

OPERATORS MANUAL

AVDU-2645-xx-01-OPS

**Airborne Video Display Unit
(With RADAR Adaptor)**



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General Description

This manual applies to the AVDU-2645-xx-01 Monitor. The functions described in this manual are inline with the R-TV Harmonised definition.

The Display allows the connection of a Remote Control Panel (RCMP series) to be attached to the AVDU Series monitor fitted with a "Remote" connector. The attached RCMP MUST also be to a Harmonised specification.

The Display also allows connection to an external RADAR adaptor (e.g. RAIU-100-01) to the "Remote" connector.

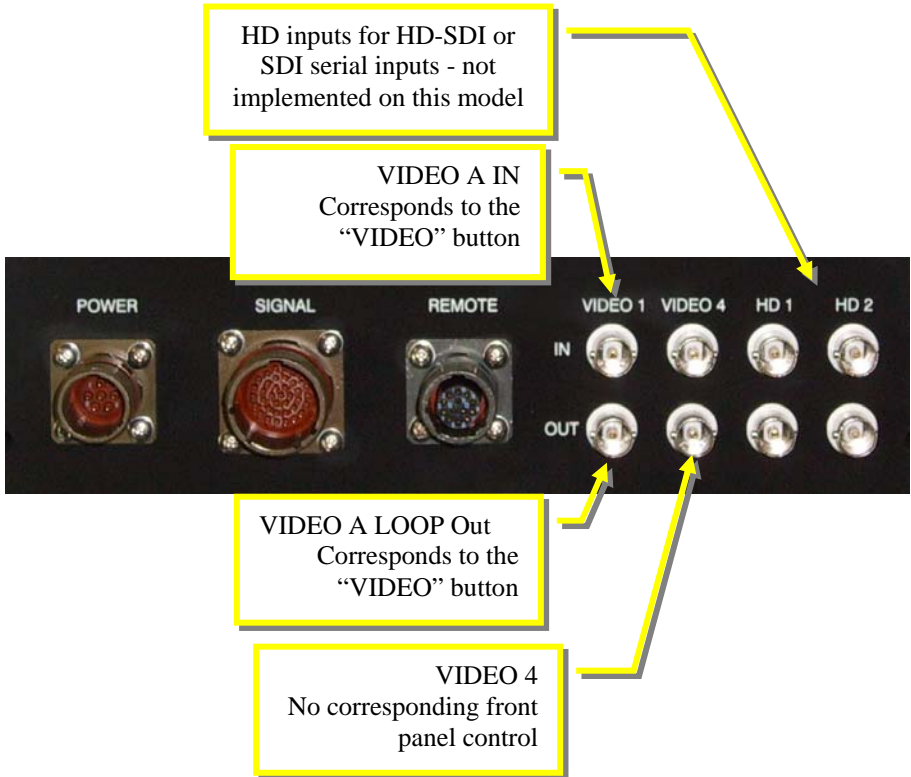
This manual relates to a harmonised upgrade to the base operation man machine interface. Future upgrades to the man machine interface are indicated in a MOD strike or firmware upgrade identification plate at the rear of the unit and on the On-screen Display (OSD) of the associated monitor.

This manual relates to the following man machine interface versions:

Control system Version 2.0 (Harmonised configuration)

On Screen display Version 1.60.A0 (Version displayed in the OSD)

1 Equipment connections



The unit derives Power from the power connector.

The Signal connector carries all video and graphic inputs to the display – some of these signals are also broken out to the panel mounted BNCs.

The remote connector provides 28V power and 12V power (switched) to external equipment together with the bi-directional system Data bus.

2 Control Key Functions and legend



The Unit powers on when power is applied to the monitor when the front panel Brightness rotary knob (on the left) is pressed in. The unit will power up the display and associated remote control panel or RADAR adaptor (if connected).

The brightness rotary control (left) adjusts the display illumination. The button backlight may be adjusted using the up down direction keys in Graphics mode (see over). The button backlight is also controlled from an external illumination bus (see later)

The miniature joystick (Right) allows control of the position of the PIP in "PIP" mode.

The eight pushbuttons select the image source and the image parameters the function of these controls is detailed later in the document.

