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107 MINIMA TIMINGS OF ECLIPSING BINARIES

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<b>Observatory and telescope:</b>	
<b>T1:</b> 0.4m, f/8 Cassegrain telescope, located at the University of Athens Observatory, at Zografos, Athens, Greece	
<b>T2:</b> 1.2m, f/13 Cassegrain telescope of the National Observatory of Athens, located at the Kryoneri Astronomical Station, at Korinth, Greece.	

<b>Detector:</b>	<b>C1:</b> ST-10XME CCD camera, KAF-3200ME chip, $16' \times 11'$ and $25' \times 17'$ (using an f/6.3 focal reducer) field of view (FoV) with T1, <b>C2:</b> ST-8XMEI CCD camera, KAF-1603ME chip, $15' \times 10'$ FoV with T1, <b>C3:</b> ST-8 CCD camera, KAF-1600 chip, $15' \times 10'$ FoV with T1, <b>C4:</b> Photometrics CH250 CCD camera, SI502 chip, $2.5' \times 2.5'$ FoV with T2. All CCDs have a Peltier-type cooling system and are equipped with a set of UBVRI filters (Bessell specifications).
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<b>Method of data reduction:</b>
Differential photometry

<b>Method of minimum determination:</b>
Kwee & van Woerden (1956).

<b>Times of minima:</b>					
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.
V395 And	56437.4754	0.0002	I	<i>BVRI</i>	T1+C1
	56440.4240	0.0003	II	<i>BVRI</i>	T1+C1
	56443.3740	0.0003	I	<i>BVRI</i>	T1+C1
	56453.4839	0.0004	I	<i>BVRI</i>	T1+C1
	56459.3817	0.0001	I	<i>BVRI</i>	T1+C1
XZ Aql	56486.4291	0.0001	I	<i>BVRI</i>	T1+C1
	56487.4987	0.0010	II	<i>BVRI</i>	T1+C1

<b>Times of minima:</b>						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.	
XZ Aql	2456516.3781	0.0001	I	<i>BVRI</i>	T1+C1	
	2456517.4474	0.0010	II	<i>BVRI</i>	T1+C1	
	2456531.3526	0.0002	I	<i>BVRI</i>	T1+C1	
	2456532.4234	0.0010	II	<i>BVRI</i>	T1+C1	
AR Aur	2452993.4143	0.0003	I	<i>VRI</i>	T1+C3	
	2453301.4461	0.0004	II	<i>R</i>	T1+C3	
V402 Aur	2452654.4595	0.0016	I	<i>BVRI</i>	T1+C3	
	2452655.3588	0.0016	II	<i>BVRI</i>	T1+C3	
	2452668.3348	0.0008	I	<i>BVRI</i>	T1+C3	
V410 Aur	2452992.3830	0.0003	I	<i>VRI</i>	T1+C3	
	2453331.2675	0.0004	I	<i>VRI</i>	T1+C3	
	2453331.4466	0.0006	II	<i>VRI</i>	T1+C3	
	2453331.6339	0.0003	I	<i>VRI</i>	T1+C3	
	2453332.3659	0.0001	I	<i>RI</i>	T1+C3	
	2453332.5468	0.0001	II	<i>RI</i>	T1+C3	
	2453336.3962	0.0001	I	<i>V</i>	T1+C3	
	2453351.2296	0.0003	II	<i>V</i>	T1+C3	
	2453351.4160	0.0001	I	<i>V</i>	T1+C3	
	2453351.5962	0.0002	II	<i>V</i>	T1+C3	
	2453352.3293	0.0007	II	<i>B</i>	T1+C3	
	2453352.5148	0.0004	I	<i>B</i>	T1+C3	
	2453353.2480	0.0008	I	<i>B</i>	T1+C3	
	2453353.4301	0.0006	II	<i>B</i>	T1+C3	
	2453353.6148	0.0004	I	<i>B</i>	T1+C3	
	2453375.2274	0.0007	I	<i>V</i>	T1+C3	
	CK Boo	2453218.3282	0.0006	II	<i>VRI</i>	T1+C3
		2453221.3431	0.0012	I	<i>VRI</i>	T1+C3
		2453231.2888	0.0005	I	<i>BVRI</i>	T1+C3
2453421.6473		0.0003	I	<i>BVRI</i>	T1+C3	
2453422.5394		0.0006	II	<i>BVRI</i>	T1+C3	
2453423.6042		0.0004	II	<i>BVRI</i>	T1+C3	
2453425.5546		0.0003	I	<i>BVRI</i>	T1+C3	
XY Boo	2456666.6369	0.0002	II	<i>BVRI</i>	T1+C1	
	2456679.6067	0.0002	II	<i>BVRI</i>	T1+C1	
	2456680.5324	0.0003	I	<i>BVRI</i>	T1+C1	
	2456687.5726	0.0003	I	<i>BVRI</i>	T1+C1	
	2456699.6181	0.0002	II	<i>BVRI</i>	T1+C1	
	2456701.6554	0.0004	I	<i>BVRI</i>	T1+C1	
	2456707.5837	0.0004	I	<i>BVRI</i>	T1+C1	
V445 Cep	2456578.4395	0.0003	II	<i>BVRI</i>	T1+C1	
	2456579.3631	0.0002	II	<i>BVRI</i>	T1+C1	
	2456580.2681	0.0002	II	<i>BVRI</i>	T1+C1	
	2456580.4463	0.0002	I	<i>BVRI</i>	T1+C1	
	2456581.3574	0.0002	I	<i>BVRI</i>	T1+C1	
	2456584.3062	0.0002	II	<i>BVRI</i>	T1+C2	
TZ Dra	2452424.4357	0.0002	I	<i>I</i>	T1+C3	
	2452446.5163	0.0009	II	<i>I</i>	T1+C3	

