MARK ROBERTS MOTION CONTROL

MSA-21 LFP CONTROLLER

QUICK START GUIDE

Product Covered: MRMC-1561-00
Product Coder: MRMC-1168-02

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Chapter 1 **Quick start**

Safety

- Do not use around flammable gas. All electrical equipment can generate sparks that can ignite flammable gas.
- Heads have powerful motors that can pinch, so take care not to get your hands trapped in the head or cabling.
- Keep the equipment dry. The system has **not** been made weatherproof. Do not use with wet hands.
- Keep cables tidy. Use cable ties to keep them out of harm's way. If you have a head with slip rings then make use of them; avoid running any cables between the base and the rotating head or camera.

Overview

Thank you for using the **L**arge **F**ormat **P**anel (LFP) camera head controller from Mark Roberts Motion Control (MRMC). You can use the LFP as a standalone controller attached to an MRMC camera head. The LFP is a robust controller designed for day-in, day-out use in professional studio and Outside Broadcast environments.

The two-handed controls on the LFP controller give you precise, ergonomic, real-time control of the camera direction (pan, tilt, and roll), position (if on a rail) and camera functions (focus, zoom, and iris). You can also plug additional controls into the LFP such as focus and zoom lens controls, and pan bars.

The controller includes the following features:

- Record and Playback of static camera positions - You can store up to eight static head "preset" positions (including lens settings) and go to any preset position at the touch of a button.

- Record and Playback of moves, including camera synchronization - You can create, store, play back, and modify up to 174 axis-minutes of head movements, including lens control movements.
- A-B moves – To define start and end points and automatically create a smooth move between them.
- Time-lapse Playback – to record a move at normal speed and play it back slowly in stop-frame or slow motion mode.
- Back-Pan – You can set up the pan axis to automatically compensate for rotation axis movement to keep the camera on target.
- Soft-limits – to limit the movement ranges of the axes
- Velocity limits – to ensure axes do not trip
- Acceleration limits – to give smooth movement
- Lens axis control – to give absolute position control when required
- Standard axis control – to give relative position control when required
- Control scaling – to allow fine adjustment or a fast response

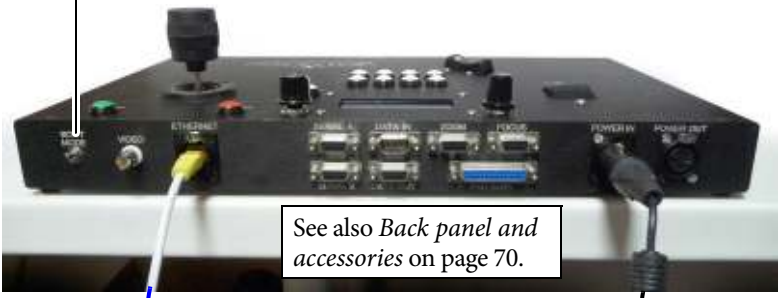
Connecting the cables

Put the **BOOT MODE** switch to **Up** position. Attach the power cables last.

3-hole plug, 24 Volts DC

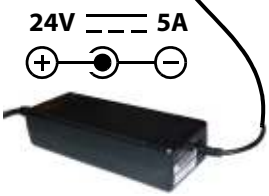
ETHERNET

POWER IN



See also *Back panel and accessories* on page 70.

Example head: AFC



The head and controller both use the same type of power supply brick.

Hint

It is recommended that you **do not** use the **POWER OUT** socket on the LFP to power the head if you are using an Ethernet connection to the head. If you do so then powering up the LFP will simultaneously power up the head, and in this instance powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

Powering up and loading the head

There is no power switch on the LFP; the power is on whenever the 24-volt power supply is attached and live. Similarly, there is normally no power switch on MRMC camera heads; the power is on whenever the head has a 24-volt power supply that is live.

1. Attach the power cables to the head and the LFP after you have attached all the other cables. Make sure the relevant indicators light up; for example, the power indicator LEDs on all 24Volt power supply bricks (), and the power indicator LED on the head ().

   Hint

   If you are using an Ethernet connection between the controller and the head it is recommended that you power up the head first and the controller last, as powering up two devices simultaneously on the same network can cause communication problems.

   If you are using a Serial connection to the head you must power up the controller first and the head last.

> Hint
>
> Do not touch the Joystick control when the controller is starting up. Within the first second of start-up, the controller uses the centre (resting) position of the Joystick as the zero calibration point, and any Joystick movement or offset during this time will result in the head moving later when no one is touching the Joystick.

When the LFP has power, its screen displays a prompt similar to the following:

```
(C) MRMC 2016
MSA-21  v6.14.
PRESS SELECT TO
LOAD QUAD ETHER II
```

The last line of the prompt tells you which operating system will be loaded into the head - in this example `QUAD ETHER II`. Each LFP is configured at the factory for a specific head, and contains the operating system for that head.

If this prompt does not appear then check that the position of the **BOOT MODE** switch on the LFP is in the Normal (Up) position for stand-along operation, then remove and re-attach the power cables.

2. Press the **SELECT** knob to load the operating system into the head. This is called "**loading the head**".

If the load is successful, the screen on the LFP displays a message similar to the following, and you will be able to move the head with the joystick:

```
ETHERNET MODE
CAM FPS: 0.00
```

If you get a message similar to any of the following, see *Troubleshooting* on page 53:

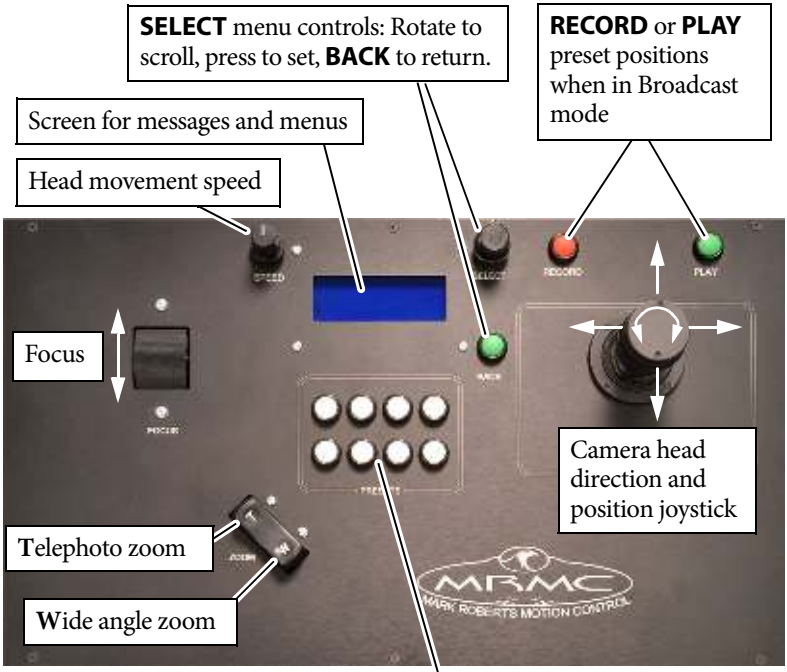
```
HEAD DID NOT LOAD
HEAD NOT LOADED
LOAD FAIL
FAILED TO LOAD HEAD
```

Turning off the LFP and head

As there is no power switch on the LFP or head, to turn these off you simply remove the power cable. All MRMC controllers and heads have robust electronics that are designed to withstand the rigours of connection and disconnection to live power cables.

You can leave the other cables plugged in if you want.

The LFP controls



On the LFP the rotation of the joystick is typically assigned to Roll or lens focus, if such a facility is available.

Note that the physical effects of most controls are adjustable in the menu, in terms of the **limit** (range) of motion, **direction**, **speed**, **damping**

(smoothing of jerkiness in the controls), **input exponential** and **scale** (sensitivity).

The LFP has two main modes of operation:

- **Broadcast mode**, in which you can store and recall static camera positions. This is described in Chapter 2.
- **Film mode**, in which you can store and recall dynamic camera movements. This is described in Chapter 3.

To change modes you use the menu option CHANGE MODE.

Setting the control directions

In the LFP you need to specify the directions of the focus, zoom and joystick controls for your particular head, lens gearing attachments, and preference. For example, some people prefer the camera to point upward when the joystick is pulled back, while others prefer the opposite logic whereby pushing forward ("up") on the joystick targets the camera upward in the scene. To set the control directions you use the procedure below.

1. On the LFP, use the **SELECT** knob (rotate and press) to choose the menu sequence:

   SET DIRECTION (if you are in Broadcast mode)

   or...

   GENERAL SETUP > SET DIRECTION (if you are in Film mode)

2. Set each sub-option to FWD (forward) or REV (reverse) as you prefer. Test each control after you set it.

Menu option	Description
JOY HORIZ JOY VERT JOY ROTATE	Joystick controls - three directions 
FOCUS CON	Focus control. 
ZOOM CON	Zoom control. Make sure the **T** on the LFP zoom control zooms in, and the **W** zooms out. 

Menu option	Description
FOCUS AUX	Auxiliary focus control plugged into the LFP. 
ZOOM AUX	Auxiliary zoom control plugged into the LFP. 

Zeroing the axes

At the beginning of each session, right after loading the head, you need to **zero the axes**. This defines a base position at which all head positions and lens settings are set to zero (0) in the LFP. All limits, lens controls, preset positions, and moves that are stored in the LFP are measured relative to this base position. The zero points themselves are not stored in the head or lens when the power is off, so you need to define them at the start of each session, by zeroing the axes.

You can zero the axes in two ways, depending on how you want to calibrate the head direction:

- **Zero the axes manually** - you use the controls to point the camera in the direction that you want to use as the zero position for the head axes. See *Zeroing the axes manually* on page 11.
- **Zero the axes by homing** - the LFP automatically moves the head to its "home" position, and uses that position as the zero position. The "home" position is the head's centre of motion, as determined by the limit sensors built into the head hardware. You can only use this method if your head has a homing facility and your LFP is in Film mode. See *Zeroing the axes by homing* on page 12.

Hint

If you are using a lens with external Lens Control Motors (LCMs), you need to make sure that the LFP controls move the focus, zoom, and iris rings in the correct direction, before you zero the axes. Refer to *Zeroing lens axes with external Lens Control Motors* on page 64.

Zeroing the axes manually

1. If you have a serial lens with internal motors for the focus, zoom, and iris then you can skip this step.

   If you have a lens with external motors, set the **focus to infinity** (∞), **zoom to wide-angle** (zoomed out all the way), and **iris/aperture to wide open**. Do this either with the LFP controls or by moving the gears by hand. Also see *Zeroing lens axes with external Lens Control Motors* on page 64**.**

2. Use the controls to point the camera head in the direction that you want to use as the zero position for the head axes. (If the head is on rails, also use the controls to move to the zero rail position that you want to use).

   > Hint
   >
   > Some methods for finding a useful zero position are, in order of increasing accuracy and repeatability:
   >
   > - Use the controls to point the camera straight ahead.
   > - Use the controls to point the camera at a small object in the field of view that is easy to find again in subsequent sessions, such as the corner of a ceiling or desk.
   > - Zoom in on the object and centre it in the field of view (but remember to zoom all the way out again after adjusting the direction so that your zoom axis will be correctly zeroed.)
   > - If you are in Film mode you can use DIAGNOSE AXES > LIMIT INPUTS to display information that tells you when an axis crosses its home position as you move the controls. See page 52.

