

Star Pairs for Blind Offset Check

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This note gives details of star pairs provided to test the accuracy of blind offsetting. The first table gives pairs around the sky both north and south of the La Palma zenith. The second table gives pairs which cross the equator. All positions come from the CMC catalogue.

Introduction:

Star pairs with separations of between 4 and 20 arcminutes are required to check the confidence observers can place in the blind offsetting capabilities of the ING telescopes. The CMC catalogue was searched to find suitable pairs. One set has been chosen to give a wide choice around the sky, both north and south of the La Palma zenith, to minimise the amount the dome will need to be rotated. A second set was chosen from a subset provided by Bob Argyle which gives stars in a narrow band around the equator. These are to check that nothing untoward occurs with positions having declinations between +01 and -01 degrees.

Positions:

The positions are all selected from the CMC catalogue, which has an accuracy of approximately 0.1 arcseconds in each coordinate. The positions given in the system catalogue are for the epoch of the original observation and equinox of J2000.0. The positions given in the tables here are for equinox and epoch J2000.

Tables:

col 1: The name by which the star is known to the ING telescope control computers. Entering the command `GOCAT` followed by this name will cause the telescope to centre on the star.

col 2: Right Ascension.

col 3: Declination.

col 4: The separation between the two stars in arcminutes.

col 5: The position angle of the star pair measured anticlockwise from north.

col 6: Separation in Right Ascension, $\Delta\alpha$, in seconds of time.

col 7: Separation in declination, $\Delta\delta$, in seconds of arc.

col 8: Separation in ξ in the tangent plane along the projected right ascension direction, in arcseconds.

col 9: Separation in η in the tangent plane along the projected declination direction, in arcseconds.

col 10: Visual magnitude.

Note:

The first star of each pair is the tangent point for the calculation of ξ and η . At higher declinations and large separations it should be noted that there are significant differences, depending on which star of the pair is used as the tangent point, when using ξ , η coordinates (see, for example, the table overleaf). The Telescope Control System uses the position of the target object (selected by `NEXT`, `GOCAT` or `GOTO` as the tangent point for an offset specified in ξ and η , so this should always be the first star of a pair. ξ or η are entered with the `offset arc` command, $\Delta\alpha$ and $\Delta\delta$ with the `offset time` command.

Example of ξ and η at High declinations

(referred to equinox and epoch J2000.0)

α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
<i>h m s</i>	<i>o ' "</i>	<i>l</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
18 52 21.22	+52 3 36.3	18.08	144.7	-68.38	883.8	-627.2	885.1	8.4
18 51 12.84	+52 18 20.1							9.2
18 51 12.84	+52 18 20.1	18.08	144.5	68.38	-883.8	630.6	-882.6	9.2
18 52 21.22	+52 3 36.3							8.4
02 40 58.86	+72 47 15.1	18.64	87.3	-251.41	-61.7	-1117.0	-52.0	8.5
02 36 47.45	+72 46 13.3							9.8
02 36 47.45	+72 46 13.3	18.64	86.3	251.41	61.7	1115.9	71.5	9.8
02 40 58.86	+72 47 15.1							8.5
02 58 22.94	+72 40 22.1	19.67	102.4	256.88	-264.4	1152.3	-254.2	7.7
03 2 39.82	+72 35 57.6							8.6
03 2 39.82	+72 35 57.6	19.67	103.5	-256.88	264.4	-1147.6	274.7	8.6
02 58 22.94	+72 40 22.1							7.7
22 25 23.62	+74 49 41.5	14.53	137.2	-152.74	636.2	-592.8	639.4	8.0
22 22 50.88	+75 0 17.7							7.7
22 22 50.88	+75 0 17.7	14.53	136.6	152.74	-636.2	599.6	-633.0	7.7
22 25 23.62	+74 49 41.5							8.0
04 46 0.57	+76 36 39.7	15.80	61.7	-238.07	-456.6	-834.6	-449.6	6.5
04 42 2.50	+76 29 3.1							9.6
04 42 2.50	+76 29 3.1	15.80	60.7	238.07	456.6	826.9	463.6	9.6
04 46 0.57	+76 36 39.7							6.5

References

CMC, Carlsberg Meridian Catalogue, 1994, Copenhagen University Observatory,
 Royal Greenwich Observatory, Real Instituto Y Observatorio de la Armada en
 San Fernando.

