references to the **DFR-8321 series frames** also includes all versions 20-slot (DFR-8321) frames and any available options.
- "**Auto Select Key**" is a key in which two video signals are required to insert the key. The Key Alpha is used to cut the hole in the video and Key Video is used to fill the hole.
- "**Board**" or "**Card**" refers to both the MDK-111A-M and the MDK-111A-K, including all components and switches unless otherwise noted.
- "**DashBoard**" refers to the DashBoard Control System™.
- "**LTC**" and "**Timecode**" both refer to Linear Timecode unless otherwise noted.
- "**Multiple Transition**" refers to a transition between both the Background sources and the Key sources simultaneously.
- "**Operator**" and "**User**" refers to the person who uses the MDK-111A-M.
- "**Self Key**" is a key in which the luminance, or brightness, values of the key source is used as the alpha for the key.
- "**System**" and "**Video System**" refers to the mix of interconnected digital and analog production equipment in which the MDK-111A-M and MDK-111A-K operate.

Installation

In This Chapter

This chapter provides instructions for the basic physical installation and communications setup of your MDK-111A-M and MDK-111A-K.

The following topics are discussed:

- Before You Begin
- Card Overview
- Card Installation
- Cabling
- Serial Port Cabling
- Ethernet Port Cabling
- GPI/Tally Cabling
- Linear Timecode Cabling

Before You Begin

Before you begin, ensure that you are using DashBoard version 3.0.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.

Static Discharge

Throughout this chapter, please heed the following cautionary note:

ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking

Unpack each card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Card Overview

This section provides an overview of the MDK-111A-M and MDK-111A-K components.

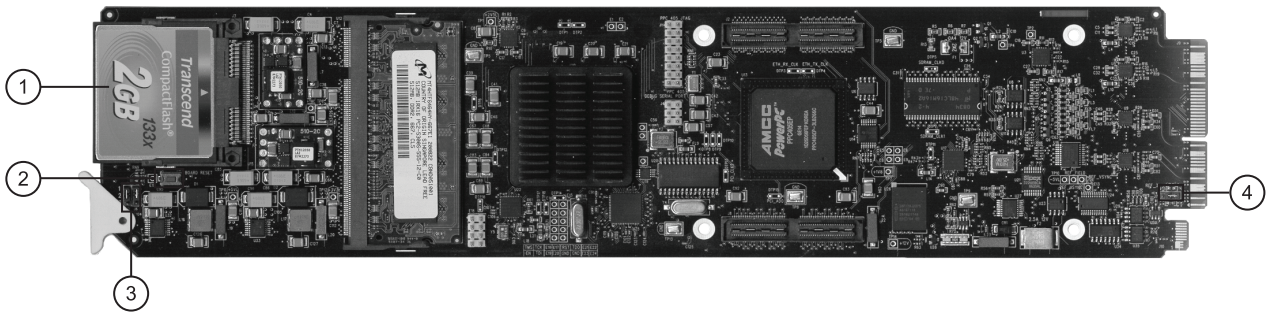


***Figure 2.1** Components*

1) CompactFlash® Card	3) JP5, JP6
2) Board Reset Button (SW1)	4) Reference Termination (JP7)

1. CompactFlash® Card

The CompactFlash card provides 2GB of flash memory to administer media files, such as stills and animations, for the MDK-111A-M and MDK-111A-K.

2. Board Reset Button (SW1)

Pressing this button resets the microprocessor and re-initializes the card. This is a hard reset of the card and settings are not saved. This may cause loss of data and should only be performed as advised by Ross Video Technical Support.

3. JP5, JP6

These jumpers are not yet implemented and must be left in the default position of Pin 2 (center) and Pin 3 (bottom).

4. Reference Termination (JP7)

J7 is a 3-position jumper block used to configure the 75ohm termination on the local analog reference input on **BNC 9** of the Rear Module.

- **Pin 1** (left) + **Pin 2** (center) position — In this position, the analog reference is terminated with an 75ohm resistor. This configuration is to be used for point-to-point cabling, or on the last card of a daisy chain topology. This is the default position (**Figure 2.2**).

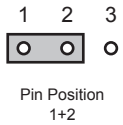


***Figure 2.2** J7 — Default Position*

- **Pin 2** (center) + **Pin 3** (right) position — In this position, the 75ohm terminator is removed and the analog reference is not terminated. This configuration is used in a daisy chain cabling topology where only the last card is to be terminated.

Card-edge LEDs

This section describes the card-edge LEDs. **Figure 2.3** outlines the locations of the card-edge controls.

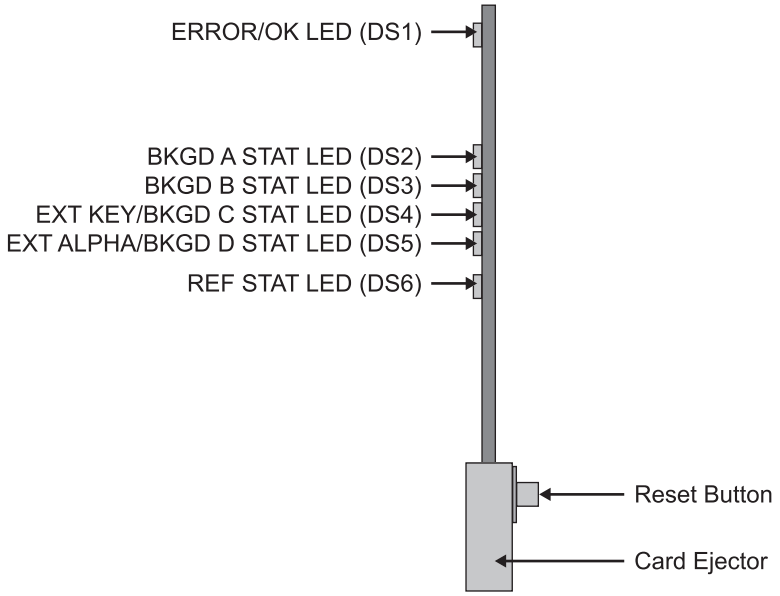


***Figure 2.3** Card-edge Controls*

Table 2.1 LEDs on the Card-edge

LED	Color	Display and Description
ERROR/OK	Green	When this LED is green, the card is in normal operation with no errors.
	Red	When this LED is red, the card is experiencing internal errors.
	Off	When this LED is off, there is no power to the card.
BKGD A STAT	Green	When this LED is green, the BKGD A video input is valid.
	Red	When this LED is red, the BKGD A input is not present or is invalid.
BKGD B STAT	Green	When this LED is green, the BKGD B video input is valid.
	Red	When this LED is red, the BKGD B input is not present or is invalid.
EXT KEY/ BKGD C STAT	Green	When this LED is green, the external Key Video input is valid.(MDK-111A-M only) When this LED is green, the BKGD C input is valid. (MDK-111A-K only)
	Red	When this LED is red, the external Key Video input is not present or is invalid (MDK-111A-M only) When this LED is red, the BKGD C input is not present or is invalid. (MDK-111A-K only)
EXT ALPHA/ BKGD D STAT	Green	When this LED is green, the external Key Alpha video input is valid.(MDK-111A-M only) When this LED is green, the BKGD D input is valid. (MDK-111A-K only)
	Red	When this LED is red, the external Key Alpha video input is not present or is invalid.(MDK-111A-M only) When this LED is red, the BKGD D input is not present or is invalid. (MDK-111A-K only)
REF STAT	Green	When this LED is green, the reference signal is valid.
	Red	When this LED is red, the reference signal is not present or is invalid.

Card Installation

This section provides a brief overview of the required Rear Modules and physical installation of the MDK-111A-M and MDK-111A-K cards.

Note — *If possible, do not block the ventilation holes on the top of the DFR-8321 series frame that houses the MDK-111A-M and MDK-111A-K. A 1RU open space above the DFR-8321 series frame gives the maximum air cooling and allows the frame filled with MDK-111A-M and MDK-111A-K cards to operate at the maximum ambient temperature of 40°C. If these holes are blocked, then the maximum operating ambient temperature must be de-rated from 40°C to 35°C.*

Rear Modules

When installing the card in the DFR-8321 series frame, the **8320AR-033** Rear Module is used.

Note — *The 8320AR-033 Rear Module occupies four slots in the DFR-8321 series frame.*

Power Fail Relay

There is a power fail relay from the BKGD A input to Output 1 on the Rear Module. The purpose of this relay is as follows:

- When the card is removed from the frame, the relay passes video from the BKGD A input to the Output 1 of the card. This allows the card to be serviced without interrupting the video signal.
- If the card loses power, or the frame loses power, the video still passes through.
- When the card boots, the relay will be left in Bypass mode until the card can generate a valid output. Once the card is up and functional, the relay is disabled.

Installing a Rear Module

If the Rear Module is already installed, skip this section.

Use the following procedure to install a Rear Module in an DFR-8321 series frame:

1. Refer to the ***DFR-8300 Series User Manual*** to ensure that the frame is properly installed according to instructions.
2. Remove the Blank Plates from the rear of the selected card frame slots.
3. Seat the bottom of the Rear Module in the seating slot at the base of the backplane of the frame.
4. Align the top hole of the Rear Module with the screw hole on the top-edge of the frame backplane.
5. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the backplane. Do not over tighten.
6. Verify whether your Rear Module Label is self-adhesive by checking the back of the label for a thin wax sheet. You must remove the wax sheet before affixing the label.
7. Affix the supplied Rear Module Label to the BNC area of the Rear Module.

8. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank Plates.

Note — *Verify that the card aligns with the Rear Module before fully tightening any of the slot screws.*

This completes the procedure for installing a Rear Module in the DFR-8321 series frame.

Installing a Card

Use the following procedure to install the card in a DFR-8321 series frame:

1. Ensure that the DFR-8321 series frame is properly installed.
2. Ensure the Rear Module is properly installed.
3. Hold the card by the edges and carefully align the card edges with the rails in the frame.
4. Fully insert the card into the frame until the card is properly seated in the Rear Module.

This completes the procedure for installing the card in a DFR-8321 series frame.

Cabling

The MDK-111A-M and MDK-111A-K features four video inputs and four programmable video outputs. You can use up to 80m of industry standard 75ohm coaxial cable. This section provides general instructions for video input and output cabling the Rear Module for the cards.

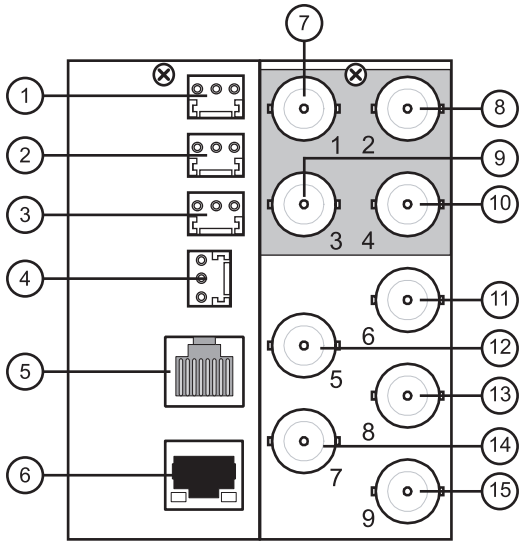


***Figure 2.4** 8320AR-033 Cable Connections*

1) GPI/O 1,2 Port	6) Ethernet 10/100 Port	11) OUT 2 BNC Connector
2) GPI/O 3,4 Port	7) BKGD B BNC Connector	12) OUT 1 BNC Connector
3) GPI/O 5,6 Port	8) EXT KEY/BKGD C BNC Connector	13) OUT 4 BNC Connector
4) GPI/O 7,8 Port	9) BKGD A BNC Connector	14) OUT 3 BNC Connector
5) Serial COM Port	10) EXT ALPHA/BKGD D BNC Connector	15) REF IN BNC Connector

Video Input and Output Cabling

Refer to **Figure 2.4** and the Rear Module label for cabling designations.

Use the following procedure to connect video input and output cables to the Rear Module:

1. Connect the appropriate input video sources to the BNC connectors on the Rear Module. Note that if you are using an MDK-111A-M:
   - Connect the Background video signals to the BNC 1 and BNC 3.
   - Connect the External Key Video signal to BNC 2.
   - Connect the External Key Alpha signal, if applicable, to BNC 4.
2. Connect the output BNC connectors as required for your facility.
3. To use an external reference source, other than the Frame Ref 1 and Frame Ref 2 available on the DFR-8321 series frame, connect the reference input source to the **REF IN BNC** connector. Refer to the section "**Card Overview**" on page 2-3 for information on setting **J7** to configure the 75ohm termination on the local reference.

This completes the procedure for connecting video input and output cables to the Rear Module.

Serial Port Cabling

The MDK-111A-M and the MDK-111A-K include an RS-422/232 serial communications port which can be used to remotely control the operations of the card. This section applies if you wish to control the card via a serial protocol, such as the GVG M-2100 protocol.

Serial Communication Cabling

This section outlines how to cable serial communications for the card. In order to properly complete this procedure, you need the following cables and equipment:

- **Serial Interface Cable** — This is a serial cable with a RJ-45 connector on one end and a connector on the other end to connect to your serial device. For the best performance, Ross Video recommends using a standard ethernet cable such as a CAT-5 or CAT-5e. **Table 2.2** includes serial cable pinout details. Ross Video does not supply this cable.

Use the following procedure to set up serial communications for the card:

1. Refer to **Table 2.2** for pinout information for your required **Serial Interface Cable**.
2. Connect and secure the RJ-45 connector of the **Serial Interface Cable** to the **Serial COM** port on the Rear Module (**Figure 2.4**).
3. Connect and secure the other end of the **Serial Interface Cable** to the appropriate port on your serial device. Refer to the user manual for your serial device for pinout information and the required port to use.

This completes the procedure for setting up serial communications for the card. For information on configuring the **Serial COM** port for communications, refer to the section "**Serial Communication Setup**" on page 3-8.

Serial COM Port Pin Assignment

When building cables to interface to the card **Serial COM** port, it is recommended to use CAT-5 or CAT-5e cable with the standard ethernet wiring color coding. **Table 2.2** shows the pin assignment of the **Serial COM** port located on the Rear Module.

Table 2.2 RJ-45 Pin Assignment

RJ45 Pin	RS-232	RS-422	RS-422 Null
1	n/c	Tx+	Rx+
2	Rx	Tx-	Rx-
3	Tx	Rx+	Tx+
4[a]	+12V	+12V	+12V
5[a]	+12V	+12V	+12V
6	n/c	Rx-	Tx-
7	GND	GND	GND
8	GND	GND	GND

a. Two pins are reserved for +12V to provide power to a handheld remote control panel.

Ethernet Port Cabling

The Ethernet Port on the Rear Module is used to connect to an ethernet network for communications, software upgrades using DashBoard, media file management via an FTP client, and for viewing thumbnails

This section presents a general overview of the ethernet connection process. The exact steps for connecting your card to your facility via an ethernet network depends on the network requirements of your facility.