3. In the LFP menu, choose one of the following options:

   DIRECT ZERO ALL (in Broadcast mode; this option is only available if the Engineering menu option HOME AXIS > ZEROING METHOD is set to ZEROING.)

   or...

   HOME AXES > DIRECT ZERO ALL (in Film mode).

The LFP axes settings are now zeroed. Any stored limits, presets, and moves are now operational.

Zeroing the axes by homing

Hint

If your head is in an **underslung** configuration (hanging upside-down from its mount) then it is recommended that you use the **manual** method for zeroing the axes (see page 11) instead of the automatic homing method. Depending on the direction settings of the Tilt and Pan axes in the controller, the automatic homing method might pan or tilt the camera into a home orientation that is 180° from your working target orientation, which can be potentially awkward or risky for the attached cables and equipment.

You can only use this method if your head has a homing facility.

1. In the LFP menu, choose one of the following options:

   HOME ALL AXES (if you are in Broadcast mode; this option is only available if the Engineering menu option HOME AXIS > ZEROING METHOD is set to HOMING.)

   or...

   HOME AXES > ALL AXES (if you are in Film mode)

2. The menu panel on the LFP prompts you to move the lens controls (focus, zoom, and iris as applicable) to their zero points:

   IF USING LCMs FOCUS ON INFINITY, OPEN THE IRIS, ZOOM OUT, AND PRESS SELECT

   You can skip this step if you have a serial lens with internal motors for the focus, zoom, and iris, or if all of your external Lens Control Motors (LCMs) have homing enabled (that is, if the Engineering menu option HOME AXES > SET HOME AXIS TYPE is set to HARD-LIMIT).

   If you have any external Lens Control Motors that have homing disabled (Engineering menu option HOME AXES > SET HOME AXIS TYPE set to DIRECT) then you need to manually set the **focus to**

infinity (∞), **zoom to wide-angle** (zoomed out all the way), and **iris/aperture to wide open**, as relevant for that axis. Do this either with the LFP controls or by moving the gears by hand. Also see *Zeroing lens axes with external Lens Control Motors* on page 64**.**

3. Press **SELECT**.

The head moves its axes to their home positions and all LFP axes settings are zeroed. Any stored limits, presets, and moves are now operational.

Setting the soft limits

In order to prevent damage to cables and other equipment, you can set limits to the range of physical travel of the head movement and lens controls. This is especially important if you have a head without slip rings, where cabling can get wrapped around the head, or if you have a lens with external lens control motors where you need to limit the travel of the lens axes.

Before the limits can be set or applied you need to zero the axes as described in page 10.

> Hint
>
> The soft limits apply to any live motions that you perform with the LFP controls, and to any existing positions and moves that you have recorded previously. If you tighten the limits or zero the axes in a different place, any existing position or move that now extends outside a limit will be restrained; it will only go as far as the limit allows.
>
> If an axis is outside its soft limit then you will only be able to move the axis towards the nearest soft limit.

1. Choose one of the following menu options:

   SET SOFT LIMITS (in Broadcast mode)

   or...

   GENERAL SETUP > SET SOFT LIMITS (in Film mode:).

2. The menu shows the current soft limits. For example:

```
PAN SL: ENABLED
  MAX: 203923
  MIN: -202148
TILT SL: ENABLED
  MAX: 80365
  MIN: -90008
FOCUS SL: ENABLED
  MAX: 187614
  MIN: 0
ZOOM SL: ENABLED
  MAX: 149113
  MIN: 0
IRIS SL: ENABLED
  MAX: 65522
  MIN: 0
```

The numbers in the menu options refer to physical positions of the head or lens axes, relative to the zero point that was set earlier.

3. Set the MAX and MIN limits that you want. For example to set the pan limits:

   3.1 Make sure the PAN SL option is set to ENABLED.

   3.2 Scroll to the PAN MAX option and press **SELECT**.

   The PAN MAX number in the menu now shows the current pan position of the head (for example 31896), which is updated continuously as you pan the head.

   3.3 Use the joystick to pan the head so that the PAN MAX number in the menu goes toward **higher** numbers (more positive numbers). Stop where you want this end of the physical pan limit of the head to be.

   3.4 Press SELECT. You have now set the pan maximum limit.

   3.5 Scroll to the PAN MIN option and press **SELECT**.

   3.6 Use the joystick to pan the head in the other direction, so that the PAN MIN number in the menu goes toward **lower** numbers (or more negative numbers). Stop where you want this end of the physical pan limit of the head to be.

   3.7 Press SELECT. You have now set the pan minimum limit.

4. Repeat step 3 for the head tilt and position (if on a rail), and for the lens controls (focus, zoom, and iris as applicable).

> Hint
>
> You can turn off the limits for one or more axes. For example if you have an Ulti-head or AFC head with slip rings and you want to make use of the 360 degree pan capability, set PAN SL to DISABLED.
>
> For the lens controls you only set the MAX limit, as the MIN limit will have already been set to zero when you zeroed the axes.
>
> For all axes, MAX must be greater (more positive) than MIN. If this is not possible for a particular axis (for example, if focussing closer puts that axis into negative values) then it means that the axis values are increasing in the wrong direction for that axis, on your particular rig. To fix this problem see *Zeroing lens axes with external Lens Control Motors* on page 64.

Session summary

After you have initially set up the system for your particular camera lens and preferences, subsequent sessions take less time to set up, especially if you have not disconnected control cables or moved sites. For subsequent sessions at the same site you typically need to do the following at the start of every session.

1. Attach the power cables to the head and LFP.
2. Load the head (page 4).
3. Zero the axes (page 10).

If you have moved sites you will need to connect the control cables before the power cables, and then set new soft limits after you have zeroed the axes (page 13).

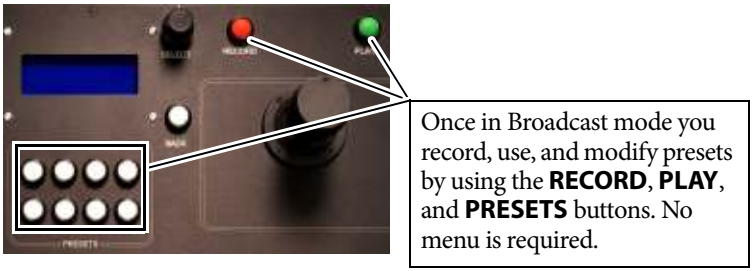
Chapter 2 **Using Broadcast mode to record and re-use static camera positions**

About Broadcast mode

In Broadcast mode you can record the current head direction and position (if on rails), and lens focus, zoom, and iris settings as a single "**preset**", and then return to that preset later at the touch of a button.

You can record up to eight presets, and the LFP remembers them even if you power off, and even if you change modes and then come back to Broadcast mode. To go into Broadcast mode:

- In the LFP menu choose `CHANGE MODE` > `BROADCAST MODE`.



Recording a preset

1. In Broadcast mode, press the **RECORD** button.

   The panel shows that you are now in Record mode: `SHOTBOX RECORD`.

2. If you haven't done so already, use the LFP controls to go to the head direction and position, and lens focus, zoom, and iris settings that you want to record.

3. Press one of the eight white **PRESETS** buttons.

   The current settings are stored to **that PRESETS** button.

4. Repeat steps 2 and 3 to record additional presets if you want, using a different **PRESETS** button for each position.

As long as you stay in Record mode (panel showing SHOTBOX RECORD), pressing one of the white **PRESETS** buttons will store the current settings to that button, overwriting the previous settings for that button.

Using a preset

1. In Broadcast mode, press the **PLAY** button.

   The panel shows that you are now in Playback mode: SHOTBOX PLAYBACK.

2. Press one of the white **PRESETS** buttons.

   The head and lens go to the settings that are stored under **that** button.

3. Repeat step 2 to go to any other presets that you want.

As long as you stay in Playback mode (panel showing SHOTBOX PLAYBACK), pressing one of the white **PRESETS** buttons will go to that combination of head position and lens settings.

> Hint
>
> You do not need to wait until the head finishes going to a preset position in order to go to another one. For example, if you press the wrong **PRESETS** button by mistake during a broadcast you can rectify it by immediately pressing the correct one. Pressing any **PRESETS** button in Playback mode instantly aborts any current action and goes to the new preset selection.
>
> 
>
> To immediately stop the head and abort the current action without going to another preset, press the **BACK** button.
>
> 
>

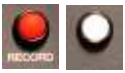
Modifying a preset

1. Press **PLAY** then the **PRESETS** button for the position you want to modify.

2. When the head arrives at the preset position, use the Joystick and lens controls to fine-tune the settings the way you want.

3. Press **RECORD** then press **the same PRESETS** button again.

The new fine-tuned settings overwrite the previous settings for that button.

Chapter 3 **Using Film mode to record and play back camera movements**

About Film mode

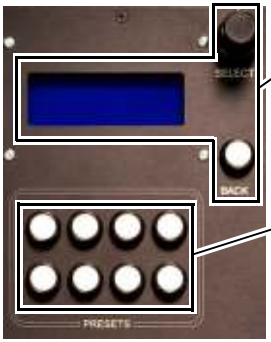
In Film mode you can record the movements of the head and changes to the lens focus, zoom, and iris settings as a single "**move**", and then play that move again later.

In addition to recording live moves, you can define a move by defining its start and end points (including lens settings and other parameters), and the LFP can generate the move by interpolating between the points.

There is no practical limit on the number of moves you can store, although there is a total time limit of 174 axis minutes. For example, if you record the movements of 4 axes simultaneously, the total time storage capacity is about 43 minutes.

The LFP remembers the stored moves even if you power off, and even if you change modes and then come back to Film mode. To go into Film mode:

- In the LFP menu choose CHANGE MODE > FILM MODE.



Once in Film mode you record, play, and modify moves by using the menu.

You can also assign existing moves to the **PRESETS** buttons, and then play the moves with the buttons. See page 35.

Using the Emergency Stop button

Some variants of the LFP are supplied with an **E STOP** (Emergency Stop) button.

- Pressing the **E STOP** button **once** stops all playback immediately, disables all controls on the LFP, and makes the head hold its current position.
- Pressing the **E STOP** button **again** also cuts power to the head (to stop a runaway head), so will cause the head to droop if it is in a position that is affected by gravity.

The following message is displayed:

```
E-STOP DROPPED

PRESS BACK AND
E-STOP TO RE-ENABLE
```

To recover from an Emergency stop:

- Press the **E STOP** and **BACK** buttons simultaneously and release, then press the **BACK** button again by itself.

After you recover from a **single-press** E-Stop your axes retain their zero setting so you do **not** need to re-zero them.

After you recover from a **double-press** E-Stop your axes encoders will have lost position so you will need to re-zero them.

Specifying the camera settings

Before recording and playing back moves, you need to specify how the LFP will trigger the video camera to start and stop recording, along with other camera parameters. To do this:

- In Film mode, choose menu option `CAMERA SETUP` and specify the options suitable for your camera.

