Mention binoculars, and most of us envision a pair of small prismatic refracting telescopes joined together by a central spine. Their small size and light weight make binoculars perfect for an impromptu viewing session — whether a distant scene, a bird in flight, or a look at the night sky. Of course, not all binoculars are small and light. Some are large and heavy. Despite their differences in size, however, all binoculars have the same basic design. Until now.

**A new concept**

Late in 2002, Jim's Mobile, Inc. (JMI) introduced an innovative product called the RB-66 binoscope. The “RB” stands for “Reverse Binoculars,” something the amateur market hadn’t seen. The RB-66 is, in effect, two 6-inch f/5 Newtonian reflectors with a protective “clamshell” of molded plastic surrounding the entire assembly.

The RB-66 comes with an alt-azimuth mount that attaches to a Celestron tripod. Accessories include two 20mm matched Plössl eyepieces (any two identical eyepieces will work), two Celestron 1¼” mirror star diagonals, and Celestron’s Star Pointer red dot unity finder. JMI’s own NGC micro-Max digital setting circles (with a database of 245 objects) is an optional accessory. The mount is pre-drilled to accept the NGC micro-Max and its encoders. A highly recommended accessory is a foam-lined, wheeled carrying case. The case helps when the RB-66 must be moved or shipped.

**Design**

Light enters the two tubes of the RB-66, reflects from the primary to the secondary mirrors, and exits through focusers that face each other. A pair of star diagonals then turns the light path 90° toward the front of the instrument where the observer views from a seated position. The tubes are separated by about 10 inches, so the observer’s head won’t block the view.

One problem JMI overcame was how to focus the image. Conventional focusers move in and out, but that would never do for the RB-66 because the distance between eyepieces (called the interocular distance) changes every time they’re focused. This distance has to be adjustable for each observer, but once set, it needs to remain fixed.

To solve the dilemma, JMI modified and motorized their RCF-mini focuser to slide parallel to the tubes. Each secondary mirror holder is permanently attached to the focuser to move with the eyepiece. The focusers are independently adjusted by pushing two sets of buttons on the RB-66’s control panel, which is located between the tubes.

Interocular distance also is adjusted electrically with a rocker switch. The controls’ motions are smooth, although focuser travel is a little fast. I would have preferred a two-speed control to make critical focusing easier. The folding control panel also has a pair of foam-covered, motorcycle-style handles for pointing the binoculars.

**Power**

A 6-volt, 4.5-amp-hour rechargeable battery hidden inside the pier supplies power for the RB-66’s motorized focusers and adjustment motors. Just insert the plug into the connector mounted on the pier, and the system is ready to go. A charger that comes with the telescope plugs into a standard wall socket to recharge the battery when needed. This battery really holds a charge. Although I used the telescope extensively for more than a month, I never had to recharge the battery.

**Setup**

The RB-66 arrived from the factory in two boxes, one holding the binocular telescope and the other the carrying case. The case is foam-lined and equipped with wheels, making transporting the unit easy while offering solid protection.

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Phil Harrington is the author of the new observing guidebook *Star Watch*. 

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**TELESCOPE REVIEW**

These impressive binoculars provide brilliant, wide-field views of celestial objects.

/// BY PHIL HARRINGTON

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Phil Harrington is the author of the new observing guidebook *Star Watch*.

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THE JMI RB-66 REVERSE BINOCULARS may be the dream of many observers. —ASTRONOMY: WILLIAM ZUBACK
in its molded carrying case, and a second containing the tripod. The RB-66 comes from the factory fully assembled. Just remove a shipping brace and attach the finder to the protective cover.

To set up the RB-66, first open the tripod and adjust the length of its legs. At this point, attach the tripod’s leg spreader to strengthen the assembly. Before lifting the binocular unit out of its case and onto the tripod, tighten the vertical position lock to hold the binoculars rigidly to the alt-azimuth mounting. This way, the mount won’t flop around when the instrument is lifted by the top-mounted handle. Place the mounting base on top of the tripod and bolt the two together using the three captive thumbscrews.

Although this sounds simple, it takes some getting used to. I had difficulty positioning the instrument’s base exactly over the tripod’s three mating holes, especially at night. An alignment pin or some other reference key machined into the base of the RB-66 would have made the whole process much easier.

Alignment
Like using any reflecting telescope with a fast focal ratio, the first thing to do when setting up for an observing session is to check the system’s optical collimation. The test instrument arrived with both sides out of collimation, but gaining access to the three adjustment screws behind each mirror was easy: I simply removed the instrument’s carrying handle and pulled away the cover’s top half.

