April 28, 1981

Dear Colleague:

The following is the preliminary edition of the IUE ULTRAVIOLET SPECTRAL ATLAS. The data (the line-by-line and merged files of the IUE low dispersion spectra) for the stars in Table 1 have been collected in two magnetic tapes, and are ready for distribution. However, if you are not urgently in need of the data, we would encourage you to wait until June of 1981. By that time, we will have uniformly reprocessed all the data with a set of software which is currently being used in the general production by the Observatory. In August 1981, we plan to produce another version of the Atlas which is the result of reprocessing with the software used on November 2, 1980.

If you urgently need the standard star spectra to help you analyze your IUE data, you can send us two tapes (or one tape if you just need a few selected stars; one tape holds about 40 spectra). We will copy the line-by-line and merged data onto your tapes and mail them back to you. Our mailing address is

CSC Code 685
NASA Goddard Space Flight Center
Greenbelt, MD 20771

Chi-Chao Wu
IUE Resident Astronomer

IUE ULTRAVIOLET SPECTRAL ATLAS

(PRELIMINARY EDITION)

C.-C. WU, A. BOGGESS, A. V. HOLM, F. H. SCHIFFER, III, AND B. E. TURNROSE

IUE OBSERVATORY

NASA GODDARD SPACE FLIGHT CENTER

THE SPECTRAL TYPE STANDARD STAR PROGRAM AT THE IUE OBSERVATORY (GSFC)

In March 1980, the IUE Observatory at the Goddard Space Flight Center started a program to obtain low dispersion trailed spectra for a group of stars which covers spectral type from O3 to M4 and luminosity class from V to Ia. The stars were selected according to the following four criteria:

1. The stars chosen had to be sufficiently faint that low dispersion trailed spectra can be obtained at trail rates less than 40 arc second per second.

2. The stars had to be relatively unreddened. Uncertainties in the shape of the extinction curve to be applied to different regions of the sky could greatly increase the errors in the derived unreddened fluxes for heavily reddened stars. The exceptions to this criteria are the stars with types from O3 to O6 where there are no lightly reddened stars. To derive appropriate extinction curves, we need to observe some late O and early B stars which are in the same fields as the heavily reddened O3-O6 stars. This is necessary because it is likely that each association has a unique extinction curve so that use of the "average extinction curve" for dereddening may introduce gross errors.

3. The stars must have well-determined spectral types in the MK system. An effort was made to include as many of the primary MK standards ("dagger" types) from Morgan and Keenan (1973) as satisfied the other criteria. Gaps in the coverage were filled in mostly with stars classified by Johnson and Morgan (1953), Walborn (1973), Lesh (1968, 1972), Hiltner, Garrison, & Schild (1969).

4. Stars known to be spectroscopic binaries were rejected.

In addition, some super-metal-rich (SMR) stars are also included in our program.

It is important to construct a good grid of standard stars not only for its obvious scientific values, but also because these unreddened (almost) stars will most likely be too bright for future ultraviolet experiments. Intrinsic colors of stars of different spectral types and luminosity classes are available for bandpasses at 1550, 1800, 2200, 2500 and 3300 Å (Wu et al. 1980). These colors were derived from the observations made by the Dutch ANS satellite with a spectral resolution of 100-200 Å. The IUE spectra, even in low dispersion, have significantly higher resolution (~5-7 Å) and have the additional coverage of the spectral region from 1200-1500 Å. The low dispersion IUE spectra, for all practical purposes, have sufficient resolution for stellar population synthesis of galaxies, spectral synthesis of accretion disks and X-ray heated atmospheres, derivation of extinction curves and comparison with the low dispersion spectra of peculiar objects.

Several important classes of objects have been left out of our observing program. These are hot white dwarfs, subdwarfs, horizontal branch stars, selected globular clusters and extragalactic H II regions. These and many additional standard stars and a sample of prototype galactic and extragalactic objects have been or will be observed by different investigators and will be included in our Atlas in the future.

Table 1 lists the stars for which we have data on two magnetic tapes and ready for distribution. Columns (1) and (2) give the HD number and the name of the star, respectively. Column (3) gives the spectral type adopted from the references cited in item 3 above. Column (4) gives the V magnitude from Lesh (1968, 1972) and Nicolet (1978). Column (5) gives the E(B-V) which is derived by adopting the intrinsic colors of FitzGerald (1970). Column (6) gives the IUE image numbers. SWP stands for Short Wavelength Prime camera and LWR stands for Long Wavelength Redundant camera. Column (7) gives the exposure time of each image which is based on the assumption that the length of the aperture is 20.0 arcsec (exposure time = 20.0 arcsec/trail rate in arcsec per sec). Measurements of this length are being made and will be published in the IUE Newsletter when complete. Column 8 gives the maximum exposure level in IUE data number units, cameras saturate at 255 DN. Frequently, LWR images are affected by microphonic noise, the strength of and the wavelength region in which the noise occurs are given in Column (9).

The spectral type standard star spectra were processed with the software used for routine production by the Image Processing staff at the time the data were taken. In other words, all of the data were not processed with a consistent set of software. In the future, we will reprocess all the data with the software used on November 2, 1980. The resulting Spectral Atlas will be designated "First Edition". The "Second Edition" of the Atlas will be produced by reprocessing all the data with the software in use after November 3 (after 9:00 EST) of 1980 (with additional corrections for spectral format and reseau change according to the camera head amplifier temperature). Further editions will be made available when there is major change in processing software or absolute calibration.

In this Atlas, the plots for the stars listed in Table 1 are given. These are calibrated spectra with the absolution calibration of Bohlin and Holm (1980). The spectra have not been corrected for interstellar reddening.

The spectrum at wavelength affected by reseaux is plotted as plus signs. No flag is used to indicate reseaux that lie in the background. Most LWR spectra are contaminated by a permanent bright blemish at 2190 Å. In many cases this blemish has also been flagged by plotting it with plus signs.

If you need to refer to the source of the standard star data in the near future, you may use:

Wu, C.-C., Boggess, A., Holm, A.V., Schiffer, F.H., III, and Turnrose, B.E. 1981, IUE Ultraviolet Spectral Atlas (Greenbelt: Goddard Space Flight Center), Preliminary Edition.

The above reference may change when we release the First and Second editions. If you do use some data from the Atlas to help you analyze and interpret your own data, we would appreciate that you acknowledge "The IUE Observatory at the NASA Goddard Space Flight Center" for making the data available to you.

We wish to thank Miss Ruth E. Ehlers and Mr. Glenn C. Rice for their valuable help in the preparation of this Atlas; and Drs. T.B. Ake and R.J. Panek for obtaining some of the spectra. This work is partially supported by the IUE research contract NAS 5-25774 to the Computer Sciences Corporation.

References

Bohlin, R. C., and Holm, A. V. 1980, IUE Newsletter No. 10, 37.

FitzGerald, M. P. 1970, Astr. Ap., 4, 234.

Hiltner, W. A., Garrison, R. F., and Schild, R. E. 1969, Ap.J., 157, 313.

Johnson, H. L., and Morgan, W. W. 1953, Ap.J., 117, 313.

Lesh, J. R. 1968, Ap. J. Suppl., 151, 371.

_____, 1972, Astr. Ap. Suppl., 5, 129.

Morgan, W. W., and Keenan, P. C. 1973, Ann. Rev. Astr. Ap., 11, 29.

Nicolet, B. 1978, Astr. Ap. Suppl., 34, 1.

Walborn, N. R. 1973, Ap.J. 179, 517.

Wu, C.-C., Faber, S. M. Gallagher, J. S., Peck, M., and Tinsley, B. M. 1980, Ap.J. 237, 290.

TABLE 1

STARS OF DIFFERENT SPECTRAL TYPES OBSERVED BY THE IUE

H D	Name	SP Type	V	E(B-V)	Image No.	Trailed Exp. Time	Max DN	Note
93250		O3 V	7.37	+0.48	SWP 11224	108s	200	
					LWR 9840	70s	200	
303308		O3 V	8.17	+0.44	SWP 11225	180s	210	
					LWR 9841	115s	195	
	-59^{o} 2600	O6 V ((f))	8.61	+0.53	SWP 11137	330s	190	
					LWR 9842	255s	227	
47839	15 Mon	† O7	4.65	+0.07	SWP 8146	1.37s	215	
					LWR 7077	1.93s	215	
14633		O8 V	7.46	+0.09	SWP 8150	21.61s	205	
					LWR 7080	27.78s	225	
188209		O9.5 Ia	5.65	+0.18	SWP 8195	10.99s	230	
					LWR 7123	7.30s	210	65 DN noise, 2573-2634 Å
36512	υ Ori	† B0 V	4.61	+0.02	SWP 8164	1.10s	215	
					LWR 7097	1.79s	225	
63922		B0 III	4.11	+0.11	SWP 9511	1.14s	220	
					LWR 8237	1.40s	230	
34816	λ Lep	B0.5 IV	4.29	+0.03	SWP 8166	0.97s	230	
					LWR 7100	1.47s	225	47 DN noise, 3254-3300 Å
150898		B0.5 Ia	5.57	+0.15	SWP 10173	7.87s	190	
					LWR 8837	10.15s	260	41 DN noise, 2653-2685 Å
31726		B1 V	6.15	+0.05	SWP 8165	7.87s	230	
					LWR 7098	10.15s	220	

Table 1 (continued)

H D	Name	SP Type	V	E(B-V)	Image No.	Trailed Exp. Time	Max DN	Note
40111	139 Tau	B1 IB	4.83	+0.12	SWP 8151	5.35s	220	
					LWR 7081	3.94s	210	
51283		B2 III	5.28	+0.05	SWP 8167	8.51s	208	
					LWR 7101	6.19s	220	
165024	θ Ara	B2 Ib	3.66	+0.08	SWP 10174	2.07s	225	
					LWR 8838	1.41s	220	
190993	17 Vul	B3 V	5.06	+0.02	SWP 9961	5.12s	200	
32630	η Aur †	B3 V	3.16	+0.02	SWP 8197	0.99s	208	
					LWR 7126	0.99s	207	32 DN Noise, 2764-2802 Å
53138	0^2 CMa †	B3 Ia	3.04	+0.03	SWP 8168	2.03s	210	
					LWR 7103	1.03s	210	
34759	ρ Aur †	B5 V	5.22	+0.02	LWR 9868	7.50s	215	
147394	τ Her †	B5 IV	3.88	+0.01	SWP 8194	2.96s	205	
					LWR 7122	2.57s	220	6 DN Noise, 3133-3165 Å
83183		B5 II	4.08	+0.14	SWP 9512	10.70s	245	
					LWR 8238	4.51s	220	
86440	φ Vel	B5 Ib	3.54	+0.00	SWP 9513	4.08s	235	
					LWR 8239	2.02s	220	
164353	67 Oph	B5 Ib	3.97	+0.11	SWP 10172	5.78s	175	
					LWR 8836	4.00s	230	
58350	η CMa †	B5 Ia	2.46	+0.01	SWP 8199	1.40s	215	
					LWR 7127	0.70s	220	51 DN Noise, 2839-2904 Å

Table 1 (continued)

H D	Name	SP Type	V	E(B-V)	Image No.	Trailed Exp. Time	Max DN	Note
23630	η Tau	† B7 III	2.87	+0.03	SWP 8147	2.64s	205	
					LWR 7078	1.64s	210	
23324	18 Tau	† B8 V	5.65	+0.04	SWP 8148	27.78s	202	
					LWR 7079	19.61s	208	
23850	27 Tau	† B8 III	3.62	+0.01	SWP 11245	6.00s	210	
					LWR 9867	3.50s	220	
103287	γ UMa	† A0 V	2.44	+0.01	SWP 8198	4.44s	208	
					LWR 7124	2.17s	195	
111775		A0 II	6.32	+0.03	SWP 9515	133.3s	190	
					LWR 8241	76.9s	210	
104035		A0 Ia	5.60	+0.17	SWP 9514	309.1s	235	
					LWR 8240	78.1s	205	94 DN Noise, 3077-3114 Å
166205	δ UMi	A1 V	4.35	-0.01	SWP 9132	31.45s	210	
					LWR 7863	13.58s	195	
80081	38 Lyn	A2 V	3.83	+0.00	SWP 11235	20.00s	200	
					LWR 9855	11.00s	210	
197345	α Cyg	† A2 Ia	1.25	+0.04	SWP 9133	4.10s	260	
					LWR 7864	1.05s	197	
216956	α PsA	† A3 V	1.16	+0.00	SWP 9134	2.29s	220	
					LWR 7865	1.00s	190	
116842	80 UMa	A5 V	4.03	+0.00	SWP 10283	18.47s	113	
					LWR 8949	16.00s	220	

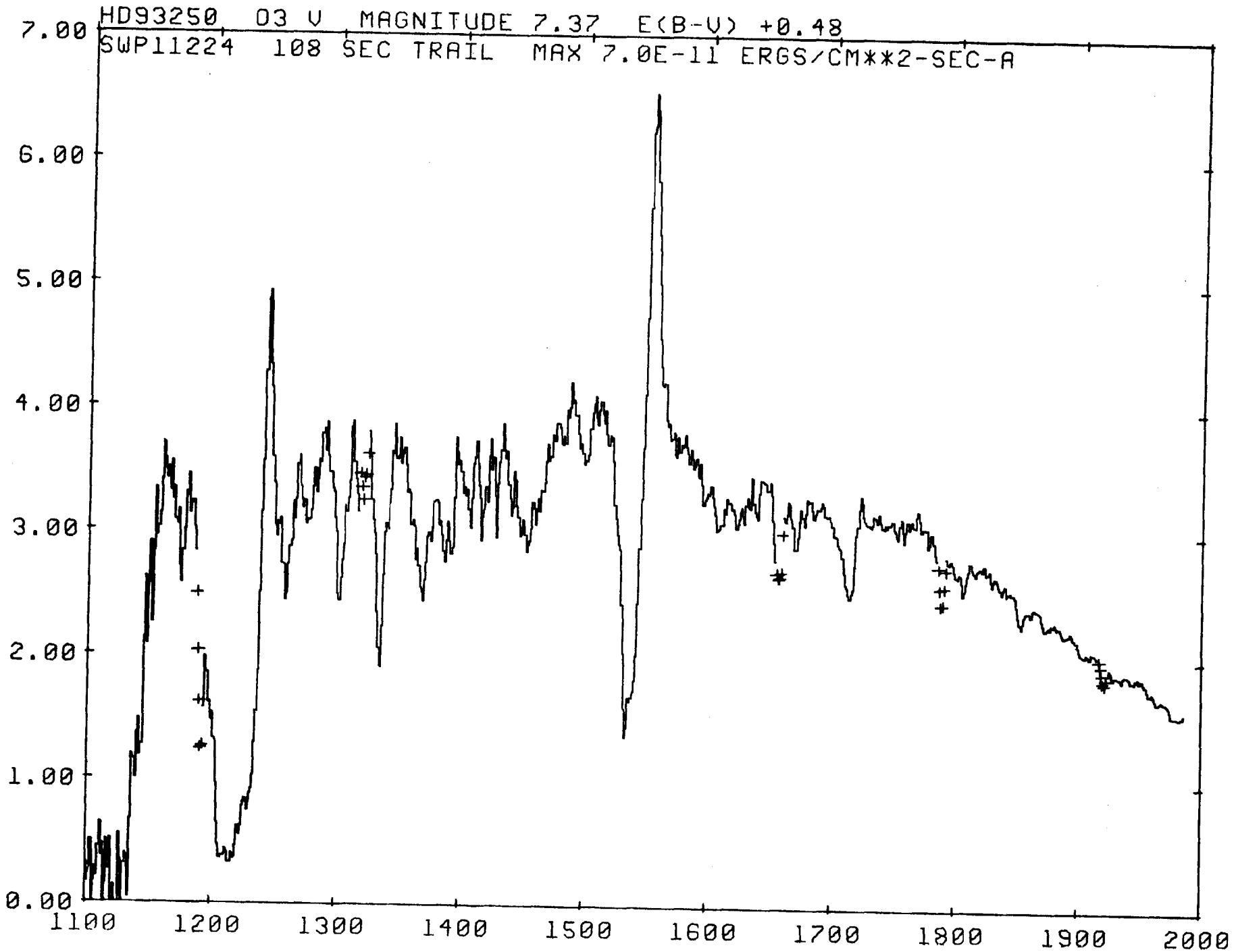
Table 1 (continued)