<b>Times of minima:</b>						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.	
GSC 4778-0001	2451880.4857	0.0003	II	<i>V</i>	T1+C3	
	2451896.4618	0.0007	II	<i>V</i>	T1+C3	
	2452639.4307	0.0003	II	<i>V</i>	T1+C3	
	2452671.3862	0.0004	II	<i>V</i>	T1+C3	
	2452697.3500	0.0004	I	<i>V</i>	T1+C3	
	2453342.4534	0.0013	II	<i>V</i>	T1+C3	
	2453376.4057	0.0003	I	<i>V</i>	T1+C3	
	2453382.3983	0.0004	II	<i>V</i>	T1+C3	
TX Her	2453858.51923	0.00004	I	<i>VI</i>	T1+C3	
	2453859.54918	0.00006	II	<i>VI</i>	T1+C3	
V899 Her	2456733.5874	0.0003	I	<i>BVRI</i>	T1+C1	
	2456734.6402	0.0003	II	<i>BVRI</i>	T1+C1	
	2456735.4849	0.0004	II	<i>VRI</i>	T1+C1	
	2456736.5362	0.0002	I	<i>BVRI</i>	T1+C1	
	2456737.5899	0.0003	II	<i>BVRI</i>	T1+C1	
	2456738.6364	0.0003	I	<i>BVRI</i>	T1+C1	
	2456756.5390	0.0003	II	<i>BVRI</i>	T1+C1	
	2456758.4336	0.0003	I	<i>BVRI</i>	T1+C1	
AQ Psc	2456766.4414	0.0003	I	<i>BVRI</i>	T1+C1	
DZ Psc	2452968.3678	0.0003	I	<i>BVRI</i>	T2+C4	
	2452170.3860	0.0002	II	<i>R</i>	T1+C3	
	2452177.3437	0.0002	II	<i>R</i>	T1+C3	
	2452177.5259	0.0002	I	<i>R</i>	T1+C3	
	2452178.4413	0.0003	II	<i>V</i>	T1+C3	
	2452186.3132	0.0002	I	<i>B</i>	T1+C3	
	2452186.4972	0.0005	II	<i>B</i>	T1+C3	
	2452187.4107	0.0003	I	<i>I</i>	T1+C3	
	2452188.3258	0.0004	II	<i>V</i>	T1+C3	
	2452192.3538	0.0004	II	<i>V</i>	T1+C3	
	2452192.5358	0.0003	I	<i>V</i>	T1+C3	
	2452193.4528	0.0003	II	<i>I</i>	T1+C3	
	2452206.2672	0.0002	II	<i>R</i>	T1+C3	
	2452206.4486	0.0003	I	<i>R</i>	T1+C3	
	VY Sex	2453499.3807	0.0006	II	<i>BVRI</i>	T1+C3
		2453500.2668	0.0005	II	<i>BVRI</i>	T1+C3
	YY Sgr	2452839.3849	0.0002	I	<i>V</i>	T1+C3
	V505 Sgr	2452837.6016	0.0029	I	<i>BVRI</i>	T1+C3
2452843.3891		0.0029	I	<i>VRI</i>	T1+C3	
2453263.3029		0.0001	I	<i>R</i>	T1+C3	
HH UMa	2456674.5499	0.0003	I	<i>BVRI</i>	T1+C1	
	2456668.5399	0.0006	I	<i>BVRI</i>	T1+C1	
	2456657.4628	0.0006	II	<i>BVRI</i>	T1+C1	
	2456657.6496	0.0005	I	<i>BVRI</i>	T1+C1	
	2456678.4854	0.0007	II	<i>BVRI</i>	T1+C1	
	2456665.5334	0.0006	I	<i>BVRI</i>	T1+C1	
	2456667.6007	0.0014	II	<i>VRI</i>	T1+C1	
	2456403.4410	0.0014	I	<i>BVRI</i>	T1+C1	

