Installation and Operation Manual

VCP-015-02-x

Multi-Standard Video Cassette Player

Document # 540228

Document Revision History

Rev. Level	Date	Description
IR	06/2001	Initial Release
A	05/2003	Corrected Reference Drawings, Wiring Requirements, and Dimensions. Added Instructions for Continued Airworthiness

Reference Documents

Document #	Description
523777 Rev IR1	VCP-015-02-x Outline Drawing

Service Bulletin List

Service Bulletin #	Subject	Manual Revision	Revision Date

Table of Illustrations

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SECTION I – GENERAL INFORMATION

1.0   Introduction

This manual contains information for the proper installation and operation of Audio International's (AI) Multi-Standard Video Cassette Player, VCP-015-02-x. The "-x" in the model number designates the type of connector utilized; "-1" = Positronic and "-2" = D-Subminiature. The manual also includes mechanical and electrical characteristics of the unit.

2.0   Purpose of the Equipment

2.1   Audio International specifically designed the VCP-015-02-x as a high quality video cassette player that meets all the special requirements of aircraft use. This unit supports all standard Video Cassette Playback features, including Play, Stop, Fast-Forward, Reverse, Pause, Stop, and Eject.

2.2   The VCP-015-02-x can be mounted in a cabinet or bulkhead. A unique strapping feature allows up to eight (8) similar devices to be used in the same system at the same time while maintaining independent control of each.

3.0   Operational Features

❑ Operates directly from +28 VDC
❑ Compact, lightweight package
❑ Easy to mount and connect
❑ Optional infrared remote controllable
❑ AI proprietary RS-485 data bus compatible
❑ Frequency response of 200 Hz to 8 kHz
❑ Playback formats of PAL, MESECAM, and NTSC
❑ Outputs NTSC format

4.0   Optional Equipment

Users can optionally control the VCP-015-02-x by infrared remote or AI's touch screen panel. Some remote controls possess functions not duplicated by the unit's front panel buttons, such as Set-Up. While the VCP-015-02-x functions as a complete standalone Video Cassette Player, Audio International strongly recommends that users also employ a remote control device for thorough enjoyment of the unit.

Audio International also offers a wide variety of monitors, speakers, headphone jacks, video distribution devices, and other equipment that will perfectly complement the VCP-015-02-x and serve as valuable and attractive additions to any cabin interior.

Contact your AI representative for details.

5.0   Technical Specifications

Physical Specifications	
Housing	Aluminum
Weight	10.5 lb / 4.76 kg
Dimensions (l x w x h)	10.9" x 13.43" x 4.25" 27.7 cm x 34.11 cm x 10.8 cm

6.0   Application

6.1   Introduction

6.1.1 VCP-015-02-x functions as a multi-standard video cassette player. It supports PAL, MESECAM, and NTSC formats, and outputs video signal in NTSC mode.

6.1.2 Typically the VCP-015-02-x video input interfaces with a video monitor or a video distribution device (i.e., AV-3232, VSS-0408, etc.). Additionally, VCP-015-02-x has the capability to provide audio output to various audio distribution devices (i.e., AV-3232, AI-LDC101, HDM-3 etc.)

6.1.3 The unit accepts a +5 VDC infrared digital input and AI's proprietary RS-485 two-wire serial data bus input.

6.2   Typical Application

6.2.1   This system is fully compatible with Audio International's proprietary RS-485 digital data bus system. It can be configured for IR remote control utilizing AI's remote control unit AI-RCx-17xxxx and IFR-485.
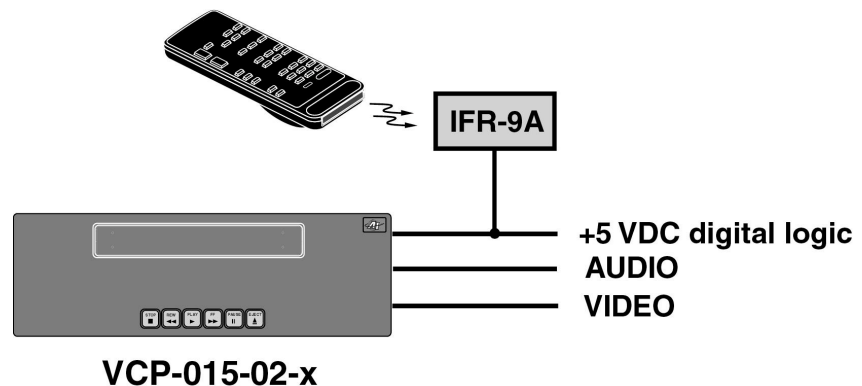