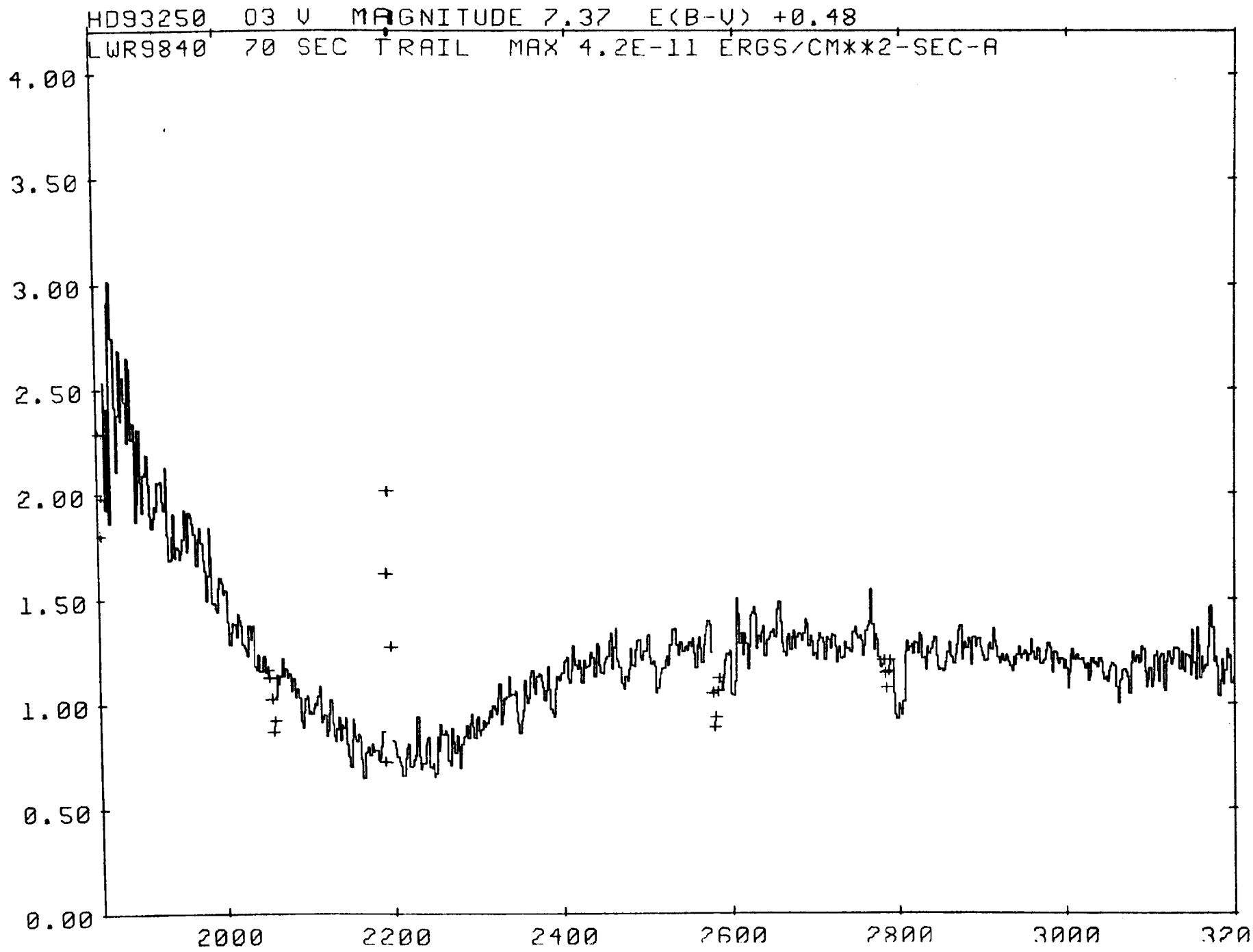
H D	Name	SP Type	V	E(B-V)	Image No.	Trailed Exp. Time	Max DN	Note
76644	ι UMa	† A7 IV	3.15	+0.03	SWP 10284	21.35s	215	
					LWR 8950	7.49s	210	
147547	γ Her	A9 III	3.76	+0.01	SWP 10872	107.0s	225	
					LWR 9560	22.98s	215	28 DN Noise, 2060-2093 Å
12311	α Hyi	F0 V	2.86	+0.04	SWP 11242	37.00s	203	
					LWR 9862	8.35s	225	
40136	η Lep	F0 IV	3.69	+0.02	SWP 10286	95.69s	232	
89025	ζ Leo	† F0 III	3.44	-0.01	LWR 9732	23.33s	210	39DN Noise, 3049-3086 Å
99028	ι Leo	F2 IV	3.94	+0.06	SWP 11311	290s	225	
					LWR 9918	24s	210	
61421	α CMi	F5 IV	0.35	+0.01	LWR 9108	0.84s	215	
173667	110 Her	F6 V	4.19	-0.01	SWP 10784	601.5s	205	
					LWR 9459	29.85s	200	
84441	ε Leo	G0 II	2.98	+0.08	LWR 9731	28.00s	190	
2151	β Hyi	G2 IV	2.80	-0.02	LWR 9864	14.25s	245	
76294	ζ Hya	G8 III	3.10	+0.06	LWR 9650	81.4s	210	
72324	υ^2 Cnc	G9 III	6.36	+0.04	LWR 9854	585.00	130	super metal rich star
62509	β Gem	† K0 III	1.15	+0.01	LWR 9844	14.00s	200	
85503	μ Leo	K2 III	3.90	+0.06	LWR 9857	10 min	190	super metal rich star

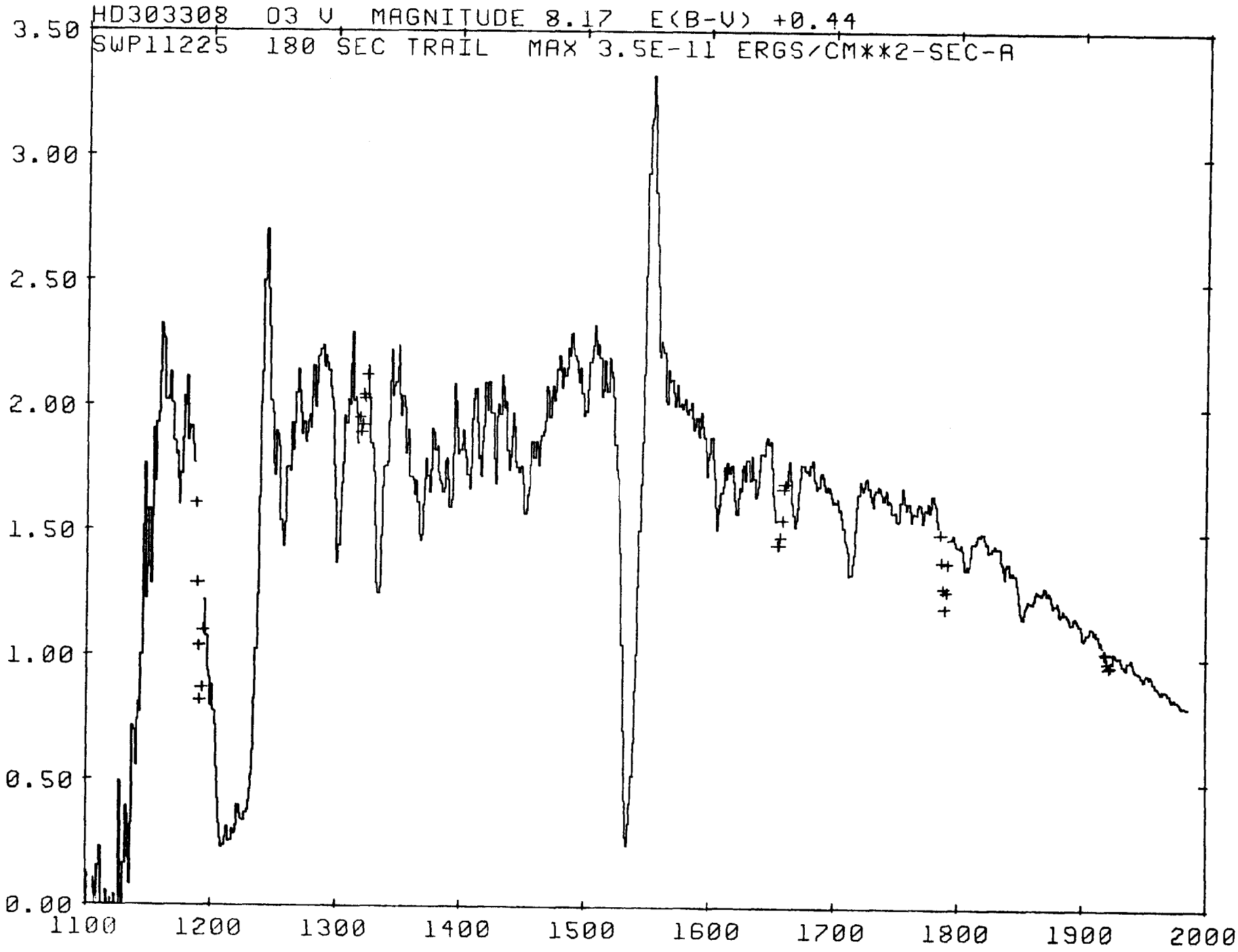
Table 1 (continued)

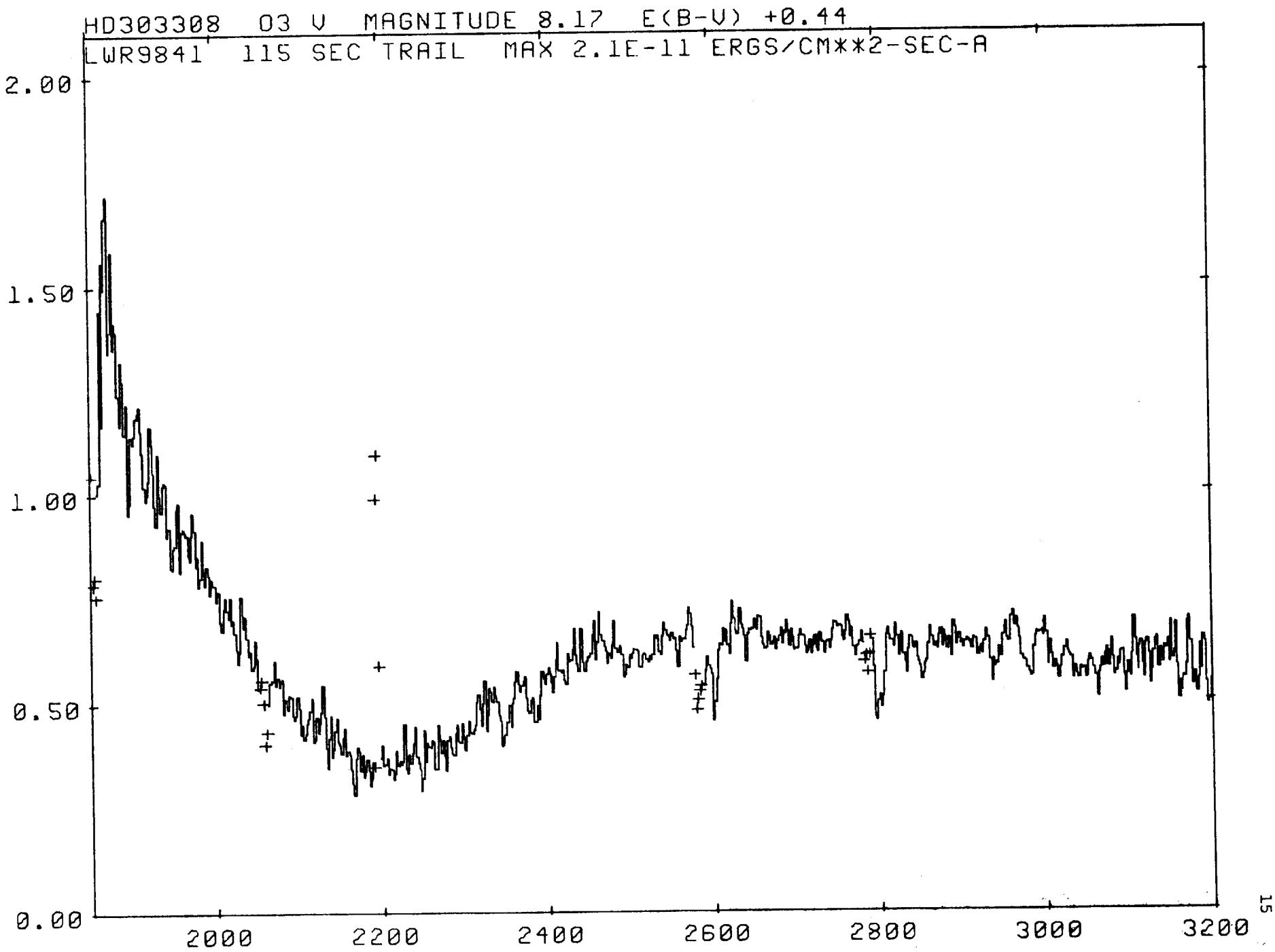
H D	Name	SP Type	V	E(B-V)	Image No.	Exp. Time	Max DN	Note
137759	ι Dra	K2 III	3.31	+0.00	LWR 9858	5^m30^s	205	
69267	β Cnc †	K4 III	3.53	+0.09	LWR 9738	11.11 min	193	
17709	17 Per	K7 III	4.54	+0.03	LWR 9405	4x12 min	400	53 DN Noise, 3062 Å, MgII emission line saturated

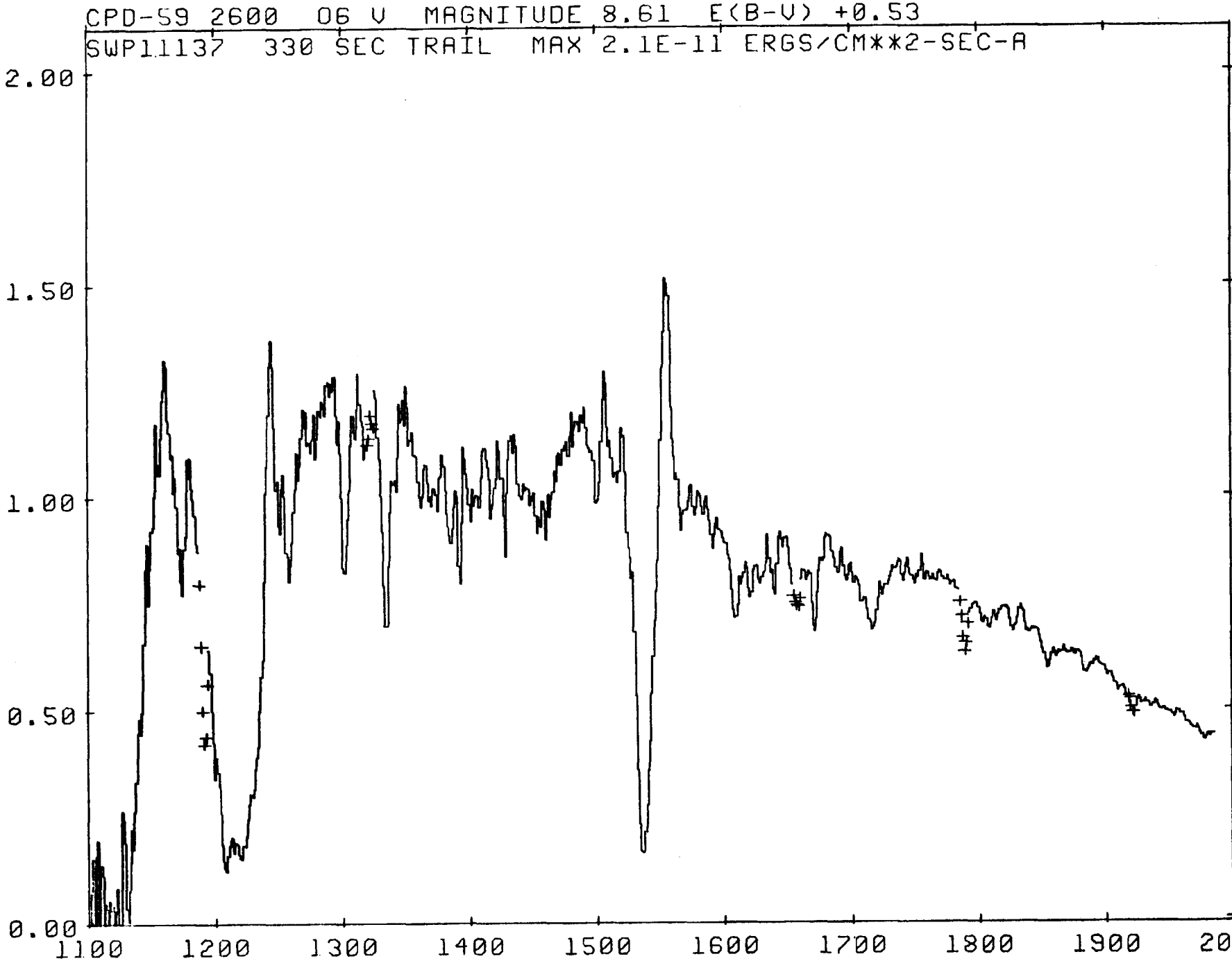
† Primary MK standards as given by W. W. Morgan and P. C. Keenan (1973, Ann. Rev. Astr. Ap., 11, 29.)

