ARRI TECHNICAL NOTE P-1014

ICU Ramp Time/Quick Setup Guide

Summary

This note contains information about the ICU minimum ramp time plus an ICU Quick Setup Guide. It also contains instructions on how to create a handy laminated reference card.

Definitions

A controlled change of the camera's frame rate (fps), performed while the camera is running, is called a "ramp". Please note that switching between the NORM and PS/CCU speed setting on the new cameras, or between crystal and variable speeds on a 35-3, are wild speed changes (not controlled), and are not considered ramps.

If the resulting change in exposure is compensated for by the camera's electronic mirror shutter, the ramp is called a "speed/shutter ramp". The 535 and the 435ES are capable of speed/shutter ramps.

If the change in exposure is compensated for by the Iris Control Unit (ICU), the ramp is called a "speed/iris ramp". All modern Arriflex cameras and the 16SR and 35-3 are capable of speed/iris ramps.

Minimum Ramp Time

The Controlled Lens Motor 1 (CLM-1) used by the Iris Control Unit needs a certain minimum time to move from point A to point B during a speed/iris ramp. There is no automatic ramp time limitation built into the ICU or the CLM-1, so it is possible to run a speed/iris ramp faster than the CLM-1 motor can keep up with. Use the chart provided below to calculate the proper minimum ramp time for speed/iris ramps!

Please note that it is the CLM-1 lens motor that dictates the minimum ramp duration when using the ICU. Using the ICU with other motors could result in different minimum ramp times.

CCU-1, RCU-1 and LCC

The CCU-1, the RCU-1 and the LCC will calculate the minimum ramp time for a speed/shutter ramp, NOT for a speed/iris ramp, so minimum ramp times calculated by the RCU-1 or the LCC do not apply to the ICU.

Do not use minimum ramp times calculated
by CCU-1, RCU-1 or LCC for the Iris Control Unit!
Always use the chart below to calculate
minimum ramp times for the ICU!

CLM-1 Motor Reaction Speed

The CLM-1 motor has two settings for how fast it reacts to a change in camera speed: fast and slow. A comprehensive discussion of this issue can be found in the ARRI Technical Note P-1006. It is important to know, though, that the chart and the formula below calculate the minimum ramp time for a CLM-1 set to the fast reaction speed. The minimum ramp time has to be doubled if the CLM-1 is set to the slow reaction speed.

Changing Speed By Hand

The chart and the formula below give the minimum ramp time for a ramp that is pre-programmed and executed automatically. If the hand knob on the RCU-1, or any other hand control is used to change the camera speed during the ramp, the minimum ramp time calculated from the chart and formula below has to be multiplied by a factor of 3.

Creating a Laminated ICU Reference Card

Print or copy page 3 of this Technical Note on a piece of paper. Print or copy page 4 on the back of that same piece of paper. Alternatively, you can print each on a separate piece of paper, and use a photocopier to copy page 4 onto the back of page 3.

Cut the center part out, and have your local copy shop laminate it. Make sure this card always travels in the ICU case!

Cross Reference

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

- ARRI Technical Note P-1003: Reverse Ramps
- ARRI Technical Note P-1004: Internal versus External Ramps
- ARRI Technical Note P-1006: ICU/CLM-1 Reaction Speed

Article Change History

May 11, 1998	Article was created.
September 29, 1998	Added steps to Quick Setup Guide, slight changes to text.

Keywords

Iris Control Unit, ICU, Controlled Lens Motor, CLM, Minimum Ramp Time, Reaction Speed, ICU Quick Setup Guide.

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ICU Quick Setup Guide

1. Attach Lens Motor to Support Rods
Switch lens motor to IRIS

2. Connect Cables
535, 535B: .....LC-D1 to RU receptacle
SR-3, SR-3 HS, 435ES: .....LC-D1 to ACC receptacle
35-3, 435, 435ES: .....LC-D2 to 11 pin receptacle
SR-1, SR-2, SR-2 HS: .....LC-D4 to 11 pin receptacle
765: .....LC-D3 to SCU receptacle

3. Turn ICU Power On
SET F-STOP and NON LINEAR LEDs blink fast: fast reaction speed is set.
SET F-STOP and NON LINEAR LEDs blink slow: slow reaction speed is set.
See ARRI Technical Note P-1006 for information on reaction speed.

4. Push CAL Button to Calibrate ICU

5. Set Lens Motor Drive Direction
Set L/R switch on CLM-1 motor so the rotation of the iris corresponds to the OPEN and CLOSE buttons on the ICU.

6. Assign F-Stops
Linear iris scale: hold F-STOP button and drive through 4 full F-Stops (i.e. f 2 - f 8).
SET F-STOP LED illuminates: a linear iris scale has been memorized.
Non linear iris scale: hold F-STOP button and drive to each full F-Stop.
At each full F-Stop push CAL button.
NON-LINEAR LED illuminates: a non linear iris scale has been memorized.
Note: end stops are generally not full F-stops!

7. Verify Operation
While camera is running, change from 24 to 48 fps. Iris should open one stop.

8. Calculate Minimum Ramp Time
Use the Chart on the back to calculate the minimum ramp time.
- Double result when slow motor reaction speed is set.
- Multiply result by 3 when fps is changed by hand.

From the ARRI Technical Note P-1014, September 29, 1998

ICU Minimum Ramp Time

The chart shows the minimum ramp time required when using the ICU and the CLM-1. Do not use minimum ramp times calculated by the CCU-1, RCU-1 or LCC. The chart is meant as a guide only; shooting tests is always recommended.

Use a ruler to connect the starting fps in the first column and the finishing fps in the third. The intersection with the middle column shows the minimum ramp time in seconds.

The chart shows minimum ramp time for a pre-programmed ramp when the CLM-1 is set to a fast reaction speed. Double the result when the CLM-1 is set to the slow reaction speed. Multiply the result by 3 when changing speed by hand instead of through a pre-programmed ramp.

The minimum ramp time for a pre-programmed ramp with fast CLM-1 reaction speed can also be calculated using the formula below. For slow CLM-1 reaction speed, multiply "t" by 2. For hand control, multiply "t" by 3.

$$t = \frac{V_2 - V_1}{4V_1}$$

- t Minimum ramp time in seconds
- V_2 Highest speed in fps
- V_1 Lowest speed in fps