Selection of Blind offset Pairs

(referred to equinox and epoch J2000-0)

ING Name	α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
	<i>h m s</i>	<i>o ' "</i>	<i>l</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
BL0005+256	0 5 43.24	+25 36 54.6	21.56	48.8	72.16	850.3	974.2	851.4	10.0
BL0006+258	0 6 55.40	+25 51 4.9							11.1
BL0011-017A	0 11 19.32	-1 44 38.1	5.45	93.0	21.79	-17.3	326.6	-17.3	12.9
BL0011-017B	0 11 41.11	-1 44 55.4							12.6
BL0016+472	0 16 44.79	+47 16 45.9	11.75	96.0	68.88	-74.6	701.2	-73.4	8.4
BL0017+472	0 17 53.67	+47 15 31.2							12.0
BL0208+333	2 8 30.90	+33 20 24.3	15.69	162.2	22.92	-896.2	288.0	-896.0	9.2
BL0208+330	2 8 53.82	+33 5 28.1							10.6
BL0224+442	2 24 48.85	+44 14 35.9	10.38	160.3	-19.55	586.5	-209.5	586.6	12.6
BL0224+444	2 24 29.30	+44 24 22.4							9.8
BL0230-331	2 30 14.99	-33 6 29.9	6.67	13.9	7.62	388.5	95.9	388.5	8.0
BL0230-330	2 30 22.61	-33 0 1.3							12.6
BL0235-027	2 35 26.93	-2 47 49.0	21.12	82.8	83.90	158.4	1257.1	158.2	12.6
BL0236-027	2 36 50.83	-2 45 10.6							10.2
BL0330+482	3 30 27.08	+48 15 39.9	9.60	170.1	9.84	-567.2	98.6	-567.2	8.3
BL0330+481	3 30 36.92	+48 6 12.7							6.0
BL0452+435	4 52 25.76	+43 34 31.5	16.99	177.8	3.58	-1018.5	39.1	-1018.5	11.5
BL0452+432	4 52 29.35	+43 17 32.9							11.0
BL0454-163	4 54 40.29	-16 20 38.6	10.21	115.7	38.35	-265.4	551.8	-265.6	11.6
BL0455-164	4 55 18.65	-16 25 4.0							5.8
BL0456-051A	4 56 24.19	-5 10 16.9	12.68	123.2	42.60	-416.8	636.4	-416.9	5.4
BL0457-052	4 57 6.79	-5 17 13.7							12.9
BL0457-052	4 57 6.79	-5 17 13.7	11.97	127.2	-38.30	433.7	-572.1	433.7	12.9
BL0456-051B	4 56 28.49	-5 9 59.9							9.0
BL0559+249	5 59 53.45	+24 59 26.2	13.92	92.5	-61.38	34.9	-834.4	35.7	14.1
BL0558+250	5 58 52.07	+25 0 1.2							13.2
BL0600+250	6 0 29.34	+25 3 48.9	15.32	93.9	-67.48	61.2	-916.8	62.2	14.7
BL0559+250	5 59 21.86	+25 4 50.2							13.3
BL0713-273	7 13 36.46	-27 21 23.4	5.25	44.9	16.67	223.1	222.2	223.1	6.1
BL0713-272	7 13 53.13	-27 17 40.2							8.8
BL0715-216	7 15 51.32	-21 37 43.3	13.79	25.3	25.34	748.4	353.8	748.2	8.7
BL0716-214	7 16 16.66	-21 25 15.0							8.4
BL0757+645	7 57 46.14	+64 32 12.4	13.07	175.6	9.35	-782.1	60.8	-782.1	11.6
BL0757+643	7 57 55.50	+64 19 10.3							8.8
BL0757+329A	7 57 18.51	+32 58 45.1	8.68	105.2	39.92	-137.4	502.5	-137.0	10.8
BL0758+329B	7 57 58.43	+32 56 27.7							7.7
BL0907+410	9 7 56.20	+41 5 26.0	6.86	61.6	32.07	195.6	362.3	195.9	11.9
BL0908+411	9 8 28.27	+41 8 41.6							8.4
BL0917-145	9 17 7.72	-14 34 26.7	10.37	35.5	24.86	506.4	361.2	506.3	5.8
BL0917-144	9 17 32.59	-14 26 0.3							8.6

