

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5493

Konkoly Observatory
Budapest

13 January 2004

HU ISSN 0374 – 0676

CCD MINIMA FOR SELECTED ECLIPSING BINARIES IN 2003

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Observatory and telescope:	
Sylvester Robotic Observatory (SRO): 33 cm f/4.5 Newtonian on Paramount GT-1100s mount	

Detector:	SRO: SBIG ST7e, 1.24 pixels, 15.8 x 10.5 FOV, cooled -10 < T < -30 °C
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Method of data reduction:	
Aperture photometry using MIRA, by Axiom Research	

Method of minimum determination:	
Digital tracing paper method, bisection of chords, curve fitting, and (occasionally) Kwee and van Woerden (1956)	

Observed star(s):							
Star name	GCVS type	Coordinates (J2000)		Comp. star	Ephemeris		Source
		RA	Dec		E 2400000+	P [day]	
WZ And	EB/KE:	1.0143	38.0546	GSC 2799-0902	52974.6749	0.6956631	
XZ And	EA/SD:	1.5652	42.0602	GSC 2824-1778	52949.78266	1.3573206	
AB And	EW/KW	23.1132	36.5335	GSC 2763-0735	52936.6626	0.3318922	
AD And	EB/DW:	23.3645	48.4016	GSC 3641-0161	52950.6879	0.9862141	
DS And	EB/DM	1.5746	38.0428	GSC 2816-1250	52972.5956	1.0105187	
EP And	EW/KW	1.4229	44.4542	GSC 2827:0103	52885.7425	0.4041105	
V0346 Aql	EA/SD	20.1	10.21	GSC 1077:1496	52793.922	1.1063617	
AH Aur	EW/KW	6.2605	27.5956	GSC 1887:1240	52667.6405	0.4942796	
AP Aur	EA/SD:	7.235	36.2653	GSC 2464-0664	52986.8502	0.5693877	
HS Aur	EA/DM	6.5118	47.4024	GSC 3394:0370	52642.684	9.8153765	
IY Aur	E	5.4827	43.0458	GSC 2919:0468	52683.6681	2.7933771	
KU Aur	EA/SD:	6.2756	30.2324	GSC 2422-0020	52936.8623	1.3195723	
SU Boo	EA/DM:	14.2921	32.081	GSC 2553:0253	52667.2487	1.5612498	
TU Boo	EW/KW	14.0459	29.5958	GSC 2545:1000	52752.7789	0.3242813	
TY Boo	EW/KW	15.0047	35.08	GSC 2568:0997	52699.8482	0.3171502	
TZ Boo	EW/KW	15.0809	39.5813	GSC 3045:0892	52674.9175	0.2971604	
VW Boo	EW/KW	14.1726	12.3403	GSC 0908:1021	52716.8624	0.3423181	
XY Boo	EW/KW	13.4912	20.1125	GSC 1466:0038	52750.7945	0.370573	
CV Boo	EA	15.262	36.5853	GSC 2570:0869	52759.7411	0.8469938	
AO Cam	EW/KW	4.2813	53.0244	GSC 3732-0682	52943.82676	0.3298803	