3 Display Operation

The following refers to a set of push buttons that are fitted to the front of the unit. In addition to power on/off, and a rotary control for backlight brightness, the control button interface provides for video source selection and an On-Screen Display (OSD) Menu.

RADAR	MAP	VIDEO	PIP ☒	CONT ◀ (-)	CONT (+) ▶	ZOOM ◀ (-)	ZOOM (+) ▶
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Button No.	Legend		Function (Configuration 04)
1	RADAR	Graphic	Selects the Graphic input on the Signal Connector at the rear of the Display. Sends a command to the RADAR adaptor to select the RADAR. Pressing the button while in PIP mode will remove the PIP
2	MAP	Graphic	Selects the 'Video 1' video input from the signal Connector or BNC at the rear of the Display (Composite). Pressing the button while in PIP mode will remove the PIP. Pressing the button in freeze mode will unfreeze the image.
3	VIDEO	Video 1 Composite	Selects the 'Video 1' video input from the signal Connector at the rear of the Display or from the Video 1 BNG (Composite). Pressing the button while in PIP mode will remove the PIP. Pressing the button in freeze mode will unfreeze the image.
4	PIP ☒	Graphic/ Video PIP	Selects the last elected Video inputs superimposed as a picture over the Graphics video input from the MAP or RADAR (Picture In Picture). Pressing the button again removes the PIP Pressing zoom +/- in this mode makes the PIP larger or smaller
5	'CONT (-)'		Adjusts the display contrast down. (Graphic or Video Depending on the mode)
6	'CONT (+)'		Adjusts the display contrast up.
7	'ZOOM (-)'	Video	Freezes and zooms out the video image (no function if a graphic [MAP or RADAR] is displayed) In PIP mode this control adjusts the size of the PIP
8	'ZOOM (+)'	Video	Freezes and zooms in the video image (no function if a graphic [MAP or RADAR] is displayed)

The four direction keys have five modes depending on the current display mode.

MODE	RADAR/ MAP	VIDEO Live	VIDEO Freeze	PIP	MENU
Down	Button illumination Down	Button illumination Down	Zoom frozen image out	PIP window Down	DOWN
UP	Button illumination UP	Button illumination UP	Zoom frozen image in	PIP window Up	UP
LEFT	Video Contrast -	Video Contrast -	Video Contrast -	PIP window Left	LEFT
RIGHT	Video Contrast +	Video Contrast +	Video Contrast +	PIP window Right	RIGHT

4 Key Backlights

The back illumination of the front panel buttons is controlled by the lighting bus in the aircraft. The aircraft lighting bus is connected to the lighting bus contact in the "Remote" connector. The signal is fed to the Display where it is processed and passed to the peripheral units along the remote data bus. The minimum brightness of the key backlights may be adjusted up and down and offset from the aircraft lighting bus setting by using the Up/Down direction keys while in live VIDEO, RADAR MAP mode. The offset setting is stored and will be recalled to its previous value when next powered up.

The operation of the lighting bus is dependant on the mode programmed in the factory and the available voltages from the aircraft. By default the lighting bus is set to the "Universal" setting that provides illumination as follows:

0-1V	Full brightness - Follows screen	Open cct. or no connection default.
1-2V	Off	Guard Band
2-5V	Off to Full adjustable	5V lighting bus
5V to 8V	Off	Guard Band
11-28V	Off to Full adjustable	28V lighting bus

**Voltages are approximate*

Other factory-set options include:

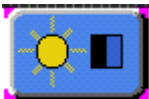
Always on (Follows screen), 0-5V, 0-12V, 0-28V and 12-28V.

5 On Screen Display (OSD) operation.



- | | |
|----------------------------------|---|
| To turn on the OSD menu: | Press the MENU button and hold for three seconds then press The Left most button of the eight selection keys. |
| Move to next icon: | Press the MENU button momentarily (or push the joystick in) |
| Select options within icon menu: | Use UP/ DOWN buttons or the joystick, the selected option is in yellow. |
| Increase/decrease setting: | Use +/- buttons (RIGHT/LEFT) |
| Move selection left/right: | Use +/- buttons, the selected option is in green |
| To confirm the selection: | Use + button (RIGHT) |
| To turn off the OSD Menu | Press the MENU button and hold for three seconds (or push the joystick in) – this will store the user adjusted settings - some settings are returned to the default after the power is removed. |