Blind Offset Pairs (contd)

(referred to equinox and epoch J2000-0)

ING Name	α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
	<i>h m s</i>	<i>o / "</i>	<i>'</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
BL1011-231	10 11 20.83	-23 8 11.8	10.90	117.9	41.91	-305.7	577.7	-306.0	9.9
BL1012-232	10 12 2.74	-23 13 17.5							9.5
BL1025+263	10 25 30.49	+26 23 21.5	17.43	61.9	68.75	491.0	922.7	492.0	13.4
BL1026+265	10 26 39.24	+26 31 32.4							8.6
BL1107+438	11 7 28.75	+43 50 1.6	14.69	165.8	19.86	-854.4	215.8	-854.3	10.9
BL1107+435	11 7 48.61	+43 35 47.2							9.8
BL1129-147	11 29 53.03	-14 44 40.5	9.23	172.0	5.31	-548.1	77.0	-548.1	13.8
BL1129-148	11 29 58.34	-14 53 48.6							13.7
BL1239-103	12 39 21.64	-10 22 50.6	11.03	152.9	20.41	-589.1	301.0	-589.1	14.0
BL1239-105	12 39 42.05	-10 32 39.7							13.1
BL1404+043	14 4 36.62	+4 19 29.7	20.33	114.2	74.38	-500.4	1112.7	-500.1	12.1
BL1405+041	14 5 50.99	+4 11 9.3							10.3
BL1448+427	14 48 28.97	+42 47 59.1	12.59	45.7	49.25	526.5	540.7	527.2	9.9
BL1449+429	14 49 18.22	+42 56 45.7							11.1
BL1536-053	15 36 7.99	-5 18 11.0	11.73	45.6	33.64	492.8	502.6	492.8	12.8
BL1536-051	15 36 41.63	-5 9 58.1							11.8
BL1553+613	15 53 25.48	+61 21 7.7	14.08	41.4	78.18	631.9	559.1	633.3	10.1
BL1554+615	15 54 43.66	+61 31 39.5							9.6
BL1705+459	17 5 21.26	+45 57 7.8	19.81	18.7	36.68	1125.6	380.4	1125.9	9.3
BL1705+462	17 5 57.94	+46 15 53.3							10.5
BL1828-127	18 28 29.40	-12 47 59.6	11.99	171.5	7.28	-711.3	106.3	-711.3	9.8
BL1828-129	18 28 36.68	-12 59 50.9							8.4
BL1828-135	18 28 39.05	-13 30 5.9	12.35	118.1	44.83	-348.3	653.6	-348.5	9.5
BL1829-135	18 29 23.88	-13 35 54.2							8.5
BL1832-146	18 32 20.66	-14 38 39.4	14.37	157.6	22.67	-797.0	328.7	-797.1	6.3
BL1832-148	18 32 43.33	-14 51 56.4							5.5
BL1901+295	19 1 19.32	+29 31 8.1	20.73	136.2	65.81	-898.7	861.1	-897.7	6.8
BL1902+292	19 2 25.13	+29 16 9.4							9.9
BL1918-217	19 18 3.59	-21 45 37.1	8.24	53.3	28.44	295.7	396.5	295.5	12.9
BL1918-216	19 18 32.03	-21 40 41.4							13.1
BL1918-215	19 18 28.70	-21 31 30.0	9.22	175.2	3.33	-551.4	46.4	-551.4	13.1
BL1918-216	19 18 32.03	-21 40 41.4							13.1
BL1935+356A	19 35 10.24	+35 37 42.5	9.11	81.2	44.31	83.2	540.1	83.7	8.6
BL1935+356B	19 35 54.55	+35 39 5.8							11.9
BL1942+571	19 42 41.60	+57 7 47.3	9.44	123.5	57.89	-313.7	472.4	-312.8	9.4
BL1943+570	19 43 39.49	+57 2 33.6							6.2
BL2042-224	20 42 3.38	-22 28 12.8	20.24	132.0	65.17	-812.6	901.9	-813.5	9.5
BL2043-226	20 43 8.55	-22 41 45.4							9.6
BL2038-028	20 38 15.09	-2 53 25.1	7.97	163.1	9.29	-457.5	139.2	-457.5	12.2
BL2038-030	20 38 24.38	-3 1 2.6							9.3