VCP-015-02-x
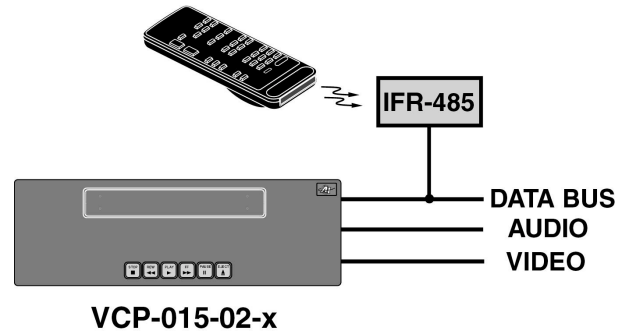
6.2.2   The unit can also be configured for IR remote control utilizing AI's remote control unit AI-RCx-17xxxx and IFR-9A. This following configuration utilizes a +5 VDC digital logic level for activation of infrared commands.

VCP-015-02-x

Connection to multiple IFR-9A units utilizing the +5 VDC digital logic level connection requires an external Schottkey diode at each IFR-9A unit. This will prevent signal loading. Contact AI for details.

6.2.3   The unit can also be configured for Touch Screen or remote panel control (i.e. entertainment control panels). The panels are on AI's proprietary RS-485 digital data bus system and configured to control the operational features of the VCP-015-02-x.

VCP-015-02-x
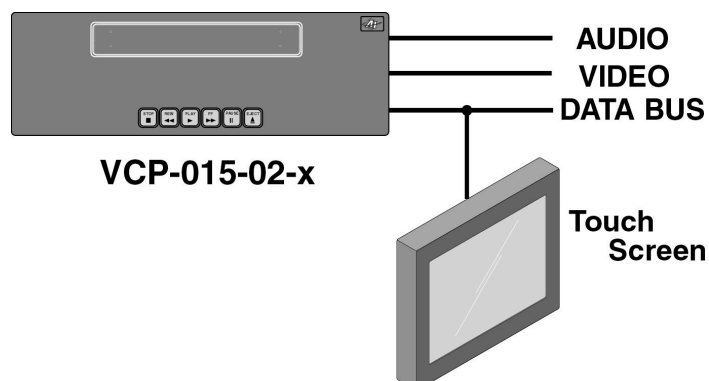
SECTION II - INSTALLATION

1.0   Prior to Installation

1.1   During the design and layout of the aircraft cabin, careful consideration of the location of this and all other audio/visual modules is necessary. Some of the items to be considered include:

- Space
- Proximity to other devices (i.e. source equipment)
- Available power supply
- Length of cable runs
- Environmental conditions (temperature, humidity, etc.)
- Location of other aircraft systems (i.e. oxygen delivery)
- Access for service repair (if applicable)
- Convenience for user interface (if applicable)

1.2   The VCP-015-02-x shall be installed to conform to the standards designated by the customer, installing agency, and existing conditions as to the unit location and type of installation.

1.3   Mounting screws are required to secure the unit. The unit shall be mounted in a horizontal position only (not on side). Refer to Section II, Subsection 9.0 for mounting hole diameters and configurations.

1.4   All headphone amplifiers and line level amplifiers shall be located no more than three (3) feet away from the VCP-015-02-x. Long low-level audio runs may introduce noise into the audio signal.

1.5   Avoid installing the unit where it will be exposed to excessive heat, moisture, splashing liquids, dusty areas, direct sunlight, or angled/inclined installations.