Note — *Contact your IT Department before connecting the card to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for the card.*

Ethernet Communication Cabling

In order to properly complete this procedure, you need the following cables and equipment:

- **Ethernet Cable** — This is a standard network CAT-5 cable to connect the card to your facility network. You can use a standard straight-through ethernet cable, with no need for a crossover cable as the card includes an Auto-MDIX ethernet PHY that will switch from straight to crossover automatically as needed. Ross Video does not supply this cable.

Use the following procedure to connect the card to an ethernet network:

1. Ensure that you are running DashBoard Control System version 3.0.0 or higher before proceeding. The DashBoard Control System software and user manual are available to download from the Ross Video website.
2. Connect the card to the same subnet as your DashBoard computer or to a network that has a route to the network your DashBoard computer is on. Refer to **Figure 2.4** for the **Ethernet 10/100** port location on the Rear Module.
3. Make a note of the IP Address as this information is required when configuring the communication settings for your card.
    - Network topologies vary greatly between facilities. Contact your IT Department for assistance in connecting your card to the appropriate network at your location.

This completes the procedure for connecting the card to an ethernet network. For information on setting up the ethernet communications for the card, refer to the section "**Ethernet Communication Setup**" on page 3-10.

GPI/Tally Cabling

The MDK-111A-M and MDK-111A-K each include eight General Purpose Input (GPI) and Tally pins to interface with external equipment. There are eight bi-directional pins labelled GPI/O 1-8 on the terminal block of the Rear Module. (**Figure 2.4**) Ports are user programmable to be either an input (GPI) or an output (Tally) using the **GPI/Tally Setup** tab in DashBoard. Electrically, the ports are setup for contact closure to ground, with 1Kohm pull-up resistor to +5V, so they default to a logical high state.

Note — *The default state for the GPI/O contacts is active low signalling. This way, if the card is removed from the DFR-8321 series frame, no external events will be inadvertently asserted by the card. This also means that if a GPI cable is absent from the Rear Module, no GPI or Tally will be triggered and executed inadvertently by the card.*

GPI/Tally Cable Connections

The GPI ports are available on four 3-pin WECO® connectors located on the Rear Module. Four 3-pin mating connectors are provided with the Rear Module. This section provides information for connecting GPI/Tally cables to the installed Rear Modules of your DFR-8300 series frame.

Use the following procedure to cable the rear module for GPIs and Tallies:

1. Locate the GPI/Tally ports on the Rear Module. Refer to the Rear Module labelling, and **Figure 2.4** for locations.
2. Wire the GPI/Tally ports as follows:
   - The left and right pins are the two GPI/O signals while the center pin is the common Ground (GND).
   - Refer to **Figure 2.5** for GPI/Tally configuration on the Rear Module.

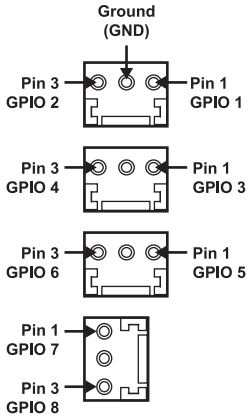


***Figure 2.5** 8320AR-033 GPI Connections*

This completes the procedure for cabling the rear module for GPIs and Tallies. For details on setting up the communications for the GPI/Tally ports, refer to the section "**GPI/Tally Communication Setup**" on page 3-11.

Linear Timecode Cabling

The card receives Linear Timecode (LTC) on the **Serial COM** port, or via the **GPI** pins, then decodes and keys the timecode over the Background video. The outgoing video signal is rendered with a known and constant delay.

This section presents a general overview of how to connect your LTC device to the MDK-111A-M or MDK-111A-K.

LTC Cable Connections

This section describes the two methods of LTC cabling an LTC input to the MDK-111A-M and MDK-111A-K: via the **Serial COM** port, or via one of the eight **GPI** ports, on the rear module.

- **Serial COM** port — Use this port when the LTC device drives a balanced pair, following the recommended voltage amplitude defined in the SMPTE 12M specification. The LTC signal pair must be connected to the **Serial COM** port on the Rx+ and Rx- input pins.
- **GPI** port — Use one of these ports when the LTC device drives a single-ended TTL compatible signal.

Note that how you connect to the LTC device determines how you must configure the communications between the LTC device and your card.

For More Information...

- on configuring your card to communicate with an LTC device, refer to the section "**LTC Communication Setup**" on page 3-14.

Cabling for the Serial COM Port

Use the following procedure to cable a serial connection for an LTC input to the card rear module:

1. Refer to **Table 2.3**, and your LTC device documentation, for pinout information for your required **Serial Interface Cable**.

Table 2.3 Interface Cable for LTC Input

RJ45 Pin	RS-422 Serial COM Rx Port	LTC Signal
1	Tx+	
2	Tx-	
3	Rx+	LTC+
4	+12V	
5	+12V	
6	Rx-	LTC-
7	GND	GND
8	GND	GND

2. Connect and secure the RJ-45 connector of the **Serial Interface Cable** to the **Serial COM** port on the Rear Module. (**Figure 2.4**)
3. Connect and secure the other end of the **Serial Interface Cable** to the appropriate port on your LTC device. Refer to the user manual for your LTC device for specific pinout information and the required port to use.

This completes the procedure for cabling a serial connection for an LTC input. Next you will configure the card to communicate with the LTC device as outlined in the section "**LTC Communication Setup**" on page 3-14.

Cabling for a GPI Port

Note — *When using a GPI port for LTC, the LTC interface must be TTL compatible where V (IH) is 2.0V-5.0V, and V(IL) is 0.0V-0.8V.*

Use the following procedure to cable a GPI port for an LTC input:

1. Locate the GPI/Tally ports on the Rear Module. Refer to the Rear Module labelling, and **Figure 2.4** for locations.
2. Wire the GPI/Tally port for an LTC input as follows:
   - The left and right pins are the two GPI/O signals while the center pin is the common Ground (GND).
   - Refer to **Figure 2.5** for GPI configuration on the Rear Module.
   - Refer to your LTC device documentation for specific pinout information.

This completes the procedure for cabling a GPI port for an LTC input. Next you will configure the card to communicate with the LTC device as outlined in the section "**LTC Communication Setup**" on page 3-14.

Configuration

In This Chapter

This chapter provides instructions for configuring the MDK-111A-M and MDK-111A-K using the options available in the DashBoard Control System™.

The following topics are discussed:

- Selecting the Video Format and Reference Source
- Video Input and Output Configuration
- Audio Mixing Configuration
- Serial Communication Setup
- Ethernet Communication Setup
- GPI/Tally Communication Setup
- LTC Communication Setup
- Loading the Factory Defaults
- Personality Options
- Software Upgrades
- SNMP Monitoring

Note — *Before proceeding, ensure that you are running DashBoard software version 3.0.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.*

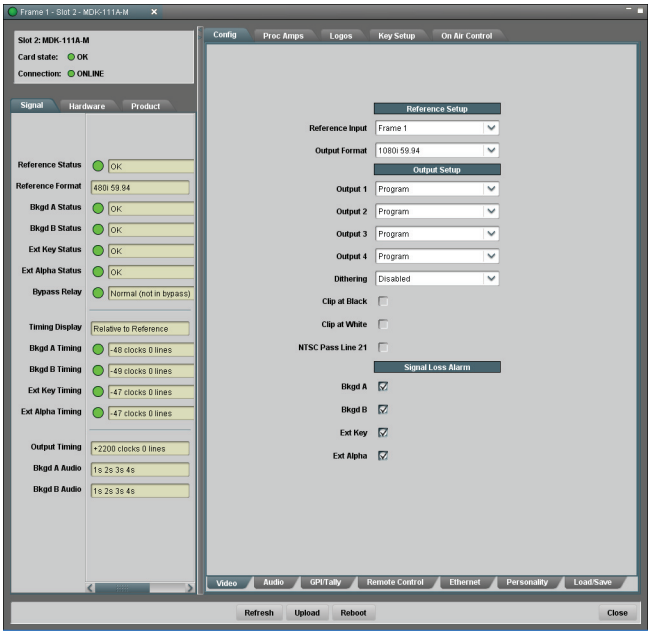
Selecting the Video Format and Reference Source

This section provides information for selecting the video format and the reference source for your card.

Selecting the Video Format and Reference Source

Use the following procedure to select the video format and reference source:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Video** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Video** tab located at the bottom of the **Config** tab.



Config Tab — Video Tab

3. Select a reference source from the **Reference Setup** area. Choose from the following:
   - **Frame 1** — Select this option to use the reference source connected to the **FRAME REF 1** port on the DFR-8321 series frames.
   - **Frame 2** — Select this option to use the reference source connected to the **FRAME REF 2** port on the DFR-8321 series frames.
   - **External** — Select this option to use the external reference source connected to **REF IN** on the Rear Module. Use **J7** on the card to enable or disable a 75ohm terminator on the External Reference input. Refer to the section "**Card Overview**" on page 2-3 for information on configuring **J7**.
4. Select the card output video format from the **Output Format** menu. Ensure that it is the same format as in the input video format.

This completes the procedure for selecting the video format and reference source.

Operating Tip — *Use the **Signal** tab to monitor the Signal status, including the reference and the Background sources. Refer to the section "**Status Menus**" on page 6-2 for more information.*

Output Format Reference Compatibility

Depending on the reference format you use, the card will only be able to operate in certain formats (**Table 3.1**).

Table 3.1 Output/Reference Compatibility

Reference	Output							
	480i 59.94Hz	720p 59.94Hz	1080i 59.94Hz	576i 59.94Hz	720p 50Hz	1080i 50Hz	1080pSF 23.98Hz	1080pSF 24Hz
480i 59.94Hz	✓	✓	✓					
720p 59.94Hz		✓						
1080i 59.94Hz	✓	✓	✓					
576i 59.94Hz				✓	✓	✓		
720p 50Hz					✓			
1080i 50Hz				✓	✓	✓		
1080pSF 23.98Hz							✓	
1080pSF 24Hz								✓

Video Input and Output Configuration

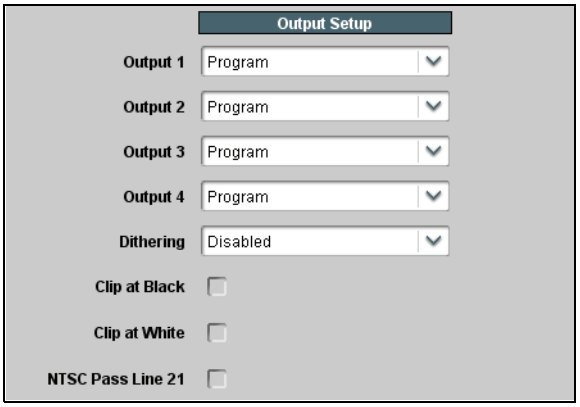
Keep the following in mind when configuring your video inputs and outputs:

- Each video input has a line sync that can support a full line of SD or HD video including horizontal blanking.
- All video inputs must be timed with the reference. The input tolerance is +/- 0.5 line. Exceeding this tolerance will result in the output shifting of 1 line.
- All of the video inputs must be the same video format as specified in the **Config** tab for the card. If the formats do not match, the card reports an error in the DashBoard **Signal Status** area and on the card-edge LEDs.
- The Program and Preview sources can be any of the four internally generated Logo channels or external inputs, or an internally generated black.
- When using an MDK-111A-M, each of the four outputs can be configured as PGM, Preview, or one of four Clean Feeds.
- On the MDK-111A-K, the four outputs are configured directly from the **On-Air Control** tab.
- Each output has a Proc Amp that can adjust parameters such as the black offset and gain.
- All of the outputs can be enabled to add dither, clip to SMPTE black or allow super-black, or clip to SMPTE white or allow super-white.

Configuring the Video Outputs

Use the following procedure to configure your video outputs on the card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Video** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Video** tab located at the bottom of the **Config** tab.
3. From the **Output Setup** area, locate the Output BNC you want to configure.



MDK-111A-M Config Tab — Output Setup Area

4. If you are using an MDK-111A-M, choose an output to configure as follows:
   - **Output 1** — Select this field to configure the source on Output 1.
   - **Output 2** — Select this field to configure the source on Output 2.
   - **Output 3** — Select this field to configure the source on Output 3.

- **Output 4** — Select this field to configure the source on Output 4.

5. If you are using an MDK-111A-M, select the output that you want to assign to the selected Output BNC from the **Output** field. You can choose between the following:
   - **Program** — Select this option to assign the source to the Program output.
   - **Preview** — Select this option to assign the source to the Preview output.
   - **Clean Feed** — Select this option to assign the source to one of the Clean Feeds.
6. From the **Dithering** field, select the type of dithering you want to apply to all outputs. You can choose between the following:
   - **Disabled** — Select this option to disable the Dithering feature.
   - **Enabled low** — Select this option to enable 2 bit dithering.
   - **Enabled medium** — Select this option to enable 3 bit dithering.
   - **Enabled high** — Select this option to enable 4 bit dithering.
7. Enable the Clip White or Clip Black feature as follows:
   - **Clip at Black** — Select this box to enable the card to clip to SMPTE black on all outputs. An unchecked box allows super-black.
   - **Clip at White** — Select this box to enable the card to clip to SMPTE white on all outputs. An unchecked box allows super-white.
8. Enable the **NTSC Pass Line 21** when using NTSC (480i) video format:
   - Select the box to have Line 21 pass through unaltered. This setting should only be used when closed-captioning, or other data, is present on Line 21.
   - Clear this box to treat Line 21 as active video.

This completes the procedure for configuring your outputs on the card.

Signal Loss Alarm Setup

The **Signal Loss Alarm** feature enables DashBoard to display status alarms when a loss of signal is experienced on the Backgrounds, external Key, or external Alpha input sources. The alarm information displays in the **Signal** tab of DashBoard and on the card-edge LEDs. For more information on the status LEDs, refer to the section "**Card-edge LEDs**" on page 2-4.

Use the following procedure to set up the Signal Loss Alarm feature:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Video** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Video** tab located at the bottom of the **Config** tab.
3. If you are configuring an MDK-111A-M, enable or disable the alarms by selecting or clearing the required boxes in the **Signal Loss Alarm** area as follows:
   - **Bkgd A** — Select this box to enable DashBoard to report the status of the Background A input source on Input 3.
   - **Bkgd B** — Select this box to enable DashBoard to report the status of the Background B input source on Input 1
   - **Ext Key** — Select this box to enable DashBoard to report the status of the external Key video input source on Input 2.
   - **Ext Alpha** — Selecting this box enables DashBoard to report the status of the external Alpha input source on Input 4.

4. If you are configuring an MDK-111A-K, enable or disable the alarms by selecting or clearing the required boxes in the **Signal Loss Alarm** area as follows:

   - **Bkgd A** — Select this box to enable DashBoard to report the status of the Background A input source.
   - **Bkgd B** — Select this box to enable DashBoard to report the status of the Background B input source.
   - **Bkgd C** — Select this box to enable DashBoard to report the status Background C input source.
   - **Bkgd D** — Selecting this box enables DashBoard to report the status of the Background D input source.