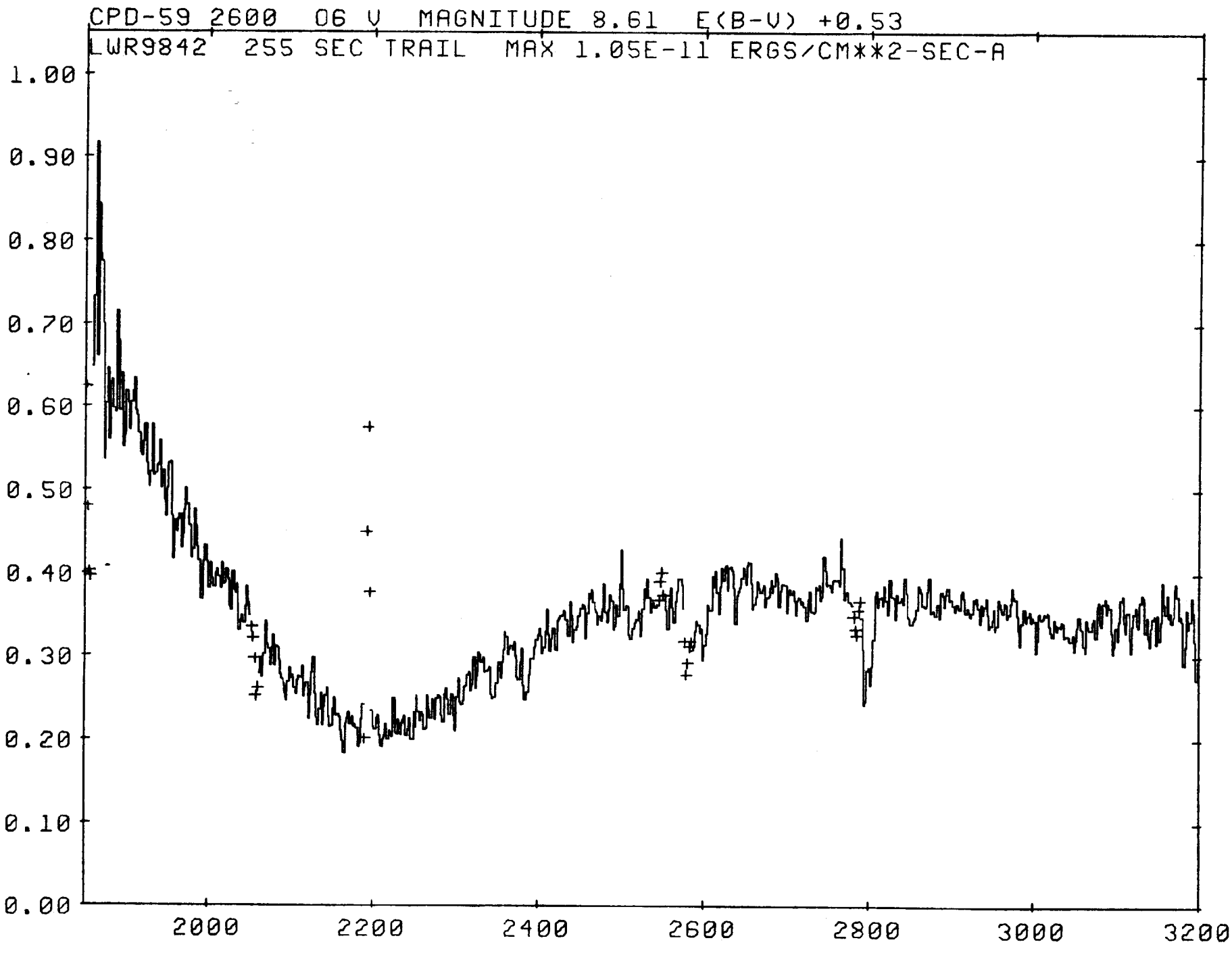

HD93250 O3 V MAGNITUDE 7.37 E(B-V) +0.48
SWP11224 108 SEC TRAIL MAX 7.0E-11 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

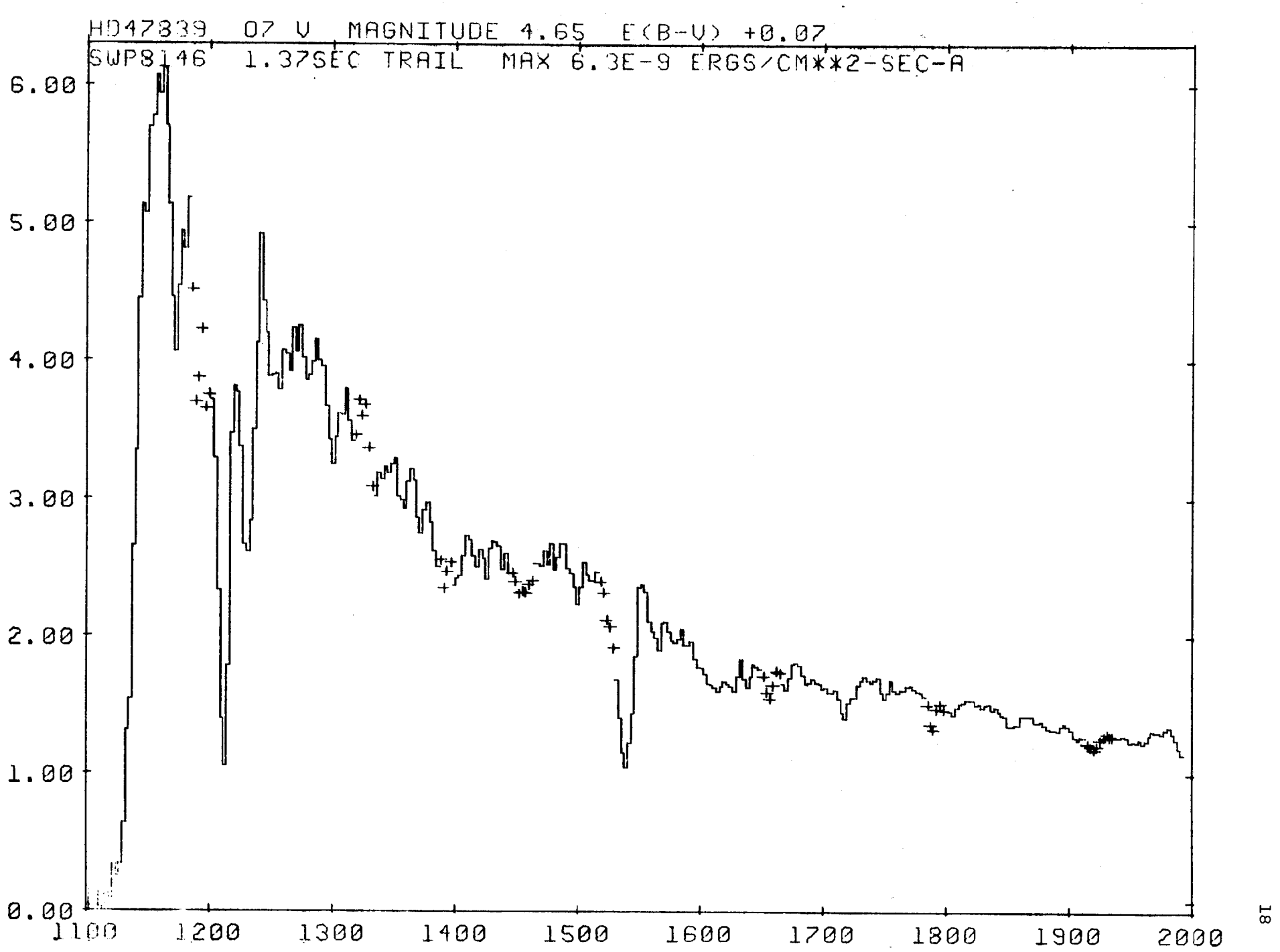

HD93250 03 V MAGNITUDE 7.37 E(B-V) +0.48
LWR9840 70 SEC TRAIL MAX 4.2E-11 ERGS/CM**2-SEC-A
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

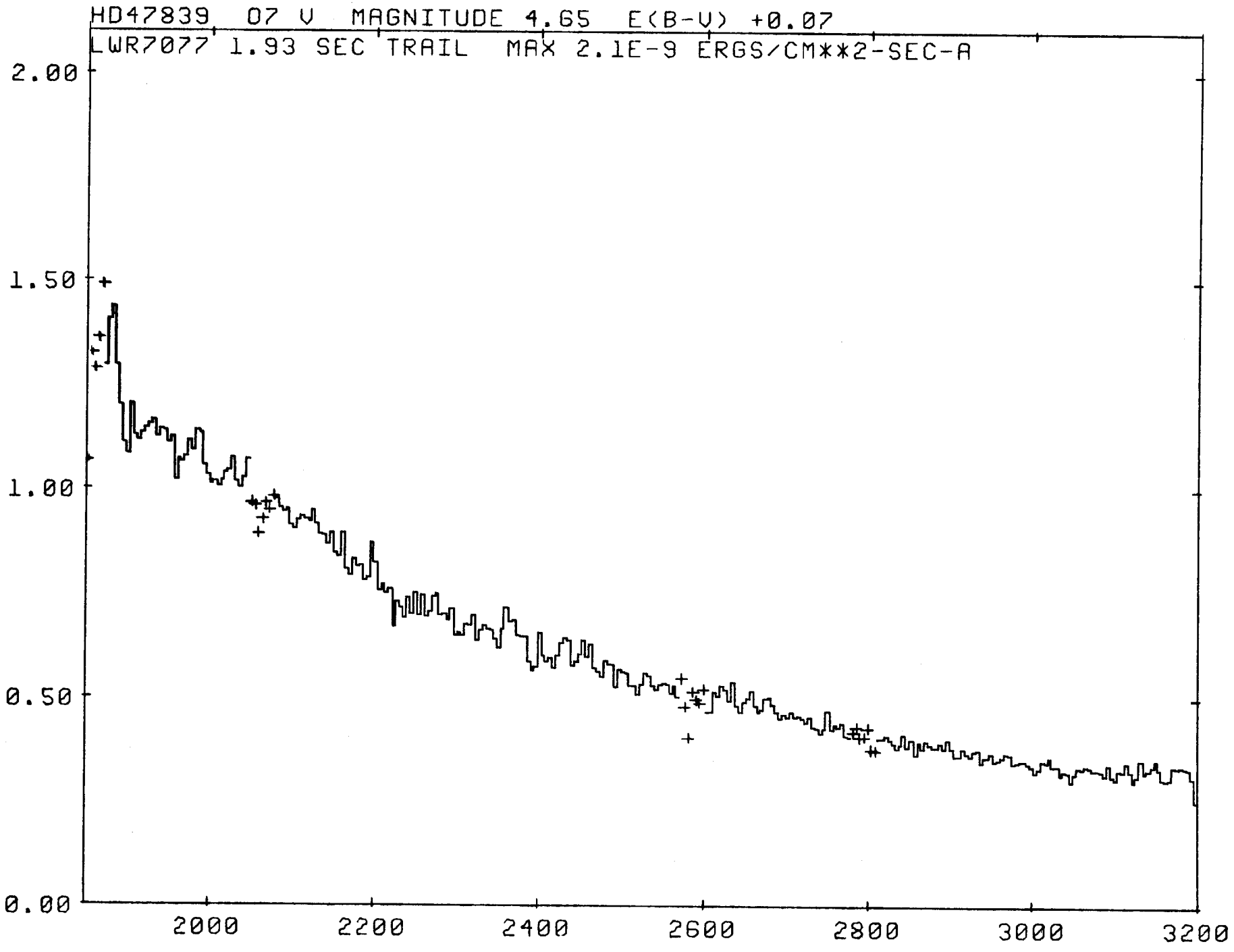

HD303308 O3 V MAGNITUDE 8.17 E(B-V) +0.44
SWP11225 180 SEC TRAIL MAX 3.5E-11 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000


HD303308 O3 V MAGNITUDE 8.17 E(B-V) +0.44
LWR9841 115 SEC TRAIL MAX 2.1E-11 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

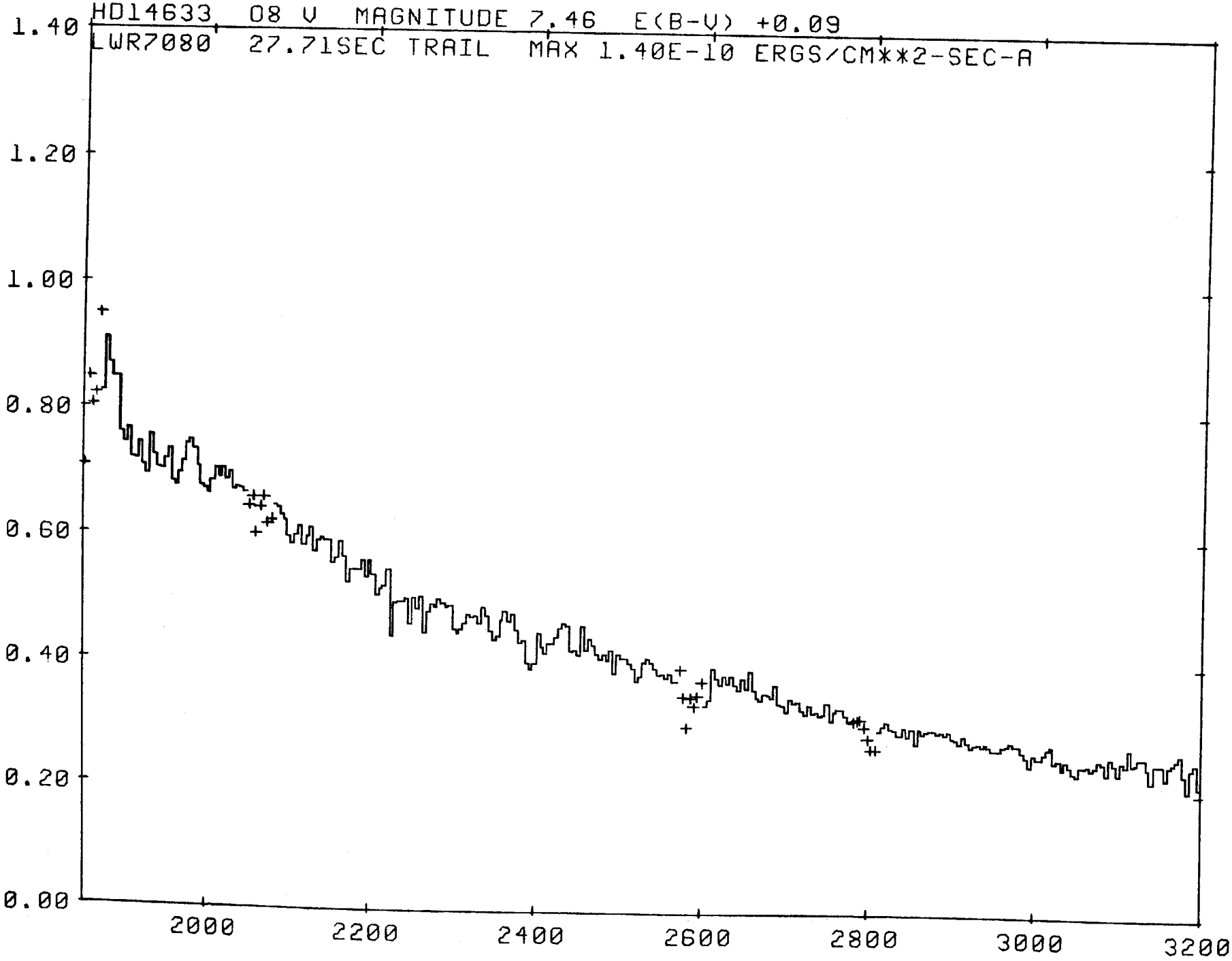

CPD-59 2600 O6 V MAGNITUDE 8.61 E(B-V) +0.53
SWP11137 330 SEC TRAIL MAX 2.1E-11 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