The following is a summary of the important options:

- `FPS` - Frames Per Second at which the camera is running.
- `LPF` - Lines Per Frame. The number of encoder lines (servo motor) or steps (Stepper motor) that are required when the camera motor rotates in order to expose 1 frame.

- The ENABLE setting controls how the LFP triggers the camera when you play back a move. Possible settings are:
  - MOMENTARY - This option only applies to controllers that have a separate **CAMERA** trigger button, such as the MSA-20 Handwheels, Joystick Controller, and Mini MSA. The camera is not triggered during playback, and you take manual control of the camera trigger instead. The controller generates a continuous high camera trigger signal when you depress and hold the **CAMERA** trigger button, and stops when you release the button, whether or not playback is in progress.

  - TIME-LAPSE - used only for time-lapse playback. A camera trigger pulse is generated at the start of each frame (see page 31).
  - PULSE - At the start of playback the controller sends a brief signal to turn on the camera. During playback no further camera trigger signal is sent; the camera keeps running. At the end of playback the controller sends a brief camera trigger signal to turn off the camera.
  - CONTINUOUS - At the start of playback the controller starts sending a continuous high signal to turn on the camera. During playback the controller keeps sending the continuous high signal and the camera keeps running. At the end of playback the controller stops the signal, to turn off the camera.

> Hint
>
> For MOMENTARY, PULSE, and CONTINUOUS settings, if a bloop light is connected to the system (see page 73) the light will flash at the start of move playback.
>
> For TIME-LAPSE mode it is assumed that you won't have a bloop light, but you might have an auto-focus cable attached to the same output pins (see page 73). An auto-focus signal is generated whenever the camera trigger signal is generated.

- The CAM SYNC setting specifies where the controller should look to find the synchronisation ("sync") signal. This signal is used to control how the movement of the head is synchronised to the camera frames so that repeat passes match, frame for frame. This signal usually comes from the camera, but can also come from a separate "genlock" sync generator, and is used to synchronise the movement of the head with the video frames so that multi-pass shots match, frame-for-frame.
  - INTERNAL - (Not operational in this version.)
  - MSA GPI 1 - the controller expects the sync signal to come in through the General Purpose Input connector. This does not apply to the LFP.
  - MSA VIDEO - (Not operational in this version.)
  - HEAD - the controller expects the sync signal to come in via the head, through one of the following connectors:

    Trigger In (pin 3) on the **TRIGGER** connector, on an AFC head that has the optional BCST70 panel or on any head with a Quad-box or Octo-box (SFH-30 head or SFH-50).

    GPI1 In (pin 10, Trigger In 1) on the **CAM ACC** (Camera Accessory) connector on any head with an Ulti-box (SFH-50 head or Ulti-head).
  - DISABLED - no synchronisation. Record and playback starts without waiting for a sync pulse from the camera.

  If you specify MSA GPI 1 or HEAD, recording or playback of a move will not begin until the controller detects an incoming sync signal through the specified connection. That is, you must start the camera manually to initiate recording or execution of the move.

- SYNC TIMEOUT - The number of seconds that the controller will wait to receive a sync pulse at the start of the move. If no sync pulse is received in this time then the move will not start and the message CAM SYNC FAILED is displayed.

> Hint
>
> All synchronization sources are rising-edge triggered. For information on how the sync facility interacts with playback, camera triggering, and bloop light triggering, see *Summary of playback events* on page 30.

Creating a move by defining start and end points

1. In Film mode, choose menu option REC-PLAY AXES > A->B WAYPOINT MOVE > SET POSITIONS > POS A:STORE CURRNT?.
2. Move the head to the starting point of the move, and set the lens controls the way you want.
3. Press **SELECT**.

   The starting point is now stored:
   POS A:STORED
4. Scroll to POS B: NOT STORED and press **SELECT**.
5. Move the head to the end point of the move, and set the lens controls the way you want.
6. Press **SELECT**.

   The end point is now stored:
   POS B:STORED
7. Press **BACK**, then use option SET MOVE DURATION > MOVE SECONDS, to set amount of time that you want the move to take, in seconds.
8. Press **BACK** then use option SET A->B FAIRINGS > UP FAIRING to set the acceleration for the start of the move. For example, a value of 25% means that the head will use the first 25% of the movement to accelerate from 0 to the move's full speed.
9. Use the option DOWN FAIRING to set the deceleration for the end of the move. For example, a value of 25% means that the head will use the last 25% of the move to slow from the move's full speed to 0.
10. Press **BACK** then use option GENERATE A->B MOVE (pressing **SELECT** again if prompted) to create the move.

The move is automatically assigned a move number for identification and stored in the LFP. For example:

```
A->B MOVE GENERATED
PROGRESS: 100%
MOVE #8
```

11. Press **BACK** then test the move by using the following sequence:

    11.1 `RUN GENERATED MOVE` > `PLAYBACK SAME SPEED`.

    11.2 When the panel displays `READY TO GOTO`, press **SELECT** to go to the start position of the move. (When moving to the start position, the panel displays `PERFORMING GOTO`.)

    11.3 When the panel displays `READY TO SHOOT`, press **SELECT** to begin playing the move. (When playing a move, the panel displays `SHOOTING`.)

> Hint
>
> If the LFP is set to wait for a sync signal (`CAMERA SETUP` > `CAM SYNC`, see page 22) then the controller displays the message `AWAITING CAM SYNC` and playback of the move will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must also start the camera to start playback.
>
> The message `CAM SYNC FAILED` appears if no sync signal is received within the time that you specified in `CAMERA SETUP` > `SYNC TIMEOUT`.

If necessary, you can stop a move at any time by using the **BACK** button.

To modify the move, see *Modifying a move* on page 33.

Creating a move by live recording

1. In Film mode, choose menu option REC-PLAY AXES > RECORD.
2. Use SELECT REC AXES to select which axes you want to include in the recording. Each axis can have one of the following values:
   - LEARN - (not operational in the LFP.)
   - LIVE - This axis will **not** be recorded, although you can still move it with the controls during both recording and playback.
   - RECORD - This axis will be recorded. (The default setting)
   - IGNORE - This axis will **not** be recorded. During playback this axis will hold its position and you will **not** be able to move it with the controls.

   If an axis is UNASSIGNED then there is no control mapped to it; it will not be recorded as you will not be able to move it with the controls.
3. Press **BACK**, then choose menu option RECORD.

   The panel shows NOT RECORDING, along with the ID number of the move about to be recorded, and the recording time left. For example:
   MOVE #1
   TIME LEFT: 00:43:26
4. Move the head and lens controls to the start positions of the move.
5. Press **SELECT** to start the recording.

> Hint
>
> 
>
> If the LFP is set to wait for a sync signal (CAMERA SETUP > CAM SYNC, see page 22) then the controller displays the message AWAITING CAM SYNC and recording will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must start the camera to start recording.
>
> The message CAM SYNC FAILED appears if no sync signal is received within the time that you specified in CAMERA SETUP > SYNC TIMEOUT.

6. Move the controls to make the motion that you want to record.

   The TIME LEFT amount decreases as you record.

7. When you have finished the move, press **SELECT** which stops recording and saves the move.

   The panel shows NOT RECORDING, along with the ID number of the next move to be recorded, if you choose to do so.

8. If you want to record another move, repeat steps 4 to 7. Otherwise press **BACK** twice then PLAYBACK > PLAYBACK SAME SPEED to play the move.

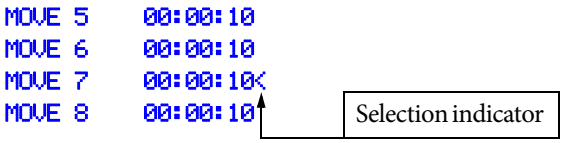
If you press the **BACK** button while recording a move, the recording is aborted. You are returned to the REC-PLAY AXES menu and the move is not stored.

Playing back a move - simple method

> Hint
>
> In the context of the LFP and this manual, the term "**Playback**" refers only to the move that is being played by the LFP. The camera itself is either broadcasting or recording pictures or video, while the LFP is "playing back" its move.

1. In Film mode, choose menu option REC-PLAY AXES > PLAYBACK > SELECT PLAY MOVE.

2. Use the **SELECT** knob to choose which move you want to play. For example, move #7:



3. Press **BACK** then PLAYBACK SAME SPEED.

4. When the panel displays READY TO GOTO, press **SELECT** to go to the start position of the move. (When moving to the start position, the panel displays PERFORMING GOTO.)

5. When the panel displays READY TO SHOOT, press **SELECT** to begin playing the move. (When playing a move, the panel displays SHOOTING.)

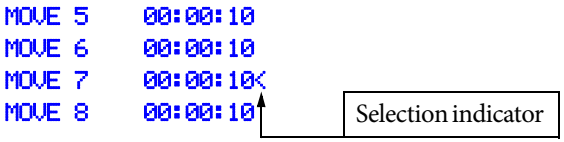
> Hint
>
> 
>
> If the LFP is set to wait for a sync signal (CAMERA SETUP > CAM SYNC, see page 22) then the controller displays the message AWAITING CAM SYNC and playback of the move will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must start the camera to start playback.
>
> The message CAM SYNC FAILED appears if no sync signal is received within the time that you specified in CAMERA SETUP > SYNC TIMEOUT.

If necessary, you can stop a move at any time by using the **BACK** button.

Playing back a move - advanced method

1. In Film mode, choose menu option REC-PLAY AXES > PLAYBACK > SELECT PLAY MOVE.

2. Use the **SELECT** knob to choose which move you want to play. For example, move #7:



3. Press **BACK** then PLAY OPTIONS to specify the options you want:

   - REPEATS: the number of times you want the move to be played back. A setting of INFINITE will replay the move continuously until you press **BACK** to stop it.
   - REC.SPEED: the speed of the camera (frames per second) used when the move was recorded. This number affects the playback speed, which is also related to the number of frames per second that is specified in the menu option CAMERA SETUP > FPS. For example, for a move originally defined as a 10-second move:

REC-PLAY AXES > PLAYBACK > PLAY OPTIONS > REC.SPEED	CAMERA SETUP > FPS	Actual playback time (seconds)
25	25	10
10	25	4
25	10	25
10	10	10
10	5	20

> Hint
>
> You can think of the REC. SPEED (first column) as the original number of frames per second that the move was designed for when recording the move, and the FPS (second column) as the number of frames per second that the camera is actually using when the move is played back. If these are different, the LFP will automatically adjust the speed of the playback a proportionate amount so that the overall move still contains the same number of frames, taken at exactly the same head positions and lens settings.

4. Press **BACK** then PLAYBACK ANY SPEED.
5. When the panel displays READY TO GOTO, press **SELECT** to go to the start position of the move. (When moving to the start, the panel displays PERFORMING GOTO.)
6. When the panel displays READY TO SHOOT, press **SELECT** to begin playing the move. (When playing a move, the panel displays SHOOTING.)

> Hint
>
> 
>
> If the LFP is set to wait for a sync signal (CAMERA SETUP > CAM SYNC, see page 22) then the controller displays the message AWAITING CAM SYNC and playback of the move will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must start the camera to start playback.
>
> The message CAM SYNC FAILED appears if no sync signal is received within the time that you specified in CAMERA SETUP > SYNC TIMEOUT.