This completes the procedure for setting up the Signal Loss Alarm. Refer to the section "**Signal Tab**" on page 6-2 for details on the type of messages displayed in the **Timing** fields.

Audio Mixing Configuration

The Audio Mixing feature in the **Config** tab for the MDK-111A-M configures how audio mixing, including Fade to Black, is performed.

The MDK-111A-K does not perform audio mixing and this option is unavailable. Embedded audio from the Backgrounds is passed through unchanged to the corresponding outputs.

Note — *Fade to Black is only available for the MDK-111A-M.*

Use the following procedure to configure the Audio Mixing feature:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Audio** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Audio** tab located at the bottom of the **Config** tab.
3. Configure the Audio Mixing feature as follows:
   - Select the box to enable the audio to follow the video.
   - Clear the box to perform a hard-cut during an audio transition. This option is suggested when using non-PCM audio, such as Dolby®.

This completes the procedure for configuring the Audio Mixing feature.

Serial Communication Setup

The card serial interface can be configured to communicate with a variety of data rates and protocols. You can communicate with an external device using a serial protocol through the **Serial COM** port on the rear module, or via an ethernet connection. This section briefly outlines how to set up serial communications using DashBoard.

Note — *A protocol can only be active on the serial port, or on the ethernet port, but not both. Should you attempt to enable the same protocol on both ports, the card automatically disables the first port (the **Enabled** checkbox is cleared).*

For More Information...

- on cabling the **Serial COM** port, refer to the section "**Serial Port Cabling**" on page 2-8.
- on cabling the **Ethernet 10/10** port, refer to the section "**Ethernet Port Cabling**" on page 2-9.

Serial Communications via the Serial COM Port

Use the following procedure to configure the card to communicate with a serial device via the **Serial COM** port:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Remote Control** tab as follows:
   - From the **Device View**, select the **Config** tab.
   - Select the **Remote Control** tab located at the bottom of the **Config** tab.
3. Select a protocol from the **Protocol** box. Choose from the following:

Operating Tip — *The Port Type, Bit Rate, Data Bits, Parity, and Stop Bits values are reset to their default values when a different Protocol is selected.*

   - **M-2100** — Select this option if you are using the GVG M-2100 protocol to communicate with the card.
   - **Timecode** — Select this option if you are communicating with an LTC device. Refer to the section "**LTC Communication Setup**" on page 3-14 for details.
4. Select the electrical standard from the **Port Type** box. Choose from the following:
   - **RS 232** — Select this option if the card is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard.
   - **RS 422** — Select this option if the card is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the RX receive end is terminated with a 120ohm resistor on the card.
   - **RS 422 unterm** — Select this option if the card is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated. This setting is recommended when the **Protocol** is set to **Timecode**.
   - **RS 422 Null** — Select this option if the card is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the RX receive end is terminated with a 120ohm resistor on the card.

- **RS 422 Null unterm** — Select this option if the card is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the card port and the Rx receive end is not terminated on the card. This mode is used to daisy-chain several card Rx ports, where only the last one would be terminated.

5. Use the **Bit Rate, Data Bits, Parity** and **Stop Bits** fields to set the required parameters for the external serial device. Note that these settings have no effect when **Protocol** is set to **Timecode**.
6. Select the **Port Enabled** box in the **Serial Port** area. When the Port is disabled, any incoming data on the serial port is discarded by the card.

This completes the procedure for configuring the card to communicate with a serial device.

Serial Communications via an Ethernet Connection

Use the following procedure to configure the card to communicate via an ethernet connection:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Remote Control** tab as follows:
   - From the **Device View**, select the **Config** tab.
   - Select the **Remote Control** tab located at the bottom of the **Config** tab.
3. To use the GVG M-2100 Protocol to control the card via ethernet:
   - Select the **M-2100 Enabled** check box located in the **Ethernet Protocol** area. When the box is cleared, any incoming data from the serial device is discarded by the card. Note that a protocol can only be active on the serial port, or on the ethernet port, but not both.
   - From the **Protocol** box, select a Transport Layer Protocol. Choose from the following:
     - **TCP** — Select this option if your device is connected to the card through a network and uses the Transmission Control Protocol (TCP/IP).
     - **UDP** — Select this option if your device is connected to the card through a network and uses the User Datagram Protocol (UDP/IP).
   - From the **Port** box, specify the Port Address for your serial device. Choose a unique port number between 1 and 32767.

Note — *TCP ports 0, 21, 22, 80, and 6667 are unavailable for serial communications.*

This completes the procedure for configuring the card to communicate with a serial device via an ethernet connection.

Ethernet Communication Setup

To enable the card to perform software upgrades, or to use an automation protocol to control the card via ethernet, the card must be configured with valid ethernet settings for the **10/100 Ethernet** port on the Rear Module of the card. The settings can be specified manually (**Static**) or may be obtained automatically from a server on your network (**DHCP**).

Use the following procedure to set up ethernet communications for the card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Ethernet** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Ethernet** tab located at the bottom of the **Config** tab.
3. To manually configure the ethernet settings:
   - Select **Static**.
   - Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** settings for the card.
   - To save the new settings, click **Apply Changes**. Note that clicking **Cancel** will revert to the previous settings.
4. To obtain network settings automatically:
   - Select **DHCP**.
   - To save the new settings, click **Apply Changes**. Note that clicking **Cancel** will revert to the previous settings.

This completes the procedure for setting up ethernet communications for the card.

GPI/Tally Communication Setup

This section explains how to configure communications for GPIs and Tallies on the card using the menus and options available in DashBoard. Each of the GPI/O ports can be configured as a GPI or Tally output.

GPI Overview

When configured as a GPI, a port behaves as an input, and can be used to trigger actions such as Cut/Dissolve the Key and/or Background. A push-button switch, or an ON-OFF switch, may be directly connected between the port and the adjacent ground pin. Alternatively, a external device may drive a low level. Minimum pulse duration is 1ms, anything shorter will be filtered out.

Typically, users will configure the GPI for Edge trigger. This means that the action is carried out either on the falling edge (button is pushed), or rising edge (button is released), depending on which Polarity is selected. Alternatively, users may configure the GPI for Level trigger. In this mode, the action is carried out on both the rising and falling edges, so there are effectively two states. The Polarity control can be used to invert the behavior. Regardless of the trigger type, GPI commands may be overridden by other command inputs such as serial protocols.

Edge

This option enables the GPI to act as a latching trigger. Edge triggers are used when you want to toggle between settings. This option enables the GPI to execute a specific function.

- If configured for Falling Edge, the selected function is executed when the GPI input signal transitions from High to Low.
- If configured for Rising Edge, the selected function is executed when the GPI input signal transitions from Low to High.
- Edge triggered GPI signals are sampled once a frame and the associated function is executed only once per frame. The minimum pulse width is 1 millisecond.
- Typically, the edge triggered GPI is driven by external equipment that generates one pulse per event.

Level

Level triggers are used when you want to assert a particular state for a setting. You define the on-air state of the function as being either Level High or Level Low. Therefore, if the on-air state of the Key is defined as Level High for example, when the GPI is a Level High signal, the Key will stay on air. If a Level Low is received, the Key will be taken off air.

- If configured for Active Low, the selected function is executed when the GPI input signal is driven Low.
- If configured for Active High, the selected function is executed when the GPI input signal is driven High.

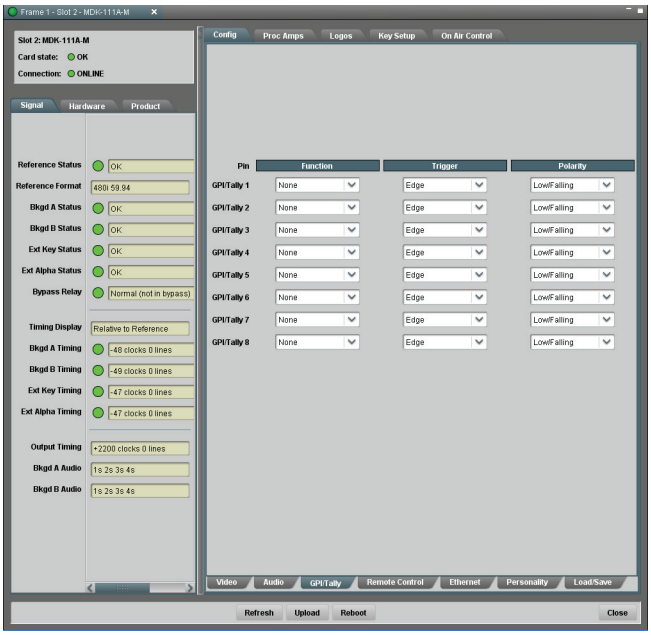
Tally Overview

When configured as a Tally, a port becomes an output, providing a status indicator. Typically this is used to indicate which input(s) are on-air at any given moment. Each tally output on the card can be configured to be active when any of the four inputs are on air. They can be configured as Active High or Active Low. The Trigger type (Edge or Level) is only relevant for GPI inputs and has no effect on Tally outputs. The tally outputs defaults to a logical high level when inactive. When the tally becomes active, for example the signal is on-air, then the output is driven low.

GPI Communication Setup

Use the following procedure to configure remote control for GPIs:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **GPI/Tally** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **GPI/Tally** tab located at the bottom of the **Config** tab.



Config Tab — GPI/Tally Tab

3. Assign a transition event to a GPI by selecting the function next to the GPI in the **GPI/Tally** area. Choose from the following:
   - **GPI Cut Bkgd** — Select this option to have a cut performed between the Background sources when a trigger is received by that GPI input. This option is only available for the MDK-111A-M.
   - **GPI Auto Bkgd** — Select this option to have an auto transition performed between the Background sources when a trigger is received by that GPI input. This option is only available for the MDK-111A-M.
   - **GPI Cut Key #** — Select this option to perform a cut transition on the specified Key when a trigger is received by that GPI input.
   - **GPI Auto Key #** — Select this option to perform an auto transition on the specified Key when a trigger is received by that GPI input.
   - **GPI Fade to Black** — Select this option to perform a fade to black when a trigger is received by that GPI input. This option is only available for the MDK-111A-M.
   - **Timecode Input** — Select this option when this pin is used to communicate with an LTC device to input timecode. The **Trigger** and **Polarity** settings are ignored.
   - **None** — Select this option to not assign a function to the selected GPI. This is the default setting. The **Trigger** and **Polarity** settings are ignored.
4. Select a trigger for the GPI from the **Trigger** column. Choose from the following:
   - **Edge** — Select this option to configure the card to perform the **Function** on either the Rising or Falling Edge of the GPI signal as determined by the **Polarity** setting.

- **Level** — Select this option to have the GPI action controlled by a static voltage level. The card performs the **Function** when the GPI state is either High or Low as determined by the **Polarity** set in step 5. The action triggered by the GPI input will remain in that state until the GPI level changes.

5. Select a Polarity for the GPI from the **Polarity** column. Choose from the following:
   - **High/Rising** — Select this option to have the GPI triggered on a static High level, or on a Low-to-High pulse.
   - **Low/Falling** — Select this option to have the GPI triggered on a static Low level or on a High-to-Low pulse.

This completes the procedure for configuring remote control for GPIs.

Tally Communication Setup

When configured as a tally, a port becomes an output, providing a status indicator. Typically this is used to indicate which input(s) are on-air at any given moment. The tally outputs default to a logical high level when inactive. When the tally becomes active, such as the signal is on-air, then the output is driven low. It is possible to invert the signal using the **Polarity** feature.

Use the following procedure to configure a Tally for a selected card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **GPI/Tally** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **GPI/Tally** tab located at the bottom of the **Config** tab.
3. Select what will drive the tally output when the input is on-air by selecting the function next to the **Tally** in the **GPI/Tally** area. Choose from the following:
   - **Tally A** — Select this option to have the Tally active when the Bkgd A input source is on-air.
   - **Tally B** — Select this option to have the Tally active when the Bkgd B input source is on-air.
   - **Tally Ext Key** — Select this option to have the Tally active when the external Key Video input source is on-air. This option is named **Tally Bkgd C** when using the MDK-111A-K.
   - **Tally Ext Alpha** — Select this option to have the Tally active when the external Key Alpha input source is on-air. This option is named **Tally Bkgd D** when using the MDK-111A-K.
   - **Tally Key #** — Select this option to have the Tally active when the specified Key source is on-air.
   - **Tally Any Key** — Select this option to have the Tally active when any of the Keys is on-air.
   - **None** — Select this option not to assign a function to the selected Tally port. This is the default setting. The **Polarity** setting is ignored.
4. Select the polarity of the tally from the **Polarity** column. Choose from the following:
   - **High/Rising** — Select this option to send a high (+5 Volts) tally output signal.
   - **Low/Falling** — Select this option to send a low (0 Volts) tally output signal.

This completes the procedure for configuring a Tally connection for the selected card.

LTC Communication Setup

This section explains how to configure an LTC input to the card using the menus and options available in DashBoard.

Serial Communication Setup

Use the following procedure to configure serial communications for an LTC input:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Serial** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Serial** tab located at the bottom of the **Config** tab.
3. Select the **Port Enabled** box.
   - When the Port is disabled, any incoming data on the serial port is discarded by the card.
   - The **Bit Rate, Data Bits, Parity** and **Stop Bits** fields are ignored.
4. Select **Timecode** from the **Protocol** box.
5. Select **RS 422 unterm** from the **Port Type** box.

This completes the procedure for configuring serial communications for an LTC input.

GPI Communication Setup

Note — *Ensure that only one GPI port is configured as an LTC input at one time. If you attempt to configure a second GPI port for timecode communications, the first GPI will be automatically assigned to* ***None****.*

Use the following procedure to configure GPI communications for an LTC input:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **GPI/Tally** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **GPI/Tally** tab located at the bottom of the **Config** tab.
3. Assign a GPI to the LTC input as follows:
   - From the **Function** box for the GPI you are configuring, select **Timecode Input**.
   - The **Trigger** and **Polarity** fields are ignored.

This completes the procedure for configuring GPI communications for an LTC input.

Loading the Factory Defaults

If required, the card menu parameters can be reset to the factory default values using the option available in the **Load/Save** tab.

Note — *Ethernet settings, reference input selection, and the output format are not reset using this method.*

Use the following procedure to reset the card to the factory default settings in DashBoard:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Load/Save** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Load/Save** tab located at the bottom of the **Config** tab.
3. From the **Global Settings** area, click **Load Factory Defaults** to display the **Confirm** dialog.
4. Click **Yes** to load the factory default values for all menu parameters, or **No** to cancel the load and close the dialog.

This completes the procedure for resetting the card to the factory default settings in DashBoard.

Personality Options

This section outlines how to configure the options available in the **Personality** tab.

Configuring the Transition Buttons

The **Personality** tab in DashBoard enables you to specify how the **Cut** and **Auto** buttons, in the **On Air Control** tab, behave when toggled during a transition.