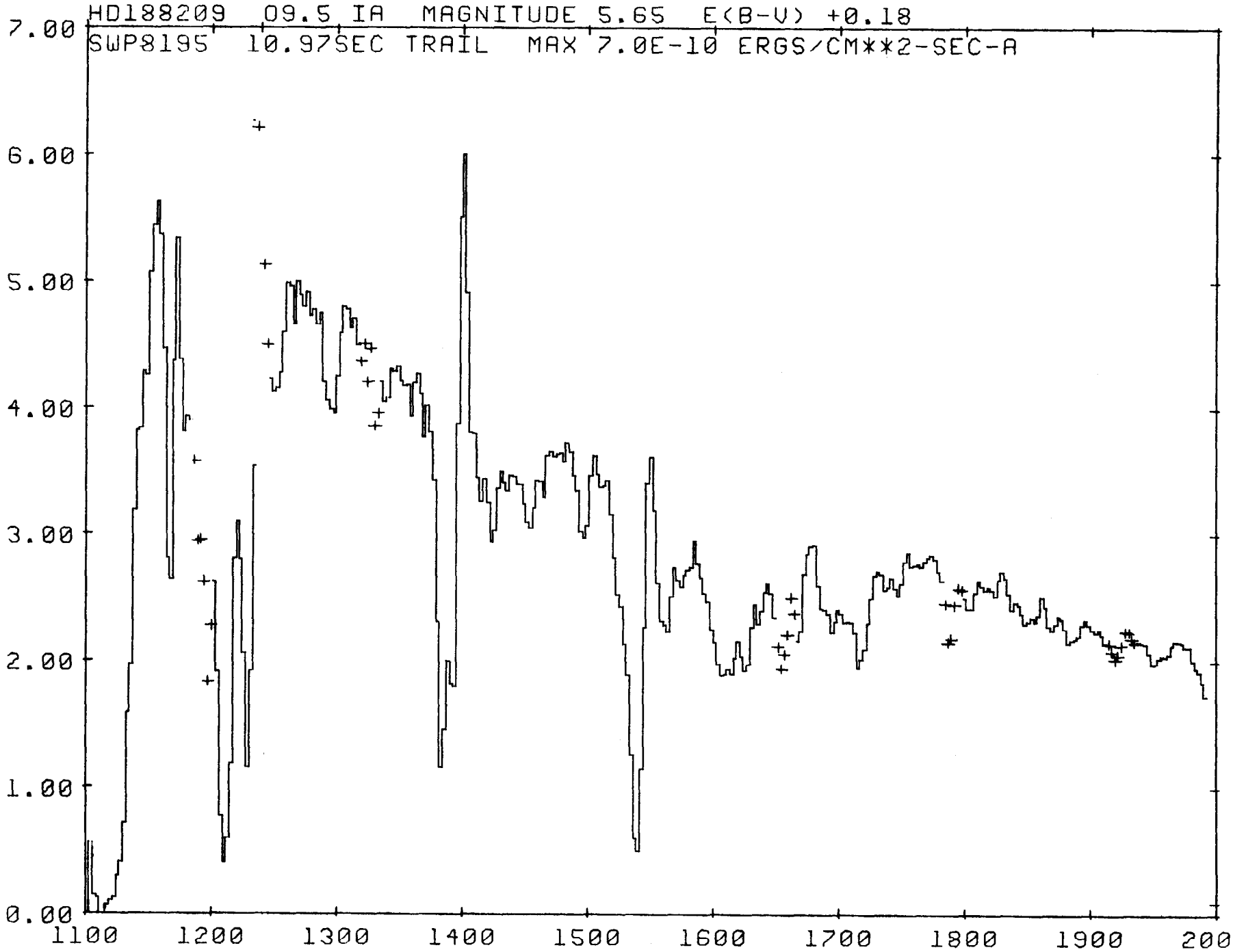

CPD-59 2600 O6 V MAGNITUDE 8.61 E(B-V) +0.53
LWR9842 255 SEC TRAIL MAX 1.05E-11 ERGS/CM**2-SEC-A
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2000
2200
2400
2600
2800
3000
3200

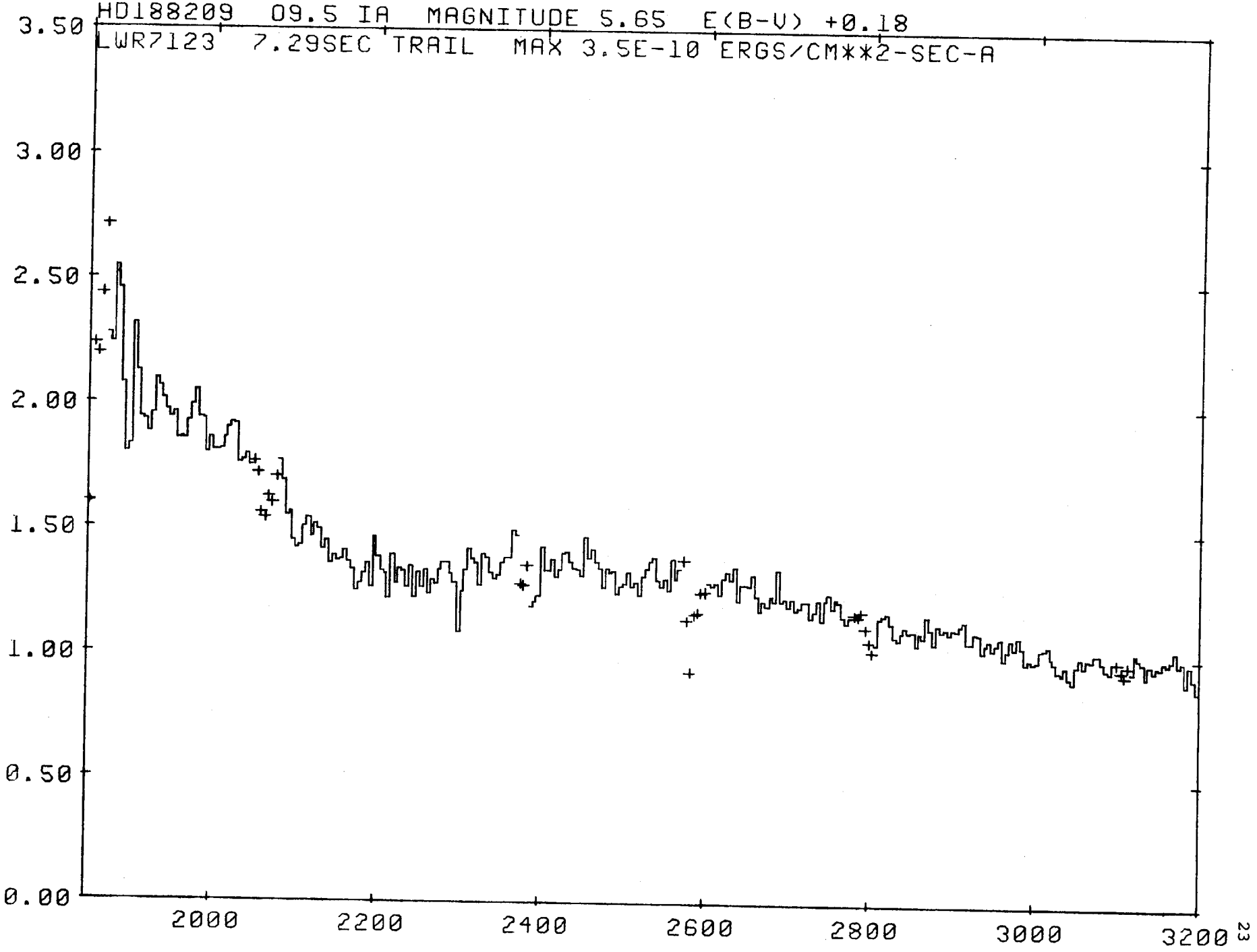

HD47839 O7 V MAGNITUDE 4.65 E(B-V) +0.07
SWP8146 1.37SEC TRAIL MAX 6.3E-9 ERGS/CM**2-SEC-A
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

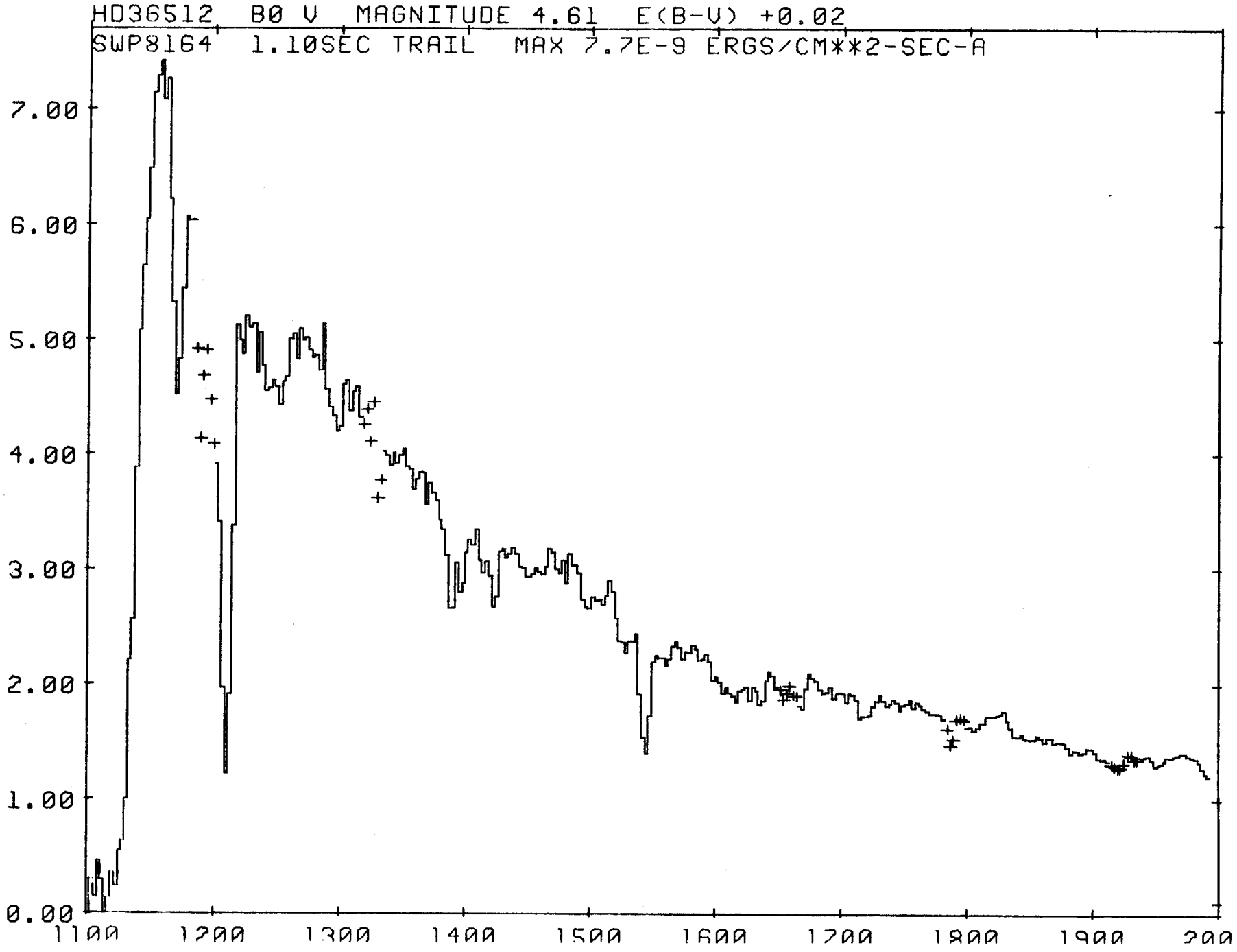

HD47839 07 V MAGNITUDE 4.65 E(B-V) +0.07
LWR7077 1.93 SEC TRAIL MAX 2.1E-9 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

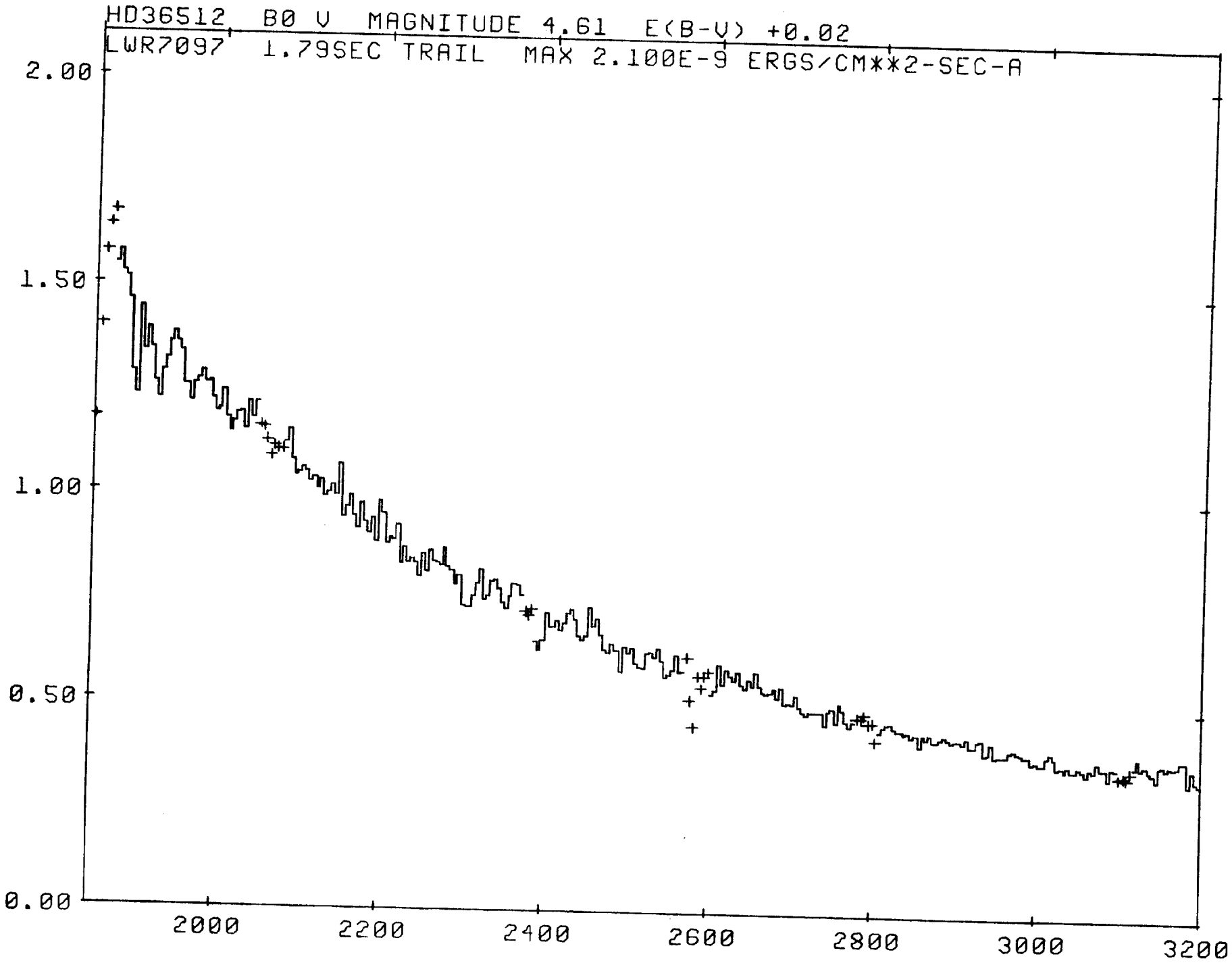

HD14633 O8 V MAGNITUDE 7.46 E(B-V) +0.09
SWP8150 21.61SEC TRAIL MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

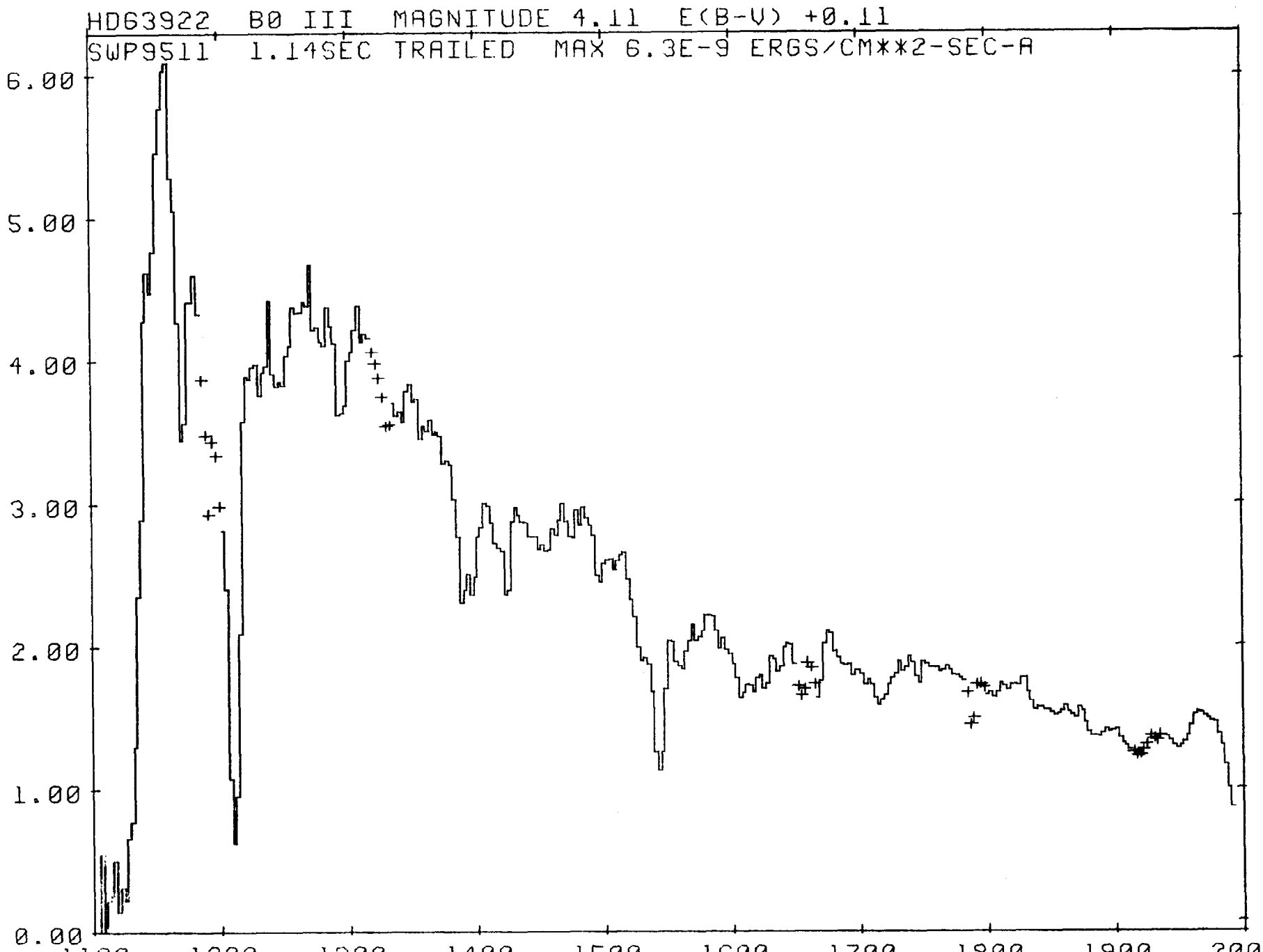

HD14633 O8 V MAGNITUDE 7.46 E(B-V) +0.09
LWR7080 27.71SEC TRAIL MAX 1.40E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