Observed star(s):							
Star name	GCVS type	Coordinates (J2000)		Comp. star	Ephemeris		Source
		RA	Dec		E 2400000+	P [day]	
ZZ Cas	EB/KE	0.333	62.304	GSC 4019-3762	52964.60807	1.243527	
AB Cas	EA+dSct	2.3732	71.1816	GSC 4320:0413	52647.6045	1.3668891	
BH Cas	EW:	0.2121	59.0908	[not GSC]	52865.8351	0.4058916	
BU Cas	EA/DM	1.2841	61.0755	GSC 4031-1893	52894.7099	2.2551869	
CW Cas	EW/KW	0.4554	63.0505	GSC 4020-1387	52975.5892	0.3188614	
DZ Cas	EB/KE	23.3951	55.5256	GSC 4004-1197	52890.8345	0.7848866	
KL Cas	EB/SD	0.5142	58.5148	GSC 3667-0726	52977.587	2.447425	
V0344 Cas	EW/KE	23.0735	57.2334	GSC 4006-1807	52893.694	1.0007436	
V0364 Cas	EA	0.5243	50.281	GSC 3270-0612	52949.6201	0.8176332	
V0387 Cas	EA/DM	1.0032	58.4146	GSC 3680-1741	52963.7008	1.6082162	
V0445 Cas	EB	0.3135	53.1312	GSC 3654-1529	52951.66811	0.6735235	
RW Cep	EW/KW	23.2224	72.5524	GSC 4486:1402	52834.776	0.4174459	
RW Cet	EA/SD	2.1522	-12.1227	GSC 5283:0173	52641.5992	0.9752004	
UZ CMi	EW/DW	7.5053	3.3918	GSC 0184:1875	52667.8273	0.7619865	
TX Cnc	EW/KW	8.4002	18.5959	GSC 1395:1070	52647.8334	0.3828826	
EH Cnc	EW	8.2618	20.525	GSC 1391-1159	52999.8204	0.4180365	
RW Com	EW/KW	12.33	26.4258	GSC 1991:1659	52724.7854	0.2373455	
RZ Com	EW/KW	12.3505	23.2014	GSC 1990:3321	52693.8196	0.3385082	
SS Com	EW/KW	12.4939	18.4212	GSC 1452:0477	52705.9055	0.4128189	
CC Com	EW/KW	12.1206	22.3158	GSC 1986:1744	52648.958	0.2206856	
ZZ Cyg	EA/SD	20.2353	46.5515	GSC 3576:0964	52795.7866	0.6286158	
V0463 Cyg	EA/DM	19.4214	31.1802	GSC 2656:1627	52839.7805	2.1175658	
V0513 Cyg	EA/KE:	20.4557	40.3813	GSC 3170:0502	52866.7764	1.0561819	
V0874 Cyg	EW/KW	19.3	28.2155	[not GSC]	52862.737	0.4236445	
V1411 Cyg	EA	21.5824	49.4415	GSC 3613:0609	52769.8966	0.7767313	
EX Del	EW/KW	20.1568	15.5253	[not GSC]	52838.8285	0.3309878	
WW Gem	EB/KE	6.1206	23.3018	GSC 1877-1243	52964.8384	1.2378121	
AF Gem	EA/SD	6.504	21.2156	GSC 1343-2551	52964.9452	1.2434987	
AL Gem	EA/D:	6.5739	20.5332	GSC 1356-0980	52951.9411	1.3913467	
AZ Gem	EB/KE:	6.3433	14.2824	GSC 0745:0898	52694.6773	1.006186	
TT Her	EB/KE	16.5423	16.5013	GSC 1525:0805	52755.8687	0.912079	
V0728 Her	EW/KW	17.1805	41.5041	GSC 3081:1028	52760.8348	0.4712863	
DF Hya	EW/KW	8.5502	6.0538	GSC 0225-0943	52986.937	0.3306135	
FG Hya	EW/KW	8.2704	3.3052	GSC 0201:2026	52706.6829	0.3278286	
PP Lac	EW/KW	22.4238	53.2456	GSC 3984:1085	52859.8563	0.4011617	
XZ Leo	EW/KE	10.0234	17.0247	GSC 1412:0423	52705.7566	0.4877351	
DU Leo	EA/SD	9.4411	25.2111	GSC 1963-1353	52943.9318	0.6870923	
RT LMi	EW/KW	9.4948	34.2715	GSC 2505-0079	52997.9093	0.3749172	
SW Lyn	EW/DW	8.0742	41.4802	GSC 2976-1660	52947.87998	0.6440659	
UU Lyn	EA/DM	9.151	42.4211	GSC 2990:0019	52644.8922	0.4684598	
UV Lyn	EW/KW	9.0324	38.0554	GSC 2983-1629	52952.9535	0.4149843	
TZ Lyr	EB/D	18.155	41.0638	GSC 3107:1492	52761.766	0.5288271	
UZ Lyr	EA/SD	19.2109	37.5611	GSC 3134:0830	52716.965	1.8912109	
PY Lyr	EW/KW	19.2026	28.5644	[not GSC]	52741.9859	0.3857696	
V0396 Mon	EW/KW	6.3837	3.3618	GSC 0151-0295	52973.8783	0.396341	
V0530 Mon	EW	7.0316	3.1454	[not GSC]	52947.0313	0.4877529	
V0532 Mon	EW:/KW:	7.0431	-0.2107	GSC 4814:1947	52707.6689	0.4669855	
UW Ori	EB/KE	5.5553	20.1016	GSC 1320-0260	52974.8592	2.0381355	
ER Ori	EW/KW	5.1115	-8.3324	GSC 5330:0364	52644.7649	0.4233994	
FZ Ori	EW/KW	5.4121	2.3623	GSC 0119-0361	52949.8933	0.3999836	
V0392 Ori	EA/KE	6.1125	18.33	GSC 1318-0080	52998.7648	0.659284	
U Peg	EW/KW	23.5758	15.571	GSC 1722-0498	52950.6096	0.374777	
BO Peg	EA/KE:	21.3119	11.5654	GSC 1127:1439	52834.8796	0.5804301	
WY Per	EA/SD	3.3824	42.4039	GSC 2870-1440	53002.616	3.3270632	
BP Per	EB	3.3114	49.2447	GSC 3320:0009	52885.8533	1.9789127	
KW Per	EB/SD	1.5959	53.1332	GSC 3684:1840	52876.8165	0.931262	
NZ Per	EA/D	4.2759	37.5031	GSC 2879-0469	52973.744	0.9379161	
RV Psc	EA/DW	1.194	31.1144	GSC 2291-0189	52894.8267	0.5539896	
VZ Psc	EW/KW	23.2748	4.5124	GSC 0581-0207	52947.6473	0.2611872	

