ARRI

ARRIFLEX 535



SYSTEM INTRODUCTION

Entering the second century of film technology, ARRI brings forth timely advances in the system approach to 35 mm cinematography. The ARRIFLEX 535 is an universal production camera designed to unite unequalled integrated features, quiet running and precision ARRIFLEX image quality.

ARRI designers have developed a swing-over viewfinder with both unprecedented flexibility and a range of advanced features. New electronic shutter and variable speed functions offer manual, automatic and remote control.

The ARRIFLEX 535 employs a PL lens mount and accomodates standard, anamorphic, Super-35, and reverse filming. An integrated CCD camera module makes video assist more streamlined than ever. The internal time code generator anticipates Eastman Keykode (r) and other future post production technologies. New matte box and lens support systems afford filmmakers greater choice and shorter set-up time.

Together these features comprise today's most versatile and advanced universal camera system

SOUND LEVEL

Lowest noise level at 24 fps with constant flange focal distance.

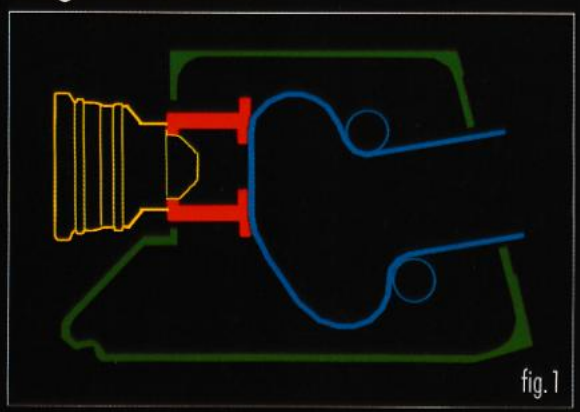

fig. 1

A rigid, mechanical connection between lens mount and focal plane is the hallmark of all ARRIFLEX Cameras. Due to the long lasting stability of the flange focal distance, no adjustment is necessary (fig. 1). Even when the camera is subjected to extreme conditions such as rapid acceleration and unusual camera mounting, this has no effect on image sharpness.

The 535's low sound level is achieved mainly through a refined movement concept that minimizes isolated frequency peaks. The insulated inner camera "skeleton" transmits little vibration to the outer camera. New film loop geometry smoothes film travel, further reducing vibration and sound level.

FILM TRANSPORT SYSTEM

Modular concept, ultra-quiet movement.
Universal aperture plate.

The new film transport employs a 7-link, ultra-quiet movement and sprocket wheels, mounted together on a modular movement plate. This arrangement is mechanically superior, centralizes film threading, and allows easy removal (fig. 2). The dual-pin registration provides exceptional picture steadiness. Adjustable pitch control and reverse film transport are standard features. Electronic sensors monitor film travel and prevent an unintentional roll-out.

A new universal aperture plate was designed to accept interchangeable metal format masks. Eight masks in standard aspect ratios allow the use of a single aperture plate for all filming formats.

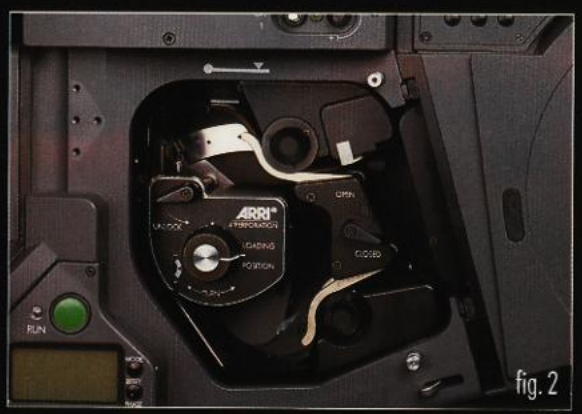

fig. 2

SWING-OVER VIEWFINDER SYSTEM

270° operation from left to right.
Standard, extension, hand-held viewfinders.