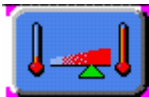
Note the Default settings are in **BOLD**

On screen Display (OSD) functions



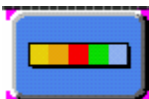
Brightness and Contrast :

- The Brightness and contrast of the video and Map are independent
- Brightness  Increase/decrease panel brightness level, total: 100 steps (**50**)
- Contrast  Increase/decrease panel contrast level, total: 100 steps (**50**)






Colour Temperature : 9500K / 8000K / **6500K** / 5000K

Adjust the warmness of the image displayed. The higher temperature the cooler the image looks like. The lower temperature the warmest image looks.

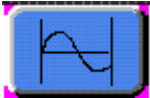


Video Adjustment : (DISPLAYED IN VIDEO MODE ONLY)


- Colour:  adjust video colour level
- Tint:  adjust video tint level (NTSC video only)
- Sharpness  adjust video image sharpness level
- :
- Picture Type Motion/Still/Normal Select different modes for different Videos
- Motion mode** – Good for dynamic scenes
- Still mode – Steady and sharp image. For still


picture displayed.
Normal mode – “Non-flicker” image. For general use
change bandwidth to match the source **(DVD)**

Video Type: DVD / VCR



Frequency and Phase : (DISPLAYED IN GRAPHIC MODE ONLY)

Frequency  Adjust the image horizontal size

Phase  Fine tune the data sampling position (adjust image quality)

Picture Type : Motion/Still/Normal
Select still mode to getting a stable still picture displayed inside PIP window.
Select Normal mode to getting a better display quality for RGB video input
(MOTION)

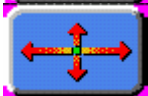


Video System : Select video system and input signals
AUTO : automatic detection of NTSC and PAL system (not applicable in SECAM system)
(AUTO)

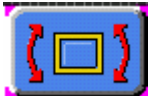
NTSC / NTSC 4.43 : manual select NTSC system
PAL / PAL M : manual select PAL system
SECAM : manual select SECAM system



Status : Display graphic information: resolution and frequency (DISPLAYED IN GRAPHIC MODE ONLY)



Position :
Image up/down : Use SEL UP/SEL DN to move the image vertically
Image left/right : Use +/- SEL RIGHT/LEFT to move the image horizontally



Rotation : Rotates the image from landscape format to portrait format. (DISPLAYED IN VIDEO MODE ONLY)



Picture in Picture : (DISPLAYED IN GRAPHIC MODE ONLY)

PIP Size : / 1 / 2 / 3 Select PIP window size: close, size 1, size 2 to size 24
Do not set this to zero or no PIP will be displayed in PIP mode

PIP Source : Select video source to be display in PIP window: **(Set to Auto / Comp / Auto –may be changed by the controller)**

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Issue A

Svid/YCbCr

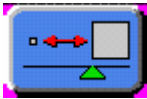
Auto – automatic detection of Composite, S-video and Component (May be changed by the controller)

Comp – manual select composite video only

SVid – manual select S-video only

YCbCr/RGB – manual select component video only
(YCbCr/RGB Internally selected by switch to RGSB)

Horizontal Position		adjust the position of the PIP window horizontally
Vertical Position		adjust the position of the PIP window vertically
Advanced PIP Settings :		
Brightness		adjust the image brightness of the PIP window
Contrast		adjust the image contrast of the PIP window
Sharpness		adjust the image sharpness of the PIP window
Tint		adjust the tint of the image of the PIP window
Colour		adjust the colour of the image of the PIP window



Video Scaling : (DISPLAYED IN VIDEO MODE ONLY)
Use the UP and DOWN arrow keys to select the following scaling modes.

Normal

Letterbox

Letterbox with Subtitles

Nonlinear Scaling Modes : Horiz Clipping / Horiz Offset / Horiz Stretch / Vert Clipping / Vert Offset / Vert Stretch

Graphic

(DISPLAYED IN GRAPHIC MODE ONLY)

Scaling Modes

Use the up and down arrow keys to choose a scalar mode.

Use the + or - key to modify a following scalar parameters.

