

22:15:16 FocusMax Version 3.2.1  
22:15:16 System is c8\_st8\_cfw10\_f10  
22:15:16 RoboFocus Control Program is connected  
22:15:16 CCDSoft V 5.1.7.0 is the Imaging Software  
22:15:28 PinPoint is not connected  
22:15:28 Warning - NOVAS-COM Vector Astrometry Engine is not connected  
22:15:28 and is required with telescope use. Please download from  
22:15:28 DC3 ASCOM Download Library at  
22:15:28 <http://ascom-standards.org/downloads.html>  
22:15:35  
22:15:35 System: c8\_st8\_cfw10\_f10  
22:15:35 \*\* Beginning Focus run \*\*  
22:15:35 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
22:15:35 Using convergence: Steps = 2 Samples = 5  
22:15:35 Move direction: Out  
22:15:35 Filter number = 0  
22:15:35 Focus Start: 11405  
22:15:47 Target star found at x = 739, y = 656  
22:15:47 Focus exposures will be 0.11 sec  
22:15:52 Position , HFD , Mean Best Focus , X , Y , Flux  
22:15:52 11405 , 25.41 , 0 , 743 , 658 , 23922  
22:15:57 11427 , 18.14 , 0 , 743 , 661 , 20941  
22:15:57 On correct side of focus  
22:15:57 Move to Near Focus HFD  
22:16:03 11451 , 9.95 , 0 , 742 , 661 , 22187  
22:16:03 \*\* Starting Near Focus \*\*  
22:16:03 Position , HFD , Mean Best Focus , X , Y , Flux  
22:16:03 11451 , 9.95 , 11479 , 742 , 661 , 22187  
22:16:07 11451 , 9.28 , 11478 , 743 , 660 , 21530  
22:16:11 11451 , 9.36 , 11478 , 742 , 660 , 21417  
22:16:13 11451 , 9.70 , 11478 , 743 , 661 , 21673  
22:16:15 11451 , 9.53 , 11478 , 742 , 661 , 20054  
22:16:19 11451 , 10.18 , 11478 , 742 , 660 , 23777  
22:16:19 Focus has converged  
22:16:19 Best Focus is: 11478  
22:16:24 11478 , 3.60 , 11478 , 742 , 662 , 21166  
22:16:24 Focusing Completed  
22:16:26 Focus time = 50 sec  
22:29:03  
22:29:03 System: c8\_st8\_cfw10\_f10  
22:29:03 \*\* Beginning Focus run \*\*  
22:29:03 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
22:29:03 Using convergence: Steps = 2 Samples = 5  
22:29:03 Move direction: Out  
22:29:03 Temperature = 614.0  
22:29:03 Filter number = 1  
22:29:03 Focus Start: 11418  
22:29:16 Target star found at x = 676, y = 592  
22:29:16 Focus exposures will be 0.11 sec  
22:29:22 Position , HFD , Mean Best Focus , X , Y , Flux  
22:29:22 11418 , 22.78 , 0 , 679 , 517 , 4929  
22:29:28 11437 , 0.00 , 0 , 647 , 485 , 4723  
22:29:28 On correct side of focus  
22:29:28 Move to Near Focus HFD  
22:29:32 Error in modHFR Sub StarIntersectsFrameEdge  
22:29:32 Star is too close to frame edge or is too weak  
22:29:32 Increasing frame width  
22:29:37 Star is too close to frame edge or is too weak  
22:29:44 Star is too close to frame edge or is too weak  
22:29:44 Increasing subframe width, attempt 1  
22:29:49 Star is too close to frame edge or is too weak  
22:29:49 Increasing subframe width, attempt 2  
22:29:54 Star is too close to frame edge or is too weak  
