

modern tests

newest cameras, lenses & important accessories

YASHICA FR-I: START WITH A CONTAX RTS, THEN . . .

MANUFACTURER'S SPECIFICATIONS: Yashica FR-I 35mm eye-level single-lens-reflex camera. Body No. 004543. **LENS:** 50mm f/1.7 Yashica ML in interchangeable bayonet mount, stops to f/16, focusing to 21 in. (0.5 m), accepts 52mm accessories. **SHUTTER:** Electronically-timed cloth focal plane with speeds from 4 to 1/1000 sec. plus B, X sync., self-timer. **VIEWING:** Fixed, eye-level prism with non-interchangeable central diagonal split-image rangefinder, micropism collar, full-focusing screen. **FEATURES:** Silver-oxide-battery powered silicon diode cell in prism housing measures center-weighted area of focusing screen at full aperture, ASA 12 to 3200 for aperture-priority automatic exposure (user sets aperture, camera selects shutter speed), auto-exposure-compensation dial, manual override, over- and under-exposure signals in finder; shutter speeds, apertures visible in finder; battery-check light; film box memo holder, provision for multiple exposures; depth-of-field preview; electromagnetic release; provision for auto winder, data back. **PRICE:** \$510 with 50mm 1/1.7 lens, \$553.50 with 50mm 1/1.4 lens, \$673.50 with 55mm 1/1.2 lens.

The electronics and mechanics of the Yashica FR-I are hardly newcomers to "Modern Tests." The internal casting, many of the electronic mechanisms and controls can be found on the auto-exposure Contax RTS and the original match-diode semi-automatic Yashica FR. The FR-I is basically a reshuffling of already-proven features to provide Yashica with yet another offering—and a very good offering it is, too: It provides the precision, automation and flexibility of the Contax RTS at a vast saving in money. With the same handsome black finish, the FR-I's physiognomy is one of the best-looking among 35mm SLR cameras.

Rather than repeat *ad infinitum* where the Contax RTS and FR are similar to the FR-I and

where they are not (which has often been done elsewhere in this magazine) let's instead analyze the FR-I by itself.

The camera, 5 9/16 in. long x 3 3/8 in. high and 2 1/2 in. deep, weighing 32 oz. (with 50mm f/1.7 lens), must be considered average in size and weight—not a compact. It gives the impression of being (and all tests bear out that it is) a solidly-made, well-thought-out, nicely-constructed camera with an excellent finish.

Looking through the viewfinder, you see a bright focusing and viewing image slightly smaller than life size, with good contrast. The diagonally-split central rangefinder and really excellent micropism collar are usable from maximum aperture to f/ 5.6. Beyond this point, focusing should be done on the remarkably grainless outer focusing screen area.

Running horizontally at the top of the picture area is a transparent strip with black opaque aperture numerals plus a black pointer to indicate the actual aperture set by the user. At the right, running vertically, is another strip, with shutter speed markings in black, a meter needle, and red over- and under-exposure warning areas. In our opinion, these scales are among the most legible and easiest to read of any, in all the SLRs we have ever tested. The entire viewfinder area can be seen by eyeglass wearers.

For auto-exposure control, the top shutter speed dial must first be set to the orange "Auto" position. To turn on the metering circuit, you can push slightly inwards on the ribbed meter-turn-on switch at the back of the camera (called an "exposure check button" in the camera instructions). As long as you keep the switch under pressure, the meter will remain on. However, it's more convenient to turn on the meter for continuous use by pulling out the rapid-wind lever to operating position and then sliding the meter-turn-on switch to the right, where it will lock in the "On" position. You shut off the meter by returning the rapid-wind lever to the inboard position. Even with the wind lever protruding, we found we could view, focus and operate the cam-

era using either right or left eye without inadvertently pushing in the wind lever with a nose or suffering undue dents in the forehead—a frequent complaint about other SLRs which also use the wind lever as a meter switch.

Thanks to the new silicon circuitry, the reaction of the viewfinder meter needle to changes in illumination is almost instantaneous, even when going from a brightly-lit scene to one of considerable darkness. The exceptionally smooth electromagnetic shutter-release button, located in the hub of the rapid-wind lever,

Besides using standard auto exposure, you can dial in auto-exposure compensation from 1/4 to 4X by turning the outer ring of the rewind knob to the appropriate setting. The ring, which is nicely studded for easy gripping, also controls the ASA indexes. Lift it and turn to the desired ASA numeral, then let the ring slip back in place. We were thankful that the auto-exposure-compensation settings acted independently of the ASA setting. With many SLRs, you cannot use the over-exposure auto compensation at the low end of the ASA

Yashica FR-I: What's New At A Glance

Battery check lights up frame counter

Concave electromagnetic shutter release like Yashica FR camera.