2.0   Unpacking and Inspection

2.1   Carefully open the packaging and remove the VCP-015-02-x. Verify that all components have been included in the package per the packing list. Inspect the unit for shipping damage.

2.2   If damage has occurred during shipping, a claim should be filed with Audio International WITHIN 24 hours and a **Return Request Authorization Number** shall be obtained from AI. Refer to the front cover of this manual for address and telephone number of Audio International, Inc. Repackage the unit in its original packaging materials and return it to AI following instructions given by the AI representative. If no return is necessary, retain the packing list and the packing materials for storage.

3.0   *Cautions & Warnings*

3.1   It is important to do a pin-to-pin power and ground check on all connectors. Ensure that power and ground are applied only where specified. Damage to the unit may result if power or ground is applied to the wrong points.

3.2   **DO NOT** connect or disconnect the unit while power is applied.

3.3   **DO NOT** remove any factory-installed screws. Damage to the unit may result and void any warranties.

3.4   **DO NOT** attempt to open the case. Refer servicing to qualified personnel.

3.5   **DO NOT** place foreign objects into openings. Contact with foreign objects may result in dangerous voltage or electric chock.

3.6   **DO NOT** place unit near hot air ducts, heating elements, or other heat sources.

3.7   **DO NOT** use this unit other than for its intended purpose. Doing so might lead to electric shock or injury or damage to the equipment.

3.8   **DO NOT** use near water, moisture, or volatile sprays. Do not use any type of solvent when cleaning the unit, surface damage may occur.

3.9   **USE** this unit in a horizontal position only. **DO NOT** mount it on its side.
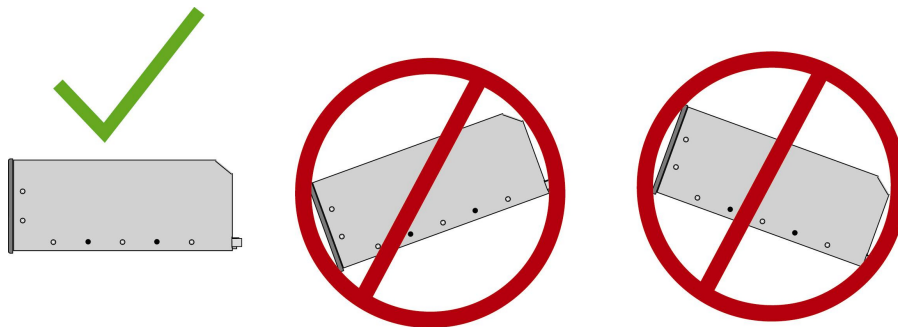
3.10   **DO NOT** leave cassette tapes loaded in the unit with no power applied.

3.11   **NO** scheduled maintenance is required to ensure airworthiness.

3.12   **DO NOT** insert any screw more than 0.25 inch into the case. Mounting holes on the unit provide multiple anchoring points. These threaded inserts do not have physical stops. Care should be taken not to penetrate the outer casing with any screw by more than 0.25 inch. This could result in serious damage to the video cassette player.

3.13   **ESD** (Electro Static Discharge) guidelines shall be followed.

4.0   Wiring Requirements

4.1   Introduction

The installing agency shall supply and fabricate all external cables. The length and routing of external cables should be carefully studied and planned before attempting installation of the equipment. Allow adequate space for installation of cable and connectors. Avoid sharp bends and placing cables near aircraft control cables. Maintain a minimum clearance of three (3) inches from any control cable. If wiring is run parallel to combustible fluid or oxygen lines, maintain a separation of six (6) inches between the lines.

4.2   Power Wires

All power and ground wires require 22 AWG, MINIMUM, shielded twisted pair with the shield properly bonded at one (1) end only. Power ground wires shall be bonded to electrically conductive chassis mounting point with <1 Ω resistance using <50 Ω impedance cable. Twisted shielded pair cable shall be in accordance with **NEMA WC 27500** or equivalent.