If necessary, you can stop a move at any time by using the **BACK** button.

Summary of playback events

If camera sync is **disabled** (page 22), the sequence of events when you try to play a move is as follows:

1. READY TO GOTO
2. **SELECT**
3. PERFORMING GOTO
4. READY TO SHOOT
5. **SELECT**
6. SHOOTING (Controller simultaneously starts the move, sends a camera trigger signal, and sends a bloop trigger signal.)

If camera sync is **enabled** (page 22), the sequence of events when you try to play a move is as follows:

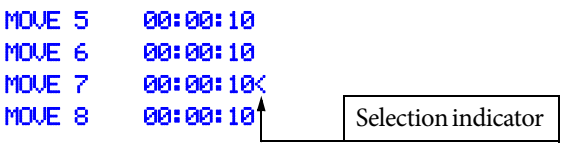
1. READY TO GOTO
2. **SELECT**
3. PERFORMING GOTO
4. READY TO SHOOT
5. **SELECT**
6. AWAITING CAM SYNC
7. Controller automatically sends a camera trigger signal
8. Camera starts
9. Controller receives sync signal from the camera or other sync generator
10. SHOOTING (Controller simultaneously starts the move and sends a bloop trigger signal.

Using time-lapse playback

When you play back a move on the LFP using the time-lapse facility, the head and lens perform the same motions as during normal playback, but the LFP sends a camera trigger pulse to take a frame (single exposure) at regular time intervals along the way. The resulting camera exposures can then be played back later as a video which gives the illusion of compressed time, where slow events occur quickly on the screen.

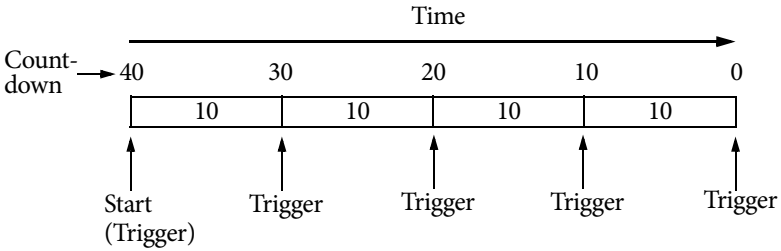
The controller also sends an auto-focus trigger pulse when it sends a camera trigger pulse. For technical details, see *Camera trigger out* on page 73 and *Auto-focus and bloop trigger out* on page 73.

1. In Film mode, choose menu option CAMERA SETUP.
2. Change the ENABLE option to TIME-LAPSE. This sends a trigger to the camera at the start of each frame during time-lapse playback.
3. Press **BACK** then REC-PLAY AXES > TIME LAPSE > SELECT TL PLAY MOVE.
4. Use the **SELECT** knob to choose which move you want to play. For example, move #7:



5. Press **BACK** then TL OPTIONS to specify the options you want:
   - FRAMES: the total number of exposures you want the camera to take during the move.
   - FRAME TIME: the number of seconds between exposures. (FRAMES × FRAME TIME = total time to execute the move.) The

following example uses FRAMES: 4, FRAME TIME: 10, giving a total playback time of 40 seconds.



Note that because the controller takes frames at both the start and end of the move, it actually takes a total of FRAMES+1 frames, so 5 total frames in the above FRAMES: 4 example. This makes it easy to calculate the total time as FRAMES × FRAME TIME.

- TYPE: One of:
  - SLOW-MOTION - the head and lens settings don't stop during the exposures. The move is played as one continuous motion, and the camera is triggered at the correct points along the way.
  - STOP-FRAME - the head and lens axes stop just before triggering each exposure. The head and lens axes essentially perform a go-to at each frame, then stop and hold position while the frame is exposed. If you choose this option, the LFP also calculates and displays a MIN FRAME value. The FRAME TIME that you specify above must be larger than this value so that the axes have enough time to accelerate, move, decelerate, and stop between exposures.

  In the above example, the slow motion and stop-frame playback would each take 40 seconds of total running time. The stop-frame would execute the move in four distinct motions, each of which would come to a stop just as the trigger point is reached.

6. Press **BACK** then TL PLAYBACK.

7. When the panel displays READY TO GOTO, press **SELECT** to go to the start position of the move. (When moving to the start, the panel displays PERFORMING GOTO.)

8. When the panel displays READY TO SHOOT, press **SELECT** to begin playing the move. (When playing a move, the panel displays SHOOTING.)

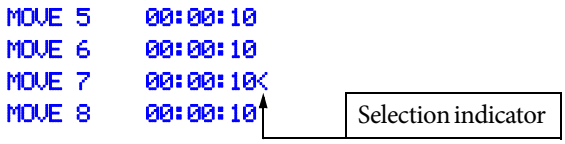
If necessary, you can stop a move at any time by using the **BACK** button.

Modifying a move

To modify a move you play it back in a special way, replacing one or more of the axes with live controls. The original move remains unchanged in the LFP and the modified move is stored as a complete new move. You typically use this facility to manually correct a lens setting, such as focus.

1. In Film mode, choose menu option REC-PLAY AXES > MODIFY > SELECT PLAY MOVE.

2. Use the **SELECT** knob to choose which move you want to modify. For example, move #7:



3. Press **BACK** then SELECT MOD AXES.

4. Choose which axis you want to modify by changing its setting to MODIFY. For example:

   FOCUS: MODIFY

   Make sure that any recorded axis motions that you want to keep are set to PLAY.

   If any axes are using LIVE or IGNORE status in the move then you can keep the original status or change it to MODIFY to include it in the new recording. Once an axis is included in the recording you cannot modify its status back to LIVE or IGNORE.

5. Press **BACK** then RECORD MOD.

6. When the panel displays READY TO GOTO, press **SELECT** to go to the start position of the move. (When moving to the start, the panel displays PERFORMING GOTO.)

   The panel also displays the ID number of the move that you are modifying, the ID number of the modified move that will be created, and the total time of the move. For example:

   ```
   PLAY #7, REC #9
   TIME LEFT: 00:00:06
   ```

7. When the panel displays READY TO SHOOT, press **SELECT** to begin playing the move. (When playing a move, the panel displays SHOOTING.)

   > Hint
   >
   > 
   >
   > If the LFP is set to wait for a sync signal (CAMERA SETUP > CAM SYNC, see page 22) then the controller displays the message AWAITING CAM SYNC and playback of the move will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must start the camera to start playback.
   >
   > The message CAM SYNC FAILED appears if no sync signal is received within the time that you specified in CAMERA SETUP > SYNC TIMEOUT.

8. As the move plays, use the live controls to move the selected axis the way you want. Concentrate only on that axis; the others will be insensitive to the controls.

   When the move finishes it is automatically stored with your modification and you can immediately create another modified move, in case your previous modification wasn't quite perfect.

   ```
   READY TO GOTO
   PLAY #9, MOD #10
   TIME LEFT: 00:00:06
   ```

9. If you want to do another take, press **SELECT** and repeat steps 7 to 8. Otherwise press **BACK** twice then PLAYBACK > PLAYBACK SAME SPEED to check the final modified move.

Assigning moves to the Preset buttons

If you assign an existing move to one of the eight white **PRESETS** buttons you can play the move by pressing the button. This is equivalent to using the menu option REC-PLAY AXES > PLAYBACK > PLAYBACK SAME SPEED.

1. In Film mode, choose menu option REC-PLAY AXES > PAIR PRESETS&MOVES.
2. Use the menu to pair up any of the first eight listed Presets with an existing move that you have created. In this example Preset buttons 1 and 2 will trigger moves 7 and 6:

   ```
   PRESET P1: MOVE 7
   PRESET P2: MOVE 6
   PRESET P3:-
   PRESET P4:-
   ```

3. When you have assigned all the moves you want, press **BACK** to return to the top-level menu.

Playing a move with a Preset button

1. In Film mode, press one of the eight white **PRESETS** buttons that you have assigned to a move.

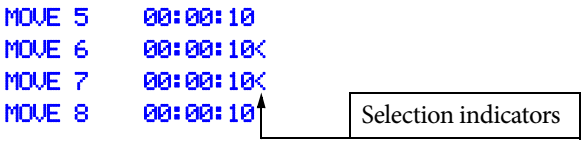
   The head immediately goes to the start of the move.
2. Press **SELECT** to start the move.

> Hint
>
> If the LFP is set to wait for a sync signal (CAMERA SETUP > CAM SYNC, see page 22) then the controller displays the message AWAITING CAM SYNC and playback of the move will not start until a sync pulse is received from the specified sync source. If you are using a sync source from the camera you must start the camera to start playback.
>
> The message CAM SYNC FAILED appears if no sync signal is received within the time that you specified in CAMERA SETUP > SYNC TIMEOUT.

After the move finishes you can press **SELECT** to return to the start of the move for another replay, or press another **PRESETS** button.

Deleting a move

1. In Film mode, choose menu option REC-PLAY AXES > DELETE > DELETE MOVES.
2. In the panel, select all the moves that you want to delete:



3. Scroll to the HOLD SEL HERE 2 DEL option at the top of the list and press **SELECT**.

The moves are deleted, and system memory is rearranged to provide the maximum amount of free space for recording more moves. If a large amount of memory has been used up then the delete process may take some time to complete (worst case is 1minute 22 seconds).

Chapter 4 **Speed controls**

The following is a summary of the controls that have an effect on the speed of the rig.

- **SPEED** knob on the LFP.
  This controls the general speed of the head movement when using manual controls. It has no effect on playback speed, and no effect on the lens controls (focus, zoom, or iris).

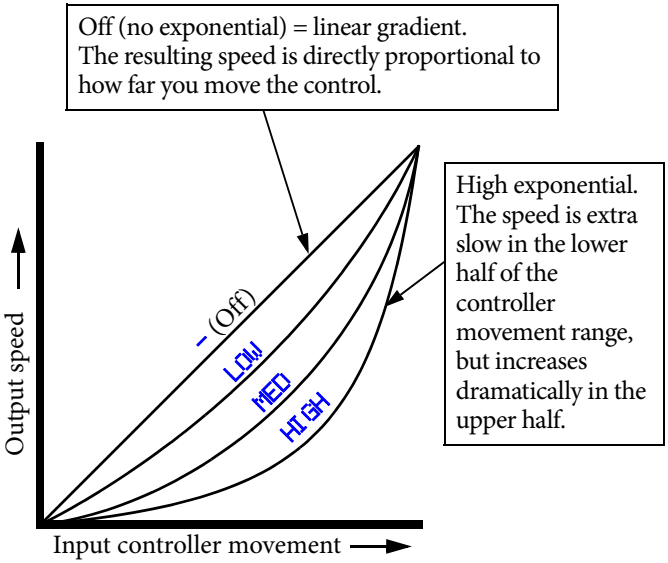
- **Scaling of controls**
  SET INPUT SCALE % in Broadcast mode, or
  GENERAL SETUP > SET INPUT SCALE % in Film mode.
  The amount of scaling to be applied to each control, entered as a percentage of the maximum that the control is capable of.

- **Scaling of axes**
  GENERAL SETUP > SET SCALES in Film mode.
  The amount of scaling to be applied to the axes. To automatically calculate the scale so the axis range matches the range of a FIZ pot controller, see page 68.