22:29:54 Increasing subframe width, attempt 3  
22:30:00 Star is too close to frame edge or is too weak  
22:30:08 11437 , 10.31 , 0 , 679 , 523 , 3167  
22:30:12 Star is too close to frame edge or is too weak; increasing frame size  
22:30:12 Increasing frame width  
22:30:17 11437 , 13.76 , 0 , 683 , 521 , 5091  
22:30:17 \*\* Starting Near Focus \*\*  
22:30:17 Position , HFD , Mean Best Focus , X , Y , Flux  
22:30:17 11437 , 13.76 , 11476 , 683 , 521 , 5091  
22:30:22 11437 , 0.00 , 11456 , 656 , 494 , 2744  
22:30:26 Error in modHFR Sub StarIntersectsFrameEdge  
22:30:26 Star is too close to frame edge or is too weak  
22:30:26 Increasing frame width  
22:30:31 Star is too close to frame edge or is too weak  
22:30:38 Star is too close to frame edge or is too weak  
22:30:38 Increasing subframe width, attempt 1  
22:30:43 Star is too close to frame edge or is too weak  
22:30:43 Increasing subframe width, attempt 2  
22:30:48 Star is too close to frame edge or is too weak  
22:30:48 Increasing subframe width, attempt 3  
22:30:54 11437 , 13.26 , 11462 , 684 , 521 , 4382  
22:30:59 Star is too close to frame edge or is too weak; increasing frame size  
22:30:59 Increasing frame width  
22:31:05 11437 , 11.98 , 11464 , 680 , 521 , 2072  
22:31:09 Star is too close to frame edge or is too weak; increasing frame size  
22:31:09 Increasing frame width  
22:31:14 Star is too close to frame edge or is too weak

22:31:14 Increasing frame width  
22:31:20 11437 , 12.46 , 11466 , 680 , 526 , 3384  
22:31:25 Star is too close to frame edge or is too weak; increasing frame size  
22:31:25 Increasing frame width  
22:31:30 Star is too close to frame edge or is too weak  
22:31:30 Increasing frame width  
22:31:36 11437 , 14.43 , 11468 , 682 , 522 , 6909  
22:31:36 Skew= -1.28151 Replacing HFD= 0.00  
22:31:41 Star is too close to frame edge or is too weak  
22:31:41 Increasing frame width  
22:31:46 Star is too close to frame edge or is too weak  
22:31:54 11437 , 14.71 , 11475 , 680 , 523 , 6441  
22:31:58 Star is too close to frame edge or is too weak  
22:31:58 Increasing frame width  
22:32:03 11437 , 0.00 , 11469 , 624 , 467 , 857  
22:32:03 Skew= -1.498735 Replacing HFD= 0.00  
22:32:08 Error in modHFR Sub StarIntersectsFrameEdge  
22:32:08 Star is too close to frame edge or is too weak  
22:32:08 Increasing frame width  
22:32:12 Star is too close to frame edge or is too weak  
22:32:19 Star is too close to frame edge or is too weak  
22:32:19 Increasing Subframe Width, attempt 1  
22:32:24 No star found  
22:32:31 Star is too close to frame edge or is too weak  
22:32:31 Increasing Subframe Width, attempt 2  
22:32:36 Star is too close to frame edge or is too weak  
22:32:36 Increasing Subframe Width, attempt 3  
22:32:41 Star is too close to frame edge or is too weak  