Combining a versatile swing-over viewfinder with advanced features was a main design objective. Both standard and extension viewfinders pivot 270° left to right and 360° parallel to camera (fig. 3). A telescoping viewfinder extender is also available. Together these functions deliver unprecedented freedom and ease of viewing.

This system features programmable Arriglow, de-anamorphoser, 2x image magnifier, 3-way beam splitter unit, and pivoting contrast viewing filters – all integrated. The standard 6.5x image magnification can be enlarged up to 13x with the image magnifier. In addition, the super wide-angle eyepiece accepts a new variable-intensity heated eyecup.



fig. 3

INTEGRATED VARIABLE SPEED

From 3-50 fps with programmable speed changes.

The ARRIFLEX 535 features integrated variable speed control, with preset and programmable quartz accurate speeds. The integrated, plug-on variable speed unit (VSU-I) is highly accurate throughout its entire range.

The CCU can preset the camera to any quartz accurate speed (3-50 fps). The selected frame rate can be used directly or stored in the camera's running program. The camera's program switch will then activate the chosen speed automatically – even during filming.

The running program also performs simultaneous frame rate/shutter angle effects. This allows automatic speed changes during running with precise exposure compensation and repeatability. The four preset crystal speeds from 24 – 30 fps are chosen via the frame rate selector. Reverse filming speeds are also selectable via the CCU.

ARRIGLOW

8 formats integrated and programmable.
Up to 3 simultaneously displayed.

The 535's Arriglow system for illuminated format markings employs new opto-electronic technology. The CCU activates up to 3 of the 8 standard filming formats included in the camera's single focusing screen module. These "electronic etchings" allow continuously adjustable brightness via the rheostat control. This system includes the following formats: Silent (1.33), TV (1.33), Academy (1.37), Widescreen (1.66 and 1.85), Super-35 (1.85 and 2.35), Anamorphic (2.35).

REMOTE UNIT

For speed, shutter and programmed control.
From 3-50 fps and 11-180°, during running.

The remote unit (RU) brings frame rate, shutter angle and running program functions together in a simple palm-sized controller (fig.5). Filming speed and shutter angle are continuously adjustable with the dials throughout their entire range.

The running program switch controls shutter and frame rate together or independently, before or during filming. In addition, speed changes with constant exposure, via a single dial-control, are possible in the RU's "coupled" mode. The RU's 100 ft (30m) range makes the ARRIFLEX 535 highly compatible with remote camera support systems.

CAMERA LCD DISPLAYS

Complete information on camera status.

The camera left and right side liquid crystal displays (LCD) provide complete and identical information on all major camera functions. This information is called up with the single mode selector.

Display groups

- exposed film (f/m per take) + running speed/tachometer (fps)
- shutter opening (degrees) + selected speed (fps)
- exposed film (f/m running count) + battery status (DC volts)
- time code (running count H:M:S: frames)
- time code (user bits)

Both LCD's also report on the performance of magazine, movement, and shutter functions.

The viewfinder warning display informs operator of low film supply, low battery, and asynchronous running. All warnings also appear on the camera LCD's. When using the running program, both selected shutter angle and frame rate values are automatically displayed.

MODULAR VIDEO ASSIST

Integrated plug-on module.
CCD camera with flicker reduction.

The CCD camera with flicker reduction accompanies a mini plug-on optical module that makes video assist a fully integrated feature. This mini-module, in connection with the 3-way beam splitter unit, provides optimal light transmission for all video assist applications – standard or remote.

The CCD camera provides over 750 pixels horizontal resolution, without the image burn-in, lag, or geometric distortion resulting from video tubes. Image flicker is reduced considerably at speeds over 20 fps.

INTEGRATED TIME CODE

On-board or remote control
for 24, 25, 29.97, 30 fps.

The integrated time code generator allows recording of SMPTE RP 135 and RP 136 80-bit TC between the picture frame and perforations. This TC track location makes ARRI time code uniquely compatible with Eastman's Keykode (r) edge numbering system. Time code can be recorded autonomously when the camera is preset by a TC master clock. The plug-on TC module can be interchanged in seconds.