Note — *The selected behavior also applies to GPI/Os.*

Use the following procedure to configure the transition buttons:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Personality** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Personality** tab located at the bottom of the **Config** tab.
3. Configure the **Cut** button behavior by choosing an option from the **Cut Button** field.
   - **Abort** — Select this option to return the transition to the beginning when the **Cut** button is pressed again while a transition is in progress. This is the default setting.
   - **Finish** — Select this option to instantly finish the transition when the **Cut** button is toggled.
   - **Ignore** — Select this option to disregard any successive presses of the **Cut** button until the transition is complete.
4. Configure the **Auto** button behavior by choosing an option from the **Auto Button** field.
   - **Pause/Resume** — Select this option to pause the transition when the **Auto** button is toggled, and resume the transition when the button is pressed again.
   - **Reverse** — Select this option to reverse the transition back to the start.
   - **Ignore** — Select this option to disregard any successive presses of the **Auto** button until the transition is complete.

This completes the procedure for configuring the transition buttons.

Configuring the Edit Permissions

The **Personality** tab in DashBoard enables you to lock the card permission so that parameters are read-only and cannot be changed.

Use the following procedure to configure the card edit permissions:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Personality** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Personality** tab located at the bottom of the **Config** tab.
3. Configure the edit permission by choosing an option from the **Edit Permission** menu.

- **Unlocked** — Select this option to enable card parameters to be edited from DashBoard. This is the default setting.
- **Locked** — Select this option to lock all the card parameters to read-only except the Edit Permission. The card can still be controlled by GPI and/or GVG M-2100 commands if were enabled prior to locking the card.

This completes the procedure for configuring the card edit permissions.

Configuring the Input Signal Timing Display

The **Timing Display** feature enables you to configure how the input signal timing is reported by DashBoard. This information is displayed in the **Bkgd A, B, Ext Key** (**Bkgd C**), and **Ext Alpha** (**Bkgd D**) **Timing** fields of the **Signal** tab in the number of clocks and lines. Negative values indicate the input signal timing is earlier than the reference. Positive values indicate the input signal timing is later than the reference. Note that there are 4400 clocks per line when using the 1080i 59.94Hz format.

Use the following procedure to configure the input signal timing for your card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Display the **Personality** tab as follows:
   - From the **Device** tab, select the **Config** tab.
   - Select the **Personality** tab located at the bottom of the **Config** tab.
3. Configure how the signal timing by selecting one of the following options from the **Timing Display** menu:
   - **Relative to Reference** — Select this option to display the timing offset values of the SDI inputs and output relative to the selected analog reference as follows:
     - › A negative offset value indicates that the SDI signal is earlier than the analog reference.
     - › A positive value indicates that the SDI signal is later than the analog reference.
   - **Input to Output** — Select this option to display the timing offset values of the SDI BKGD inputs relative to the SDI output of the card as follows:
     - › A negative offset value indicates that the SDI BKGD input signal is earlier than the SDI OUT signal.
     - › A positive value indicates that the SDI BKGD input signal is later than the SDI OUT signal.

This completes the procedure for configuring the input signal timing for your card.

Software Upgrades

The card can be upgraded in the field using the **Ethernet 10/100** port on the Rear Module and using the options available in DashBoard. Refer to the section "**Ethernet Communication Setup**" on page 3-10 for setting up ethernet communications.

Note — *This procedure assumes that you are running DashBoard v3.0.0 or higher.*

Use the following procedure to upgrade the software on a card:

1. Contact Ross Technical Support for the latest software version file.
2. Ensure the ethernet cable is connected to the **Ethernet 10/100** port on the Rear Module. Refer to the section "**Ethernet Port Cabling**" on page 2-9 for details.
3. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
4. From the **Device** tab, click **Upload** to display the **Select file Upload** dialog.
5. Navigate to the ***.bin** file you wish to upload.
6. Click **Open**.
7. If you are upgrading a single card, click **Finish** to start the upgrade. Proceed to step 9.
8. If you are upgrading multiple cards:
   - Click **Next >** to display the **Select Destination menu**. This menu provides a list of the compatible cards based on the card selected in step 3.
   - Specify the card(s) to upload the file to by selecting the check box(es) for the cards you wish to upload the file to.
   - Verify that the card(s) you wish to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
   - Click **Finish**.
9. Monitor the upgrade.
   - A **Upload Status** dialog enables you to monitor the upgrade process.
   - The card reboots automatically once the file is uploaded. The card is temporarily taken offline.
   - The reboot process is complete once the status indicators for the **Card State** and **Connection** return to their previous status.

Operating Tip — *If you are running DashBoard v2.3 or lower, you must click **Reboot** in the **Device** tab to complete the upgrade process.*

This completes the procedure for upgrading the software on a card.

Troubleshooting

If you encounter problems when upgrading your card software, verify the following:

- Your network settings on the card are valid. Refer to **Table 6.9** for a list of settings.
- Ethernet communication is properly configured.
- The file you are attempting to load is a ***.bin** file that is for the card you are upgrading.

SNMP Monitoring

The MFC-8300 Series Network Controller cards in the DFR-8321 series frames provide optional support for remote monitoring of your frame the using Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring tools.

Refer to the Management Information Base (MIB) file that came with your card for a breakdown of the available SNMP monitoring features. Refer to the ***DFR-8300 Series User Manual*** and the ***MFC-8300 Series User Manual*** for additional information on SNMP Monitoring.

Operation

In This Chapter

This chapter provides a summary of the operational features, such as Proc Amp controls, Key Setup, and performing transitions in DashBoard.

The following topics are discussed:

- Adjusting the Proc Amp Controls
- Configuring a Key
- Performing Transitions

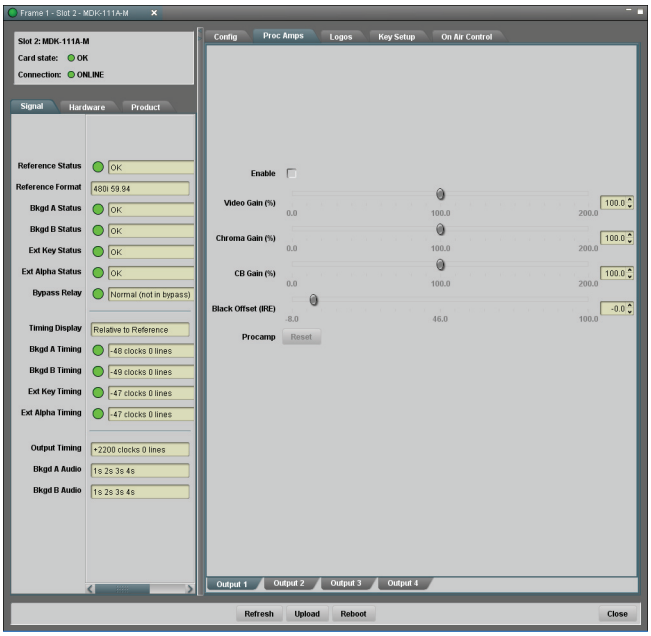
Note — *Before proceeding, ensure that you are running DashBoard software version 3.0.0 or higher. The DashBoard Control System software and user manual are available for download from the Ross Video website.*

Adjusting the Proc Amp Controls

Each output on the card has a Proc Amp that can adjust the black offset, the video gain, the chroma gain and the CB gain. This section briefly outlines how to adjust the options available in the **Proc Amp** tab.

Use the following procedure to adjust an output using a Proc Amp:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Select an output signal to adjust as follows:
   - Select the **Proc Amps** tab.
   - Select the **Output** tab for the output signal you want to adjust. The **Output** tabs are located at the bottom of the **Proc Amps** tab.



Proc Amps Tab — Output 1 Disabled

3. Select the **Enable** box to ensure the color adjustments are applied. The **Enable** box must be selected in order for any color correction to take effect on the selected output.
4. Adjust the **Video Gain** of the Background and Key Video as follows:
   - Use the **Video Gain** slider to adjust the amount of Video Gain you want to apply. Increasing overall gain causes an increase in contrast while also making colors more saturated and vivid. Decreasing overall gain causes a decrease in contrast while de-saturating colors.
5. Adjust the **Chroma Gain** of the Background and Key Video as follows:
   - Use the **Chroma Gain** slider to adjust the chrominance video signal components (Cr and Cb) simultaneously. Increasing the chroma gain value causes the video signal colors to become increasingly saturated and more vivid. Decreasing the chroma gain value de-saturates color from the video signal until it is black and white.
6. Adjust the **CB Gain** of the Background and Key Video as follows:
   - Use the **CB Gain** slider to adjust the Cb component of the chrominance video signal. Increasing the Cb Gain value causes the video signal colors to become

increasingly saturated with blue. Decreasing the Cb Gain value desaturates blue from the video signal.

7. Adjust the **Black Offset** of the Background and Key Video as follows:

   - Use the **Black Offset** slider to adjust the Black Offset you want to apply. Increasing the Black Offset value causes a lightening effect. Decreasing the Black Offset value causes a darkening effect.

Operating Tip — *To reset the Proc Amp settings to the default values, click **Reset** and then **Yes** in the **Confirm** dialog box.*

This completes the procedure for adjusting an output using a Proc Amp.

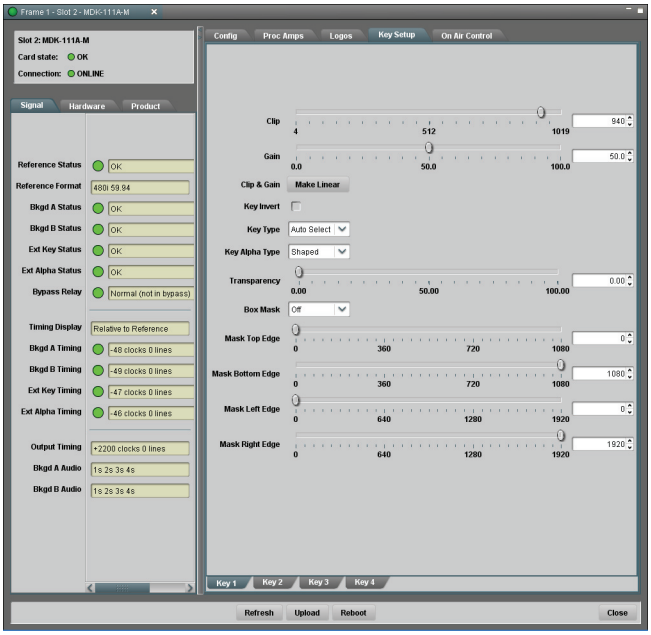
Configuring a Key

This section briefly describes how to set up Key Alphas, Auto Keys, adjust the Clip and Gain values, and how to apply a box mask.

Configuring a Key

Use the following procedure to configure a key:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. From the **Device** tab, select the **Key Setup** tab.



Key Setup Tab

3. From the **Key Setup** tab, select the tab for the key you wish to configure.
4. Set the **Key Type** by choosing one of the following from the **Key Type** menu:
   - **Auto Select** — An Auto Select Key is a key in which two video signals are required to insert the key. The Key Alpha is used to cut the hole in the video, and the Key Video is used to fill the hole.
     - › MDK-111A-M — Select this option to use the source on BNC 2 as the Key Video and the source on BNC 4 as the Key Alpha when **Ext Key** is used for the key source.
     - › MDK-111A-K — Selects an internal Logo channel (1-4).
     - › If an internal Logo channel is used, selecting this option takes the associated alpha (not BNC 2 or BNC 4) signal.
     - › Note that the **Key Alpha Type** is automatically set to **Shaped**.
   - **Self** — A Self Key is a key in which the luminance, or brightness, values of the key source is used as the alpha for the key.
     - › MDK-111A-M — Select this option to use the source on BNC 2 as the Key Video, when **Ext Key** is selected for the key source on the **On Air** tab, and its own luminance value of the same video as the Key Alpha.

› MDK-111A-K — Selects an internal Logo channel (1-4).

› If an internal Logo channel is used, the luminance value of the associated alpha is used.

› Note that the **Key Alpha Type** is automatically set to **Unshaped**.

5. If required, select the **Key Alpha Type** from the **Key Alpha Type** menu. Choose from the following:

   - **Unshaped** — Select this option to set the Key Alpha to unshaped. With an Unshaped Key, the Key Alpha luminance value mixes linearly the Key Video with the Background. Shades of gray, in the Key Alpha, are translated into transparency levels, giving the key a soft edge. Self Keys are set to Unshaped by default.
   - **Shaped** — Select this option to set the Key Alpha to shaped. With a Shaped Key, the Key Alpha cuts a hole in the Background based on the luminance value of the Key Alpha and adds the Key Video to the Background hole. Shaped Key alphas are sometimes used with Character Generators to cut very precise holes for the Key Video fill.

Note — *Ross Video strongly recommends leaving the Clip and Gain values at the default settings to avoid undesirable effects.*

6. Adjust the **Clip** value of the key as follows:

   - Use the **Clip** slider to adjust the luminance level of the key. The lower the threshold setting, the more the Key is visible.
   - To reset the Clip and Gain values, press **Make Linear**.

7. Adjust the **Gain** value of the key as follows:

   - Use the **Gain** slider to adjust the softness of the edges of the key.
   - To reset the Clip and Gain values, press **Make Linear**.

8. Adjust the **Transparency** level of the key as follows:

   - Use the **Transparency** slider to adjust the transparency level of the key. The values range as follows:

     › **0%** — The key is completely opaque. At this value, there is no difference between the original key and the key with the transparency effect applied to it.

     › **100%** — The key is completely transparent. At this value, the key is not visible on the screen.

9. To invert the key, select the **Key Invert** checkbox.

Note — *The **Key Invert** feature reverses the polarity of the Key Alpha. A Key Invert can be applied to any key type.*

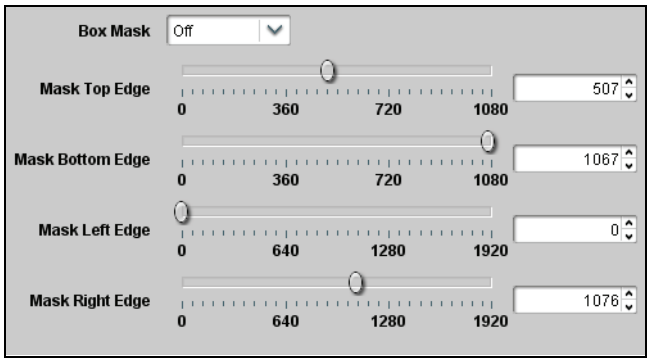
This completes the procedure for configuring a key.

Masking a Key

The Box Mask uses a simple box shape to mask the key and can be adjusted for size and location, but cannot be rotated. All key types can be masked.

Use the following procedure to apply a box mask to a key:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. From the **Device** tab, select the **Key Setup** tab.