- **Damping**
  SET DAMPING % in Broadcast mode, or
  GENERAL SETUP > SET DAMPING % in Film mode
  The amount of smoothing to be applied to the controls, in order to filter out sudden movements and twitches.

- **Maximum acceleration**
  SET MAX ACCEL % in Broadcast mode, or
  GENERAL SETUP > SET MAX ACCEL % in Film mode.
  The maximum allowed acceleration of the axes, as a percentage of the maximum possible acceleration.

- **Input exponential**
  SET INPUT EXP in Broadcast mode, or
  GENERAL SETUP > SET INPUT EXP in Film mode.
  The sensitivity gradient of the controls; that is, the relationship between the amount that you move the control (such as the joystick) and the resulting speed of the motion:



- **Zoom Related Speed**
  SET ZRS > ZRS SCALE in Broadcast mode, or
  GENERAL SETUP > SET ZRS > ZRS SCALE in Film mode.
  When you are zoomed in, the head automatically slows down by an amount proportional to the zoom setting. You can adjust this by using the menu option. The higher the number, the greater the slowing effect. You can also specify:

  – SET ZRS > ZRS MASTER - Choose which axis to use as the reference axis. You usually choose ZOOM.

  – SET ZRS > (Controls) - Choose which controls you want to slow down, by changing OFF to ON. You usually choose whichever controls have been assigned to Pan and Tilt, such as JOY HORIZ and JOY VERT., or the Pan Bars (PB 1 and PB 2).

- **Feathering**
  GENERAL SETUP > SET FEATHERING in Film mode.
  The maximum deceleration an axis is allowed to have as it approaches a soft limit. The lower the feathering value, the sooner the axis starts to slow down as it approaches its soft

limit. The higher the value, the closer the axis gets to the soft limit before it starts slowing down to come to a stop.

- **Goto speed**
  SET GOTO SPEED % in Broadcast mode, or
  GENERAL SETUP > SET GOTO SPEED % in Film mode.
  The speed of the head when going to a preset position (in Broadcast mode), or when going to the start of a move (in Film mode). You set this as a percentage of the maximum axis speed.

Appendix 1 **Menu reference**

The collection of menu options that are available on your controller depends on which menu mode you are in: Broadcast, Film, or Engineering. To change modes, use the menu option CHANGE MODE. The controller remembers the current mode when you switch it off between sessions. The options are summarised in the following sections:

- *Broadcast mode* on page 42
- *Film mode* on page 44

This Appendix describes the menu options in version **MSA-21 6.14** of the LFP firmware. The firmware version number is displayed on the screen when you first power up the controller in Normal mode or Flair mode.

> Caution
>
> When you go into Engineering mode you are prompted for a four-digit password (available from Mark Roberts support), as applying the wrong settings here can stop the system from working. You should only use Engineering mode if you are an experienced user and have requirements that cannot be satisfied by using options in the other two modes. Make a note of any changes that you make so you can revert to the previous value if the system stops working. Engineering mode is beyond the scope of this *Quick Start Guide*. If you need this information please refer to the more comprehensive *User Guide* for your controller.

The names of the **controls**, as they appear in the menu, can vary depending on which specific controller model you've got and how it has been configured for accessories. For example, the LFP is typically set up for the following controls:

JOY HORIZ (Joystick Horizontal)
JOY VERT (Joystick Vertical)
JOY ROTATE (Joystick Rotate)
FOCUS CON (Focus Control)
ZOOM CON (Zoom Control)
FOCUS AUX (Focus Auxiliary control)
ZOOM AUX (Zoom Auxiliary control)
PB 1 (Pan Bars 1)

PB 2 (Pan Bars 2)
PB 3 (Pan Bars 3)
PB 4 (Pan Bars 4)

The menu listings in this section abbreviate the above list as "**(Controls)**" instead of repeating the entire list each time.

The names of the **axes**, as they appear in the menu, can vary in how they are assigned to the controls, depending on how the controller has been configured for your particular head, requirements, and preferences. The axes are typically:
PAN
TILT
ROLL
FOCUS
ZOOM
IRIS (Aperture)

The menu listings in this section abbreviate the above list as "**(Axes)**" instead of repeating the entire list each time.

Broadcast mode

Menu sequence (Broadcast mode)		Description and possible settings
DIRECT ZERO ALL or HOME ALL AXES		Zero all axes at their current position or their home position. See page 10.
SET SOFT LIMITS >	(Axes) SL MAX MIN	ENABLE or DISABLE the limits of travel for each axis, and specify those limits. The MAX value must be larger (or more positive) than the MIN value. See page 13.
SET DIRECTION >	(Controls)	Set the direction in which the controls operate. See page 8. FWD - Forward OFF - Disable the control. REV - Reverse
SET INPUT EXP >	(Controls)	The sensitivity gradient of the controls. See page 37. – (Off) LOW MED HIGH
SET ZRS >	ZRS MASTER ZRS SCALE (Controls) ON/ OFF	Specify the parameters for the Zoom-Related Speed facility, whereby the head axes (usually Pan and Tilt) automatically slow down a proportionate amount when you are zoomed in. See page 38.
SET INPUT SCALE % >	(Controls)	The amount of scaling to be applied to the controls. See page 37.

Menu sequence (Broadcast mode)		Description and possible settings
SET DAMPING % >	(Controls)	The amount of smoothing to be applied to the controls, to filter out sudden jerks and twitches. See page 37.
SET MAX ACCEL % >	(Axes)	The maximum allowed acceleration and deceleration. See page 37.
SET GOTO SPEED % >	(Axes)	The speed of the axes, as a percentage of maximum speed, when going to a preset position (in Broadcast mode), or when going to the start of a move (in Film mode). See page 39.
INPUT VALUES >	(Controls)	The current values of the controls, updated continuously as you move the controls.
AXIS POSITIONS >	(Axes)	The current values of the axes, updated continuously as you move the axes.
AUTO ENABLE >	(Axes)	Automatically restart an axis if it trips out, for example from overheating, over-current, or loss of position.
CHANGE MODE >	BROADCAST MODE	Change the operating mode. Engineering mode requires you to enter a four-digit password.
	FILM MODE	
	ENGINEERING MODE	

Film mode

Menu sequence (Film mode)		Description and possible settings
CAMERA SETUP >	FPS	Camera speed, in Frames Per Second. See page 20.
	LPF	Lines Per Frame for the servo or stepper motors. See page 20.
	ENABLE	The type of signal used to trigger the camera during playback. See page 21. MOMENTARY TIME-LAPSE PULSE CONTINUOUS
	CAM SYNC	The connection to be used for the incoming sync signal, used to synchronise the movement of the head with the camera. See page 22. INTERNAL MSA GPI 1 MSA VIDEO HEAD DISABLED
	SYNC TIMEOUT	The number of seconds to wait for the synchronisation signal to start a move.

Menu sequence (Film mode)			Description and possible settings
GENERAL SETUP >	SET SOFT LIMITS >	(Axes) SL MAX MIN	ENABLE or DISABLE the limits of travel for each axis, and specify those limits. The MAX value must be larger (or more positive) than the MIN value. See page 13.
	SET SCALES >	(Axes) SCL	The amount of scaling to be applied to the axes. See page 37.
	SET DIRECTION >	(Controls)	The direction in which the controls operate. See page 8. FWD - Forward OFF - Disabled. REV - Reverse
	SET FEATHERING >	(Axes)	The maximum deceleration an axis can have as it approaches a soft limit. See page 39.
	SET INPUT SCALE % >	(Controls)	The amount of scaling to be applied to the controls. See page 37.
	SET MAX ACCEL % >	(Axes)	The maximum allowed acceleration and deceleration. See page 37.

Menu sequence (Film mode)			Description and possible settings
GENERAL SETUP > (continued)	SET GOTO SPEED % >	(Axes)	The speed of the axes, as a percentage of top speed, when going to a preset position (in Broadcast mode), or when going to the start of a move (in Film mode). See page 39.
	SET DAMPING % >	(Controls)	The amount of smoothing to be applied to the controls, to filter out sudden jerks and twitches. See page 37.
	SET INPUT EXP >	(Controls)	The sensitivity (exponential) gradient of the controls. See page 37. – (Off) LOW MED HIGH
	SET ZRS >	ZRS MASTER ZRS SCALE (Controls) ON/OFF	Specify the parameters for the Zoom-Related Speed facility, whereby the head axes (usually pan and tilt) automatically slow down a proportionate amount when you are zoomed in. See page 38.

Menu sequence (Film mode)			Description and possible settings
GENERAL SETUP > (continued)	SET BACK-PAN >	BP	Link two axes so that when one rotates, the other compensates to keep the camera on target. For example with a head mounted on a crane, assign the crane's ROTATE axis to the BP AXIS, and the head's PAN axis to the PAN AXIS. Rotating the crane would automatically pan the head to keep the camera on target. The link is one-way; you can still move the Pan axis with the controls but this has no effect on the Rotate axis. BP SCALE prompts you to move the axes to different positions and then automatically calculates the scaling required to keep the camera on target.
		PAN AXIS	
		BP AXIS	
		BP SCALE	
	SET AXIS HOME SPEED >	(Axes)	The speed used when homing the axes, as a percentage of top speed.
	SET HOMING POWER >	(Axes)	The amount of motor power to be used when homing the axes, as a percentage of maximum power.

<table>
<tr><th colspan="3">Menu sequence
(Film mode)</th><th>Description and
possible settings</th></tr>
<tr><td rowspan="4">HOME
AXES ></td><td colspan="2">ALL AXES</td><td rowspan="2">Zero the axes automatically, all at once or one at a time, using the homing facility if your head has it.
See page 12.</td></tr>
<tr><td>SELECT
AXIS ></td><td>(Axes)</td></tr>
<tr><td>DIRECT
ZERO ></td><td>(Axes)</td><td rowspan="2">Zero the axes manually, at their current position. The menu displays the status as each axis is zeroed.
See page 11.</td></tr>
<tr><td colspan="2">DIRECT ZERO ALL</td></tr>
</table>

Menu sequence (Film mode)				Description and possible settings
REC-PLAY AXES >	A->B WAYPOINT MOVE >	SET POSITIONS >	POS A	Create a move by defining its start and end points. See page 23.
			POS B	
		SET MOVE DURATION >	MOVE SECONDS	
		SET A->B FAIRINGS >	UP FAIRING	
			DOWN FAIRING	
		GENERATE A->B MOVE		
		RUN GENERATED MOVE >	SELECT PLAY MOVE	Test the move that you created. See page 24.
			PLAY OPTIONS	
			PLAYBACK SAME SPEED	
			PLAYBACK ANY SPEED	
			SET PLAYBACK TRIGGE >	This only applies to the MSA-20 Handwheels. Trigger the start of playback (and subsequent replays) by using an external input device plugged into the **GPIO 2** connector. See page 50.