If desired, the CCU will reset the TC count, and program daily production information (user bits) into the camera. This two-tiered control system gives flexibility in using time code for expediting post production.

CAMERA SYNC FEATURES

Integrated phase control.

The phase shifter/run test switch makes filming of quartz controlled monitors a simple, integrated process. Synchronizing to exterior sources – monitors, generators, or other cameras – is further simplified by the 535's microprocessor and open-ended electronic circuitry. In "standby" the run tester advances the film at 1 fps for easy inspection of film travel.

ARRIFLEX 535 with attached MB-14 matte box, follow focus FF-3, extension viewfinder, 1000 ft (300m) magazine, plug-on video assist module with CCD camera, variable speed unit (VSU) and shutter control unit (SCU).

FILM MAGAZINES
1000 ft (300m), 400 ft (120m) coaxial with LCD display.

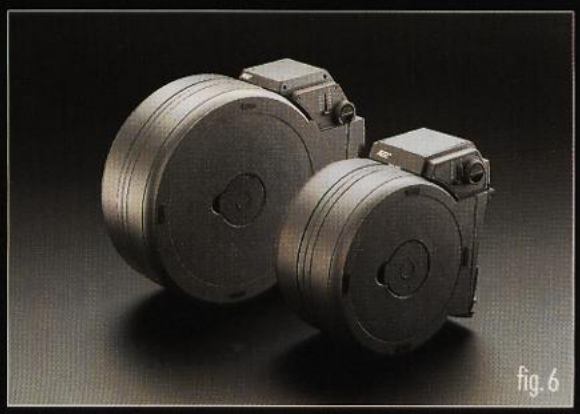
fig. 6

These new quick-thread magazines are quiet, simple to use, and require no regular maintenance (fig.6). With the film loop adjusted inside the camera, magazine loading becomes fast and easy. Proper tension of supply and take-up are ensured by dedicated, electronically torque-controlled motors. Magazines also include digital LCD counters (ft/m), mechanical raw stock gauge, and push-button safety locks.

SWING-AWAY MATTE BOX SYSTEM MB-14
MB-14 6.6"x6.6" swing-away matte box.
MB-14W 6.6"x6.6" wide-angle matte box.

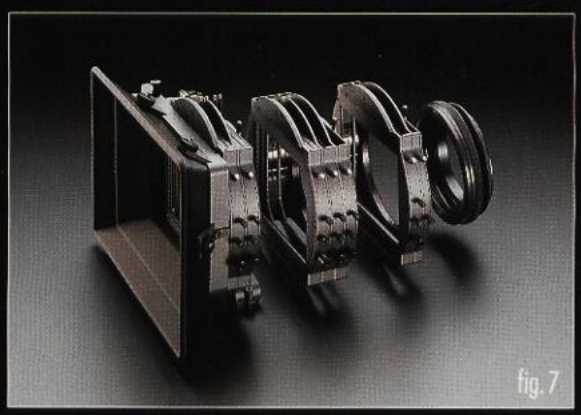
fig. 7

The MB-14 matte box features 5 new slide-on filter stages (fig.7). This allows more filter combinations with quicker changes, for lenses 12 mm and up. New fine adjustments provide precise lens alignment.

The MB-14 W accepts the same slide-on stages for lenses 9.8 mm and up. A new tilting double filter stage, new series light shields and hard mattes complete the system.

QUICK-RELEASE FOLLOW FOCUS FF-3
Snap-on assembly, 2-speed operation.

The FF-3 provides precise 2-speed operation from camera left or right and compliments the new bridge plate system. Snap-on assembly and removal can be done simply with one hand. New quick-mount lens support and zoom motor holder also simplify lens changes.

BRIDGE PLATE BP-5
With quick-release adapter plate.
New hand-held shoulder set.

The BP-5 sliding bridge plate features a removable adapter for mounting directly on the ARRIHEAD or other touch'n'go systems. This bridge plate accomodates the camera's new optical center and includes a reversible base for Super-35 filming. The new support rods have been doubled in strength for precise alignment of lens accessories.