Manual shutter speed dial has "auto" setting for aperture priority auto exposure

Auto exposure compensation scale

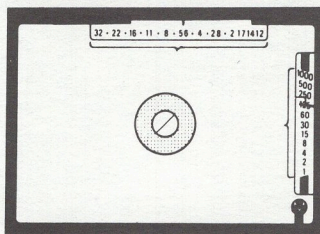
Hot sync shoe is X-only

ASA Film Speed scale



Camera body identical to Yashica FR-I, very similar to Contax RTS

Bayonet mount Yashica ML lens interchanges with 37 different Zeiss and Yashica brand lenses

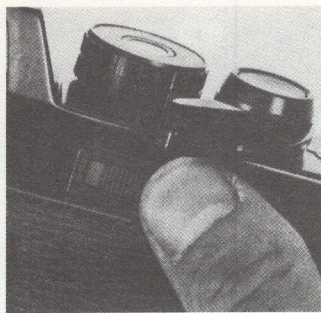


Good full viewfinder: shutter, aperture scales with pointers, high- and low-light warning signals, diagonal split-image rangefinder, micropism collar, and full-focusing scale.

deserves special commendation. Its concave shape, which conforms to the ball of your trigger finger, is very welcome. Shutter noise and vibration are average.

scale or the under-exposure compensation at the top of the scale. With the Yashica FR-I you can, which is an important feature to anyone who is, for instance, contemplating auto-exposure slide copying on Kodak's new E-6 duplicating film (which has a speed of 8). Using the auto-exposure-compensation dial you can easily adjust to this speed. Both ASA and auto-exposure-compensation dial markings are extremely legible—as are all the markings on the FR-I.

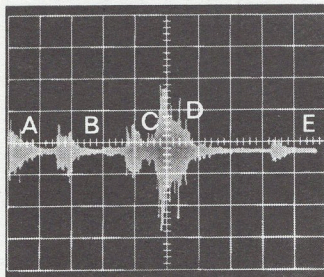
Besides the auto-exposure compensation, you also have the option of removing the camera from automatic exposure control by turning the shutter speed dial from the "Auto" position to any needed manual (electronically-controlled) shutter speed. While



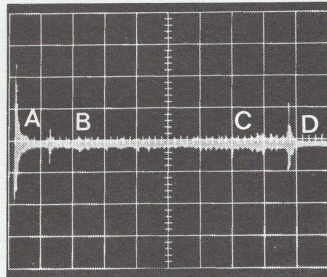
Push in meter switch lever for intermittent reading; slide to right and circuit remains on until wind lever is pushed in. Good, convenient dual system.



Left-eyed photographers will be able to operate camera, keep meter on without having wind lever collide seriously with nose or forehead.



At a full-sweep scanning time of 1/20 sec., graph shows electronically timed cloth focal plane shutter in Yashica FR-1 to be of average noise level, about 73 dB. Oscilloscope display shows (A) mirror up; (B) first curtain release; (C) second curtain release; (D) both shutter curtains close; (E) mirror down.



At a full-sweep scanning speed of 1/4 sec. you can see winder is capable of 2 frames per sec. Oscilloscope graph shows (A) mirror up, exposure, curtains close (compressed due to slow scanning speed); (B) mirror down, winder starts; (C) average winder noise; (D) winder stop, shutter recocked.

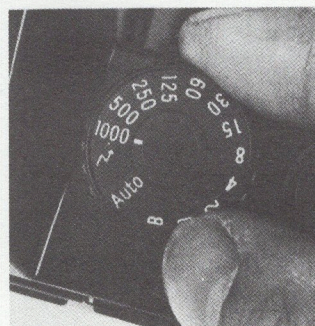
a great to-do has been made of having a locking position at the auto setting to prevent inadvertent movement of the shutter-speed dial, we felt the click auto position was sufficient. Also, as soon as you move the dial from the "Auto" setting, a red "M" signal appears in the finder to warn you that the camera is no longer providing auto exposure—another welcome feature. The metering system will continue to indicate the proper shutter speed for any aperture set. You can either take its advice or ignore it, but you will have to check your shutter-speed dial itself for the manual shutter speed set, since it doesn't appear in the viewfinder. While auto-exposure speeds are available from 4 sec. upward, manual speed begin at 1 sec.—sufficient, we thought, for most

practical purposes.