One to One :

Horizontal Pan



Vertical Pan

Fill Screen : enable full screen expansion for lower resolution Image
(Default)

Fill to Aspect ratio : enable fill screen expansion for lower resolution image according to aspect ratio.

Nonlinear : Horiz Clipping / Horiz Offset / Horiz Stretch / Vert

Scaling Modes : Clipping / Vert Offset / Vert Stretch

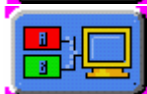
:

Language : Select OSD menu language display

1. English **(Default)**
2. Danish
3. Chinese (Simplified)



Video source : Select the input video signal

Analogue RGB / Component Video / **Composite Video** / S-Video





Utilities : DISPLAYS THE OSD VERSION = "V1.60A0"

User Setting :	User Timeout	adjust the OSD menu timeout period in a step of 5 seconds (No user adjustment possible – setting will be overridden to always on/5 sec)
	DPMS	Disable / Enable the DPMS function When enabled the screen will display an error message when no input is present on the selected image source. The display will go into standby after a short period if there continues to be no input. The display will "wake up" if an image source returns.
	Display Input	Disable /Enable the input source name on screen (Disabled by default)
	Auto Source Select	: Off - Disable auto source select function. Low - Auto source select enable ONLY in power up. High - Auto source select ALWAYS enable. Set to OFF by Default – screen will display an error message when no input is present)
	Gamma:	1.0 (Default setting) 1.6 2.2
	Video Port Select	Select "Port 1" or "Port 2" of the source Composite/SVideo/YCbCr (Do not adjust these settings it may not be possible to view an image again or return to the OSD)
OSD Setting :		
	OSD Horz position :	 move the OSD menu horizontally
	OSD Vert Position :	 move the OSD menu vertically
	OSD Background :	Translucent / Opaque
	OSD Rotate :	Normal / Rotate
	Freeze Frame :	Freeze the image (use "+>" button)
	Zoom :	Zoom level : enable the zoom in function on the image displayed.

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Issue A

Use "+>" Right button to zoom in the image.

Use "<-" Left button to decrease the zoomed image.

Horizontal Pan



Vertical Pan



Direct Access #1: Define the hot key function(Right "+" and Left "-") for one of the following adjustments : Brightness / Contrast / Volume / Freeze / Zoom / Video Source* / PIP

(Normally set to Contrast) This can be set to any other function

Direct Access #2: Define the hot key function ("SEL UP" and "SEL DN") for one of the following adjustments : Brightness / Contrast / Volume / Freeze / Zoom / Video Source* / PIP

(Automatically set to Brightness)

Display Orientation : **Normal** / Horizontal Inverse /

Vertical Inverse / Inverse

Calibrate RGB Gain : Colour Calibration

(DISPLAYED IN GRAPHIC MODE ONLY)

Load Factory Defaults : Recall factory default settings.

* By pressing the hot key, the source is in sequence of Analogue

RGB/Composite Video/S-Video/Component Video.



Volume : Not Implemented

Adjust the audio volume level (functions only if the audio add-on installed)

Exit menu

Do not exit the OSD menu using this mode. The User adjustments will not be saved and the exit mode is indeterminate. To Exit the menu Press and hold the Menu button for three seconds. In the event that the menu is exited using this method return to the OSD by pressing and holding the Menu key for three seconds twice (the first will not display the OSD, the second will display the OSD. It will then be possible to exit the menu normally (pressing and holding the Menu key for three seconds) and the adjustments will be saved, Alternatively remove power from the unit by turning the system power switch off.

(applies to V1.60.A0 OSD firmware)

NOTE:

The OSD settings chosen will be stored in memory. The OSD menu can be cleared from the screen by pressing and holding the Menu Key for more than three seconds. Exiting the Menu in this way will allow the system to store the changed parameters and return to the normal operating mode. Moving the selection bar to the EXIT icon pressing the “+” (Right) button will exit the menu but will cause an error in the function of the keys and is not recommended.

5.1 Factory defaults

The following defaults are reset at power on to the factory settings.

User time out = 5 sec (infinite)

Direct Access #2 = brightness (keys used for key backlight brightness)

5.2 Installation Defaults

The following defaults (Shown in blue above) are reset at power on to the installation settings. They may be changed and used but they will be returned to the installation defaults on reapplying power.