Observed star(s):							
Star name	GCVS type	Coordinates (J2000)		Comp. star	Ephemeris		Source
		RA	Dec		E 2400000+	P [day]	
BI Ser	EA/SD:	15.5601	17.303	GSC 1499:0982	52717.8917	1.2048495	
AH Tau	EW/KW	3.4712	25.0702	GSC 1804:2470	52891.8882	0.3326717	
AM Tau	EA/SD	5.5221	16.1701	[ensemble]	52952.8319	2.0439011	
AQ Tau	EA/SD:	4.5558	27.5312	GSC 1840-0988	52972.7324	1.2158931	
CT Tau	EW/KE	5.585	27.0442	GSC 1871-0434	52948.8365	0.6668254	
CU Tau	EW/KW	3.4737	25.2312	GSC 1804-2270	52942.9257	0.4122048	
EQ Tau	EW/KW	3.4813	22.1924	GSC 1260-0575	52964.7111	0.3413479	
GR Tau	EB/SD:	4.0103	20.2524	GSC 1258-0303	52948.755	0.4298509	
GW Tau	EB/KE	4.301	25.3242	[not GSC]	52951.8502	0.6413219	
V0471 Tau	EA/D/RS+X	3.5025	17.1447	GSC 1252-0770	52975.66	0.5211834	
V0781 Tau	EW/KW	5.5013	26.5744	GSC 1870:0514	52648.736	0.344908	
X Tri	EA/SD	2.0034	27.5319	GSC 1763-1881	52943.75396	0.9715222	
RV Tri	EA/SD	2.1318	37.0102	GSC 2321-0072	52952.6982	0.7536622	
TY UMa	EW/KW	12.0902	56.0154	GSC 3836-0293	52973.9664	0.3545473	
UX UMa	EA/WD+NI	13.3641	51.545	GSC 3469:0516	52713.787	0.1966713	
UY UMa	EW/KW	13.4438	55.1316	GSC 3854:0010	52757.8106	0.37601927	
VV UMa	EA/SD	9.3807	56.0107	GSC 3810:1500	52674.648	0.6873702	
XZ UMa	EA/SD	9.3125	49.2812	GSC 3429:1027	52707.7708	1.2223017	
BH UMa	EW/KE	10.4556	52.1451	GSC 3449:0746	52704.807	0.6986821	
AW Vir	EW/KW	13.2733	3.0228	GSC 0303:0415	52734.83597	0.3539977	
AX Vir	EW/KE	13.2745	3.5227	GSC 0303:0289	52706.8384	0.7025278	
AZ Vir	EW/KW	13.4326	4.3657	GSC 0311:1491	52715.8774	0.3496638	
Z Vul	EA/SD	19.2139	25.3429	GSC 2128:2157	52786.847	2.4549328	
BE Vul	EA/SD	20.2534	27.2209	GSC 2164:0285	52891.7313	1.552047	
G0143-1718 A	EW	6.1348	5.5712	GSC 0143-1836	52948.9624	0.399806	
G0702-1892 A	EW	5.1245	10.151	GSC 0702-2174	52950.8087	0.2769553	
G2038:0674 D	??	16.1005	25.3655	GSC 2038:0040	52713.8809	0.5308274	
G2038:0674 E	??	16.1005	25.3655	GSC 2038:0410	52751.8347	0.5308274	
G2533:1563 C	??	12.4442	35.5756	GSC 2533:0959	52715.7932	0.3290529	
G3018:1509 A	??	12.3309	37.582	GSC 3018:1486	52693.9027	0.494967	

RA values are in the format HH.MMSS, Dec in DD.MMSS.