Key Setup Tab — Box Mask Area

3. Set the **Box Mask** by choosing one of the following from the **Key Type** menu:
   - **Off**— Select this option to not apply a mask to the key.
   - **On** — Select this option to apply the mask to the key. The key is masked, only the portion inside the box is displayed.
   - **On Inverted** — Select this option to reverse the mask. The portion outside of the box is displayed.
4. Adjust the position of the mask as follows:

Operating Tip — *The values of the Box Mask parameters are set in number of lines and pixels, and are therefore dependent on the video format you are using.*

- Use the **Mask Top Edge** slider to adjust the location of the top edge of the mask.
- Use the **Mask Bottom Edge** slider to adjust the location of the bottom edge of the mask.
- Use the **Mask Left Edge** slider to adjust the location of the left edge of the mask.
- Use the **Mask Right Edge** slider to adjust the location of the right edge of the mask.

This completes the procedure for applying a box mask to a key.

Performing Transitions

The transition can be set up in a number of ways and involve any number of elements such as the Background video, the external key, as well as the internal Logo channels. This section briefly outlines how to configure the transition options and how to perform basic transitions.

Transitions Setup

This section provides general instructions on setting up the transition options for the card using the options available in the **On Air Control** tab such as selecting sources, and configuring transition rates. The **On Air Control** tab options are dependent on whether you are using an MDK-111A-M or an MDK-111A-K. This section is applicable to both cards.

Use the following procedure to set up the transition options on the card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Set up your Keys as outlined in the section "**Configuring a Key**" on page 4-4.
3. Click the **On Air Control** tab to display the menu options in the **Device View**.

MDK-111A-M — On Air Control Tab

4. Select the **Program** output for the Background from the **(Bkgd) Source** menu. This selects what is on the Program bus background. Choose from the following:
   - **Black** — Sets the source for the Background Program output to Black.
   - **Bkgd A** — Select this option to assign the input source on BNC 3 as the Background Program output.
   - **Bkgd B** — Select this option to assign the input source on BNC 1 as the Background Program output.
   - **Ext Key** — Select this option to assign the input source on BNC 2 as the Background Program output. This option is only available for the MDK-111A-M.
   - **Ext Alpha** — Select this option to assign the input source on BNC 4 as the Background Program output. This option is only available for the MDK-111A-M.

- **Bkgd C** — Select this option to assign the input source on BNC 2 as the Background Program output. This option is only available for the MDK-111A-K.
- **Bkgd D** — Select this option to assign the input source on BNC 4 as the Background Program output. This option is only available for the MDK-111A-K.
- **Logo #** — Select this option to assign the specified Logo channel as the Background Program output.
- **Alpha #** — Select this option to assign the specified Alpha channel as the Background Program output.

5. Set the source for the **Background Preview** output from the **Background Preview** menu. When using the MDK-111A-K, you are selecting a Logo channel source from the **Program A Key Source** menu. Choose from the following:
   - **Black** — Sets the source for the Background Preview output to Black. This option is only available for the MDK-111A-M.
   - **Bkgd A** — Select this option to assign the input source on BNC 3 as the Background Preview output. This option is only available for the MDK-111A-M.
   - **Bkgd B** — Select this option to assign the input source on BNC 1 as the Background Preview output. This option is only available for the MDK-111A-M.
   - **Ext Key** — Select this option to assign the input source on BNC 2 as the Background Preview output. This option is only available for the MDK-111A-M.
   - **Ext Alpha** — Select this option to assign the input source on BNC 4 as the Background Preview output. This option is only available for the MDK-111A-M.
   - **Logo #** — Select this option to assign the specified Logo channel as the Background Preview (Program A Key Source) output.
   - **Alpha #** — Select this option to assign the specified Alpha channel as the Background Preview output.This option is only available for the MDK-111A-M.
6. When using an MDK-111A-M, repeat step 4. For each key, select the source for the key. Key layering is fixed, and starts with Key 1 and progresses to Key 4.
7. When using an MDK-111A-K, repeat step 4. and step 5. for each Program output (B-D).
8. When using an MDK-111A-K, configure the **Lock Keyers** option as follows:
   - **Checkbox selected** — When locked, the key transition and states are configured to transition at the same time. This means that when you click any **Cut** or **Auto** transition button, the four keys are transitioned at the same time. For example, Program A, B, and C are off-air and Program D is on-air. Click any **Cut** button on the **On Air Control** tab to perform a cut transition that takes Program A, B, and C on-air, and Program D is transitioned off-air.
   - **Checkbox cleared** — Disables this option.
9. When using an MDK-111A-M, and if you are performing a transition with multiple keys, toggle the required **Include** button(s) in the **Multiple Transition** area.
10. When using an MDK-111A-M, select an **Auto Trans Type** from the **Transition Rates** area as follows:
    - **Mix** — Select this option to perform a gradual fade from one source to the next. The MDK-111A-M performs a cross fade between sources.
    - **Fade-Fade** — Select this option to perform a double transition from the Program source to Black to the Preview source. The MDK-111A-M fades down from one source to black and then transitions to the next source.
    - **Take-Fade** — Select this option to perform a cut to black, then fade up to the next source.

- **Fade-Take** — Select this option to fade from one source to black and then cut to the next source.

This completes the procedure for setting up the transition options on the MDK-111A-M.

Transition Rates

Transition rates set how much time, in frames, the card takes to perform an Auto Transition. You can set rates for the Background and Key transitions using the options in the **On Air Control** tab.

Use the following procedure to set the Background and Key transition rates:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Set up your Keys as outlined in the section "**Configuring a Key**" on page 4-4.
3. Set up your transition options as outlined in the section "**Transitions Setup**" on page 4-7.
4. Click the **On Air Control** tab to display the menu options in the **Device View**.
5. When using an MDK-111A-M, set the **Background Transition Rate** as follows:
   - From the **BKGD Rate** menu, select a transition rate to set up.
   - Specify the rate, in number of frames, as required, in the **Slow Rate**, **Medium Rate** and **Fast Rate** fields.
6. Set the **Key Transition Rate** as follows:
   - From the **Key Rate** menu, select a transition rate to set up.
   - Specify the rate, in number of frames, as required, in the **Slow Rate**, **Medium Rate** and **Fast Rate** fields.
7. Set the **Auto Transition Rate** as follows:
   - From the **Key Rate** menu, select a transition rate to set up.
   - Specify the rate, in number of frames, as required, in the **Slow Rate**, **Medium Rate** and **Fast Rate** fields.

This completes the procedure for setting the Background and Key transition rates.

Performing a Cut Transition

Use the following procedure to perform a Cut transition on the card:

Note — *Clicking the **Cut** button while a transition is already in progress can either abort, or instantly finish the transition depending on the option selected in the **Personality** tab. Refer to the section, "**Configuring the Transition Buttons**" on page 3-16 for details.*

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Click the **On Air Control** tab to display the menu options in the **Device View**.
3. If required, configure the **Cut** button behavior during a transition as specified in the section "**Configuring the Transition Buttons**" on page 3-16.
4. When using an MDK-111A-K, verify the **Lock Keyers** option is configured as required.

5. When using an MDK-111A-M, to perform a Cut transition between Background sources:
   - Select a source for the Program output from the Background **Source** menu.
   - Select a source for the Preview output from the **Preview** menu.
   - Click **Cut** located below the **Background** thumbnail.
   - The selections for the Program and Preview menus swap in anticipation of the next transition.
6. To perform a Cut transition for a Key:
   - Select a source for the Program output from the desired Key **Source** menu.
   - Click the corresponding **Cut** button for the Key located below the applicable thumbnail.
   - The Key is transitioned on or off air. The **Key Status** field(s) indicates the on-air status of the key.
7. When using an MDK-111A-M, to perform a Cut transition between multiple sources:
   - Select the sources for the Program output using the options in the **Source** menus for each Key.
   - From the **Multiple Transition** area, select the **Include** button(s) for any Key or Background sources to be included in the transition.
   - Click **Cut** in the **Multiple Transition** area. The **Key Status** fields indicate the on-air status of each key included in the transition.

This completes the procedure for performing a Cut transition on the card.

Note — *To allow for audio cross fading, a cut takes six frames. Three frames are used for the audio fade down, the video is then cut, followed by a three frame audio fade up.*

Performing an Auto Transition

The speed at which the Auto transition is performed, in number of frames, is determined by the Transition Rate (Slow, Medium or Fast) set in the **Transition Rate** area.

Note — *Clicking the **AUTO** button while a transition in progress can either pause, ignore, or reverse the transition depending on the option selected in the **Personality** tab. Refer to the section "**Configuring the Transition Buttons**" on page 3-16 for details.*

Use the following procedure to perform an Auto transition on the card:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Select the **On Air Control** tab to display the menu options in the **Device View**.
3. If required, configure the **Auto** button behavior during a transition as specified in the section "**Configuring the Transition Buttons**" on page 3-16.
4. When using an MDK-111A-K, verify the **Lock Keyers** option is configured as required.
5. When using an MDK-111A-M, ensure the **Auto Trans Type** is set to the desired type in the **Transition Rate** area.
   - If the **Auto Trans Type** is set to **Mix,** the transition performs a fade directly between Background sources.

- If the **Auto Trans Type** is set to **Fade-Fade**, it fades to black then to the next Background source.
- If the **Auto Trans Type** is set to **Take-Fade**, it cuts to black, then fades up to the next Background source.
- If the **Auto Trans Type** is set to **Fade-Take**, it fades from one Background source to black and then cuts to the next Background source.

6. If you want to select a different transition rate, set it now. Refer to the section "**Transition Rates**" on page 4-9 for details.
7. When using an MDK-111A-M, to perform an Auto Background transition:
   - Ensure the Background sources are configured.
   - Click **Auto** located below the **Background** thumbnail.
   - The selections for the Program and Preview menus swap in anticipation of the next transition.
8. To perform an Auto Key transition:
   - Select the sources to be included in the transition.
   - Click the corresponding **Auto** button for the Key located below the applicable thumbnail.
   - The Key is transitioned on or off air. The **Key Status** field(s) indicate the on-air status of the key.
9. When using an MDK-111A-M, to perform a multiple Auto Background and an Auto Key transition simultaneously:
   - Select the sources to be included in the transition.
   - Select the **Include** button(s), located in the **Multiple Transition** area, for any Keys or Backgrounds to be included in the transition.
   - Click **Auto** in the **Multiple Transition** area.

This completes the procedure for performing an Auto transition on the MDK-111A-M.

Performing a Fade to Black

The **Fade to Black** feature allows you to fade to black, where the Program bus is faded to black at the Background Rate. This feature is only available on the MDK-111A-M.

Use the following procedure to perform a **Fade to Black**:

1. Display the **Device** tab of the MDK-111A-M by double-clicking its status indicator in the **Basic Tree View**.
2. Click the **On Air Control** tab to display the menu options in the **Device View**.
3. To perform a Fade to Black, toggle the **Fade to Black** button as follows:
   - **Fade Down** — When the button displays this label, clicking it performs an Auto transition to black. The button label changes to **Fade Up**.

Note — *If the **Fade Down/Fade Up** button is clicked while a Fade to Black is in transition, the Fade will reverse.*

   - **Fade Up** — When the button displays this label, clicking it performs an Auto transition from black. The button label changes to **Fade Down**.

This completes the procedure for performing a **Fade to Black**.

Media File Management

In This Chapter

This chapter provides information on managing the images and animations using the DashBoard options available for the MDK-111A-M and MDK-111A-K.

The following topics are discussed:

- Overview
- Loading Media Files
- Adjusting On-Air Properties
- Managing Media Files
- Configuring a Logo Channel to Display LTC

Overview

This section provides a general overview of the media file management features of the MDK-111A-M and MDK-111A-K.

DashBoard enables you to select and configure the four Logo channels that are loaded in the MDK-111A-M and MDK-111A-K. Each Logo channel has a sub-tab that enables you to assign a media file to the specified logo, view a thumbnail that represents the media file currently loaded, and adjust on-air properties.

The following tips and restrictions apply when managing your media files:

- Media files, such as stills and animations, are transferred to and from the MDK-111A-M and MDK-111A-K using FTP protocol. The media files are stored on a CompactFlash® card that is installed on the MDK-111A-M and MDK-111A-K.
- If you select an image size that is larger than the current video format this may corrupt the video output.
- When a media file is loaded, metadata, such as X/Y position, is also loaded, if it exists. Otherwise, default values are used. For animations, parameters are recalled after the last frame is loaded.
- When using Mac OS X™ to transfer files to the CompactFlash® Card via an FTP server, you may only have read-only access. Refer to your Mac OS X™ documentation for details.

For More Information...

- on loading a media file into a Logo channel, refer to the section "**Loading Media Files**" on page 5-3.
- on adjusting the position of a still image, refer to the section "**Adjusting On-Air Properties**" on page 5-5.
- on image specifications and renaming media files, refer to the section "**Managing Media Files**" on page 5-6.
- on managing media files using an FTP client, refer to the section "**Connection using FTP**" on page 5-7.
- on using the CompactFlash® card, refer to the section "**CompactFlash® Card**" on page 5-7.
- on using timecode, refer to the section "**Configuring a Logo Channel to Display LTC**" on page 5-8.

Loading Media Files

The MDK-111A-M and MDK-111A-K feature four Logo channels (Logos 1-4) into which you can load files from the CompactFlash® Card physically installed on the MDK-111A-M and MDK-111A-K. Each card has 2GB of DDR playout memory. **Table 5.1** lists an estimation of how many uncompressed frames can fit into the playout memory of the MDK-111A-M and MDK-111A-K.

Table 5.1 Full Frame Animation

Format	Image Size	No Alpha	With Alpha
1080i	1920x1080	388	256
720p	1280x720	872	580
PAL	720x576	1940	1292
NTSC	720x486	2300	1532

Note — *Very large animations may take several minutes to load.*

Loading a Media File

From the **Directory** menu in the each **Logo** sub-tab, files may be loaded from the following locations:

- **[PATTERNS] —** A virtual directory that currently contains timecode overlays. Refer to the section "**Configuring a Logo Channel to Display LTC**" on page 5-8 for information on loading Timecode files.
- **[RAM CACHE]** — A virtual directory that displays media files that are already loaded in the playout memory. Selecting this directory enables you to quickly access a pre-loaded file from the memory.
- **[ROOT]** — This is the default directory and represents the top-most directory on the CompactFlash® Card. You can manage files on the CompactFlash® Card using an FTP connection. Refer to the section "**Managing Media Files**" on page 5-6 for details.
- **User created directories** — A list of user-created directories using an FTP connection.

Use the following procedure to load a media file into a Logo channel:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Select a Logo channel as follows:
   - Select the **Logo** tab in the **Device View**.
   - Select the tab for the Logo channel you want to load the media file for.
3. If files were added or re-named using an FTP connection, click **Re-scan** to update the list of directories and filenames.
4. Select a media file to load to the Logo channel as follows:
   - From the **Directory** menu, select the directory you wish to load a file from.
   - From the **Filename** menu, select the file.

Note — *You can clear space in the image cache by selecting* ***None*** *from the* ***Filename*** *menu of any Logo channel. However, doing so immediately replaces the current media file with the file you are attempting to load.*

This completes the procedure for loading a media file into a Logo channel.

Adjusting On-Air Properties

The **Logo** tab in DashBoard allows you to adjust the position and play modes of media files.