The light weight shoulder set features double adjustable grips for optimal comfort in hand-held operation. Direct attachment to the BP-5 allows quick interchanging amongst support systems.

CAMERA POWER
24V/7Ah battery block, 24V/2Ah on-board battery.
24V quick charger, AC power supply.

The 24-volt/3-pin configuration is designed for reliability in all filming conditions especially with multiple accessories (fig.8).

The new NC 24/7R nickel cadmium battery block delivers 7Ah to its 3-pin output, and provides maximum running time for all filming speeds. The durable rubber exterior is highly water resistant. The light weight NC 24/2 on- board battery mounts atop the camera for hand-held filming with the 400ft (120m) magazine or filming on tripod without cable.

The NCL 12R quick-charger accomodates all 24-volt batteries up to 7Ah, and features a 3.5 hour charging time. A residual discharger is built-in to preserve battery storage capacity.

The NG-24R is a new AC power supply that provides a constant 24V/10A output from a variety of source voltages. Input is switchable between 100/120/220/240V.


fig. 8

The hand-held viewfinder is a light weight version designed for well-balanced shoulder operation (fig. 4). With integrated eyepiece and de-anamorphoser, this unit quickly interchanges with the standard viewfinder for all filming formats.

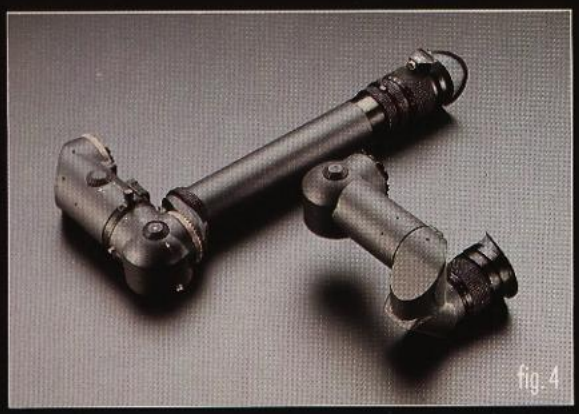
fig. 4

535 ELECTRONIC SYSTEM
Control, accuracy, information.

The ARRIFLEX 535 uses an innovative electronic control system: The main microprocessor enables exceptional accuracy of camera functions, simultaneous frame rate and shutter angle effects, and provides more detailed information on running status than ever before.

The main microprocessor monitors film travel, shutter timing, and magazine torque with greater accuracy than standard belt-driven systems. These functions are now driven by dedicated 24V DC motors, with a self-testing capability that ensures reliability. Specific message symbols allow instant response to camera functions requiring adjustment. Camera displays report everything from battery voltage to time code user bits – totally free from accessories.

The integrated running program gives cameramen simple automated control of frame rate and shutter angle during running. The seperate camera control unit presets these and other functions, thereby preserving a streamlined camera profile.

CAMERA CONTROL UNIT (CCU)
Two-tiered camera control.
Open-ended electronics.

The camera control unit lets the user preset various electronic camera functions before filming (fig. 5). The CCU can pre-program the camera's shutter angle and filming speed for later on-board control: Simultaneous adjustment of frame rate and shutter angle can now be performed electronically for the first time ever – and without accessories.

The CCU also presets the camera's mode selectors and time code functions. Modes for Arriglow, film counters (ft/m), and warning indicators are programmed in before production. Likewise, the camera's own running program receives preset shutter angle and/or frame rate combinations from the CCU, for access before or during running, without the CCU – as a fully integrated camera function.

When using time code, the CCU enters production information (user bits) into the camera's TC generator. SMPTE time code can also be recorded autonomously. A quick overview of all camera functions is displayed in the unit's "status" mode. In addition, the CCU features a diagnosis function enabling swift and conclusive testing of the camera's electrical system.