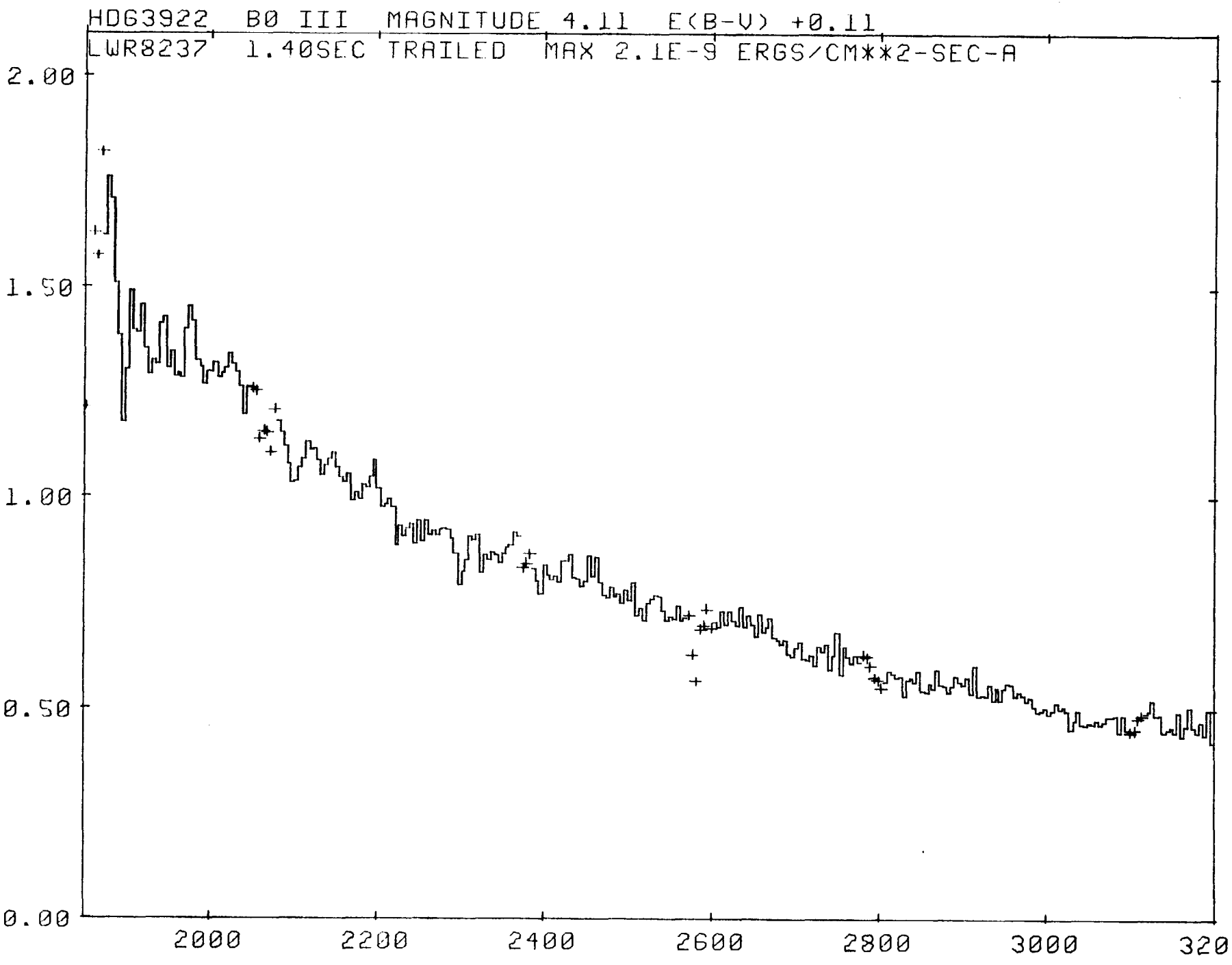

HD188209 09.5 IA MAGNITUDE 5.65 E(B-V) +0.18
SWP8195 10.97SEC TRAIL MAX 7.0E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

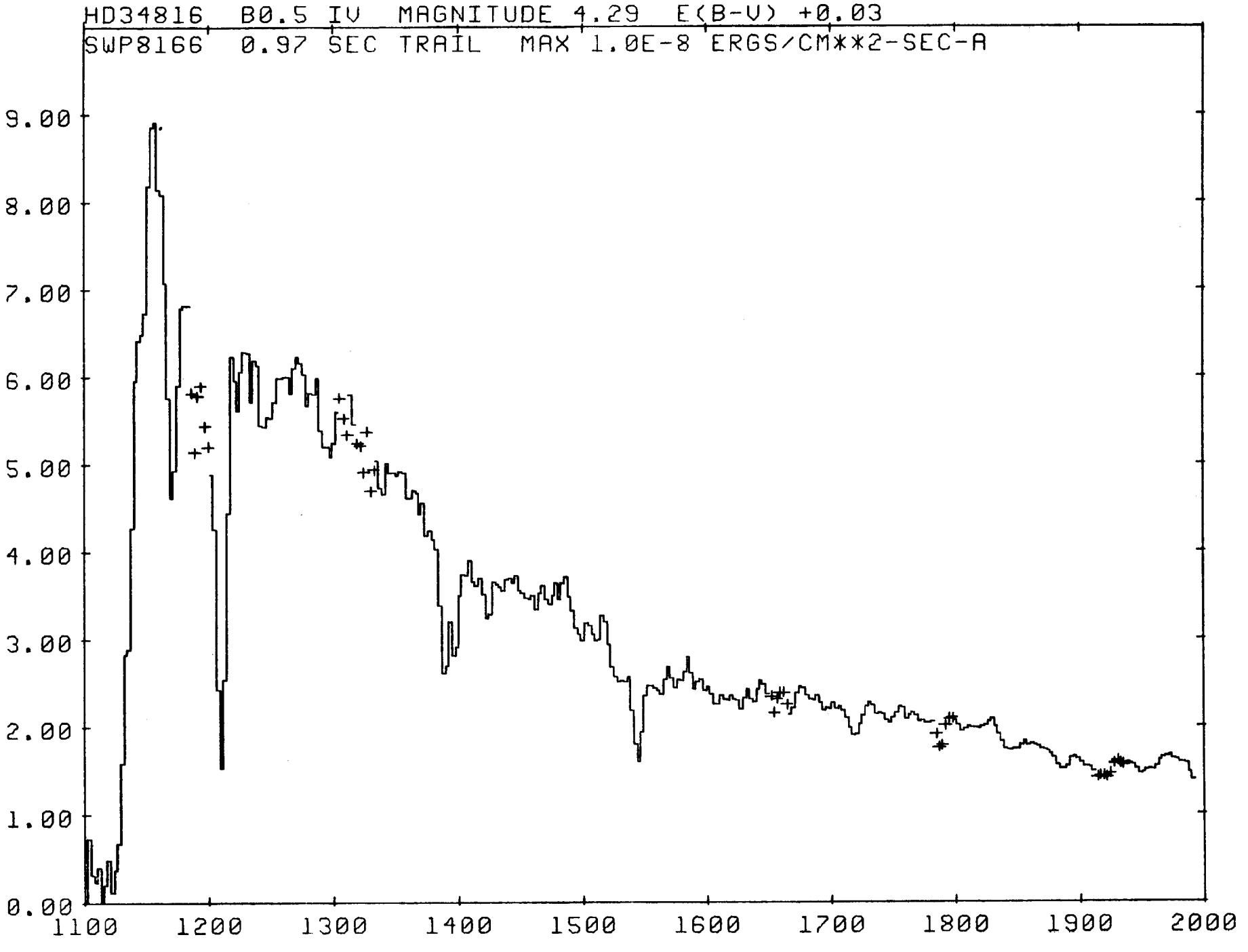

HD188209 O9.5 IA MAGNITUDE 5.65 E(B-V) +0.18
LWR7123 7.29SEC TRAIL MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

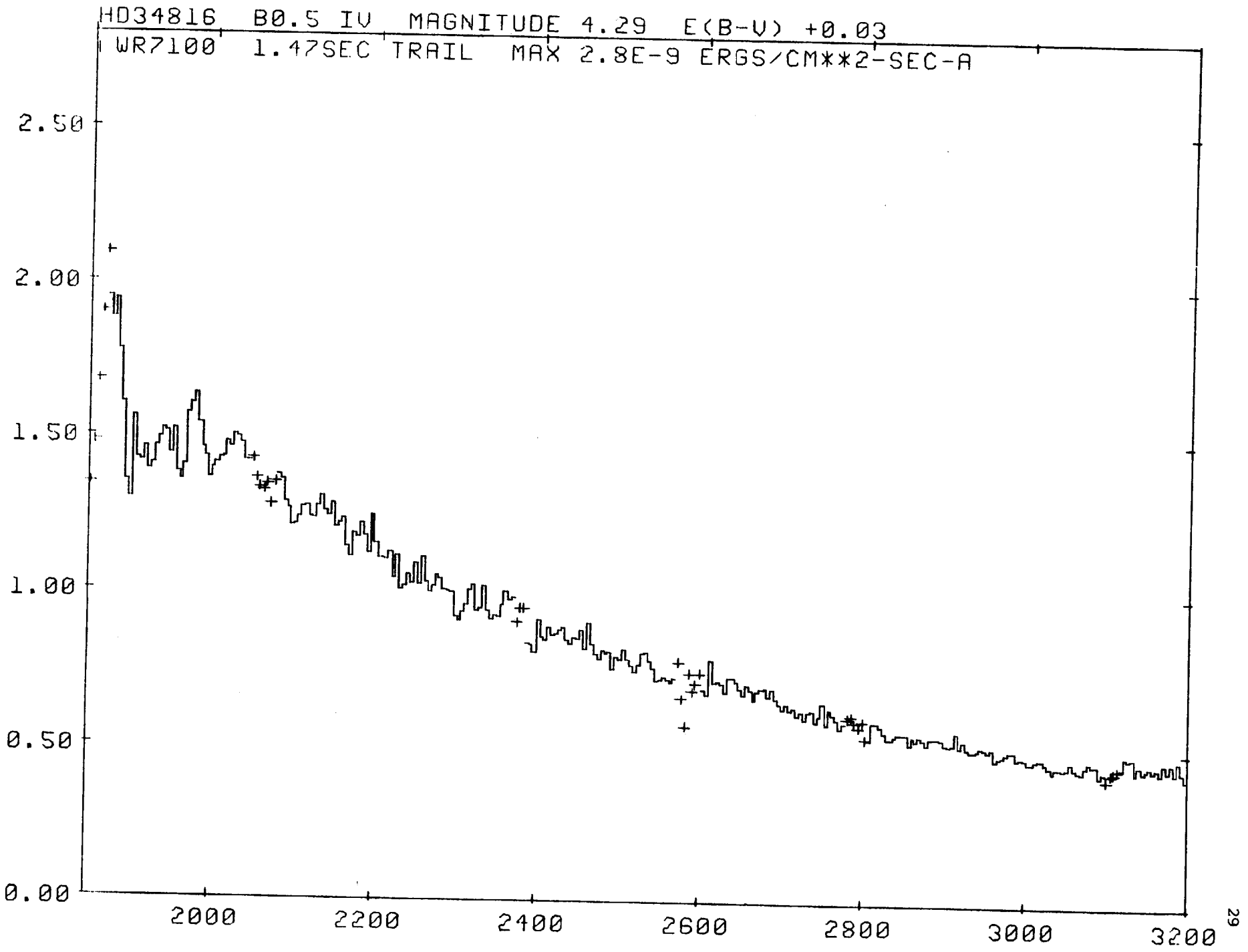

HD36512 B0 V MAGNITUDE 4.61 E(B-V) +0.02
SWP8164 1.10SEC TRAIL MAX 7.7E-9 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

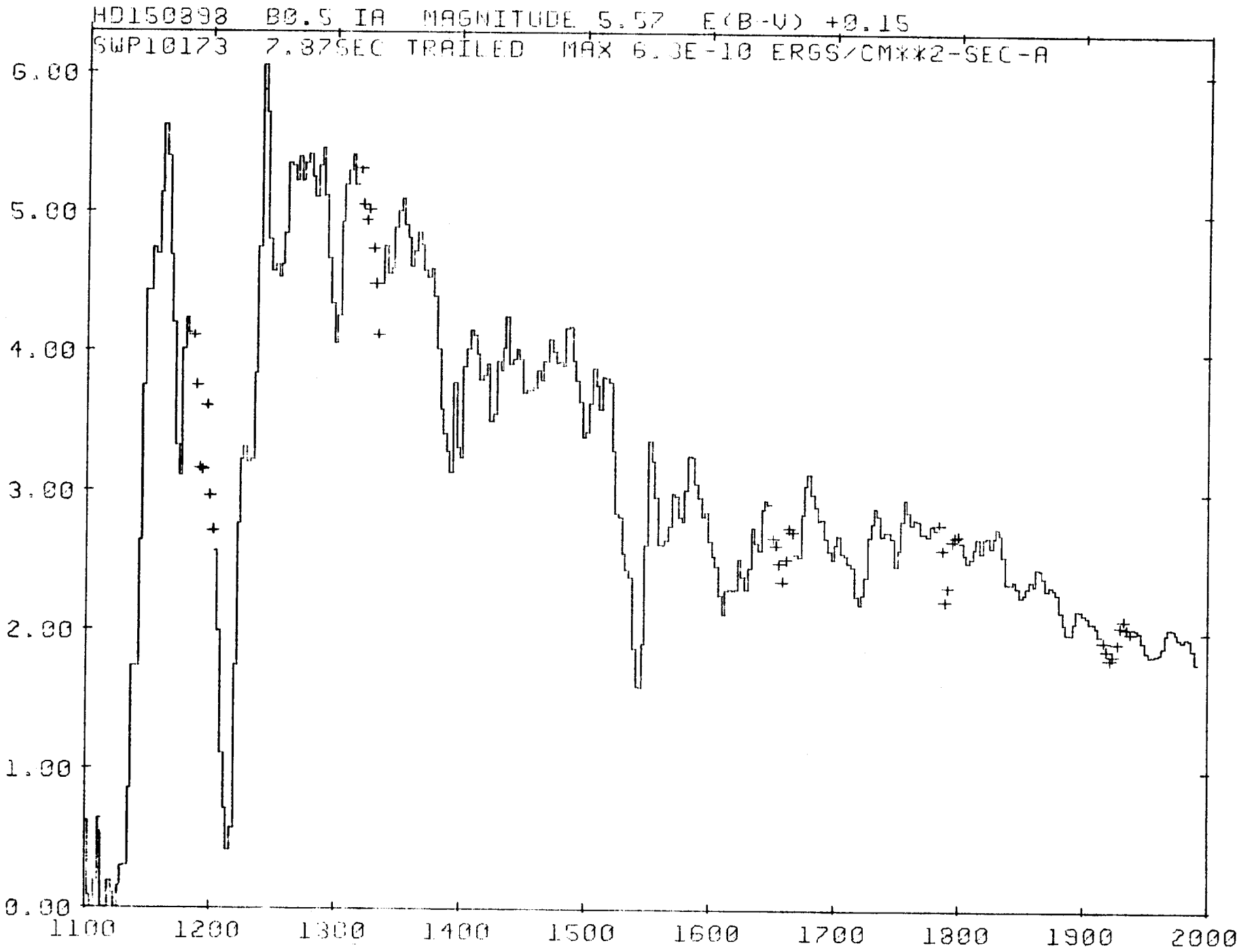

HD36512 B0 V MAGNITUDE 4.61 E(B-V) +0.02
LWR7097 1.79SEC TRAIL MAX 2.100E-9 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