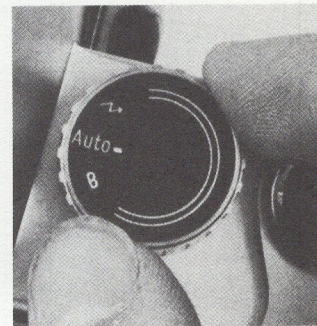
The wind lever is excellently shaped with a comfortable plastic tip. You can wind film and shutter with a single 140° throw or with multiple throws, since the mechanism is ratcheted.

We did find the folding rewind crank handle on the smallish side for good gripping.

The FR-1 opens for loading in the traditional manner—by pulling upwards on the rewind knob. The interior, including the take-up spool, is more than faintly reminiscent of the FR itself and the Contax RTS, meaning that the matching of the film rails and general finish are of a very high order indeed. The take-up spool is of the four-leaf plastic collar type, under which the film leader end can easily be slipped. Winding of film is hardly unusual save



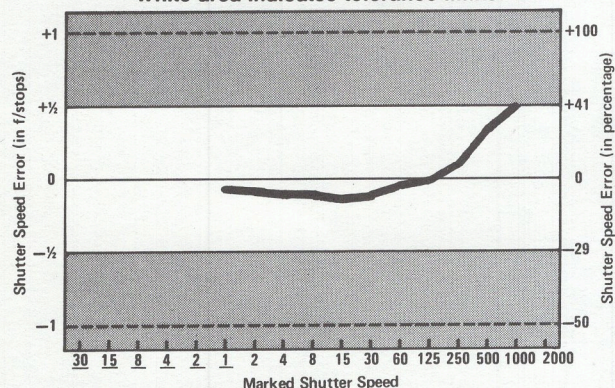
Although "Auto" setting has no lock, detent is sufficient to keep it from moving until you wish to use manual shutter speeds.



Major difference. Yashica FR-11 is automatic only; no manual or mechanical shutter speeds are available.

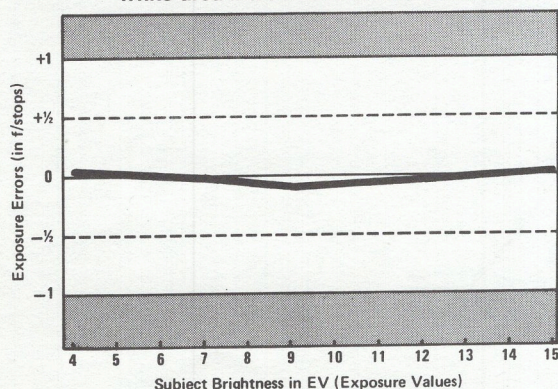
SHUTTER-SPEED ACCURACY

White area indicates tolerance limits.



EXPOSURE ACCURACY (at film plane, ASA 100)

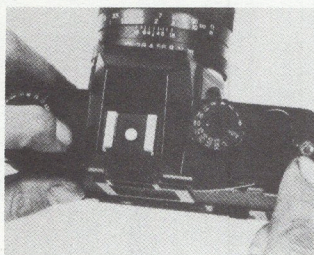
White area indicates tolerance limits.



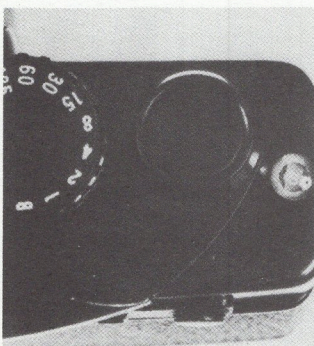
GENERAL PERFORMANCE

Checkpoints	Our Standard	As Tested
FINDER:		
Apparent viewing distance	Between infinity and 20 in. (0.5m)	2 m (79 in.)
Apparent distance of shutter-speed scale	Between infinity and 1 m (39 in.)	1 m (39 in.)
Apparent distance of aperture scale	Same as above	2 m (79 in.)
View area compared to film area	Vertically and horizontally more than 100%, less than 90%	Vertical: 92% Horizontal: 92%
Parallax error compared to film	Vertical: 0.96mm Horizontal: 1.4mm	Vertical: 0.43mm Horizontal: 0.62mm
Focusing accuracy at maximum aperture	Within depth of focus	No discrepancy
Image magnification	0.87 x ± 0.1	0.87X
PICTURE SIZE:		
	24 ± 0.6mm x 36 ± 0.9mm	24.1 x 36.2mm
SHUTTER:		
Curtain travel evenness	± 0.33 stop	-0.11 stops
Camera insulation from sync	More than 7 megohms	infinity
Sync contact efficiency	More than 60%	80%
Synchronizer delay time	X: within full opening	Okay
Shutter curtain bounce	Not allowed	None
Self-timer delay time	7-10 sec.	7 sec.
CAMERA SIZE:		
	Body: 141 mm wide; 86 mm high, 56 mm deep (5.6 x 3.4 x 2.2 in.)	
WEIGHT:		
	Body: 680g (1 lb. 8 oz.)	

modern tests



Push battery check on left and guess what happens on right? Frame counter lights!



