Ross Video Limited

CDK-111A-M
Owner's Guide

Installation and Operation

Software Issue 4.10

ROSS

Live Production Technology™

CDK-111A-M Owner's Guide • Installation and Operation

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Notice

Trademarks

RossGear Terminal Equipment • Warranty and Repair Policy

This **RossGear** product is 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 RossGear CDK-111A-M 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 RossGear CDK-111A-M has failed after your warranty period has expired, we will repair your defective product for as long as suitable replacement components are 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 RossGear CDK-111A-M Owner's Guide provides all pertinent information for the safe installation and operation of your RossGear CDK-111A-M. Ross Video policy dictates that all repairs to the CDK-111A-M 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 CDK-111A-M, 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 CDK-111A-M. A temporary replacement module, if required, 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 this equipment.

Important Regulatory and Safety Notices

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

Products may require specific equipment, and /or installation procedures 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 RossGear 8000 series frame. Refer to the RossGear 8000 series frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it's 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 cords from the chassis' rear appliance connectors before servicing this area.

Warning

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 within 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 type and rating.

Only use attachments/accessories specified by the manufacturer.

EMC Notices

US 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 users will be required to correct the interference at their own expense.

Notice

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

CANADA

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

Cet appareil numerique de classe "A" est conforme à 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 RossGear 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 RossGear 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.

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Technical Support

At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross personnel. During business hours (eastern standard time), technical support personnel are available by telephone any time. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support personnel who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. These people are available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

For **Technical Support**, call (+1) 613-652-4886 and, for **After Hours Emergency**, dial (+1) 613-349-0006.

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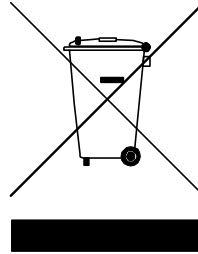
If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

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

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Introduction

A Word of Thanks

Congratulations on your purchase of the Ross Video CDK-111A-M, Component Digital Multi-Keyer.

The CDK-111A-M is part of a full line of Ross Video digital products and are backed by over 25 years of engineering and design expertise.

You will be pleased at how easily your new CDK-111A-M fits into your overall working environment. Equally pleasing is the product quality, reliability and functionality.

Once again, thank you for joining the ranks of satisfied Ross Video customers – throughout the world!

About This Guide

This guide covers the installation and operation of the Ross Video CDK-111A-M Component Digital Multi-Keyer.

Along with a **Table of Contents**, the following chapters are included:

- Chapter 1, "**Introduction**" summarizes the guide and describes the components and features of the CDK-111A-M.

- Chapter 2, "**Installation and Setup**" provides basic installation instructions for each module, including cabling, jumper settings, and communication configuration.

- Chapter 3, "**Image Transfer Program**" describes the installation and operation of the Image Transfer program, used for uploading and downloading images to and from the CDK-111A-M.

- Chapter 4, "**Operation**" provides a detailed chart of all card-level functions, plus comprehensive information on all operating modes, menus and features.

- Appendix A, "**Serial Protocol**" presents the communication protocol used in the CDK-111A-M.

- Appendix B, "**Software Upgrades**" provides detailed instructions on how to perform software upgrades.

- Appendix C, "**Specifications**" presents a list of module specifications.

- Appendix D, "**Animated Logo Generator Mode**" describes card functionality when used as an Animated Logo Generator.

An **Index** is also provided for your reference.

Should you have a question pertaining to the operation of your CDK-111A-M, please contact us at the numbers listed in the front of this guide. Our technical support staff is always available for consultation, training, or service.

Documentation Conventions

The following conventions are used throughout this guide:

- Rear panel connectors and card-level components are indicated in bold-faced upper case letters. For example:

   The **NTSC/PAL OUT 1** connector is …

- Menu functions on the Preview Overlay are indicated in bold-faced upper and lower case text. For example:

   The **NTSC Setup Function** allows you to …

- Menu choices on the Preview Overlay are indicated in bold-faced upper case letters, using sans-serf font. For example:

   Select **BANK A** to access the first bank of …

Documentation Terms

The following terms are used throughout this guide:

- "**Chassis**" and "**Frame**" both refer to the **DFR-8014A-C** and **DFR-8110A-C** frames that house the **CDK-111A-M** modules.

- "**Operator**" and "**User**" both refer to the person who uses the **CDK-111A-M**.

- "**Board**", "**Card**", and "**Module**" all refer to the **CDK-111A-M** card itself, including all components and switches.

- "**SDI**", **Serial Digital Interface**, **SMPTE 259M-C**, all refer to the serial digital video signal that is distributed via a single coaxial cable with BNC connectors and is used by the **CDK-111A-M**.

- "**System**" and "**Video System**" refers to the mix of interconnected digital and analog production equipment in which the **CDK-111A-M** operates.

Abbreviations

The following abbreviations are used throughout this guide:

Abbreviation Guide

Abbreviation	Definition
A-D	Analog-to-Digital
BKGD	Background Bus
D-A	Digital-to-Analog
DA	Distribution Amplifier
DSK	Downstream Keyer
DVE	Digital Video Effects
EDH	Error Detection and Handling
GPI	General Purpose Interface
ID	Identification
PGM	Program
PV	Preview
RU	Rack Unit
SDI	Serial Digital Interface

CDK-111A-M Overview
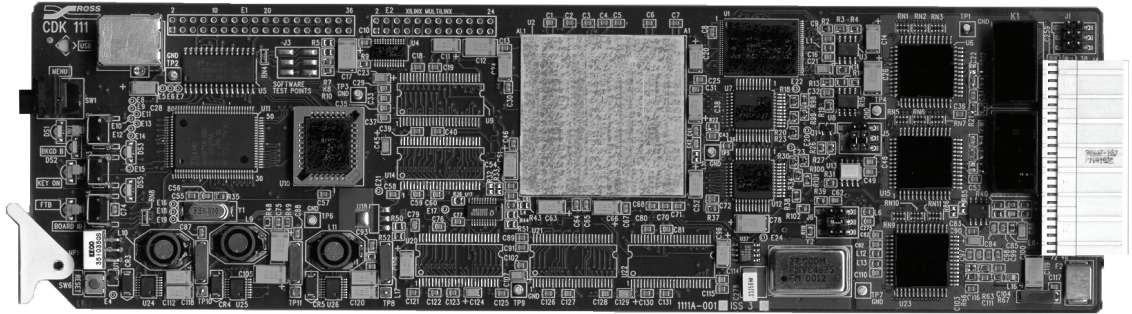
CDK-111A-M

The **CDK-111A-M** is the most advanced single card component digital keyer and keyer/mixer available on the market today. It suits a multitude of situations where high quality digital video keying and mixing is performed. With built-in fade-to-black and fail-safe relay design, the CDK-111A-M is the perfect device for your critical program stream applications.

All CDK-111A-M input video signals can be referenced to the BKGD 1 input, or the reference input on the frame. All signals can have full frame synchronization capability with infinite timing adjustment. This makes it easy to install and eliminates many system timing issues.

The CDK-111A-M can be configured with a true look-ahead preview output, which is ideal for live productions, providing confidence in the quality and accuracy of the next scene to go to air.

The CDK-111A-M can be configured "on the fly" to key either an external or internally generated key source, or both. The internal key source can be a full-frame still or linear key, one of many stored linear key logos, or an animated logo. This makes the insertion of trouble slides, content rating bugs, logos, and animated logos simple and affordable.

Control over the CDK-111A-M is available via GPI, RS-422 unbalanced full duplex RS-485 or 0-12V RS-232 compatible, on-screen menu, remote control panel, and card-edge pushbuttons for unsurpassed flexibility. As well, configurable on-air tally outputs are also available.

The cards are installed in Ross Video's **DFR-8110A-C** (2 RU) or **DFR-8104A-C** (1 RU) frames.

Product Comparison Chart

For your reference, the following is a detailed chart that compares the features that are available with the **CDK-111A-M** and the **CDK-111A-Lite** card configurations. For further information on the CDK-111A-Lite, see the ***CDK-111A-Lite Owner's Guide, v4.***

Feature Comparison Chart

Feature	CDK-111A-M	CDK-111A-Lite
Video input channels	4	3
Number of keys on air	2	1
Preview Overlay menu display	Yes	No
BKGD Crossfade	Yes	No
Frame synchronization on every input	Yes	Yes
External analog reference signal input	Yes	Yes
Adjustable delay from reference to output signal	Yes	Yes
Storage for multiple stills and animated logos	32MB	No
Fade to black	Yes	Yes
Program output with EDH insertion	Yes	Yes
Second program output with EDH insertion	Yes (1)	Yes
One preview output with EDH insertion	Yes (1)	No
Fail-safe relay BKGD1 to PGM Out 1 on power failure	Yes	Yes
Accommodates SMPTE 259M-C	Yes	Yes
USB port for image download	Yes	No
Full transition control with 0-999 frame control	Yes	Yes
Clip, gain, matte fill, and box mask controls	Yes	Yes
Control via GPI, unbalanced full duplex RS-485 or 0-12V RS-232 compatible interface, on-screen configuration menu, control panel, and card-edge pushbuttons	Yes	Yes
Supports 525-line (NTSC) and 625-line (PAL) formats	Yes	Yes
Serial interface	Yes	Yes
5 year warranty	Yes	Yes

1) Configured via the menu, if desired

CDK-111A-M Block Diagram

The **CDK-111A-M** is a single card broadcast quality digital keyer designed specifically for broadcast or production situations.
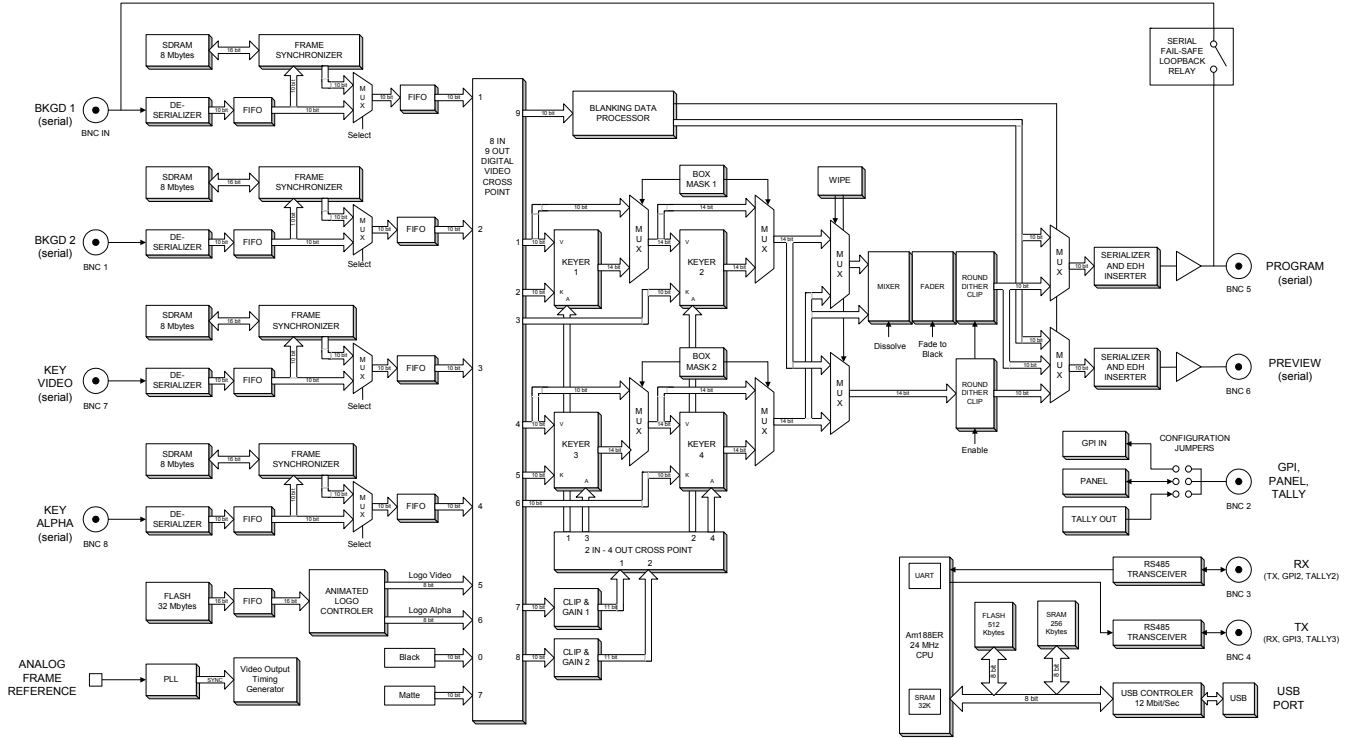
CDK-111A-M Block Diagram

The CDK-111A-M is housed in a RossGear **DFR-8014A-C** or **DFR-8110A-C** frame.

The BNC connector configuration at the rear of the frame is shown below:
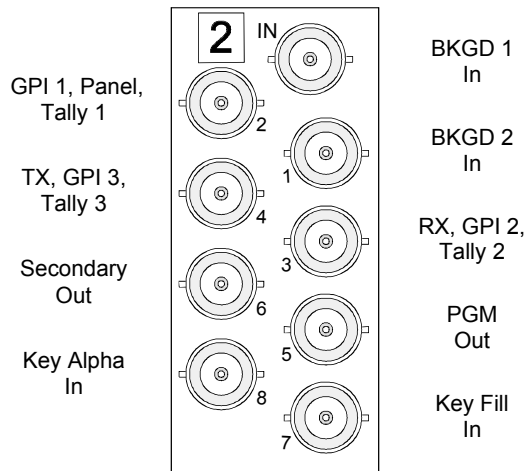
CDK-111A-M BNC Connectors

Optional Accessories

The two optional accessories for the CDK-111A-M are:

- Control Panel (DCP-111)

- Image Transfer Program (v2.3)

Control Panel (DCP-111)

The Control Panel is a fully functional remote panel that replicates all of the user functions available on the card edge. If used, it is connected to BNC 2 on the rear of the frame. See Chapter 2, "**Installation and Setup**", and Chapter 4, "**Operation**", for a complete explanation of the panel.

Image Transfer Program (v2.3)

The Image Transfer Program v2.3 is a Windows 2000/XP based application that is used to download still and animated images, and logos, into the card memory. See Chapter 3, "**Image Transfer Program**", for a complete discussion of the program.

Warning

> The Image Transfer Program is not supported by computers running Microsoft® Windows XP Professional x64 Edition®.

Installation and Setup

In This Chapter

This chapter provides instructions for the installation and setup of your CDK-111A-M. The following topics are discussed:

- Getting Started
- Overview
- BNC Connectors
- Connecting the Cables
- Accessing the Menu System
- Card Edge Controls
- Control Panel
- Card Setup and Configuration
- Card Address Configuration
- Reference Source Selection

Static Discharge

Throughout this chapter, please heed the following cautionary note:

ESD Susceptibility

Caution — Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling the CDK-111A-M cards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Touch the rack frame to dissipate static charge before removing cards from the frame and exercise proper grounding precautions when working on the CDK-111A-M cards.

Getting Started

Unpacking

Unpacking your CDK-111A-M shipment will be unique for each customer and will depend upon your specific order. However, the following general rules will apply:

- If your order includes either RossGear **DFR-8110A-C** or **DFR-8014A-C** frames, your CDK-111A-Ms will be shipped to you already installed in the frames.

Note

> Please ensure that each card is properly seated before turning on the power.

- If your order does not include any rack frames, the cards will be shipped to you in a 10-pack RossGear Terminal Equipment Pack box.

Once the rack frames and/or boxes are unpacked, check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video Limited immediately.

> **Caution** — Both the CDK-111 Product Resources and Image Transfer Program (v2.3) CDs contain the necessary USB drivers to allow data transfer between your computer and the CDK-111A-M card via the USB port.
>
> Ensure the software has been correctly installed in your computer *before* connecting the USB cable between your computer and the CDK-111A-M card. Otherwise, Windows 2000/XP installs a default driver that will not work with the CDK-111A-M, and may necessitate the reinstallation of the OS.

Overview
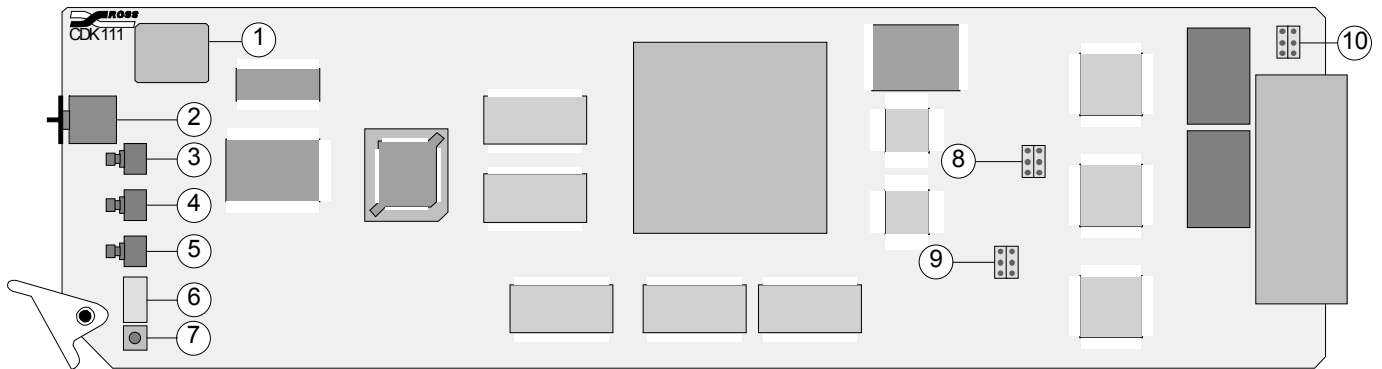
CDK111A-M Card, Component Side

1)	USB Port	5)	Menu Select / FTB Button	9)	GPI, Panel, Tally Jumper Block
2)	Menu Selector	6)	Board ID Switch	10)	RX Termination Jumper Block
3)	Menu Up / BKGD Button	7)	Reset Button		and Download Connector
4)	Menu Down / Key Button	8)	EDH Insertion Jumper Block		

1) **USB Port (J2)**

   The USB Port is used to transfer still images and animation to and from the card.

2) **Menu Selector (SW1)**

   The Menu Selector is a 16 position rotary knob, labeled **0** to **F**. It is used to select the various menus for card installation and operation.

3) **Menu Up / BKGD Button (SW2)**

   Operation **mode**– this button will dissolve from BKGD 1 to BKGD 2 and vice versa, using the transition rate set in the menu.

   Menu **mode** – this button moves the cursor to the item above on the menu. A momentary press will advance one item. When an item is selected, holding the button will scroll up through the possible values.

4) **Menu Down / Key Button (SW3)**

   Operation **mode** – this button will dissolve a key or two keys on or off, depending on the card used and the setup chosen. It uses the transition rate set in the menu.

   Menu **mode** – this button moves the cursor to the item below on the menu. A momentary press will advance one item. When an item is selected, holding the button will scroll up through the possible values.

5) **Menu Select / FTB Button (SW4)**

   Operation **mode** – this button fades the PGM output to black or brings the PGM up from black, depending upon its present state. It uses the transition rate set in the menu.

   Menu **mode** – this button moves the cursor to the sub-menu values in the right-hand column. The values in these sub-items can then be

adjusted using the **Menu Up** or **Menu Down** button. Pressing the **Menu Select** button again will return the cursor to the left-hand column.

6) **Board ID Switch (SW5)**

The **Board ID** Switch is a 16 position rotary knob, labeled **0** to **F**. In a multiple card setup, it is used to define the card's unique address for communication purposes.

7) **Reset Button (SW6)**

Pressing the Reset Button will reset the card to a power-up state with BKGD 1 on-air with no key.

8) **EDH Insertion Jumper Block (J5)**

This jumper block is used to insert the EDH information into the PGM and/or PV video stream. See Appendix C, "**Specifications**" for jumper pinout reference.

9) **GPI, Panel, Tally Jumper Block (J6)**

This jumper block is used in conjunction with the menu (software) to define the status of BNC 2 – whether it is used as an input for a GPI, an input/output for a Control Panel, or as a Tally output. See Appendix C, "**Specifications**" for jumper pinout reference.

10) **RX Termination Jumper Block and Download Connector (J1)**

If BNC 3 and 4 are used as Rx input and Tx output connectors, this jumper block is used to terminate BNC 3 and 4. See Appendix C, "**Specifications**" for jumper pinout reference.

This jumper block can also be used as a connector to serially transfer images and animation between the card and a PC, using the Serial Download Cable.

Important

> When transferring images using the Serial Download cable, disconnect BNC 3 and BNC 4 to avoid any communication conflicts during the transfer.

BNC Connectors

This section defines the BNC connector assignments for the CDK-111A-M.

CDK-111A-M Connectors

The CDK-111A-M has nine (9) BNC connectors on the rear of each module, as shown below:

CDK-111A-M Connector Assignments

CDK-111A-M BNC Settings

Connector	Use
IN	BKGD 1 In – any video source (can be used as card reference, configurable via menu)
1	BKGD 2 In – any video source
2	GPI 1 or Panel or Tally 1 – (configurable via menu and jumper setting)
3	RX or GPI 2 or Tally 2 – (configurable via menu)
4	TX or GPI 3 or Tally 3 – (configurable via menu)
5	PGM Out
6	Secondary Output – (configurable via menu)
7	Key Fill Input
8	Key Alpha Input

Connecting Video and Communication Cables

Video Input and Output Cable Connections

Connect the appropriate input video sources as shown in the above tables and diagrams to the BNC connectors on the rear of the CDK-111A-M, using up to 75 meters of industry standard 75 Ohm coaxial cable and BNC connectors.

Connect the output video connections as appropriate for your facility.

Note

All inputs and outputs are SMPTE 259M-C (SDI) digital video signals. D–A converters may be required for some devices (e.g., monitors, VTRs, etc.).

For more information on our complete line of converters and distribution equipment, contact your Ross Video dealer or visit our website at www.rossvideo.com.

Communication Cables and Jumper Settings

If the operational requirements of your facility require you to communicate with your CDK-111A-M via the Rx (BNC 3) and Tx (BNC 4) serial ports, use the following diagrams to connect the appropriate cables and set the appropriate jumpers.

Single CDK-111A-M Settings for RS 422/485 Communication

A single CDK-111A-M connects to an RS 422/485 serial device via the Serial Interface Cable (supplied with CDK-111A-M, P/N 1111C-301), which splits the Rx and Tx signals.

The interface cable is approximately 2 ft. in length and has a Type "D", 9-pin connector on one end and 2 coaxial cables with female BNC connectors on the other. Extend the communication cables to the required length for your facility (up to 300 meters) using 75 Ohm coaxial cables and BNC connectors.
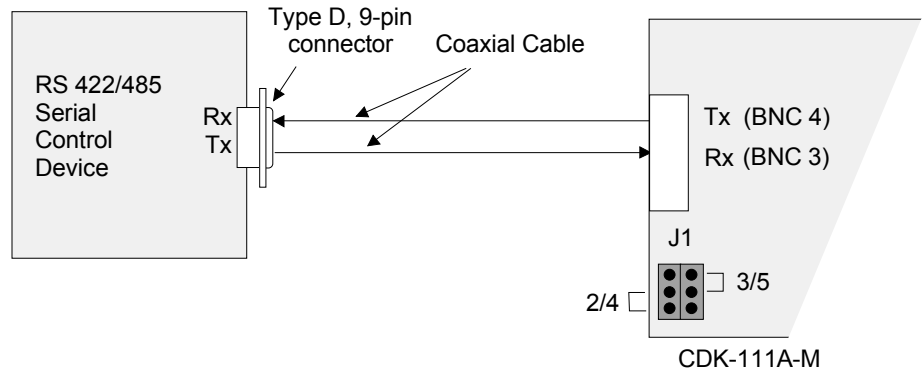
Single CDK-111A-M RS 422/485 Cabling and Jumper Settings

Note

When a single CDK-111A-M is connected via the serial ports, the card *must* be terminated. Bridge pins 2 and 4, and pins 3 and 5 on jumper **J1** to terminate the card. See Appendix C, "**Specifications**" and the silk screen on the back of the card for jumper pinout reference.

Single CDK-111A-M Settings for RS 232 Communication

A single CDK-111A-M connects to an RS 232 serial device via the Serial Interface Cable (supplied with CDK-111A-M, P/N 1111C-301), which splits the Rx and Tx signals.

The interface cable is approximately 2 ft. in length and has a Type "D", 9-pin connector on one end and 2 coaxial cables with female BNC connectors on the other. Extend the communication cables to the required length for your facility (up to 300 meters) using 75 Ohm coaxial cables and BNC connectors.
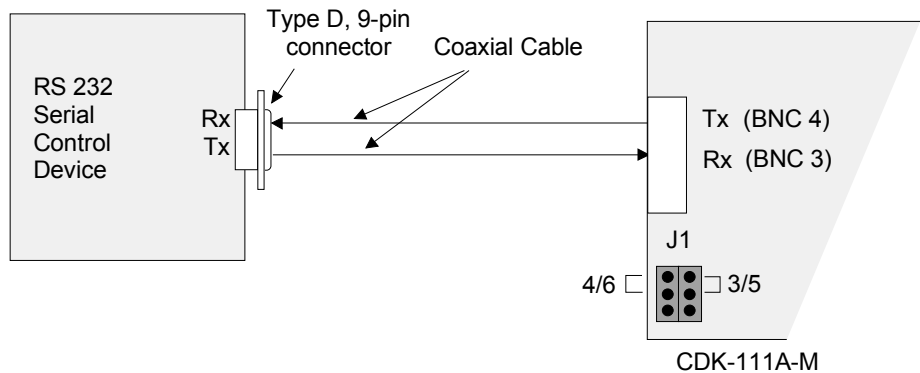
Single CDK-111A-M RS 232 Cabling and Jumper Settings

Multiple CDK-111A-M Settings for RS 485 Communication

Up to 127 CDK-111A-Ms can be daisy-chained from a single RS 485 serial device using industry standard, 75 Ohm coaxial cable. The initial connection to the serial port is made with the Serial Interface Cable (supplied with CDK-111A-M, P/N 1111C-301), which splits the Rx and Tx signals. The individual cables are then split at each card using a BNC "T" connector and connected to either BNC 3 or BNC 4, as shown in the figure on page 2-8.
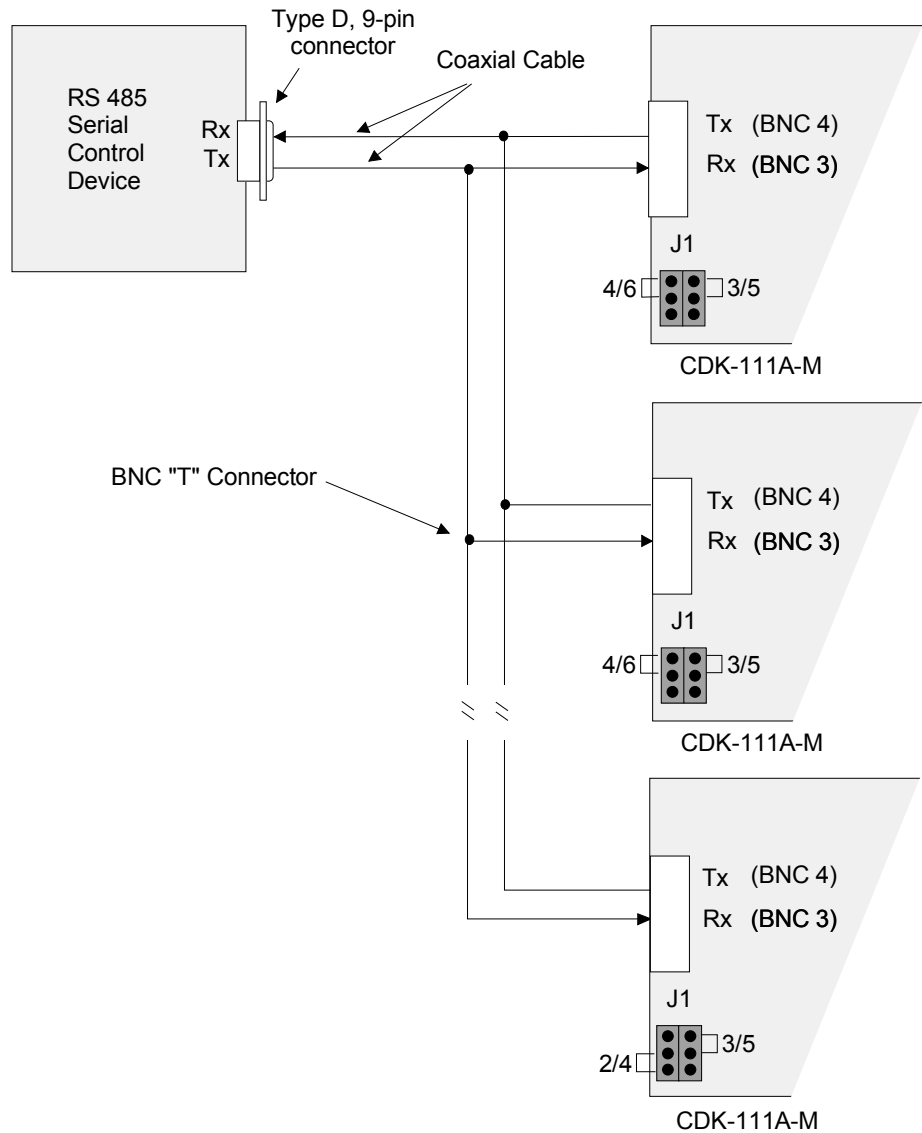
Multiple CDK-111A-Ms Communication Cable Connections

Note

When multiple CDK-111A-Ms are connected to a serial port, the last card in the series *must* be terminated. Bridge pins 2 and 4, and pins 3 and 5 on jumper **J1** to terminate the last card.

On all other cards, place a jumper on pins 4 and 6 and one on pins 3 and 5. See Appendix C, "**Specifications**" and the silk screen on the back of the card for jumper pinout reference.

If your facility requires more than 127 CDK-111A-Ms, a second serial port must be used to control the next 127 cards.

The interface cables are approximately 2 ft. in length and have a Type "D", 9-pin connector on one end and two coaxial cables with male BNC connectors on the other. Extend the communication cables to the required length for your facility (up to 300 meters) using 75 Ohm coaxial cables and BNC connectors.

Accessing the Menu System

Setup and configuration of your CDK-111A-M is done through a menu system that is accessed in one of two ways – via the button and knob controls on the card edge or the optional DCP-111 Digital Mixer Keyer Control Panel.

Card Edge Controls

There is a knob and three card edge buttons used to access the menu system, as in the diagram below. For a description of how each is used, please refer to the previous section, titled **Overview**.
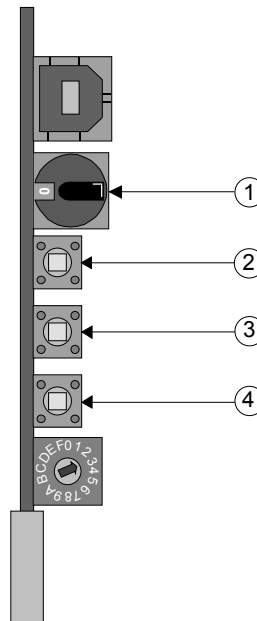
Card Edge Controls

1)	Menu Selector	3)	Menu Down / Key Button
2)	Menu Up / BKGD Button	4)	Menu Select / FTB Button

Navigating Through the Menus Using the Card Edge Buttons

Enter the menus by turning the Menu Selector (1) knob. The Menu Selector is a 16 position rotary knob, labeled **0** through **F** (hex). Position **0** is the operational state. Rotating the selector through positions **1** to **F** will display the 15 different menus as a preview overlay on the PV monitor as per the example below:

Example of the Menu Preview Overlay – Menu 1: Runtime Parameters

Note

If you are setting up the menus on a CDK-111A-M and you want to swap the menu from a PV overlay to a PGM overlay, position the selector on a menu position, then hold down the Menu Select / FTB Button until the system swaps the menu to the program output. Changing the menu back to a preview overlay will involve changing the Menu Output item in **Menu D: Card Setup**.

Each menu has a number or letter in the upper left hand corner, which corresponds to the label on the selector knob, along with its title.

Most menus are shown as two columns. The left hand column contains a list of parameters for that specific menu, while the right hand column contains values, Boolean choices or lists associated with an item.

Once you have chosen a menu, use the Menu Up (2) and Menu Down (3) buttons to move the cursor and navigate through the items on each menu. Pressing the Menu Up button will move the cursor on the left hand side of the menu to the item above. Likewise, pressing the Menu Down button will move the cursor to the next item below on the list. Some items have a single Menu Help line at the bottom of the menu, which gives additional detail for that item.

When you wish to select an item and change its value, press the Menu Select (4) button. The cursor will move to the right hand column. This column contains the values associated with each parameter and can be changed. A momentary press of the up or down button will either increase or decrease the value of that item. Holding either button down will cause the cursor to scroll through the values faster, thus saving setup time.

When you have set the value of an item, press the select button once again and the system will accept the new value and the cursor will return to its left hand position.

When you have completed your setup, turn the Menu Selector knob back to **0**. The message, "STORING DATA TO FLASH ..." will appear. When all of the changed values have been stored, the preview overlay and menu will disappear, and the card will be in its operational mode.

Control Panel – DCP-111 (Optional)

Use the Control Panel to configure and operate a single CDK-111A-M. The Control Panel can perform the same functions as the card edge controls.
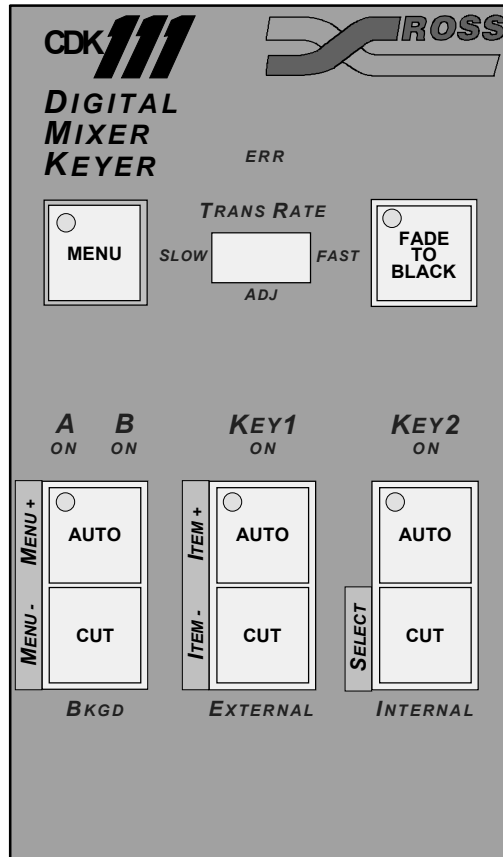
Digital Mixer Keyer Control Panel

DCP-111 Installation

Use the following steps to install and configure the card for use with the Control Panel.

1. Remove the card from the frame, if it is already installed.

2. On the card, remove any jumpers from the GPI, Panel, Tally Jumper Block (**J6**) and bridge pins 3 and 4 of this jumper block.

Caution — Only one bridge may be installed on the jumper block **J6**. Installing more than one bridge may cause permanent damage to the CDK-111A-M card. Please note that contrary to the other jumper blocks, the single bridge on **J6** must be installed horizontally across either pins 1 and 2, or pins 3 and 4, or pins 5 and 6.

Note

See item 9 in the "**Overview**" section of this chapter for jumper block location information.

See also Appendix C, "**Specifications**" for jumper pinout reference.

---

3. Re-install the card in the frame.

4. With the card active in the frame, set the card edge **Menu Selector** knob to **D**.

5. In the **Menu D: Card Setup** menu, navigate to the **BNC 2** menu item by pressing the **Menu Up** or **Menu Down** buttons on the card edge.