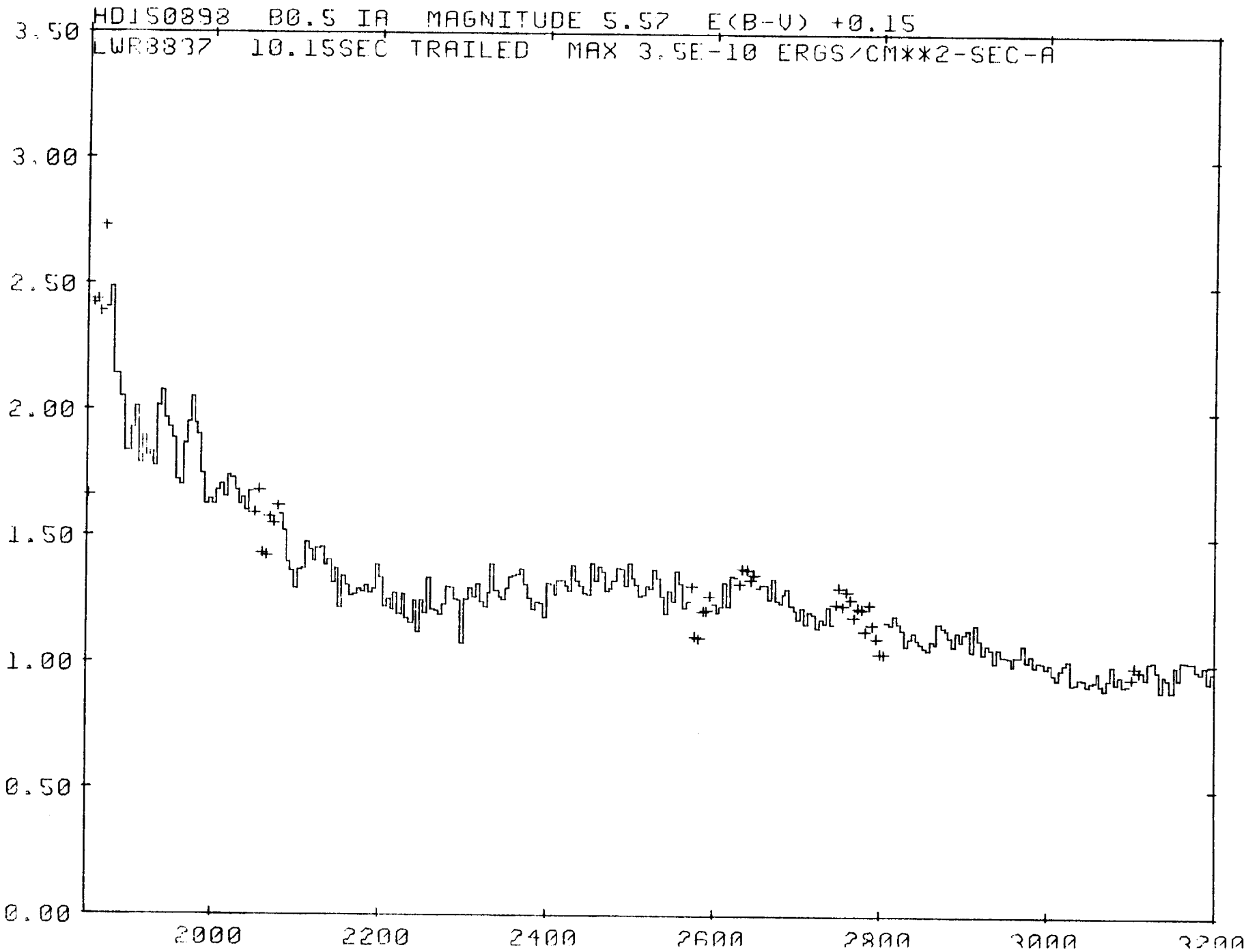

HD63922 B0 III MAGNITUDE 4.11 E(B-V) +0.11
SWP9511 1.14SEC TRAILED MAX 6.3E-9 ERGS/CM**2-SEC-A
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

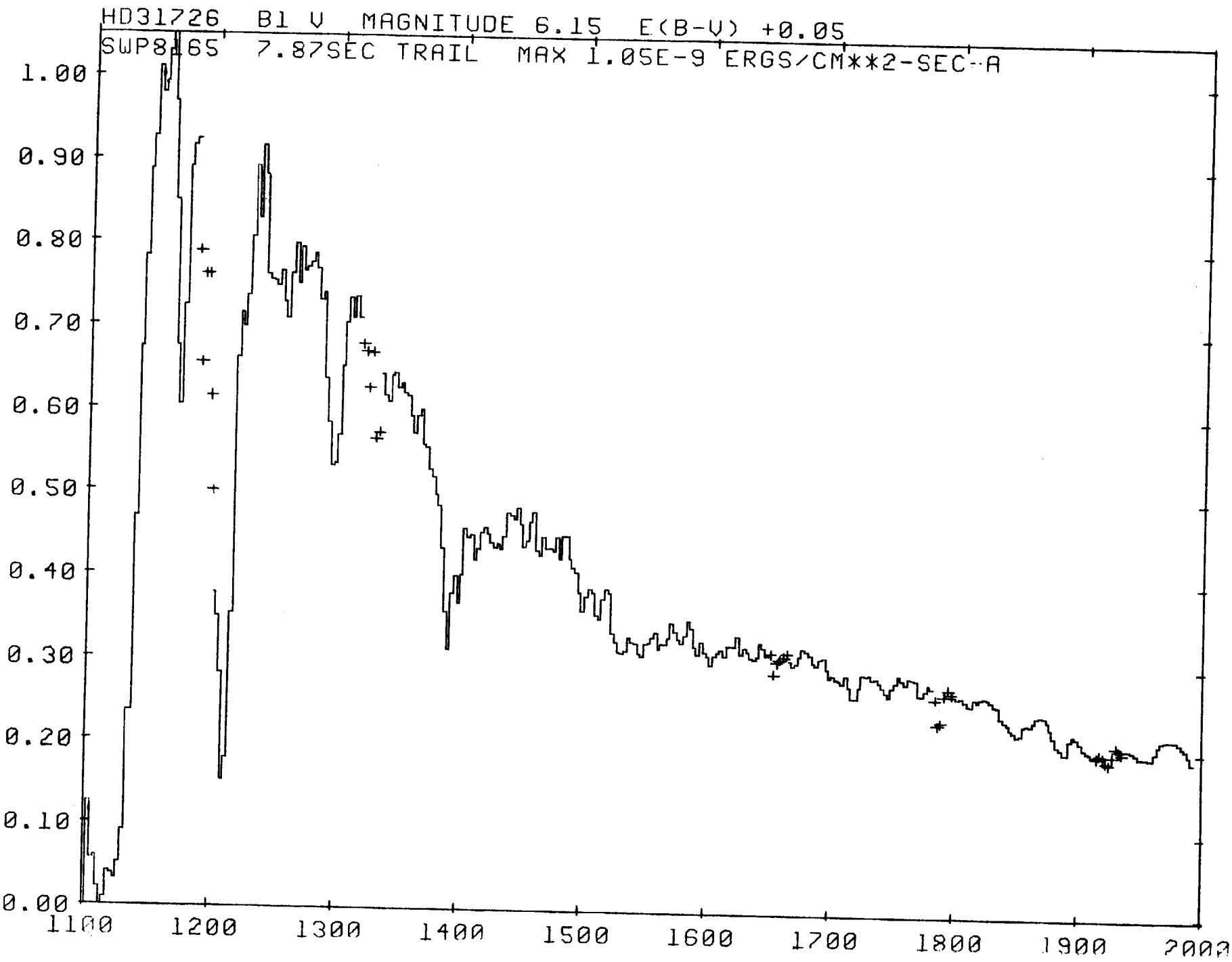

HD63922 B0 III MAGNITUDE 4.11 E(B-V) +0.11
LWR8237 1.40SEC TRAILED MAX 2.1E-9 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

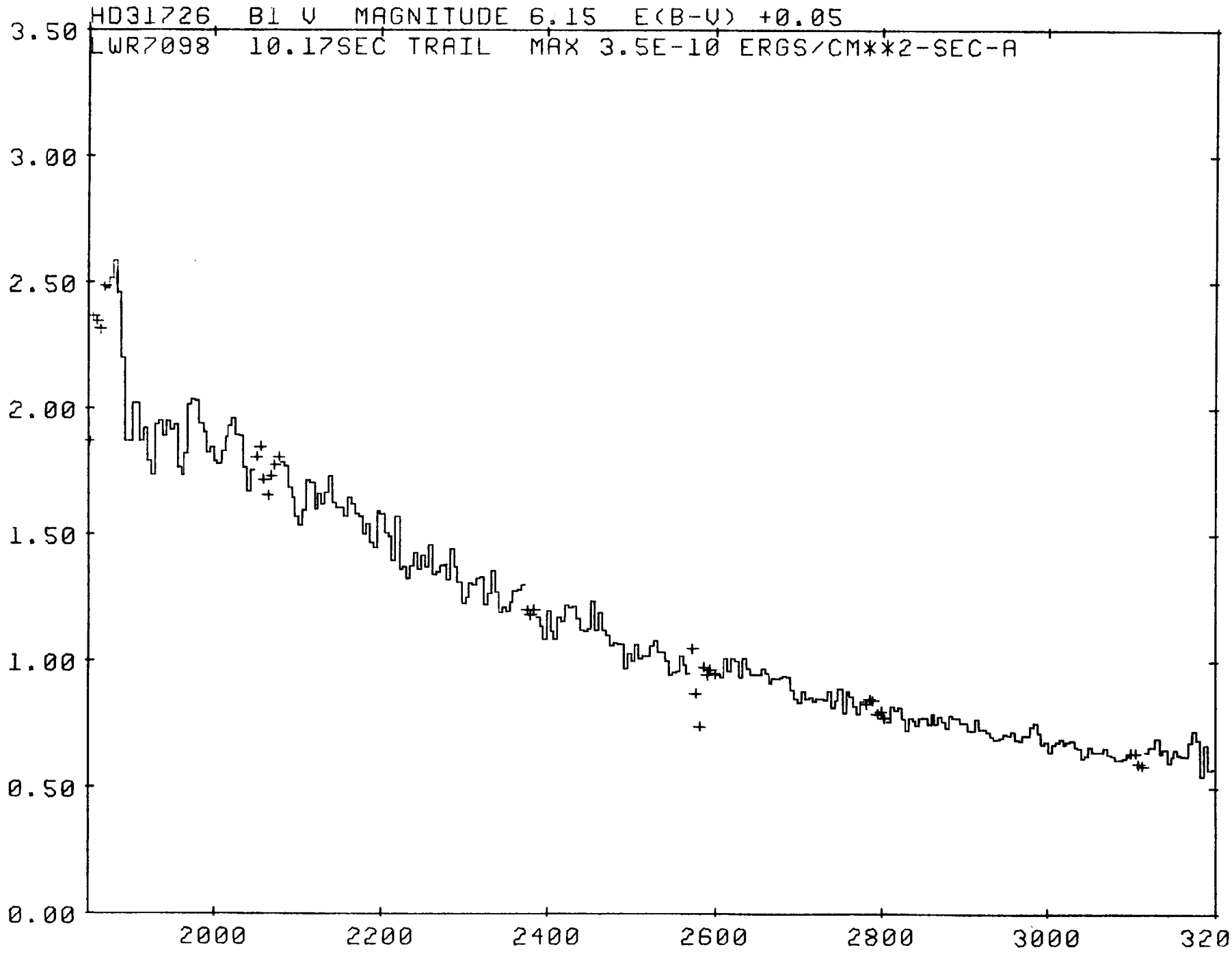

HD34816 B0.5 IV MAGNITUDE 4.29 E(B-V) +0.03
SWP8166 0.97 SEC TRAIL MAX 1.0E-8 ERGS/CM**2-SEC-A
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

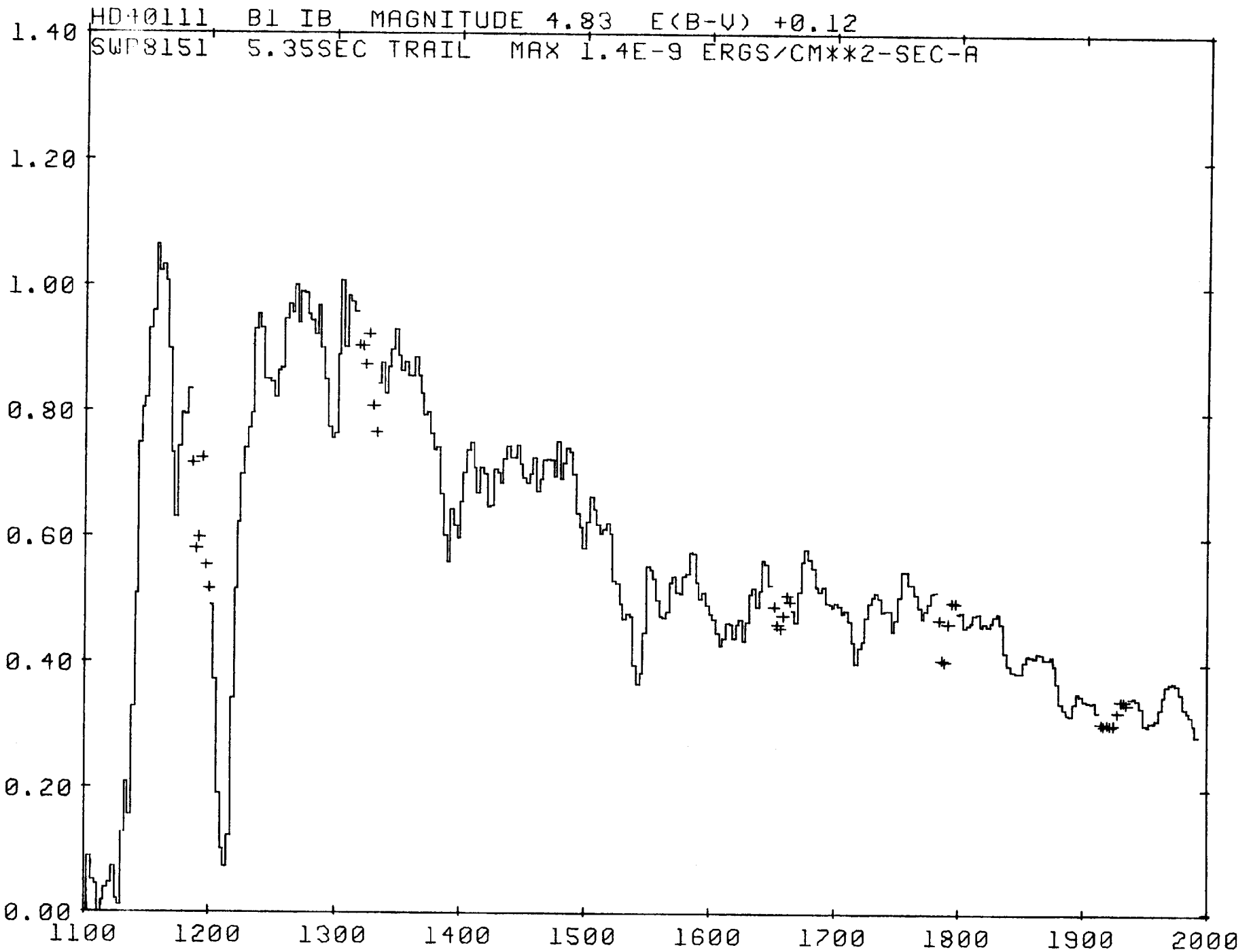

HD34816 B0.5 IV MAGNITUDE 4.29 E(B-V) +0.03
WR7100 1.47SEC TRAIL MAX 2.8E-9 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