Menu sequence (Film mode)				Description and possible settings
REC-PLAY AXES > (continued)	RECORD >	SELECT REC AXES >	(Axes)	Select which axes you want to include in the recording. See page 25.
		RECORD		Record a move. See page 25.
	PLAYBACK >	SELECT PLAY MOVE		Play back a move. See page 26.
		PLAY OPTIONS >	REPEATS	
			REC. SPEED	
		PLAYBACK SAME SPEED		
		PLAYBACK ANY SPEED		Play back a move with extra options. See page 28.
		SET PLAYBACK TRIGGE >	INPUT: TRIG1 = GPI1 (pin 3) TRIG2 = GPI2 (pin 4) TRIG3 = GPI3 (pin 5) TRIG4 = GPI4 (pin 6)	This only applies to the MSA-20 Handwheels. Trigger the start of playback (and subsequent replays) by using an external input device plugged into the **GPIO 2** connector. You can still use the **SELECT** button to trigger playback if you want.
	MODIFY >	SELECT PLAY MOVE		Create a new move that is partially based on an existing move. See page 33.
		SELECT MOD AXES >	(Axes)	
		RECORD MOD		

<table>
<tr><th colspan="4">Menu sequence
(Film mode)</th><th>Description and possible settings</th></tr>
<tr><td rowspan="5">REC-PLAY AXES >

(continued)</td><td rowspan="4">TIME-LAPSE ></td><td colspan="2">SELECT TL PLAY MOVE</td><td rowspan="4">Run a move as normal but trigger the camera at regular time intervals during playback, instead of just once at the start of the move.
See page 31.</td></tr>
<tr><td rowspan="3">TL OPTIONS ></td><td>FRAMES</td></tr>
<tr><td>FRAME TIME</td></tr>
<tr><td>TYPE</td></tr>
<tr><td colspan="2">TL PLAYBACK</td></tr>
<tr><td colspan="2">PAIR PRESETS&MOVES</td><td colspan="2">Assign recorded moves to the PRESETS buttons. In Film mode you can then play a move by pressing the relevant PRESETS button. (In Broadcast mode the PRESETS buttons still invoke static camera positions).
See page 35.</td></tr>
<tr><td rowspan="2">DELETE ></td><td colspan="2">DELETE MOVES</td><td>Delete one or more moves.
See page 36.</td></tr>
<tr><td colspan="2">DELETE ALL MOVES</td><td>Delete all stored moves.</td></tr>
</table>

Menu sequence (Film mode)			Description and possible settings
DIAGNOSE AXES >	INPUT VALUES >	(Controls)	The current values being output by the controls, updated continuously as you use the controls.
	AXIS POSITIONS >	(Axes)	The current values of the axes, updated continuously as you move the axes.
	LIMIT INPUTS >	(Axes) LIMIT	Three digits that indicate the state of the hard limit and datum (home position) switches on an axis, updated as you move the controls. The first digit is the limit status: 1 (one, open) when an axis reaches either one of its hard limit switches, and 0 (zero, closed) otherwise. The second digit is the datum status. For a head with homing fins it is 0 (closed) on one side of the home position and 1 (open) on the other side. For a head with a magnetic homing switch it is 1 (open) at the home position and 0 (closed) on either side of it. The third digit is not currently used.
CHANGE MODE >	BROADCAST MODE		Change the operating mode. Engineering mode prompts you for a four-digit password.
	FILM MODE		
	ENGINEERING MODE		

Appendix 2 **Troubleshooting**

Typical symptoms, causes, and actions

Symptoms or message	Cause and/or action
HEAD DID NOT LOAD	The LFP failed to load the operating system into the head. Check that all cables are connected, and all devices have power. If you have connected more than one head, connected the MRMC system to another local network, or moved the controller and head between networks, check that correct LAN addresses have been entered in the controller. See *Working with Local Area Networks* on page 56. Check the order in which the devices are powering up. If you are using an Ethernet connection to the head, avoid powering the head from the power output socket on the controller in order to avoid powering up the two devices simultaneously (which can cause problems on small isolated Ethernet networks). Use an independent power source for each, and power up the head first. If you are using a Serial connection to the head, power up the controller first. Data corruption can also cause a failure to load the head. Use a shorter cable to improve the communication, and ensure the cable is not running near any high current devices.
HEAD NOT LOADED	
LOAD FAIL	
FAILED TO LOAD HEAD	
FAILED TO INITIALIZE ETHERNET	
Controls move in the wrong direction	Change the working direction of the controls to your preference (page 8).

Symptoms or message	Cause and/or action
Limits are being ignored or causing the head to oscillate when reached.	The axes have not been zeroed. You must do this at the beginning of each session just after you load the head (page 10).
The **PRESETS** buttons do not work (Broadcast mode).	
Can't set limits, or the head oscillates when you set a limit.	When you set soft limits (page 13) you must set the MAX limit to the higher (or more positive) axis value, and set the MIN limit to the lower (or more negative) value. After zeroing the axes (page 10), all the lens axes (focus, zoom, and iris) should have a MIN value of zero (0) and for these axes you should only change the MAX values. If you can only move the focus, zoom, or iris axis into negative values then it means you are using a lens with external motors, and that the axis value is increasing in the wrong direction on your particular rig. To cater for this, see *Zeroing lens axes with external Lens Control Motors* on page 64.
The head moves too slowly or too quickly when zoomed in.	The Zoom Related Speed (ZRS) feature automatically slows the live pan and tilt controls to cater for the narrow field of view when zoomed in. You can adjust the amount of slowing in the SET ZRS menu options (page 38).
The head moves more slowly when zoomed out.	You are using a lens with external motors, and the zoom axis value is increasing in the wrong direction on your particular rig. To cater for this, see *Zeroing lens axes with external Lens Control Motors* on page 64.

Symptoms or message	Cause and/or action
Move playback fails to start. AWAITIING CAM SYNC CAM SYNC FAILED	The option CAMERA SETUP > CAM SYNC is using a setting other than DISABLED and the controller has not yet received a sync signal from the camera (or external genlock system) to trigger the start of the move recording or playback. Start the camera running. Check the cable and connector that the sync signal is going through, and make sure the connection used is one of those specified in the CAMERA SETUP > CAM SYNC option (see page 22).

Working with Local Area Networks

If you are using an Ethernet connection between the LFP and the head, they communicate with each other through an Ethernet Local Area Network (LAN). The LFP and head are **devices** on the network. Under certain circumstances you might need to change the LAN settings of the devices so that the devices not only work together, but do so when connected to another network. For example:

- If you install the LFP as part of a multi-component system.
- If you connect your MRMC equipment to a LAN.
- If you move the equipment between networks.
- If you have customised the LAN settings in a head for one of the above reasons and then sent the head back to MRMC for servicing. The service might change the LAN settings back to the factory defaults, and you will need to customise them again when you get the head back.

Introduction to LAN addresses

Each device on an Ethernet network has a suite of three addresses:

- Internet Protocol (IP) address. This is the specific address within the LAN.
- Subnet (SN) address. This defines the size (address range) of the local area network, and should normally be set to the value shown in the next table.
- Gateway (GW) address. This is the address of the device used when talking between local area networks. This should normally be set to the value shown in the next table, and you would only change it if you needed to communicate with a head that is not on the same LAN as the controller.

Together, these addresses indicate the device's identity and location on the network. Each address is usually written as a group of four numbers separated by periods. The factory default values used in MRMC equipment are shown in the next table:

	LFP	Head
IP address	192.168.1.235	192.168.1.236
SN address	255.255.255.0	255.255.255.0
GW address	192.168.1.1	192.168.1.1

On a given local network, the last group of numbers in the IP address must be unique for each device. All other numbers and addresses must be identical.

The LAN addresses of the LFP and head are **static**. That is, they will stay the same unless you explicitly change them.

> Hint
>
> Most local networks use the SN and GW values shown in the above table, so under ordinary circumstances you will only need to be concerned with **IP addresses**. The rest of this section therefore concentrates on **IP addresses**, but you might also need to inspect or change the SN and GW addresses, depending on the structure of the network that you are using to access the head.

Although a simple LFP setup has only **two** devices on the network (the LFP and the head) there are potentially **three** IP addresses involved:

1. **The IP address of the LFP itself.** This is stored in the **LFP**. You don't ordinarily need to change this unless you are connecting it to a local network that requires different settings.
2. **The IP address that the LFP looks for** when it tries to find and load the head on the network. This is stored in the **LFP**. This must match the next IP address...
3. **The actual IP address of the head.** This is stored in the head. This is usually the IP address shown in the above table unless it has been changed, or unless you specified a different address when you ordered the head. In any case, the factory-set IP address of a head is ordinarily printed on a sticker on the head.

You can use the **LFP** to inspect and edit all of the above stored IP addresses using the procedure given in the next section, *Managing LAN addresses with the LFP*.

If you want, you can also use Flair Motion Control Software to inspect and edit the actual IP address of a head with an unknown history. Details are in *Managing LAN addresses with Flair* on page 61.

Managing LAN addresses with the LFP

1. Connect the LFP and head to each other with the Ethernet cable.
2. Make sure the LFP and head have power. The menu panel on the LFP displays a prompt similar to the following:

   ```
   (C) MRMC 2016
   MSA-21  v6.14.
   PRESS SELECT TO
   LOAD QUAD ETHER II
   ```

3. Press the **SELECT** knob to load the head.

   - If the head fails to load, you can use the remaining procedure to find the actual IP address of the head and then specify that IP address as the one that the LFP looks for when trying to load the head.
   - If the head loads successfully, you can use the remaining procedure to change the actual IP address of the head.

   You can also use the remaining procedure to inspect and edit the IP address of the LFP itself, regardless of whether the head loaded or not.

4. Use the **SELECT** knob again to choose the following menu sequence:

   `CHANGE MODE > ENGINEERING MODE`

5. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

6. Choose one of the following menu sequences:

   To view or change the IP address of the LFP itself, choose:
   `GENERAL SETUP > LAN SETUP > SET MSA IP ADDRESS`

   Otherwise choose...
   `GENERAL SETUP > LAN SETUP > SET HEAD IP ADDRESS`

7. The LAN addresses of the selected device are displayed. For example:

   ```
   IP:192.168.1.236
   GW:192.168.1.1
   SN:255.255.255.0
   ```

   You can edit the addresses here as required. In most cases you will only need to change the IP address.

   If you are looking at the **MSA IP address** (that is, the IP address of the LFP) then you can inspect or edit it here to make sure the IP address is unique on the network.

   If you are looking at the **Head IP address** then the displayed value is the IP address that the controller is looking for when it tries to load the head.

   - If the head loaded successfully then when you edit the IP address here, this will also change the actual IP address of the head.
   - If the head did not load successfully then you can enter the actual IP address of the head here so the controller can find it the next time you try to load the head.

   If you don't know the actual IP address of the head then you can find and register it as follows:

7.1 Press **BACK**, then FIND HEAD.

The panel displays: PRESS SLCT TO FIND

7.2 Press **SELECT** to begin the search.

The panel displays Searching... and then the actual IP address that it found for the head. For example:

IP:192.168.1.236

(If the panel displays No head found then the actual SN and/or GW values stored in the head are different from those on the controller and the controller will not be able to find out the IP address. Contact Mark Roberts Motion Control for advice.)

7.3 Make a note of the IP address that the controller found for the head.

7.4 Press **BACK** then SET HEAD IP ADDRESS.

7.5 Enter the IP address that the controller found for the head.

7.6 You can check that the controller can communicate with the head on the new IP address by pressing **BACK** then PING HEAD and **SELECT**. The panel shows a blinking PING! response when it successfully tests the connection.