4.3   Audio Wires

All audio connections require 22 AWG, MINIMUM twisted, shielded cable with the cable shields properly grounded at the source. Twisted shielded pair cable shall be in accordance with **NEMA WC 27500** or equivalent.

4.4   Video Wires

Composite video connections require shielded coaxial cable in accordance with the military specifications of **M17/94-RG179** or equivalent.

4.5   AI's Proprietary RS-485 Data Bus

4.5.1   VCP-015-02-x is designed to interface with other Audio International equipment via AI's proprietary RS-485 serial data bus. The data bus shall be implemented using a twisted shielded pair cable in accordance with **NEMA WC 27500** or equivalent. The wire size for the conductors in this cable shall be 22 AWG, MINIMUM. The shield shall be connected everywhere a shield pin is provided. Shield terminations shall be made as close to the connector pin as possible.

4.5.2   All modules on AI's proprietary RS-485 data bus shall be connected in a 'daisy-chain' configuration. AI's proprietary RS-485 data bus specification is available upon request.

5.0   Installation Information

5.1   Refer to Section II, Subsection 9.0 for unit dimensions and attachment points.

5.2   When mounting the unit, allow sufficient space for mating connectors.

5.3   Allow a MINIMUM of one (1) inch of air space around the unit to allow for proper air circulation.

5.4   This unit has an internal fan and ventilation holes in the chassis for cooling. Installation recommendation requires 1-inch spacing from other components and structures except the mounting surface for which the unit should be in direct contact.

5.5   When running cables, avoid sharp bends and placing cables near aircraft control cables. Maintain a MINIMUM clearance of three (3) inches from any control cable. If wiring is run parallel to combustible fluid or oxygen lines, maintain a separation of six (6) inches between the lines.

5.6   Bonding between chassis mounting point and airframe installation to be <1 Ω resistance using <50 Ω impedance cable. No surface prep is required due to conductive chassis finish (except front bezel).

6.0   Electrical Characteristics

6.1   Electrical Specifications:

Electrical		
	Power	1A @ +28 VDC
	Operating Voltage Range	+18 to +32 VDC
	Data Bus Type	AI Proprietary RS-485
	Audio Frequency Response	200 Hz to 8 kHz
	Audio S/N	>37dB (NOMINAL)
	Video Output	1 V$_{(p-p)}$ into 75 Ω
	Playback Format	PAL, MESECAM, & NTSC
	Video Output	NTSC
	Video Heads	4
	Infrared Signal Input	+5 VDC digital logic level

6.2   The VCP-015-02-x utilizes one (1) 15-pin connector for electrical connections. This connector provides power, left/right audio output, data bus control, infrared input, and eight (8) infrared strapping pins for alternate configuration of infrared digital command codes to allow up to eight (8) VCP-015-02-x in the same system.

6.3   Mating Connector Information

Model #	Mating Connector
VCP-015-02-1	RD15F10JVL0
VCP-015-02-2	DAMA-15S D20418-2 Female Screwlock
BNC1 Video Output	AMPHENOL 31-71013 or equivalent

6.4   Pinout Assignment and Descriptions

Pin Configuration	
Pin #	**Description**
1	+28 VDC, Power Input
2	Ground
3	R+ Audio Output
4	R- Audio Output
5	L+ Audio Output
6	L- Audio Output
7	Data Bus (A)
8	Data Bus (B)
9	Infrared Input +
10	Infrared Input -
11	IR Strap 2
12	IR Strap 3
13	IR Strap 4
14	IR Strap Common
15	Reserved

7.0   Post-Installation Test

7.1   Verify +28 VDC power has been connected to the unit. The audio signal output of the unit is generally connected to cabin speaker systems in addition to headphone locations. Verify all connections before supplying power to the unit. Verify video inputs are available to the system.

7.2   Load the VCP-015-02-x with a videocassette tape. Use the front panel controls or the hand-held remote control unit to select PLAY. Check for a picture on the appropriate monitor. Verify the audio can be heard through the speaker and/or the headphone system.

