Curtin

UNIVERSITY OF TECHNOLOGY

CENTRE FOR MARINE SCIENCE & TECHNOLOGY

Field-Sequential 3D Video Multiplexer 1 July 2003

Centre for Marine Science & Technology, Curtin University, GPO Box U1987, Perth 6845, Western Australia
Ph: +61 8 9266 7380. Fax: +61 8 9266 4799. Web: http://www.curtin.edu.au/cmst

Curtin University - Centre for Marine Science & Technology
Field-Sequential 3D Video Multiplexer

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Packing List

1. **1 x Field-Sequential 3D Video Multiplexer**
2. **1 x Instruction manual (this manual)**

NB: power for the 3DMux is provided by either a 9V battery mounted internally or an external power supply (9-12V DC, 100mA) (not provided).

Introduction

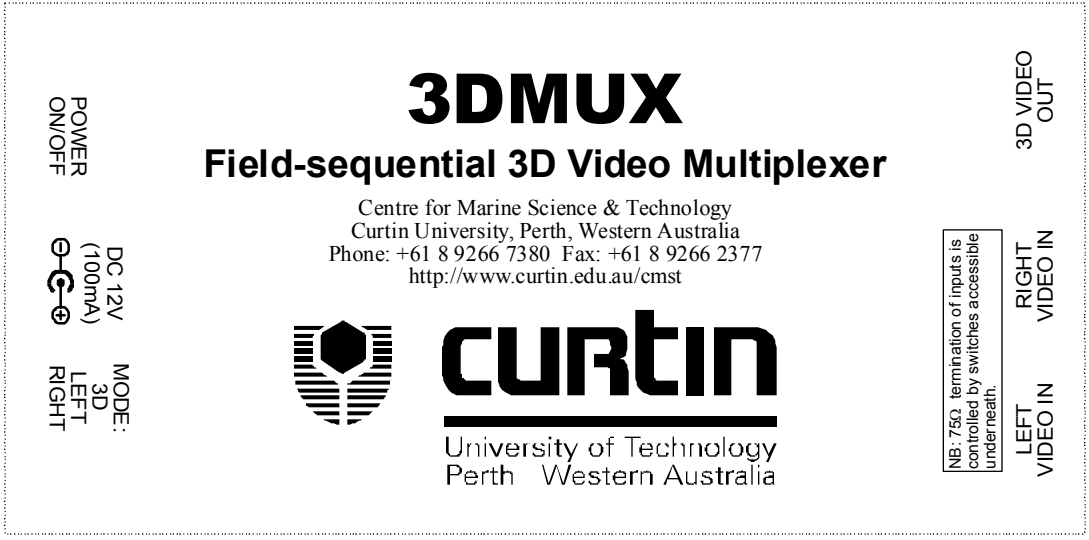
The 3DMux is a device which allows the generation of field-sequential 3D video from a pair of genlocked video cameras. The output 3D video signal can be recorded using a single VCR and viewed in 3D using a range of different techniques.

The 3DMux is compatible with both the PAL composite video and NTSC composite video standards.

NB: This 3DMux must be used with genlocked cameras - the use of non-genlocked cameras will result in a corrupted video signal.

Controls and Connections

The layout of the controls and connections of the 3DMux is illustrated below:



Left Hand Side:

(1) Power On/Off switch. A green light illuminates when power is applied.

(2) External Power Socket (2.5mm DC power socket). If the 3DMux is to be used for an extended period of time, an external 12V power supply capable of supplying up to 100mA current can be connected here. Please ensure the centre pin is positive. (NB: An external power supply has not been included with the supplied unit because of the worldwide differences between power sockets and mains supply voltage. You will need to source one locally.)