Use the following procedure to adjust the on-air properties of a media file:

1. Load a media file as outlined in the section "**Loading a Media File**" on page 5-3.
2. Adjust the position of a still image in the viewing area of the screen as follows:

Note — *You cannot position any portion of an image off-screen. Full screen images cannot have their position adjusted.*

- **X Position** — Use this option to adjust the horizontal position of the image on the screen.
- **Y Position** — Use this option to adjust the vertical position of the image on the screen.

3. Adjust the characteristics of an animation as follows:
   - Use the **Auto Play** checkbox to set whether the animation automatically starts to play when it is taken on-air.
   - Use the **Looping** checkbox to set whether the animation will start over when it reaches the last frame of the animation.
   - When both **Auto Play** and **Looping** are enabled, the animation begins to play on a transition, and keeps playing in an endless loop. If another transition is triggered, the animation jumps to the first frame and keeps playing in an endless loop.
4. Select how an image is displayed by selecting an option from the **Play Mode** menu:

Note — *The **Play Mode** feature only applies to Interlaced video formats and has no effect when using Progressive video formats.*

- **Normal** — Select this option to have the entire frame of the image displayed.
- **Swap Fields** — Select this option to have Field 1 and Field 2 of the image swapped when they are displayed.
- **Field 1 Only** — Select this option to have only Field 1 of the image displayed.
- **Field 2 Only** — Select this option to have only Field 2 of the image displayed.

This completes the procedure for adjusting the on-air properties of a media file.

Managing Media Files

Media files, such as animations and still images, can be transferred to and from the CompactFlash® Card using an FTP connection. Once transferred to the CompactFlash® Card, you use the options in the Logo tab to load the files and assign them to a Logo channel.

This section outlines the specifications for media files and provides general information on using the CompactFlash® Card and an FTP connection.

For More Information...

- on assigning media files to Logo channels, refer to the section "**Loading a Media File**" on page 5-3.

Image Specifications

Media files used on the MDK-111A-M and MDK-111A-K must meet the specifications outlined in **Table 5.2**.

Table 5.2 Media File Specifications

Parameter	Specification
File Type	BMP, GIF, JPEG, PNG, TGA
Compression	compressed and uncompressed
1080 formats	1920x1080 pixels max. image size
720 formats	1280x720 pixels max. image size
PAL	720x576 pixels max. image size
NTSC	720x486 pixels max. image size
Animation Maximum Length	10,000 frames

File Naming Specifications

The name can contain letters, numbers, and spaces, but cannot contain symbols such as ! @ # & * ( ) ? / , ‘ “.

If you are naming an animation, each file must be numbered in the sequence that it will play out. The following restrictions apply to file names for animations:

- Each file can use a minimum 3-digit number, including all the leading zeros.
- The file name and number must be separated by an _ followed by three or more digits, then a period (.).
- Each file in the sequence must have the same numbering scheme.
- The MDK-111A-M or MDK-111A-K loads files in numerical order.

The following is an example of a 10-frame animation using a typical numbering scheme:

- DTVB_000.tga
- DTVB_001.tga
- ...
- DTVB_009.tga

Connection using FTP

You can use an FTP connection to media files to and from the CompactFlash® Card of the MDK-111A-M and MDK-111A-K. You can also use an FTP client to delete images on the CompactFlash® Card and re-name images.

To access the MDK-111A-M or MDK-111A-K via FTP:

- Have the IP address from Config-Ethernet.
- Ensure an ethernet cable is plugged into the MDK-111A-M or MDK-111A-K rear module. Refer to the section "**Ethernet Port Cabling**" on page 2-9 for connection details.

An FTP connection to the MDK-111A-M or MDK-111A-K should be established by your facility IT department. The following information is required to create an FTP connection:

- **User Name — user**
- **Password — password**

Connection using RossLinq™

RossLinq enables you to transfer still images directly from the XPression™ to a MDK-111A-M or MDK-111A-K Logo channel. You can transfer files into any of the directories for any of the Logo channels on the card. There are four directories, each corresponding to a specific Logo channel on the card. The file can be a format as listed in **Table 5.2**. Note that the transfer of animations is not supported at this time. To connect to the XPression via RossLinq, establish an FTP connection using the following information:

Note — *The RossLinq™ channel in XPression must be set as a passive FTP connection in order to set up communications between XPression and the MDK-111A-M or MDK-111A-K. Refer to the XPression documentation for details.*

- **IP Address** — This information is displayed in the **IP Address** field of the **Ethernet** tab in DashBoard for your card.
- **User Name — xpression**
- **Password — password**

For More Information...

- on XPression, refer to the ***XPression User Guide***.

CompactFlash® Card

The following tips and restrictions apply when using the CompactFlash® Card:

- the CompactFlash® Card must be installed on the MDK-111A-M or MDK-111A-K before the MDK-111A-M or MDK-111A-K powers up and must remain inserted.
- if you wish to remove the CompactFlash® Card for programming, you must re-boot the MDK-111A-M or MDK-111A-K when you re-install the CompactFlash® Card. This allows the MDK-111A-M or MDK-111A-K to recognize that a new CompactFlash® Card is available.
- the CompactFlash® Card is 2GB in size, the number of files you can store depends on the type of file (PNG, TGA, JPG). The **CompactFlash Status** field in the **Hardware** tab displays how much space is available on the CompactFlash® Card.

Configuring a Logo Channel to Display LTC

The **Logos** and **On Air Control** tabs in DashBoard enable you to assign an LTC input to a Logo channel, then assign that Logo channel to an output. This section summarizes the steps required to configure an output to display LTC text, and provides additional configuration information.

For More Information...

- on connecting an LTC device to the MDK-111A-M or MDK-111A-K, refer to the section "**Linear Timecode Cabling**" on page 2-11.
- on setting up communications between an LTC device and the MDK-111A-M or MDK-111A-K, refer to the section "**LTC Communication Setup**" on page 3-14.

Overview

The timecode information displays on-screen in one of the following formats:

--:--:--:--	This format is used when no LTC input signal is received.
HH:MM:SS:FF	This is the standard format. The timecode is displayed in Hours, Minutes, Seconds, and Frames. The drop-frames is not active.
HH:MM:SS;FF	The timecode is displayed in Hours, Minutes, Seconds, and Frames. The drop-frame is active.

Frame Count Range

The frame count range depends on the video format you are using:

- When using **Interlace Video Modes** (480i 59.94Hz and 1080i 59.94Hz), the range is from 00 to 29.
- When using **576i 50Hz** and **1080i 50Hz**, the range is from 00 to 24.
- When using **1080pSF 23.98Hz** and **1080pSF 24Hz**, the range is from 00 to 23.
- When using **720p 50Hz**, the range is from 00 to 49.
- When using **720p 59.94Hz**, the range is from 00 to 59.

Note — *When using a progressive video format, the LTC standard only provides a count of every second frame, but the MDK-111A-M or MDK-111A-K will increment and display the frame count on every frame.*

Configuring a Logo Channel to Display LTC

This section outlines how to configure an output on the card to display the timecode text from an LTC device.

Use the following procedure to configure a Logo channel for displaying LTC on-screen:

1. Display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
2. Select a Logo channel to configure as follows:
   - Select the **Logo** tab in the **Device View**.
   - Select the tab for the Logo channel you want to load the timecode file for.
3. Select a timecode file to load to the Logo channel as follows:

- From the **Directory** menu, select **[PATTERNS]**.
- From the **Filename** menu, select one of the following:
  - › **Timecode - Large** — The timecode is set in large font.
  - › **Timecode - Medium** — The timecode is set in medium font.
  - › **Timecode - Small** — The timecode is set in small font.

4. Adjust the transparency and other on-air properties for the output as described in the section "**Configuring a Key**" on page 4-4.

Note — *It is recommended to set the **Key Alpha Type** to **Unshaped**.*

5. Adjust the on-screen position of the timecode by selecting one of the following:
   - **X Position** — Use this option to adjust the horizontal position of the timecode on the screen.
   - **Y Position** — Use this option to adjust the vertical position of the timecode on the screen.
   - You cannot position any portion of a timecode off-screen.
6. Assign the Logo channel to an output as follows:
   - Click the **On Air Control** tab to display the menu options in the **Device View**.
   - Locate the output you wish to assign the Logo channel to.
   - From the associated **Source** (or **Key Source** when using an MDK-111A-K) box, select the Logo channel to assign it to the output.

This completes the procedure for configuring a Logo channel for displaying LTC on-screen.

Configuration Notes

Keep the following in mind when configuring a Logo channel for displaying LTC on-screen:

- The **Status** field on the **Logo** tab indicates the dimensions of the timecode file in the number of pixels. Note that this value changes depending on the video format you are using.
- To assign the same LTC to multiple outputs, configure a Logo channel with the LTC and then assign that Logo channel to multiple key sources.

  For example, to assign LTC to the Logo 3 channel and then assign it to multiple outputs on the MDK-111A-K:
  - › Configure **Logo 3** to display LTC.
  - › Navigate to the **On Air Control** tab of DashBoard.
  - › Select **Logo 3** from the **Source** box for Key 1, Key 2, Key 3, and Key 4.
- Should you attempt to load the same LTC to a second Logo channel, an error occurs and a message is displayed in the **Status** field of the second Logo tab.
- You can transition between the keys, or the Background when using an MDK-111A-M. This can be used to transition the LTC on and off air. Refer to the section "**Performing Transitions**" on page 4-7 for an overview of transitions. If you are using a MDK-111A-K, you can also enable the **Lock Keyers** feature to transition multiple outputs at one time.

Appendix A. DashBoard Menus

In This Appendix

The DashBoard Control System enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the openGear DFR-8300 series frames through a MFC-8300 Series Network Controller Card. This controller card is required in order to use DashBoard to monitor the MDK-111A-M and MDK-111A-K. Refer to the ***MFC-8300 Series User Manual*** for details.

This appendix briefly summarizes the menus, items, and parameters available from the DashBoard Control System™ for the MDK-111A-M and MDK-111A-K. Default values are noted with an asterisk (*). Some menu and options are card dependent. Names in brackets indicate the display name when using an MDK-111A-K.

The following topics are discussed:

- Status Menus
- Configuration Menus
- Proc Amps Menus
- Logos Menus
- Key Setup Menus
- On Air Control Menus

Note — *Before proceeding, ensure that you are running DashBoard software version 3.0.0 or higher. The DashBoard Control System software and user manual are available to download from the Ross Video website.*

Status Menus

This section briefly summarizes the read-only information displayed in the **Status** tabs.

Signal Tab

Table 6.1 summarizes the information displayed in the **Signal** tab.

Table 6.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Signal (Read-only)	Reference Status	Green - OK	Valid reference signal
		Red - No reference	No signal detected on selected reference input
		Red - Reference Unlocked	Signal detected, but not locked (or lock lost)
		Red - Invalid Reference	Signal detected, but incompatible with the current video mode
	Reference Format	Unknown	No signal present, or format is not recognized
		480i 59.94	Composite NTSC reference detected
		720p 59.94	
		1080i 59.94	Tri-level sync at 59.94Hz detected
		576i 50	Composite PAL reference detected
		720p 50	
		1080i 50	Tri-level sync at 50Hz detected
		1080PsF 24	Progressive segmented frames at 24Hz detected
		1080PsF 23.98	Progressive segmented frames at 23.98Hz detected
	Bkgd A Status	Green - OK	Normal operation
		Green - Alarm Suppressed	An alarm condition exists but is silenced
		Yellow - Invalid Signal	Signal detected but format not recongized
		Yellow - Incompatible format	Signal present but format does not match the video output format configuration of the card
		Red - No signal	No signal present on the input
	Bkgd B Status	Same parameters as above	
	Ext Key Status (Bkgd C Status)	Same parameters as above	
	Ext Alpha Status (Bkgd D Status)	Same parameters as above	
	Bypass Relay	Green - Normal (not in bypass)	Video is being routed through the card; keyers may be active
		Red - Active (in bypass)	BKGD A (BNC 3) bypasses the card and is looped passively on Output 1 (BNC 5) through the relay

Table 6.1 Signal Tab Items

Tab Title	Item	Parameters	Description
Signal (Read-only)	Timing Display	Relative to Reference	The **Bkgd Timing** fields display the input signal timing values relative to the selected analog reference
		Input to Output	The **Bkgd Timing** fields display the input signal timing values relative to the SDI output of the card
	Bkgd A Timing	## Clocks ## lines	Indicates the timing of the BKGD A input signal relative as specified in the **Timing Display** feature. Where 1 clock is 1 period of 27MHz (SD) or 1 period of 148.xMHz (HD)
		Green	The BKGD A input signal is within the valid range
		Yellow	The BKGD A input signal is outside the valid range; a vertical shift will occur[a]
		Grey	The BKGD A input signal is not available
	Bkgd B Timing	Same parameters as above	
	Ext Key Timing (Bkgd C Timing)	Same parameters as above	
	Ext Alpha Timing (Bkgd D Timing)	Same parameters as above	
	Output Timing	## Clocks ## lines	Indicates the timing of the output signals relative to the reference
	Bkgd A Audio	1**s** 2**x** 3**a** 4s	Displays the audio status for each of the four audio groups where **s** indicates the presence of synchronous audio on the group, **x** indicates that audio is not present, and **a** indicates the presence of asynchronous audio on the group Only available for the MDK-111A-M
	Bkgd B Audio	Same parameters as above; only available for the MDK-111A-M	

a. The inputs on the card are line-synchronized. Therefore, in order to avoid vertical shifts of the video, the input signals must be timed within approximately +/- half a line.

Hardware Tab

Table 6.2 summarizes the information displayed in the **Hardware** tab.

Table 6.2 Hardware Tab Items

Tab Title	Item	Parameters	Description
Hardware (Read-only)	Voltage (V)	#	Supply Voltage, in Volts
	Current (mA)	#	Current consumption of card in milliAmperes
	Power (W)	#	Power consumption of card in Watts
	FPGA Temp	##C[a] / ##F	FPGA core temperature

Table 6.2 Hardware Tab Items

Tab Title	Item	Parameters	Description
Hardware (Read-only)	CPU Usage	x.xx/y.yy/z.zz[b]	CPU Load average
	RAM Available	#/##	CPU Memory Used / Total CPU Memory
	CF Card Status	#.## of 2.0 GB used	Displays the amount of memory used on the CompactFlash® card
		Missing	CompactFlash card is not present
		Unreadable	An error has occurred such as incompatible CompactFlash card, or an error reading the card
	Playout RAM	a/b/c/d	Displays RAM memory usage where: • **a** represents the memory in use • **b** represents the memory cache from previously loaded files • **c** represents the memory dedicated to the frame sync buffers and related functions. Note that this memory is unavailable for images and animations. • d represents the total playout memory

a. A warning is displayed in DashBoard when the FPGA Core Temperature reaches 85°C. If the temperature reaches 110°C, the card will automatically shut down to avoid permanent damage and will have to be reset, rebooted, or power cycled to resume normal operation.

b. The CPU Load average is displayed in the following format where x.xx represents in the last minute, y.yy represents the last five minutes and z.zz is the last fifteen minutes.