7.3   Test each function of the VCP unit (Fast Forward, Rewind, Eject, etc.). See Section III for front panel functions. Ensure each button works properly and that the unit Ejects smoothly.

8.0   Instructions for Continued Airworthiness

8.1   Unit Maintenance

- Ensure the unit is not exposed to excessive heat, moisture, splashing liquids, dusty areas, direct sunlight, or angled/inclined installations. Any of these conditions may damage the unit.
- Adequate ventilation MUST be maintained; see Section II, Subsection 5.0 for ventilation details.
- VCP-015-002-x should be periodically cleaned with a standard commercial VCP cleaning tape. Cleaning steps may vary depending on the product used; be certain to follow the cleaning tape directions of the product you use.
- **Never** force the videocassette into the receiving slot. **Never** place foreign objects into the VCP unit.

8.2   General Troubleshooting Procedures

- Verify +28 VDC power is applied to the proper pins on the unit. Use a voltmeter to verify correct level.
- Reset by removing power from the unit for at least one (1) minute and reapply power.
- Recheck all connections to the unit for security and all harness runs for possible pinching. Recheck all pinouts for application accuracy.
- Utilizing a voltmeter, oscilloscope, or other voltage instrument, verify proper input voltage on the data bus pins to check data bus integrity. Typical measurements are as follows:
  A to Ground : 4.0 to 4.5 VDC
  B to Ground : 0.1 to 0.2 VDC
  If any device is transmitting (i.e., holding bus active), then these typical measurements would be reversed for the A-to-Ground and B-to-Ground measurements. This troubleshooting tool can help indicate a data bus lockup. If this occurs, remove the data bus from all other equipment one piece at a time. As each is removed, check the bus status to see if it is now functioning properly. Once you have removed the piece or pieces of offending equipment, disconnect power and then reconnect everything but the suspect component, reapply power and test the functionality of the unit.
- The RS-485 data bus is a bi-directional bus that does not have a 'bus controller'. The bus uses a differential digital signal that will transmit only when commands are entered via switch selection or other system synchronizing commands. The "A" leg of the bus is HI and the "B" leg LO.

8.3   Troubleshooting Chart

Problem	Possible Cause	Solution
No power	➢ Faulty wiring	• Verify +28 VDC power and audio/video input is present. Recheck connections.
	➢ Circuit breaker not 'ON'	• Turn circuit breaker to 'ON' position
Unclear picture	➢ Video heads may be dirty	• Use a commercial head cleaner
Video not present	➢ Cassette not installed	• Install videocassette
	➢ Tape defective	• Replace videocassette tape
	➢ Video connector not operational	• Reconnect or repair cable
Audio not present	➢ Defective videocassette tape	• Replace videocassette
	➢ Power/Audio connector not operational	• Reconnect or repair cable
Buttons not operating	➢ Moisture may have condensed inside the unit	• Allow unit to warm to room temperature and moisture has evaporated
Tape cannot be inserted	➢ Foreign object in tape slot	• Remove foreign object
Unit does not eject	➢ EJECT button not functioning	• See above or play tape to end for automatic rewinding