8. After you have inspected and/or edited the IP addresses, press **BACK** to return to the top of the Engineering menu.

9. Return to Broadcast mode or Film mode:

CHANGE MODE > BROADCAST MODE
or...
CHANGE MODE > FILM MODE

10. Unplug the LFP power cable, then plug it back in.

11. Press **SELECT** to load the head when prompted.

When the head has been loaded successfully you can use the LFP to control the head, lens, and camera.

Managing LAN addresses with Flair

The factory-set IP address of a head is printed on a sticker on the head.

If the IP address of a head has been changed to an unknown value so you can't load the head from the LFP, you can find out the head's IP address either by using the FIND facility in the or by connecting the head to a Windows PC that has Flair Motion Control Software installed on it and using Flair to interrogate the head on the network.

The procedure below tells you how to use Flair to find the IP address of a head, and if necessary change it. You can also use Flair to change the IP, SN, and GW addresses of the head if necessary.

1. Find a PC that has Flair Motion Control Software installed on it, or install Flair on your own PC.
2. Attach the head to the PC with an Ethernet cable. You can use the same Ethernet cable that was connecting the head to the LFP.
3. Make sure the head has power, by checking that the power indicator LED on the head lights up.

Power LED

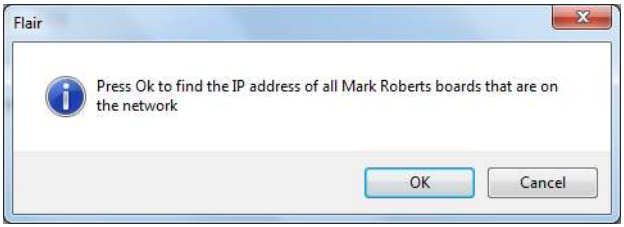
4. Start Flair on the PC.
5. If you get any error messages, click on **OK** to close them.
6. When you get a message about network failure, click on the **Network Setup** button in the message:

or...

If the Flair installation already has a valid head connection on a network then you might not get the network failure message. In this case, start the Network Setup facility manually by choosing the **Setups > Network Setup** menu option in Flair.

The Network Setup window, Connection tab, lists the Nodes (head connections) that Flair is looking for, as defined in the NetworkDirect.ini file. Any changes that you make and **Save** in the Network Setup window are saved in the NetworkDirect.ini file. You can also edit this file by using the menu option **Help > View Network .ini File**. If Flair cannot find the head on the network at the IP address shown then the node's status is **Not connected**.

7. In the Network Setup window click on **Find**, then on **OK** in the pop-up to confirm:



8. An Information pop-up displays information about the heads that Flair has found on the network:

Make a note of the head's IP address that is displayed in the pop-up; for example 192.168.1.236.

9. To change the IP address stored in the head you can use either the LFP or Flair. If you want to use Flair to change the head's IP address, or to inspect or change the SN or GW addresses, follow the sub-steps below:

    9.1 Enter the head's existing IP address (as shown in the Information pop-up) into the Network Setup window and click on **Save**.

    9.2 Click on **Load** to reset and load the head.

    Once Flair is connected to the head, any LAN address changes that you make and **Save** in the Network Setup window will also affect the LAN addresses stored in the head.

    9.3 To change the IP address of the head, enter the new IP address into the Network Setup window now and click on **Save**.

    The Status temporarily changes to **Not connected** as Flair changes the IP address in the head, then to **Connected** as Flair reconnects with the head at its new IP address.

    9.4 To inspect or change the SN or GW address of the head, click on **Find** again. A pop-up shows the head's three current LAN addresses, and the **Subnet Mask** (SN) and **Default Gateway** (GW) fields in the Network Setup window become editable. Enter the new SN and GW addresses that you want to use and click on **Save**.

10. Close the Network Setup window by clicking on **Exit**.

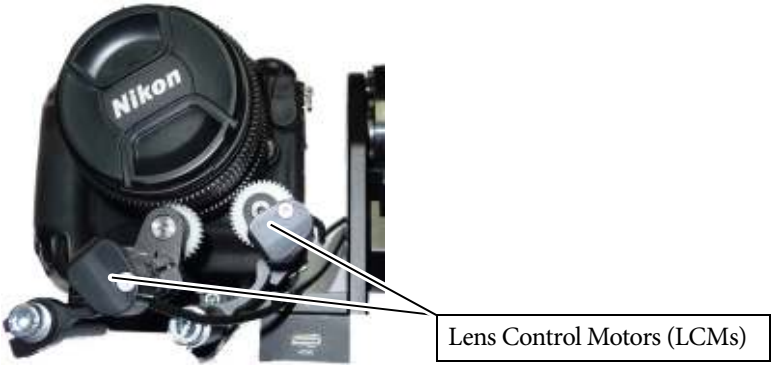
11. You are now done with the PC:

    11.1 Close Flair by choosing the **File** > **Quit** menu option.

    11.2 Disconnect the Ethernet cable from the PC, and re-attach it to the LFP, so the head and LFP are now connected.

    11.3 Tell the LFP which IP address to look for by following the procedures in *Managing LAN addresses with the LFP* on page 58.

Zeroing lens axes with external Lens Control Motors



Axes directions

If you are using a lens with external LCMs, you need to make sure that when you move the lens controls (focus, zoom, and iris), the axis values (as displayed on the LFP) increase in the correct direction. To check this:

1. Choose menu option:

   AXIS POSITIONS (in Broadcast mode)

   or...

   DIAGNOSE AXES > AXIS POSITIONS (in Film mode)

2. Inspect the values for the FOCUS, ZOOM, and IRIS displayed in the panel, as applicable to your setup. The values are updated as you move the controls:

   - FOCUS axis values must increase (or become more positive) as you focus near, and decrease as you focus toward infinity (∞).
   - ZOOM axis values must increase (or become more positive) when you zoom in (toward the telephoto end) and decrease when you zoom out (toward the wide angle end).
   - IRIS (aperture) axis values must increase (or become more positive) when you close down the aperture (to, say, f/22) and decrease when you open up the aperture (to, say, f/2.8).

If any of the axes increase in the wrong direction then this will cause problems with limits and stored positions and moves. You can fix the problem by following the remainder of this procedure.

3. Press **BACK** several times to return to the top of the menu tree, then choose CHANGE MODE > ENGINEERING MODE.

4. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

5. Choose menu option GENERAL SETUP > AXES SETUP > SET DIRECTION.

6. Invert the relevant FOCUS, ZOOM, or IRIS setting that you need to change. That is, change FWD to REV or vice versa for the rogue axis.

7. You now need to invert the input direction for the axis that you just changed, if you want to retain the same feel as before you inverted the axis numbering. To do this, press **BACK** several times to return to the top of the menu tree, then choose GENERAL SETUP > INPUT SETUP > SET INPUT DIR.

8. Invert the relevant control for the FOCUS, ZOOM, or IRIS axis that you changed. That is, change FWD to REV or vice versa for the relevant control.

9. Press **BACK** several times to return to the top of the menu.

10. Exit Engineering mode:

    CHANGE MODE > BROADCAST MODE or FILM MODE.

11. Re-zero the axes (including the lens axes) using the manual or automatic homing method described in *Zeroing the axes* on page 10. Note that inverting the axis direction will also change its homing direction and position.

The zero points, limits, and Zoom-Related Speed (ZRS) facility will now work correctly for your lens system.

Zeroing a lens ring with a hard stop

For any lens ring that has a hard physical stop at the end of its range (for example zoom or iris) you have a choice of configuring the lens to be zeroed manually or homed automatically.

Setting up a lens axis for manual zeroing

1. Choose menu option CHANGE MODE > ENGINEERING MODE.
2. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

3. Set the menu option HOME AXES > SET AXIS HOME TYPE to DIRECT.

This disables the homing facility for this axis and you will need to move it into the home position manually with the controls whenever you zero or home all axes in the future (page 10).

Setting up a lens axis for automatic homing

1. Choose menu option CHANGE MODE > ENGINEERING MODE.
2. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

3. Set the menu option HOME AXES > SET AXIS HOME TYPE to HARD-LIMIT.

4. Adjust the HOME AXES > SET HOMING POWER value to a suitable setting (usually 30% to 70%). The power needs to be high enough to move the lens ring but not so high that the motor jumps out of mesh when it reaches the hard limit of the lens ring.

With this setting, homing a lens axis (page 12) automatically moves the lens ring to find both ends of the hard physical limit, recording the encoder positions at each end. The homing facility then calculates the axis range, sets the lower end to zero, and uses the range information to set the soft limits of the axis.

When a lens axis is configured for automatic homing, you can still zero it manually if you want, by using the relevant DIRECT ZERO option (page 11).

Zeroing a lens ring with a slip clutch

Some lens rings (usually focus) have no hard limit. That is, when you reach one end of travel, such as focussing on infinity, you can continue turning the ring and this will have no further effect as the ring slips against the internal focussing mechanism.

For lens rings that have no physical hard limit to their range of movement, no amount of fine-tuning of the homing power will be able to find the point at which the ring starts to slip, so you must use manual zeroing instead. To set up a lens axis with a slip clutch for manual zeroing:

1. Choose menu option CHANGE MODE > ENGINEERING MODE.
2. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

3. Set the menu option HOME AXES > SET AXIS HOME TYPE to DIRECT.

This disables the homing facility for this axis and you will need to move it into the home position manually with the controls when you zero or home all axes in the future (page 10).

Using a FIZ pot

If you plug a FIZ pot (**F**ocus-**I**ris-**Z**oom) into your controller, you identify it in the menus by the name of the connector that you attached it to, for example ZOOM AUX. You assign it to an axis by using the Engineering menu option GENERAL SETUP > INPUTS SETUP > SET CONTROLLER. You can assign more than one control to an axis, and adjust the control directions independently of each other (page 8).

If your FIZ pot moves the axis in the wrong direction then you need to first make sure the associated lens axis moves in the correct direction relative to its axis values (page 64), then adjust the direction setting of the FIZ pot control for that axis (page 8).

A FIZ pot differs from the controls on your LFP, in that a FIZ pot has hard stops that limit its rotation range to about 355°. This has several consequences, described below.

You might reach the FIZ pot hard stop before you reach the soft limit of its assigned axis. If this happens you can do the following:

1. Press and hold the Disable button on the FIZ pot, which disables the FIZ pot output.
2. Rotate the FIZ pot back to centre (without affecting the axis).
3. Release the button and rotate the FIZ pot again in the original direction to continue moving the axis where you left off.

You can repeat this procedure as necessary until you get to the soft axis limit.

Calibrating the FIZ pot

To exploit the full ranges of both the FIZ pot and its assigned axis, you can map the FIZ pot range to the axis range. You do this as follows:

1. Choose menu option CHANGE MODE > ENGINEERING MODE.

2. Enter the PIN (given to you by MRMC support) to access the Engineering menu.

> Caution
>
> Engineering mode is for advanced users, as applying the wrong settings here can stop the system from working. Apply the settings carefully, and make a note of the changes so you can revert to the previous settings if the system stops working.