6. Move to the **BNC 2** submenu by pressing the **Menu Select** button.

7. Navigate to the **Control Panel** submenu item by pressing the **Menu Up** or **Menu Down** buttons.

8. To save the changed menu item value, press the **Menu Select** button once.

9. To store the changes, turn the **Menu Selector** knob back to **0**.

   The message, "STORING DATA TO FLASH" will appear. When all of the changed values have been stored, the menu will disappear from the screen, and the card will be in *Operation* mode.

10. Using up to 100 meters of industry standard 75 Ohm coaxial cable, connect the control panel cable to BNC 2 on the rear of the frame slot housing the CDK-111A-M.

Note

See Chapter 4, "**Operation**" for a complete description of the Control Panel.

Navigating Through the Menus Using the Control Panel

Enter the menus by pressing and holding the **MENU** button until the light in the upper left hand corner of the button flashes. This will take approximately 3 seconds. There are 15 menus in all, labeled **1** to **F** (hex). Once in the menu system, the buttons on the control panel take on a different meaning than their labels would indicate. See Chapter 4, "**Operation**", for a complete description of the Control Panel in its operational mode.

You can scroll through the menus either forward or backward. In the **BKGD A / B** area, pressing the **MENU+** button will scroll forward through the menus, while pressing the **MENU-** button will scroll backward. The menus will be displayed as a preview overlay on the PV monitor as per the example below:
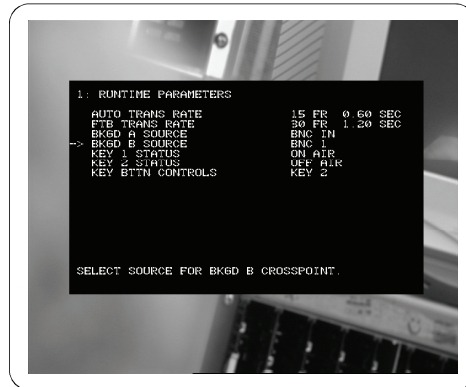
Example of the Menu Preview Overlay – Menu 1: Runtime Parameters

Each menu has a number and title displayed in the upper left hand corner.

Most menus are shown as two columns. The left hand column contains a list of items (or parameters) for that specific menu, while the right hand column contains values, Boolean choices or lists associated with each item.

Once you have chosen a menu, use the two **KEY1** buttons to move the cursor and navigate through the items on each menu. Pressing the **ITEM+** button will move the cursor on the left hand column to the **NEXT** item. Likewise, pressing the **ITEM-** button will move the cursor to the **PREVIOUS** item on the list. Some items have a single *Menu Help Line* at the bottom of the menu, which gives additional detail for that item.

When you wish to select an item and change its value, press the **KEY2** button labeled **SELECT**. The cursor will move to the right hand column. This column contains the values associated with each item. Momentarily pressing the **ITEM+** button will scroll forward through the variables, while pressing the **ITEM-** button will scroll backward through the variables. Holding either button down will cause the cursor to scroll through the values faster, thus saving setup time.

When you have set the value of an item, press the **SELECT** button once again and the system will accept the new value and the cursor will return to its left hand position.

When you have completed your setup, exit the menu system by pressing the **MENU** button again. The message, "STORING DATA TO FLASH ..." will appear. When all of the changed values have been stored, the preview overlay and menu will disappear, and the card will be in *Operation* mode.

Card Setup and Configuration

Configuring the CDK-111A-M is done in the menus. Enter the menus (as described in above sections) and navigate to Menu **D: Card Setup**.

Note

> See Chapter 4, "**Operation**" for details on Menu **D** items and their parameters.

Menu D: Card Setup
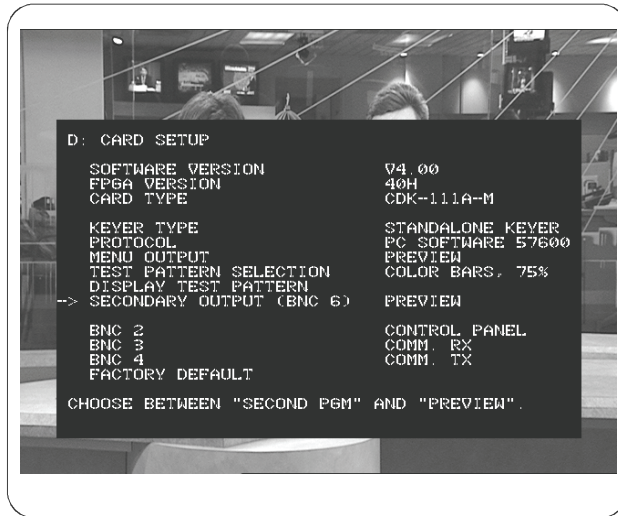
Menu D: Card Setup

The Card Setup menu allows you to configure the initial parameters of the CDK-111A-M. These menu parameters must be completed for each card.

The first three items in the menu are for informational purposes only.

- **Software Version**

  The value on the right contains the version number of software loaded on this card. It is for information only and cannot be changed.

- **FPGA Version**

  The value on the right contains the version number of the FPGA. It is for information only and can not be changed.

- **Card Type**

  The card type will indicate a CDK-111A-M.

The next series allow you to configure your CDK-111A-M to meet your operational requirements.

- **Keyer Type**

  There are several choices – Switcher DSK, Edit Bay Keyer, Standalone Keyer, Animated Logo Generator, and Still Store.

- **Protocol**

  There are several choices – None, PC Software 57600, PC Software 19200, Master 2100, Leitch DSK, and GVG 100.

- **Menu Output**

  Choose between the Preview or Program monitors for your menu display.

- **Test Pattern Selection**

  Select one of the built-in test patterns – Color bars 75%, EQ Pathological, PLL Pathological, Flat Field Black.

- **Display Test Pattern**

  Pressing the Menu Select Button will display the test pattern that is presently selected.

- **Secondary Output (BNC 6)**

  There are several choices – PGM, PV, BKGD 1 + PV Key, and BKGD 2 + PV Key. Choose the appropriate one to meet your operational requirements.

  o PGM is the program output

  o PV output will consist of all keys (whether on air or not) and the background which is NOT on air.

  o BKGD 1 + PV Key will show BKGD 1 always, and only keys which are NOT on air.

  o BKGD 2 + PV Key will show BKGD 2 always, and only keys which are NOT on air.

The final items in Menu D allow you to define how you want your CDK-111A-M to operate and communicate with the rest of your facility. There are several variations to consider:

- **BNC 2**

  BNC 2 can be configured in one of three ways – either as an input for a GPI, as the Control Panel connection point, or as a Tally output.

  o **GPI Input**

    ~ Bridge jumper **J6** (see card diagram at the beginning of this chapter for the location of **J6**) at pins 1 and 2. See Appendix C, "**Specifications**" for jumper pinout reference.

    ~ Set BNC 2 value in the menu to GPI #1.

  o **Control Panel Connection Point**

    ~ Bridge jumper **J6** (see card diagram at the beginning of this chapter for the location of **J6**) on the card at pins 3 and 4.

    ~ Set BNC 2 value in the menu to DCP.

- o **Tally Output**

  - ~ Bridge jumper **J6** (see card diagram at the beginning of this chapter for the location of **J6**) on the card at pins 5 and 6.

  - ~ Set BNC 2 value in the menu to Tally #1.

- • **BNC 3**

  BNC 3 can be configured in one of three ways – either as an RX input, a GPI input, or as a Tally output. To configure BNC 3 as an,

  - o **RX Input**

    - ~ Set BNC 3 value to Comm. RX.

  - o **GPI Input**

    - ~ Set BNC 3 value to GPI #2.

  - o **Tally Output**

    - ~ Set BNC 3 value to Tally #2.

Note

> If BNC 3 is configured as an RX input, ensure that BNC 4 is set to the corresponding TX configuration.

- • **BNC 4**

  BNC 4 can be configured in one of three ways – either as a TX output, a GPI input, or as a Tally output. To configure BNC 4 as a,

  - o **TX Output**

    - ~ Set BNC 4 value to Comm. TX.

  - o **GPI Input**

    - ~ Set BNC 4 value to GPI #3.

  - o **Tally Output**

    - ~ Set BNC 4 value to Tally #3.

- • **Factory Default**

  Selecting the Factory Default will reset all values in all menus to the initial factory default settings.

When you have completed the initial setup for each card, the next step is to configure the unique address for each card in a multiple card setup.

If your facility has a single card, you can exit the menu system. If your video connections have been properly made and you are feeding video to the card, you should now see video on your PGM monitor. If you do not see video, double check your video cables, jumper settings and menu setup to determine where the problem arises.

Card Address Configuration

Once the BNCs, GPIs, tallies, and jumpers have been configured, the next step in a multiple card setup is to assign each card a unique address. This address is used by the control device to identify and communicate with a particular card.

There are two ways to set addresses -

- using the Board ID Switch in facilities with less than 16 CDK-111A-Ms

- through the menu system for facilities that have 16 or more CDK-111A-Ms.

Less Than 16 CDK-111A-Ms

For facilities that have less than 16 CDK-111A-Ms, you can use the menu system (as described in the next section) or use the Board ID Switch on the bottom of the card edge to set the address of each CDK-111A-M. See diagram below.
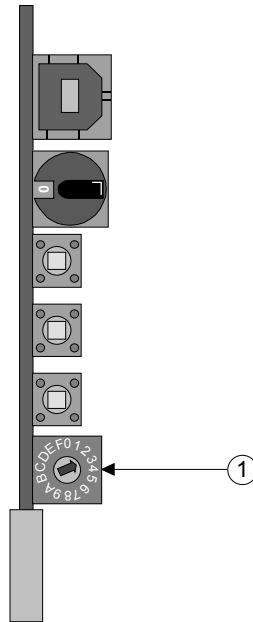
1) Board ID Switch

The **Board ID Switch** is a 16 position rotary knob labeled **0** through **F**.

Using a "tweaker" screwdriver, systematically set each card in the system to a different number on the **Board ID Switch**, using numbers **1** through **F**. Zero (**0**) is *not* a valid address for the first card.

See Appendix A, "**Serial Protocols**" for a complete explanation of the address system.

16 or More CDK-111A-Ms

For facilities that have 16 or more CDK-111A-Ms, the menu system must be used to assign a unique address for each card. This address is used by the serial device to communicate with an individual card.

To set the card address (16-127 cards):

1. Set the Board ID Switch on each card to **0** before assigning any addresses with the menu.

2. Using the **Menu Selector** knob on the card edge, navigate to **Menu C: Secondary Card Setup**.
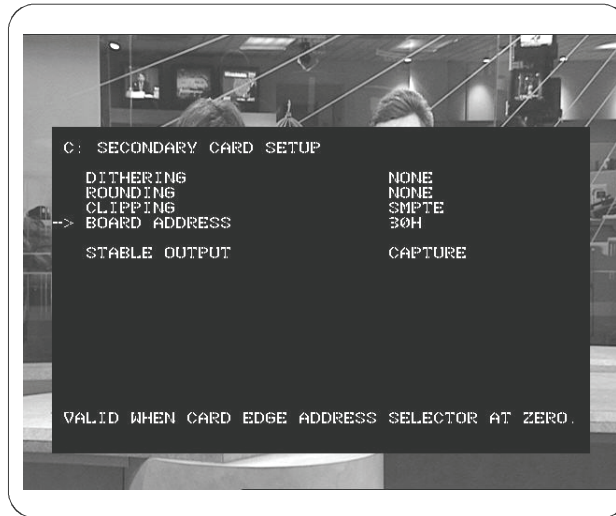
Menu C: Secondary Card Setup

Note

See Chapter 4, "**Operation**" for details on Menu **C** items and their parameters.

3. For each card, navigate to the **Board Addr** item and press the **Menu Select** button on the card edge to move the cursor to the menu item's submenu column.

Note

The Board Addresses are displayed in hexadecimal and range from 0 (Hex) to FC (Hex). Addresses must be *even* numbers (a system requirement), and, therefore, the system is limited to a total of 127 uniquely numbered cards.

This is also the total number of cards that can be controlled from a single serial port.

For those not familiar with working in hexadecimal, the *even* digits are those that end in 0, 2, 4, 6, 8, A, C, and E.

4. Systematically enter the **Board Addr** item in each card and set its address to a unique *even* number.

5. When you have set a card's address, press the **Menu Select** button again to return you to the left hand column.

6. Rotate the Menu Selector knob to the **0** position to save the data and exit the menu system.

Reference Source Selection

This section describes procedures for choosing the reference signal for the card.

In **Menu 9: Input/Output Delays**, the Reference Source Select menu item has three options:

- **EXTERNAL REF**

- **BNC IN REF**

- **AUTO DETECT**

EXTERNAL REF

On power up, with this default option selected, the card attempts to synchronize to an external analog reference signal, usually the house sync black or color bars.

When the card is installed in a DFR-8110A-C frame with an external reference connected to the REF BNC input, the card locks to the reference and displays the normal program output.
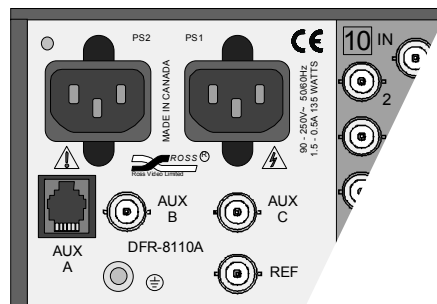
External Reference Input (REF) *on Rear of Frame DFR-8110A-C*

While synchronizing, the **DS8** LED pulses red, and turns off when synchronization is achieved. If unsuccessful, the **DS8** Error LED lights solid red and remains lit until you view the external sync failure error in **Menu A: Diagnostics**. For more information on the LEDs, see "**LED Functions**" in Chapter 4.

If there is no external reference signal on the REF BNC input:

- The card attempts every 10 seconds to sync to signal from the REF BNC input

- The card generates invalid signal until you either:

    ~ Connect a valid source to the REF BNC input.

    OR

    ~ Select another reference source option in **Menu 9: Input/Output Delays**.

BNC IN REF

When selected, this option causes the card to synchronize to the BKGD 1 input on BNC IN.

CDK-111A-M BNC IN Reference Input

While synchronizing, the **DS8** LED pulses red, and turns off when synchronization is achieved. If unsuccessful, the **DS8** Error LED lights solid red until you view the error explanation in **Menu A: Diagnostics**. For more information on the LEDs, see "**LED Functions**" in Chapter 4.

If there is no reference signal on BNC IN:

- The card attempts every 10 seconds to sync to signal from BNC IN.

- The card generates invalid signal until you either:

    ~ Connect a valid source to the BNC IN input.

    OR

    ~ Select another reference source option in **Menu 9: Input/Output Delays**.

AUTO DETECT

On power up, this setting attempts for 10 seconds to synchronize to the External Ref signal. If that signal is not present, the card then attempts every 10 seconds to synchronize to the BNC IN input.

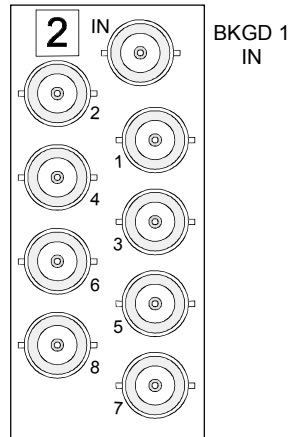While synchronizing, the **DS8** LED pulses red, and turns off when synchronization is achieved. If unsuccessful, the **DS8** Error LED lights solid red until you view the error explanation in **Menu A: Diagnostics**. For more information on the LEDs, see "**LED Functions**" in Chapter 4.

If the card still fails to lock to a sync signal, check all cable connections and retry.

Image Transfer Program

In This Chapter

This chapter includes:

- Preparing for Image Transfers
- Image Specifications
- File Naming Conventions
- Installing the Image Transfer program
- Image Transfer Protocol Setup
- Image Transfer Cable Connections
- Card Menu Setup for Serial Transfer
- Transferring Still Images
- Transferring Animated Images
- Uploading Images to the CDK-111A-M
- Additional Features
- Displaying the Contents of the Card
- Downloading Images from the CDK-111A-M
- Capturing Stills
- Erasing Images

Preparing For Image Transfers

Images are transferred to and from the CDK-111A-M using a provided Windows based **Image Transfer Program** (ITP) v2.3, developed by Ross Video. Images can be stills or animation. Images must meet the following specifications and naming conventions:

Image Specifications

File type

Images for the CDK-111A-M can be created in any graphic package that outputs a Targa file. All images must be *uncompressed* targa files with a .tga extension.

Still image file size

Still images can be created as either a 24-bit or 32-bit file:

- 24-bit file contains no alpha component

- 32-bit file contains an alpha component

Maximum size of a Still image single frame:

- NTSC (525 lines) 720 pixels by 486 lines

- PAL (625 lines) 720 pixels by 576 lines

Note

Full-screen images prepared for PAL format but displayed in NTSC will lose content. Conversely, full-screen images prepared for PAL format but displayed in NTSC will not fill the screen.

Animated image file sizes

Animated images should be created as a 32-bit file with an alpha component.

Maximum size of an Animated image single frame:

- NTSC (525 lines) 340 pixels by 486 lines
- PAL (625 lines) 340 pixels by 576 lines

File naming convention

Still images

A file name can be up to 11 characters and can contain letters, numbers, spaces, and special characters, *not* including the *.tga* extension. File names any longer will be truncated.

Animated images

Each file must have the same file name (for example, DTVB), followed by a frame number. The first frame number in the sequence must be 001.

Each subsequent frame in the sequence must be a unique number – one higher than the one before. The combination of the name and the sequence number can not exceed 11 characters, *not* including the .tga extension. File names any longer will be truncated.

Sample file naming for an image with 90 frames:

DTVB_001.tga

DTVB_002.tga

To

DTVB_090.tga

Installing the Image Transfer Program

Caution — Both the CDK-111 Product Resources and Image Transfer Program (v2.3) CDs contain the necessary USB drivers to allow data transfer between your computer and the CDK-111A-M card via the USB port.

Ensure the software has been correctly installed in your computer *before* connecting the USB cable between your computer and the CDK-111A-M card. Otherwise, Windows 2000/XP installs a default driver that will not work with the CDK-111A-M, and may necessitate the reinstallation of the OS.

The **Image Transfer Program** (ITP) is provided in two formats:

- **CDK-111 Product Resources CD** (P/N 1111O-501) containing the ITP, drivers, Owner's Guide, and Synergy Installation and Operation Guides.

- **ITP CD** (P/N 1111O-001) containing the ITP, drivers and the Owner's Guide.

Procedures for installing the ITP from both CDs are provided below.

Warning

The Image Transfer Program is not supported by computers running Microsoft® Windows XP Professional x64 Edition®.

Installing the ITP from the CDK-111 Product Resources CD

Warning

> The Image Transfer Program is not supported by computers running Microsoft® Windows XP Professional x64 Edition®.

Use the following steps to install the ITP v2.3 on your Windows 2000/XP compatible PC.

1. If you have a previous version of the ITP on your computer already, uninstall it using the Windows Control Panel Add/Remove Programs tool.

2. Place the supplied Product Resources CD in the drive.

3. Do one of the following:

   - If the CD splash window opens automatically, click the **Install Products** link. In the Install window, click the **Image Transfer Program** link. Proceed to step 6.

   OR

   - If the CD splash window does not open automatically, navigate to the CD drive folder. Proceed to step 4.

4. In the folder, double-click the **Launch.exe** file.

5. In the CD splash window, click the **Install Products** link. In the Install view, click the **Image Transfer Program** link.

6. Click the appropriate buttons on the various Windows installation dialogs.

   Ross Video recommends using the default settings provided in the installation dialogs.

   The setup program will automatically create a **Ross Video** > **CDK-111 Image Transfer** folder in the Windows Start > Programs menu. The executable file application is called **CDKXFER.exe**.

7. From the Windows Start > Programs menu, navigate to the **Ross Video** > **CDK-111 Image Transfer** application. Click it to open the ITP.

8. Proceed to the **Image Transfer Protocol Setups** section below.

Installing the ITP from the ITP CD

Warning

> The Image Transfer Program is not supported by computers running Microsoft® Windows XP Professional x64 Edition®.

Use the following steps to install the ITP v2.3 on your Windows 2000/XP compatible PC.

1. If you have a previous version of the ITP on your computer already, uninstall it using the Windows Control Panel Add/Remove Programs tool.

2. Place the supplied ITP CD in the drive.

3. Do one of the following:

    • If the CD splash window opens automatically, click the **Install Products** link. In the Install window, click the **Image Transfer Program** link. Proceed to step 6.

    OR

    • If the CD splash window does not open automatically, navigate to the CD drive folder. Proceed to step 4.

4. In the folder, double-click the **Launch.exe** file.

5. In the ITP CD splash window, click the **Install Products** link. In the Install view, click the **Image Transfer Program** link.

6. Click the appropriate buttons on the various Windows installation dialogs.

    Ross Video recommends using the default settings provided in the installation dialogs.

    The setup program will automatically create a **Ross Video** > **CDK-111 Image Transfer** folder in the Windows Start > Programs menu. The executable file application is called **CDKXFER.exe**.

7. From the Windows Start > Programs menu, navigate to the **Ross Video** > **CDKXFER** application. Click it to open the ITP.

8. Proceed to the **Image Transfer Protocol Setups** section below.

Image Transfer Protocol Setups

USB Transfer Protocol Setup

Use the following procedure to set the USB transfer protocol.

1. Open the Image Transfer Program by clicking the **Ross Video** icon in the Start > Programs > Ross Video > CDKXFER folder.
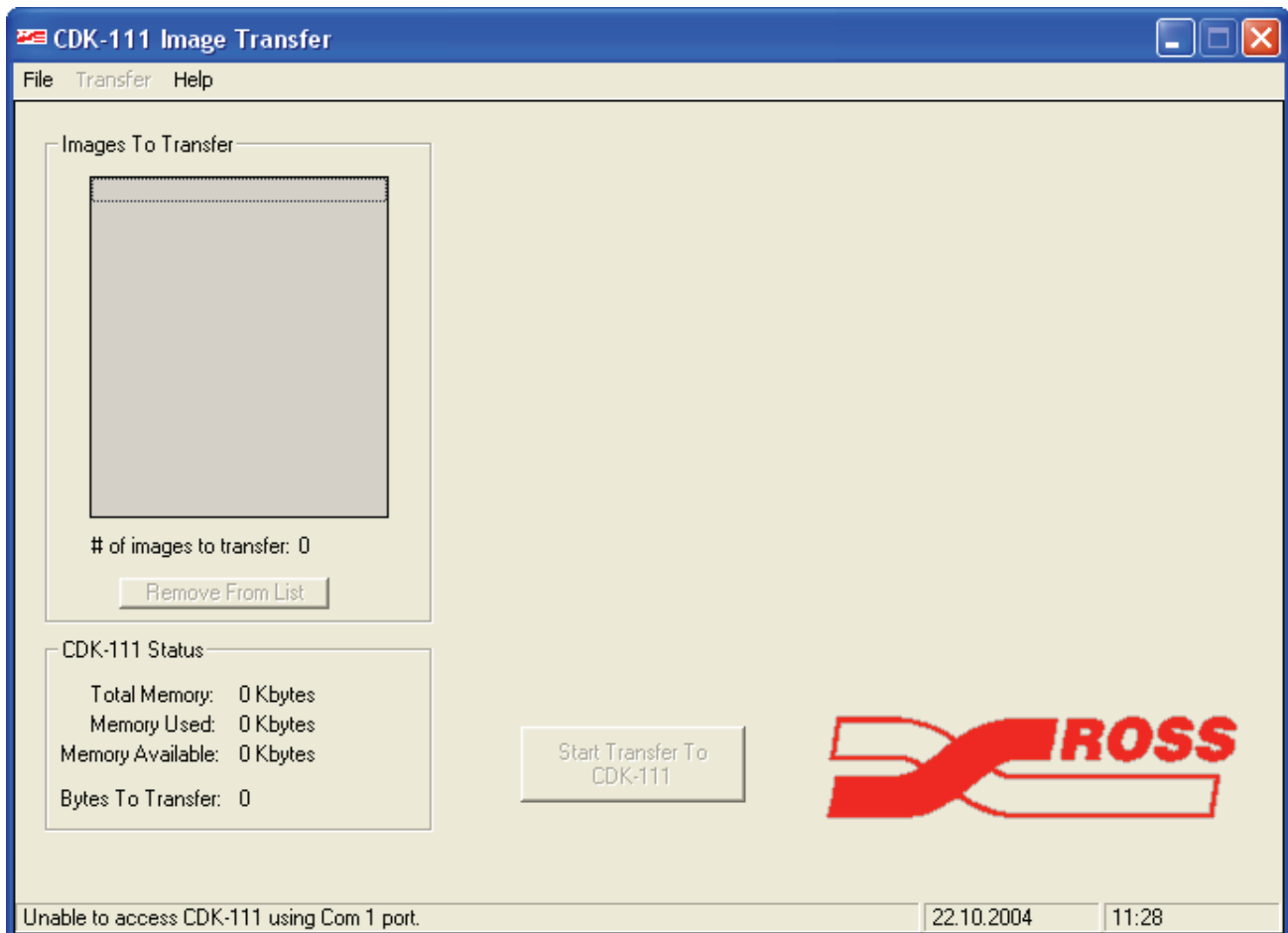
CDK-111 Image Transfer Program Window

2. On the menu bar, click on the **File** menu item at top left. A drop-down list appears, as follows:
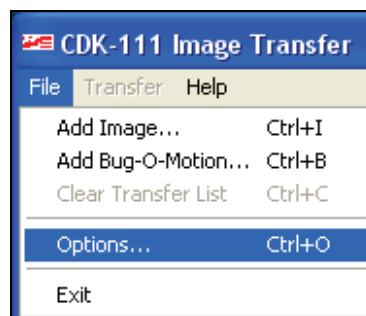
File Menu Drop-Down List

3. Click on **Options** to open the Options dialog.
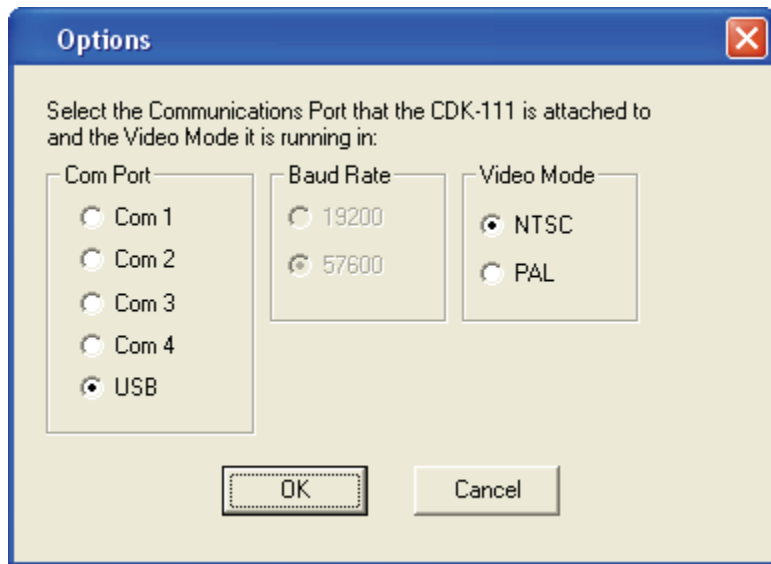
Options Dialog

4. Select the **USB** Com Port option.

5. Click **OK**.

6. Wait until the status bar message in the ITP main dialog says

    "No response from CDK-111 using USB port".

7. Proceed to the **Image Transfer Cable Connections** section below.

Serial Transfer Protocol Setups

Use the following steps to set the serial transfer protocols.

1.   Open the Image Transfer Program by clicking the **Ross Video** icon in the Start > Programs > Ross Video > CDK-111 Image Transfer folder.
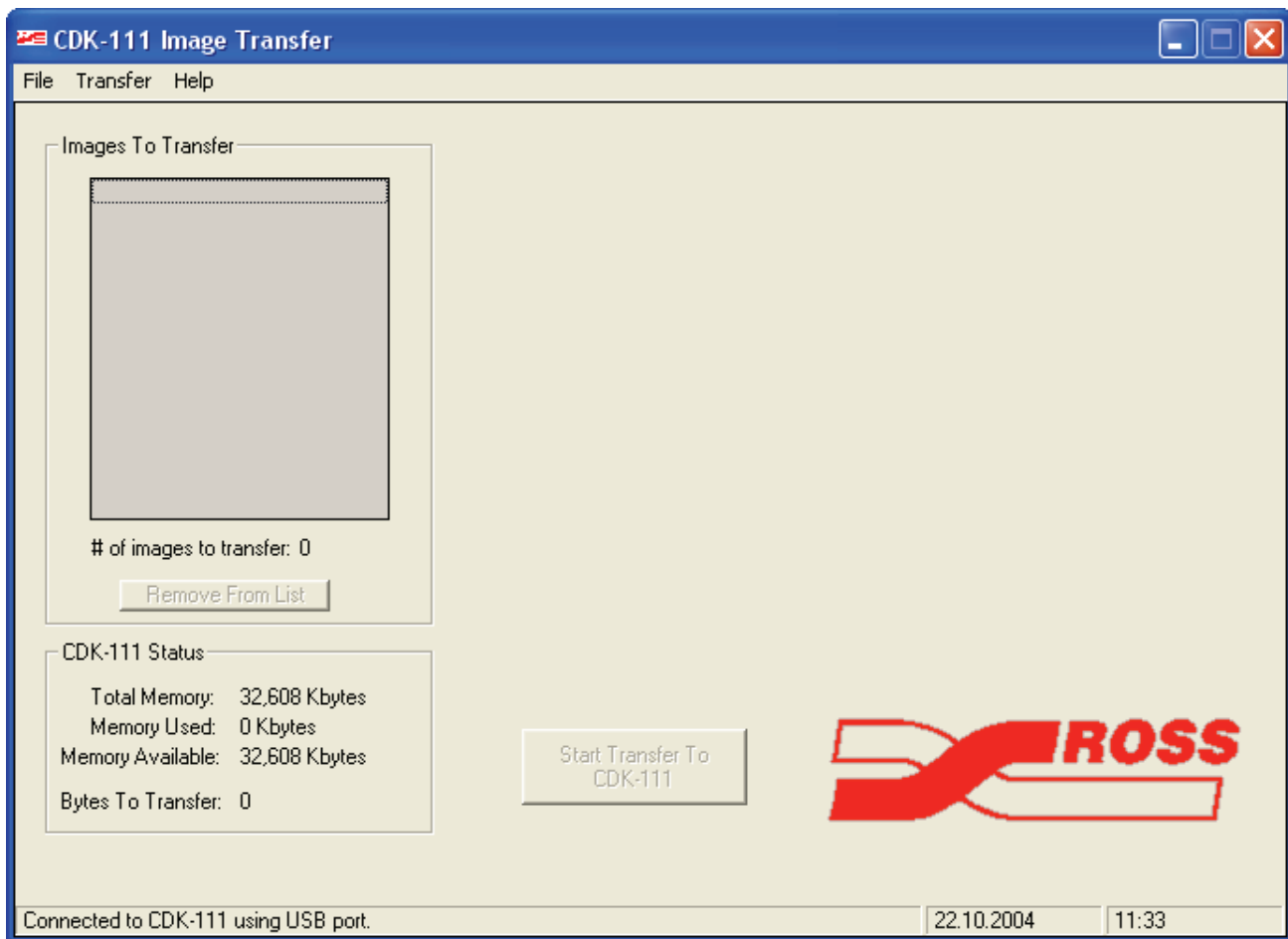
CDK-111 Image Transfer Program Window

2.   On the menu bar, click on the **File** menu item at top left. A drop-down list appears, as follows:
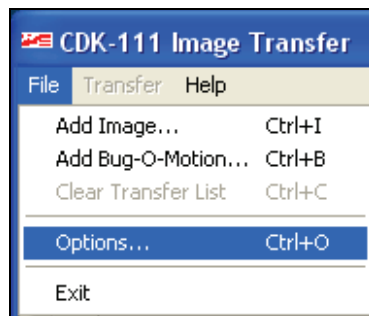
File Menu Drop-Down List

3. Click on **Options** to open the serial transfer Options dialog:
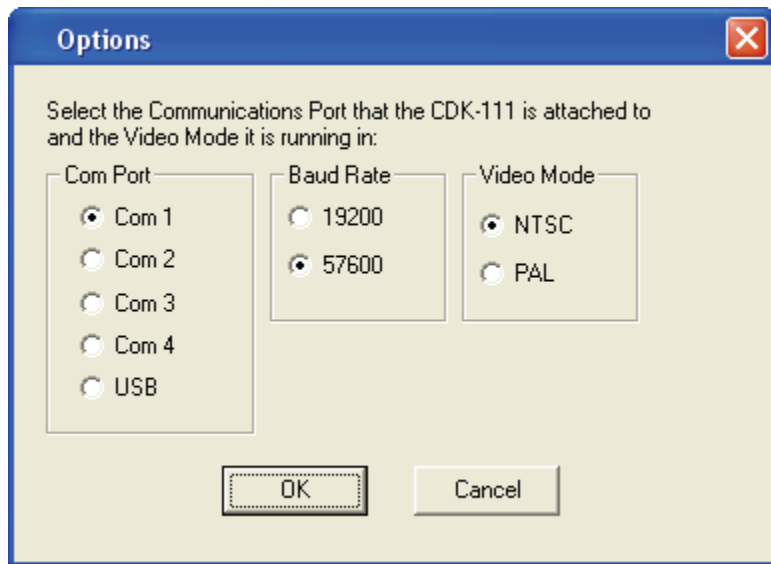
Options Dialog

4. Select the Com Port that has the transfer cable attached.

5. Select the desired baud rate.

   Usually, the higher the baud rate, the lower the amount of time to transfer an image. At 57,600 baud, expect an image transfer to take approximately eight (8) minutes per MB of data.

Note

See Chapter 4, "**Operation**" for details on this menu parameter.

6. Select the appropriate video mode for your system.

7. Click **OK**.

8. Proceed to the **Image Transfer Cable Connections** section below.

Image Transfer Cable Connections

There are three different cables available to transfer images to the CDK-111A-M.

- Universal Serial Bus (USB) A/B Cable (supplied, P/N 135-004)
- PC Interface Cable (supplied, P/N 1111C-302)
- Serial Download Cable (supplied with cards *prior* to Issue 3, P/N 1111C-300)

Choose the cable that is more convenient for your facility layout and working situation.

The USB cable and either of the serial cables can be connected simultaneously, but only one Com Port at a time can be active for image transferring.

Connecting the USB cable

A USB cable is supplied with either of the **Image Transfer Program** CDs.

Caution — Both the CDK-111 Product Resources and Image Transfer Program (v2.3) CDs contain the necessary USB drivers to allow data transfer between your computer and the CDK-111A-M card via the USB port.

Ensure the software has been correctly installed in your computer *before* connecting the USB cable between your computer and the CDK-111A-M card. Otherwise, Windows 2000/XP installs a default driver that will not work with the CDK-111A-M, and may necessitate the reinstallation of the OS.

After the ITP v2.3 has been installed on your PC,

1. Connect the A male end connector of a USB cable to a USB port on your PC.

USB cable, A male end connector view

2. Connect the cable's B male end connector to the USB socket **J2** on the front edge of the CDK-111A-M card.

Note

The location of the USB socket **J2** is shown on the diagram at the beginning of Chapter 2, "**Installation**".
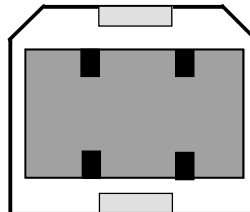
USB cable, B male end connector view

If you require additional cable length, attach USB cable extensions as necessary.