DPMS
Display Input - Source Name
Auto Source select (Source Priority)
OSD Transparency
OSD Rotate
Display Orientation

All other settings are remembered during power off and may be changed during operation. This specifically includes:

PIP Size
PIP Location
Direct Key #1

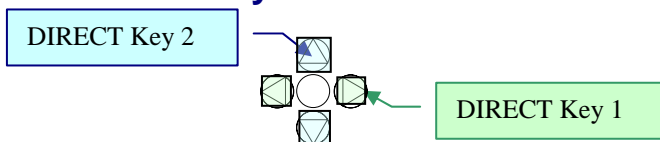
6 A note on Brightness


The front panel brightness control adjusts the illumination level coming from the display unit. It may be adjusted to match the background illumination level present in the aircraft and may be set to very low levels for night operation and high levels for day operation. Care should be taken not to leave the unit powered at high brightness levels when in a static or training mode as high power is drawn by the unit and overheating may occur. There is an independent “brightness” secondary control on the OSD for both the video and the Graphics/map input. This sets the video level of the video or graphic source. It is factory set to its midpoint (50) and it should not be normally necessary to adjust this on a day to day basis.

7 Contrast.

The contrast is normally adjusted using the “Contrast” keys in video mode. Pressing either these keys will display a contrast bar in the centre of the screen. Pressing the keys or holding them will adjust the contrast + or -. The contrast is factory set to its midpoint (50) It should not be necessary to adjust this on a day to day basis unless the contrast level from the sensor video is poor (It is usually better to adjust the sensor settings rather than the “normalised” display. (Holding the key will auto repeat for rapid value change) The contrast settings for the Map and the video are independent and are stored separately.

8 A note on the Direct Keys



The function of the four direct keys can be programmed in two modes using the OSD Utilities menu.  However these menu settings are immediately overridden by the internal controller and thus have no function. Permanently changing the direct key programming in the menu, from the factory default settings, is therefore not possible.

Direct Key 1 - Direct key one is programmed in the factory to control contrast. This is the normal setting.

Direct Key 2 - The function of this key can be programmed in the factory to control Brightness

9 TROUBLESHOOTING

When troubleshooting the flat panel display system it is worth considering it as separate elements, such as:

- External Equipment; PC settings, video format
- Display Panel (Menu setup, cabling, connection, panel, PC settings)
- Backlight (inverter, cabling, backlight tubes)
- Computer system (display settings, operating system)

Through step-by-step cross checking with instruction manuals and a process of elimination to isolate the issue it is usually possible to clearly identify the problem area.

Note that removing power from the system may clear a system lockup or return the settings to their default condition.

No image:

- If the panel backlight is not working it may still be possible to just see some image on the display.
- A lack of image is most likely to be caused by incorrect connection, lack of power, failure to provide a correctly formatted signal or incorrect graphic card settings.

Image position:

If it is impossible to position the image correctly, (i.e. the image adjustment controls will not move the image far enough), then test using another graphics card. This situation can occur when a custom graphics card, that is not close to standard timings, is used.

Image appearance:

- A faulty panel can have blank lines, failed sections, flickering or flashing display
- Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, to scroll, flicker badly or possibly even no image.
- Incorrect internal jumper settings on the internal controller card may cause everything from total failure to incorrect image. Internal jumper settings are set at the factory.

Continued failure:

If unit after unit keeps failing investigate whether you are short circuiting the equipment or doing something else seriously wrong.

Generally after common sense issues have been resolved we recommend step-by-step substitution of known working parts to isolate the problem.

10 Handling Precautions

Handling of the Remote Control should be in compliance with Real-Time Vision's handling principles.

- 1) Be sure to turn off the power supply when inserting or disconnecting the input connectors.
- 2) Wipe off water or fluid droplets immediately. Long contact with water or other fluids may cause discoloration or spots.
- 3) Since CMOS LSI is used in this module, take adequate static electricity precautions and ensure correct human earth bonding when handling.
- 4) Do not open nor modify the Assembly.
- 5) At the insertion or removal of the Remote Connectors, ensure that the sockets are free from debris and be sure not to damage the Interface pins

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