Source(s) of the ephemeris:

O–C charts using all available published times of minima. See Bob Nelson's O–C Files' in the references. The epochs are the latest and best times of minima (which usually coincide with the times newly reported here.)

Times of minima:						
Star name	Time of min.	Error	Type	Filter	O – C	Rem.
	HJD 2400000+					
WZ And	52974.6749	0.0002	I	clear		
XZ And	52949.78266	0.00005	I	clear		C-K slope
AB And	52936.6626	0.0001	II	clear		
AD And	52950.6879	0.0002	II	clear		
DS And	52972.5956	0.0001	I	clear		
EP And	52885.7425	0.0001	II	clear		
V0346 Aql	52793.922	0.00006	I	V		
AH Aur	52667.6405	0.0002	I	clear		
AP Aur	52674.8306	0.0001	I	clear		
AP Aur	52986.8502	0.0002	I	clear		
HS Aur	52642.684	0.0001	I	clear		Fog terminated run early
IY Aur	52683.6681	0.0003	I	clear		
KU Aur	52936.8623	0.0001	I	clear		

Times of minima:						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	$O - C$ [day]	Rem.
SU Boo	52667.2487	0.0001	I	clear		
TU Boo	52752.7789	0.0002	I	clear		
TY Boo	52699.8482	0.0003	II	clear		
TZ Boo	52674.9175	0.0002	I	R		K-C slope
VW Boo	52716.8624	0.0001	I	clear		
XY Boo	52750.7945	0.0001	II	clear		
AC Boo	52668.0725	0.0001	II	V		
CV Boo	52722.8971	0.0001	II	I		
CV Boo	52742.8017	0.0003	I	V		No check star
CV Boo	52759.7411	0.0001	I	V		
AO Cam	52943.82676	0.00005	II	clear		
ZZ Cas	52964.60807	0.00005	I	clear		
AB Cas	52647.6045	0.0001	I	clear		
BH Cas	52865.8351	0.0002	I	clear		
BU Cas	52894.7099	0.0002	I	clear		
CW Cas	52658.6417	0.0002	II	clear		
CW Cas	52975.5892	0.0001	II	clear		
DZ Cas	52890.8345	0.0004	I	clear		
KL Cas	52977.587	0.0001	I	clear		
V0344 Cas	52893.694	0.0001	I	clear		
V0364 Cas	52949.6201	0.0001	II	clear		
V0387 Cas	52963.7008	0.0002	I	clear		
V0445 Cas	52951.66811	0.00005	I	clear		
WZ Cep	52834.776	0.001	I	clear		
RW Cet	52641.5992	0.0003	I	clear		Very windy - check star not possible
UZ CMi	52667.8273	0.0004	I	clear		
TX Cnc	52647.8334	0.0001	I	clear		
EH Cnc	52999.8204	0.0001	I	clear		
RW Com	52724.7854	0.0002	II	clear		
RZ Com	52693.8196	0.00005	II	clear		
SS Com	52705.9055	0.0004	I	clear		
CC Com	52648.958	0.0001	I	clear		
ZZ Cyg	52795.7866	0.00006	I	"V,I"		
V0463 Cyg	52839.7805	0.0002	I	clear		
V0513 Cyg	52866.7764	0.0002	II	clear		
V0874 Cyg	52859.772	0.001	I	clear		
V0874 Cyg	52862.737	0.0001	II	clear		
V1411 Cyg	52769.8966	0.0002	II	clear		K-C slope
EX Del	52838.8285	0.0001	I	clear		
WW Gem	52964.8384	0.0003	I	clear		
AF Gem	52964.9452	0.0001	I	clear		
AL Gem	52951.9411	0.0001	I	clear		
AZ Gem	52694.6773	0.0004	I	clear		
TT Her	52755.8687	0.0001	I	clear		
V0728 Her	52701.9227	0.0001	II	clear		
V0728 Her	52760.8348	0.0001	I	"V, I"		
DF Hya	52986.937	0.0002	I	clear		
FG Hya	52706.6829	0.0001	II	clear		
PP Lac	52859.8563	0.0002	II	clear		
XZ Leo	52705.7566	0.0001	I	clear		
DU Leo	52722.688	0.0001	I	clear		
DU Leo	52943.9318	0.0001	I	R		
RT LMi	52997.9093	0.0003	I	clear		
SW Lyn	52947.87998	0.00005	I	V		
UU Lyn	52644.8922	0.0001	I	clear		
UV Lyn	52952.9535	0.00005	I	V		
TZ Lyr	52761.766	0.001	I	clear		Slight C-K slope
UZ Lyr	52716.965	0.0001	II	clear		
PY Lyr	52741.9859	0.0002	I	clear		