3. In the menu choose GENERAL SETUP > INPUTS SETUP > SET POT RANGE.
4. Scroll to the control that corresponds to your FIZ pot, for example ZOOM AUX, and press **SELECT**.

   The LOWER value becomes editable.
5. Rotate the FIZ pot all the way counter-clockwise and press **SELECT**.

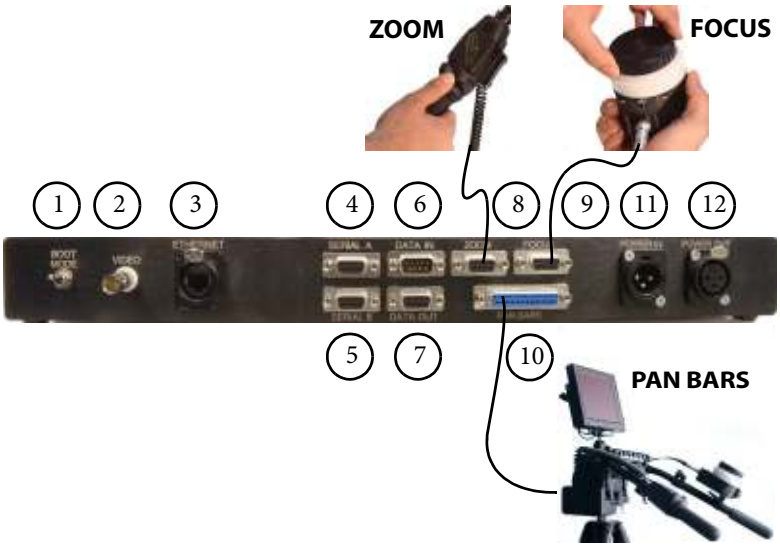
   The UPPER value becomes editable.
6. Rotate the FIZ pot all the way clockwise and press **SELECT**.

   The display shows the calculated FIZ pot range. For example 9834.
7. Press **BACK** several times to return to the top menu level.

> Hint
>
> If the axis has a slip clutch that slips and misaligns the axis range with the FIZ pot range, you can re-align them by rotating the FIZ pot all the way clockwise then all the way counter-clockwise.

Appendix 3 **Back panel and accessories**

Panel summary



1. **BOOT MODE** switch. The mode in which to start up. One of:

   - **Up** position = **Normal (stand-alone) mode**, where the LFP will be used as the main controller, communicating with the head through the **ETHERNET** or **SERIAL A** connector. This mode is also used when copying moves to and from a PC that is running MSA Archiver software (either MSA Ethernet Archiver software connecting via the Ethernet port or legacy MSA Archiver software connecting via the **SERIAL B** port).

   - **Centre** position = **Flair mode**. The LFP only operates as a slave mimic device and boots up from Flair Motion Control Software, either directly from a PC running Flair (over an Ethernet cable, **ETHERNET** connector), or indirectly from the Flair PC, via an RT-12 or RT-14 interface box (over a DataLink cable, **DATA IN** connector). A head can be added to the system by attaching it to an Ethernet hub. A head with DataLink capability can be added to the DataLink daisy-chain by attaching the head to the **DATA OUT** connector on the LFP.

- **Down** position = **Serial mode**. This is only used to update the firmware in the LFP through the **SERIAL A** connector.

2. **VIDEO** input connector for the synchronisation signal from the camera.

3. **ETHERNET** RJ45 connector, for connection to the head or larger multi-component system. Ethernet is the recommended connection method (as opposed to DataLink or Serial). This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

4. **SERIAL A** connector. Used for updating the firmware in the LFP, and for connecting to a head (such as an Ulti-head) using an RS-232 serial connection (as opposed to Ethernet or DataLink). For pin-out information see *Serial A connector* on page 75.

5. **SERIAL B** connector. Used for copying moves and settings to and from a PC that is running MSA Archiver software. The copying is controlled in both directions from the MSA Archiver software. However, this usage has largely been superseded by using MSA Ethernet Archiver software running over the Ethernet connection. For pin-out information see *Serial B connector* on page 76.

6. **DATA IN** DataLink In connector, used in combination with Flair boot mode (see above) to connect to an RT-12 or RT-14 interface box using a DataLink connection, as an alternative to an Ethernet connection. For pin-out information see *Data In connector* on page 74.

7. **DATA OUT** DataLink Out connector, used in combination with Flair boot mode (see above) to connect to a head using a DataLink connection (as opposed to Ethernet or Serial). For pin-out information see *Data Out connector* on page 75.

8, 9, 10. **FOCUS**, **ZOOM**, **PAN BARS** connectors. You can use these additional controllers in parallel with those on the LFP. For pin-out information see:
Auxiliary connectors for Focus and Zoom on page 76 *Pan Bars connector* on page 77

11. **POWER IN** connector. The LFP requires a 3-pin, 24 Volt DC power supply. For pin-out information see *Power In connector* on page 78.

12. **POWER OUT** connector. For pin-out information see *Power Out connector* on page 78.

> Hint
>
> It is recommended that you **do not** use the **POWER OUT** socket to power the head if you are using an Ethernet connection to the head. If you do so then powering up the LFP will simultaneously power up the head, and in this instance powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

Connector pin-out information

Camera trigger out

When you play a move on the LFP, it outputs a camera trigger signal (Trigger 1) from the appropriate connector on the attached head. For example:

- Pin 2 of the **TRIGGER** connector on an AFC head, Quad-box (on an SFH-30 or SFH-50 head), or Octo-box (on an SFH-50 head)
- Pin 14 of the **CAM ACC** connector on an Ulti-box (on an SFH-50 head or Ulti-head)

To control the type of trigger signal produced, see the ENABLE setting on page 21.

Auto-focus and bloop trigger out

The auto-focus and bloop trigger output signals from the controller share the same output connectors:

- Pin 13 of the **CAM ACC** connector on an Ulti-box (on an SFH-50 head or Ulti-head)
- Pin 3 (Trigger 2 Out) of the **TRIGGER** connector on an AFC head, Quad-box (on an SFH-30 or SFH-50 head), or Octo-box (on an SFH-50 head). Note that some **TRIGGER** connectors might be internally configured (with a jumper setting) so that Pin 3 is a Trigger In instead of a Trigger 2 Out. If you have such a system and you want to use a bloop light or auto-focus facility then you won't be able to use Pin 3; you will have to use Pin 2 instead, by splitting camera Trigger 1 Out signal (**TRIGGER** Pin 2) and using one of the splits to trigger the bloop or auto-focus when the camera starts.

In Broadcast mode (see page 16) or time-lapse Film mode (see TIME-LAPSE on page 21) it is assumed that you will want to use an auto-focus trigger and not a bloop light. The controller generates an auto-focus signal through the above connectors whenever it generates a camera trigger signal.

In normal Film mode (see PULSE, or CONTINOUS on page 21) it is assumed that you will want to use a bloop light, and use some other

means to trigger the camera's auto-focus. The controller generates a bloop light trigger pulse through the above connectors at the start of move playback.

The bloop trigger pulse is 40ms long, and the camera trigger pulse and bloop trigger pulse are sent at the same time; there is no delay. If the camera reaction is too slow and the recording misses the bloop then you can start the camera in advance manually and the bloop will trigger as usual when the move starts.

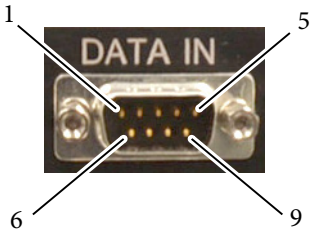
Camera sync in

For information on which pins you can use to input the camera sync signal into the controller, see page 22.

Data In connector

The Data In (DataLink In) connector is used to connect the LFP to an RT-12 or RT-14 interface box when the LFP is booted up in Flair mode and used only as a slave mimic device. For usage see page 71. Bit rate 10Mbps.

1. Watchdog–
2. In–
3. Out–
4. N/C
5. N/C
6. Watchdog+
7. In+
8. Out+
9. N/C



Data Out connector

The Data Out (DataLink Out) connector is used to connect the LFP to a head when the LFP is booted up in Flair mode and used only as a slave mimic device. For usage see page 71. Bit rate 10Mbps.

1. Watchdog–
2. Out–
3. In–
4. N/C
5. N/C
6. Watchdog+
7. Out+
8. In+
9. N/C

Serial A connector

Serial A is an RS232 port used for updating the firmware in the LFP, and for connecting the LFP to an Ulti-Head or any other head that can use an RS-232 serial connection (as opposed to Ethernet or DataLink). The Baud rate is 76.8 kbps.

1. N/C
2. TX-A
3. RX-A
4. N/C
5. GND
6. N/C
7. N/C
8. N/C
9. N/C

Serial B connector

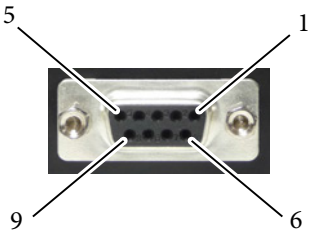
Serial A is an RS232 port used for copying moves to and from a PC that is running MSA Archiver software. The copying is controlled in both directions from the MSA Archiver software. The Baud rate is 38.4kbps.

1. N/C
2. TX-B
3. RX-B
4. N/C
5. GND
6. N/C
7. N/C
8. N/C
9. N/C
10.

Auxiliary connectors for Focus and Zoom

The pin assignments for these connectors are identical.

1. A+
2. B+
3. N/C
4. N/C
5. +5V
6. A–
7. B–
8. N/C
9. GND



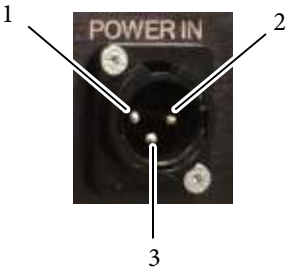
Pan Bars connector

1. PB1A+
2. PB1B+
3. PB2A+
4. PB2B+
5. PB3A+
6. PB3B+
7. PB4A+
8. PB4B+
9. GPO6
10. GPO7
11. GPO8
12. GPO9
13. +12V
14. PB1A–
15. PB1B–
16. PB2A–
17. PB2B–
18. PB3A–
19. PB3B–
20. PB4A–
21. PB4B–
22. +5V
23. GND
24. GND
25. GND

Power In connector

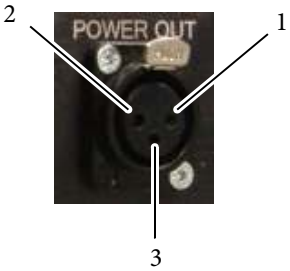
Power to supply the LFP and the power output connector. The LFP can run from 12-35 Volts DC.

1. GND
2. 24VIN
3. N/C



Power Out connector

1. GND
2. 24VOUT
3. N/C



Hint

It is recommended that you **do not** use the **POWER OUT** socket on the LFP to power the head if you are using an Ethernet connection to the head. If you do so then powering up the LFP will simultaneously power up the head, and in this instance powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

Appendix 4 **Specifications**

Weight: 2.4 Kg

Power requirements: 24 Volts DC / 100-240 Volts AC

Temperature range: 0-45 °C (32-113 °F)

Humidity tolerance: 0% to 85% relative humidity, non-condensing

Dimensions: L × W × H = 273 × 442 × 106 mm

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