On the computer, the Windows New Hardware wizard detects the CDK-111A-M for the first time and installs the correct device driver from the installed ITP files.

Windows XP takes a few moments to find the driver. Windows 2000 requires you to close and reopen the ITP program to verify the USB connection.

The next step is to identify and select the image(s) that you plan to download from your PC. There are two kinds of images – stills and animation. Proceed to the **Transferring Still Images** or **Transferring Animated Images** section as necessary.

Connecting the Serial Cables

There are two serial cables available to transfer images to the CDK-111A-M serially.

- PC Interface Cable (supplied, P/N 1111C-302)

- Serial Download Cable (supplied with cards *prior* to Issue 3, P/N 1111C-300)

There is no difference between the functionality of the cables. Choose the cable that is more convenient for your facility layout and working situation.

PC Interface Cable
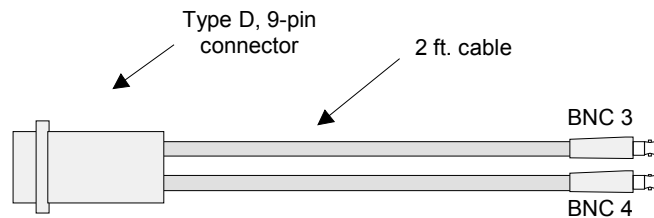
PC Interface Cable (P/N 1111C-302)

1. Place a jumper on **J1** bridging pins 4 and 6. See Appendix C, "**Specifications**" for jumper pinout reference.

2. Place a jumper on **J1** bridging pins 3 and 5. See Appendix C, "**Specifications**" for jumper pinout reference.

3. Connect the Type D, 9-pin connector to a Com Port on your PC.

4. Extend the cables labeled BNC 3 and BNC 4 to the required length using industry standard coaxial cable.

Note

> The locations of the BNC connectors are shown in the BNC Connectors section of Chapter 2, "**Installation**"

5. Connect the PC Interface Cable extensions to the BNC 3 and BNC 4 connectors on the rear of the frame.

Serial Download Cable
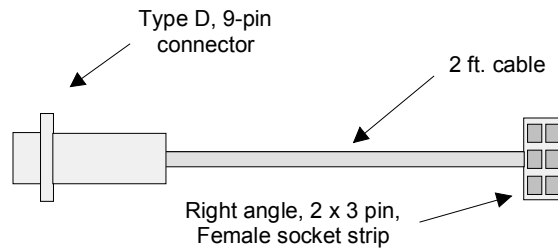
Serial Download Cable (P/N 1111C-300)

Important	When transferring images using the Serial Download cable, disconnect BNC 3 and BNC 4 to avoid any communication conflicts during the transfer.

1. Remove the CDK-111A-M card from its frame slot

	Caution — If recently in service, the card may be hot. Handle with care.

2. Connect the right-angled socket strip connector end of the cable to jumper **J1** (Rx Termination and Download Jumper) on the CDK-111A-M card.

    The socket strip connector end should be plugged in to jumper **J1** so that the cable lays along the card, and the Type D, 9-pin connector end is accessible from the front end of the frame when the card is re-installed.

    See Appendix C, "**Specifications**" and the silk screening on the back of the card for pin reference. The location of the jumper **J1** is shown on the diagram at the beginning of Chapter 2, "**Installation**".

3. Re-install the card into its frame slot.

4. Connect the Type D, 9-pin connector to a Com Port on your PC.

    If you require additional cable length, attach serial cable extensions as necessary.

Card Menu Setup for Serial Transfer

The Image Transfer Program is set to transfer images via the USB port by default. If you are using the PC Interface cable or the Serial Download cable, each card must be individually set up via the menu before you can upload or download images.

1. Go to **Menu D: Card Setup** by rotating the Menu Selector knob to the D position.

2. Using the middle **Menu Down** button on the card edge, scroll down to the Protocol item.

3. Press the bottom **Menu Select** button to move the cursor to the right hand column.

4. Using the top and/or the middle button on the card edge, scroll through the protocol options and stop at either of the baud rates, **PC Software 57600**, or **19200**.

   Usually, the higher the baud rate, the lower the amount of time to transfer an image. At 57,600 baud, expect an image transfer to take approximately eight (8) minutes per MB of data.

Note

> See Chapter 4, "**Operation**" for details on this menu parameter.

5. Press the bottom **Menu Select** button to return the cursor to the left hand column.

6. Return the **Menu Selector** knob to the **0** position to save the data and exit the menu.

The next step is to identify and select the image(s) that you plan to download from your PC. There are two kinds of images – stills and animation.

Transferring Still Images

Note

Ross Video recommends transferring images only when the CDK-111A-M is off air. If the user is displaying a key on air, and a USB image transfer is initiated, the key will disappear. When the transfer is complete, the user must redisplay the key in order to see it on air.

Use the following steps to transfer still images:

1. Ensure that the **Menu Selector** knob is set to the **0** position and no menu is open. Note that if you are in DSK Mode, the knob can be set to the **0** or **6** positions.
2. Initiate the ITP on your PC by clicking **CDK-111 Image Transfer** from the Windows Start > Programs> Ross Video menus.
3. On the ITP menu bar, click **File**.

   The following drop-down list appears:
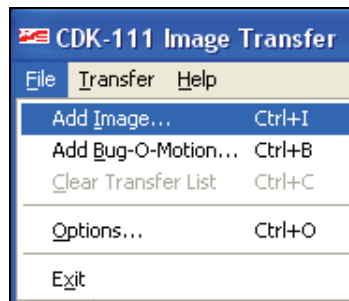
File Menu Drop-Down List

4. Click **Add Image** to open the following dialog:
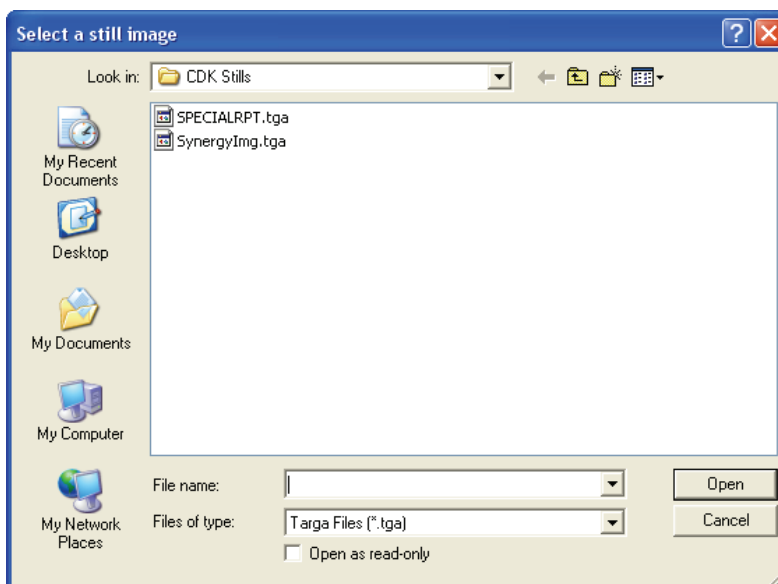
Select a still image Dialog

5. Navigate to the folder where you have stored your still images.

6. Highlight a file and click **Open**, or double click on the file.

    The **Select a still image** dialog closes.

Image Properties Panel

In the **Image Properties** panel, on the main screen, a thumbnail of the image appears and text fields populate with important file information. See image below.
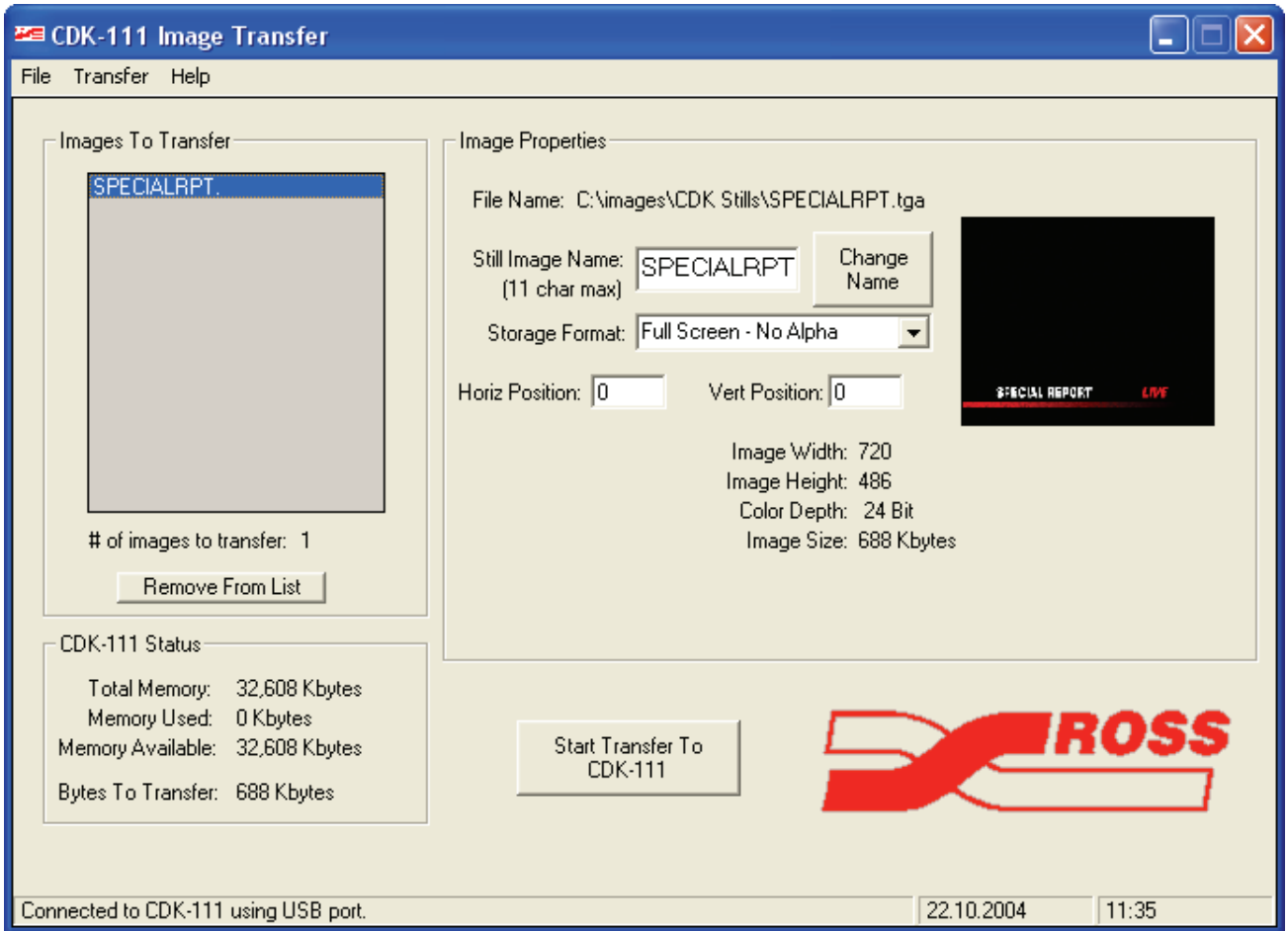
CDK-111 Image Transfer Program Window

Panels on the main screen display information about the image you selected. Panel descriptions follow.

Images To Transfer Panel
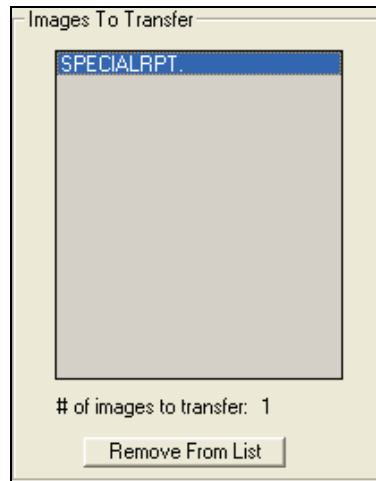
Images To Transfer Panel

The main screen displays additional information about the file that has just been selected. The **Images To Transfer** panel is on the upper left side of the main screen.

The name of the selected file loads into the **Images To Transfer** panel. It contains a list of images that are being cued up for transfer.

Images can be removed from the list by highlighting the image and clicking **Remove From List** at the bottom of the panel. You can clear all images from the list by choosing **Clear List** from the **File** menu.

When all files have been cued, they can be transferred one at a time or in a batch. This process is explained in the **Uploading Images to the CDK-111** section, below.

CDK-111 Status Panel
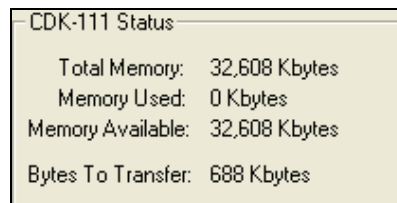
CDK-111 Status Panel

On the lower left side of the main screen, the **CDK-111 Status** panel displays information about the on-board memory.

- **Total Memory**
  Each CDK-111A-M card has 32MB of non-volatile memory.
- **Memory Used**
  This displays the amount of memory that has been used.
- **Memory Available**
  This displays the amount of space available on the memory for more stills or animation.
- **Bytes To Transfer**
  This displays the total size of the images in the **Images To Transfer** panel which are ready for transferring (uploading) to the memory.

Image Properties Panel
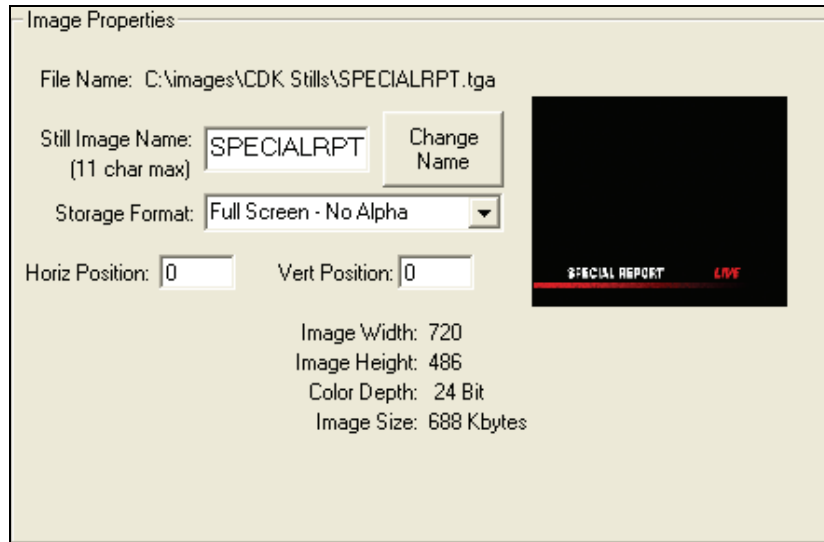
Image Properties Panel

On the upper right side of the main screen, the **Image Properties** panel displays information about the selected image.

- **File Name**

  The selected file name's path and location is displayed above the thumbnail image.

- **Still Image Name**

  The name of the still is loaded into the box labeled **Still Image Name**. You can change the name of the file to be stored on the card by typing the new name in the text box and clicking on **Change Name**. The program automatically updates the new name in the **Images To Transfer** panel.

Note

> A name can be up to 11 characters, *not* including the .tga extension, and can contain letters, numbers, spaces, and special characters. If the name has over 11 characters, the program will only use the first 11.

- **Storage Format**

  You can choose how you wish the still image to be stored on the CDK-111A-M. How it is stored will ultimately affect its keying characteristics, the amount of storage space it takes up on the CDK-111M, how fast the image stores into card memory initially, and how fast the image loads into the video buffer before being brought to air.

  When an image is selected for transfer, the color depth of the image determines whether it is stored with or without an alpha.

    - A 24-bit image (no alpha) is defaulted to **Full Screen - No Alpha** for storage.

    - A 32-bit image (with alpha) defaults to **Logo with Alpha**.

In most cases, the default is recommended. If you change the Storage Format to **Uncompressed Full Screen**, the image will load faster into the video buffer before being brought to air but will take up more storage space on the card.

Uncompressed stills can only be used for backgrounds NOT keys.

- **Horiz and Vert Position**

  The **Horizontal** and **Vertical Position** boxes define the upper left hand corner (in pixels and lines) of an image. A full screen image will always have these values defined as **0** and **0**.

  When an image is less than full screen, the values in these boxes can be changed by typing in a new number or clicking on the up/down arrows. The thumbnail image will change its position in the image box to reflect the new coordinates.

  You can also change or place the location of the image by clicking on the image box itself. The point of click in the box is defined as the upper left hand corner (pixel and line) of the image. The position of the image will follow the pointer with each click.

  You cannot place an image outside of the active video area as defined by the image box. If you click outside of the box, the program will automatically place the lower right hand coordinates of the image in the lower right-most position of the box.

- **Image Width**

  This is the number of pixels in one line of the image. The maximum number is 720 for a still image.

Note

If the image is an odd number of pixels wide, the ITP will truncate the rightmost column of pixels to force the image to even-width.

- **Image Height**

  This is the number of lines in the image. The maximum number is 486 (NTSC) and 576 (PAL).

- **Color Depth**

  This number defines an image created without an alpha (24-bit) or an image created with an alpha (32-bit).

- **Image Size**

  This number displays the size of the image in bytes.

If you are only transferring still images, skip the next section on **Transferring Animated Images** and go directly to the **Uploading Images to the CDK-111A-M** section.

Transferring Animated Images

If you are using a Laptop PC, the following settings can interrupt ITP processes when they activate:

- Screen Saver Timeout: 15 min
- Hard Drive Turn Off: 30 min
- Standby Mode: 20 min

Resetting these options for a longer time or Never will assure improved ITP performance during image transfers to the CDK-111A-M.

Note

Ross Video recommends transferring images only when the CDK-111A-M is off air. If the user is displaying a key on air, and a USB image transfer is initiated, the key will disappear. When the transfer is complete, the user must redisplay the key in order to see it on air.

Use the following steps to transfer animated images.

1. Initiate the ITP on your PC by clicking **CDK-111 Image Transfer** from the Windows Start > Programs> Ross Video menus.

2. On the menu bar, click **File**. The following drop-down list appears:
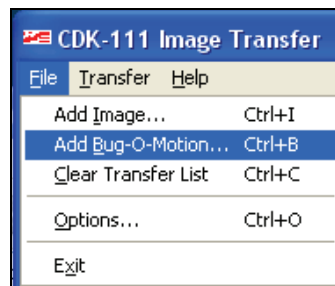
File Menu Drop-Down List

3. Click **Add Bug-O-Motion** to open the following dialog:
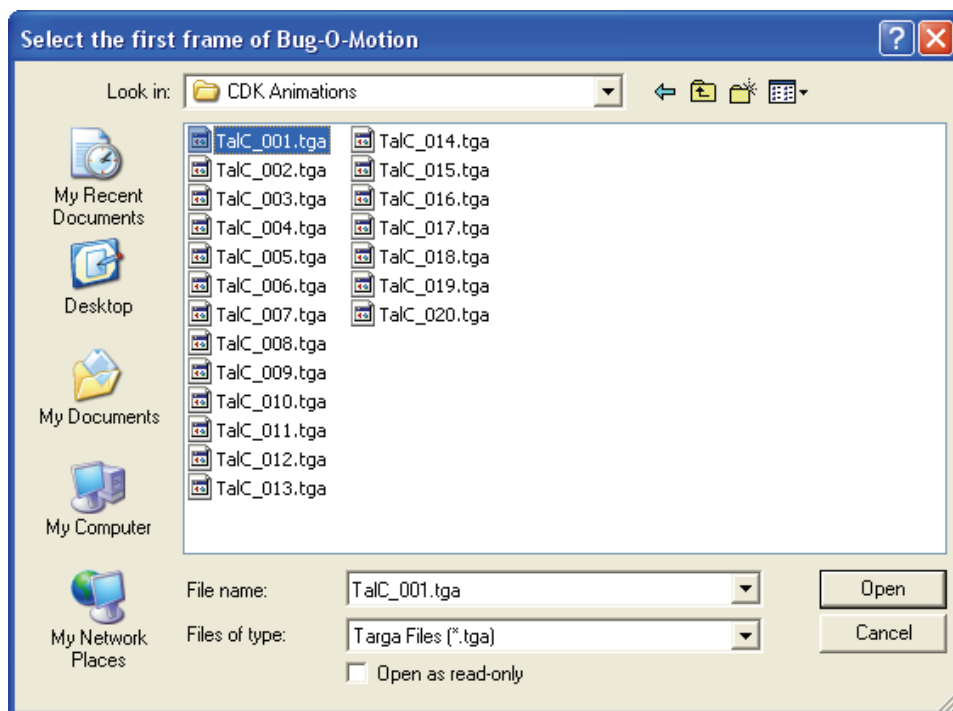
Select the first frame of Bug-O-Motion Dialog

4. Navigate to the folder where you have stored your animation images.

5. Highlight the first file (frame) of the animation sequence and click **Open**, or double click on the file.

    The program selects all of the files in the sequence, and loads them into the **Images To Transfer** panel. Each of the selected files will have the sequence number portion of the filename changed, starting at **Frame 1** for the first selected file.

Note

> If you do not want the animation to start at the first file of the sequence, click on the file that you wish to start at and it will become the first frame in the **Images To Transfer** panel's list box. All following frames will be re-numbered accordingly.

Upon opening the first frame of the animation, you are returned to the main screen, where a thumbnail of the image is drawn in the upper right hand window box. As well, important information about the file and the sequence displays.
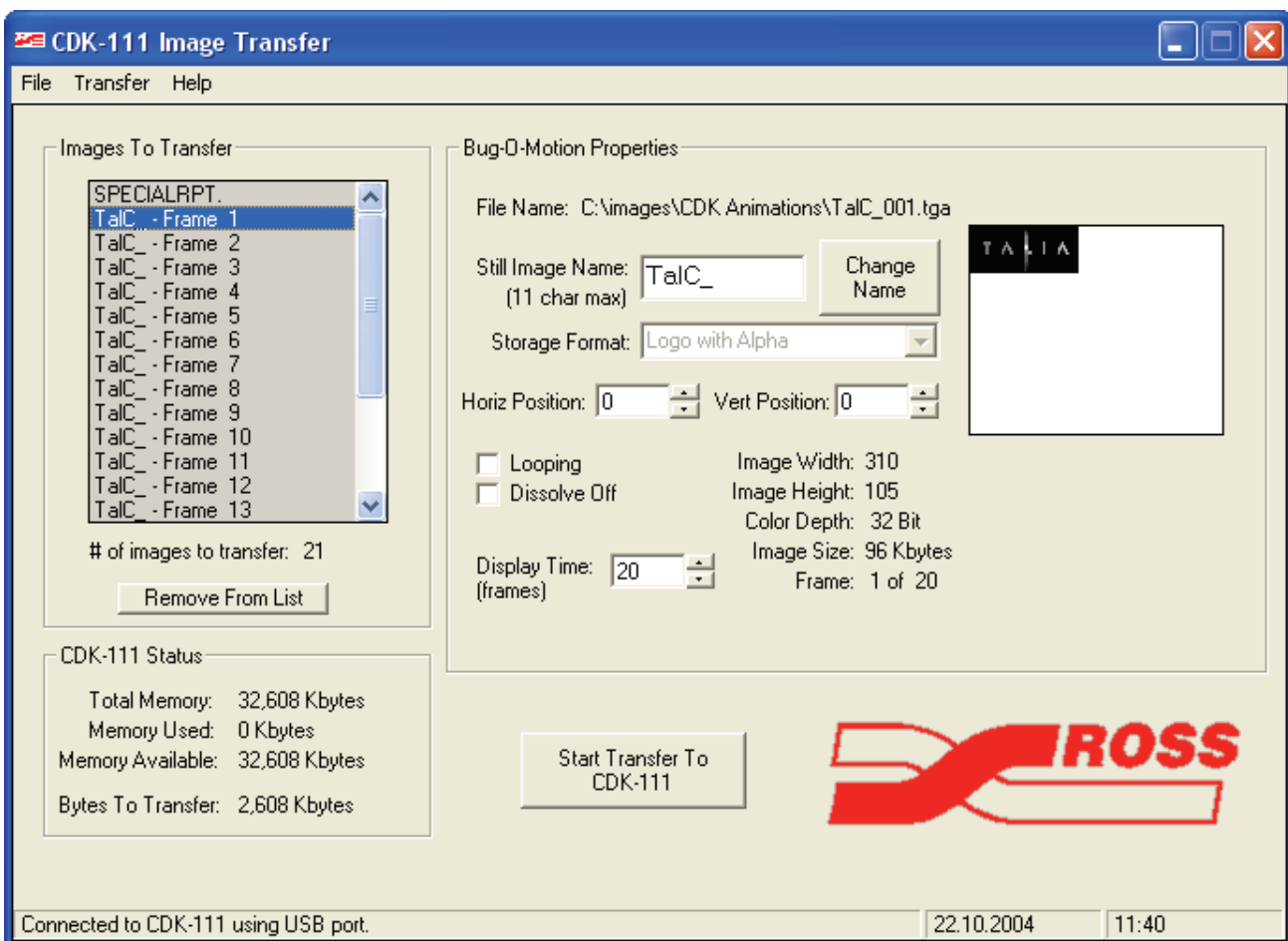
CDK-111 Image Transfer Program Window

Panels on the main screen display information about the sequence you selected. Panel descriptions follow.

Images To Transfer Panel
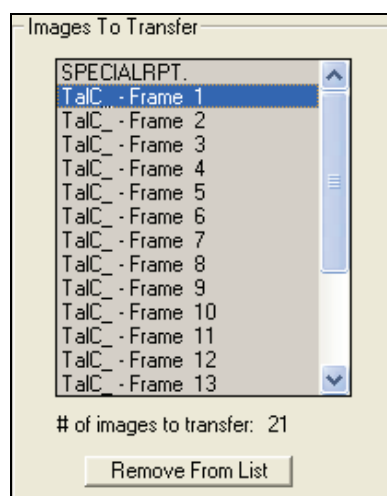
Images To Transfer Panel

The **Images To Transfer** panel is on the upper left side of the main screen.

Each frame (file) of the animated image loads in the **Images To Transfer** panel. The program separates the original file name, in this case **TalC_**, and appends a sequential frame number to it for its own reference.

Any image in the sequence can be removed by highlighting the image (frame number) and clicking on the **Remove From List** bar at the bottom of the box. You can clear all images from the list by choosing **Clear List** from the **File** menu.

When all files have been cued, they can be transferred in a batch. This process is explained in the **Uploading Images to the CDK-111A-M** section, below.

CDK-111 Status Panel
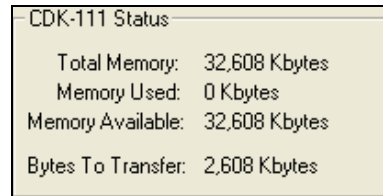
CDK-111 Status Panel

On the lower left side of the main screen, the **CDK-111 Status** panel displays information about the on-board image storage memory.

- **Total Memory**
  Each CDK-111A-M card has 32MB of non-volatile memory.
- **Memory Used**
  This displays the amount of memory that has been used.
- **Memory Available**
  This displays the amount of space available on the memory for more stills or animation.
- **Bytes To Transfer**
  This displays the total size of the images in the **Images To Transfer** panel which are ready for transferring (uploading) to the memory.

Bug-O-Motion Properties Panel
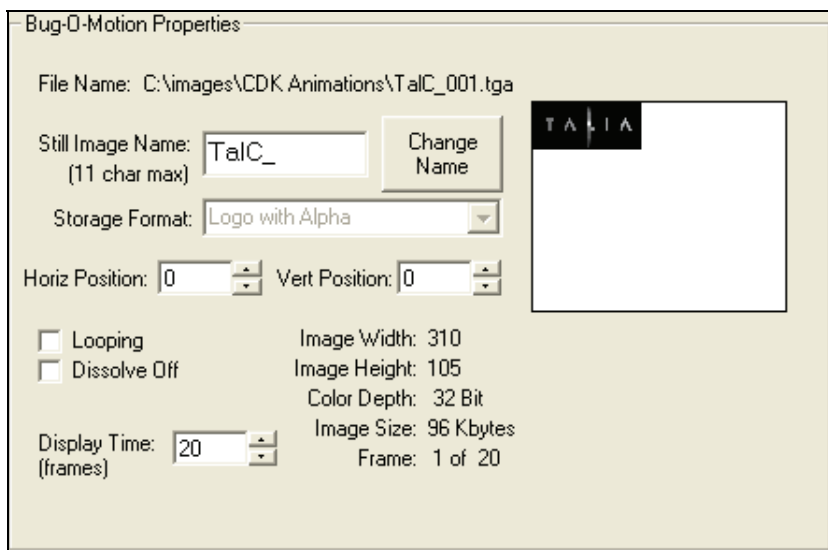
Bug-O-Motion Properties Panel

On the upper right side of the main screen, the **Bug-O-Motion Properties** panel displays information about the selected animated image.

- **File Name**

  The first frame of the selected animation displays above the thumbnail image.

- **Still Image Name**

  The name of the first file (frame), without the numbers, is loaded into the **Still Image Name** box. You can change the name of the sequence by typing in a new name for the *first frame only*, and clicking the **Change Name** button. The program automatically updates the new name on all of the files in the sequence, in the **Images To Transfer** panel.

Note

> A name can be up to 11 characters, *not* including the .tga extension, and can contain letters, numbers, spaces, and special characters. If the name has over 11 characters, the program will only use the first 11.

- **Storage Format**

  Since all files in an animation sequence must have an alpha component, the **Storage Format** box shows a "grayed out" **Logo with Alpha** and cannot be changed.

- **Horiz and Vert Position**

  The **Horizontal** and **Vertical Position** boxes define the upper left hand corner (in pixels and lines) of the first frame of the sequence. The first frame will always show the default values of **0** and **0** when the sequence is first loaded.

  The values in these boxes can be changed by typing in a new number and pressing Enter, or by clicking on the up/down arrows. The thumbnail image will change its position in the image box to reflect the new coordinates.

  You can also change or place the location of the first frame of the sequence by clicking on the image box itself. The point of click in the box is defined as the upper left hand corner (pixel and line) of the image. The position of the image will follow the pointer with each click.

  You cannot place an image outside of the active video area as defined by the image box. If you click outside of the box, the program will automatically place the lower right hand coordinates of the image in the lower right-most position of the box.

- **Looping**

  When selected, the animation sequence will become a continuous loop by starting over whenever it reaches the last frame in the sequence. It will continue to do so until told to stop.

- **Dissolve Off**

  When selected, the animation will freeze on the last frame of the sequence and dissolve off using the transition rate set in the menu.

Note

> **Looping** and **Dissolve Off** can be used together.

- **Display Time**

  This box is used to speed up or slow down the animation sequence.

  The default display time is one video frame per .tga file in the sequence. If you want to speed up the animation, reduce the display time shown by either typing in a lower number or clicking on the down arrow beside the box. Conversely, if you want to slow down the animation sequence, increase the display time shown by either typing in a higher number or by clicking on the up arrow beside the box. The program will automatically make the adjustment in the display time.

Note

> For optimum animation smoothness, Ross Video recommends that animation sequences be displayed at the frames-per-file rate they were designed to run with.

- **Image Width**

  This is the number of pixels in each line, of each frame. The maximum number is 340.

- **Image Height**

  This is the number of lines in each image (frame). The maximum number is 486 (NTSC) and 576 (PAL).

- **Color Depth**

  This will always show 32-bit for an animated sequence.

- **Image Size**

  This is the size of each frame of animation, displayed in bytes.

- **Frames**

  This displays which frame has been selected in the sequence.

The selected images are ready to be uploaded. Proceed to **Uploading Images to the CDK-111A-M**.

Uploading Images to the CDK-111A-M

The final step when transferring images to the card is the actual uploading process itself.

Important

When transferring images using the Serial Download cable, connect BNC 3 and BNC 4 to ensure communication during the transfer.

1. Once all of the images, whether still or animated, have been selected, click **Transfer** on the menu bar to open the drop-down list as follows:
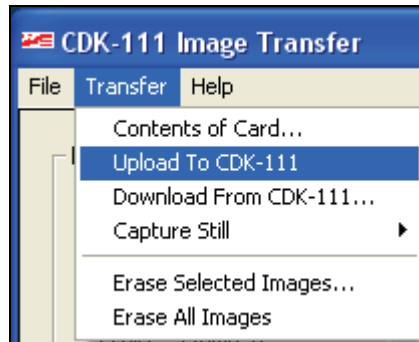
Transfer Menu Drop-Down List

2. To begin the transfer, click on the **Upload to CDK-111** menu item, or click on the **Start Transfer to CDK-111** box in the main screen.

The **Transfer Status** dialog opens:
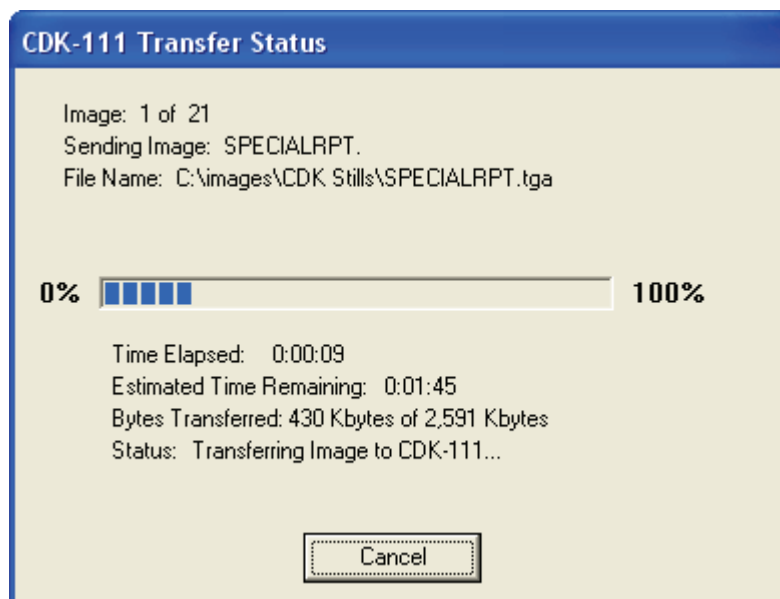
Transfer Status Dialog

This dialog displays the relevant transfer information as it happens.

- **Image**
  This displays the number of files that are scheduled for transferring and which file is presently in progress.

- **Sending Image**
  This displays the actual name of the image being transferred.

- **File Name**
  This displays the name of the file being transferred and the path where it is stored on your computer.

- **Progress Bar**
  The progress bar is a visual representation of how much of the transfer has been completed.

- **Time Elapsed**
  This displays the total time that has elapsed during the transfer of the image in progress.

- **Estimated Time Remaining**
  This displays the estimated amount of time remaining to transfer the image in progress.
  "Recording..." now flashes in the status bar of the ITP main window.

- **Bytes Transferred**
  This displays the total amount of bytes that have been transferred for the current image.

- **Status**
  This display changes as the CDK-111A-M and computer communicate during the transfer process.

During the transfer process, the two red LEDs on the card, **DS3** and **DS5**, flash intermittently as a signal that the transfer is in progress.

3. Click **OK** on the **CDK-111 Image Transfer** dialog that appears.
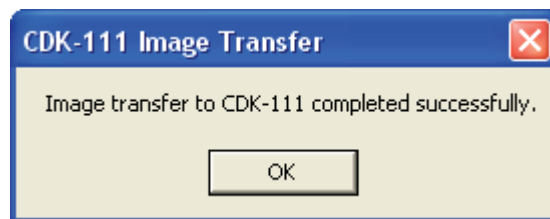
CDK-111 Image Transfer Dialog

When the transfer is complete, the LEDs stop flashing and the program returns to the main screen.

Note

See Chapter 4, "**Operation**", for details on the LED locations and functionality.