Large red warning bands appear in illuminated frame counter at start and at end of film.

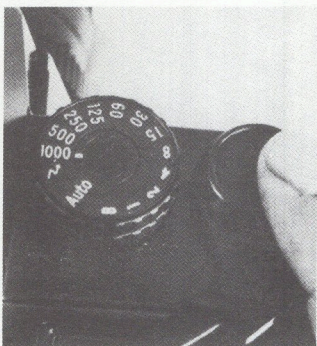
for the frame counter, which has a bright red warning band at film start and end. The battery-check light, which indicates the condition of the 6-v silver-oxide battery within the bottom chamber, is located within the frame counter window and serves as a counter light when you wish to check frames in poor illumination—another added feature.

While our overall impression of the Yashica FR-I is obviously very favorable, there were points that we found could bear improvement. The 7-sec. self-timer interval seemed rather short (unless the photographer is fast and extremely agile). Within the viewfinder, the lowest shutter speed shown is 1 sec., although the camera is capable of highly accurate exposures even at ASA 400 down to 4 sec. At any exposure over 1 sec., the shutter-speed needle enters the red under-exposure warning area and the user does not know whether the exposure is within the 4-sec. range or requires more exposure (the camera will still yield a maximum 4-sec. exposure). Additional numbers to 4-sec. should be added to the finder scale.

While the metering system seems less affected than similar cameras by extraneous backlight entering the viewfinder during auto exposures (when the user's eye isn't right up to the eyepiece), there is some inflation. However, no built-in or accessory view-



Six-volt silver oxide battery resides in compartment underneath camera.



Large, concave electromagnetic shutter release fits ball of your finger nicely.

finder eyepiece blind is furnished: It would be a welcome addition, although a user need only shield the eyepiece with his hand or tape it to accomplish the same thing (albeit a little less conveniently). The camera has X-synchronization only, meaning that flashbulbs should be used at speeds of 1/30 sec. or slower.

Balancing out these minor criticisms are the new film-box-end memo holder on the camera's hinged back, and the provision for the same electronic remote cable switches used on the Contax RTS and Yashica, which eliminate delay and mechanical problems of the (now somewhat obsolete) spring-actuated cable releases. By the way, there is no provision for a mechanical cable release to be used.

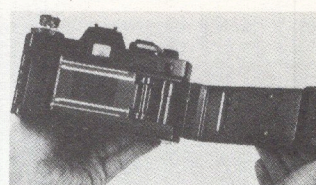
The Contax/Yashica stainless steel, three-clawed bayonet lens mount, common to all FR, FX Yashicas as well as the Contax RTS, is by now well established. Available in the lens line are some 37 Zeiss and Yashica lenses, as well as a growing number made by independent lens manufacturers. Lens interchange remains simple, requiring only a light touch on the lens-lock release button on the right side of the lens mount and a 72° counter-clockwise twist of the lens. Each lens has a bright red mounting dot to align with the red marking dot on the body mount.

The interior of the mirror cham-

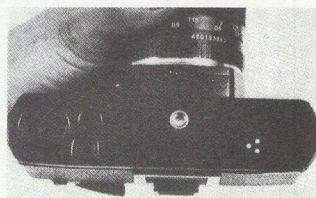
ber, virtually identical to the FR and Contax RTS, is well baffled against stray light with a large rapid-return mirror to prevent mirror edge darkening with long lenses, small apertures or when using bellows or extension tubes.

The 15¼ oz. Yashica winder (\$165) looks much like the Contax RTS winder and, upon examination, it is virtually identical (except for a few eliminated items and a slight attempt at a change in cosmetics).