<b>Times of minima:</b>						
Star name	Time of min. HJD 2400000+	Error	Type	Filter	Rem.	
HH UMa	2456655.5860	0.0017	II	<i>BVRI</i>	T1+C1	
	2456667.4126	0.0005	I	<i>VRI</i>	T1+C1	
	2456678.6809	0.0007	I	<i>BVRI</i>	T1+C1	
MS Vir	2452723.5689	0.0005	II	<i>BVRI</i>	T1+C3	
	2452726.5359	0.0004	I	<i>BVRI</i>	T1+C3	
	2452765.4372	0.0014	II	<i>BVRI</i>	T1+C3	

**Explanation of the remarks in the table:**

T1, T2, C1, C2, C3 and C4 refer to the instrumentation (telescope and CCD camera) used for each case.

**Remarks:**

A large number of the above observations were performed utilizing the robotic and remotely controlled telescope at the University of Athens.

**Acknowledgements:**

Times of minima of contact binaries presented in this work are by-product of the *W UMa Project* (Papers I - VII) (Kreiner et al. 2003; Baran et al. 2004; Zola et al. 2004; Gazeas et al. 2005; Zola et al. 2005; Gazeas et al. 2006; Zola et al. 2010.), which aims at performing accurate photometric and spectroscopic study of eclipsing binaries of W UMa type. In addition, part of this work is a result of the *Contact Binaries Towards Merging (CoBiToM) Project*, initiated in 2012 and still undergoing at the National and Kapodistrian University of Athens (PI: K.Gazeas).

References:

- Baran A., Zola S., Rucinski S. M., Kreiner J. M., Siwak M., Drozd M., 2004, *AcA*, **54**, 195 (Paper II)
- Gazeas K., Baran A., Niarchos P., Zola S., Kreiner J.M., et al., 2005, *AcA*, **55**, 123 (Paper IV)
- Gazeas K., Niarchos P., Zola S., Kreiner J.M., Rucinski S.M., 2006, *AcA*, **56**, 127 (Paper VI)
- Kreiner J. M., Rucinski S. M., Zola S., Niarchos P., Ogloza W., Stachowski G., Baran A., Gazeas K., Drozd M., Zakrzewski B., Pokrzywka B., Kjurkchieva D., Marchev D., 2003, *A&A*, **412**, 465 (Paper I)
- Kwee K., van Woerden H., 1956, *Bulletin of the Astronomical Institutes of the Netherlands*, **12**, 327
- Zola S., Rucinski S.M., Baran A., Ogloza W., Pych W., Kreiner J.M., Stachowski G., Gazeas K., Niarchos P., Siwak M., 2004, *AcA*, **54**, 299 (Paper III)
- Zola S., Kreiner J.M., Zakrzewski B., Kjurkchieva D.P., Marchev D.V., Baran A., Rucinski S.M., Ogloza W., Siwak M., Koziel D., Drozd M., Pokrzywka B., 2005, *AcA*, **55**, 389 (Paper V)
- Zola S., Gazeas K., Kreiner J. M., Ogloza W., Siwak M., Koziel-Wierzbowska D., Winiarski M., 2010, *MNRAS*, **408**, 464 (Paper VII)