Additional Features

You can use the **Image Transfer Program** to do several other image file management tasks, such as:

- Displaying the contents of the card memory for deletion and download selection
- Downloading images from the card to a PC
- Capturing full frame, still images from either BKGD source
- Erasing all or selected images from the card memory

Displaying the Contents of the Card

Since the CDK-111A-M can store a number of still and animated images, it is necessary to check the contents of the card memory at certain times.

On the menu bar, click **Transfer** and select **Contents of Card**.
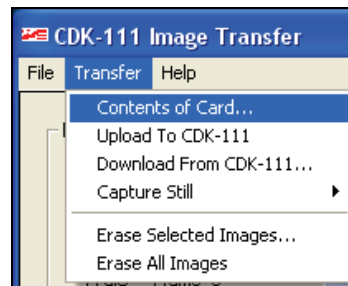
Transfer Menu Drop-Down List

The **Images Stored On CDK-111** dialog opens.
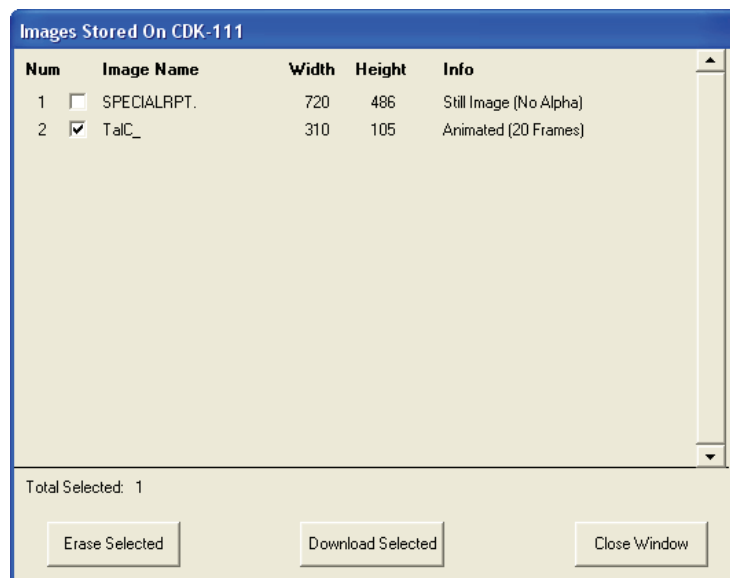
Images Stored on CDK-111 Dialog

This dialog lists all the information for each file stored in the card memory – its number, its name, width, height, and type of file. The type of file is listed in the Info column and describes the file as a **Still Image (With Alpha)**, **Still Image (No Alpha)**, or as **Animated (xx Frames)**.

Downloading Images from the CDK-111A-M

Important

> When transferring images using the Serial Download cable, disconnect BNC 3 and BNC 4 to avoid any communication conflicts during the transfer.

Use the following steps to transfer an image from the CDK-111A-M to your computer

1. On the menu bar, click **Transfer**, and select **Download from CDK-111**.
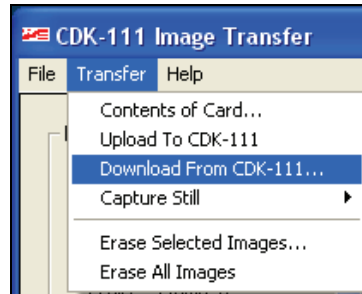
Transfer Menu Drop-Down List

The **Images Stored On CDK-111** dialog opens, as shown on the previous page.

2. Click the checkbox beside the image name to select the image or animation sequence that you wish to transfer.

3. When you have selected all of the images that you wish to transfer, click the **Download Selected** button.

The following dialog will open to prompt you for a download directory on your computer:
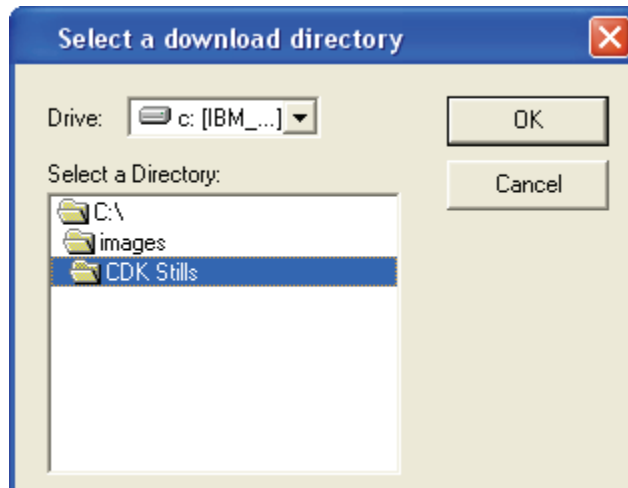
Select a Download Directory Dialog

4. Select the directory and click **OK** to begin the download.

The **Transfer Status** dialog opens and displays the transfer information.
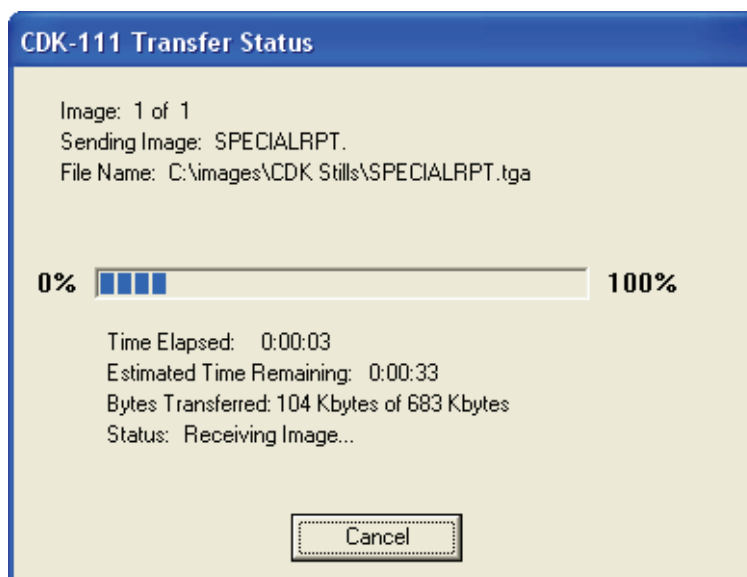
Transfer Status Dialog

5. When the transfer is complete, the Image Download dialog appears. Click **OK**.

    The **Image Transfer Program** copies the file to the directory that you have chosen. It uses the file name that the file was stored under on the card and appends .tga to the end.

Capturing Stills

The CDK-111A-M can capture full frame images from either of the BKGD inputs or the complete Key and Alpha information from BNC 7 and 8. In each case, the card captures the active portion of the video information. It does not capture any of the ancillary data, such as Closed Captioning.

Note

> Key captures and BKGD captures are stored in different internal formats.
>
> You can not display a Key capture in a BKGD buffer or a BKGD capture in a key buffer.

1. On the menu bar, click **Transfer**, and select **Capture Still**.

2. A secondary tab opens:
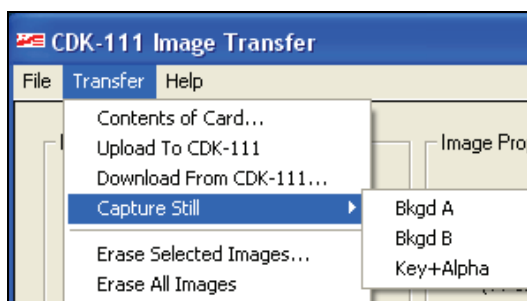
Transfer Menu Drop-Down List

3. Click on either **BKGD A**, **BKGD B**, or **Key+Alpha.**

The program asks you to give the captured image a name:
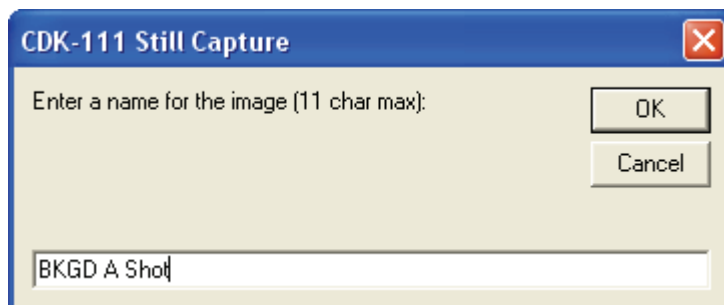
CDK-111 Still Capture Dialog

4. Type in the name and click **OK**.

5. In the **CDK-111 Image Transfer** dialog that appears, click **OK**.
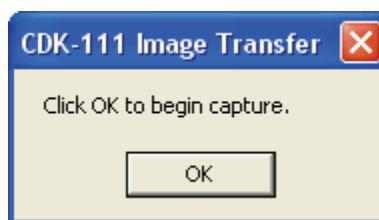
CDK-111 Image Transfer Dialog

The program saves the image to the card and displays the following **Please Wait** message:
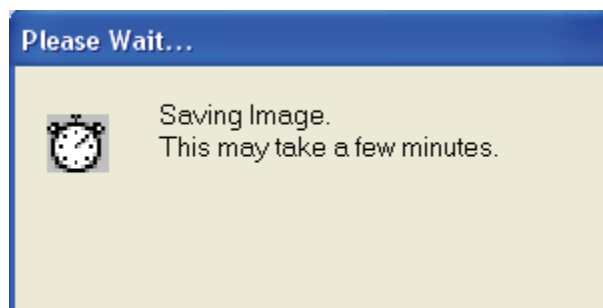
Please Wait Message

When the image is finished saving, the program returns to the main screen for the next instruction.

You can verify that the image was saved to the card by checking the **Contents Of Card** dialog.

Erase Selected Images

Use the following steps to erase selected images from the CDK-111A-M:

1. On the menu bar, click **Transfer**, and select **Erase Selected Images** .
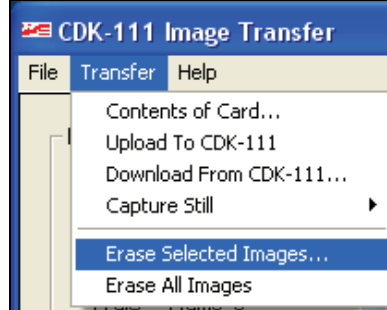
Transfer Menu Drop-Down List

2. In the **Images Stored On CDK-111** dialog, click the checkbox beside the image name to select an image.
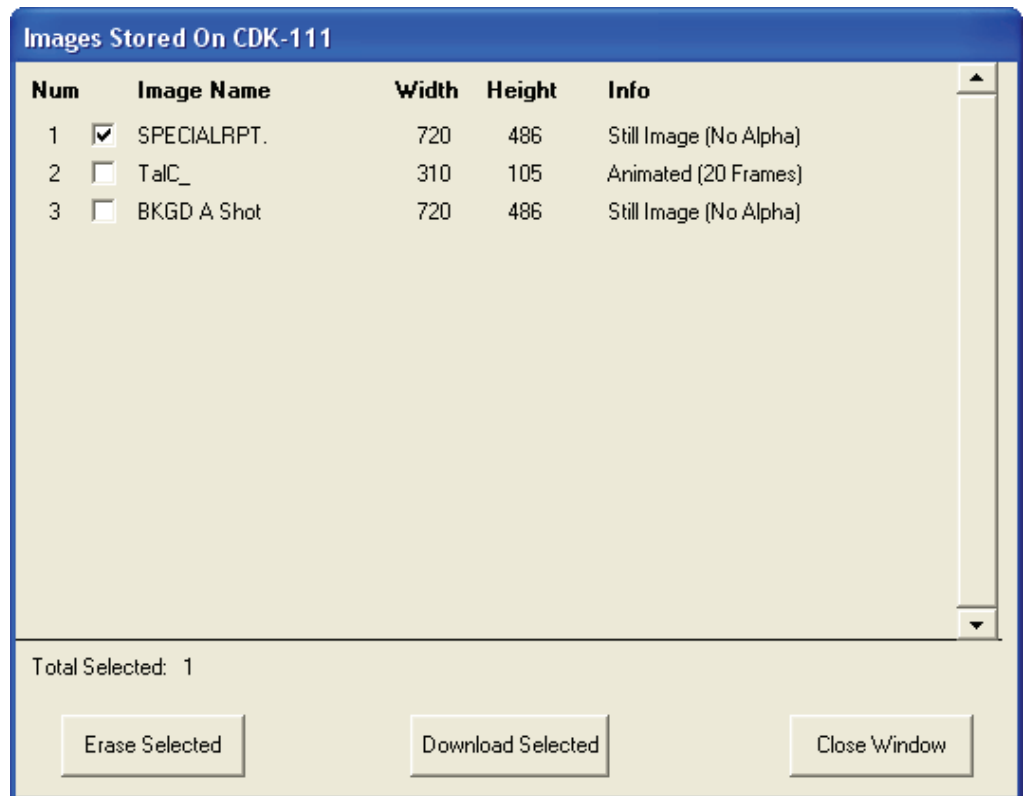
Images Stored on CDK-111 Dialog

3. Click the **Erase Selected** button.

4. In the **Confirm Erase** dialog, click **Yes**.

   A Message appears while the program erases the image from the card memory and the **Images Stored On CDK-111** dialog refreshes with the erased image removed from the list.

Erase All Images

Use the following steps to erase all images on the card at one time

1. On the menu bar, click **Transfer**, and select **Erase All Images**.

    The following warning dialog appears:
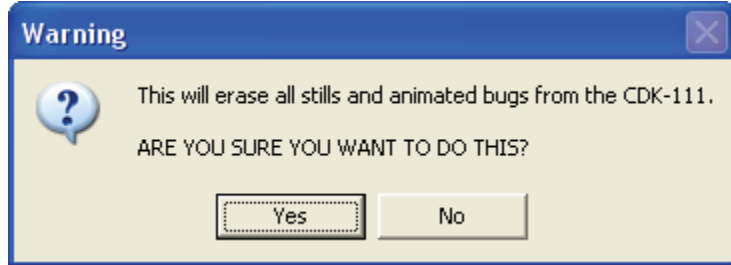
Warning dialog

2. Click **Yes**.

    A message box appears while the CDK-111A-M erases the image(s). When it closes, all images are erased from the card.

This completes the discussion on the **Image Transfer Program**.

Operation

In This Chapter

This chapter describes in detail the function of all card edge buttons and knobs, control panel buttons, and the internal menus used during the operation of the CDK-111A-M.

Specifically, the following topics are discussed:

- Card Edge Controls
- LED functions
- Control Panel – DCP-111 (Optional)
- GPIs and Tallies
- The Menu System

Card Edge Controls

In Chapter 2, "**Installation and Setup**", the card edge buttons and knobs were discussed in terms of installing and setting up your CDK-111A-M (*menu* mode). These same buttons and knobs perform a different role during operation (*operation* mode).
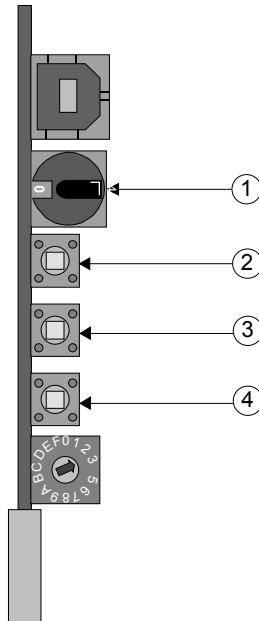
1)	Menu Selector	3)	Menu Down / Key Button
2)	Menu Up / BKGD Button	4)	Menu Select / FTB Button

1) **Menu Selector (SW1)**

   The Menu Selector is a 16 position rotary knob, labeled **0** to **F**. It is used to select the various menus for card installation and operation.

   It must be in position **0** during operation as a standalone keyer, or in position **6** during operation as a downstream keyer.

Note

> Setting the card in Menu mode while the card is drawing a still to a Bkgd or Key will freeze or corrupt the drawing. Wait until images are drawn to their outputs before entering menu mode.

2) **Menu Up/BKGD Button (SW2)**

   - *Operation* – pressing the Menu Up / BKGD Button will dissolve from BKGD 1 to BKGD 2 and vice versa, using the transition rate set in the menu.

   - *Menu mode* – the Menu Up / BKGD Button is used to move the cursor to the item above on the menu. A momentary press will advance one item. When in a sub-menu, holding the button will cause the cursor to automatically scroll up through the items.

3) **Menu Down/Key Button (SW3)**

- *Operation mode* – pressing the Menu Down / Key Button will dissolve a key on or off, using the transition rate set in the menu.

- *Menu mode* – the Menu Down / Key Button is used to move the cursor to the item below on the menu. A momentary press will advance one item. When in a sub-menu, holding the button will cause the cursor to automatically scroll down through the items.

4) **Menu Select/FTB Button (SW4)**

- *Operation mode* – pressing the Menu Select / FTB Button will fade the PGM output to black or bring it up from black, depending upon its present state. It uses the transition rate set in the menu.

- *Menu mode* – the Menu Select / FTB button is used to move the cursor to the sub-menu values in the right-hand column. The values in these sub-items can then be adjusted using the Menu Up or Down Button. Pressing the Menu Select Button again will return the cursor to the left-hand column.

When setting up the menus on a CDK-111A-M and you want to swap the menu from a PV overlay to a PGM overlay, hold down the Menu Select / FTB Button until the system swaps the menu to the program output. Changing the menu back to a preview overlay will involve changing the Menu Output item in **Menu D: Card Setup**.

Note

When the card starts drawing a still (indicated by 2 toggling red LEDs), it responds a bit slower to the operation mode button presses. Hold buttons down a few seconds longer or wait until the still is drawn in this situation. If a BKGD image is being drawn, you cannot access menus.

LED Functions

Light Emitting Diodes (LEDs) on the CDK-111A-M cards indicate normal and error conditions. This section describes LED locations and functionality.

Component side   Solder side
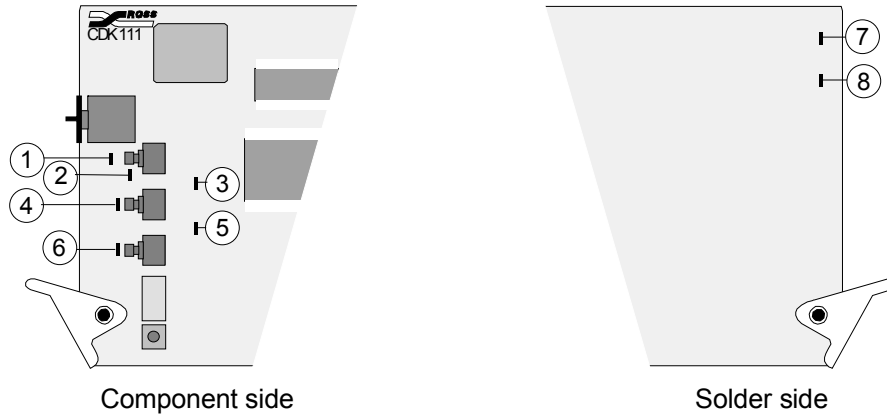
CDK-111A-M LED locations

1)	DS1 BKGD 1	5)	DS5 Status In
2)	DS2 BKGD 2	6)	DS6 FTB
3)	DS3 Status Out	7)	DS7 Signal Good
4)	DS4 Key	8)	DS8 Error

LED Functions and Indicators

LED	Signal for:	Color	Action	Status
DS1	BKGD 1	Green	Solid	On air
			Flashing	Comm problem — video input sync error
DS2	BKGD 2	Green	Solid	On air
			Flashing	Comm problem — video input sync error
DS3	Status Out	Red	Flashing Slow	Downloading/Drawing
			Flashing Fast	Comm problem — key video input sync error
DS4	Key	Green	Solid	On air
DS5	Status In	Red	Flashing Slow	Downloading/Drawing
			Flashing Fast	Comm problem — key alpha input sync error
DS6	Fade to Black	Red	Solid	Faded To Black
DS7	Signal Good	Green	Solid	Signal Good
			Flashing Slow	Signal Good, Pinging other devices
			Flashing Fast	Comm problem — any input sync error
DS8	Error	Red	Solid	Signal Error — Once error descriptions have been viewed in Menu A: Diagnostics, this light will turn off
			Flashing Slow	Attempting synchronization with ref input

Control Panel – DCP-111 (Optional)

The optional Control Panel is used to configure and/or operate a single CDK-111A-M. It is connected to BNC 2 on the rear of the CDK-111A-M. The Control Panel replicates the capabilities and functionality of the card edge controls.

Note

When using a Control Panel, ensure that the **GPI, Panel, Tally Jumper (J6)** is bridged *only* at pins 3 and 4 on the jumper and BNC 2 is set in **Menu D: Card Setup** to Control Panel. See Appendix C, "**Specifications**" for jumper pinout reference.

Caution — Only one bridge may be installed on the jumper block **J6**. Installing more than one bridge may cause permanent damage to the CDK-111A-M card. Please note that contrary to the other jumper blocks, the single bridge on **J6** must be installed horizontally to short circuit either pins 1 and 2, or pins 3 and 4, or pins 5 and 6.
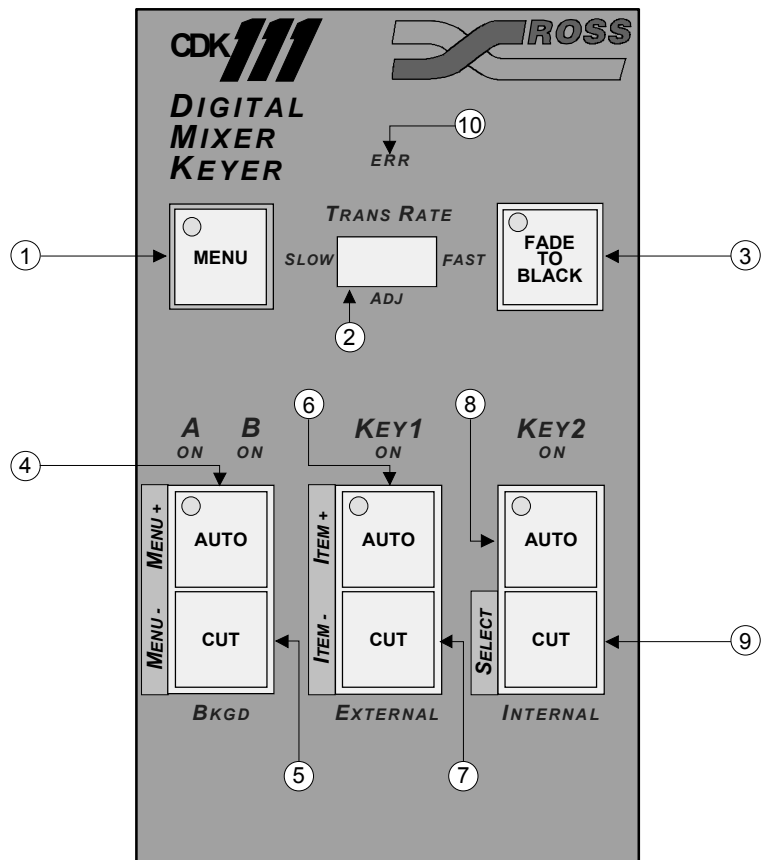
1) Menu Button	5) BKGD Cut Button	9) Key 2 Cut Button
2) Trans Rate Toggle Switch	6) Key 1 Auto Trans Button	10) Secret Till Lit Error LED
3) Fade To Black Button	7) Key 1 Cut Button	
4) BKGD Auto Trans Button	8) Key 2 Auto Trans Button	

DCP-111 Control Buttons

1) **Menu Button**

   The Menu Button is used to enter and exit the menu system. Press and hold the Menu Button until the button light begins to flash. This will take approximately 3 seconds, after which the menu will appear as an overlay on the preview or, if configured via the menu, the PGM monitor.

Note

Setting the card in Menu mode while the card is drawing a still to a Bkgd or Key will freeze or corrupt the drawing. Wait until images are drawn to their outputs before entering menu mode.

2) **Trans Rate Toggle Switch**

   The Trans Rate Toggle Switch is used to quickly change the transition rate for the FTB, BKGD and Key transitions, to preset rates. There are three settings – slow, fast and adjustable. The fast rate is set for a 10-frame transition, while the slow rate is set for 45 frames. Toggling the switch to the center, adjustable position will use the transition rate set in the menu.

3) **Fade To Black**

   - *Operation Mode* – pressing the Fade To Black button fades the PGM output to black or up from black, depending upon its present state, using either the control panel transition rate (see Trans Rate Toggle Switch) or the transition rate set in the menu.

   - *Menu mode* – this button does not have a function when working in menu mode.

4) **BKGD Auto Trans Button**

   - *Operation Mode* – pressing the BKGD Auto Trans Button will transition between BKGD 1 and BKGD 2, using either the control panel transition rate (see Trans Rate Toggle Switch) or the transition rate set in the menu.

   - *Menu mode* – pressing the BKGD Auto Trans Button will change the on screen menu to the next menu in the 1–F menu sequence.

5) **BKGD Cut Button**

   - *Operation Mode* – pressing the BKGD Cut Button will cut from whichever BKGD is on air, to the other one.

   - *Menu mode* – pressing the BKGD Cut Button will change the on-screen menu to the previous menu in the 1–F menu sequence.

6) **Key1 Auto Trans Button**

   - *Operation Mode* – pressing the Key1 Auto Trans Button will transition Key1 on or off.

   - *Menu mode* – in the left-hand column, pressing the Key1 Auto Trans Button will move the cursor to the next item in the menu you are in. In the right-hand column, pressing the Key1 Auto Trans Button will step forward through the variables for that item.

7) **Key1Cut Button**

- *Operation Mode* – pressing the Key1 Cut Button will cut Key1 on or off air, depending upon its present state.

- *Menu mode* – when the cursor is in the left hand column (item column); pressing the Key1 Cut Button will move the cursor to the previous item. When the cursor is in the right hand column (value column), pressing the button will step backwards through the variables for that item.

8) **Key2 Auto Trans Button**

- *Operation Mode* – pressing the Key2 Auto Trans Button will transition Key2 on or off.

- *Menu mode* – this button does not have a function when working in menu mode.

9) **Key2 Cut Button**

- *Operation Mode* – pressing the Key2 Cut button will cut Key2 on or off air.

- *Menu mode* – pressing the Key2 Cut Button will move the cursor to the sub-menu values in the right-hand column. The values in these sub-items can then be changed using the Key1 Auto Trans and Key1 Cut Buttons. Pressing the Key2 Cut Button again will return the cursor to the left-hand column.

10) **Secret Till Lit Error LED**

The Secret Till Lit Error LED mimics the CDK-111A-M card edge Error LED and lights only when an error condition is reached. View **Menu A: Diagnostics** to turn off the LED and find out the cause of the error.

Note

When the card starts drawing a still (indicated by 2 toggling red LEDs), it responds a bit slower to the operation mode button presses. Hold buttons down a few seconds longer or wait until the still is drawn in this situation.

GPIs and Tallies

This section describes GPI and Tally settings for the CDK-111A-M.

GPIs

This section explains how the GPI settings are structured in order to decrease set up time and maximize the capabilities of the CDK-111A-M.

Configure the GPI and Tally settings in **Menu E**.

GPI Functions

The following functions are available for GPI control:

- CUT BKGD
- AUTO BKGD
- CUT KEY 1
- CUT KEY 2
- AUTO KEY 1
- AUTO KEY 2
- AUTO FTB
- SELECT BKGD 1
- SELECT BKGD 2

GPI Triggers

GPI triggers can be configured as:

- EDGE HIGH
- EDGE LOW
- LEVEL HIGH
- LEVEL LOW

GPI Edge Triggers

Edge triggers are used when you want to toggle between settings. For the sake of comparison, pressing a card edge button or DCP-111 Control Panel button acts the same as the card receiving a GPI edge trigger. All of the GPI functions listed above can be triggered using GPI edge triggers.

Note

> Edge triggered GPI signals should be stable at the selected level for 1 full frame of video to ensure the action will be triggered.

Note

> The on/off air status of the BKGD or key is *not* determined by the GPI. The GPI will simply cause the on/off air status of the BKGD and/or key to toggle.

Note	In edge trigger mode, SELECT BKGD 1 and SELECT BKGD 2 will both cause the current on-air background to toggle between BKGD 1 and BKGD 2.

GPI Level Triggers

Level triggers are used when you want to assert a particular state for a setting. In this case, the user defines the on-air state of the function as being either LEVEL HIGH or LEVEL LOW. Therefore, if the on-air state of Key 1 is defined as LEVEL HIGH for example, as long as the GPI is a LEVEL HIGH signal, Key 1 will stay on air. If a LEVEL LOW GPI is received, Key 1 will be taken off air.

Note	GPI Level Triggers can be overridden by card edge, DCP-111, and protocol controls. Therefore, the states corresponding to a level setting can be changed by performing a transition with the other controls.

GPI Level Trigger States

Function	**Equals Trigger State**	**Does Not Equal Trigger State**
CUT BKGD	BKGD 1 will be on air	BKGD 2 will be on air
AUTO BKGD	BKGD 1 will be on air	BKGD 2 will be on air
CUT KEY 1	Key 1 will be on air	Key 1 will not be on air
CUT KEY 2	Key 2 will be on air	Key 2 will not be on air
AUTO KEY 1*	Key 1 will be on air	Key 1 will not be on air
AUTO KEY 2*	Key 2 will be on air	Key 2 will not be on air
AUTO FTB	Will be faded to black	Will not be at black
SELECT BKGD 1**	PGM Output uses BKGD 1	PGM Output uses BKGD 2
SELECT BKGD 2**	PGM Output uses BKGD 2	PGM Output uses BKGD 1

* Level changes during a transition are ignored.

** Specified BKGD shows on PGM, and other BKGD shows on PST.

Tallies

This section explains how the Tally settings are structured in order to decrease set up time and maximize the capabilities of the CDK-111A-M.

Configure the GPI and Tally settings in **Menu E**.

Tally Functions

The following functions are available for Tally association.

- BKGD 1
- BKGD 2
- KEY 1
- KEY 2

Tally Outputs

Tally outputs can only be LEVEL HIGH or LEVEL LOW. They report the on air state of the BKGD(s) and Key(s). Therefore, if the on air state of Key 1 is defined as LEVEL HIGH for example, the Tally will continue to send a LEVEL HIGH signal until Key 1 is taken off air. When that happens, the Tally signal will change to LEVEL LOW, reporting the fact that Key 1 is off air.

This following table outlines the level of the tally output based on the function and setting.

Tally Level State Table

Function	Trigger Set To Level High	Trigger Set To Level Low
BKGD 1	Tally high if BKGD 1 on PGM Tally low if BKGD 2 on PGM	Tally low if BKGD 1 on PGM Tally high if BKGD 2 on PGM
BKGD 2	Tally high if BKGD 2 on PGM Tally low if BKGD 1 on PGM	Tally low if BKGD 2 on PGM Tally high if BKGD 1 on PGM
KEY 1	Tally high if Key 1 on air Tally low if Key 1 off air	Tally low if Key 1 on air Tally high if Key 1 off air
KEY 2	Tally high if Key 2 on air Tally low if Key 2 off air	Tally low if Key 2 on air Tally high if Key 2 off air

The Menu System

The CDK-111A-M is configured through a menu system. Each card is set up individually and can respond to commands from a variety of sources, most often from serial control devices such as switchers, computers, or edit controllers. Although each card can be operated using its card edge controls or a control panel, often it will be controlled from a remote device. Various menu options must be selected so that the card can read signals from the various remote devices. This section provides detailed descriptions of the menus and their item options.

Menu Feature Descriptions

The menus are laid out like the menu shown below:
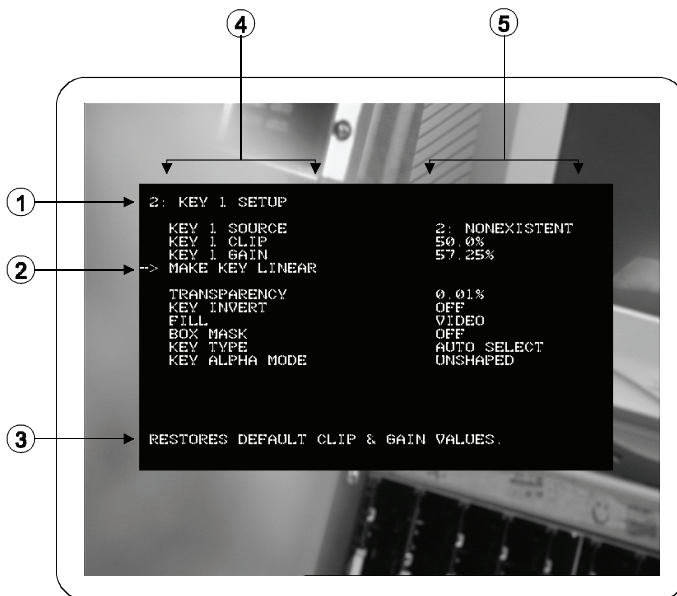
1) Menu Number and Title	3) One Line Help	5) Value Column
2) Menu Cursor	4) Item Column	

1) **Menu Number and Title**

   The 15 menus are numbered 1 to F. Each has a title, which describes the focus of that particular menu. Position **0** is reserved for standalone keyer operation mode. Position **6** is reserved for downstream keyer operation mode.

2) **Menu Cursor**

   The menu cursor can be moved up and down the left hand column using the card edge controls or the control panel buttons. It can also be moved to the right hand column to change the values associated with the item.

3) **One Line Help**

   Some items have a One Line Help line at the bottom of the menu, which provides a brief explanation of that item.

4) **Item Column**

   The left hand column is a list of items, which provide information about the card or item headings which require configuration.

5) **Value Column**

   The right hand column displays the value of its associated item.

Menu Titles

Menu titles	
1	Runtime Parameters
2	Key 1 Setup
3	Key 2 Setup
4	Box Mask Positioning
5	Matte Selection
6	DSK Setup (Downstream Keyer Mode)
7	Still Store Setup
8	Image Freezing, Storage, and Deletion
9	Input / Output Delays
A	Diagnostics
B	Reserved For Future Use
C	Secondary Card Setup
D	Card Setup
E	Tally / GPI Setup
F	BNC Listing

The following is a detailed listing of all 15 menus, including variables that are used during the card configuration. The menus have been formatted in this guide so that if you wish, you can photocopy these pages and take them with you as you configure the individual cards in your facility. Where applicable, default settings are indicated in the descriptions.

Menu 1: Runtime Parameters

Menu 1: Runtime Parameters	

Auto Trans Rate	This value is the rate in frames at which a dissolve on the card will take place. Both key and background dissolves use this rate. Transition rates cannot be changed while a transition is in progress. If you would like your transitions to be cuts, change this value to 1 frame, or use a Cut button on the DCP. For serial control, the transition rate should be sent immediately preceding or as part of the Start Transition command.
	
	    • In 525 line systems (NTSC), 30 frames equal 1 second.
	
	    • In 625 line systems (PAL), 25 frames equal 1 second.

FTB Trans Rate	This value is the rate in frames at which the fade to black will take to complete.
	
	    • In 525 line systems (NTSC), 30 frames equal 1 second.
	
	    • In 625 line systems (PAL), 25 frames equal 1 second.

BKGD 1 Source	The CDK-111A-M consists of two background inputs, one of which is on air at any given time and the other background, which is 'cued' for transition. When a background dissolve is started, the system dissolves between what it has been told is the BKGD 1 Source and the BKGD 2 Source.
	
	This setting tells the system what the BKGD 1 source is.
	
	Your available options are:
	
	    • BNC IN – Live video from the BNC labeled 'IN' (default setting).
	
	    • Still names – All of the valid full screen still names will appear.

BKGD 2 Source	Works as the BKGD 1 Source menu.
	
	Your available options are:
	
	    • BNC 1 – Live video from the BNC labeled '1' (default setting).
	
	    • Still names – All of the valid full screen still names will appear.