22:32:49 Star is too close to frame edge or is too weak  
22:32:49 Can not measure HFD for this image  
22:32:54 Moving to previous focus position of 11478  
22:35:50  
22:35:50 System: c8\_st8\_cfw10\_f10  
22:35:50 \*\* Beginning Focus run \*\*  
22:35:50 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
22:35:50 Using convergence: Steps = 2 Samples = 5  
22:35:50 Move direction: Out  
22:35:50 Temperature = 612.0  
22:35:50 Filter number = 1  
22:35:50 Focus Start: 11418  
22:36:03 Starting exposures with Extended Time  
22:36:03 Min flux setting = 10000  
22:36:03 Total Flux = 5903 Next exposure = 1.00 sec  
22:36:13 Total Flux = 49151  
22:36:13 Target star found at X = 763, Y = 548  
22:36:13 Focus exposures will be 1.00 sec  
22:36:20 Position , HFD , Mean Best Focus , X , Y , Flux  
22:36:20 11418 , 20.54 , 0 , 761 , 548 , 47972  
22:36:25 11433 , 15.70 , 0 , 762 , 550 , 48989  
22:36:25 On correct side of focus  
22:36:25 Move to Near Focus HFD  
22:36:33 11450 , 9.54 , 0 , 761 , 550 , 47731  
22:36:33 \*\* Starting Near Focus \*\*  
22:36:33 Position , HFD , Mean Best Focus , X , Y , Flux  
22:36:33 11450 , 9.54 , 11477 , 761 , 550 , 47731  
22:36:40 11450 , 9.26 , 11476 , 760 , 550 , 47611  
22:36:43 11450 , 9.55 , 11476 , 761 , 550 , 49027  
22:36:47 11450 , 9.49 , 11476 , 762 , 550 , 46788  
22:36:51 11450 , 9.45 , 11476 , 762 , 550 , 46701  
22:36:54 11450 , 9.78 , 11477 , 762 , 550 , 47842  
22:36:54 Focus has converged  
22:36:54 Best Focus is: 11477  
22:37:03 11477 , 3.44 , 11477 , 763 , 552 , 46337  
22:37:04 Focusing Completed  
22:37:04 Focus time = 74 sec  
22:37:09 Single Exp. HFD: 4.07 @ 11477 X: 764 Y: 554 Flux: 5627  
22:37:12 Single Exp. HFD: 3.59 @ 11477 X: 766 Y: 555 Flux: 5545  
22:37:17 Single Exp. HFD: 3.52 @ 11477 X: 765 Y: 555 Flux: 5700  
22:37:22 Single Exp. HFD: 3.84 @ 11477 X: 765 Y: 557 Flux: 5413  
22:37:27 Single Exp. HFD: 3.81 @ 11477 X: 766 Y: 557 Flux: 5894  
23:17:36  
23:17:36 System: c8\_st8\_cfw10\_f10  
23:17:36 \*\* Beginning Focus run \*\*  
23:17:36 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
23:17:36 Using convergence: Steps = 2 Samples = 5  
23:17:36 Move direction: Out  
23:17:36 Temperature = 610.0  
23:17:36 Filter number = 2  
23:17:36 Focus Start: 11417  
23:17:49 Target star found at X = 754, Y = 524  
23:17:49 Focus exposures will be 0.11 sec  
23:17:54 Position , HFD , Mean Best Focus , X , Y , Flux  
23:17:54 11417 , 20.59 , 0 , 755 , 528 , 6887  
23:17:59 Star is too close to frame edge or is too weak  
23:17:59 Increasing frame width  
23:18:04 11432 , 18.12 , 0 , 753 , 527 , 8090  
23:18:04 On correct side of focus  
23:18:04 Move to Near Focus HFD  
23:18:10 11456 , 7.31 , 0 , 755 , 531 , 7276  
23:18:10 \*\* Starting Near Focus \*\*

23:18:10 Position , HFD , Mean Best Focus , X , Y , Flux  
