This quick start guide is a basic primer on how to observe double stars in the RASC observing program. We will go through a few examples to prepare you for what you might encounter in the eyepiece.

Ahead of Each Observation

1. select a target double star from the checklist
2. note the "combined" magnitude of the two stars
3. note the suggested aperture and magnification
4. go to target area or target star
5. view field with a low power telescope eyepiece or binoculars
6. examine the field

If you want more details for the target star before observing it, such as the separation in arc-seconds and the position angle, all visible companions, review the Supplemental list.

case study 1

Do you see this? Two obvious stars close together? "Done, got 'em, obvious pair, easy!"

Note the colours in your log book: "Orange and blue."

Note the angle of the two stars. If you do not know the field orientation, use a clock face. "Orange to 10 o'clock position and blue to the 4 o'clock position." If you know the field directions, "Orange to the north-east and blue to the south-west."

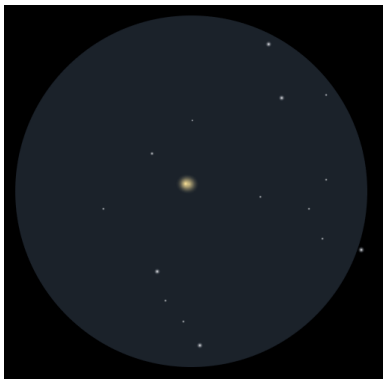
Describe the separation. "Close at 48 power." or "Just touching at 77x."

Fill out your own log book or use our log sheet. Include detailed information, if possible.

target	**HD 654321**	alternate IDs	**BAN 54321, SAO 654321, HIP 654321**		
constellation	**Pea**	combined mag.	**5.0**	RA (2000)	**25h38m19.9s**
date	Sun 2 Jun '19	time	11:20 PM	time zone	EDT
location	backyard, Bradford West Gwillumbury				
telescope equipment used	Meade ETX 90mm with clock drive				
eyepieces, magnifications used	Celestron Plössl 26mm (48x), Pentax (62x)				
first impression of target	double	multiple		Moon phase	● ● ◑ ◐
general appearance of entire system	Beautiful pair in a sparse field!				
pair designations	primary	second			
orientation	10 o'clock	4 o'clock			
distance	-	close			
brightness	bright	dimmer			
colour	orange	blue			
sky conditions, particularly seeing	warm, 70% humid., poor seeing			sky location, part. altitude	
other notes, remarks, comments	Reminds me of Albireo! Lovely colours.				what I saw
	Secondary close at 48x, clearly separated. Easy, for me...				
	even though the seeing wasn't that great...				
	Second star to my 4 or 5 o'clock which I think is south-west				

case study 2

Do you see this? It looks like one star! "Where's the partner?"

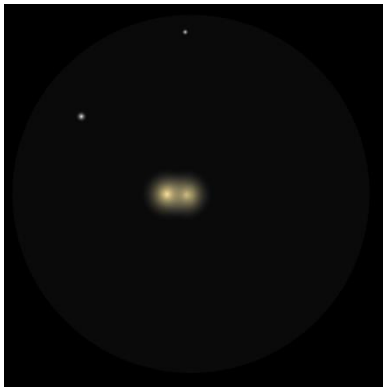


First, double-check you're in the right location!

"Done, verified I'm in the right spot."

Slowly increase power or magnification.

Don’t hesitate to use very high power, e.g. 300x or 400x.



Ah ha, with magnification second star appears. Increased magnification moves away from primary. "Done, got 'em, had to work a bit to split them!"

Log the colours and angle, as per usual

Describe the separation. "Touching at 222x." or "When the seeing is steady, a black line between the two equal stars."

Return to low power. Do you still see the two stars?

Is it obvious now that the primary is not perfectly round? Is it rod-shaped? Log it!

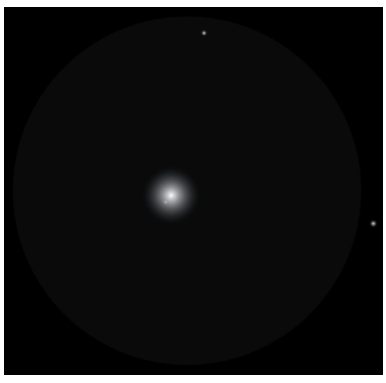
case study 3

Do you see this? "That ain't no double star! Where's the partner?"

First, double-check you're on the correct double star. "Done, I'm certain of the location."

Slowly increase power or magnification to divide the stars.

Wait, what?! There's another star! A very dim point really close to the bright primary. It was lost in the glare. "Yes! I got it! Sweet!"



Note the colours, separation, and angle. “Toward 8 o’clock.” Note the power when the companion emerged. In particular, note the delta or the significant difference in magnitudes. “3 or 4 magnitudes different.”

Return to low power. Do you still see the companion? Do you resolve the delicate tiny dot beside the bright primary? Log it!

Bad seeing will obscure a dim partner. Note the conditions. Come back at another time, if necessary. Very faint companions may require a large aperture.

case study 4

Do you see this? "Wow, two in the view! But which one is my target star?"

First, double-check you're in the right spot!

Review the checklist for combined magnitude value and location. "Done, verified. The 'upper' brighter pair is my target."