Blind Offset Pairs (contd)

(referred to equinox and epoch J2000-0)

ING Name	α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
	<i>h m s</i>	<i>o ' "</i>	<i>'</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
BL2058+444	20 58 19.46	+44 28 18.3	14.22	154.4	34.28	-769.8	368.2	-769.5	5.5
BL2058+442	20 58 53.73	+44 15 28.5							11.8
BL2123+049	21 23 19.85	+4 56 52.7	15.64	18.6	20.01	889.7	298.9	889.7	10.6
BL2123+051	21 23 39.86	+5 11 42.3							11.0
BL2154+347A	21 54 18.62	+34 46 1.9	8.24	87.5	40.08	21.5	493.8	21.9	9.2
BL2154+347B	21 54 58.70	+34 46 23.4							7.2
BL2154+347B	21 54 58.88	+34 46 23.4	14.32	31.3	36.29	733.9	446.1	734.3	7.2
BL2155+349	21 55 35.17	+34 58 37.3							7.1
BL2333-015	23 33 41.11	-1 30 52.0	17.47	23.5	27.90	960.7	418.5	960.7	10.0
BL2334-012	23 34 9.01	-1 14 51.2							5.8
BL2341+367	23 41 47.78	+36 47 39.3	21.97	134.5	78.03	-925.0	940.5	-923.5	9.0
BL2343+365	23 43 5.82	+36 32 14.3							12.6

Blind offset Pairs, across equator

(referred to equinox and epoch J2000-0)