Key 1 Status	This item will display if Key 1 is currently on air. You can change this manually here if you desire.
	
	Your available options are:
	
	    • ON AIR – Key 1 is currently on air.
	
	    • OFF AIR – Key 1 is currently off air (default setting).

Key 2 Status	This item will display if Key 2 is currently on air. You can change this manually here if you desire.
	
	Your available options are:
	
	    • ON AIR – Key 2 is currently on air.
	
	    • OFF AIR – Key 2 is currently off air (default setting).

Key Button Controls	This item allows you to decide what the front card edge button 'key trans' does.
	
	Your available options are:
	
	    • KEY 1 – When the card edge button is pushed an auto trans will start that involves key 1 (default setting).
	
	    • KEY 2 – When the card edge button is pushed an auto trans will start that involves key 2.
	
	    • KEY 1 & KEY 2 – When the card edge button is pushed an auto trans will start that involves both key 1 and key2.
	
	NOTE: This does **not** mean that after the card edge button is pushed that the selected keyers will be on air. The selected keyers will instead toggle their on-air state.

Menu 2: Key1 Setup

Menu 2: Key1 Setup	
Key1 Source	Your available options are: • OFF – No key will be displayed for Key 1 • BNC 7 and 8 – Key 1 will use the external key inputs on BNC 7 and 8 (default setting). • Key Image Names– Only key image file names appear. This option allows you to choose to key any still source or animated source that has previously been downloaded into the card.
Key1 Clip	The CDK-111A-M is a linear luminance keyer. This means that the shape of the key on screen is determined by the luminance values of the alpha signal (BNC 8 for an external key), in conjunction with the clip and gain values. The default setting is 50%. The clip value sets a threshold value for the luminance in the alpha signal. Every luminance value in the alpha signal that is greater than the clip value is shown in the key, and no luminance value in the alpha signal that is less than the clip value is shown as part of the key. A clip value of 0.0% means that the key video will be displayed full screen, and none of the background video will be visible. A clip value of 100.0% means that the key video will *not* be visible at all regardless of whether the key is on air or not.
Key1 Gain	Key gain determines the size of a range around the clip level setup in key clip. A gain value of 100.0% has a range size of 0 around the key clip. The default setting is 57.24%. A key gain value of 100.0% is referred to as a 'Hard key'. A hard key has no transparency in it. Every value of the alpha signal that is above the clip level is shown fully on the program video, whereas no value of the alpha signal that is below the clip level is shown in the program video at all. Lower gain values increase the size of the range around the key clip. Values of the luminance level of the alpha signal that fall within this range will now start to appear in the program monitor as transparent. Luminance values at the very bottom of this range will be fully transparent, and as the luminance values approach the top values in the range, the key will become less and less transparent.
Make Key Linear	Selecting this item will force the Clip and Gain values to their default settings.
Transparency	The transparency value is applied to the key after the clip and gain values are set. The default value of 0.0% will leave the key output on the PGM output unchanged. As the transparency value is increased, the key output on the PGM will become increasingly transparent.
Key Invert	ON/OFF. Turning the key invert on will invert the portions of the program video that come from the background video, and the portions that come from the key video. The default setting is OFF.
Fill	The fill setting allows you to choose whether your key is filled with video or with a constant matte color. Your available settings are: • VIDEO – Key will be filled with video (default setting). • MATTE – Key will be filled with a constant matte color. The color is chosen in menu 5.
Box Mask	ON/OFF. This setting allows you to turn on or off the box mask. The box mask can only be used when the keyer is set to use an external key (BNC 7 and 8). The default setting is OFF.

Menu 2: Key1 Setup	
Key Type	Keys on the CDK-111A-M can be of two types, auto select keys or self keys.
	In an auto select key, the shape of the key is determined by the luminance values in the alpha channel. (BNC 8 for an external key). The default setting is auto-select.
	In a self key, the shape of the key is determined by the luminance values in the video image itself. (BNC 7 for an external key)
	You should choose an auto select key in almost all circumstances. Any device, which provides a separate alpha signal, will be used as an auto select key. Therefore, character generators and any image downloaded to the still store on the card that has an alpha channel, are used as auto select keys.
	The only time you would choose a self key would be if you were trying to key from a source that did not have a separate alpha channel such as a camera or VTR source.
Key Alpha Mode	There are two types of linear luminance keys, Shaped and Unshaped. The default setting is Unshaped.
	Every key provided to the CDK-111A-M, whether downloaded into the card as a still or fed live into BNC 7 and 8, will be one of these two types.
	You should ensure that the key type chosen inside the CDK-111A-M menu matches the key type that you are providing to the card. If you are unsure of which key type to use you are best off picking unshaped.
	The major hint that you have the wrong key type selected is if the edges of your key appear incorrect. In that case, return to the menu and select the other key type.
	Shaped keys use fixed clip and gain values and no transparency value. Therefore, users cannot change clip, gain, or transparency values while the system is set to use shaped keys.

Menu 3: Key2 Setup

Menu 3: Key2 Setup	
Key2 Source	Your available options are:
	• OFF – No key will be displayed for Key 2
	• BNC 7 and 8 – Key 2 will use the external key inputs on BNC 7 and 8 (default setting).
	• Key Image Names – Only key image file names appear. This option allows you to choose to key any still source or animated source that has previously been downloaded into the card.
Key2 Clip	The CDK-111A-M is a linear luminance keyer. This means that the shape of the key on screen is determined by the luminance values of the alpha signal (BNC 8 for an external key), in conjunction with the clip and gain values. The default setting is 50%.
	The clip value sets a threshold value for the luminance in the alpha signal. Every luminance value in the alpha signal that is greater than the clip value is shown in the key, and no luminance value in the alpha signal that is less than the clip value is shown as part of the key.
	A clip value of 0.0% means that the key video will be displayed full screen, and none of the background video will be visible.
	A clip value of 100.0% means that the key video will *not* be visible at all regardless of whether the key is on air or not.

Menu 3: Key2 Setup	
Key2 Gain	Key gain determines the size of a range around the clip level setup in key clip. A gain value of 100.0% has a range size of 0 around the key clip. The default setting is 57.24%. A key gain value of 100.0% is referred to as a 'Hard key'. A hard key has no transparency in it. Every value of the alpha signal that is above the clip level is shown fully on the program video and no value of the alpha signal that is below the clip level is shown in the program video at all. Lower gain values increase the size of the range around the key clip. Values of the luminance level of the alpha signal that fall within this range will now start to appear in the program monitor as transparent. Luminance values at the very bottom of this range will be fully transparent, and as the luminance values approach the top values in the range, the key will become less and less transparent.
Make Key Linear	Selecting this item will force the Clip and Gain values to their default settings.
Transparency	The transparency values are applied to the key after the clip and gain values are set. The default value of 0.0% will leave the key output on the PGM output unchanged. As the transparency values are increased, the key output on the PGM will become increasingly transparent.
Key Invert	ON/OFF. Turning the key invert on will invert on the PGM monitor, the portions of the program video that come from the background video, and the portions that come from the key video. The default setting is OFF.
Fill	The fill setting allows you to choose whether your key is filled with video or with a constant matte color. Your available settings are: • VIDEO – Key will be filled with video (default setting). • MATTE – Key will be filled with a constant matte color. The color is chosen in menu 5.
Box Mask	ON/OFF. This setting allows you to turn on or off the box mask. The box mask can only be used when the keyer is set to use an external key (BNC 7 and 8). The default setting is OFF.
Key Type	Keys on the CDK-111A-M can be of two types, auto select keys or self keys. In an auto select key, the shape of the key is determined by the luminance values in the alpha channel. (BNC 8 for an external key). The default setting is auto-select. In a self key, the shape of the key is determined by the luminance values in the video image itself. (BNC 7 for an external key) You should choose an auto select key in almost all circumstances. Any device, which provides a separate alpha signal, will be used as an auto select key. Therefore, character generators and any image downloaded to the still store on the card that has an alpha channel, are used as auto select keys. The only time you would choose a self key would be if you were trying to key from a source that did not have a separate alpha channel such as a camera or VTR source.
Key Alpha Mode	There are two types of linear luminance keys, Shaped and Unshaped. The default setting is Unshaped. Every key provided to the CDK-111A-M, be it downloaded into the card as a still or being fed live into BNC 7 and 8, will be one of these two types. You should ensure that the key type chosen inside the CDK-111A-M menu matches the key type that you are providing to the card. If you are unsure of which key type to use you are best off picking unshaped. The major hint that you have the wrong key type selected is if the edges of your key appear incorrect. In that case, return to the menu and select the other key type. Shaped keys use fixed clip and gain values and no transparency value. Therefore, users cannot change clip, gain, or transparency values while the system is set to use shaped keys.

Menu 4: Box Mask Positioning

Menu 4: Box Mask Positioning	
A box mask allows you to choose a region of the screen where the key will not be displayed regardless of any other settings. This mask can be used to hide portions of a key that you no longer wish to display, or, by turning the mask on and off, it gives you the ability to reveal and hide portions of the key on the program output.	
Top Edge Position	0-100%. Moves the top edge of the box mask. The default setting is 30%.
Bottom Edge Position	0-100%. Moves the bottom edge of the box mask. The default setting is 70%.
Left Edge Position	0-100%. Moves the left edge of the box mask. The default setting is 30%.
Right Edge Position	0-100%. Moves the right edge of the box mask. The default setting is 70%.
Mask Invert	The choices are: • OFF – The area *inside* the box will hide the key (default setting). • ON – The area *outside* the box will hide the key.

Menu 5: Matte Selection

Menu 5: Matte Selection	
The matte is the color that is used when a key is set to Matte Fill.	
Hue	0% = blue (default setting), 100% = blue again, with the color spectrum between. If you have a selected key set to Matte fill, it will show in a preview window on the menu.
Saturation	Color saturation is defined as the depth of the selected color. Use this to make a distinction between a pale red and a deep red, for example. A value of 0.0% will give no depth, i.e., you will get a shade of grey. A value of 100.0% will give you the maximum depth for your chosen color. The default value is 50%.
Luminance	Luminance is defined as the brightness of the selected color. 0.0% will give you black, 100.0% will give you white. Please note that regardless of your selected hue and saturation, as you approach 0.0% or 100.0% your color will approach black and white. The default value is 50%.

Menu 6: DSK Setup

No display
When selected using the card edge selector, this menu provides automatic settings for the CDK-111A-M when it is used as a Downstream Keyer with a Synergy switcher. The reference source detection setting in Menu 9 is automatically set to Auto-Detect while position 6 is selected.

Menu 7: Still Store Setup

Menu 7: Still Store Setup	
The CDK-111A-M can store up to 250 image records. These records are *not* on a 1-1 basis with the images downloaded into the card. Once you have downloaded images into the card, the CDK-111A-M associates each image number (an image record) with a downloaded image name, and then sets up parameters for this image number.	
You can download a small 1/9-screen size bug and give it a name. Image number 1 can use this bug and position it in the lower right hand corner. As well, image number 2 can use the same bug but this time position it in the left hand side of the screen.	
In this menu the image number is the number of the record that you wish to modify. Every item in the menu below the image number refers to that image number only.	
Therefore, the appropriate way to set up your image records is to first associate an image name with an image number. Next, you set all of the parameters for that image number. When this is completed, return to the image number line in the menu, change it to the next image number you would like to modify and set its parameters. Do this for every image number that you require.	
Number of Images	The number of physical images stored in the card. (For informational purposes only, cannot be changed.)
Memory Used	The amount of memory used by the current images. (For informational purposes only, cannot be changed.)
Image Number	The image record number that you want to modify. (Content dependent)
Image Name	The selected image that you want to associate with this image record. (Content dependent)
X Position	The X position on screen for this image record (defined in pixels). Note that you will not be able to modify this value for images stored as full screen. (Content dependent)
Y Position	The Y position on screen for this image record (defined in lines). Note that you will not be able to modify this value for full screen images. (Content dependent)
Display Time	This item is only used for Bug-O-Motion animations.
	The default display time for one image of animation is one frame of video. However, if you would like to speed up or slow down the rate of animation, simply adjust this time. Increasing the value will slow down the animation, while decreasing the value will speed up the animation. (Content dependent)
Loop Animation	This item is only used for Bug-O-Motion animations.
	The choices are:
	• ON – When the last frame of the animation is reached, the system will automatically return to the first frame and play the animation again.
	• OFF – When the last frame is reached, the frame will freeze (default setting).
Auto Dissolve	This item is only used for Bug-O-Motion animations.
	The choices are:
	• ON – (All modes except DSK) When the last frame of the animation is reached, the system will freeze the frame and dissolve the key off screen.
	• OFF – (All modes) When the last frame is reached, the animation will stay on air (default setting).
X Size	The horizontal size of the image in pixels. (Information only, cannot be changed.)
Y Size	The vertical size of the image in pixels. (Information only, cannot be changed.)
Number of Frames	The number of frames this image contains. (Information only, cannot be changed.)

Menu 8: Image Freezing, Storage, and Deletion

Menu 8: Image Freezing, Storage, and Deletion	
Number of Images	The current number of images stored in the card. (Information only, cannot be changed.)
Memory Used	The percentage of memory used by the images stored in the card. (Information only, cannot be changed.)
(Un)freeze PGM BKGD	When the select button is pressed on this item, whichever BKGD is on air will toggle between a live and a frozen state. LIVE is the default setting.
(Un)freeze Key + Alpha	When the select button is pressed on this item, the video currently being used in the external key input buffers will be frozen. LIVE is the default setting.
Store Last Frozen Image to Flash	This will take the last image that was frozen in this menu and store it in flash memory. After this has been done you should go to the "Still Store Setup" menu to set up your image records to use this new image. Communication with external devices is disabled while an image is being captured this way.
Select Still to Delete	If you want to free up memory on the card, use this item to choose which still image you would like to delete. 1: is the default value.
Delete Selected Still	Pressing the select button on this item will delete the still you choose in the above item.

Menu 9: Input/Output Delays

Menu 9: Input/Output Delays	
Video Format	This item displays "PAL" or "NTSC" as appropriate for the video format being used. (Information only, cannot be changed.)
Current Reference Source	This item displays the reference source the card is currently using. (Information only, cannot be changed.)
Reference Source Select	This item selects which reference to use. The options are: • EXTERNAL REF – Analog house sync reference signal from frame. • BNC IN REF – Digital reference from BNC IN video input. • AUTO DETECT – Uses whichever signal is present (default setting).
Delay Mode	This item selects the card delay mode used. The options are: • MINIMUM DELAY – Not yet implemented. • USER DEFINED – This setting allows the output to be delayed by the minimum amount (115 clock units) plus the user defined value set in the following CARD DELAY option.
Card Delay	Information only, cannot be changed. This item sets a delay (up to one frame) within a range of: • NTSC: 0-525 Lines, 0-1716 Samples • PAL: 0-625 Lines, 0-1728 Samples
Input To Output Delays: These items describe delay ranges in clock units up to one frame from the start of the input frame to the start of the output frame at each BNC.	
BKGD 1	# Lines, # Samples. Information only, cannot be changed.
BKGD 2	# Lines, # Samples. Information only, cannot be changed.
Key Fill	# Lines, # Samples. Information only, cannot be changed.
Key Alpha	# Lines, # Samples. Information only, cannot be changed.

Menu A: Diagnostics

Menu A: Diagnostics	
The Error LED on the card edge will turn on in the following circumstances: • An error in an incoming video source has been detected and you have programmed the card to report those errors to you. The error LED on the card will stay on until the video error has been corrected. You have the option in this menu of turning off the reporting of these video errors on an input-by-input basis. If you are not going to be attaching video to any input, you should turn error reporting off for it, as this would cause the error LED to be on constantly, negating its usefulness. • An internal error of some kind has occurred. These errors can be anything from a communication error to a failure of some internal diagnostics. This menu will display the last 50 internal errors that have occurred and how long it has been since that error occurred. When a new internal error occurs, the Error LED will turn on. Once this error has been viewed in this diagnostics menu, the Error LED will turn off.	
BKGD 1 Video	The choices are: • LED ON IF ERROR – The error LED will turn on whenever there is a video error on BKGD 1 Video. • LED OFF IF ERROR – Video errors on BKGD 1 will be reported in the menu, but LED will not light.
BKGD 1 Video	The choices are: • LED ON IF ERROR – The error LED will turn on whenever there is a video error on BKGD 2 Video. • LED OFF IF ERROR – Video errors on BKGD 2 will be reported in the menu, but LED will not light.
Key Video	The choices are: • LED ON IF ERROR – The error LED will turn on whenever there is a video error on Key Video. • LED OFF IF ERROR – Video errors on Key Video will be reported in the menu, but LED will not light.
Alpha Video	The choices are: • LED ON IF ERROR – The error LED will turn on whenever there is a video error on Alpha Video. • LED OFF IF ERROR – Video errors on Alpha Video will be reported in the menu, but LED will not light.
At the bottom of the menu area, the error message type and the time since the error occurred are displayed. The messages can be scrolled using the up/down buttons. These items cannot be changed and are for reporting purposes only. There are two types of errors that can appear here – Operational and Internal errors. Operational errors are not necessarily a problem; the occasional checksum failure on communication protocols for example, is quite ordinary. However, the same error repeatedly should be investigated. Internal errors will be marked by the text "Internal Error #: xxx", where xxx is replaced by a number. These errors should never appear. If you encounter them, please call Ross Video Customer Service and report them.	

Menu B: Reserved For Future Use

Menu B: Reserved For Future Use

Menu C: Secondary Card Setup

Menu C: Secondary Card Setup	
Dithering	This item controls dithering values. • NONE – function disabled (default setting). • +/- 3 – random values applied to last 2-bits. • +/- 7 – random values applied to last 3-bits. • +/- 15 – random values applied to last 4-bits.
Rounding	This item controls rounding values. • NONE – function disabled (default setting). • 8 BIT – lose least significant bits until 8 are left. • 10 BIT – lose least significant bits until 10 are left.
Clipping	This item controls clipping values. • SMPTE – The CDK-111A-M will clip all values beyond this standard's ranges with this option selected (default setting). • ALLOW SUPERBLACK – adds superblack range to SMPTE range. • ALLOW SUPERWHITE – adds superwhite range to SMPTE range. • ALLOW ALL – adds superblack and superwhite ranges to SMPTE range.
Board Address	The (hex) board address is used for some external protocols to identify the card. The default setting is 30H.
Stable Output	This item controls the output provided by the card in the event that background video input is lost. This option is not applicable if BNC IN is the reference source. • BLACK – black screen displays on output. • CAPTURE – card saves the last valid video frame to memory and displays it on the output (default setting).

Menu D: Card Setup

Menu D: Card Setup	
Software Version	This item states the version of software loaded on the card. (Information only, cannot be changed.)
FPGA Version	This item states the version of hardware firmware resident on the card. (Information only, cannot be changed.)
Card Type	This item states the card type, CDK-111A-M. (Information only, cannot be changed.)
Keyer Type	You have several choices: • SWITCHER DSK – Choose this option if you are attaching your CDK-111A-M downstream of a Synergy Series switcher. If you choose this option, you *must* select the GVG100 Protocol in the next item as the means of controlling your keyer. • EDIT BAY KEYER – Choose this option if you are doing editing with the keyer. • STANDALONE KEYER – Choose this option if you are using the keyer as a standalone unit or in a master control application. This setting serves as the correct choice in most applications (default setting). • STILL STORE – Not yet implemented. • ANIM. LOGO GEN. – Choose the Animated Logo Generator option to send whatever key crosspoint is on Keyer 1 as output to a switcher, with the fill going out on BNC 5 (PGM) and the alpha going out on BNC 6 (PV/secondary output). In this mode, transitions are unavailable, and if Secondary Output is set to PROGRAM, it will automatically switch to PREVIEW. If you wish to output two fills in this mode, set the Secondary Output back to PROGRAM.
Protocol	You have several choices: • GVG 100 – Choose this option if you are going to be controlling your CDK-111A-M using the GVG 100 protocol. If you choose this option, you *must* have BNC 3 set to COMM RX and BNC 4 set to COMM TX. See Appendix A, "**Serial Protocols**", for more information on protocol commands (default setting). • MASTER2100 – Choose this option if you are going to be controlling your CDK-111A-M using the Master 2100 protocol. If you choose this option, you *must* have BNC 3 set to COMM RX and BNC 4 set to COMM TX. See Appendix A, "**Serial Protocols**" for more information on protocol commands. • PC SOFTWARE 19200 – Choose this option when you want to connect the CDK-111A-M to the Image Transfer Program to transfer images to and from the card. This option should only be used if you have problems getting the PC SOFTWARE 57600 protocol to work. For serial transfer only, not required for USB. • PC SOFTWARE 57600 – Choose this option when you want to connect the CDK-111A-M to the Image Transfer Program to transfer images to and from the card. For serial transfer only, not required for USB. • LEITCH DSK – Choose this option if you are going to be controlling your CDK-111A-M using the LEITCH DSK protocol. If you choose this option, you *must* have BNC 3 set to COMM RX and BNC 4 set to COMM TX. See Appendix A, "**Serial Protocols**" for more information on protocol commands. • NONE – Choose this option if you are *not* going to be controlling the CDK-111A-M using a remote control protocol.

Menu D: Card Setup	
Menu Output	This item lets you choose on which output the menus will appear. When you have made your selection, you must close the menu for the change to take effect. See "**Program and Secondary Output Options**" in Appendix C for more information. • PROGRAM – The menus will appear on the output set to PGM - BNC 5. • PREVIEW – The menus will appear on the output set to PV - BNC 6 (default setting).
Test Pattern Selection	This item allows you to choose from the following built in test patterns, which the card will output when you have Display Test Pattern set to ON. The selected pattern will also display whenever the card is synchronizing to a reference signal, whether Display Test Pattern is On or Off. • COLOR BARS 75% (default setting) • FLATFIELD BLACK • PLL PATHOLOGICAL • EQ PATHOLOGICAL
Display Test Pattern	ON/OFF. Press select.
Secondary Output (BNC 6)	This item allows you to set the output for BNC 6. When you have made your selection, you must close the menu for the change to take effect. See "**Program and Secondary Output Options**" in Appendix C for more information. • PROGRAM – BNC 6 will output the program video. This will be an identical copy of the video output on BNC 5. • PREVIEW – BNC 6 will output all keys, whether on air or not, and the BKGD not on PGM (default setting). • BKGD 1 + PV Key – BNC 6 will output BKGD 1 and any key not on the PGM output • BKGD 2 + PV Key – BNC 6 will output BKGD 2 and any key not on the PGM output
BNC 2	BNC 2 can be configured in one of three ways – either as the I/O for the control panel, an input for a GPI, or as a Tally output. To configure BNC 2 as a: • CONTROL PANEL – When selected, bridge jumper **J6** on the card at pins 3 and 4. See card diagram at the beginning of Chapter 2, "**Installation and Setup**", for the location of **J6.** See Appendix C, "**Specifications**" for jumper pinout reference (default setting). • GPI # – When selected, bridge jumper **J6** (see card diagram at the beginning of Chapter 2, "**Installation and Setup**", for the location of **J6**) at pins 1 and 2. See Appendix C, "**Specifications**" for jumper pinout reference. • TALLY # – When selected, bridge jumper **J6** (see card diagram at the beginning of Chapter 2, "**Installation and Setup**", for the location of **J6**) on the card at pins 5 and 6. See Appendix C, "**Specifications**" for jumper pinout reference.
BNC 3	BNC 3 can be configured in one of three ways – either as an Rx input, a GPI input, or as a Tally output. To configure BNC 3 as an, • COMM RX – If GVG100 or Master2100 protocol is selected above, BNC 3 *must* be set to this option (default setting). • GPI #2 – Uses BNC 3 as GPI #2. • TALLY #2 – Uses BNC 3 as Tally #2. **NOTE:** If BNC 3 is configured as an Rx input, ensure that BNC 4 is set to the corresponding Tx configuration.

Menu D: Card Setup	
BNC 4	BNC 4 can be configured in one of three ways – either as a Tx output, a GPI input, or as a Tally output. To configure BNC 4 as a, • COMM TX – If GVG100 or Master2100 protocol is selected above, BNC 4 *must* be set to COMM TX (default setting). • GPI #3 – Uses BNC 4 for GPI #3. • TALLY #3 – Uses BNC 4 for Tally #3.
Factory Default	Selecting the Factory Default will reset all values on the card to the initial factory default settings and reset the card itself.

Menu E: Tally / GPI Setup

Menu E: Tally / GPI Setup	
GPI #1 (BNC 2)	GPI Function for GPI #1. This is only used if BNC 2 is set to GPI #1 in Menu D: Card Setup and jumper **J6** is bridged at pins 1 and 2. • USED FOR COMM (default setting) • CUT BKGD • AUTO BKGD • CUT KEY 1 • CUT KEY 2 • AUTO KEY 1 • AUTO KEY 2 • AUTO FTB • SELECT BKGD 1 • SELECT BKGD 2
GPI #1 Trigger	GPI Trigger for GPI #1. • EDGE HIGH (default setting) • EDGE LOW • LEVEL HIGH • LEVEL LOW
GPI #2 (BNC 3)	GPI Function for GPI #2. This is only used if BNC 3 is set to GPI #2 in Menu D: Card Setup. See GPI #1 list for options available here. Same default as BNC 2.
GPI#2 Trigger	GPI Trigger for GPI #2. See GPI #1 Trigger options. Same default as BNC 2.
GPI #3 (BNC 4)	GPI Function for GPI #3. This is only used if BNC 4 is set to GPI #3 in Menu D: Card Setup. See GPI #1 list for options available here. Same default as BNC 2.
GPI #3 Trigger	GPI Trigger for GPI #3. See GPI #1 Trigger options. Same default as BNC 2.
Tally #1 (BNC 2)	Tally Function for Tally #1: This is only used if BNC 2 is set to TALLY #1 in Menu D: Card Setup and jumper **J6** is bridged at pins 5 and 6. • USED FOR COMM (default setting) • BKGD 1 • BKGD 2 • KEY 1 • KEY 2

Menu E: Tally / GPI Setup	
Tally #1 Trigger	Tally Trigger for Tally #1. • LEVEL HIGH (default setting) • LEVEL LOW
Tally #2 (BNC 3)	Tally Function for Tally #2: This is only used if BNC 3 is set to TALLY #2 in Menu D: Card Setup. See Tally #1 list for options available here. Same default as BNC 2.
Tally #2 Trigger	Tally Trigger for Tally #2. • LEVEL HIGH (default setting) • LEVEL LOW
Tally #3 (BNC 4)	Tally Function for Tally #3: This is only used if BNC 4 is set to TALLY #4 in Menu D: Card Setup. See Tally #1 list for options available here. Same default as BNC 2.
Tally #3 Trigger	Tally Trigger for Tally #3. • LEVEL HIGH (default setting) • LEVEL LOW

Menu F: BNC Listing

Menu F: BNC Listing	
This menu is for informational purposes only. The BNC listing is designed for easy reference during card configuration and troubleshooting. This menu reflects configurations set in Menu D.	
BNC IN	BKGD 1 INPUT (default setting)
BNC 1	BKGD 2 INPUT (default setting)
BNC 2	Depends upon card configuration (GPI, CONTROL PANEL (default setting), or TALLY)
BNC 3	Depends upon card configuration (GPI, TALLY, or RX (default setting))
BNC 4	Depends upon card configuration (GPI, TALLY, or TX (default setting))
BNC 5	PROGRAM OUT (default setting)
BNC 6	PREVIEW (default setting) or PROGRAM OUT
BNC 7	KEY VIDEO INPUT (default setting)
BNC 8	KEY ALPHA INPUT (default setting)
Key 1 Status	Whether Key 1 is currently ON AIR or OFF AIR (default setting)
Key 2 Status	Whether Key 2 is currently ON AIR or OFF AIR (default setting)
FTB Status	ON/OFF (default setting). Whether the card is currently faded to black or not.
Time Active	The time begins counting up when the card is powered on. If the card continues to be in service with uninterrupted power for a period of approx. 2 ¼ years, it will reset to 0 and begin counting up again.

Appendix A. Serial Protocols

In This Appendix

This appendix describes the communications protocol systems used with the CDK-111A-M.

Note

Only those who are developing a custom serial interface to the CDK-111A-M will require the contents of this Appendix.

The following topics are discussed:

- GVG 100 Emulation Protocol
- Protocol Elements
- Editor Interface State Diagram
- Protocol Command Descriptions
- Additions to GVG 100 Emulation Protocol
- GVG MASTER2100 Emulation Protocol
- GVG MASTER2100 Emulation Commands
- Leitch DSK Emulation Protocol
- Leitch DSK Emulation Commands

Note

Protocol extensions for the CDK-111A-M are planned beyond those covered in this Appendix. Please contact Ross Video for the latest version of this Appendix.

GVG 100 Emulation Protocol

This protocol system is based on the GVG 100 Serial Interface Protocol (Manual Number: TP0273-01). (GVG is a registered trademark of Thomson 2002)

It is intended for editors designed to control the following switchers:

- GVG 100
- GVG 110
- RVS 210A
- RVS 216A
- RVS 210D
- RVS 216D
- Synergy 100

It will also be able to control a CDK-111A-M keyer without modification.

The figure below highlights the buttons on a GVG 110 switcher that have CDK-111A-M equivalents.
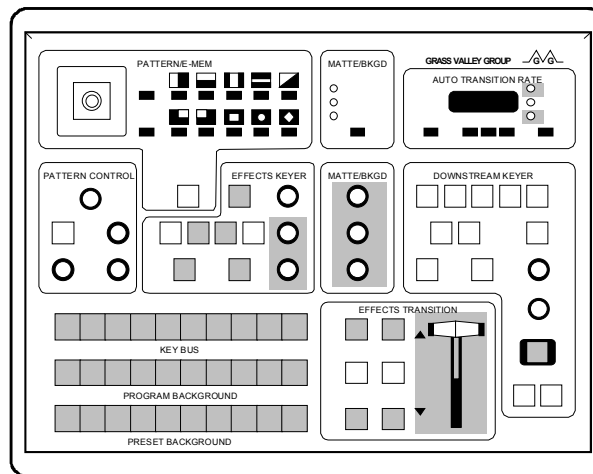
GVG 110 Panel

General Description

The CDK-111A-M serial interface provides a communication link between a computer based editing system or automation system and the keyer. The CDK-111A-M has provisions for every parameter to be controlled.

The major functions accessible via the protocol are:

- KEY BUS input button (crosspoint) selection
- push-button / lamp control
- analog control settings (knobs)
- transition and auto transition control (selections and rate settings)

These functions are each described in the following pages.

By means of "read" and "write" operations, the protocol allows the editor to configure and control the keyer. In general, read operations determine the current status of keyer controls and write operations set controls and make selections on the keyer.

The editor serial interface is fixed at RS-485 transmission standard and operates at a baud rate of 19,200.

Editor Transmission Standard

The CDK-111A-M is factory shipped with:

- 19,200 baud, ODD parity, one stop bit, 8 data bits and

- a select address of 30 (hexadecimal)

The default select address of 30 assumes that the "Board ID" rotary switch at the card edge is in position **0**. Changing the select address is discussed in the section "**Address Byte (Editor Select Address)**" later in this Appendix.

Editor Connector Pinouts

The CDK-111A-M provides an unbalanced full duplex RS-485 or 0-12V RS-232 compatible interface.

The signals on the rear of the RossGear chassis have been named from the point of view of the CDK-111A-M. An editor serial interface will require the use of BNC 3 and 4.
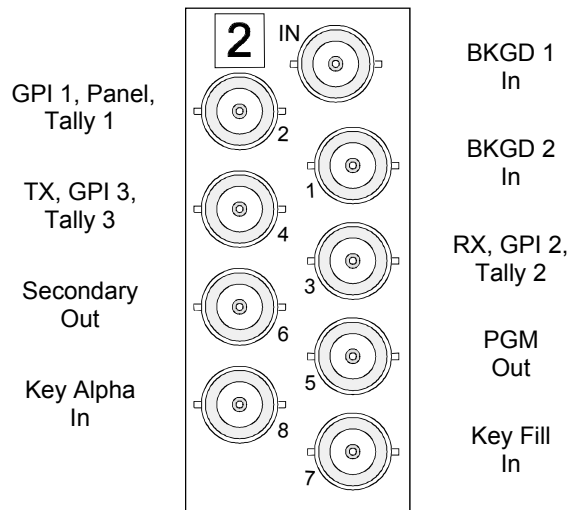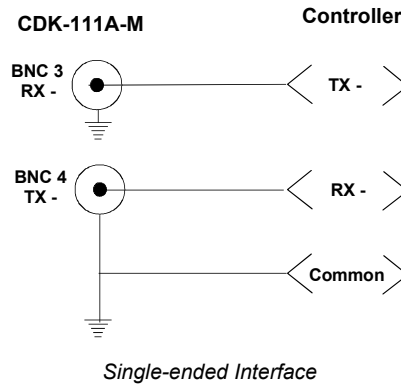

CDK-111A-M Connectors

The CDK-111A-M uses a single-ended interface with the normally positive-going signals always set to ground. This is because the coax connector has only one signal pin and the surrounding shield is grounded as a standard feature of the chassis. This will inherently limit the noise immunity of the connection and care must be taken when controlling the CDK-111A-M in noisy environments or over long cable runs.

Protocol Elements

The recommended wiring to a controller using a standard single-ended unbalanced full duplex RS-485 or 0-12V RS-232 compatible interface is as follows:


Single-ended Interface

If differential input is required, the recommended CDK-111A-M to controller wiring is as follows. Note the bias of approximately two volts on the RX minus input connection, internal to the controller:

Differential Input Interface
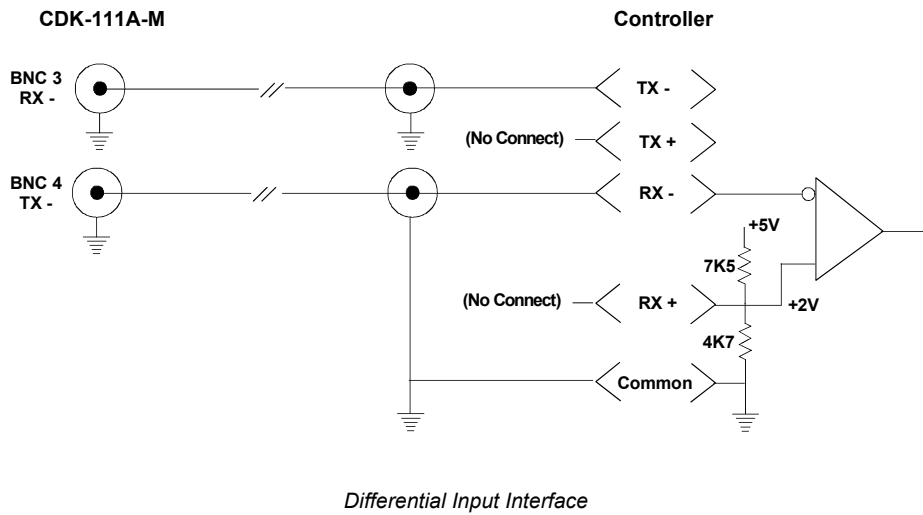
The components of the serial data are shown in the figure below. These are:

1. The break character, to prepare the serial interface for communication.

2. An address byte, to select the keyer as the device to communicate with the editor. For the CDK-111A-M, this is factory shipped as 30H (Hex) with the ability to change it to any legal value.

3. The command / message blocks,which actually direct keyer operation. The structure of these blocks is discussed in the next sections.