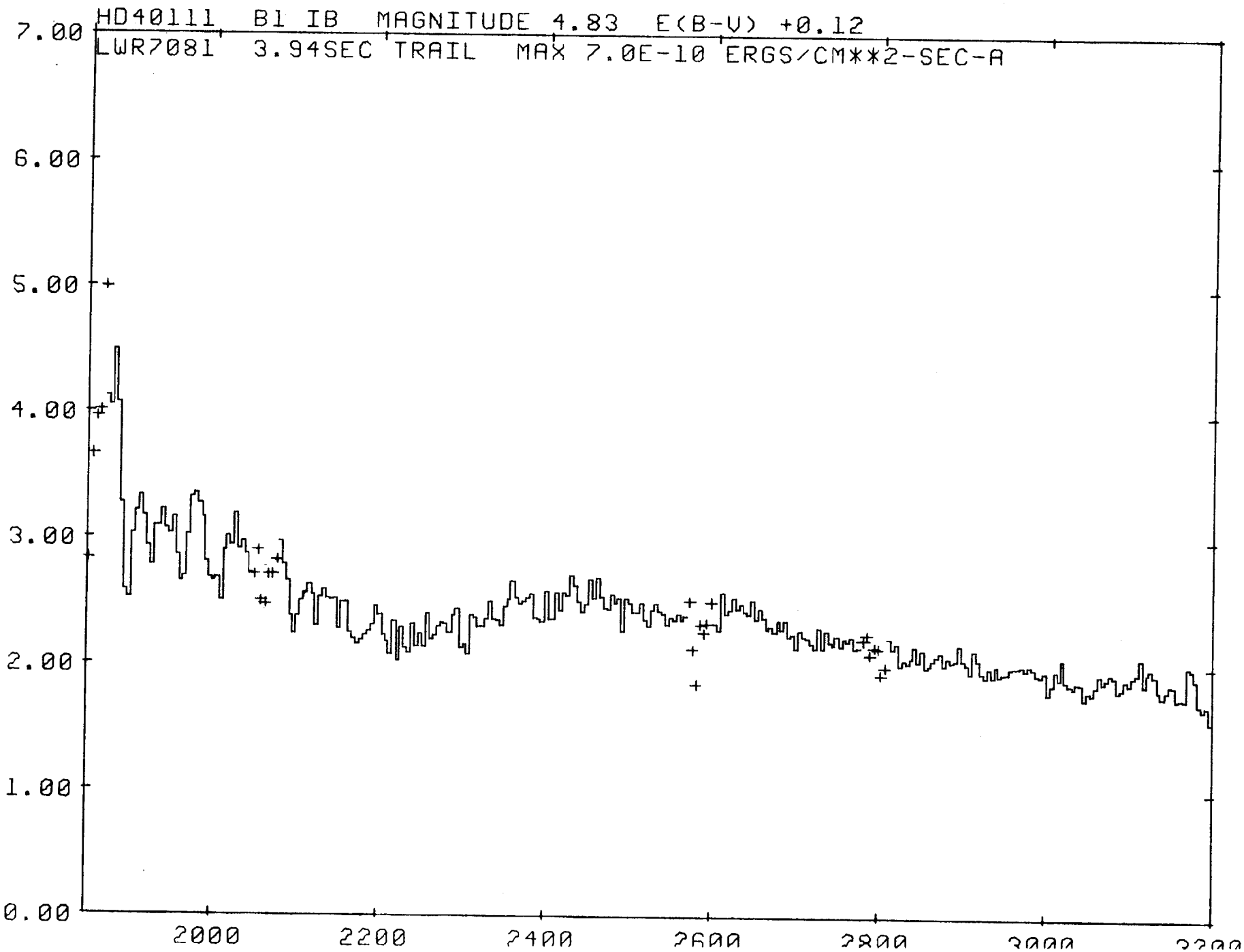

HD150898 B0.5 IA MAGNITUDE 5.57 E(B-V) +0.15
SWP10173 7.87SEC TRAILED MAX 6.3E-10 ERGS/CM**2-SEC-A
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

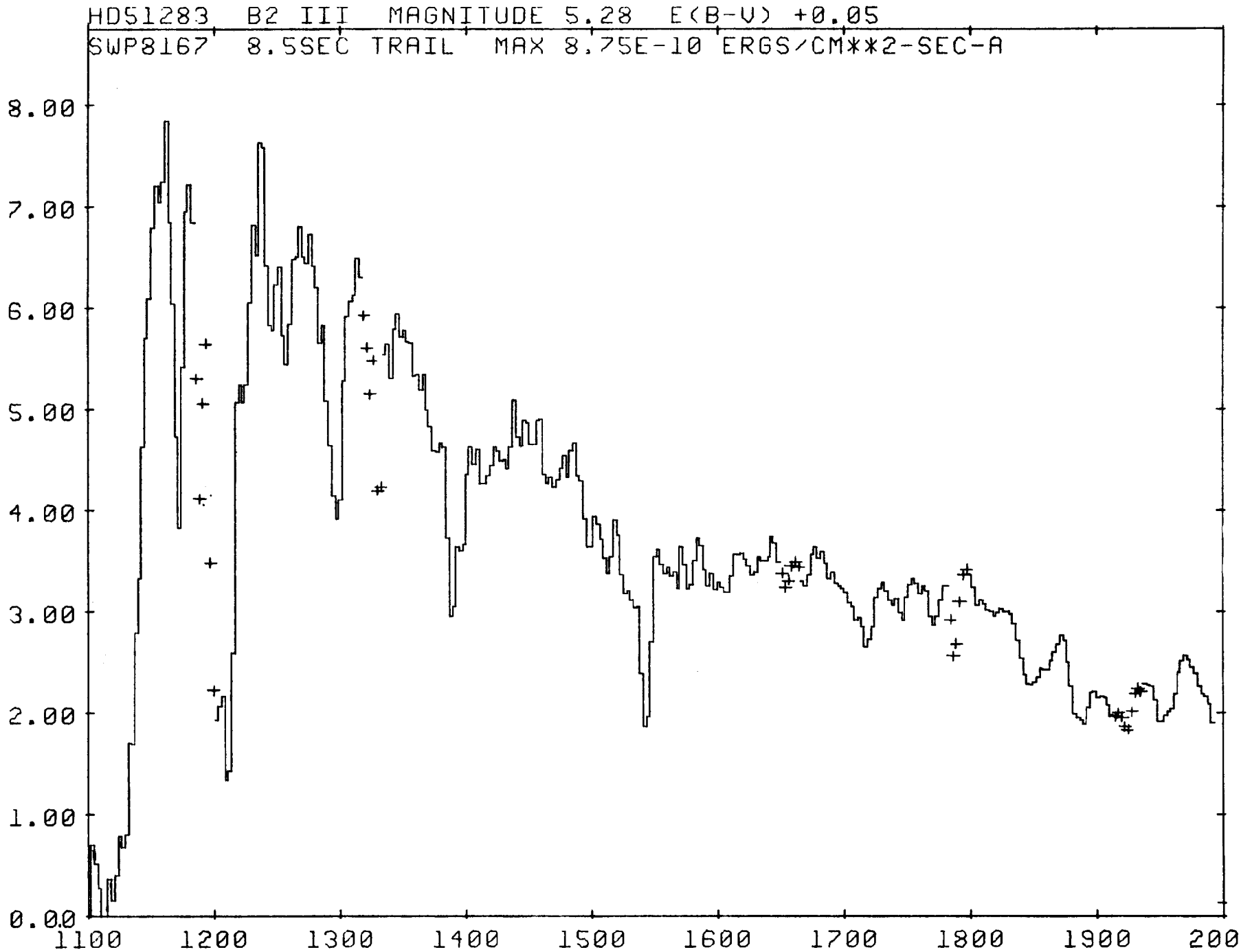

HD150898 B0.5 IA MAGNITUDE 5.57 E(B-V) +0.15
LWR8337 10.15SEC TRAILED MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

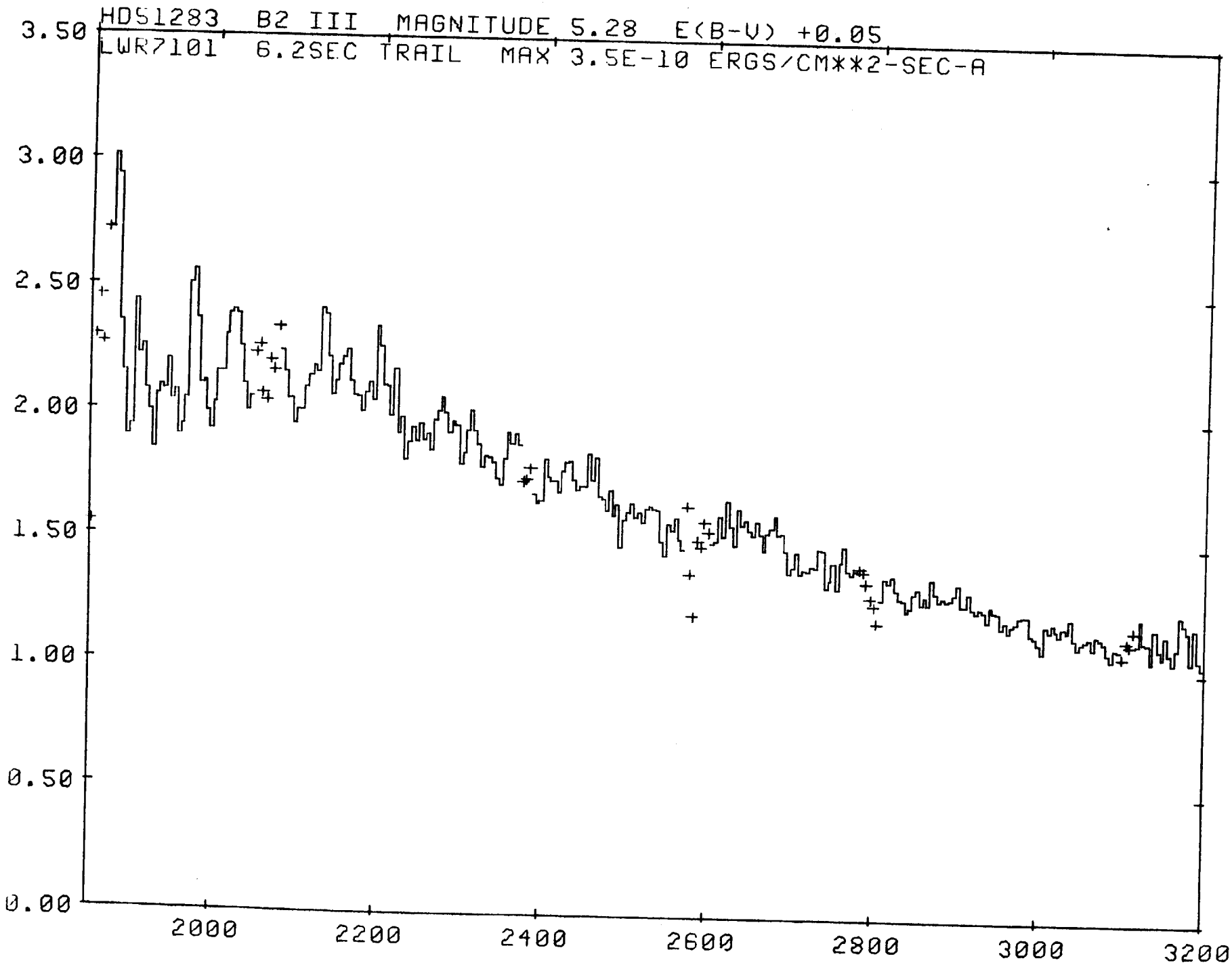

HD31726 B1 V MAGNITUDE 6.15 E(B-V) +0.05
SWP8165 7.87SEC TRAIL MAX 1.05E-9 ERGS/CM**2-SEC-A
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

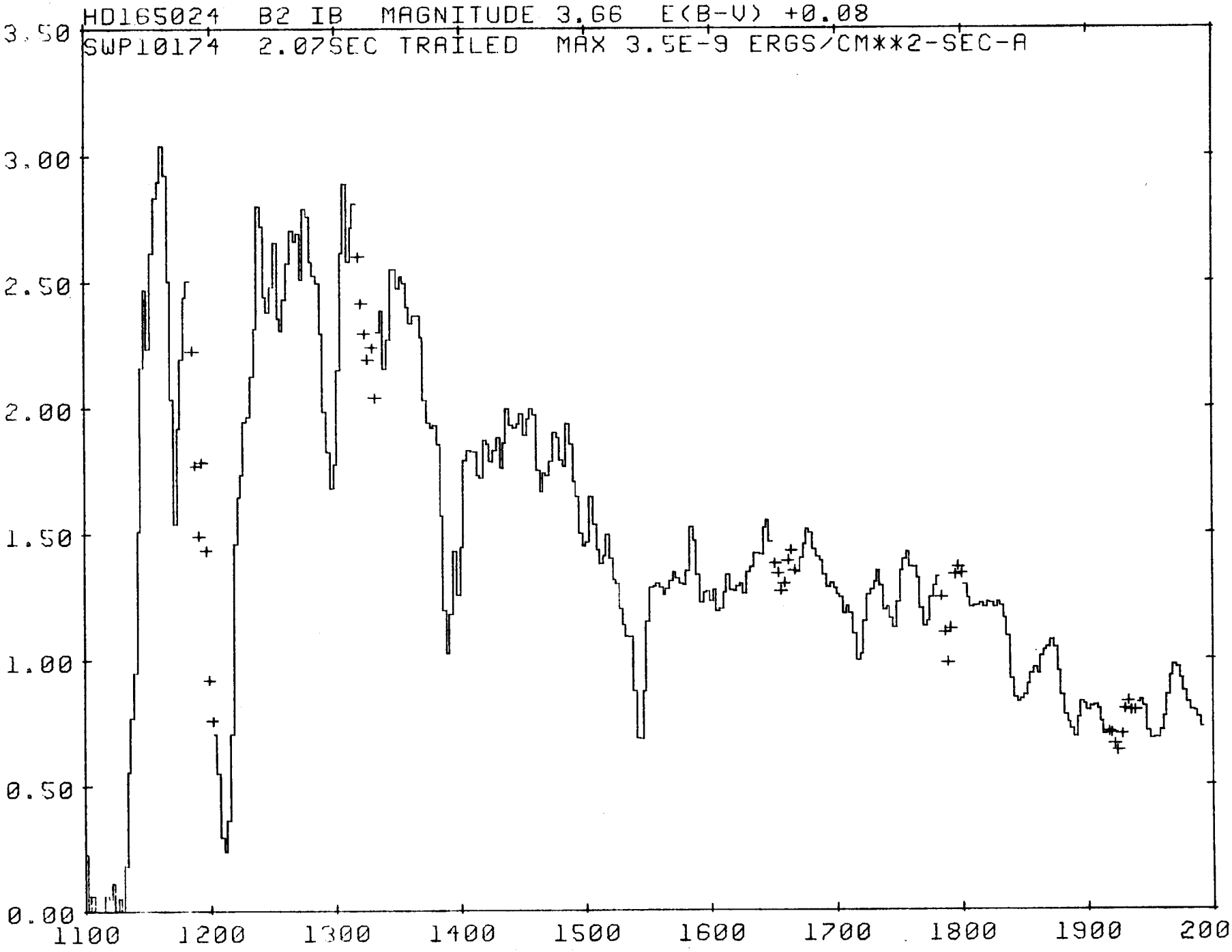

HD31726 B1 V MAGNITUDE 6.15 E(B-V) +0.05
LWR7098 10.17SEC TRAIL MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

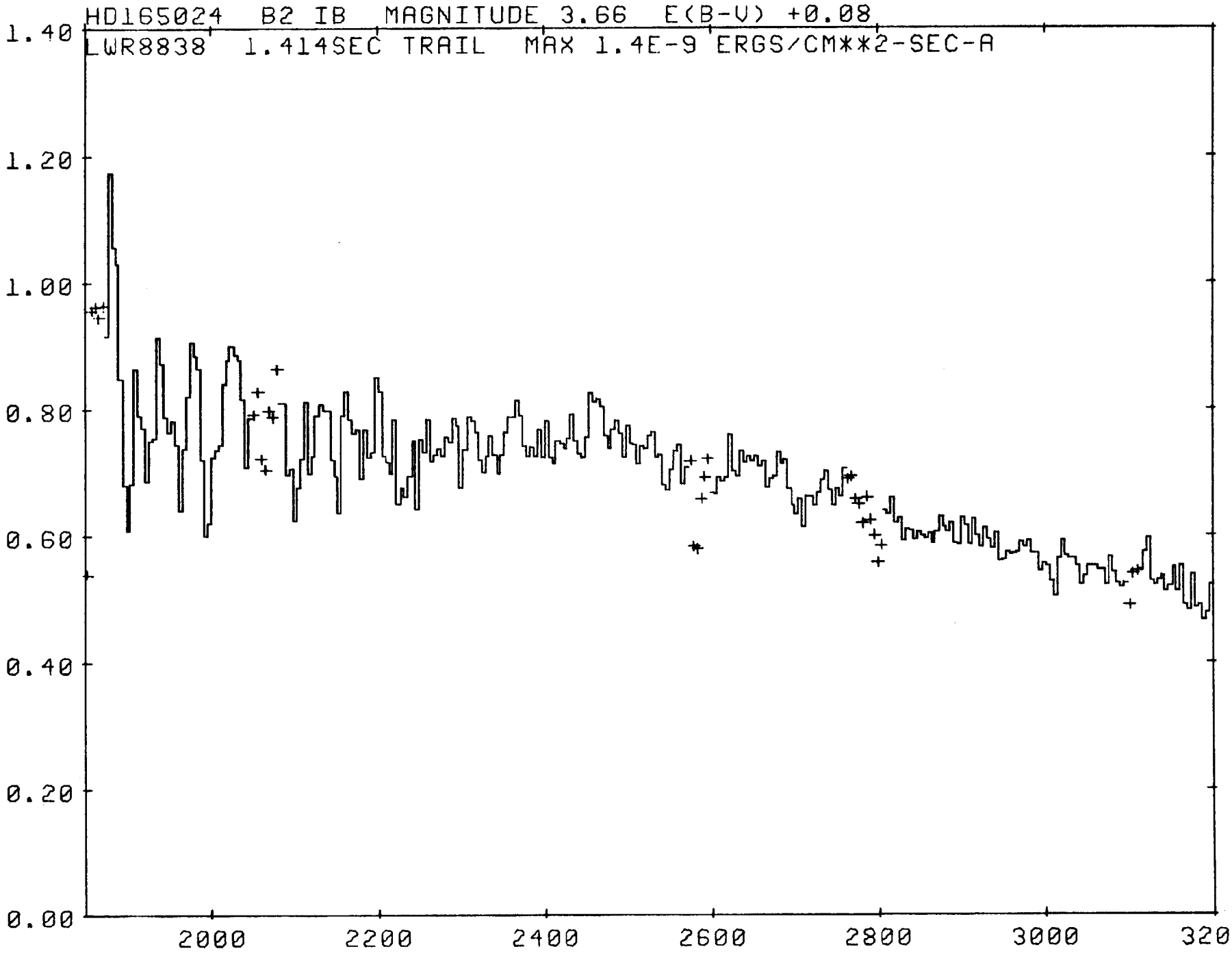

HD 10111 B1 IB MAGNITUDE 4.83 E(B-V) +0.12
SWP8151 5.35SEC TRAIL MAX 1.4E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