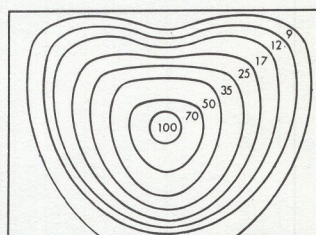
The winder has a hinged battery chamber that swings away at the touch of a release button to reveal the interchangeable 6-AA-cell plastic battery clip and the folded attaching key, which threads to the camera tripod socket. The clip has a battery



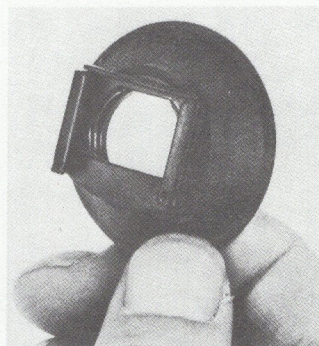
Nothing radically innovative about loading system, but finish of focal plane rails is exemplary.



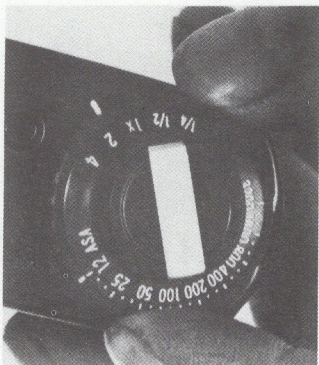
Well-laid-out bottom plate, left to right: battery compartment, winder mechanical coupling, re-wind button, tripod socket, winder electrical contacts.



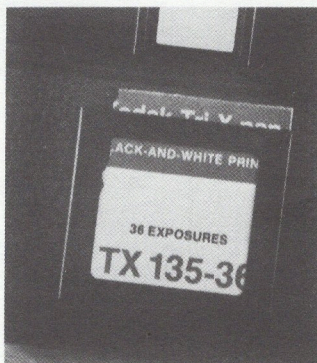
Metering sensitivity pattern shows the obvious center-weighting of the meter reading.



Slip-on rubber eyecup is nice, but eyepiece blind would be equally welcome.



Auto-exposure-compensation scale operates independently of ASA scale. You can use both to reach an E.I. of 8—fine for copying slides with Kodak's new E-6 duping film.



Film box memo holder is a welcome addition to FR-I body.

placement diagram to help owners load the cells quickly and properly. Once the batteries are in place and the compartment is closed, you can stand the camera up on the winder bottom, which provides a stable base.

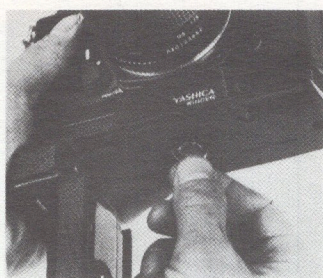
The winder operates from the camera's own shutter release—at up to two frames per second at speeds under 1/60 sec. and at 2 fps at higher speeds. While the Contax RTS winder has both an "S" (for single shot) and "C" (for continuous run) control, the Yashica winder has a single operating position. However, you can make single shots by taking your finger from the shutter release after exposure or shoot continuous bursts by letting your finger remain on the release. According to our tests of the Contax RTS winder on the Contax, some 40 rolls of 36-exposure film can be run through the camera on a set of AA alkaline energizers. The red test lamp at the back of the winder operates as a battery check, indicates film advance, and will remain on if the film end is reached but the film is not completely wound to the next exposure. This warns you to turn the winder off and rewind the film. Also on the back of the winder are sockets for a remote cable switch and the Contax Interval Timer. The Yashica FR-I can be fitted with the Infrared Controller Set to operate the camera at a distance by motorized remote control, just

like the Contax RTS. Film can be rewound without removing the winder by pushing upwards on the rewind release lever and then rewinding film with the rewind crank. Missing from the Yashica winder (but found on the Contax RTS winder) are the provision for powering the winder by an external battery source and the additional tripod socket within the battery compartment in case you wish to mount the camera on a central tripod socket (the winder's regular bottom tripod socket is at the edge of the camera). Would-be winder purchasers who feel the small deletions on the Yashica winder are too great to bear can always spend the extra \$50 and purchase the Contax RTS winder, which works just as well on the Yashica FR-I as it does on the Contax RTS. Incidentally, we see no reason why the Contax Motor Drive system, which allows up to 5 fps, won't work just as well on the Yashica FR-I; we shall certainly try it when we receive a production sample of the Contax RTS motor set.

We were quite pleased with the Yashica (and Contax RTS) auto winder concept since it allows a user to operate it easily by wire or wireless remote control, a feature that many other winder-camera combinations do not provide.

During our field tests we were, of course, struck by the obvious and understandable similarity in handling between the Contax RTS and Yashica FR-I. There is precious little difference between them, and the FR-I has, in our opinion, a better shutter-release placement. Get a Contax RTS at a Yashica price? It seems too good to be true, but here it is.