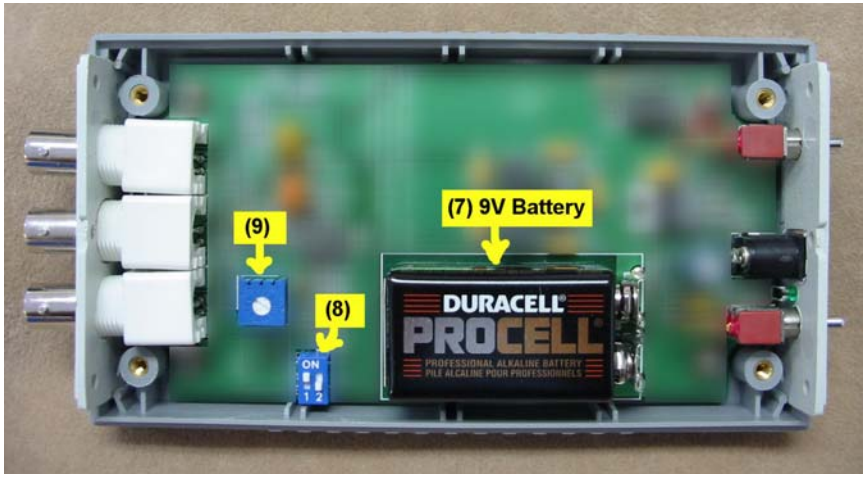
(3) Video output mode switch. 3 modes can be selected:

Position 1: 3D Field-sequential 3D video output is selected.
Position 2: LEFT The left camera only is output
Position 3: RIGHT The right camera only is output.

This switch is very useful when adjusting, aligning or reconfiguring the cameras. For example: switching to LEFT will allow the easy focusing of the left camera (and vice versa).

Right Hand Side:

(4) Left Video In (BNC connector). Connect the video output of the left video camera here.
(5) Right Video In (BNC connector). Connect the video output of the right video camera here.
(6) Video output (BNC connector). The 3DMux outputs its signal at this connector. The type of video signal (3D/Left video/Right video) is determined by the MODE switch (see (3) above).



Underside/Internal:

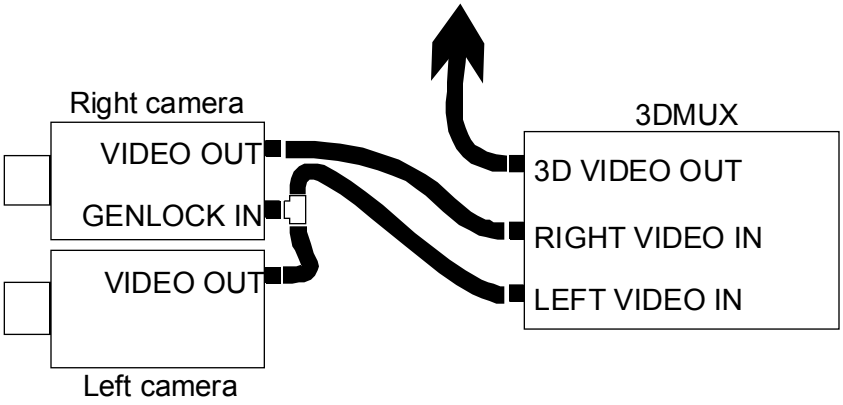
(7) 9V Battery connector. Connect a 9V battery here if you wish to use the 3DMux in a portable application.

(8) Input video termination switches. These switches enable or disable 75ohm termination of the LEFT and RIGHT video input connections. Switch 1 enables or disables 75ohm termination of the LEFT video input. Switch 2 enables or disables 75ohm termination of the RIGHT video input.
NB: These switches will be used when you configure the genlocking of your video camera pair (see the connection instructions below). NB: a hole in the bottom of the housing is provided for easy access to these switches.

(9) Left input termination adjustment. This will not normally be needed unless you need to fine tune the video termination. This has been factory set to 75ohms.

Connecting the 3DMux

An example connection of the 3DMux to a video camera stereo-pair is illustrated below:



In this configuration:

1. The video output from the left camera is connected to the GENLOCK input of the right camera (using a BNC 'T' piece connector) and then to the LEFT VIDEO input of the 3DMux.
2. The video output from the right camera is directly connected to the RIGHT VIDEO input of the 3DMux.
3. The 3D VIDEO output of the 3DMux will then be connected to your video recorder and/or video monitor.

(Be sure to use 75Ω coaxial cable for all video connections).

Please note that there are other ways in which you could configure the wiring but the diagram above shows probably the easiest configuration.