23:18:10 11456 , 7.31 , 11476 , 755 , 531 , 7276  
23:18:15 Star is too close to frame edge or is too weak  
23:18:15 Increasing frame width  
23:18:20 11456 , 8.08 , 11477 , 756 , 532 , 7256  
23:18:24 11456 , 7.11 , 11477 , 756 , 532 , 6939  
23:18:29 Star is too close to frame edge or is too weak  
23:18:29 Increasing frame width  
23:18:33 11456 , 7.61 , 11477 , 756 , 532 , 7119  
23:18:38 11456 , 6.64 , 11476 , 756 , 530 , 6847  
23:18:43 11456 , 7.38 , 11476 , 757 , 531 , 7078  
23:18:43 Focus has converged  
23:18:43 Best Focus is: 11476  
23:18:50 11476 , 2.41 , 11476 , 757 , 533 , 5656  
23:18:51 Focusing Completed  
23:18:51 Focus time = 75 sec  
23:18:56 Single Exp. HFD: 2.87 @ 11476 X: 756 Y: 532 Flux: 6706  
23:19:00 Single Exp. HFD: 2.82 @ 11476 X: 757 Y: 533 Flux: 7332  
23:19:05 Single Exp. HFD: 2.73 @ 11476 X: 756 Y: 533 Flux: 7111  
23:19:10 Single Exp. HFD: 2.90 @ 11476 X: 756 Y: 533 Flux: 7255  
23:19:15 Single Exp. HFD: 2.58 @ 11476 X: 756 Y: 533 Flux: 7518  
23:59:31 System: c8\_st8\_cfw10\_f10  
23:59:31 \*\* Beginning Focus run \*\*  
23:59:31 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
23:59:31 Using convergence: Steps = 2 Samples = 5  
23:59:31 Move direction: Out  
23:59:31 Temperature = 610.0  
23:59:31 Filter number = 3  
23:59:31 Focus Start: 11416  
23:59:43 Target star found at x = 752, Y = 546  
23:59:43 Focus exposures will be 0.11 sec  
23:59:48 Position , HFD , Mean Best Focus , X , Y , Flux  
23:59:48 11416 , 20.17 , 0 , 740 , 554 , 7885  
23:59:54 11431 , 13.52 , 0 , 737 , 556 , 5860  
23:59:54 On correct side of focus  
23:59:54 Move to Near Focus HFD  
23:59:58 11441 , 11.91 , 0 , 743 , 558 , 7654  
23:59:58 \*\* Starting Near Focus \*\*  
23:59:58 Position , HFD , Mean Best Focus , X , Y , Flux  
23:59:58 11441 , 11.91 , 11475 , 743 , 558 , 7654  
00:00:03 11441 , 12.16 , 11475 , 744 , 558 , 7532  
00:00:07 11441 , 12.82 , 11476 , 743 , 557 , 7837  
00:00:12 11441 , 12.13 , 11476 , 743 , 559 , 8170  
00:00:14 11441 , 12.16 , 11476 , 743 , 558 , 7529  
00:00:19 11441 , 12.36 , 11476 , 744 , 560 , 7231  
00:00:19 Focus has converged  
00:00:19 Best Focus is: 11476  
00:00:27 11476 , 3.74 , 11476 , 743 , 560 , 9279  
00:00:27 Focusing Completed  
00:00:27 Focus time = 57 sec  
00:00:33 Single Exp. HFD: 2.93 @ 11476 X: 744 Y: 558 Flux: 7806  
00:00:37 Single Exp. HFD: 2.76 @ 11476 X: 743 Y: 558 Flux: 7911  
00:00:42 Single Exp. HFD: 3.09 @ 11476 X: 744 Y: 558 Flux: 8337  
00:00:47 Single Exp. HFD: 2.93 @ 11476 X: 744 Y: 558 Flux: 7749  
00:00:52 Single Exp. HFD: 2.63 @ 11476 X: 745 Y: 559 Flux: 7961  
00:40:55 System: c8\_st8\_cfw10\_f10  
00:40:55 \*\* Beginning Focus run \*\*  
00:40:55 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
00:40:55 Using convergence: Steps = 2 Samples = 5  
00:40:55 Move direction: out  