Protocol Elements
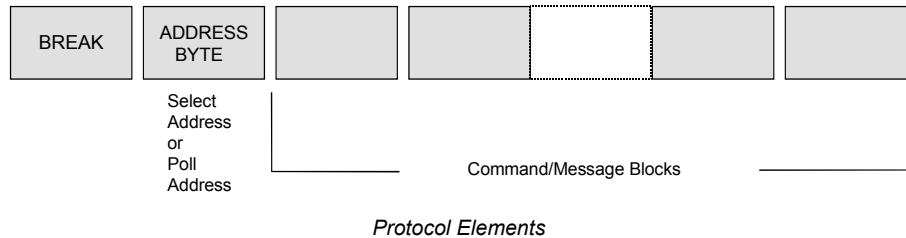
Break Character (00)

The break character is sent by the editor to the serial port of the keyer to prepare it for receipt of further data. The break character puts the editor interface into the "active" state. After receipt of the break character, the keyer ceases all bus communications, resets any communication errors, empties the receive buffer of all pending commands, and awaits receipt of an address byte. The break character is composed of 17 to 20 bits of spacing data (low logic level) followed by a minimum of two bits of marking data (high logic level).

Address Byte (Editor Select Address)

Following receipt of the break character, the editor interface will expect a one-byte address, either the Select Address or the Poll Address. Most often, the address sent is the Select Address. The editor select address identifies the keyer as the device to communicate with the editor.

The Select Address must always be an *even* number. The Poll Address equals the Select Address plus "1", and is sent by the editor to determine if the keyer is on the bus. If the keyer is present (active), it sends an "acknowledge byte" of 84H (Hex) back to the editor and remains in the active state. The keyer is now ready to accept continuous command/message transmission from the editor without going through the initial break/address sequence again. Any communication errors or "time outs" cause the keyer to send a "negative acknowledge byte" of 85H, reject any unexecuted commands, and return to the idle state.

Receipt of any other device's Select Address also causes the serial interface to enter the idle state, requiring the break/address sequence to be performed before the communication can be restored. If another device's Poll Address is received, it is ignored and the serial interface remains in the active state.

The Select Address is set on the CDK-111A-M via the rotary **Board ID** dial at the card edge. The select address for the keyer is the indicated Board ID on the dial *multiplied by 2.* If zero is selected, the Select Address is determined by navigating to the on-screen menu system. The on-screen menu system allows the selection of any legal select address (00-FC, *even* numbers).

| Note	Do *not* use address FE. It is reserved for a "**Broadcast All**" signal that is used by the controller to send a message to every card in the chain.
	Note also that when the "**Broadcast All**" message is sent, the cards perform the broadcasted command but do not respond to the controller with any completion or acknowledgement reply.

As a quick reference, the table below shows the Board ID vs. Select Address settings. All numbers are in hexadecimal.

Board ID vs. Select Address

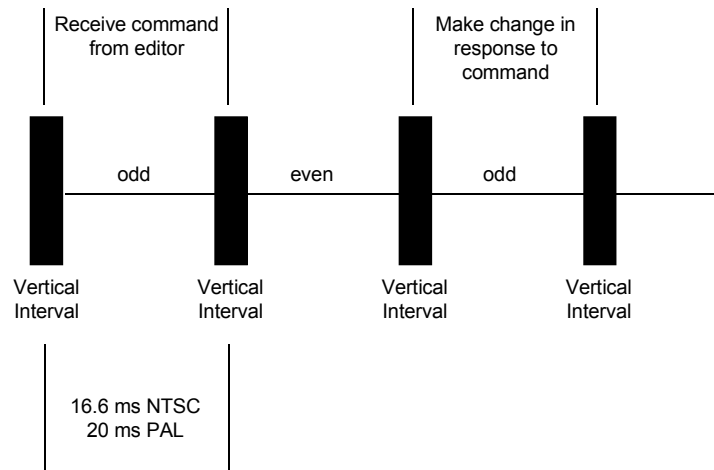| Board ID	Select Address	Board ID	Select Address
0	Via Menu	8	10
1	02	9	12
2	04	A	14
3	06	B	16
4	08	C	18
5	0A	D	1A
6	0C	E	1C
7	0E	F	1E

Command/Message Block Structure

Once selected, the serial interface receives data from the editor in the form of command/message blocks that direct keyer operation. The blocks are structures as shown below.
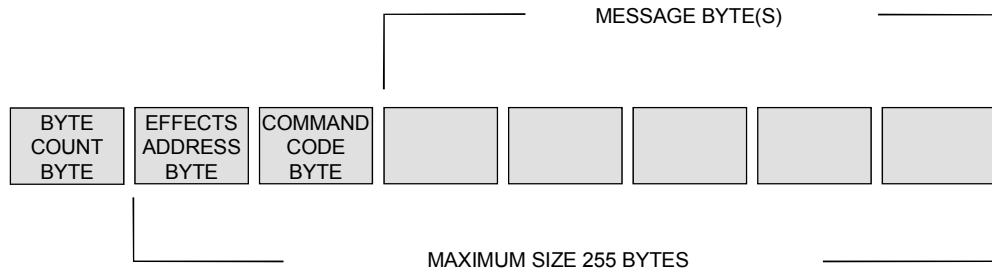
Command / Message Block Structure

The serial interface can operate continuously, allowing multiple keyer operations to be performed without cycling constantly through the break/address sequence described earlier. The individual sections comprising the command/message blocks are discussed in the following paragraphs.

The keyer executes commands in the first odd vertical interval after the command is received. A command is considered received when the last byte of data arrives. The figure below shows the keyer response timing. The beginning of the vertical interval is the timing reference for the system.

Receive command
from editor

Make change in
response to
command

odd   even   odd

Vertical
Interval

Vertical
Interval

Vertical
Interval

Vertical
Interval

16.6 ms NTSC
20 ms PAL

Timing Reference

Byte Count Byte

The command/message blocks can vary in size from 2 to 255 bytes. The byte count, the number of subsequent bytes in the block, is contained in the first byte of the block. The byte count byte is not included in the byte count so the byte count range is 1 to 255 (01H to FFH). Upon receipt of a valid byte count and the correct number of bytes, the command is carried out.

Effects Address Byte

The Effects Address Byte (sometimes referred to as "EX") should be set up to 01. In order to ensure compatibility with the majority of editing systems, the setting of the Effects Address Byte is ignored where possible.

Command Code Byte (Read, Write)

The third byte of the command/message block is the command code byte. It is either a read or a write command. Either type of command can be sent at any time, but not at the same time. When the keyer receives a write command, a two-byte status message is sent to the editor and the command is carried out. The characteristics of these commands are described below:

1. **Read Commands**

    Read commands allow the editor to determine the status of specified parameters of keyer operation. For example, a read command may be used to determine if Key Invert is currently selected or to determine the current setting of the CLIP control.

    The keyer responds to a read command from the editor by returning the status of the parameter specified in the read command. This status information is returned in the format of a write command.

Message bytes following the command code may or may not be required for read commands, depending on the specific command. Message bytes are discussed in the next section.

2. **Write Commands**

Write commands are used by the editor for operations that configure the keyer or update its parameters, such as adjusting the setting of an analog control or starting an auto transition.

The keyer responds to a write command by returning a two-byte status message. The first byte count is set to 01H. The second contains the keyer response to the command. The format of this second byte is as shown below.
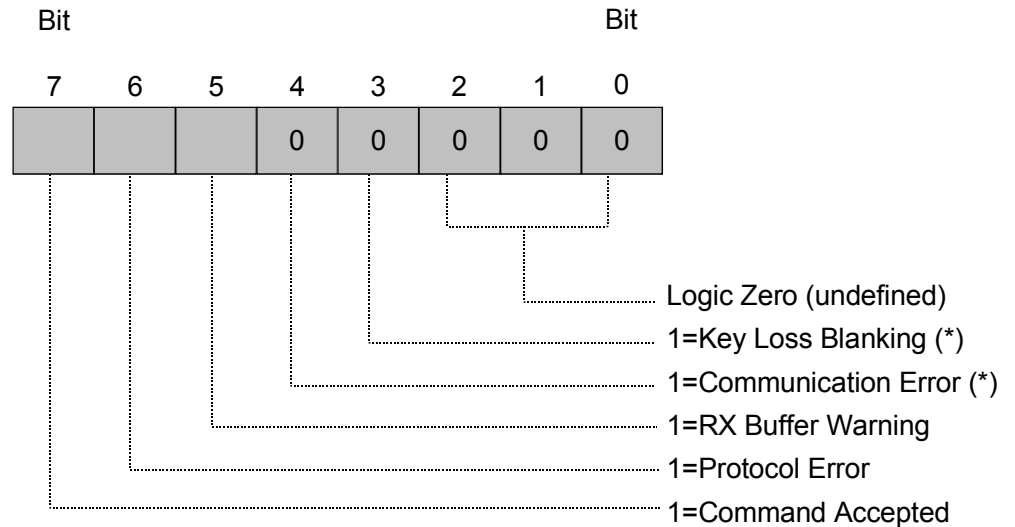
Write Command – Format of Second Byte

If bit 6 or bit 7 is high, the meaning is as follows:

- Protocol Error – If bit 6 is high (logical "1"), an illegal function may have been specified.

- Command Accepted – If bit 7 is high (logical "1"), then the command has been accepted.

- Rx Buffer Warning – High when the receive buffer is very close to full and in danger of dropping messages. *(Not currently implemented)*

- Communication Error bit – High if a communication error has occurred since the last break command while placing characters in the command queue. *(Not currently implemented)*

- Key Loss Blanking – Set when an on-air key is not displayed on the PGM output because a key signal (alpha or fill or background) is missing or bad. *(Not currently implemented)*

Message Bytes

The number of message bytes that follow a command code byte depends upon the command. The command code to read an analog control, for example, requires message bytes in order to identify the control to be read while the command code to read the MLE 1 PST bus (to determine which input is selected) requires no message byte(s).
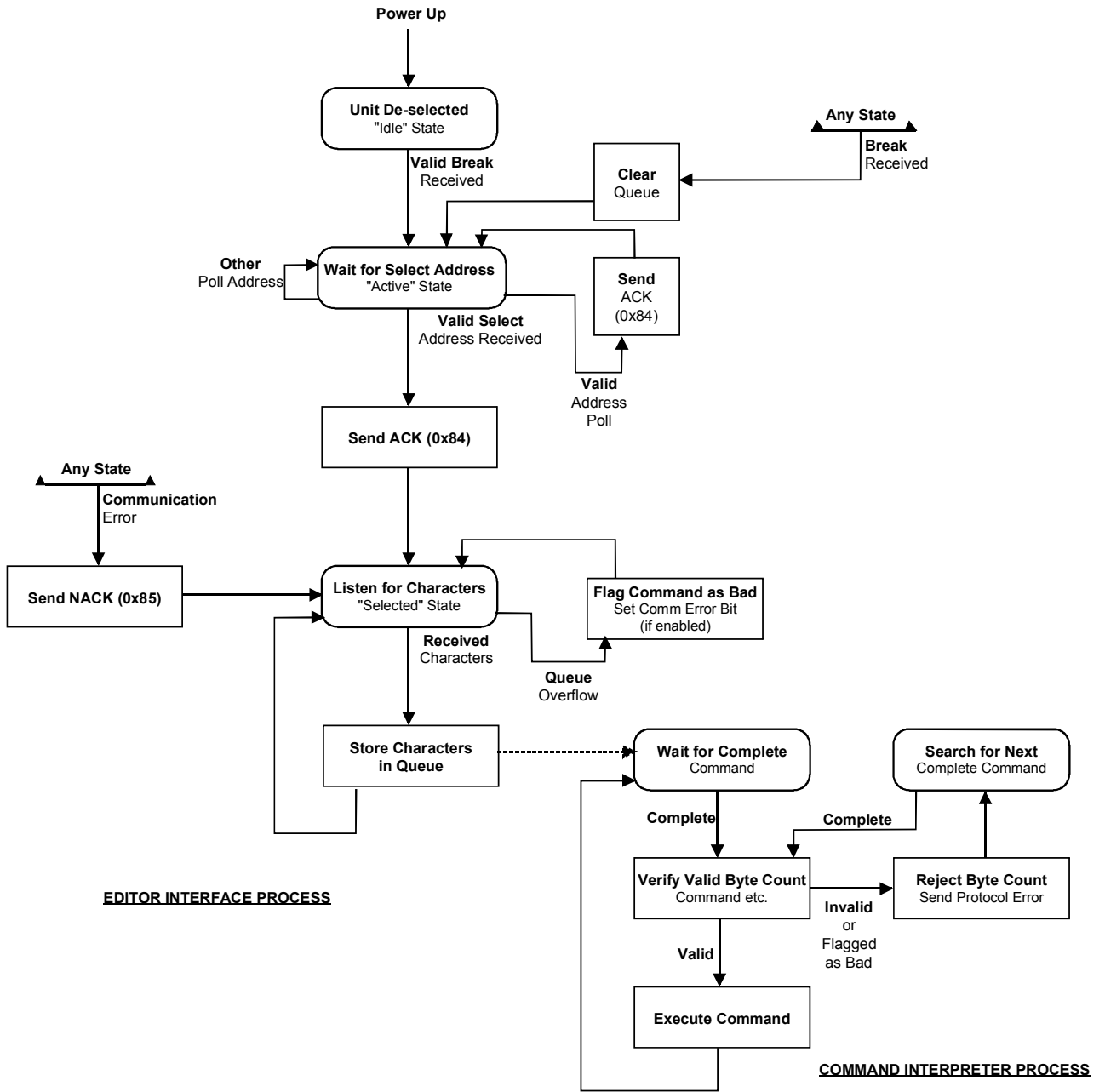
Write commands require at least one message byte, specifying the control parameter (for example, an input number – one byte) being changed. When an analog control setting is being changed, additional message bytes are required to indicate the new value to which the analog control is to be set.

Command/Message Structure – Message Bytes

Editor Interface State Diagram

Now that an overview of all elements of the protocol has been presented, here is a summary of how the keyer processes editor commands:

Power Up

Unit De-selected
"Idle" State

Any State
Break Received

Valid Break Received

Clear Queue

Other Poll Address

Wait for Select Address
"Active" State

Send ACK (0x84)

Valid Select Address Received

Valid Address Poll

Send ACK (0x84)

Any State
Communication Error

Send NACK (0x85)

Listen for Characters
"Selected" State

Flag Command as Bad
Set Comm Error Bit
(if enabled)

Received Characters

Queue Overflow

Store Characters in Queue

Wait for Complete Command

Search for Next Complete Command

Complete

Complete

EDITOR INTERFACE PROCESS

Verify Valid Byte Count
Command etc.

Reject Byte Count
Send Protocol Error

Invalid or Flagged as Bad

Valid

Execute Command

COMMAND INTERPRETER PROCESS

Editor Interface State Diagram

Protocol Command Descriptions

List of Commands

The following list shows the order of the protocol commands in this section.

If your application requires further Leitch DSK protocol command support, please contact Ross Video with this request.

Note

All numbers in the following tables are in hexadecimal

Command Descriptions

Command Name	Read Code	Write Code
Crosspoint	41-44	C1-C4
Analog Control	45	C5
Push-button/Lamp Control	46/47	C6/C7
Transition Mode	4A	CA
Auto Transition Rate	4C/7C/7D	CC/FC/FD
All Stop	n.a.	F2
Push-button Select	n.a.	FB
Software Version	6C	EC
Card Status	73	74
Error Status	71	72

n.a. = not applicable

Crosspoint Command (41-44, C1-C4)

The editor uses the read form of the crosspoint command to determine which input crosspoint is selected on the key bus. The response from the controlling device will be in the form of a write command, with the message data containing the input number.

The write command allows the editor to select and input.

Note

The CDK-111A-M keyer will treat commands 43/44 as identical and C3/C4 as identical to ensure compatibility with most editors.

The CDK-111A-M has two internal keyers, either of which can be set to either an internal or external source.

Only one animated logo can be selected in the CDK-111A-M at one time. The other key source can be external live video or an internal still image.

Only Key Bus 1 Alpha and Key Bus 2 Alpha cannot be directly selected. They follow the selections of Key Bus 1 Fill Key Bus 2 Fill. For example, if an internal logo is selected for the Fill, the Alpha is automatically routed correctly in the keyer.

Crosspoint Command (41-44, C1-C4)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
PGM Bus	02	01	41	None
PST Bus	02	01	42	None
KEY Bus 1 Fill	02	01	43	None
KEY Bus 2 Fill	02	01	44	None
WRITE:				
PGM Bus	03	01	C1	Input Number
PST Bus	03	01	C2	Input Number
KEY Bus 1 Fill	03	01	C3	Input Number
KEY Bus 2 Fill	03	01	C4	Input Number

The internal design of the CDK-111A-M allows any external or internally generated input to be routed to any bus. The message byte therefore can take on any of the following:

Message Bytes

Input Number (hex)	Meaning
00	Internal Black
01	Video In A
02	Video In B
03	Video In Key Fill
04	Video In Key Alpha
05	Internal Matte
06	Internal Still/Logo 1
07	Internal Still/Logo 2
08	Internal Still/Logo 3
09	Internal Still/Logo 4
… FF (Max amt)	Internal Still 250

Note

Input numbers corresponding to internal stills are only valid if those stills are actually loaded.

Analog Control Command (45, C5)

The editor uses the read form of this command to determine the current value of the analog control identified in the command. The response from the keyer will be in the form of the write command, the message data (three bytes) containing the control number being read (first byte) and the current value of this control (second and third bytes). The control number assigned to each analog control is listed in the table on the next page.

A write command from the editor updates the analog control to a new value. The control value setting is represented in the message by two bytes, forming a signed 16 bit two's complement number. Valid numbers range from –4096 to +4095 for bipolar controls and 0 to +4095 for unipolar controls. The format is as shown in the figures below.

MSB   LSB

Bit   Bit   Bit   Bit

7 6 5 4 3 2 1 0   7 6 5 4 3 2 1 0

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | X | X | X | X | X | X | X | X |

Don't Care Bits

8-bit Analog Value

8-Bit Analog Value

MSB   LSB

Bit   Bit   Bit   Bit

7 6 5 4 3 2 1 0   7 6 5 4 3 2 1 0

| 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | | 3 | 2 | 1 | 0 | X | X | X | X |

Don't Care Bits

12-bit Analog Value
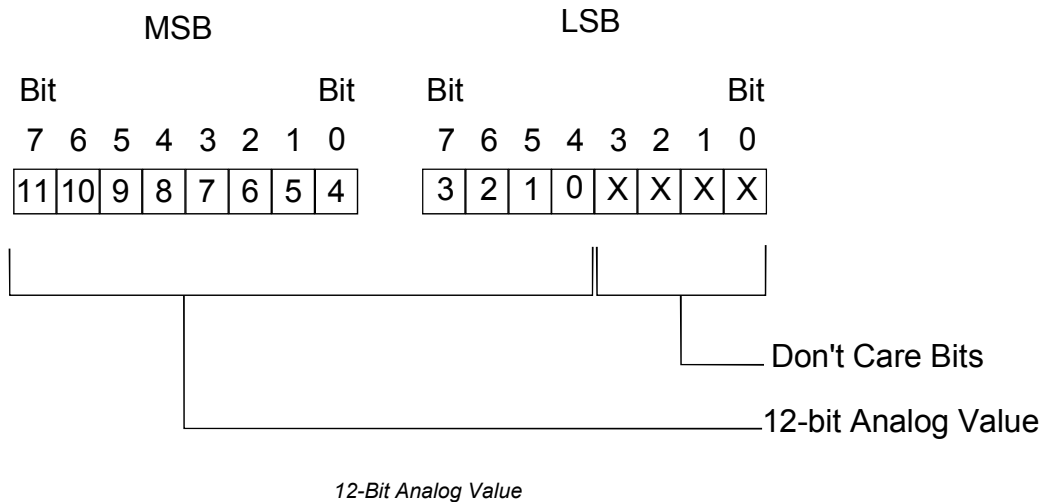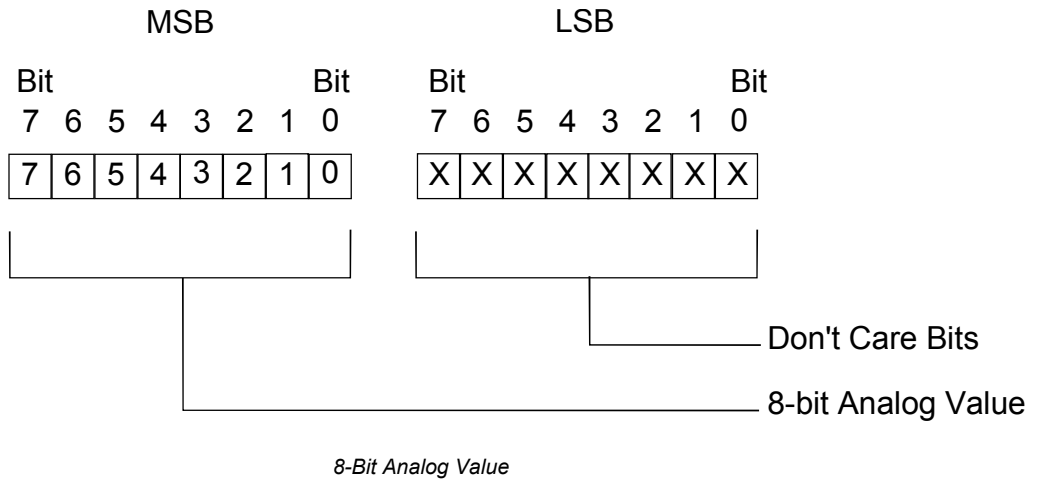
12-Bit Analog Value

*All analog values are scaled to 12-bit representation regardless of internal precision.

Analog Control Command (45, C5)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
Analog Controls	03	01	45	Analog #
WRITE:				
MLE 1 Analog Controls	05	01	C5	Analog # and value Analog #, LSB, MSB
All 4 Mask Edge Controls **	0B	01	C5	7F, top (LSB, MSB), Bottom (LSB, MSB), Left (LSB, MSB), Right (LSB, MSB)

Analog Control Numbers

Control #	Control Name
00	Fader Knob
07**	KEY2 TRANSPARENCY (0000 – 0FFF, 0000 = opaque, 0FFF = transparent)
08	KEY2 CLIP
09**	KEY2 GAIN
0A	KEY1 CLIP
0B	KEY1 GAIN
0C**	MASK TOP
0D**	MASK LEFT
0E**	MASK RIGHT
0F**	MASK BOTTOM
18, (14)	MATTE FILL –HUE
19, (1F)	MATTE FILL – SAT
1A, (1B)	MATTE FILL - LUM
50**	KEY1 TRANSPARENCY (0000 – 0FFF, 0000 = opaque, 0FFF = transparent)
7F**	MASK – TOP – BOTTOM – LEFT – RIGHT Used to decrease message traffic.

**Ross Video custom extension to GVG 100 protocol. Write Byte Count varies according to control number. Read Byte Count is 3.

Push-button / Lamp Control Command (46/47, C6/C7)

The read command is used by the editor to determine the status of a push-button and its associated lamp or LED. The keyer will, in turn, respond with the appropriate form of the write command, indicating either the "on" or "off" state of the specified push-button / lamp (PB/L).

The write command is used to turn the designated PB/L "on" or "off". Use of an invalid PB/L number within a write command will cause the keyer to ignore the command.

Note

Commands 46 and 47 are identical. If an invalid PB/L number is specified in the read command, the reply will indicate an OFF status for a fictitious PB/L 00(H)

Push-button / Lamp Control Command (46/47, C6/C7)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
Keyer PB/L	03	01	46/47	PB/L number
WRITE:				
Keyer PB/L On	03	01	C6	PB/L number
Keyer PB/L Off	03	01	C7	PB/L number

The Push-button / Lamp control command has limitations due the functional differences inherent in two types of push buttons on control panels; mutually exclusive and alternate-action. Mutually exclusive push-buttons are interlocked so that only one push-button in a group can be selected at a time; selecting one cancels any others in the group. In such groups, the C6 (write on) command will turn off the currently lighted button when another button is selected, but there is no action taken if the C7 (write off) command is sent to turn off the currently lighted button. Keyer logic requires that one button must always be selected.

The alternate-action type of push-button changes state each time the button is pressed, turning off on the first time it is selected, off the second time, on again the third, and so on. In the alternate-action groups, the Push-button / Lamp control command must select the correct "next state" – on or off – of the push-button or there will be no change to the status of the push-button.

Push-button / Lamp (PB/L) Number

Push-button Number	Description
0B	AUTO TRANS
0C	KEY2 auto transition
0D	KEY2 ON
0F	KEY1 auto transition
1B	BOX MASK Invert (GVG 200 extension)
1F	FADE TO BLACK (cut to/from black)
2E	KEY2 MATTE FILL
2F	KEY2 VIDEO FILL
40	KEY2 INVERT
41	KEY2 MASK (box mask on/off)
42	KEY2 AUTO KEY
43	KEY2 SELF KEY
44	KEY1 INVERT
45	KEY1 MASK (box mask on/off)
46	KEY1 MATTE FILL
47	KEY1 VIDEO FILL
48	BKGD select
49	Transition includes KEY1
4A	CUT (write only)
4C	KEY1 SELF – Self Key (acts like an interlocked button)
4D	KEY1 AUTO - Auto Select key (acts like an interlocked button)
52	KEY1 ON
53	Transition includes KEY2
54	V FADE TO BLACK
60	MASK FORCE
62	KEY1 ADDITIVE
63	KEY2 ADDITIVE

0F, 0C, 52, and 0D work for "Stand Alone" mode and "Editor Bay" mode only. When issued together with "Push button on"(C6) command or "Push button select"(FB) command, the above four numbers will invoke the corresponding transition. No transition starts if they are issued together with "Push button off"(C7) command.

When issued together with "Read back"(46/47) commands, 0F and 0C will return a message showing whether its corresponding auto trans is going on. 52 and 0D will not return a message.

Transition Mode Command (4A, CA)

The editor uses the read command to determine the transition mode of the keyer. The response from the keyer will be in the form of the write command, the message byte having the format shown below. A write command from the editor sets the keyer transition mode. The format of the message byte is shown below.

Transition Mode Command (4A, CA)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
Next Transition	02	01	4A	None
WRITE:				
Next Transition	03	01	CA	mode byte
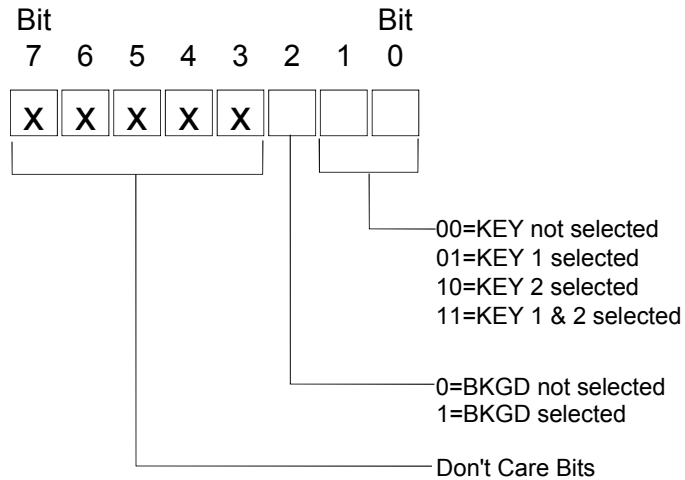
Transition Mode Byte Format

Auto Transition Rate Command (AC/7D, CC/FD)

The editor uses the read command to determine the currently set auto transition rate for the type of transition specified in the command. The response from the keyer will be in the form of the write command, the message bytes having the formats shown in the figure on the next page.

A write command from the editor sets the auto transition frame rate. The rate is specified in three message bytes; their formats are shown below. Note that the write command updates the appropriate auto transition rate display and may or may not initiate the transition. Each digit of the frame rate is expressed in binary coded decimal (BCD). The rate message bytes formats are shown below.

Rate Byte 1 – contains a transition start control bit and the most significant digit (hundreds digit) of the frame rate.

Rate Bytes 2 and 3 – Rate byte 2 contains the next most significant digit (tens digit) of the frame rate. Rate byte 3 contains the least significant digit (units digit) of the frame rate.

Auto Transition Rate Command (AC/7D, CC/FD)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
AUTO Transition Rate	02	01	4C	None
FADE Transition Rate	02	01	7D	None
VFTB Transition Rate	02	01	7C	None
WRITE				
AUTO Transition Rate	05	01	CC	Rate bytes 1, 2, 3
FADE Transition Rate	05	01	FD	Rate bytes 1, 2, 3
VFTB Transition Rate	05	01	FC	Rate bytes 1, 2, 3

Rate1=Transition control bits and
most significant digit of rate

Rate value in BCD (0000 to 1001)

000=No change to BKGD or KEY
001=KEY 1 selected
010=KEY 2 selected
011=KEY 1 and 2 selected
100=BKGD selected
101=BKGD and KEY 1 selected
110=BKGD and KEY 2 selected
111=BKGD, KEY 1, and KEY 2 selected

0=Update display only, do not
perform transition
1=Update display and do transition
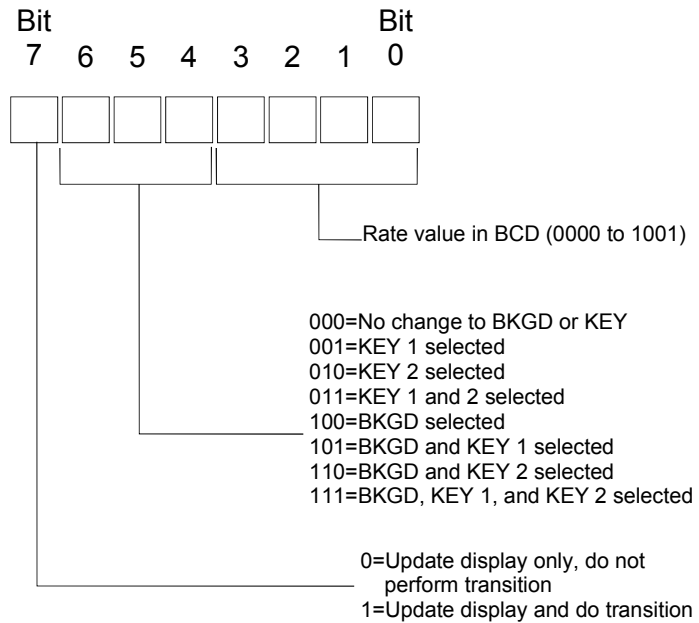
Message Rate Format – Rate Byte #1

Rate2=Next most significant digit
Rate3=Least significant digit
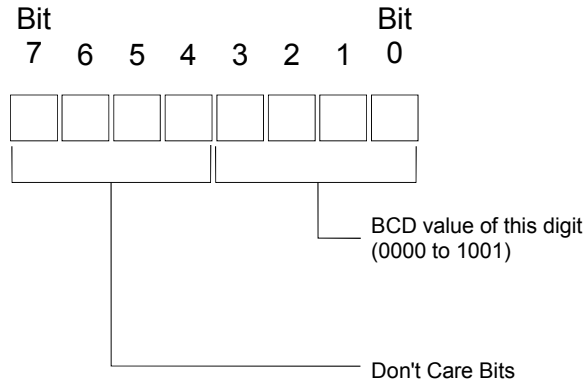
Message Rate Format - Rate Byte #2, #3

All Stop Command (-, F2)

There is no read command. The write command sets the keyer to a known state; the following occurs:

1. Any ongoing transition is stopped.
2. The transition fader is set to a limit.
3. Any key is removed from the program output.
4. Any current fade to black is removed (up from black).
5. The next transition is set to BKGD only.

| Note | The message byte is ignored. It is there to maintain consistency with Model 100 protocol, which placed it there to be consistent with Model 300 protocol. |

All Stop Command (-, F2)

Function	Byte Count	Effects Address	Command Code	Message
WRITE:				
All Stop	03	01	F2	D0

Push-button Select Command (-, FB)

There is no read command. The write command from the editor performs a press of the push-button in the same manner that an operator would press a button on a control panel. This is different from the PB/L command in that it doesn't require a prediction as to whether the control will be turned on or turned off.

This command is generally used to start an auto transition.

Transition Select Command (-, FB)

Function	Byte Count	Effects Address	Command Code	Message
WRITE:				
Push-button Select	03	01	FB	Push-button Number

Push Button Descriptions

Push-button Number	Description
0B	AUTO TRANS
0C	KEY2 auto transition
0D	KEY2 CUT
0F	KEY1 auto transition
1B	BOX MASK Invert (GVG 200 extension)
1F	FADE TO BLACK
2E	KEY2 MATTE FILL
2F	KEY2 VIDEO FILL
40	KEY2 INVERT
41	KEY2 MASK (box mask on/off)
42	KEY2 AUTO KEY
43	KEY2 SELF KEY
44	KEY1 INVERT
45	KEY1 MASK (box mask on/off)
46	KEY1 MATTE FILL
47	KEY1 VIDEO FILL
48	BKGD select
49	KEY1 select
4A	CUT (write only)
4C	KEY1 SELF – Self Key (acts like an interlocked button)
4D	KEY1 AUTO - Auto Select key (acts like an interlocked button)
52	KEY1 CUT
53	KEY2 select
54	V FADE TO BLACK
60	MASK FORCE
62	KEY1 ADDITIVE
63	KEY2 ADDITIVE

0F, 0C, 52, and 0D work for "Stand Alone" mode and "Editor Bay" mode only. When issued together with "Push button on"(C6) command or "Push button select"(FB) command, the above four numbers will invoke the corresponding

transition. No transition starts if they are issued together with "Push button off"(C7) command.

When issued together with "Read back"(46/47) commands, 0F and 0C will return a message showing whether its corresponding auto trans is going on. 52 and 0D will not return a message.

Software Version Command (6C, EC)

The editor uses the read form of this command to determine the keyer software version. The response from the keyer will be in the form of the write command. Note that the write command is shown (see below) for explanation purposes only. It is not intended to be sent by the editor to the keyer.

Software Version Command (6C, EC)

Function	Byte Count	Effects Address	Command Code	Message
READ:				
Software Version	02	00	6C	None
WRITE:				
Software Version	0B	00	EC	9 data bytes (see below)

Sample of a software version number (9 byte string):
"V 1 2 . 1 4 b b b"
(Most significant digit d0 = V . . . . b = D8 least significant digit)
Where:
- 'V' just stands for version
- '12' is the major release number
- '.' is an ASCII period acting as a separator
- '14' is the minor release number
- 'B' is an ASCII space padding out the rest of the message (this may be filled with data in future releases).

Card Status Command (73, 74)

The editor uses the read command to determine the current status of the two keys. The response from the keyer will be in the form of the write command, the message byte having the formats shown in the figure below the table.

Note

> The write command updates the appropriate key status display and may or may not change the key status.
>
> The write command is shown (see below) for explanation purposes only. It is not intended to be sent by the editor to the keyer.

Card Status Command (73, 74)

Function	Byte Count	Effects Address	Command Code	Message
READ:	02	00	73	48 (BKGD) 49 (KEY1) 53 (KEY2)
WRITE:	03	00	74	Card Status Byte

Bit
7 6 5 4 3 2 1 0

0 = Key 1 off Air
1 = Key 1 on Air

0 = Key 2 off Air
1 = Key 2 on Air

Don't Care Bits

0 = On Air
1 = Faded to Black
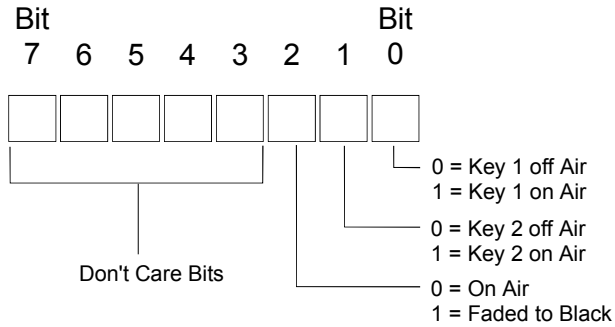
Card Status Byte Format

Error Status Command (71, 72)

The editor uses the read command to determine the current status of the BKGD and KEY video input signals. The response from the keyer will be in the form of the write command, the message byte having the formats shown in the figure below the table.