Times of minima:						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	$O - C$ [day]	Rem.
V0396 Mon	52973.8783	0.0001	I	clear		
V0530 Mon	52947.0313	0.0001	I	clear		
V0532 Mon	52707.6689	0.0002	I	clear		
UW Ori	52974.8592	0.0003	I	clear		Background difficult due to nearby bright star
ER Ori	52644.7649	0.0002	II	clear		Windy conditions
FZ Ori	52949.8933	0.0002	II	clear		
V0392 Ori	52998.7648	0.0002	I	clear		
U Peg	52950.6096	0.0001	I	V		
BO Peg	52834.8796	0.0002	II	clear		
WY Per	53002.616	0.001	I	clear		Clouds terminated run early
BP Per	52885.8533	0.0002	I	clear		
KW Per	52876.8165	0.0003	II	clear		
NZ Per	52973.744	0.0004	I	clear		
RV Psc	52894.8267	0.0004	I	clear		
VZ Psc	52947.6473	0.0001	I	clear		
BI Ser	52717.8917	0.0002	I	clear		
AH Tau	52891.8882	0.0001	I	clear		
AM Tau	52952.8319	0.00005	I	clear		Used ensemble for check star
AQ Tau	52972.7324	0.0002	I	clear		Clouds terminated run early
CT Tau	52948.8365	0.00015	I	clear		
CU Tau	52942.9257	0.0002	I?	clear		
EQ Tau	52964.7111	0.0001	I	clear		
GR Tau	52948.755	0.003	I	clear		C-K slope
GW Tau	52951.8502	0.0001	I	clear		
V0471 Tau	52649.6798	0.0001	II	R		No check star
V0471 Tau	52975.66	0.001	I	clear		
V0781 Tau	52648.736	0.0002	I	"V,I"		
X Tri	52943.75396	0.00005	I	clear		
RV Tri	52952.6982	0.00005	I	clear		
TY UMa	52657.8829	0.0005	II	clear		No check star
TY UMa	52973.9664	0.0001	I	clear		
UX UMa	52713.787	0.001	I	clear		
UY UMa	52757.8106	0.0004	I	clear		
VV UMa	52649.9027	0.0001	I	clear		
VV UMa	52674.648	0.0001	I	R		
XZ UMa	52707.7708	0.0001	I	clear		
BH UMa	52704.807	0.0003	I	clear		
AW Vir	52734.83597	0.00005	I	clear		
AX Vir	52706.8384	0.0004	I	clear		
AZ Vir	52715.8774	0.0002	II	clear		
Z Vul	52786.847	0.001	I	V		
BE Vul	52884.7467	0.0001	I	clear		
BE Vul	52891.7313	0.0003	II	clear		
GSC 0143-1718	52948.9624	0.0003	II	clear		
GSC 0702-1892	52950.8087	0.0001	II	clear		
GSC 2038:0674	52713.8809	0.0001	I	clear		C-K slope
GSC 2038:0674	52751.8347	0.0001	II	clear		
GSC 2533:1563	52715.7932	0.0003	I	clear		
GSC 3018:1509	52693.9027	0.0003	II	clear		

Explanation of the remarks in the table:

Check star(s) were used for almost all runs. In some cases, the fields were sparse and there were no suitable check stars. In other cases, the C–K (differential comparison-check magnitude) plots revealed some abnormal slope, thereby compromising accuracy. In these cases, the estimated error was adjusted upward.

Acknowledgements:

Thanks are due to Environment Canada for the website satellite views (see reference below) that were essential in predicting clear times for observing runs in this cloudy locale. Thanks are also due to Attila Danko for his Clear Sky Clocks, (see below). Much use was made of the Eclipsing Binary Ephemeris Generator; thanks Shawn. This research has made use of the SIMBAD database, operated at CDS, Strasbourg, France (see references).

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