



ARRIFLEX TECHNICAL NOTE P - 1004

Internal versus External Ramps

Summary

This note explains what a ramp is, plus the differences between internal and external ramps.

What is a Ramp?

A "Ramp" is a change of the camera's frame rate (fps), performed while the camera is running. Ramps can be used for a myriad of effects, from the dramatic speeding up or slowing down of the action to the subtle enhancing of a scene's timing. A ramp essentially allows the cameraman to compress or stretch time transparently and dynamically.

The frame rate of the new generation of Arriflex cameras can be changed with the following accessories: RU-1 (Remote Unit), RCU-1 (Remote Control Unit), CCU-1 (Camera Control Unit) and LCC (Laptop Camera Controller).

Ramps come in two flavors: internal ramps and external ramps.

Exposure Compensation

As you change the frame rate the exposure for each frame also changes. The 535 and 435ES can compensate for this exposure change by varying the open angle of the mirror shutter while the camera is running. On all new generation Arriflex cameras (535, 535B, 435, 435ES and 16SR 3) the Iris Control Unit (ICU) can be used to compensate for the exposure change. The ICU will slave to the speed of the camera and vary the lens iris opening accordingly.

Please note that compensating for the exposure change with either method has certain advantages and disadvantages.

Depth of Field When compensating by changing the lens iris with the ICU, the depth of field will change. The depth of field will not change when compensating with the electronic shutter of the 535 or 435ES.

HMI Lights HMI lights cannot be used when compensating with the electronic mirror shutter. HMI lights can be used when compensating by changing the lens iris with the ICU.

What is an Internal Ramp?

An internal ramp is a speed change that is stored in the camera's internal memory. Internal ramps are possible with the 535, 535B, 435 and 435ES. The CCU or the LCC are necessary to create an internal ramp and to send it to the camera. Once an internal ramp is stored in the camera, it can be activated and executed on the camera without any external controllers.

What is an External Ramp?

An external ramp is a speed change that is stored in the memory of an external camera controller like the LCC or the RCU. To activate and execute an external program, the controller has to be connected to the camera. Since external controllers (like the LCC, for instance) can have more memory and processing capacity than the camera, more complex ramps are possible.

Details on Internal Ramps

For the 535 and 435ES an internal ramp consists of a first speed and shutter pair, a second speed and shutter pair and a duration. For the 535B and 435 (non ES) an internal ramp consists of a first speed, a second speed and a duration. The duration is the time it will take to get from the first speed to the second speed.

Speed (fps) values can be entered with a resolution of 1/100th of a frame per second (i.e. 29.97 fps).

Before the camera is started, internal ramps need to be activated. This is generally done by pushing the PROG button on the camera or by selecting the ramp from the Programs menu of the LCC. Once the camera is running, you can trigger the speed change by pushing the PROG button on the camera again or with the PGM Trigger button on the LCC. Pushing either of those buttons again will bring the camera back to the first speed and so on.

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Pushing the PROG button on the camera or selecting None from the Programs menu of the LCC while the camera is in standby will de-activate any active internal ramp.

Details on External Ramps and the RCU

The RCU uses external ramps. It cannot modify the internal ramp values stored in the camera's memory. None the less, external ramps on the RCU behave very much like internal ramps. They consist of a first speed and shutter pair, second speed and shutter pair and a duration.

The RCU will display the screentime of a ramp. External Ramps created with the RCU will always assign a 180° mirror shutter to the higher fps value entered, and calculate the other shutter value based on the resulting exposure time.

Speed (fps) values can be entered with a resolution of 1/1000th of a frame per second (i.e. 23.976 fps).

Details on External Ramps and the LCC

An external ramp created with the LCC can have more than a first and a second speed/shutter pair. In fact, there can be an unlimited number of pairs. Thus the camera could start at 24 fps, then change to 12 fps, then change to 6 fps, etc.

The LCC can calculate shutter values automatically, or accept shutter values entered manually. This allows for effects like fade-ins or fade-outs. External ramps created with the LCC have an optional timer for the duration between speed changes. The screentime for the whole take or only part of the take, as well as the amount of film needed are calculated.

Speed (fps) values can be entered with a resolution of 1/1000th of a frame per second (i.e. 23.976 fps).

What Controller Does What?

The CCU can create and control only internal ramps.

The RCU can create and control only external ramps.

The LCC can create and control internal as well as external ramps.

Cross Reference

More information related to the topics discussed above can be found in:

- Arriflex Technical Note P-1003: Reverse Ramps

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