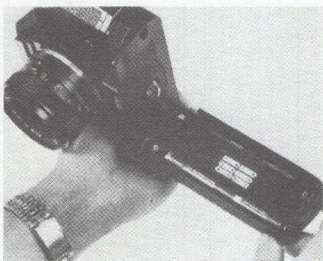
(We should mention that an



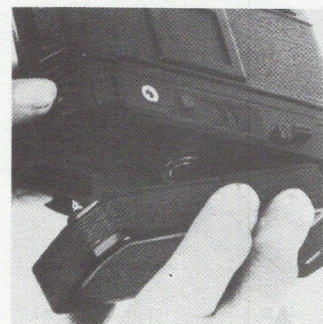
Auto winder can be fastened easily to camera bottom with hinged key underneath battery compartment.



Six AA cells fit into plastic clip to power auto winder. Battery pack is interchangeable with Contax winder also.



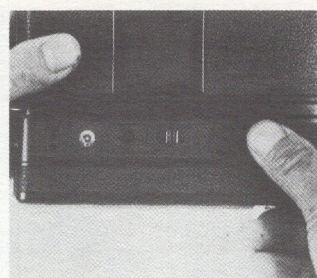
Battery clip section of auto winder can be swung out of way if you use central tripod socket.



Winder battery compartment opens when you press battery-compartment release button.



Auto winder forms solid, stable base (which can't be said for many cameras with winders).



Winder controls, left to right: interval timer socket, remote release socket, test lamp, on/off switch, film rewind lever.

even more enticing bargain for some purchasers is the Yashica FR-II in chrome finish. If you can operate without manual shutter speeds at all, you can have literally the same camera, lens and all other features, for \$100 less.)

The lens furnished with our Yashica FR-I was the 50mm f/1.7 Yashica ML, which we had previously tested with the Yashica FR camera in the Christmas 1976 issue of MODERN. It did quite well for such a moderate price, and we would be glad to send you the lens test report for 25 cents and a stamped, self-addressed envelope if you write to Readers' Service, MODERN PHOTOGRAPHY, 130 East 59th St., New York, NY 10022. In the name of progress, however, we decided to test two previously untested Yashica lenses, a wide-angle and a zoom.

28mm f/2.8 YASHICA ML

Mounts: Contax/Yashica
Filter size: 52 mm screw thread
Apertures: f/2.8 to f/16
Min. focus dist.: 0.3m (12 in.)
Features: ML (multi-layer) multi-coating
Serial no.: A1201062
Size: 61 mm diam., 41.5 mm long (2.4 X 1.6 in.)
Weight: 248 g (8.75 oz)
Price: \$199; may be available at a discount price

Performance

Our Standard	Tested
Focal length: ±5% (26.6-29.4mm)	28.2mm
Max. aperture: ±5% (f/2.66-f/2.94)	f/2.82
Distortion: ±2.5% 1% (barrel)	
Light falloff: at f/5.6 ±1 stop from theoretical limit (-1.3 stops)	-1.3 stops

Practical Comments: This 28mm wide-angle is an average lens in terms of physical dimensions (size and weight) with excellent optical quality compared to others of this focal length. In comparison to the new Carl Zeiss Distagon 28mm f/2.8, which has a compatible mount, the Yashica lens is slightly shorter and lighter, but has a longer minimum focus distance, 0.3 m (12 in.) rather

Would you like to test your own lens? Get MODERN's Lens Test Kit, \$4.95. Write to Lens Test Kit, MODERN PHOTOGRAPHY, 2160 Patterson Street, Cincinnati, Ohio 45214.



Yashica 28mm f/2.8 wide-angle lens (right) is slightly smaller and lighter than the Carl Zeiss Distagon 28mm f/2.8 lens (left) but can you tell the difference in actual pictures? See text.

than 0.25 m (10 in.). While we haven't yet lab tested the Contax wide-angle, we did put it on the FRI camera body tested this month, and shot some comparison pictures. The Yashica lens performed admirably, showing little difference in picture quality, particularly at median apertures.