Log the colours and angle and separation, as per usual. Optionally, note any other eye-catching doubles nearby, e.g. "The faint tight yellow pair is angled toward the primary of my target double."

case study 5

Do you see this? "Look at that, a triple star!"

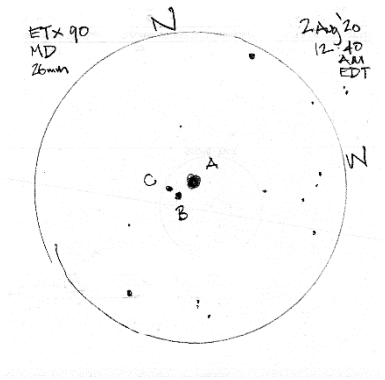
Log the colours and angle and separation of the obvious pair. Usually that's the brightest stars.

Optional, you don't have to do it, but you could log the additional star(s). "Very attractive triple in a compact check-mark shape!"

Don't forget to note colour of additional stars. Note the angle and separation from any convenient star. "The blue star is NE from the white, very close, almost touching." Or, "White is SE from orange primary and blue is east of primary, a bit further out."

sketching

Sketching is optional for RASC observing programs but strongly encouraged. Double star sketching is arguably the easiest form: draw some dots in a circle. Done!



In this example, sketching the triple above, we took the liberty of labelling the 3 bright stars then in our notes we can easily refer to each star.

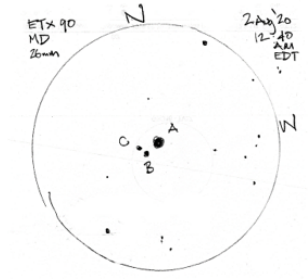
Note the direction indicators, North and West.

Sketch what you see.

Here's the completed log sheet with sketch:

target	**HD 654322**	alternate IDs	**BAN 54322, SAO 654322, HIP 654322**				
constellation	**Pea**	combined mag.	**4.9**	RA (2000)	**26h38m19.9s**	Dec (2000)	**+102°31'01"**
date	Sun 2 Jun '19	time	12:40 AM	time zone	EDT		
location	backyard, Bradford West Gwillumbury						
telescope equipment used	Meade ETX 90						
eyepieces, magnifications used	26mm (48x) & 20mm (62x)						
first impression of target	double	multiple		Moon phase	● ● ◐ ◐ ○ ○ ○ ○ ◑ ◑ ● ●		
general appearance of entire system	triple in a little hockey stick						
pair designations	A	B	C				
orientation	north-west	south-east	east of A				
distance	-	wide	close to B				
brightness	bright	1 mag less?	very dim				
colour	orange	white	blue				
sky conditions, particularly seeing	warm, 80% humid., poor seeing			sky location, part. altitude		NE, low, 30° elevation	
other notes, remarks, comments	Challenging star-hop but I made it! Really colourful! Very attractive. Blue star is NE from the white, very close, almost touching, Didn't see the C star at first at low power. It popped at 62x. Surrounded by white field stars. I want to return to this one, when it's higher in the sky...						

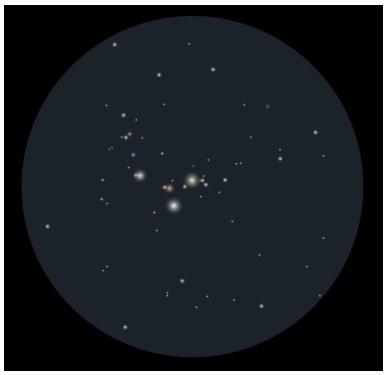
what I saw



Note the A, B, and C labels in the sheet columns and on the stars in the sketch. Again, you only need to complete a log entry for the obvious or brightest stars.

case study 6

Do you see this? "How the heck do I know what's what?!" Maybe this is an open cluster? Maybe we're viewing a target in a dense part of the Milky Way. "There are faint doubles everywhere!"



Anyone, even very experienced double star observers, would not know which star is which.

This might be somewhat typical of any double within the Milky Way in a large aperture telescope in a dark sky, where many faint field stars are revealed.

Most paper charts do not show this level of detail. With a computer and software (e.g. SkyTools), you could identify stars in-situ.

Consider sketching the field accurately, to identify the stars later.

Consult our Supplemental list in situations where you are not sure of your target or there are many stars. e.g. Miram is a beautiful target with unequal orange and blue stars. We list 6 stars from the official double star database, A through F, where D is the dimmest at magnitude 12.7 and also the tightest of all the pairs, 5.2 arc-seconds from C.

For our observing program, don't worry about every single star! Describe what you see: "Bright yellow and yellow stars, nearly north-south, in a dusting of faint stars." Then, "there's another pale-yellow star to the east, at 1.5 or 2x the separation..." Finally, "and there's a deep orange star, fainter, in the middle of these three." Look again! "Hold the phone, that's a tight double, an orange and white pair!" That would be tremendous detail for your log. It helps us know what you experienced.

That said, keep it simple, with a very basic log entry. "Equal yellow and white stars, wide, in the middle of an open cluster." Done, finished, move on.

Start at low power. Work your way up. Then come back down again. Enjoy the stunning variety of double stars up there! Enjoy the discoveries and surprises along the way.