9.0   Reference Drawings

The following diagrams show the unit dimensions, mounting locations, and connector locations for the VCP-015-02-x.
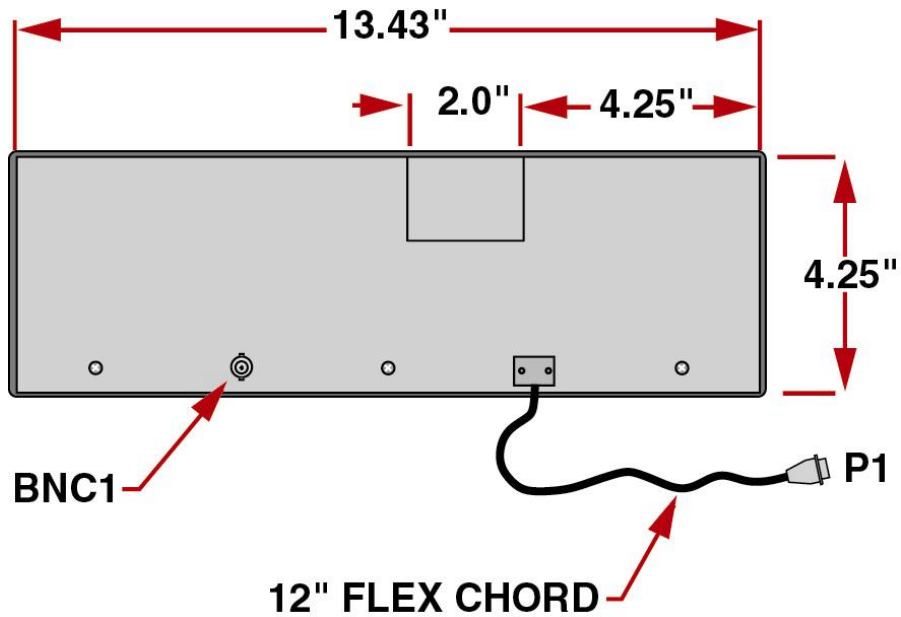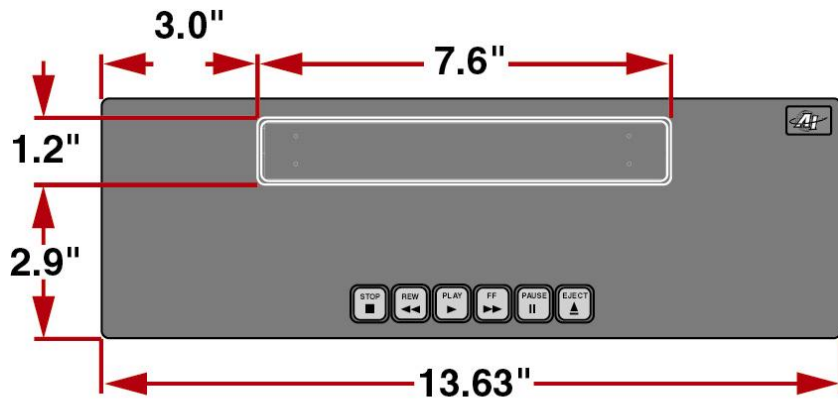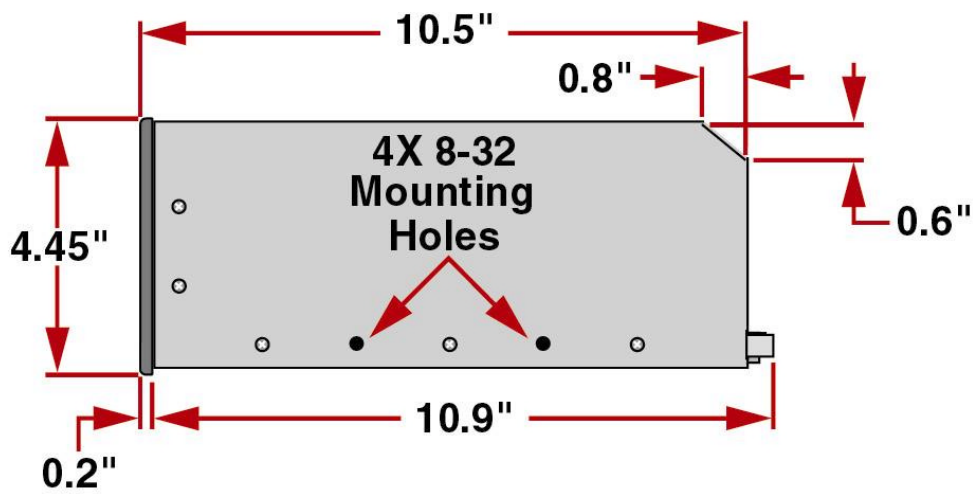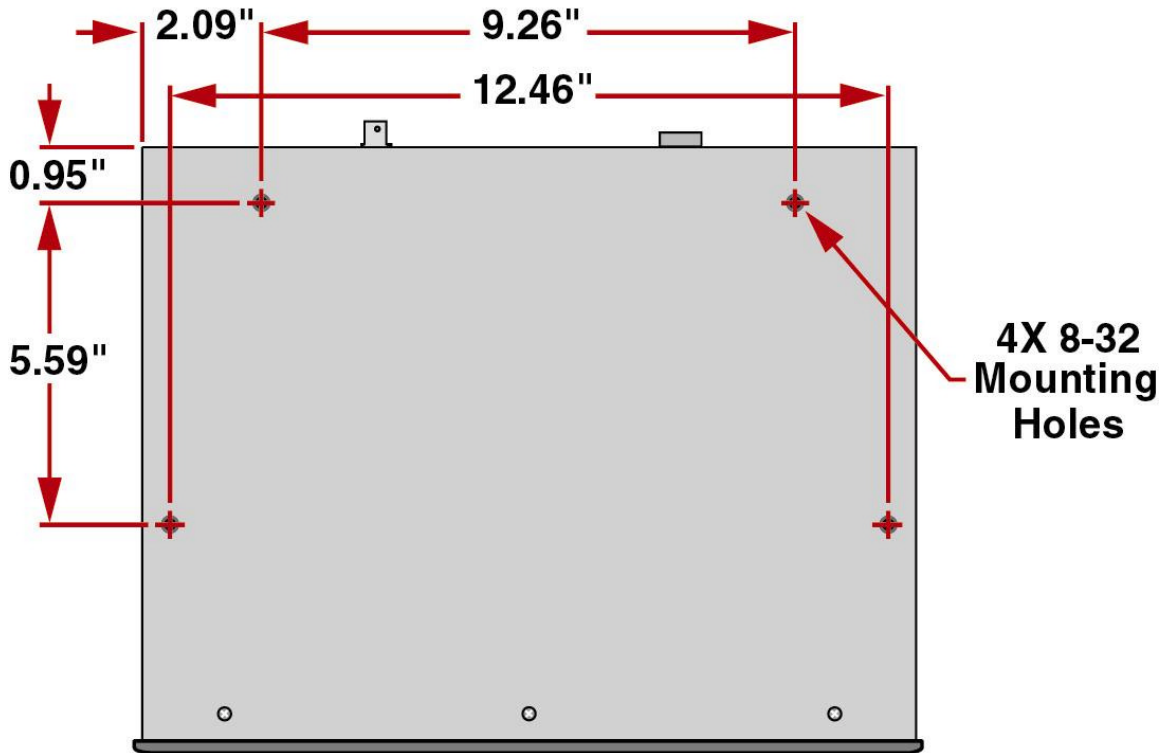
SECTION III – OPERATION