On the Optical Bench: Even at maximum aperture, the 28's very compact central star image revealed excellent optical quality. There was a slight amount of overcorrected spherical aberration, but less than average. Only one stop down, the optical bench star image formed a diffraction pattern, signifying that image sharpness is determined by the nature of the light itself not the aberrations of the lens. This lens appeared to be well centered, meaning good symmetrical polishing of all elements as well as careful assembly. Off axis, we observed some astigmatism mixed with skew ray flare, but both were judged to be smaller than average, even for an f/2.8 lens. The wings of the skew-ray pattern were very small and colorless, disappearing only one stop down from maximum aperture. At f/5.6 the astigmatism diminished to a single dot of light. Red lateral color was observed on the bench, but in very small amounts. *In field test slides:* Using this wide-angle lens at maximum aperture yielded quite good results, with better sharpness than expected at the edges of the picture field. However, stopping down to eliminate the effects of the skew ray flare produced even sharper transparencies. Residual ghosts and flare were present when shooting into strong light sources, revealing multiple pale pink ghosts in the shape of the lens diaphragm. A trace of red lateral color did show up in the slides, but it took a high-powered microscope to find it. Overall image quality is very good to excellent.

Turn page for resolution and contrast charts.

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modern tests

Resolution

at 1:47 magnification				
f/no	Center Lines/mm	Corner Lines/mm		
2.8	Good	47	Excellent	37
4	Excellent	59	Excellent	42
5.6	Excellent	66	Excellent	47
8	Excellent	66	Excellent	47
11	Excellent	59	Excellent	47
16	V/Good	53	Excellent	42

Contrast

at 30 lines/mm				
f/no	Center %	Corner %		
2.8	Medium	50	High	48
4	Medium	58	High	48
5.6	Low	60	High	54
8	Low	58	High	56
11	Medium	56	High	52
16	Low	50	High	46

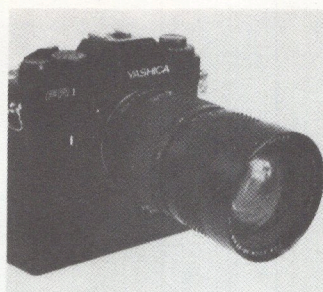
38-90 mm f/3.5 YASHICA DSB ZOOM

Mounts: Contax/Yashica
Filter size: 67 mm screw thread
Apertures: f/3.5 to f/22
Min. focus dist.: 1.5 m (5 ft.); in macro mode at 38 mm, 30 cm (12 in.) for 1:4 reproduction ratio
Features: Multicoating, macro mode, two-touch zoom
Serial no.: A7302305
Size: 70 mm diam., 110.5 mm long (2.76 X 4.35 in.)
Weight: 687 g (24.25 oz.)
Price: \$340; may be available at a discount price

Performance

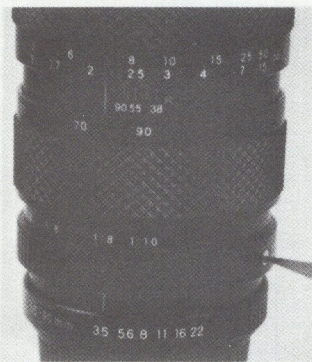
Our Standard	Tested
Focal length: ±5% (36.1-39.9 to 85.5-94.5mm)	39.8-87.8mm
Max. aperture: ±5% (f/3.3-f/3.7)	f/3.55
Distortion: ±6%	
38 mm	1% (barrel)
55 mm	1% (pincushion)
90 mm	1% (pincushion)
Light falloff: at f/5.6 ±1 stop from theoretical limit	
38 mm (-0.8 stops)	-1.3 stops
55 mm (-0.4 stops)	-1.0 stops
90 mm (-0.2 stops)	-0.9 stops

Practical Comments: This Yashica two-touch zoom is a versatile substitute for the normal 50mm lens supplied with most 35mm SLR cameras. While it is rather large and heavy compared to a standard lens (or even to some similar short zooms we've tested), it still handles rather well on camera. Also, the 1.5-m (5-ft.) minimum focus distance is supplemented with what Yashica terms a macro mode. The relatively wide zooming range (semi-wide-angle to short tele) is a definite asset which can provide precise cropping in the view-



Semi-wide angle to short tele zoom makes a good substitute for the 50mm lens usually purchased with your camera.

finder, enabling you to use the maximum negative area for your subject rather than running back and forth to frame your picture. The f/3.5 maximum aperture makes for a noticeably darker viewing image than with faster lenses, but posed no problems when using a split-image range-finder. While some consider f/3.5 too slow, we didn't find it too much of a hindrance in most shooting applications.



Yashica 38-90mm f/3.5 zoom is well finished; pencil points to chrome macro release button.

You push a chrome button to release and turn the macro ring. The scale which then appears on the barrel is marked in magnifications from 1:10 to 1:4, but these ratios apply only when you select the 38mm focal length position. Regardless, the macro mode is operable at all focal lengths, a big plus for Yashica. And while this lens doesn't focus continuously down to 1:4, we judge the small gap between full-face and head-and-shoulders portraits to be photographically insignificant.