Note

The write command is shown (see below) for explanation purposes only. It is not intended to be sent by the editor to the keyer.

Error Status Command (71, 72)

Function	Byte Count	Effects Address	Command Code	Message
READ:	02	00	71	None
WRITE:	03	00	72	Error Status Byte

Bit
7 6 5 4 3 2 1 0

0 = BKGD 1 signal Good
1 = BKGD 1 signal Error

0 = BKGD 2 signal Good
1 = BKGD 2 signal Error

0 = Key Video signal Good
1 = Key Video signal Error

Don't Care Bits

0 = Key Alpha signal Good
1 = Key Alpha signal Error
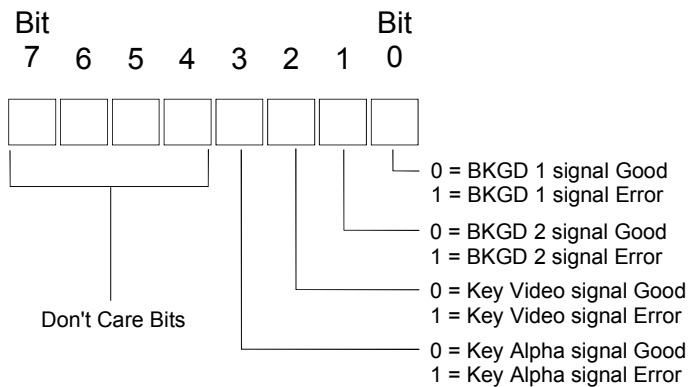
Error Status Byte Format

Additions to the GVG 100 Emulation Protocol

Commands Not Implemented

- READ/WRITE Lamp Status
- WRITE Status Update Command
- READ/WRITE Field Mode Command
- Transfer Memory Register Command
- STORE/RECALL Memory Command

The above commands will be ignored. The above write commands will result in a command valid ACK being returned for compatibility reasons.

- READ/WRITE Key Memory Command

Extra Commands / Control Numbers:

Taken from GVG 200 extension to the protocol – analog control numbers.

- BOX MASK Invert push-button number.

Ross Video Custom Commands

- READ/WRITE Analog all 4 mask edges (Top-Bottom-Left-Right) (single command)
- Box Mask Force
- Transparency
- Card Status
- Error Status

Other Differences

In the event of a communications error a GVG 100 becomes de-selected. The CDK-111A-M instead, remains selected and will search the receive buffer for the next combination of characters that can be interpreted as a valid command. A subsequent break character can be sent to flush the receive buffer and de-select the CDK-111A-M.

Note

> The degree of command error checking used in the CDK-111A-M may vary from that for the GVG 100 resulting in some differences as to where the frame responds with Command accepted or Protocol Error.

GVG MASTER2100 Emulation Protocol

This section provides selected GVG MASTER2100 Protocol commands supported by the CDK-111A-M.

If your application requires further GVG MASTER2100 protocol command support, please contact Ross Video with this request.

Ross Video's use of the protocol deviates from the standards defined in the GVG Automation Interface Protocol Manual, (5.1 software release, Technical Reference 071011605, for the M-2100 Digital Master Control System, revised printing: July 2001,) in these respects:

- Subscription command class is not supported.

- Audio processing commands not supported, audio processor status requests get a return stating "Quiescent".

- The CDK-111A-M ignores commands it is not capable of performing, i.e. 4 keyer control, wipes.

Command Format

The following is a sample command using the MASTER2100 emulation protocol.

02 84 01 82 01 77 4F

Note

> The spaces between characters in the sample command is for explanation/display purposes only.

The sample command fields and syntax are explained in the following table and sections.

Command Format Component Fields

Header Fields			Command Fields			Footer Field
Start transmission	Message byte length	Command Class	Data field byte length	ID Value	Data field	Checksum
02	**84**	**01** up to **05**	**82**	**01**	**77**	**4F**

Header Field Descriptions

02 = Start Transmission field, mandatory opening byte, in ASCII Hex.

84 = Message byte length, not including itself, the start transmission byte, or the Checksum byte(s), in ASCII Hex. All byte counts can be encoded as one or two bytes. If the most significant bit of the first byte is set, then the byte count consists of only one byte. This encoding allows up to 127 bytes to be represented with a single byte while up to 32,767 bytes with two bytes.

01 up to **05** = Command Class indicator:

01 A Command from the Control Panel to the CDK-111A-M.

02 A Query from the Control Panel asks how the CDK-111A-M is set for this command function.

03 A Status response from the CDK-111A-M in reply to a Query, can be either a statement of its particular command function parameters as requested, or 'command-initiated' and 'command-completed' responses as requested.

04 Acknowledge to a command, status response.

05 Not Acknowledge to a command, status response.

Data Field Descriptions

82 = Data field byte length, not including itself, including the data field byte length byte, the sub-command field byte, and the actual data field byte(s), in ASCII Hex. All byte counts can be encoded as one or two bytes. If the most significant bit of the first byte is set, then the byte count consists of only one byte. This encoding allows up to 127 bytes to be represented with a single byte while up to 32,767 bytes with two bytes.

01 = Sub-command field, the command-specific number, in Hex.

77 = A sample command-specific data field in Hex. The command-specific data fields and their binary parameters are defined in the command sections following this overview.

Footer Field Descriptions

4F = Single-byte sum of all fields between the message byte length and the last data field, inclusive, MSB (most significant byte) first. The sum of all message fields plus the checksum value should equal 0.

Command List

The following table lists the supported MASTER2100 protocol commands:

Command List

Function	Mnemonic	ID Value	Command	Query	Status
Next Transition	TX_NEXT	0x01	Yes	Yes	Yes
Start Transition	TX_START	0x02	Yes	No	Yes
Select Transition Type	TX_TYPE	0x03	Yes	Yes	Yes
Select Transition Rate	TX_RATE	0x04	Yes	Yes	Yes
Transition Status	TX_STAT	0x05	No	Yes	Yes
Take Crosspoint	XPT_TAKE	0x06	Yes	Yes	Yes
Break Away	BREAK_AWAY	0x07	Yes	Yes	Yes
Key Modifier	KEY_MOD	0x0A	Yes	Yes	Yes
Key Enable	KEY_ENABLE	0x0B	Yes	Yes	Yes
Key Status	KEY_STAT	0x0C	No	Yes	Yes
Automation Enable Status	AUTO_STAT	0x0D	No	Yes	Yes
Stop Ongoing transition	ALL_STOP	0x0E	Yes	No	Yes
System Status	SYSTEM_STAT	0x12	No	Yes	Yes
System Configuration	SYSTEM_CONFIG	0x13	No	Yes	Yes
Transition Status	TX_STAT2	0x15	No	Yes	Yes
Error Status for Previous	ERROR_STAT	0x20	No	Yes	Yes
Protocol / Version	PROTO_VER	0x21	No	Yes	Yes

Function: a description of the command's function on the CDK-111A-M.

Mnemonic: the (case-sensitive) command syntax.

ID Value: a Hex identifier number unique to each command.

Command: indicates whether the command can be in the form of a command (in the class indicator field) to the CDK-111A-M or not.

Query: 'indicates whether the command can be in the form of a query (in the class indicator field) to the CDK-111A-M or not.

Status: indicates whether the command can be in the form of a status response (in the class indicator field) from the CDK-111A-M

The command-specific data fields for the supported GVG MASTER2100 protocol commands are defined in the following section.

GVG MASTER2100 Emulation Commands

Following are the commands supported by the CDK-111A-M

Next Transition (0x01, TX_NEXT)

If commands TX_NEXT and KEY_ENABLE are sent in the same field, the KEY_ENABLE command must be sent first, to indicate which key is being transitioned and what state the key will transfer to.

Next Transition (0x01, TX_NEXT)

Function	Command Data Field
	Next Transition
COMMAND	1 byte
QUERY	
REPLY	1 byte

Next Transition byte values:

01   BKGD transition
02   Key transition
03   BKGD & Key transition
Bit 2-7   Reserved

Note: Either bit 0, bit 1, or both must be selected. 00 is unrecognized.

Start Transition (0x02, TX_START)

Start Transition (0x02, TX_START)

Function	Command Data Field
	Trigger Mod
COMMAND	1 byte

Trigger Mod byte values:

01   Start video.
02   Bit 1-7   Ignored/Reserved

Select Transition Type (0x03, TX_TYPE)

Select the Transition Type for the next transition. The CDK-111A-M does not support wipes. If a wipe transition is selected , the card will perform a fade. If a transition type has been configured as a custom transition, the transition will execute as a custom transition.

Select Transition Type (0x03, TX_TYPE)

Function	Command Data Field
	Transition
COMMAND	1 byte
QUERY	
REPLY	1 byte

Transition data byte values:

01	Take
02	Fade-Fade
03	Take-Fade
04	Mix
05	Fade-Take
06	Wipe (only does fade)

Select Transition Rate (0x04, TX_RATE)

Command information:

- Replies: returns the rate type and rate value for the next transition.

- If a new Transition Type is selected by the Automation system, any previously specified protocol rate will be overridden by the rate associated with the selected Transition Type. Therefore the automation system must first send the desired Transition Type, then send the Rate.

- If a Rate is selected, it is "remembered" as associated with the currently selected (non-Cut Transition Type. Whenever that Transition Type is again selected, the remembered Rate is recalled (Slow, Medium, Fast).

  - When automation selects a <rate type> = Slow, Medium, or Fast, it is remembered.

  - When automation selects a <rate type> = Rate and supplies a value, the value will not be remembered for the current Transition Type.

Select Transition Rate (0x04, TX_RATE)

Function	Command Data Fields	
	Rate type	Rate
COMMAND	1 byte	2 bytes
QUERY		
REPLY	1 byte	2 bytes

Rate type byte values:

<div style="margin-left: 2em">

00   Rate value to be used

01   Slow (60 frames)

02   Medium (25 frames)

03   Fast (10 frames)

04   No Rate (For replies only - No Rate currently selected)

</div>

Rate 2 bytes, 00 through 999 frames

Transition Status (0x05, TX_STAT)

Command information: Status of transition at the time this query was received.

Transition Status (0x05, TX_STAT)

Function	Command Data Fields		
	Transition Video Status	Transition Audio Status	Hold Off
QUERY			
REPLY	1 byte	4 bytes	1 byte

Transition Video Status byte values:

<div style="margin-left: 2em">

01   Quiescent

03   Transitional

04   Fading To Black

05   Fading From Black

06   In Black

</div>

Transition Audio Status byte value:

<div style="margin-left: 2em">

01   Quiescent - is the only value available for each of the 4 fields.

</div>

Hold On/Off Status byte value:

<div style="margin-left: 2em">

00   OFF- is the only value available for this field.

</div>

Take Crosspoint (0x06, XPT_TAKE)

Note: Hot cuts (XPT–Take, 0x06) are not allowed when a transition is in progress.

Take Crosspoint (0x06, XPT_TAKE)

Function	Command Data Fields		
	Bus Select	Crosspoint	Audio only
COMMAND	2 bytes	1 byte	1 byte
QUERY	2 bytes		
REPLY	2 bytes	1 byte	1 byte

Bus Select byte values [1]:

<div style="margin-left: 2em">

01   Program Bus

02   Preset Bus

Bit 2-15 Ignored/Reserved

</div>

Crosspoint byte values:

00	No Change
01	Black
02	Bkgd A
03	Bkgd B
04	Video Key
05	Alpha Key
06	Matte

Audio Only Crosspoint byte value:

00	No Change

1. One or more buses must be selected for the command format of this field. Only one bus may be selected for the query format of this field. No buses selected is an invalid condition.

Break Away (0x07, BREAK_AWAY)

This command breaks away (takes) audio from video, and clears any overs that may be selected. Audio functions are not supported.

Break Away (0x07, BREAK_AWAY)

Function	Command Data Fields			
	Break Away Type	Bus Select	Crosspoint	Audio Only crosspoint
COMMAND	1 byte	2 bytes	1 byte	1 byte
QUERY	1 byte	2 bytes		
REPLY	1 byte	2 bytes	1 byte	1 byte

Break Away Type byte values:

01	Video

Bus Select byte values [1]:

01	Program Bus
02	Preset Bus
Bit 2-15	Reserved

Crosspoint byte values:

00	No Change
01	Black
02	Bkgd A
03	Bkgd B
04	Video Key
05	Alpha Key
06	Matte

Audio Only Crosspoint byte values

00	No Change

1. One or more buses must be selected for the command format of this field. Only one bus may be selected for the query format of this field. No buses selected is an invalid condition.

Key Modifier (0x0A, KEY_MOD)

This command selects the characteristics for the requested key. The squeeze back field has no effect.

Key Modifier (0x0A, KEY_MOD)

Function	Command Data Fields		
	Keyer Select	Key Modifier	Squeeze Back
COMMAND	1 byte	1 byte	1 byte
QUERY	1 byte		
REPLY	1 byte	1 byte	1 byte

Keyer Select byte value [1]

    01   Keyer 1 select
    02   Keyer 2 select
    03   Both keyers are selected

Key Modifier bit settings

    Bit 0   0 = Self
               1 = External
    Bit 1   0 = Matte
               1 = Video
    Bit 2-4   Ignored
    Bit 5-7   Reserved

SqueezeBack Position byte values [2]

    00   No change

1. One keyer must be selected for the command format of this field. One keyer may be selected for the query format of this field. No keyers selected is an invalid condition.

2. Not yet implemented.

Key Enable (0x0B, KEY_ENABLE)

This command selects a Keyer to be on or off air after the next transition.

- Selecting a Keyer (bit=1) at the next transition will take an off-air key on-air, or leave an on-air key on-air. Setting (bit=0) has a similar, but complimentary effect.

- Selecting a Keyer (bit=1) for a currently off-air Keyer will cause that Key to be seen on the PST bus.

See comments in the TX_NEXT command notes concerning interaction with the KEY_ENABLE command.

Function	Command Data Field
	Keyer Select
COMMAND	1byte
QUERY	
REPLY	1 byte

Keyer Select byte values [1]

        01   Keyer 1

        02   Keyer 2

        Bit 2-7   Ignored/Reserved

1. One or more keyers must be selected for the command format of this field. Only one keyer may be selected for the query format of this field. No keyers selected is an invalid condition.

Key Status (0x0C, KEY_STAT)

This command indicates that status for Keyer 1 if not physically present will be reported as off-air. Use the System Status and System Configuration commands to obtain more information.

Key Status (0x0C, KEY_STAT)

Function	Command Data Field
	Keyer Status
QUERY	
REPLY	1 byte

Keyer Status bit settings

        Bit 0   Keyer 1 (0 = Off air, 1 = On air)

        Bit 1   Keyer 2 (0 = Off air, 1 = On air)

        Bit 2-7   Ignored/ Reserved

Automation Enable Status (0x0D, AUTO_STAT)

This command send an Enabled reply to a Status query. On the CDK-111A-M, the Automation interface cannot be disabled.

Automation Enable Status (0x0D, AUTO_STAT)

Function	Command Data Field
	Keyer Status
QUERY	
REPLY	1 byte

Status byte value

        01   Enabled

Stop Ongoing Transition (ALL_STOP)

This command stops all on-going transitions and resets the system to a known state.

Stop Ongoing Transition (ALL_STOP)

Function	Command Data Field
	All-Stop Options
COMMAND	1 byte

All-Stop Options bit settings

       Bit 0   Transitions are cut to final state

       Bit 1   Reserved

       Bit 2   The transition mode is set to background

       Bit 3   All keys are removed

       Bit 4   Change PGM and all AP's to crosspoint #1 (normally black)

       Bit 5-7 Reserved

System Status (0x12, SYSTEM_STAT)

This reply returns only values of 0, indicating an "okay" condition. This is done so the entire status byte can be tested against zero to determine if anything is *not* functioning.

System Status (0x12, SYSTEM_STAT)

Function	Command Data Field
	System Status
QUERY	
REPLY	2 bytes

System Status byte value

       00   OK.

System Configuration (0x13, SYSTEM_CONFIG)

This reply returns only values of 0, indicating an "okay" condition. This is done so the entire configuration byte can be tested against zero to determine if anything is *not* functioning.

System Configuration (0x13, SYSTEM_CONFIG)

Function	Command Data Field
	Configuration
QUERY	
REPLY	3 bytes

Configuration byte value

       00   OK.

Transition Status (0x15, TX_STAT2)

This command reply gives the status of transition at the time this query was received.

Transition Status (0x15, TX_STAT2)

Function	Command Data Fields			
	Transition Video Status	Keyer Summary Status	Transition Audio Status	Hold On/Off Status
QUERY				
REPLY	1 byte	1 byte	4 bytes	1 byte

Transition Video Status byte values

01	Quiescent
03	Transitional
04	Fading To Black
05	Fading From Black
06	In Black

Keyer Summary Status byte value

01	Quiescent
03	Transitional
04	Fading To Black
05	Fading From Black
06	In Black

Transition Audio Status byte value

01	Quiescent

Hold On/Off Status byte value

00	OFF

Error Status for Previous (0x20, ERROR_STAT)

This query should only be issued after a NAK has been received from the CDK-111A-M or the CDK-111A-M did not perform the desired action. Upon receipt of a message, the CDK-111A-M will perform a cursory check to validate it and may uncover other errors when the command is actually processed. If no errors have occurred since the last message was received by the CDK-111A-M, an error code of NO_ERR will be returned.

Error Status for Previous (0x20, ERROR_STAT)

Function	Response Data Fields					
	Error Code	Command Class	Sub-Command	Byte Position	Offending Data	Argument Number
QUERY						
REPLY	1 byte	1 byte	1 byte	2 bytes	4 bytes	1 byte

Error Code byte values

00	No_err	No errors have occurred since the last message was received.
01	Checksum_err	The checksum computed by the CDK-111A-M did not match the checksum in the message.
02	Command_err	Invalid or unrecognized Command-Class/ Sub-Command combination.
03	Bitfield_err	Invalid combination of bits selected in a data field.
04	Selection_err	Invalid selection in data field.
05	Range_err	Number in data field is out of range.
06	Feature_err	Requested feature is not implemented or not available.
07	Install_err	Requested feature is not installed.
08	Internal_err	Internal processing error.
09	Auto_disabled	Automation interface currently disabled.
10	Other_err	Other unexpected error (not fitting into any of the categories listed above).

Command Class byte value

Byte code found in the Command Class position of the message. This field will be zero for the No_Err and Checksum_Err error codes.

Sub-Command byte value

Byte code found in the Sub-Command position of the message. This field will be zero for the No_err and Checksum_err error codes.

Byte Position byte value

Approximate byte position in the message where the error was found (starting with the first byte after the STX and overall message byte count). This field will be zero for the No_err error code.

Offending Data byte value

Data that was found to be in error. If the data corresponding to the Command Class and Sub-Command is less than four bytes (as defined in the protocol), the data will be put in the least significant bytes of the 4-byte data field. This field will be zero for the No_err error code. For a Checksum_err, the data field will contain the checksum calculated by the CDK-111A-M.

Argument Number byte value

Argument or field number where the offending data was found.

Protocol / Version (0x21, PROTO_VER)

This query is provided so the controller of the M–2100 can inform the tributary which version of the M–2100 protocol is being used. The M–2100 (tributary) will respond with the version of the protocol that it is using. Incompatible versions between the controller and tributary may yield inconsistent results. The major/minor version is typically expressed in combination such as 2.1, where "2" is the major version and "1" is the minor version.

The major number is incremented if a change to the protocol or the applications which use the protocol is not backward compatible and will break the operation of

either end of the communications line. Anytime the major number is incremented, the minor number is reset to zero.

The minor number is incremented if a change to the protocol or the applications which use the protocol is backward compatible and will not break the operation of either end of the communications line.

Protocol / Version (0x21, PROTO_VER)

Function	Command Data Fields	
	Major	**Minor**
QUERY		
REPLY	1 byte	1 byte

Major byte value

      03   The query format of PROTO_VER, the major field indicates the major protocol version that the controller is using.

In the reply format, the field indicates the major protocol version that the tributary is using.

Minor byte value

      00   In the query format of PROTO_VER, the minor field indicates the minor protocol version that the controller is using.

In the reply format, the field indicates the minor protocol version that the tributary is using.

Leitch DSK Emulation Protocol

This section provides selected Leitch DSK emulation protocol commands supported by the CDK-111A-M.

If your application requires further Leitch DSK emulation protocol command support, please contact Ross Video with this request.

Ross Video's use of the protocol deviates from the standards defined in the Leitch document DSK-6801/3 Control Bus Protocol, Revision 1.0/1.2, dated August 19 1999, in some important respects:

- There is no message collision detection mechanism.
- Communication is at 19200, not 41677 or 38400 baud.

Command format

The following is a sample command using the Leitch DSK emulation protocol.

~ I ? T , K , 7 , 0 0 F C , V T R \ F 8

Note

> The spaces between characters in the sample command is for explanation/display purposes only.

The sample command fields and syntax are explained in the following table and sections.

Command Format Component Fields

Header Fields				Command Fields				Footer Fields	
Opening Character	Command group Key Letter(s)	Delimiter	Command key	Field 1	(Optional) Field 2	(Optional) Field 3	(Optional) Field 4	Closing Character	Checksum
~	I	: or ? or !	T	,K	,00100110	,00FC	,V T R	\	F8

Header Field Descriptions

~ = Mandatory opening character, reserved and cannot be used in the command message body.

<I> = Command Group key letter(s), case sensitive.

: or ? or ! = Command function delimiter:

: The Set command from the Control Panel sends a particular command to the CDK-111A-M.

? The Query command from the Control Panel asks what the CDK-111A-M's particular command function parameters are.

! The Reply from the keyer card can be either a statement of its particular command function parameters as requested, or 'command-initiated' and 'command-completed' responses as requested.

<T> = Command key letter (case-sensitive) or number.

Data Field Descriptions

All data fields require a comma *before* each field's actual data.

Keyer ID, or **Device ID** = These data fields appear in several commands and should be the same value as the "Board Address" set in Menu C of the CDK-111A-M. For the board address ID, the Leitch DSK protocol expects a two-byte Hex word between the range of 0000 to 00FD.

Control Panel ID = ID of the control panel the message is sent from. This value is automatically set when the controller sends a command and is automatically returned when the device responds. It does not effect the interpretation of the command.

,K ,00100110 ,00FC ,VTR = Some examples of command-specific data fields using numbers, letters, Binary, or Hex. A comma is required before each field's data begins. The command-specific data fields and their parameters are defined in the command sections following this overview.

Footer Field Descriptions

\ = Mandatory closing character, reserved and cannot be used in the command message body.

<**CS**> = Modulo 256 Checksum of all ASCII values of characters between '~' and '\', inclusive, transmitted as two ASCII Hex characters, MSB (most significant byte) first.

The CDK-111A-M handles the commands listed below. It will send a "response" or "reply" command if it gets a "query" or "request" command, or it will take an action and send a "response" or "reply" if it gets a "set" command.

Command List

The CDK-111A-M supports the following Leitch DSK protocol commands.

- System Informational Commands:
    - o Device Type Request
    - o Device Version Request
    - o Device Description Request
- DSK Control commands:
    - o Mask Attributes
    - o Keyer Effects
    - o Mask Location
    - o Keyer Attributes
    - o Keyer Rates
    - o Keyer Levels

The command-specific data fields for the supported Leitch DSK protocol commands are defined in the following section.

Leitch DSK Emulation Commands

Following are the commands supported by the CDK-111A-M.

System Information Commands

Device Type Request and Response (I?T, I!T)

This command is used to determine the existence, ID, and type of device(s) in the system chain. In the request command, the beginning and ending device ID fields are for determining specific units in series among several in the system, i.e. from device 4B through to device 4F only. The response comes from each of the individual devices.

Device Type Request and Response (I?T, I!T)

Function	Command Data Fields			
	Beginning Device ID	**Ending Device ID**	**Device ID**	**Device Type**
I?T (REQUEST)	**,B :** Hex word	**,E :** Hex word		**,T :** Hex word
I!T (RESPONSE)			Hex word	Hex word

Request Data Field Definitions

Beginning Device ID = Optional field for lowest ID number of multiple devices queried with the command.

Ending Device ID = Optional field for highest ID number of multiple devices queried with the command.

Device Type = Optional field for device type. If not specified all devices respond.

Response Data Field Definitions

Device ID = Unique Bus ID of responding device.

Device Type = Optional field for device type. If not specified all devices respond.

Device Version Request and Response (I?V, I!V)

This command is used to determine the version and type of device(s) in the system chain. In the request command, the beginning and ending device ID fields are for determining specific units in series among several in the system, i.e. from device 4B through to device 4F only. The response comes from each of the individual devices.

Device Version Request (I?V)

Function	Request Data Fields		
	Beginning Device ID	**Ending Device ID**	**Device Type**
I?V (REQUEST)	**,B :** Hex word	**,E :** Hex word	**,T :** Hex word

Request Data Field Definitions

Beginning Device ID = Optional field for lowest ID number of multiple devices queried with the command.

Ending Device ID = Optional field for highest ID number of multiple devices queried with the command.

Device Type = Optional field for device type. If not specified all devices respond.

Device Version Response (I!V)

Function	Response Data Fields				
	Device ID	Hardware Type	Hardware Version	Software Type	Software Version
I!V (RESPONSE)	Hex word	Hex word	Hex word	Hex word	Hex word

Response Data Field Definitions

Device ID = Unique Bus ID of responding device.

Hardware Type = Hardware version of responding device.

Hardware Version = Hardware type of responding device.

Software Type = Software version of responding device.

Software Version = Hardware version of responding device.

Device Description Request and Response (I?A, I!A)

This command is used to determine the existence, ID, and type of device(s) in the system chain. In the request command, the beginning and ending device ID fields are for determining specific units in series among several in the system, i.e. from device 4B through to device 4F only. The response comes from each of the individual devices.

Device Description Request (I?A)

Function	Request Data Fields		
	Beginning Device ID	Ending Device ID	Device ID
I?A (REQUEST)	**,B :** Hex word	**,E :** Hex word	**,T :** Hex word

Request Data Field Definitions

Beginning Device ID = Optional field for lowest ID number of multiple devices queried with the command.

Ending Device ID = Optional field for highest ID number of multiple devices queried with the command.

Device Type = Optional field for device type. If not specified all devices respond, sent as ASCII Hex number.

Function	Response Data Fields		
	Device ID	**Number of Characters**	**Character String**
I!A (RESPONSE)	Hex word	Hex word	Hex word

Response Data Field Definitions

Device ID = Unique Bus ID of responding device.

Number of Characters = Number of characters (48 max.) in (following) device description character string field.

Character String = Alphanumeric ASCII characters used to describe the device.

DSK Control commands

Mask Attributes Set, Query, Reply Commands (E:42, E?B, E!42)

This command group is used to Set, Query, and Reply information about the mask attributes such as normal, force, invert, enabled, on a keyer card.

For actual bit settings, see *Mask Attributes Command: Set and Reply Bit Options* figure below.

Mask Attributes Set, Query, Reply Commands (E:42, E?B, E!42)

Function	Packet size	Command Data Fields		
		Keyer ID	**Control panel ID**	**Attributes**
E:42 (SET)	8 Bytes	Hex word	Hex word	Byte
E?B (QUERY)	7 Bytes	Hex word	Hex word	
E!42 (REPLY)	8 Bytes	Hex word	Hex word	Byte

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Attributes = For settings, see *Mask Attributes Command: Set and Reply Bit Options* figure below.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Attributes = For settings, see *Mask Attributes Command: Set and Reply Bit Options* figure below.
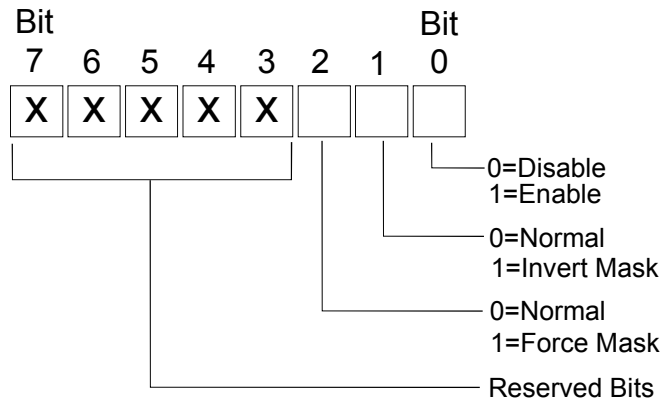
Mask Attributes Command: Set and Reply Bit Options

Keyer Effects Set, Query, Reply Commands (E:45, E?E, E!45)

This command group is used to Set, Query, and Reply information about a keyer transition on a keyer card.

The Set command from the Control Panel initiates a keyer transition. Autotrans/Cut actions, and Wipe/Dissolve options, are mutually exclusive, and refer to key signal only. Cut takes precedence over Wipe/Dissolve. The Query command from the Control Panel asks what the keyer card mask attributes are. The keyer card Replies with Transition-initiated and Transition-completed messages.

For actual bit settings, see *Keyer Effects Command: Set and Reply Bit Options* figure below.

Keyer Effects Set, Query, Reply Commands (E:45, E?E, E!45)

Function	Packet size	Command Data Fields		
		Keyer ID	Control panel ID	Attributes
E:45 (SET)	8 Bytes	Hex word	Hex word	Byte
E?E (QUERY)	7 Bytes	Hex word	Hex word	
E!45 (REPLY)	8 Bytes	Hex word	Hex word	Byte

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Effect = For settings, see *Keyer Effects Command: Set and Reply Bit Options* figure below.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Effect = For settings, see *Keyer Effects Command: Set and Reply Bit Options* figure below.

Bit 7 6 5 4 3 2 1 Bit 0

X

0=No action
1=Wipe

0=No action
1=Dissolve

0=No action
1=Cut

0=No action
1=Autotrans

0=No action
1=Fade to black

0=Program off air
1=Program on air

0=Key off air
1=Key on air

Reserved Bit
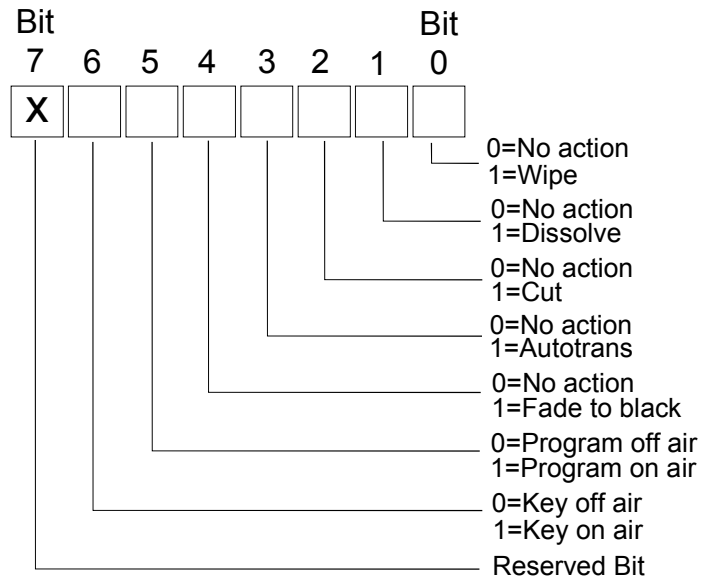
Keyer Effects Command: Set and Reply Bit Options

Mask Location Set, Query, Reply Commands (E:4A, E?J, E!4A)

This command group is used to Set, Query, and Reply information about a keyer's Mask Location.

Mask Location Set, Query, Reply Commands (E:4A, E?J, E!4A)

Function	Packet size	Command Data Fields					
		Keyer ID	Control Panel ID	Top edge	Bottom edge	Left edge	Right edge
E:4A (SET)	15 Bytes	Hex word	Hex word	Hex word	Hex word	Hex word	Hex word
E?J (QUERY)	7 Bytes	Hex word	Hex word				
E!4A (REPLY)	15 Bytes	Hex word	Hex word	Hex word	Hex word	Hex word	Hex word

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Top edge = Indicates the Top Edge position of the mask, in pixels.

Bottom edge = Indicates the Bottom Edge position of the mask, in pixels.

Left edge = Indicates the Left Edge position of the mask, in pixels.

Right edge = Indicates the Right Edge position of the mask, in pixels.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Top edge = Indicates the Top Edge position of the mask, in pixels.

Bottom edge = Indicates the Bottom Edge position of the mask, in pixels.

Left edge = Indicates the Left Edge position of the mask, in pixels.

Right edge = Indicates the Right Edge position of the mask, in pixels.

Keyer Attributes Set, Query, Reply Commands (E:4B, E?K, E!4B)

This command group is used to Set, Query, and Reply information about a keyer's fill, source, and mode attributes.

For actual bit settings, see *Keyer Attributes Command: Set and Reply Bit Options* figure below.

Keyer Attributes Set, Query, Reply Commands (E:4B, E?K, E!4B)

Function	Packet size	Command Data Fields		
		Keyer ID	**Control panel ID**	**Attributes**
E:4B (SET)	8 Bytes	Hex word	Hex word	Byte
E?K (QUERY)	7 Bytes	Hex word	Hex word	
E!4B (REPLY)	8 Bytes	Hex word	Hex word	Byte

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Attributes = For settings, see *Keyer Attributes Command: Set and Reply Bit Options* figure below.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Attributes = For settings, see *Keyer Attributes Command: Set and Reply Bit Options* figure below.

Keyer Attributes Command: Set and Reply Bit Options

Keyer Rates Set, Query, Reply Commands (E:52, E?R, E!52)

This command group is used to Set, Query, and Reply information about a keyer's transition rates.

Keyer Rates Set, Query, Reply Commands (E:52, E?R, E!52)

Function	Packet size	Command Data Fields					
		Keyer ID	Control Panel ID	FTB in	FTB out	Autotrans in	Autotrans out
E:52 (SET)	11 Bytes	Hex word	Hex word	Byte	Byte	Byte	Byte
E?R (QUERY)	7 Bytes	Hex word	Hex word				
E!52 (REPLY)	11 Bytes	Hex word	Hex word	Byte	Byte	Byte	Byte

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

FTB in = Fade to black transition in rate.

FTB out = Fade to black transition out rate.

Autotrans in = Autotrans transition in rate.

Autotrans out = Autotrans transition out rate.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

FTB in = Fade to black transition in rate.

FTB out = Fade to black transition out rate.

Autotrans in = Autotrans transition in rate.

Autotrans out = Autotrans transition out rate.

Keyer Levels Set, Query, Reply Commands (E:57, E?R, E!57)

This command group is used to Set, Query, and Reply information about a keyer's offset, gain, and transparency levels.

- Offset – value between 64 - 1024.

- Gain – value between 0.5 - 64, increments of 0.1. Represented by a number between 5 – 640 for easy transfer.

- Transparency – value between 0 – 255, where 0 = completely transparent.

Keyer Levels Set, Query, Reply Commands (E:57, E?R, E!57)

Function	Packet size	Command Data Fields				
		Keyer ID	**Control Panel ID**	**Offset**	**Gain**	**Transparency**
E:57 (SET)	12 bytes	Hex word	Hex word	Hex word	Hex word	Hex word
E?W (QUERY)	7 bytes	Hex word	Hex word			
I!V (RESPONSE)	12 bytes	Hex word	Hex word	Hex word	Hex word	Hex word

Set Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Offset = Keyer offset.

Gain = Keyer gain.

Transparency = Keyer transparency.

Query Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Automatically set ID of the control panel the message is sent from.

Reply Data Field Definitions

Keyer ID = Unique Bus ID of keyer card.

Control Panel ID = Echoes the ID of the control panel the Set or Query message was sent from.

Offset = Keyer offset.