1.0   General Information

1.1   The VCP-015-02-x can be operated via front panel 'buttons' or optionally controlled by infrared remote or AI's touch screen panel. Digital codes allow the unit to interface with an infrared handheld remote via an infrared receiver, IFR-9A or IFR-485.   Multiple units can be controlled independently using available programming pins.

1.2   Playback options with front 'button' control, remote or touch screen include stop, eject, fast-forward, rewind, track repeat, and pause.

ILLUSTRATION OF VCP-015-02-x FRONT PANEL
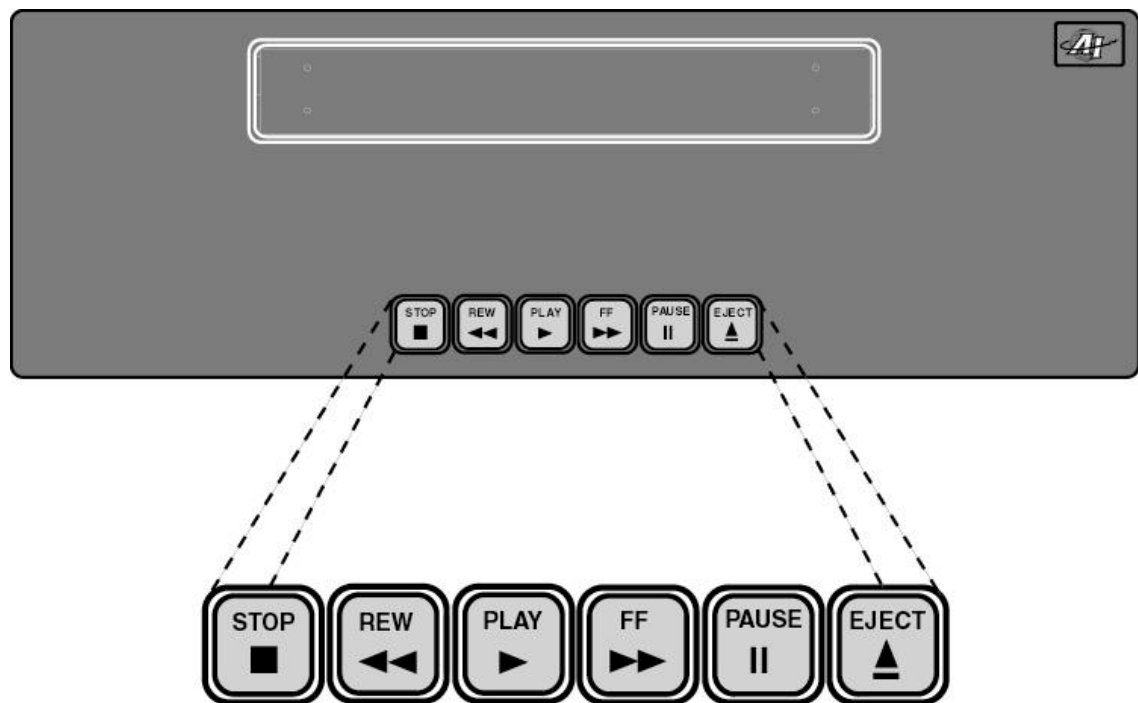
2.0   To Load a Videocassette Tape into the Tape Slot

2.1   Gently insert a videocassette tape into the cassette tape slot. Apply only slight pressure to the side edge of the tape. The VCP-015-02-x will gently 'pull' the tape into the player. Power turns 'ON' automatically when the cassette tape is inserted into the slot.

2.2   If the videocassette is inserted incorrectly, the loading system will not function. *Do not* force the tape into the unit.

3.0   Front Panel Button Functions

Button – Press the STOP button to stop videocassette tape playback.

Button - Press the REW (rewind) button during playback for a reverse search.

Button – Press the PLAY button to begin videocassette tape viewing. Pressing PLAY twice in succession activates double-speed play.

Button – Press the FF (fast-forward) button to start a forward visual search.

Button – Press the PAUSE button during playback to temporarily stop the playback of the videocassette tape.

Button – Press the EJECT button to eject a videocassette from the unit.

4.0   Operating Instructions

4.1   To rapidly move forward through the videocassette tape, press STOP and then FF. (The picture cannot be viewed in this mode.) Press STOP at any time during fast-forward to end the FF function. Press PLAY to resume playback.

4.2   To rewind the videocassette, press STOP and then REW. (The picture cannot be viewed in this mode.) Press STOP at any time to end the REW function. Press PLAY to resume playback.

4.3   To eject the videocassette tape, press EJECT at any time.

4.4   To pause the screen during playback, press PAUSE. Playback will stop and the current screen will enter a still-frame mode. Pressing PAUSE again will advance the movie one (1) frame forward. To return to normal viewing, press PLAY.

4.5   While the tape plays, press FF and the tape will fast-forward search until STOP or PLAY is pressed. Pressing FF during fast-forward mode accelerates the fast-forwarding process.

4.6   While the tape plays, press REW and the tape will reverse search until STOP or PLAY is pressed. Pressing REW during rewind mode accelerates the rewinding process.

4.7   When the VCP-015-02-x reaches the end of the videocassette, the unit will automatically STOP and enter REW mode. Once the unit has rewound the cassette, the unit will STOP. Press EJECT to unload the videocassette tape.