00:40:55 Temperature = 608.0  
00:40:55 Filter number = 0  
00:40:55 Focus Start: 11416  
00:41:07 Target star found at x = 743, Y = 555  
00:41:07 Focus exposures will be 0.11 sec  
00:41:12 Position , HFD , Mean Best Focus , X , Y , Flux  
00:41:12 11416 , 21.43 , 0 , 737 , 552 , 23669  
00:41:18 11433 , 15.36 , 0 , 737 , 554 , 23265  
00:41:18 On correct side of focus  
00:41:18 Move to Near Focus HFD  
00:41:24 11449 , 10.04 , 0 , 737 , 555 , 22353  
00:41:24 \*\* Starting Near Focus \*\*  
00:41:24 Position , HFD , Mean Best Focus , X , Y , Flux  
00:41:24 11449 , 10.04 , 11477 , 737 , 555 , 22353  
00:41:28 11449 , 9.66 , 11477 , 738 , 555 , 21748  
00:41:33 11449 , 10.06 , 11477 , 738 , 554 , 22174  
00:41:38 11449 , 9.92 , 11477 , 739 , 554 , 22266  
00:41:43 11449 , 9.81 , 11477 , 739 , 555 , 21573  
00:41:46 11449 , 9.77 , 11477 , 740 , 555 , 20301  
00:41:46 Focus has converged  
00:41:46 Best Focus is: 11477  
00:41:52 11477 , 2.50 , 11477 , 739 , 556 , 22283  
00:41:53 Focusing Completed  
00:41:53 Focus time = 58 sec  
00:41:59 Single Exp. HFD: 2.64 @ 11477 X: 739 Y: 555 Flux: 22406  
00:42:03 Single Exp. HFD: 2.61 @ 11477 X: 739 Y: 556 Flux: 23441  
00:42:07 Single Exp. HFD: 2.58 @ 11477 X: 738 Y: 556 Flux: 22862  
00:42:13 Single Exp. HFD: 2.53 @ 11477 X: 739 Y: 555 Flux: 22160

00:42:18 Single Exp. HFD: 2.84 @ 11477 X: 738 Y: 555 Flux: 22851  
01:16:33 System: c8\_st8\_cfw10\_f10  
01:16:33 \*\* Beginning Focus run \*\*  
01:16:33 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
01:16:33 Using convergence: Steps = 2 Samples = 5  
01:16:33 Move direction: Out  
01:16:33 Temperature = 611.0  
01:16:33 Filter number = 0  
01:16:33 Focus Start: 11417  
01:16:46 Star is too close to frame edge or is too weak  
01:16:46 Try star search again with cropped border  
01:16:46 Star is too close to frame edge or is too weak  
01:16:46 Attempting brightest pixel method  
01:16:46 Star is too close to frame edge or is too weak  
01:16:46 Starting exposures with Extended Time  
01:16:46 Min flux setting = 10000  
01:16:46 Total Flux = 0 Next exposure = 1.00 sec  
01:16:56 Star is too close to frame edge or is too weak  
01:16:56 Try star search again with cropped border  
01:16:56 Star is too close to frame edge or is too weak  
01:16:56 Attempting brightest pixel method  
01:16:56 Star is too close to frame edge or is too weak  
01:16:56 Total Flux = 0 Next exposure = 2.00 sec  
01:17:08 Total Flux = 53345  
01:17:08 Target star found at X = 726, Y = 566  
01:17:08 Focus exposures will be 2.00 sec  
01:17:17 Star is too close to frame edge or is too weak; increasing frame size  
01:17:17 Increasing frame width  
01:17:27 Position , HFD , Mean Best Focus , X , Y , Flux  
01:17:27 11417 , 18.97 , 0 , 724 , 521 , 2204  
01:17:37 Star is too close to frame edge or is too weak  