To sum up this zoom's forté, we'll quote the editor who field tested it: "It's like having a wide-angle, normal, short tele and macro lens all in the same barrel. I thought this lens was big, but then I thought about carrying four." **On the Optical Bench:** At the wide-angle focal length (38mm) we observed a slight amount of overcorrected spherical aberration at f/3.5. While we saw no axial color errors at this position, there was a slight amount of decentering of the elements visible. When the lens was stopped down to f/5.6, an excellent, com-

pact dot of light remained. Off axis, minor coma and slight lateral color were the major aberrations, but stopping down to f/8 improved the image quality markedly. At a mid-focal length position (55mm), the central star image showed a moderated amount of overcorrected spherical aberration, better centering of the elements than at the wide-angle position, and still no axial color error. At f/5.6 the image

Resolution

at 38 mm at 1: magnification				
f/no	Center Lines/mm	Corner Lines/mm		
3.5	Excellent	49	Good	28
5.6	Excellent	55	Good	31
8	Excellent	55	V/Good	39
11	Excellent	55	Excellent	44
16	V/Good	49	Excellent	44
22	Good	44	V/Good	39

at 55 mm at 1:49 magnification				
f/no	Center Lines/mm	Corner Lines/mm		
3.5	V/Good	44	Excellent	35
5.6	V/Good	49	Excellent	39
8	Excellent	55	Excellent	44
11	Excellent	55	Excellent	44
16	V/Good	49	Excellent	49
22	Good	44	Excellent	44

at 90 mm at 1:51 magnification				
f/no	Center Lines/mm	Corner Lines/mm		
3.5	V/Good	40	Accept.	24
5.6	Good	40	Accept.	26
8	Good	45	Good	36
11	Excellent	57	Excellent	45
16	V/Good	51	Excellent	45
22	Good	45	Good	40

Contrast

at 38 mm at 30 lines/mm				
f/no	Center %	Corner %		
3.5	High	54	Low	12
5.6	High	62	Low	16
8	High	63	Low	23
11	High	60	Low	30
16	Medium	52	Low	30
22	Low	44	Low	26

at 55 mm at 30 lines/mm				
f/no	Center %	Corner %		
3.5	Low	40	V/Low	9
5.6	High	58	V/Low	12
8	Medium	56	Low	24
11	Medium	54	Medium	38
16	Medium	48	Medium	40
22	Low	42	Medium	36

15 90 mm at 30 lines/mm				
f/no	Center %	Corner %		
3.5	V/Low	18	V/Low	6
5.6	Low	35	V/Low	8
8	Low	46	Low	22
11	Medium	50	Low	32
16	Medium	48	Low	32
22	Low	40	Low	30

quality became very good. Off axis at 55mm, we saw a twisted coma pattern with some lateral color, but fortunately no astigmatism. The aberrations were diminished significantly when the lens was stopped down to f/8. At the short tele position (90mm), we saw an average amount of undercorrected axial color with some spherochromatism. At this focal length, the best image on the bench was seen at f/8, one stop lower than at the other focal lengths. Off axis, the edge image showed moderate amount of undercorrected coma. Here this aberration twisted around so the comet-like tail pointed away from the lens axis, rather than toward the axis as at the shorter focal lengths. There was also a small amount of lateral color visible on the bench but, on the whole, the off axis image at 90mm became good at about f/11. Switching to the macro mode, we observed some zonal spherical aberration on axis with the lens wide open which turned the point of light into a donut rather than a dot. Off axis in the macro position, there was slight coma, but the dominant aberration was lateral color measuring .036 mm long, which we judged to be at the limits of acceptance. *In field test slides:* The slight decentering observed on axis on the optical bench had little effect in actual pictures. Off axis, the comatic aberrations were visible in transparencies shot with the lens wide open, but as we saw on the bench, stopping down improved the image quality dramatically. Lateral color was discernible at the edges of the pictures but mainly at the 90mm telephoto position, and in Macro shots. Residual ghosts and flare appeared in large amounts when the lens was pointed towards strong light sources. The results were large multicolored reflections in the shape of the diaphragm. However, this defect of excessive flare and ghost images haunts most zoom lenses. Overall image quality is very good for this comparatively fast zoom.



Yashica bayonet (right) features solid stainless mount while Contax (left) opts for a screw-on flange. Yashica used the latter mount on the 38-90mm zoom.