Once collimation is complete, both telescopes must be aimed parallel to one another, an easily accomplished task. Aim the RB-66 at a known object such as the Moon or a bright star to check and adjust this. Center the target in one of the eyepieces and then look through both eyepieces. By flipping the two rocker switches back and forth on the control panel, a pair of electric motors moves the telescope on the observer’s right horizontally and the telescope on the left vertically. As the instructions advise, move the horizontal adjustment first, until the two images of the target lie directly above and below each other. Then, use the vertical motor to merge the two into one. If the process is reversed and the target is aligned horizontally first, the observer’s eyes will try to merge the images by crossing. “Crossed eyes” frequently cause eye fatigue and headaches when an observer is using misaligned binoculars, regardless of their size.

The alignment process gets even easier with practice, but I would have preferred the alignment motors to have both low- and high-speed settings, because I often overshot the exact point where the images merged. It’s also easy to confuse the two identical switches that control the alignment motions, since both rock left to right. A better design would have been for the left-hand (vertical) switch to be mounted perpendicular to the other. That way, both switches would toggle in the direction they move the telescopes.

Time to observe
As luck would have it, the sky was clear the first night after I received the RB-66, so I
eagerly walked it outside and set it up for a look around. I didn’t bother waiting for complete darkness before aiming at my first target, the waxing crescent Moon. My first impression? “Wow!” The sunlit part of the lunar surface was sharp with excellent contrast, but the portion lit only by earthshine really impressed me. Binoculars seem to show that area better than telescopes anyway, but the RB-66 outdid any I have used. The view of the still-dark maria and major craters along with the illuminated crescent created a surreal, faux 3-D effect that was quite striking.

After twilight faded, I turned the instrument toward Jupiter. The supplied 20mm eyepieces produce only 38x — not enough to see great detail but enough to show all four Galilean moons, the planet’s north and south equatorial belts, and many other features.

While there may be telescopes better suited for planetary observing, the RB-66 is in a league of its own when it comes to large deep-sky objects like the Orion Nebula (M 42), the Lagoon Nebula (M 8), and the Andromeda Galaxy (M 31). I was particularly impressed with the RB-66’s view of open star clusters. The Double Cluster in Perseus (NGC 869 and NGC 884), for instance, really sparkled across the RB-66’s 1.3° field of view.

I also was struck by how much image contrast improved when using both eyes. Whether it was the faint, luminous bridge connecting the Whirlpool Galaxy (M 51) to its irregular galactic neighbor NGC 5198, or the gentle rifts of the Lagoon Nebula, object contrast and brightness were enhanced when I used both eyes as compared to viewing through just one side of the binoscope. There was also a slight improvement in limiting magnitude (the faintest stars that can be seen), typically between 0.1 and 0.2 magnitude.

Optics and mechanics
To star-test the RB-66, I checked each optical assembly using a 10mm Tele Vue Radian eyepiece and 2.5x Powermate, which produced 193x. Both telescopes had excellent optics that produced textbook diffraction patterns, giving little indication of optical aberrations. It’s critical for a binocular telescope to have identical sets of optics because even a slight difference in focal length between the two will create viewing problems. As far as my visual tests could determine, both 6-inch telescopes were equal in every way.

Summary
Few binoculars can compare to the RB-66. The best known, comparable system in the 6-inch size range is the Fujinon 25x150 M T-SX binoculars, which retail for about $6,000 (mounting extra). The higher cost and fixed eyepieces of the Fujinon binoculars are distinct disadvantages, but setup time is reduced — there’s no need to collimate optics or align tube assemblies.

If you’re looking for breathtaking low- and medium-power views of star fields, nebulae, star clusters, and the Moon, give the RB-66 from JMI serious consideration. For observers who appreciate the wonderful views seen only through a true binocular telescope, the RB-66 is a real bargain.

/// RB-66 SPECIFICATIONS

Type: Binocular Newtonian reflectors
Optical system: 6-inch f/5 primary mirrors, 1.6-inch secondary mirrors
Interocular spacing: Variable from 2 inches to 3.25 inches
Weight: 49.4 pounds
Height: 29.5° (locked into vertical position)
Width: 24"
Depth: 10.5" (folded)
Tripod weight: 9.6 pounds

Equipment
Standard
• Two 20mm matched Plössl eyepieces
• Two Celestron 1¼” mirror star diagonals
• Celestron Star Pointer red-dot unity finder
• Protective white clamshell cover (available in black by special order)
• Six motors for adjusting interocular spacing, focusing, and optical tube alignment
• Rechargeable battery and charger

Price: $2,995

Optional
• NGC micro-MAX computer, $399
• Carrying case with wheels and handles, $399.95

Contact information:
J IM’S Mobile, Inc.
810 Quail Street, Unit E
Lakewood, CO 80215
[t] 303.233.5353; 800.247.0304
[w] www.jimsmobile.com
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