Functions set via the camera control unit (CCU):

- Mode select for counters (f/m)
- Selection of Arriglow format markings (up to 3 simultaneously)
- Selection of frame rate and shutter angle from 3-50 fps and 11-180°
- New shutter angle and/or frame rate for camera's running program memory
- TC and user bits
- Mode for sync warning (audible on/off)
- Selection of film end warning (1-99 ft/m)
- Mode select for reverse filming
- Mode select for diagnosis program


fig. 5

ELECTRONICALLY CONTROLLED VARIABLE SHUTTER
Adjustable 11-180° during filming.
Running program for automatic control.

Variable shutter and filming speed – adjustable during running with simple on-board control – are chief design elements of the ARRIFLEX 535. The mirror shutter opening can be continuously dial-operated using the mini plug-on shutter control unit (SCU).

The CCU will preset any chosen shutter angle (11-180°) into the camera's running program. This angle can be activated automatically during filming via the camera's program switch – without accessories.

Simultaneous shutter/frame rate changes can also be preset via the CCU. The running program ensures an accuracy in performing these functions unattainable with manual systems. Camera shutter angle is also mechanically adjustable through the lens port.

ARRIFLEX 535

ARRIFLEX 535 TECHNICAL DATA

Universal 35 mm camera with programmable mirror reflex shutter. Data input via camera control unit.

Film format 35mm

Lens mount . . . . . 54mm PL-mount adjustable for Super-35 filming

Flange focal distance . . 51.98 – 0.01 mm

Viewing system . . . . . mirror reflex viewing
– standard viewfinder
– light weight (hand-held) viewfinder
– viewfinder extension

Viewing image magnification . . . . . 6.5/13X (with 10x super wideangle eyepiece)

Mirror reflex shutter . . . single blade, 180° electronically adjustable during filming: 11-180°

Viewfinder displays . . . asynchronous, low battery, film end, film end warning; formats

Camera displays . . . . . digital LCD's (camera left and right)

Filming speed . . . . . 24, 25, 29.97, 30 fps preset and selectable, 3-50 fps continuous quartz-accurate control via CCU, VSU and RU, reverse filming 24/25 fps

Asynchronous display . . on LCD's, in viewfinder, acoustic, and running control lamp illuminates red

Run test . . . . . at standby 1 fps

Phase shifter . . . . . integrated in camera; with "Phase" switch

Sensors . . . . . on LCD's, for: film jam, film end, improper movement position, magazine improperly mounted, rear film guides disengaged. Not ready for operation: running control lamp illuminates red

Beam splitter ratios (viewfinder : video) . . . switchable 80:20, 50:50, 0:100

Contrast filters . . . . . switchable: ND.3, ND.6

Transport system . . . . . 7-link movement with dual pin registration and pull-down, for 35 mm negative films

Drive system . . . . . quartz-controlled disc-type DC motor

Power requirements . . . 24 V

Power consumption . . . . approx. 2A at room temperature and 25 fps with loaded 400ft (120m) magazine

Battery type . . . . . NC 24/7R block, NC 24/2 on-board battery

Magazines . . . . . 1000ft (300m), 400ft (120m) coaxial with drive motors, electronic LCD counters. Connection and data transfer to camera via multi-pin plug

Time code . . . . . plug-in TC module for recording SMPTE RP 135 and RP 136 80-bit

Video assist . . . . . plug-on video optical module with: flicker reduction, BNC connector for monitor and flange connector for mini-monitor. CCD video camera with 2/3" pick-up area, available in 50 or 60 Hz versions

Weight (with standard viewfinder, 400ft (120m) magazine, without film and lens) . . . . . 38.6 lbs (17.5 kg)

Dimension (with standard viewfinder, 400ft (120m) magazine, without lens . . . . . W 13.7 H 11.0 L 19.3 in
W 349 H 279 L 490 mm

ARNOLD & RICHTER CINE TECHNIK
TÜRKENSTR. 89 · 8000 MÜNCHEN 40 · TEL. (089) 3809-1
TELEX 524317 ARRI · FAX (089) 3809-244

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