VIDEO TERMINATION:

In this configuration the optimum configuration for termination is that the genlock input has 75Ω termination turned OFF and both inputs on the 3DMux will have 75Ω termination turned ON. This is because video cables should only be end terminated once and ideally at the end of the video cable. Unfortunately some video cameras do not allow the termination of the genlock input to be turned off (i.e. it is always terminated) - if this were the case in the configuration illustrated above, the LEFT input on the 3DMux would have 75Ω termination turned OFF and the RIGHT input would have 75Ω termination turned ON.

CAMERA ADJUSTMENTS

Genlock cameras usually provide two controls: H PHASE (Horizontal Phase) and SC PHASE (Colour Sub-Carrier Phase). You will need to adjust these controls on the genlocked camera (the right camera in the illustration above) such that the horizontal phase and SC phase of the genlocked camera match the master camera (the left camera in the above diagram).

- H PHASE should be adjusted while monitoring RIGHT VIDEO IN and LEFT VIDEO IN using a dual channel oscilloscope.
- SC PHASE would be most easily adjusted by using a vectorscope to monitor 3D VIDEO OUT (while the 3DMux is in 3D mode). It is also possible to adjust SC PHASE while using a video monitor to view 3D VIDEO OUT (while the 3DMux is in 3D mode) - adjust SC PHASE until there is no colour defects in the 3D image. This method is less accurate than using a vectorscope.

Stereoscopic Image Alignment

It is beyond the scope of this document to go into fine detail on the requirements of stereoscopic camera image alignment, however it is important to note that good image alignment is the most critical issue in obtaining high quality stereoscopic images. Some things you should be careful of: mount the cameras on a solid base, use 2 cameras of the same make and model, use two lenses of the same make and model, be very careful to obtain good vertical image alignment, ensure there are not magnification differences between the two cameras, ensure that there is no relative rotation of the two camera images, choose the camera convergence distance and camera separation carefully.

Field-Sequential 3D Video

Field-sequential 3D video is a means by which stereoscopic 3D video is recorded in a standard composite video signal. Left and right images are stored in alternate fields of the video signal. This method of recording is popular because of its ease of use - Field-sequential 3D video can be recorded and played back using a standard video recorder, equipment for the viewing and playback of field-sequential 3D video is readily obtainable.

If configured correctly, this 3DMux generates field-sequential 3D video in the R1 standard (i.e. right images in the odd field / field 1). This 3DMux can be used to generate 3D video in the L1 standard by connecting the left camera to the right video input and vice versa. A document which defines the field-sequential 3D video standard can be obtained from the website of the Stereoscopic Displays and Applications conference: http://www.stereoscopic.org

Trouble Shooting

1. Ensure all plugs and cables are seated properly and connected in the correct place (see connection diagram above).
2. Ensure front panel switches are in the correct position (see CONTROLS & CONNECTIONS section above).
3. Ensure that all video 75Ω termination is correct (see VIDEO TERMINATION section above).
4. Ensure that the video cameras are generating a valid video signal by disconnecting the 3DMux and individually connecting each camera directly to a video monitor.
5. If you are running off battery power, try replacing the battery with a fresh one.
6. If the 3D looks reverse, it is possible the image is being viewed in reverse 3D. This 3DMux generates 3D video in the R1 field-sequential 3D Video standard (right image in the odd field). If the image looks reverse 3D, the 3DMux could be connected wrongly, or it could be that you are viewing the 3D video with glasses or viewing system configured for L1 operation (i.e. left image in the odd field). (See FIELD-SEQUENTIAL 3D VIDEO section above).
7. If the 3D image is unstable or tears at the top of the screen, it is possible the H PHASE adjustment on the genlocking camera is not set correctly or the genlocking camera is not genlocking properly. Check whether the left and right cameras on their own are stable by switching the mode switch to LEFT or RIGHT position. Check whether the H PHASE adjustment is set correctly.
8. If the 3D image only displays in black and white (but should be in colour) or is black and white in the top of the screen, it is possible the SC PHASE adjustment is not set correctly or the genlocking camera is not genlocking properly. Check whether the left and right cameras on their own are in colour by switching the mode switch to the 'LEFT' or 'RIGHT' position. Check whether the SC PHASE adjustment is set correctly.

9. Other problems? Contact the Centre for Marine Science & Technology on +61 8 9266 7920 or +61 8 9266 7380 or email <info@cmst.curtin.edu.au>

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