Product Tab

Table 6.3 summarizes the information displayed in the **Product** tab.

Table 6.3 Product Tab Items

Tab Title	Item	Parameters	Description
Product (Read-only)	Product	MDK-111A-M or MDK-111A-K	
	Supplier	Ross Video Ltd.	
	Board Rev	##	
	Serial Number	######	
	Rear Module	#	Type of Rear Module in this slot
	Software Rev	#.# build ###	Indicates the software and build versions
	Firmware Rev	##.##	Indicates the FPGA version number

Configuration Menus

This section briefly summarizes the options and tabs available in the **Config** tab.

Video Configuration

The following table summarizes the **Video** tab options available in Dashboard.

Table 6.4 Video Tab Options

Option	Item	Parameters	Description
Reference Setup	Reference Input	Frame 1*	The card is using Frame Reference 1
		Frame 2	The card is using Frame Reference 2
		External	The card is using the reference on BNC 9
	Output Format	480i 59.94	The format of the output signal of the card
		720p 59.94	
		1080i 59.94	
		576i 50	
		720p 50	
		1080i 50	
		1080PsF 24	
		1080PsF 23.98	
Output Setup	Output 1	Program*	Output 1 displays the program output
		Preview	Output 1 displays the preview output
		Clean Feed #	Output 1 displays the specified clean feed output
		Program A (read-only)	When using an MDK-111A-K, Output 1 is fixed to Program A
	Output 2	When using an MDK-111A-M, same parameters as above[a]. When using an MDK-111A-K, Output 2 is fixed to Program B.	
	Output 3	When using an MDK-111A-M, same parameters as above[b]. When using an MDK-111A-K, Output 3 is fixed to Program C.	
	Output 4	When using an MDK-111A-M, same parameters as above[c]. When using an MDK-111A-K, Output 4 is fixed to Program D.	
	Dithering	Disabled*	Dithering is disabled
		Enabled - low	Dithering is enabled and set to 2bits
		Enabled - med	Dithering is enabled and set to 3bits
		Enabled - high	Dithering is enabled and set to 4bits
	Clip at Black	Selected	SuperBlack is clipped on all outputs
		Cleared*	SuperBlack is not clipped
	Clip at White	Selected	SuperWhite is clipped on all outputs
		Cleared*	SuperWhite is not clipped

Table 6.4 Video Tab Options

Option	Item	Parameters	Description
Output Setup	NTSC Pass Line 21	Selected	Line 21 passes through unaltered
		Cleared*	Line 21 is treated as active video
Signal Loss Alarm	Bkgd A	Selected*	An alarm is triggered when a missing or an invalid signal is detected on the BKGD A input
		Cleared	The alarm is suppressed when a missing or an invalid signal is detected on the BKGD A input
	Bkgd B	Same parameters as above	
	Ext Key (Bkgd C)	Same parameters as above	
	Ext Alpha (Bkgd D)	Same parameters as above	

a. The default value is Program.
b. The default value is Preview.
c. The default value is Clean Feed.

Audio Configuration

The following table summarizes the **Audio** tab options available in DashBoard. Note that this tab is unavailable when using an MDK-111A-K.

Table 6.5 Audio Options

Option Title	Item	Parameters	Description
Audio	Audio Mixing	Enabled*	Audio follows video; use for normal PCM audio
		Disabled	Audio is hard-cut during transition; use for non-PCM audio such as Dolby®

GPI Configuration

The menu items available in the **GPI/Tally Setup** tab enable you to configure the functions, trigger, and polarity of each GPI connected to the MDK-111A-M or MDK-111A-K.

Table 6.6 GPI Setup Menu Items

Option Title	Item	Parameter	Description
GPI #	Function	GPI Cut Bkgd	A cut is performed between the Background sources when this GPI input is triggered. This option is only available to the MDK-111A-M.
		GPI Auto Bkgd	An auto transition is performed between the Background sources when this GPI input is triggered. This option is only available to the MDK-111A-M.
		GPI Cut Key #	The key is cut on-air or off-air when this GPI input is triggered

Table 6.6 GPI Setup Menu Items

Option Title	Item	Parameter	Description
GPI #	Function	GPI Auto Key #	An auto transition is performed to bring the key on-air or off-air when this GPI input is triggered
		GPI Fade to Black	A fade to black is performed when this GPI input is triggered. This option is only available to the MDK-111A-M.
		None*	The GPIO port is not configured and the GPI has no effect (default)
		Timecode Input	The GPIO port is used to communicate with an LTC device to input timecode. The **Trigger** and **Polarity** settings are ignored.
	Trigger	Edge*	Performs the function when a transition edge is detected on the GPI input. The Low-to-High or High-to-Low active edge is set by the Polarity control.
		Level	Performs the function when a voltage level is driven on the GPI input. The voltage level High or Low is set by the Polarity control.
	Polarity	High/Rising	Sets the polarity of the edge or level trigger. In the case of edge trigger, a Low-to-High transition starts the function. In the case of level trigger, a high level starts the function.
		Low/Falling*	Sets the polarity of the edge or level trigger. In the case of the edge trigger, a High-to-Low transition starts the function. In the case of level trigger, a low level starts the function.

Tally Configuration

The menu items available in the **GPI/Tally** tab enable you to configure each Tally.

Table 6.7 Tally Setup Menu Items

Option Title	Item	Parameter	Description
Tally #	Function	Tally A (Tally Bkgd A)	Configures the selected GPI/O port as an output and reflects the on-air status of BKGD A.
		Tally B (Tally Bkgd B)	Configures the GPI/O port as an output and reflects the on-air status of BKGD B.
		Tally Ext Key (Tally Bkgd C)	Configures the GPI/O port as an output and reflects the on-air status of the Key Video.
		Tally Ext Alpha (Tally Bkgd D)	Configures the GPI/O port as an output and reflects the on-air status of the Key Alpha.
		Tally Key #	Configures the GPI/O port as an output and reflects the on-air status of the Key video.
		Tally Any Key	Configures the GPI/O port as an output; the Tally active when any of the Keys are on-air.

Table 6.7 Tally Setup Menu Items

Option Title	Item	Parameter	Description
Tally #	Function	None*	The GPI/O port is not configured and the tally has no effect.
	Polarity	High/Rising	When asserted, the Tally output is driven High
		Low/Falling*	When asserted, the Tally output is driven Low

Remote Control Configuration

The **Remote Control** tab enables you to set up serial communications between the MDK-111A-M, or MDK-111A-K, and a device connected to the Serial COM port on the Rear Module or via a network connection. Note that the default values for the Port Type, Bit Rate, Data Bits, Parity, and Stop Bits values change depending on the Protocol selected.

Table 6.8 Remote Control Tab Items

Tab Title	Item	Parameter	Description
Serial Port	Port Enabled	Selected	Enables the serial port on the Rear Module to communicate with a serial device
		Cleared*	Disables the serial port on the Rear Module
	Protocol	M-2100*	Selects the serial communication protocol for the external device connected to the Serial COM port
		Timecode	
	Port Type	RS 232	Selects the electrical standard for the Serial COM port on the rear module
		RS 422	
		RS 422 unterm	
		RS 422 NULL	
		RS 422 NULL unterm	
	Bit Rate	9600	Selects the bit rate for the external device connected to the Serial COM port
		19200	
		38400	
		57600	
		115200	
	Data Bits	7	Sets the number of data bits transmission (character length)
		8	
	Parity	None	Sets the Parity type
		Even	
		Odd	
	Stop Bits	1	Sets the number of stop bits transmission
		2	

Table 6.8 Remote Control Tab Items

Tab Title	Item	Parameter	Description
Ethernet Port - M-2100	Enabled	Selected	Enables M-2100 communication on the ethernet port
		Cleared*	Disables M-2100 communication on the ethernet port
	Protocol	TCP*	Specifies the Transport Layer Protocol to use for M-2100 communications over an ethernet connection
		UDP	
	Port	1-32767[a]	• Specifies the port address • TCP ports 0, 21, 22, 80, and 6667 are unavailable for serial communications

a. The default value is 9000.

Ethernet Configuration

The **Ethernet** tab enables you to set up network communications for your card.

Table 6.9 Ethernet Tab Items

Tab Title	Item	Parameter	Description
Ethernet	Method	Static	User manually supplies the Ethernet settings
		DHCP*	Automates the assignment of the Ethernet settings
	IP Address	##.#.#.###	The IP Address for the card
	Subnet Mask	###.#.#.#	The subnet mask for the card
	Default Gateway	##.#.#.#	The gateway for communication outside of the local area network (LAN)
	Apply Changes		Applies and saves any changes made to the **Ethernet Settings**
	Cancel		Cancels any setting changes and resets the **Ethernet Settings** to the previous values
	Ethernet Status (read-only)	OK	Ethernet communications for the card are valid
		Link Down	Ethernet communications for the card are invalid. The ethernet cable may be disconnected on the rear module or the ethernet network may be down or experiencing problems.
		No IP Address	The following conditions are occurring: • The **Method** is set to **DHCP**. • The ethernet cable connected to card rear module is connected. • A valid IP Address could not be obtained. The DHCP server may be down or is still powering up after a power outage.
	MAC Address (read-only)	##:##:##:##:##:##	The MAC Address for the card

Personality Configuration

The menu items available in the **Personality** tab enable you to specify the transition behavior of the buttons available in the **On Air Controls** tab for the MDK-111A-M and MDK-111A-K.

Table 6.10 Personality Tab Items

Option Title	Item	Parameter	Description
Transition Behavior	Cut Button	Abort*	Returns the transition to the beginning when the **Cut** button is toggled
		Finish	Instantly finish the transition when the **Cut** button is toggled
		Ignore	Disregard any successive presses of the **Cut** button until the transition is complete
	Auto Button	Pause/Resume*	Pause the transition when the **Auto** button is toggled, and resume the transition when the button is pressed again
		Reverse	Reverse the transition back to the start
		Ignore	Disregard any successive presses of the **Auto** button until the transition is complete
Timing Display	Timing Display	Relative to Reference*	The **BKGD Timing**, **Ext Key Timing**, and the **Alpha Timing** fields in the **Signal** tab displays the timing values relative to the reference
		Input to Output	The **BKGD Timing**, **Ext Key Timing**, and the **Alpha Timing** fields in the **Signal** tab displays the timing values relative to the output
Card Lock	Edit Permission	Unlocked*	All menu items are unlocked and can be edited
		Locked	All menu items, except this one, are locked and read-only. The card can still be controlled by GPI and/or GVG M-2100 commands if these features were enabled prior to locking.

Load/Save

The menu items available in the **Load/Save** tab enable you to reset menu parameters for the card to the factory default values.

Table 6.11 Load/Save Tab Items

Option Title	Item	Parameter	Description
Global Settings	Load Factory Defaults		Resets all DashBoard parameters and values (excluding ethernet, reference, and output format settings) to the factory default values

Proc Amps Menus

Table 6.12 summarizes the **Proc Amps** tab options available in DashBoard. Each output has a sub-tab to select which output is to be modified.

Table 6.12 Proc Amps Options

Option Title	Item	Parameters	Description
Output #	Enable	Selected	Enables the adjustment of Proc Amp settings for the selected output
		Cleared*	The Proc Amp settings for the selected output are inactive
	Video Gain (%)	0 to 200[a]	Adjusts the Chroma and Luma Gain values simultaneously
	Chroma Gain (%)	0 to 200[b]	Adjusts the Cr and Cb values of the output video signals: • Increasing the gain increases the saturation of colors • Decreasing the gain desaturates the colors until the signal is black and white
	CB Gain (%)	0 to 200[c]	Adjusts the Cb component of the chrominance video signal: • Increasing the value causes the video signal colors to become increasingly saturated with blue • Decreasing the value desaturates blue from the video signal
	Black Offset (IRE)	-8 to 100[d]	Selects how much of the input video signal values are mapped to black in the output signal: • Increasing the value increases the black level and lightens the image • Decreasing the value darkens the image
	Procamp	Reset	Resets the Proc Amp menu settings for the selected output to the default values

a. The default value is 100.
b. The default value is 100.
c. The default value is 100.
d. The default value is 0.

Logos Menus

Table 6.13 summarizes the **Logos** tab options available in DashBoard. Each logo has a sub-tab to select which logo is to be modified.

Table 6.13 Logos Options

Option Title	Item	Parameters	Description
Logo #	Video Image	Displays a thumbnail image	• Displays a small image that represents the currently loaded media file. For animations, the fifth frame is displayed. • Only available when the card ethernet port is connected and properly configured • A black box with text indicates that no image is currently loaded
	Alpha Image	Displays a thumbnail image	• Displays a small image that represents the currently loaded media file on the Alpha channel. For animations, the fifth frame is displayed. • A blank area indicates that the current image has no alpha channel
	File	xxx_####.yyy	• Indicates the full path of the currently loaded file • #### represents the duration of the file if it is an animation
	Status	Loading frame X of Y	• Displays information about the channel in both the number of frames (integer), and in the number of seconds (fractional) • Any errors during loading are also displayed • When the file(s) have loaded, this field displays the dimensions of the image (e.g. 1920x1080)
		Animation loaded (#)	
		Single image loaded (#)	
		Idle	
	Selected on (read-only)	###	Indicates all the key(s), or backgrounds, that currently have the media file selected
		None	
	On Air (read-only)	###	Indicates the on-air key(s), or backgrounds, that have this media file selected
	Directory	[PATTERNS]	Provides a list of virtual files loaded in the card memory, such as timecode information
		[RAM CACHE]	• The field displays the directory the currently selected media file is located in • Provides a list of all of the directories on the CF Card • Displays the total memory usage of the RAM CACHE
		[ROOT]	
		###	

Table 6.13 Logos Options

Option Title	Item	Parameters	Description
Logo #	Filename	xxx.yyy xxx_####.yyy	• Displays the name of the currently selected media file • Animation filenames include an underscore followed by three or more digits. The number of frames, and duration in seconds, is displayed in brackets after the filename. • Updated when a new Directory is selected in the **Directory** menu • Provides a list of all the media files in the currently selected directory. Note that animations appear as a single entry.
		[NONE]	Selecting this option clears the logo channel. This item is automatically selected, without clearing the channel, when the user switches to a new directory
	File List	Rescan	Pressing the button: • updates the Directory menu options • updates the Filename menu options
	X Position	## to ##[a]	• Adjusts the position of the image along the X-axis in number of pixels • The range varies depending on the output video format
	Y Position	## to ##[a]	• Adjusts the position of the image along the Y-axis in number of pixels • The range varies depending on the output video format
	Auto Play[b]	Selected*	The animation starts to play when a transition occurs
		Cleared	The animation starts playing as soon as the animation is loaded to the bus
	Looping[c]	Selected*	The animation starts over when it reaches the last frame of the animation
		Cleared	The animation stops when it reaches the last frame of the animation
	Play Mode	Normal	The entire frame of the image is displayed
		Swap Fields	Field 1 and Field 2 of the image are swapped when they are displayed
		Field 1 Only	Field 1 of the image is displayed
		Field 2 Only	Field 2 of the image is displayed

a. Default value is 0 which represents the top-left corner of the active picture area.
b. This option is only applicable when an animation file is selected.
c. This option is only applicable when an animation file is selected.