01:17:37 Increasing frame width  
01:17:48 11443 , 12.61 , 0 , 724 , 567 , 142047  
01:17:48 On correct side of focus  
01:17:48 At Near Focus  
01:17:48 Position , HFD , Mean Best Focus , X , Y , Flux  
01:17:48 11443 , 12.61 , 11479 , 724 , 567 , 142047  
01:17:56 11443 , 12.74 , 11479 , 724 , 566 , 354238  
01:18:05 11443 , 12.69 , 11479 , 726 , 567 , 356714  
01:18:14 11443 , 12.45 , 11479 , 725 , 566 , 361468  
01:18:19 11443 , 12.46 , 11479 , 727 , 567 , 370922  
01:18:28 11443 , 12.39 , 11479 , 726 , 567 , 364779  
01:18:28 Focus has converged  
01:18:28 Best Focus is: 11479  
01:18:39 11479 , 2.69 , 11479 , 727 , 569 , 363838  
01:18:40 Focusing Completed  
01:18:40 Focus time = 126 sec  
01:18:45 Single Exp. HFD: 2.52 @ 11479 X: 727 Y: 569 Flux: 22214  
01:18:48 Single Exp. HFD: 2.43 @ 11479 X: 726 Y: 569 Flux: 23983  
01:18:53 Single Exp. HFD: 2.53 @ 11479 X: 727 Y: 569 Flux: 21127  
01:18:58 Single Exp. HFD: 2.55 @ 11479 X: 727 Y: 569 Flux: 21459  
01:19:03 Single Exp. HFD: 2.90 @ 11479 X: 727 Y: 569 Flux: 22354  
01:23:07 System: c8\_st8\_cfw10\_f10  
01:23:07 \*\* Beginning Focus run \*\*  
01:23:07 LS: -0.342509 RS: 0.342226 PID: 2.29 NFHFD: 10  
01:23:07 Using convergence: Steps = 2 Samples = 5  
01:23:07 Move direction: Out  
01:23:07 Temperature = 611.0  
01:23:07 Filter number = 0  
01:23:07 Focus Start: 11419  
01:23:19 Starting exposures with Extended Time  
01:23:19 Min flux setting = 10000  
01:23:19 Total Flux = 2147 Next exposure = 1.00 sec  
01:23:29 Total Flux = 10735  
01:23:29 Target star found at X = 734, Y = 557  
01:23:29 Focus exposures will be 1.00 sec  
01:23:36 Position , HFD , Mean Best Focus , X , Y , Flux  
01:23:36 11419 , 21.03 , 0 , 735 , 554 , 27535  
01:23:44 11435 , 15.43 , 0 , 735 , 555 , 143944  
01:23:44 On correct side of focus  
01:23:44 Move to Near Focus HFD  
01:23:51 11451 , 9.99 , 0 , 736 , 556 , 182799  
01:23:51 \*\* Starting Near Focus \*\*  
01:23:51 Position , HFD , Mean Best Focus , X , Y , Flux  
01:23:52 11451 , 9.99 , 11479 , 736 , 556 , 182799  
01:23:58 11451 , 9.66 , 11479 , 737 , 555 , 184751  
01:24:02 11451 , 9.81 , 11479 , 738 , 556 , 184011  
01:24:09 11451 , 9.48 , 11478 , 738 , 555 , 187914  
01:24:12 11451 , 9.56 , 11478 , 739 , 556 , 183974  
01:24:16 11451 , 9.68 , 11478 , 738 , 556 , 185368  
01:24:16 Focus has converged  
01:24:16 Best Focus is: 11478  
01:24:24 11478 , 2.58 , 11478 , 739 , 558 , 188450  
01:24:25 Focusing Completed  
01:24:25 Focus time = 78 sec  
01:24:30 Single Exp. HFD: 2.51 @ 11478 X: 739 Y: 557 Flux: 21398  
01:24:34 Single Exp. HFD: 2.54 @ 11478 X: 740 Y: 557 Flux: 22948  
01:24:39 Single Exp. HFD: 2.48 @ 11478 X: 741 Y: 557 Flux: 21659

01:24:44 Single Exp. HFD: 2.37 @ 11478 X: 741 Y: 557 Flux: 22763  
01:24:49 Single Exp. HFD: 2.36 @ 11478 X: 743 Y: 557 Flux: 22764