ING Name	α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
	<i>h m s</i>	<i>o ' "</i>	<i>'</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
BL0001+002	0 0 39.11	+0 13 22.8	19.55	156.6	31.05	-1076.8	465.8	-1076.8	8.3
BL0001-000	0 1 10.16	-0 4 33.9							8.3
BL0015+001	0 15 43.79	+0 7 4.7	21.03	136.2	58.26	-910.3	873.9	-910.3	9.5
BL0016-001	0 16 42.05	-0 8 5.6							12.0
BL0019+000	0 19 46.20	+0 5 48.7	14.15	131.8	42.19	-566.0	632.8	-566.0	11.8
BL0020-000	0 20 28.39	-0 3 37.3							12.1
BL0020+001	0 20 28.94	+0 7 27.0	11.07	0.7	-0.55	-664.3	-8.3	-664.3	9.7
BL0020-000	0 20 28.39	-0 3 37.3							12.1
BL0059+000	0 59 23.84	+0 3 50.4	16.36	174.0	6.88	-976.1	103.1	-976.2	11.6
BL0059-002	0 59 30.72	-0 12 25.8							10.1
BL0218+000	2 18 59.45	+0 3 52.0	21.16	132.5	62.43	-857.3	936.4	-857.3	8.9
BL0220-001	2 20 1.87	-0 10 25.3							9.9
BL0253+000	2 53 38.33	+0 3 16.4	18.28	109.7	68.84	-370.4	1032.6	-370.4	9.2
BL0254-000	2 54 47.17	-0 2 54.0							6.5
BL0421+001	4 21 24.50	+0 7 59.0	13.89	177.4	2.53	-832.6	38.0	-832.7	11.1
BL0421-000	4 21 27.04	-0 5 53.7							5.9
BL0455+000	4 55 16.24	+0 9 31.2	15.54	175.3	5.06	-929.6	75.9	-929.6	9.3
BL0455-000	4 55 21.30	-0 5 58.4							9.0
BL0559+000	5 59 51.60	+0 3 21.2	15.68	171.4	9.42	-930.0	141.3	-930.1	8.0
BL0600-000	6 0 1.01	-0 12 8.8							11.3
BL0706-001	7 6 20.65	-0 11 22.4	16.79	21.1	24.14	940.3	362.2	940.3	9.5
BL0706+000	7 6 44.79	+0 4 17.9							9.0
BL0801-000	8 1 42.99	-0 2 7.4	20.34	47.0	59.48	832.7	892.3	832.7	8.9
BL0802+001	8 2 42.48	+0 11 45.4							11.9
BL0919-001	9 19 11.02	-0 11 59.6	19.35	28.8	37.30	1017.1	559.5	1017.1	9.8
BL0919+000	9 19 48.32	+0 4 57.5							12.0
BL1040-001	10 40 1.35	-0 8 49.2	13.36	2.4	2.26	801.1	33.9	801.1	8.5
BL1040+000	10 40 3.61	+0 4 31.9							12.3
BL1102-000	11 2 33.18	-0 5 37.0	13.00	23.3	20.55	716.6	308.2	716.6	7.5
BL1102+001	11 2 53.73	+0 6 19.6							9.9
BL1236-001	12 36 44.76	-0 11 16.2	14.44	21.7	21.34	805.0	320.1	805.0	10.4
BL1237+000	12 37 6.10	+0 2 8.7							8.6
BL1237-000	12 37 11.91	-0 1 17.3	4.55	36.3	10.76	219.9	161.4	219.9	9.9
BL1237+000	12 37 22.67	+0 2 22.6							12.1
BL1321+002	13 21 52.76	+0 13 33.7	18.02	168.0	14.98	-1057.6	224.7	-1057.6	12.0
BL1322-000	13 22 7.74	-0 4 3.9							8.0
BL1358-000	13 58 43.76	-0 4 45.5	17.08	63.2	60.99	462.3	914.8	462.3	13.8
BL1359+000	13 59 44.75	+0 2 56.7							7.9
BL1506+001	15 6 15.86	+0 11 15.9	16.47	148.7	34.26	-843.8	514.0	-843.8	9.7
BL1506-000	15 6 50.13	-0 2 47.9							10.7
BL1604-000	16 4 32.16	-0 1 19.3	13.34	3.3	3.03	798.8	45.4	798.8	8.4
BL1604+001	16 4 35.19	+0 11 59.5							12.0

Blind Offset Pairs, across equator (contd)

(referred to equinox and epoch J2000-0)

ING Name	α	δ	Sep.	Ang.	$\Delta\alpha$	$\Delta\delta$	ξ	η	Mag.
	<i>h m s</i>	<i>o / "</i>	<i>'</i>	<i>o</i>	<i>s</i>	<i>"</i>	<i>"</i>	<i>"</i>	
BL1649-000	16 49 20.81	-0 4 41.0	16.43	41.4	43.49	739.1	652.3	739.2	8.0
BL1650+001	16 50 4.30	+0 7 38.2							12.5
BL1921-000	19 21 21.20	-0 5 35.8	13.51	50.1	41.45	519.7	621.8	519.7	12.6
BL1922+000	19 22 2.66	+0 3 3.9							10.6
BL2002-000	20 2 49.66	-0 2 29.8	12.15	49.8	37.14	470.0	557.0	470.0	12.2
BL2003+000	20 3 26.79	+0 5 20.3							8.0
BL2059-000	20 59 33.12	-0 2 50.0	16.35	32.5	35.17	827.2	527.5	827.2	12.6
BL2100+001	21 0 8.29	+0 10 57.2							12.6
BL2201-000	22 1 46.90	-0 4 7.9	7.39	36.4	17.53	356.9	263.0	356.9	7.8
BL2202+000	22 2 4.44	+0 1 49.0							12.6
BL2312-001	23 12 19.68	-0 10 50.2	16.27	38.7	40.70	761.4	610.5	761.4	12.8
BL2313+000	23 13 0.38	+0 1 51.1							7.7