Key Setup Menus

Table 6.14 summarizes the **Key Setup** tab options available in DashBoard. Each key has a sub-tab to select which key is to be modified.

Table 6.14 Key Setup Menu Items

Option Title	Item	Parameters	Description
Key #	Clip	4 to 1019[a]	Adjusts the clip values
	Gain	0 to 100[b]	Adjusts the gain values
	Clip & Gain	Make Linear	Resets the clip and gain values to the default settings
	Key Invert	Selected	The polarity of the Key Alpha is inverted
		Cleared*	The Key Alpha is not inverted
	Key Type	Auto Select*	A Key which two video signals (Alpha and Fill) are used
		Self	A Key that uses the luminance values of the key source for the alpha
	Key Alpha Type	Unshaped	The card performs a multiplicative key. The Key Alpha mixes the Key Video with the BKGD.
		Shaped*	The card performs an additive key. The Key Alpha cuts a hole in the BKGD and the Key Video is added to the BKGD.
	Transparency	0 to 100[c]	Adjusts the transparency level of the key
	Box Mask	Off*	Disables this feature
		On	Applies the mask to the key
		Inverted	Reverses the mask. The portion of the image that was masked is now visible and the portion that was visible is now masked.
	Mask Top Edge	0 to #[d]	Adjusts the location of the top edge of the mask
	Mask Bottom Edge	0 to #[d]	Adjusts the location of the bottom edge of the mask
	Mask Left Edge	0 to #[d]	Adjusts the location of the left edge of the mask
	Mask Right Edge	0 to #[d]	Adjusts the location of the right edge of the mask

a. The default value is 940.
b. The default value is 50.
c. The default value is 0.
d. The range of values are dependent on the video format.

On Air Control Menus

Table 6.15 summarizes the **On Air Control** options available in DashBoard.

Table 6.15 On Air Control Options

Option Title	Item	Parameters	Description
Background (Program A)	Image	Displays a thumbnail image	Displays a thumbnail image that represents the BKGD source
	Key Status (read-only)	ON AIR	Program A is on-air (MDK-111A-K only)
		OFF AIR	Program A is not on-air (MDK-111A-K only)
	Source (Bkgd Source)	Black	Assigns Black as the program output
		Bkgd #	Assigns the selected Background source as the program output
		Ext Key	Assigns the external key source as the program output (MDK-111A-M only)
		Ext Alpha	Assigns the external alpha source as the program output (MDK-111A-M only)
		Logo #	Assigns the selected Logo media file as the program output
		Alpha #	• Assigns the Alpha from the specified Logo • Black is displayed if there is no Logo loaded or if the Logo does not have an alpha channel
	Preview (Key Source)	Black	Assigns Black as the preview output
		Bkgd #	Assigns the selected Background source as the preview output
		Ext Key	Assigns the external key source as the preview output (MDK-111A-M only)
		Ext Alpha	Assigns the external alpha source as the preview output (MDK-111A-M only)
		Logo #	Assigns the selected Logo media file as the preview output
		Alpha #	• Assigns the Alpha from the specified Logo • Black is displayed if there is no Logo loaded, or if the current Logo does not have an alpha channel
	Cut	Cut	Performs an instantaneous transition between the BKGD sources selected in the **Source** and **Preview** areas
	Auto	Auto	Performs the transition, as specified in the **Auto Trans Type** menu, between the BKGD sources selected in the **Source** and **Preview** areas, at the Bkgd rate

Table 6.15 On Air Control Options

Option Title	Item	Parameters	Description
Background (Program A)	Lock Keyers (MDK-111A-K only)	Selected	When locked, the key transition and states are locked. Selecting a **Cut** or **Auto** button transitions all keys at the same time.
		Cleared*	When unlocked, the key transition and states are separate. Selecting a **Cut** or **Auto** button transitions only the selected key.
Key # (Program #)	Image	Displays a thumbnail image	Displays a thumbnail image that represents the Key source
	Key Status (Read-only)	ON AIR	The key is on-air
		OFF AIR	The key is not on-air
	Source (Key Source)	Black	Assigns Black as the Key output
		Bkgd #	Assigns the selected BKGD source as the Key output
		Ext Key	Assigns the external Key video source as the Key output (MDK-111A-M only)
		Ext Alpha	Assigns the external Alpha source as the Key output (MDK-111A-M only)
		Logo #	Assigns the selected Logo media file as the Key output
		Alpha #	• Assigns the Alpha from the specified Logo • Black is displayed if there is no Logo loaded or if the Logo does not have an alpha channel (MDK-111A-M only)
	Cut	Cut	Performs an instantaneous transition to take the Key on-air or off-air
	Auto	Auto	Performs a dissolve to transition the key on or off air. The speed of the transition is controlled by the **Key Rate** setting.
Multiple Transition (using Bkgd Rate)[a]	Include	Bkgd	Includes the BKGD source in the next transition
		Key #	Includes the specified Key source in the next transition
	Cut	Cut	Performs a cut between the BKGD sources and the included Key sources simultaneously
	Auto	Auto	Performs an auto transition between the BKGD sources and the included Key sources simultaneously
	Fade To Black	Fade Down*	The Program output fades to black (both the BKGD and the Key)
		Fade Up	The Program output fades from black back to its normal state; both the BKGD and Key are visible (if on-air)

Table 6.15 On Air Control Options

Option Title	Item	Parameters	Description
Transition Rates	Auto Trans Type (MDK-111A-M only)	Mix*	A Video Cross Fade is performed for BKGD transitions and multiple transitions
		Fade-Fade	A Video V-Fade, through black, is performed for BKGD transitions and multiple transitions
		Take-Fade	A cut to black is performed then a fade up to the next BKGD source; this also applies to multiple transitions
		Fade-Take	The BKGD fades to black then performs a cut to the next BKGD source; this also applies to multiple transitions
	Bkgd Rate (MDK-111A-M only)	Slow	Sets the BKGD transition rate to Slow
		Medium*	Sets the BKGD transition rate to Medium
		Fast	Sets the BKGD transition rate to Fast
	Key Rate	Same parameters as above[b]	
	Slow Rate	1 to 999[c]	Defines the Slow Rate in frames
	Medium Rate	1 to 999[d]	Defines the Medium Rate in frames
	Fast Rate	1 to 999[e]	Defines the Fast Rate in frames

a. This area and options are not available for the MDK-111A-K.
b. The default value is Fast.
c. The default value is 60 frames (2 seconds) when using 59.94Hz formats. When using 50Hz formats, the default value is 50 frames.
d. The default value is 30 frames (1 second) when using 59.94Hz formats. When using 50Hz formats, the default value is 25 frames.
e. The default value is 15 frames (0.5 second) when using 59.94Hz formats. When using 50Hz formats, the default value is 12 frames.

Appendix B. Serial Protocols

In This Appendix

This appendix describes the communications protocol systems used with the MDK-111A-M and MDK-111A-K.

The following topics are discussed:

- GVG M-2100 Emulation Protocol

GVG M-2100 Emulation Protocol

The MDK-111A-M and MDK-111A-K serial interface provides a communication link between a computer based editing or automation system and the MDK-111A-M or MDK-111A-K. This section briefly outlines the GVG M-2100 emulation protocol system when used with the MDK-111A-M and MDK-111A-K.

For specific details on the protocol, refer to your ***GVG M-2100 Automation Interface Protocol Manual***.

Note — *Using the GVG M-2100 protocol may cause the card to enter a condition where DashBoard may not properly reflect the current status of the card.*

Pinout Connections

When connecting to a device using the GVG M-2100 protocol, refer to the section "**Serial COM Port Pin Assignment**" on page 2-8 for pinout information for the **Serial COM** port. Refer to the documentation that came with your M-2100 protocol device for specific pinout information.

Communication Settings

Unless otherwise stated by the GVG M-2100 Automation Interface Protocol Manual, use the following communication settings when connecting a GVG M-2100 protocol device to the MDK-111A-M or MDK-111A-K.

Table 7.1 GVG M-2100 Communication Settings

Setting	Value
Baud	38400bps
Data Bits	8
Parity	None
Stop Bits	1

Emulation Commands

This section provides a brief overview of the M-2100 emulation commands supported by the MDK-111A-M and MDK-111A-K.

Table 7.2 Supported GVG M-2100 Emulation Commands

Emulation Command	Supported	Notes
Next Transition (0x01, TX_NEXT)	✓	• Either bit 0, or bit 1, or both must be selected. • Bit 00 is ignored.
Start Transition (0x02, TX_START)	✓	**Trigger Mod** Bit 1-7 are ignored/reserved.
Select Transition Type (0x03, TX_TYPE)	✓	The card does not support wipes. If a wipe transition is selected, the card returns an error. The card does not support custom transitions.

Table 7.2 Supported GVG M-2100 Emulation Commands

Emulation Command	Supported	Notes
Select Transition Rate (0x04, TX_RATE)	✓	The card supports Slow, Medium, and Fast Rates, selectable in DashBoard, and not based on the transition type selected. The **Rate type** 04 byte value will not be returned by the card. Note that the maximum transition rate is 999 frames.
Transition Status (0x05, TX_STAT)		• Not currently supported. The card always returns 03. • Audio is quiescent (01).
Transition Status (0x15, TX_STAT2)		• Not currently supported. The card always returns 03. • Audio is quiescent (01).
Crosspoint Take (0x06, XPT_TAKE)	✓	• **Bus Select** Bit values 2-15 are ignored/reserved. • **Crosspoint** byte values 01-16 designate the crosspoint number. • **Audio Only Crosspoint** byte value is not supported. • Hot cuts (XPT-Take, 0x06) are not allowed when a transition is in progress. • Refer to **Table 7.3** for details on crosspoint mapping.
Break Away (0x07, BREAK_AWAY)		Not currently supported.
Audio Over Select (0x08, OVER_SELECT)		Not currently supported.
Audio Over to Main Ratio (0x09, OVER_RATIO)		Not currently supported.
Key Modifier (0x0A, KEY_MOD)	✓	**Keyer Select** byte value: Bit 4 is not supported **Keyer Modifier** byte value is supported as follows: • Bit 0 where 0 = Self, 1 = External • Bit 1 is not supported • Bit 2-4 is ignored **SqueezeBack** byte value is not supported.
Key Enable (0x0B, KEY_ENABLE)	✓	Bit 4 is not currently supported.
Key Status (0x0C, KEY_STAT)	✓	Bit 4 is not currently supported.
Automation Enable Status (0x0D, AUTO_STAT)	✓	This command sends an Enabled reply to a Status query. On the card, the Automation interface can be disabled on the DashBoard Remote tab by clearing the Port Enabled checkbox. If you disable the Automation interface, there will be no response to commands including this one.
Stop Ongoing Transition (0x0E, ALL_STOP)		Not currently supported.
Current Preroll Time (0x0F, PREROLL)		Not currently supported.
Configuration Preroll Time (0x10, CONFIG_PREROLL)		Not currently supported.
Remaining Time Display (0x11, REMAINING_TIME)		Not currently supported.
System Status (0x12, SYSTEM_STAT)	✓	This reply returns only a value of 0, indicating an “OK” condition.

Table 7.2 Supported GVG M-2100 Emulation Commands

Emulation Command	Supported	Notes
System Configuration (0x13, SYSTEM_CONFIG)	✓	This reply returns only a value of 0, indicating an "OK" condition.
Crosspoint Audio Mode (0x14, XPT_AUDIO_MODE)		Not currently supported.
GPI Button Operation (0x17, GPI)		Not currently supported.
Select Wipe Patterns (0x18, WIPE_SEL)		Not currently supported.
Error Status (0x20, ERROR_STAT)	✓	This query should only be issued after a NAK was received from the card or the card did not perform the desired action. If no errors have occurred since the last message was received by the card, an error code of NO_ERR is returned.
Protocol/Version (0x21, PROTO_VER)	✓	Protocol version is set to 3.0.

Crosspoint Take (0x06, XPT_TAKE)

Table 7.3 provides a list of crosspoints for the XPT_TAKE command. Note that values not listed in this table are undefined and are not recommended for use.

Table 7.3 Crosspoint Take (0x06, XPT_TAKE)

Selecting Crosspoint	Selects
0x00	No Change
0x01	Black
0x05	BKGD A
0x06	BKGD B
0x07	Key Video
0x08	Key Alpha
0x09	Logo 1
0x0a	Alpha 1
0x0b	Logo 2
0x0c	Alpha 2
0x0d	Logo 3
0x0e	Alpha 3
0x0f	Logo 4
0x10	Alpha 4

Appendix C. Specifications

In This Appendix

This appendix provides information on the specifications for your MDK-111A-M and MDK-111A-K. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section includes the technical specifications for the MDK-111A-M and MDK-111A-K.

Table 8.1 MDK-111A-M and MDK-111A-K Technical Specifications

Category	Parameter	Specification
Serial Digital Video Inputs	Number of Inputs	4
	SDI Data Rates and SMPTE Standards Accommodated	• SMPTE 259M (270Mbps) • SMPTE 292M (1.485 Gbps)
	Impedance	75ohms
	Return Loss	SDI IN 1: 15dB to 1.5GHz SDI IN 2-4: >15dB to 1.5GHz
	Equalization	80m
Serial Digital Video Outputs	Number of Outputs	4
	Impedance	75ohms
	Return Loss	SDI OUT 1: 15dB to 1.5GHz SDI OUT 2-4: >15dB to 1.5GHz
	Signal Level	800mV +/-10%
	DC Offset	0+/-50mV
	Rise and Fall Time	SD: 900ps typical HD: 150ps typical
	Overshoot	<10% typical
Cable Lengths	RS-232 Serial Interface Maximum Cable Length	10m
	RS-422 Serial Interface Maximum Cable Length	300m
Environment	Maximum ambient temperature with a 1RU space above frame	40°C
	Maximum ambient temperature without a 1RU space above frame	35°C
Power Consumption	Power Consumption	22W

Appendix C. Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your MDK-111A-M or MDK-111A-K, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the "**Contact Us**" section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check —** Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reference Signal Status** — Verify that the analog reference (blackburst or tri-level) is supplied on one of the three reference inputs. Check the Reference Input and the Output Format settings. Also check the status of the reference by navigating to the Reference Status field located on the Signal tab in DashBoard.
4. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
5. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
6. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Warranty and Repair Policy

The MDK-111A-M and MDK-111A-K are warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your MDK-111A-M or MDK-111A-K proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this MDK-111A-M or MDK-111A-K has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the MDK-111A-M or the MDK-111A-K are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your MDK-111A-M or MDK-111A-K, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your MDK-111A-M or MDK-111A-K. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

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Notes:

Contact Us

Contact our friendly and professional support representatives for the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

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	After Hours Emergency	613 • 349 • 0006
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