Gain = Keyer gain.

Transparency = Keyer transparency.

Appendix B. Software Upgrades

In This Appendix

This appendix provides instructions for upgrading the CDK-111A-M software. The following topics are discussed:

- CDK-111A-M Software Upgrade

- Replacing the CPU Boot Flash Chip

Software Upgrade

From time to time, it may be necessary to do an upgrade of the CDK-111A-M software. This is accomplished simply by replacing the **CPU Boot Flash Chip** (supplied by Ross Video) on the CDK-111A-M card itself.

Please call **Technical Support** for additional information on the most current software version and obtaining upgrades.

Throughout this chapter, please heed the following cautionary note:

Caution	Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling the CDK-111A-M cards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Touch the rack frame to dissipate static charge before removing cards from the frame and exercise proper grounding precautions when working on the CDK-111A-M cards.

1) CPU Boot Flash Chip (U10)	2) Insertion Spaces for Extraction Tool	3) Beveled Corner
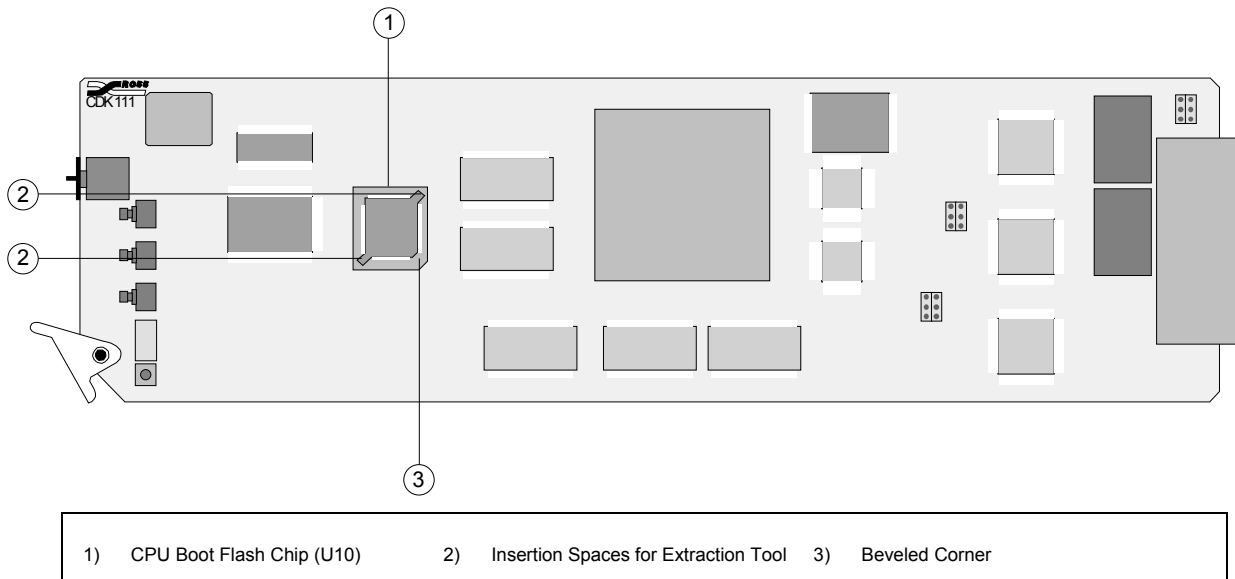
Replacing the CPU Boot Flash Chip

Use the following steps to replace the **CPU Boot Flash Chip**:

1. Observe all static discharge precautions throughout the procedure.

2. Remove the front panel cover of the RossGear frame that houses the CDK-111A-M card.

3. Using the ejector lever on the bottom of the card, carefully remove the CDK-111A-M card from its slot and set it on a flat, static free surface, with the component side up as per the above diagram.

⚠	**Caution** — Card may be hot to the touch. Allow it time to cool and handle with care.

4. Locate the **CPU Boot Flash Chip**, which is identified as component **U10**. See position **1** on the diagram above.

5. Insert the Chip Carrier Extraction Tool, which was supplied with your chip, into the two spaces provided in the IC socket (see positions **2** on the diagram) and gently pry the chip upwards until it is freed from the contacts.

⚠

Caution — Be careful not to insert the Extraction Tool too far into the spaces, as it will become lodged on the base of the socket, and will bend or break the chip socket if too much pressure is applied.

6. Discard the used chip, as you will no longer require it.

7. Holding the new **CPU Boot Flash Chip** pin side down, locate the small indented dimple on the shorter beveled side of the chip. This circle must be lined up with the small arrow located within the IC socket. If you have placed the card right side up as per the diagram, the arrow will be pointing downward on the bottom edge of the socket base.

8. Carefully position the new chip over the IC socket, with the arrow and dimple aligned as stated above.

Note

If the chip is positioned properly, you will notice that the bottom right corner is beveled to match the shape of the socket (position **3** on the diagram), thus preventing improper insertion of the chip.

9. Insert the chip into the socket, pressing gently to fasten the chip into place.

10. Replace the CDK-111A-M card into the gear frame slot from which it was removed.

11. Replace the front panel cover of the gear frame.

This completes the procedure for replacing the CPU Flash Boot Chip and hence, upgrading your CDK-111A-M software.

Appendix C. Specifications

In This Appendix

This appendix provides technical specifications and connector pinout diagrams. In addition, comprehensive tables are provided that list supported baud rates and GPI input, tally output and serial communication parameters.

The following sections are provided:

- CDK-111A-M Technical Specifications
- General
- System Timing
- Feature Comparison Chart
- Analog Reference Input
- Video Inputs
- Video Outputs
- CDK-111A-M BNC Connectors
- CDK-111A-M BNC Settings
- Baud Rates
- Cable Assemblies
- CDK-111A-M I/O, Power, Delay Specifications
- GPI Inputs, Tally Outputs and Serial Communication
- Jumper Locations
- Jumper Pinouts
- Jumper Configurations

CDK-111A-M Technical Specifications

General

The following is a list of general specifications pertaining to the CDK-111A-M:

- Built-in video test pattern generator (Flat-field black, PLL Pathological, EQ Pathological, Color bars 75%)

- 32 Mbytes card memory for image capture (32 NTSC frames) or Logo animation (128x64 Logo for 40 seconds, video and alpha)

- Key Invert

- Rounding to 8-bit or 10-bit

- Dithering to 0, +/-3, +/-7 or +/-15 levels

- Fully digital 14-bit internal processing

- Clip to SMPTE Luminance range or allow Super-Black and/or Super-White levels (configured via menu)

- Card-edge menu system control

- Card-edge Key Trans button, Background Trans button and Fade To Black button

- RS-485 Remote Control (GVG 100 Protocol)

- GPI and Tally BNC's (configured via menu)

- DCP-111 Control Panel (optional)

- STMPE 269M Fault Reporting

System Timing

- All video inputs zero time relative to BKGD 1 input, auto timing will correct for inputs out of time by up to one full frame.

- The minimum delay through the keyer is 114 samples. This delay can be manually increased in single sample steps to a maximum of one full frame.

- Delays are adjustable between the start of the reference signal frame and the start of the video output frame.

Feature Comparison Chart

Feature	CDK-111A-M	CDK-111A-Lite
Video input channels	4	3
Number of keys on air	2	1
Preview Overlay menu display	Yes	No
BKGD crossfade	Yes	No
Frame synchronization on every input	Yes	Yes
External analog reference signal input	Yes	Yes
Adjustable delay from reference to output signal	Yes	Yes
Storage for multiple stills and animated logos	32MB	No
Fade to black	Yes	Yes
Program output with EDH insertion	Yes	Yes
Second program output with EDH insertion	Yes (1)	Yes
One preview output with EDH insertion	Yes (1)	No
Fail-safe relay BKGD1 to PGM Out 1 on power failure	Yes	Yes
Accommodates SMPTE 259M-C	Yes	Yes
USB port for image download	Yes	No
Full transition control with 0-999 frame control	Yes	Yes
Clip, gain, matte fill, and box mask controls	Yes	Yes
Control via GPI, unbalanced full duplex RS-485 or 0-12V RS-232 compatible interface, on-screen configuration menu, control panel, and card-edge pushbuttons	Yes	Yes
Supports 525-line (NTSC) and 625-line (PAL) formats	Yes	Yes
Serial interface	Yes	Yes
5 year warranty	Yes	Yes

1) Configured via the menu, if desired

Analog Reference Input

- Accept a black analog reference from the DFR-8110A-C frame.

- NTSC or PAL automatic detection.

- On-board Phase Lock Loop maintains a stable display if the analog reference is lost.

Video Inputs

- Four video inputs with independent frame synchronizers.

- Compliant with SMPTE 259M-C Serial 4:2:2 digital video signaling.

- Compliant with SMPTE Recommended Practice RP 168-1993, Definition of Vertical Interval Switching Point for Synchronous Video Switching. Will compensate for switching source signals with a phase offset up to 32 us (860 video samples).

- NTSC Vertical blanking interval may end at the start of any of the lines 10 (273) through 20 (283).

- Automatic cable equalization to 75 meters.

Video Outputs

- Two video outputs.

- Compliant with SMPTE 259M-C Serial 4:2:2 digital video signaling.

- NTSC vertical blanking interval ends on the start of line 20 (283), regardless of the video input signal timings.

- EDH insertion on both outputs.

- Other ancillary data selected from BKGD1 or BKGD2 input will pass through untouched.

CDK-111A-M BNC Connectors

The CDK-111A-M has nine (9) BNC connectors on the rear of each module, as shown below:

CDK-111A-M Connector Assignments

CDK-111A-M BNC Settings

Connector	Use
IN	BKGD 1 In – any video source (can be used as card reference, configurable via menu)
1	BKGD 2 In – any video source
2	GPI 1 or Panel or Tally 1 – (configurable via menu and jumper setting)
3	Rx or GPI 2 or Tally 2 – (configurable via menu)
4	Tx or GPI 3 or Tally 3 – (configurable via menu)
5	PGM Out
6	PGM Out, PV Out, BKGD 1 + PV Key Out or BKGD 2 + PV Key Out – (configurable via menu)
7	Key Fill Input
8	Key Alpha Input

Note

> In Stand-Alone mode: For BNC 6, PV Out will display all keys whether on air or not.
>
> In External DSK mode: For BNC 6, BKGD 1 + PV Key Out will show BKGD 1 always, and only keys which are NOT on air.

Baud Rates

The following standard baud rates are supported:

Standard Baud Rate	CDK-111A-M Baud Rate	Deviation Error
19,200	19,231	+0.16%
57,600	57,692	+0.16%

Cable Assemblies

USB Cable Assembly

Part number: 135-004
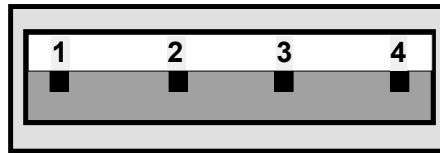
USB cable, A male end connector view
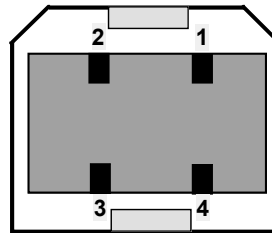
USB cable, B male end connector view

Pin #	Wire Color	Conductor Type
1	Red	5 Volt
2	White	Data -
3	Green	Data +
4	Black	Ground

PC Interface Cable Assembly

Part number: 1111C-302
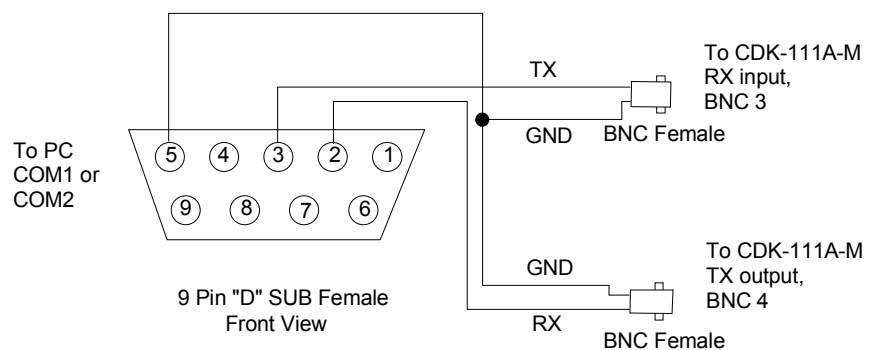
From DB9 Pin #	To BNC #	Conductor Type
2	4	Center
3	3	Center
5	3	Outer (GND)
5	4	Outer (GND)

Serial Download Cable Assembly

Part number: 1111C-300

To PC
COM1 or
COM2

WHT

BLK

BARE STRANDS

To CDK-111A-M
Board Jumper J1

9 Pin "D" SUB Female
Front View

Right Angle 2 x 3 Pin
Female Socket Strip
Front View
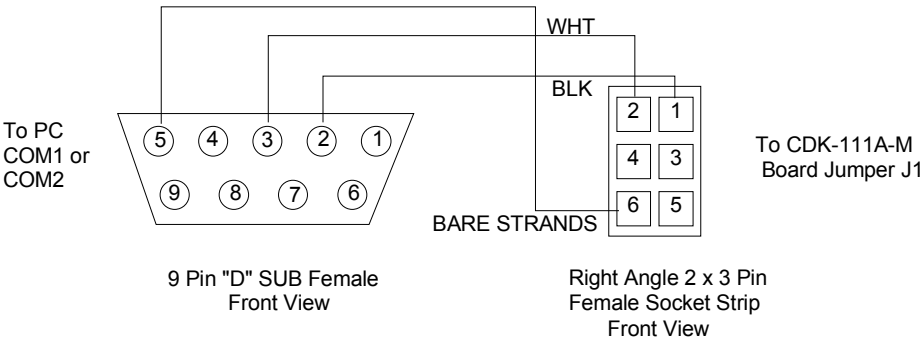
From DB9 Pin #	To Socket Pin #	Wire Color
2	1	Black
3	2	White
5	6	Bare Strands

Serial Interface Cable Assembly

Part number: 1111C-301
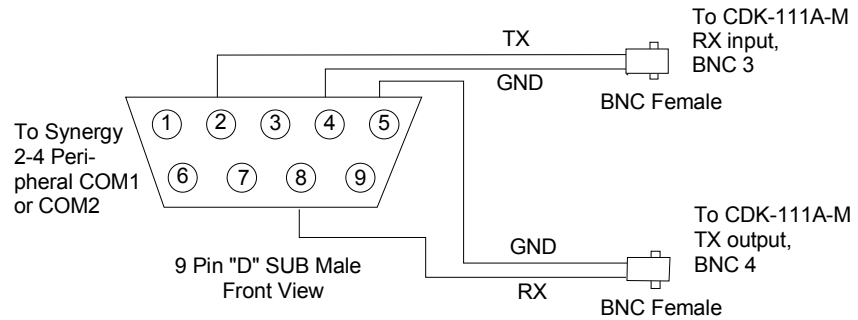
From DB9 Pin #	To BNC #	Conductor Type
2	3	Center
4	3	Outer (GND)
5	4	Outer (GND)
8	4	Center

I/O, Power, Delay Specifications

Technical Specifications		
Power Consumption	6.7V Power Rail	10watts
Serial Digital Video Input	Return Loss	15 dB
	BKGD1 Equalization	75 m
	BKGD2 Equalization	75 m
	Key Video Equalization	75m
	Key Alpha Equalization	75 m
Serial Digital Video Outputs	Return Loss	15 dB
	Signal Amplitude	700 mV
	Signal Overshoot	< 50 mV
	Signal Undershoot	< 50 mV
	Signal Rise Time	645 ps
	Jitter	851 ps
System Delay	Minimum delay is 4.19 us	to one full frame
DCP-111 Interface	Maximum cable length	100 m
RS422/485 Serial Interface	Rx/Tx Maximum cable length	300 m

GPI Inputs, Tally Outputs and Serial Communication

BNC #	Function	Description
BNC 2	GPI Input #1	0 – 5V TTL compatible input with 4.7K pull-up
	Remote Control	0 – 6.7V Proprietary serial communication protocol
	Tally Output #1	Open collector transistor sinking 100mA to BNC 2 GND shield. With 4.7K pull-up to +5V
BNC 3	GPI Input #2	0 – 5V TTL compatible input with 100K pull-up
	Rx	0 – 5V Single-ended RS-485 transceiver buffer, ¼ unit load
	Tally Output #2	0 – 5V TTL compatible output. Source/Sink 4 mA
BNC 4	GPI Input #3	0 – 5V TTL compatible input with 100K pull-up
	Tx	0 – 5V Single-ended RS-485 transceiver buffer, ¼ unit load
	Tally Output #3	0 – 5V TTL compatible output. Source/Sink 4 mA

Jumper Locations
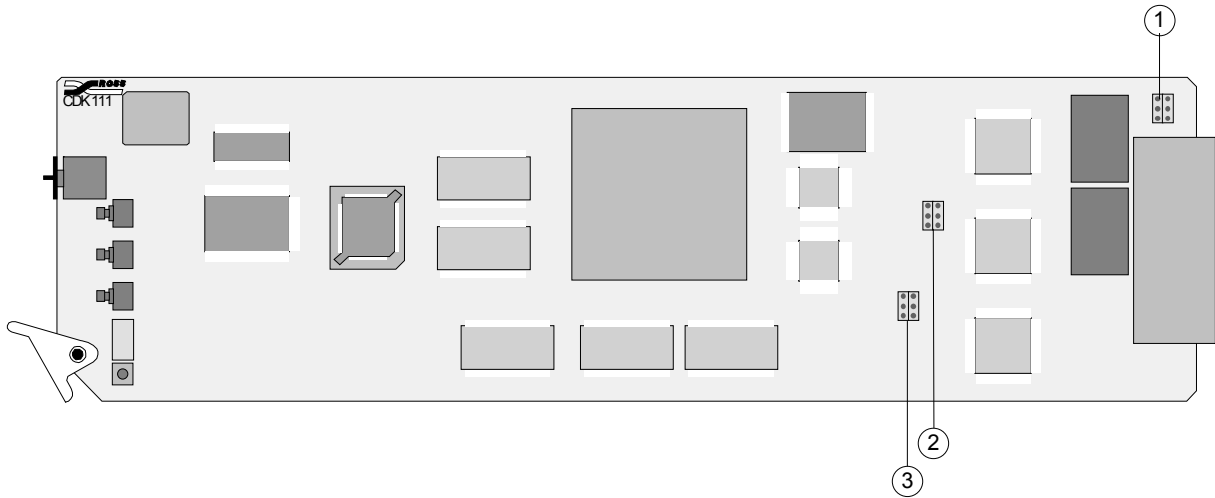
> 1) **Rx Termination Jumper Block and Download Connector (J1)**
> 2) **EDH Insertion Jumper Block (J5)**
> 3) **GPI, Panel, Tally Jumper Block (J6)**

Jumper Pinouts

Each jumper block (**J1**, **J5**, **J6**) has the same pinout configuration.

Pin Numbers, as viewed from component side of card

1	2
3	4
5	6

Jumper Configurations

RX Termination Jumper Block and Download Connector (J1)

Pins 1, 3, and 5 of **J1** configure the terminator resistor on BNC 4. BNC 4 is used normally as the RS422/RS485 Tx output and must not have a terminator resistor installed.

Pins 2, 4, and 6 of **J1** configure the terminator resistor on BNC 3 when that BNC is used as an RX input connector. BNC 3 is used normally as the RS422/RS485 Rx input. When several CDK-111A-Ms have this BNC connected in parallel, the last CDK must have the 120 Ohm terminator installed. All other CDK-111A-M cards in the chain must have the terminator removed. If this Rx input is driven from an RS232 serial port, then the 120 Ohm terminator must be removed on all CDKs.

This jumper block can also be used as a connector to serially transfer images and animation between the card and a PC, using the Serial Download Cable.

BNC 4 (Tx) RS422/RS485 Jumper Configuration

- Bridging pins 3 and 5 removes the 120 Ohm terminator on BNC 4 (Tx) output for *any position* card use.

BNC 3 (Rx) RS422/RS485 Jumper Configuration

- Bridging pins 2 and 4 installs a 120 Ohm terminator on the Rx (BNC 3) input for *single* card or *last* card use.

- Bridging pins 4 and 6 removes the 120 Ohm terminator on the Rx (BNC 3) input for *multiple* but *non*-last card use.

EDH Insertion Jumper Block (J5)

This jumper block is used to insert the EDH information into the PGM and/or PV video stream.

- Bridging pins 2 and 4 disable EDH insertion on the PGM and PV video outputs.

- Bridging pins 4 and 6 enable EDH insertion on the PGM and PV video outputs.

This jumper block can also be used to enable or disable SMPTE 269M Fault Reporting.

- Bridging pins 3 and 5 enable SMPTE 269M Fault Reporting.

- Bridging pins 1 and 3 disable SMPTE 269M Fault Reporting.

GPI, Panel, Tally Jumper Block (J6)

This jumper block is used in conjunction with the menu (software) to define the status of BNC 2 – whether it is used as an input for a GPI, an input/output for a Control Panel, or as a Tally output.

- Bridging pins 1 and 2 configures the BNC 2 to be used as a GPI input.

- Bridging pins 3 and 4 configures the BNC 2 to be used with the DCP111 Remote Control Panel unit.

- Bridging pins 5 and 6 configures the BNC 2 to be used as a Tally output.

Caution — Only one bridge may be installed on the jumper block **J6**. Installing more than one bridge may cause permanent damage to the CDK-111A-M card. Please note that contrary to the other jumper blocks, the single bridge on **J6** must be installed horizontally to short circuit either pins 1 and 2, or pins 3 and 4, or pins 5 and 6.

Important

The configuration of this jumper blocks defines the function of the BNC 2 connector. The desired operation must also be setup with the CDK-111A-M on-screen menu and must match the configuration bridge installed on **J6**. See Chapter 2, "**Installation and Setup**" for more details.

Appendix D. Animated Logo Generator Mode

In This Appendix

This appendix provides instructions and information on configuring and operating the CDK-111A-M card in Animated Logo Generator (ALG) mode.

The following topics are discussed:

- Configuration
- BNC Settings
- Configuring the CDK-111A-M as an ALG
- Configuration Parameters
- Operation
- Card Edge Controls
- DCP-111 Controls
- ALG Features
- 2 Program Outputs
- Matte Fill
- Fade To Black
- Cabling

Configuration

For information about connecting the ALG to the switcher, see "**Animated Logo Generator (CDK-111A-M) Cabling**" in Chapter 3, "**Preliminary Cabling and Check**", in the *Installation Guide* for the Synergy switcher you use.

BNC Settings

The CDK-111A-M has nine (9) BNC connectors on the rear of each module.

As shown in the diagram and table below, the Fill Out is on BNC 5 (PGM) and the Alpha Out is on BNC 6 (PV/Secondary Output).
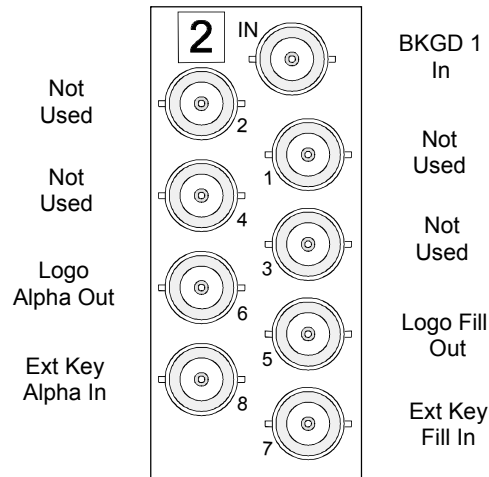
CDK-111A-M Connector Assignments

Connector	Use
IN	BKGD 1 In – any video source (can be used as card reference, configurable via menu *)
1	Not Used
2	Not Used
3	Not Used
4	Not Used
5	Logo Fill Out
6	Logo Alpha Out
7	External Key Fill Input
8	External Key Alpha Input

* The CDK-111A-M requires valid video reference to produce stable video output. The CDK-111A-M can accept an SDI digital reference signal directly to the BNC IN input, or lock to an external analog reference connected to the DFR-8110A-C frame's BNC REF input. See "**Reference Source Selection**" in Chapter 2, "**Installation and Setup**" for further details.

⚠ **Caution** — If BNC 7 and 8 are not connected to valid key sources, selecting the External Key crosspoint will produce invalid video output.

Configuring the CDK-111A-M as an ALG

Use the following procedure to set the CDK-111A-M to ALG mode.

1. Use either the card edge or the DCP-111 controls to navigate to **Menu D: Card Setup**. (See Chapter 2 , "**Installation and Setup**", for details on menu navigation and setting the card to be used with the DCP-111 control panel.)

2. From the **Keyer Type** item, choose the **ANIM. LOGO GEN.** option.

3. Exit the menu system.

Configuration Parameters

When the CDK-111A-M is set to ALG mode, the following functions are enabled/disabled:

- In **Menu D**, the **SECONDARY OUTPUT** menu item is set to **PREVIEW**.

- In **Menu 3**, **KEY2SOURCE** is set to **OFF**.

- Card edge and DCP-111 buttons have new functionality; the BKGD or Key, Cut or Auto transition functions are unavailable. For more information on the ALG button functions, see the "**Operation**" section in this Appendix.

- No keying functionality is available, so keying settings such as clip and gain, transparency, invert, etc., will not affect output.

- If the selected key is a logo, it will play using the dedicated hardware. If it is too large or not in logo format, it will be drawn in the video buffers.

- Stills without an alpha are drawn on the fill output (BNC 5) and an alpha is automatically generated on the alpha output (BNC 6). The generated alpha consists of white in the rectangular image area and black outside.

Operation

This section describes the various capabilities of the CDK-111A-M in ALG mode.

- Card Edge Controls
- DCP-111 Controls
- ALG Features

In this mode, you can send output from up to 32MB of stored animated logos and full-screen still files from the CDK-111A-M to a switcher or another video input device. There you can perform any switcher effects on the logo or still image.

Important

> On power-up, the CDK-111A-M will output to BNC 5 the key 1 video source that is currently selected in Menu 2 and stored in memory. The source's alpha component outputs to BNC 6.
>
> To have the last-viewed image appear the next time you power-up the card, save it to memory in Menu 2 of the menu system.

Card Edge Controls
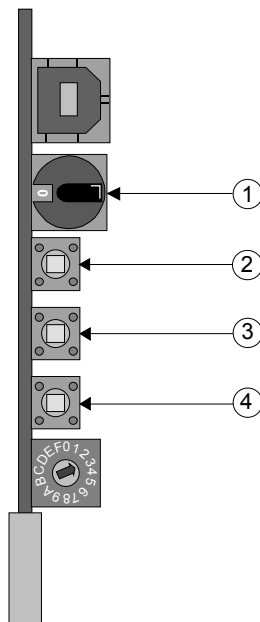
Card Edge Controls

1)	Menu Selector	2)	Source Selector
3)	Restart Animation	4)	FTB

In ALG mode, the card edge controls perform the following functions. For further information, see the "**Card Edge Controls**" section in Chapter 4, "**Operation**".

1) **Menu Selector**

   The Menu Selector is a 16 position rotary knob, labeled **0** to **F**. It is used to select the various menus for card installation and operation. With the **ANIM. LOGO GEN.** option selected in **Menu D**'s **KEYER**

TYPE item, turn the Menu Selector knob to **0** to use the controls as described below.

2) **Source Selector**

Press the Source Selector button to display each of the stills and animations stored in the card memory. Holding down the button will skip over an image that is drawing in the video buffers. Holding longer will return the view to the External key input from BNC 7 and 8.

Caution — If BNC 7 and 8 are not connected to valid key sources, selecting the External Key crosspoint will produce invalid video output.

3) **Restart Animation**

When displaying an animated logo, press this button to restart the logo sequence. If you wish to set the logo to loop only once and stop, set **Loop Animation** to **OFF** in **Menu 7: Still Store Setup**.

4) **FTB**

The FTB transition simulates a transition to a black matte fill. If you are using the output of the CDK-111A-M as a self key, triggering a FTB transition on the CDK-111A-M will have the effect of dissolving the key off of your video stream, without any action on the part of downstream devices.

Note

FTB transitions triggered on the CDK-111A-M will only effect BNC 5, not BNC 6.

Note

When the card starts drawing a still (indicated by 2 toggling red LEDs), it responds a bit slower to the operation mode button presses. Hold buttons down a few seconds longer or wait until the still is drawn in this situation.

DCP-111 Controls
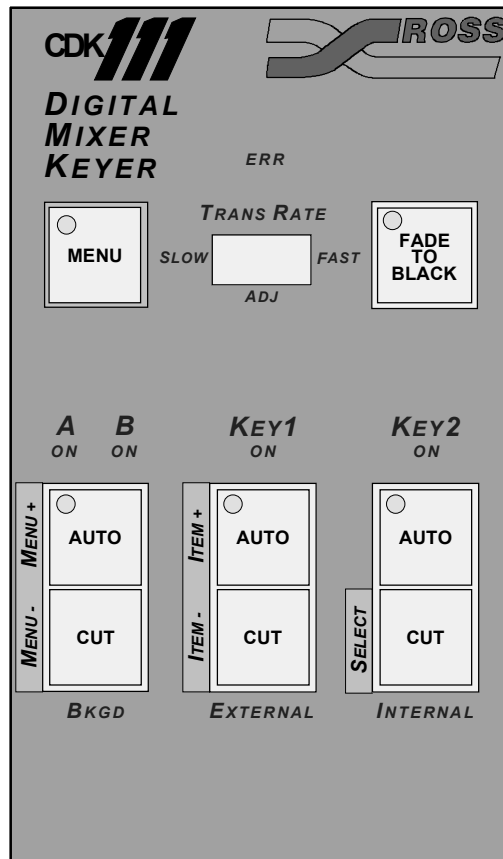
Digital Mixer Keyer Control Panel

In ALG mode, the following DCP-111 controls perform specific functions. For further information on general DCP-111 control functions, see the "**Control Panel — DCP-111**" section in Chapter 4, "**Operation**".

- **Menu +**

  Cycles forward through the stills and animations stored in the card memory.

- **Menu -**

  Cycles backward through the stills and animations stored in the card memory.

<div style="border:1px solid;">

Caution — If BNC 7 and 8 are not connected to valid key sources, selecting the External Key crosspoint will produce invalid video output.

</div>

- **Item +**, **Item -**

  When displaying an animated logo, press either of these buttons to restart the logo sequence. If you wish to set the logo to loop only once and stop, set **LOOP ANIMATION** to **OFF** in **Menu 7: Still Store Setup**.

- **FADE TO BLACK**

  The FTB transition simulates a transition to a black matte fill. See the Fade To Black discussion below for further information on this feature.

ALG Features

In most cases, you will not need to configure anything other than the key 1 source while operating in ALG mode. However, there are a few instances where it may be useful to change the default settings of this mode.

The following ALG features can be used to enhance and complement switcher operation.

2 Fill Outputs

If you don't need the alpha component of your logo, you can send the fill component to both the primary *and* secondary outputs on the card, and then route these signals to two crosspoints on a switcher or even to two switchers. These signals could then be used as self keys.

To use the ALG to send 2 fill outputs, set the **Secondary Output** (BNC 6) item in **Menu D** to **PROGRAM**.

Matte Fill

If you wish to have a matte providing the fill component of a key in ALG mode, go to **Menu 2: Key1 Setup**, scroll to the **FILL** item, and select **MATTE**. Then go to **Menu 5: Matte Selection**, to set the hue, saturation, and luminance of the matte. This will replace the key fill (video) component of the key on BNC 5 with the matte.

Fade To Black

The FTB transition has an alternate function in ALG mode. It simulates a transition to a black matte fill. Therefore, you can simply trigger an FTB instead of selecting the color black in the process described in the Matte Fill section, above. If you are using the output of the CDK-111A-M as a self key, triggering an FTB transition will have the effect of dissolving the key off, without any action on the part of downstream devices.

For most applications, Ross Video recommends that FTB be invoked only on the switcher or downstream device.

Cabling

This section explains how to connect the Animated Logo Generator (ALG) to your Synergy switcher.

Use the following steps to connect the ALG to your Synergy switcher:

1. Using industry standard coaxial cable and BNC connectors, connect either an analog reference to the BNC REF input of the DFR-8110A-C frame or an SDI digital reference signal directly to the CDK-111A-M BNC IN input. See "**Reference Source Selection**" in Chapter 2, "**Installation and Setup**" for further details.

2. In ALG mode, BNC 5 and BNC 6 are the **Fill** and **Alpha** outputs, respectively, for the logo(s) stored on the card. Using industry standard coaxial cable and BNC connectors, connect these **Fill** and **Alpha** outputs to any Synergy switcher inputs as designated by the facility engineer.

3. For remote control of the CDK-111A-M in ALG mode, connect the DCP-111 panel to BNC 2.

House Sync Generator   ALG (CDK-111A-M)   Synergy Switcher
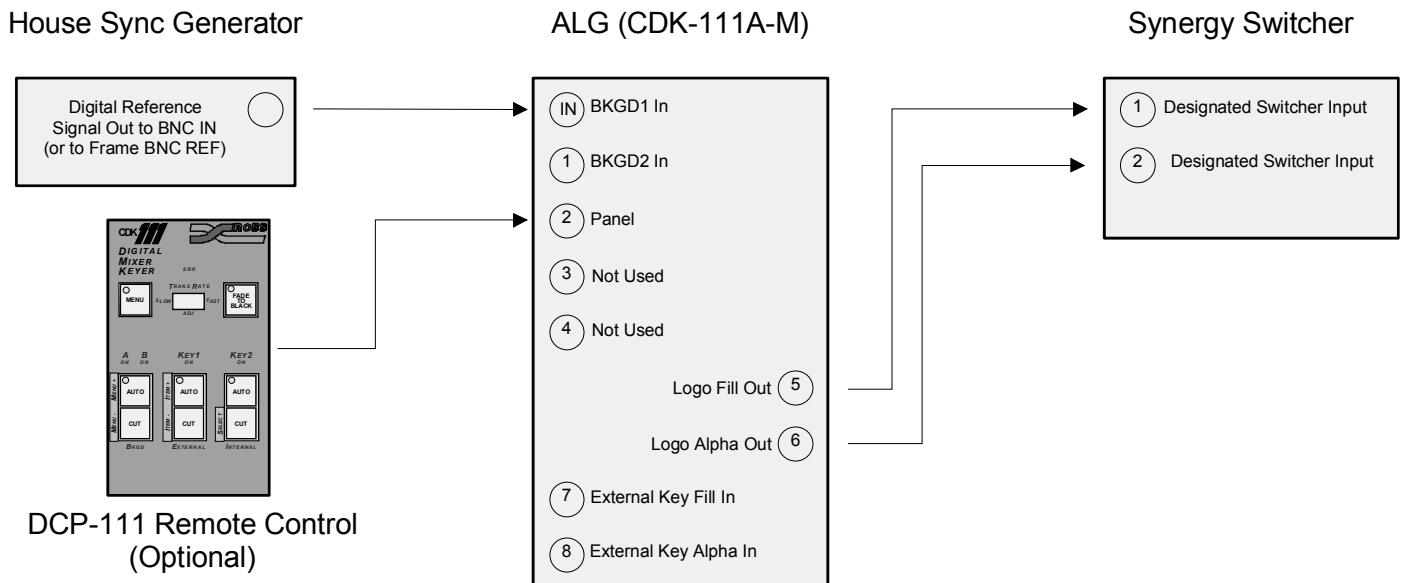
ALG (CDK-111A-M) Cabling Diagram

Important

Before turning on the power, please ensure that the rotary switch on the front edge of the CDK-111A-M card is turned to position **0**. This is the normal operating position in ALG mode.

See Chapter 4, "**Operation**" for information on controlling the ALG using either the card edge buttons or the DCP-111 remote control buttons.

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