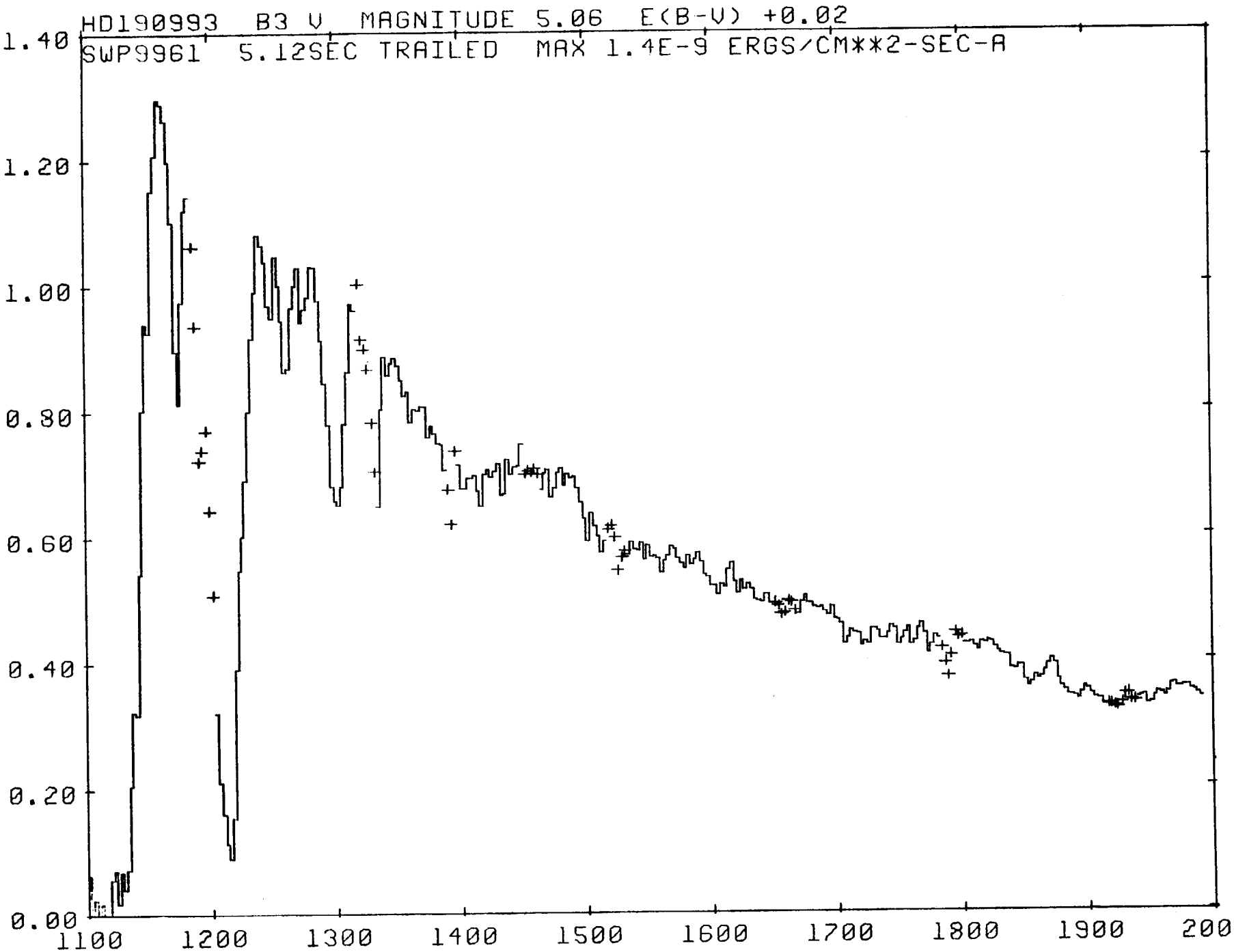

HD40111 B1 IB MAGNITUDE 4.83 E(B-V) +0.12
LWR7081 3.94SEC TRAIL MAX 7.0E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

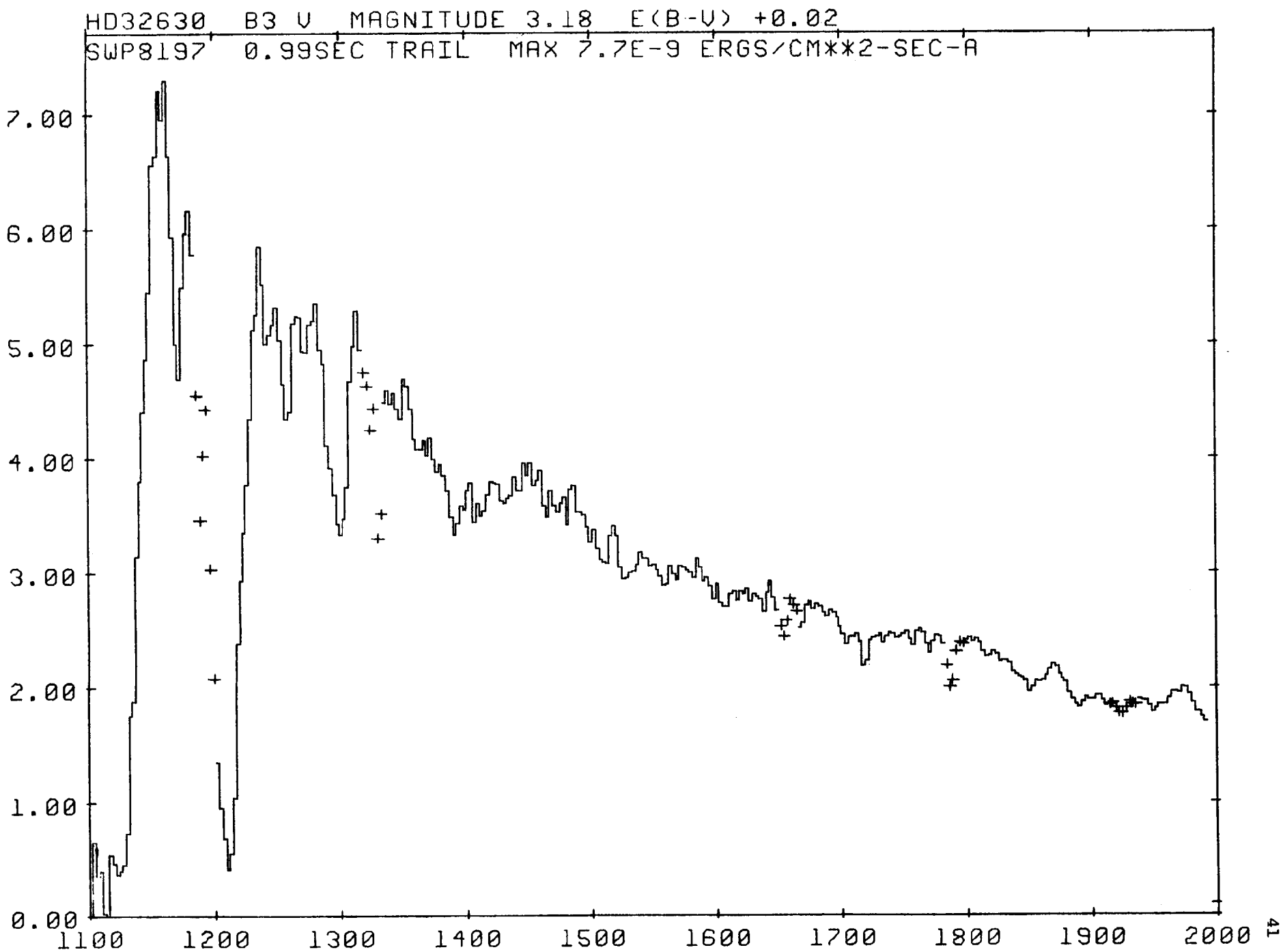

HD51283 B2 III MAGNITUDE 5.28 E(B-V) +0.05
SWP8167 8.5SEC TRAIL MAX 8.75E-10 ERGS/CM**2-SEC-A
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.0
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

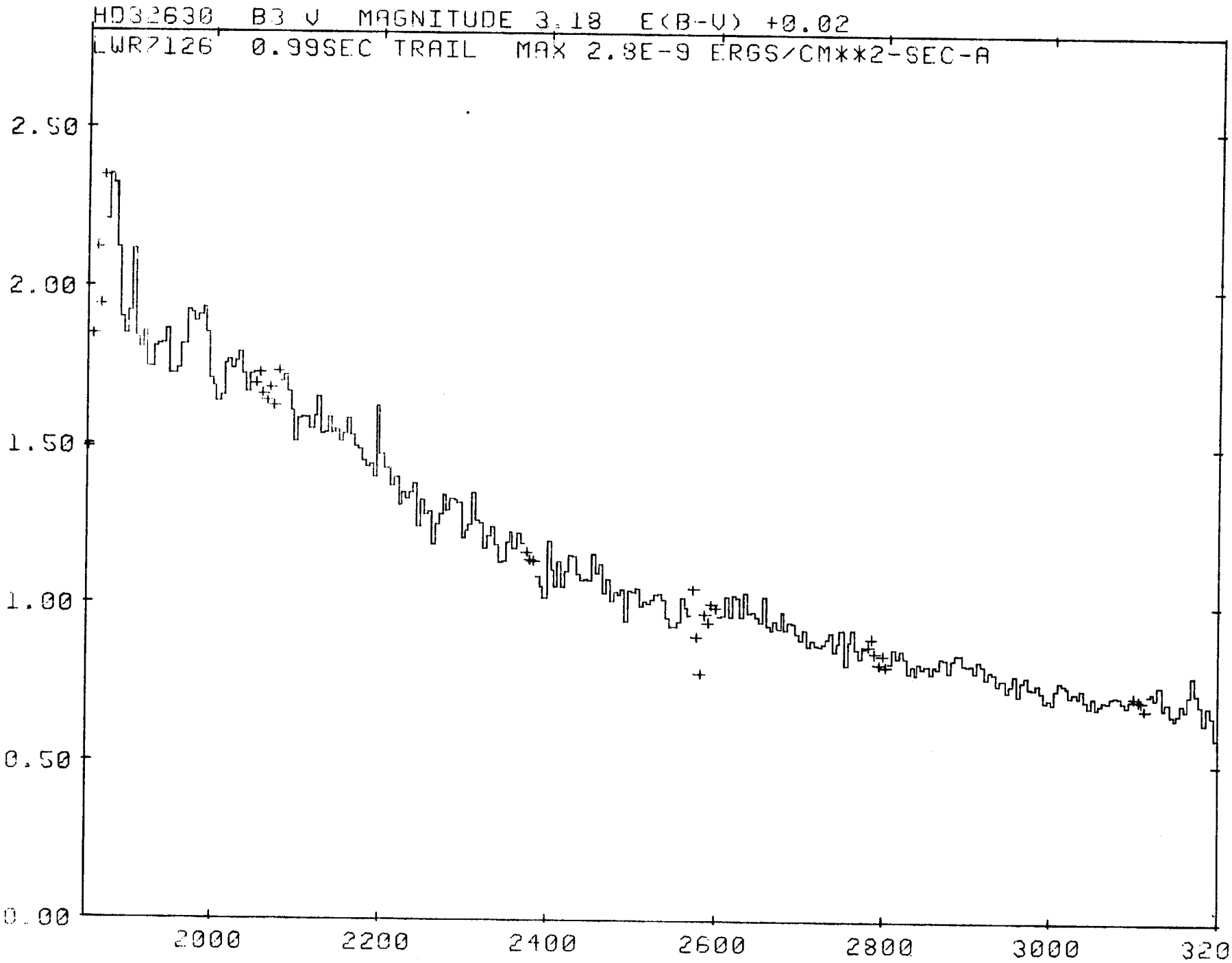

HD51283 B2 III MAGNITUDE 5.28 E(B-V) +0.05
LWR7101 6.2SEC TRAIL MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

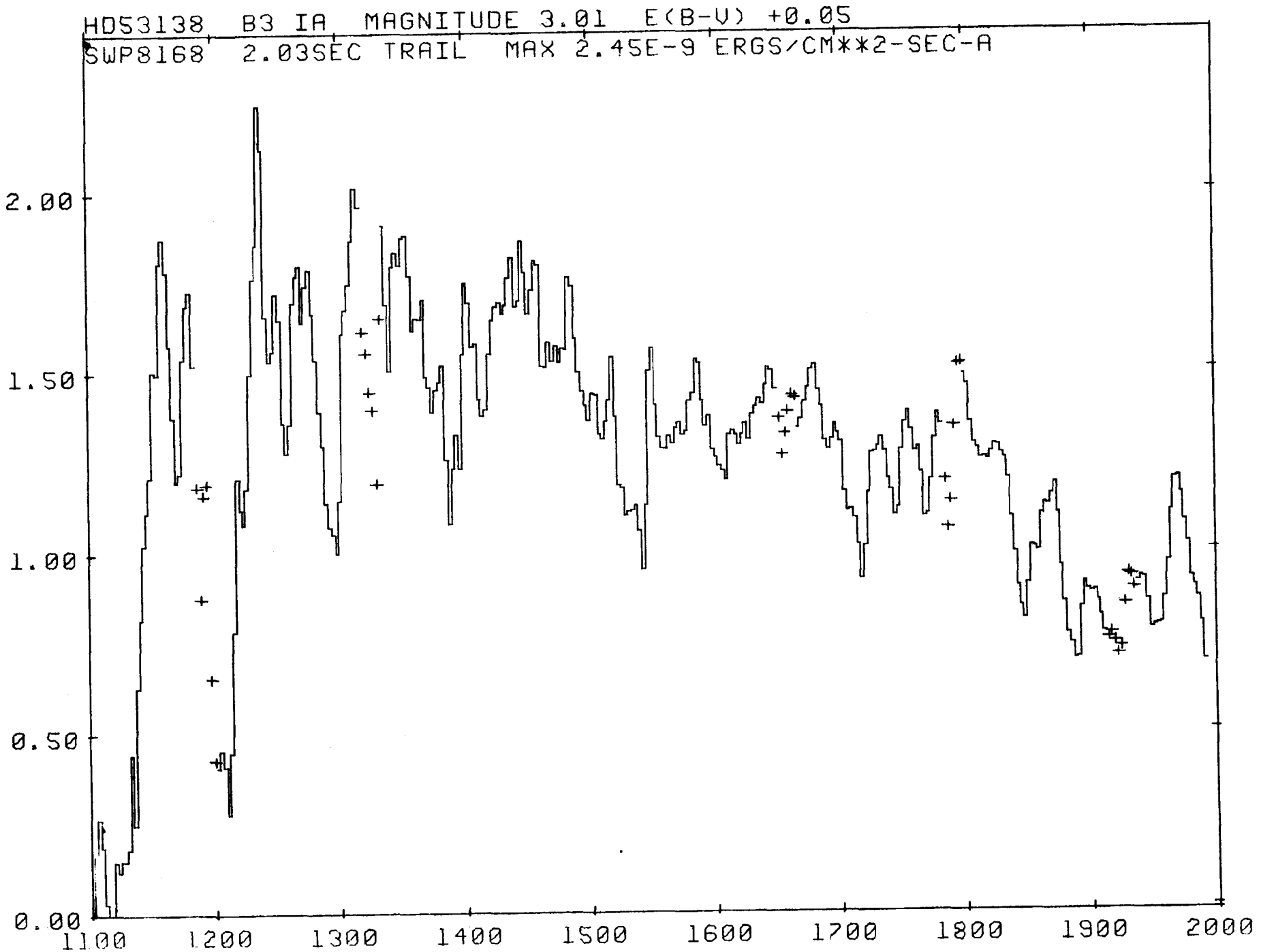

HD165024 B2 IB MAGNITUDE 3.66 E(B-V) +0.08
SWP10174 2.07SEC TRAILED MAX 3.5E-9 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

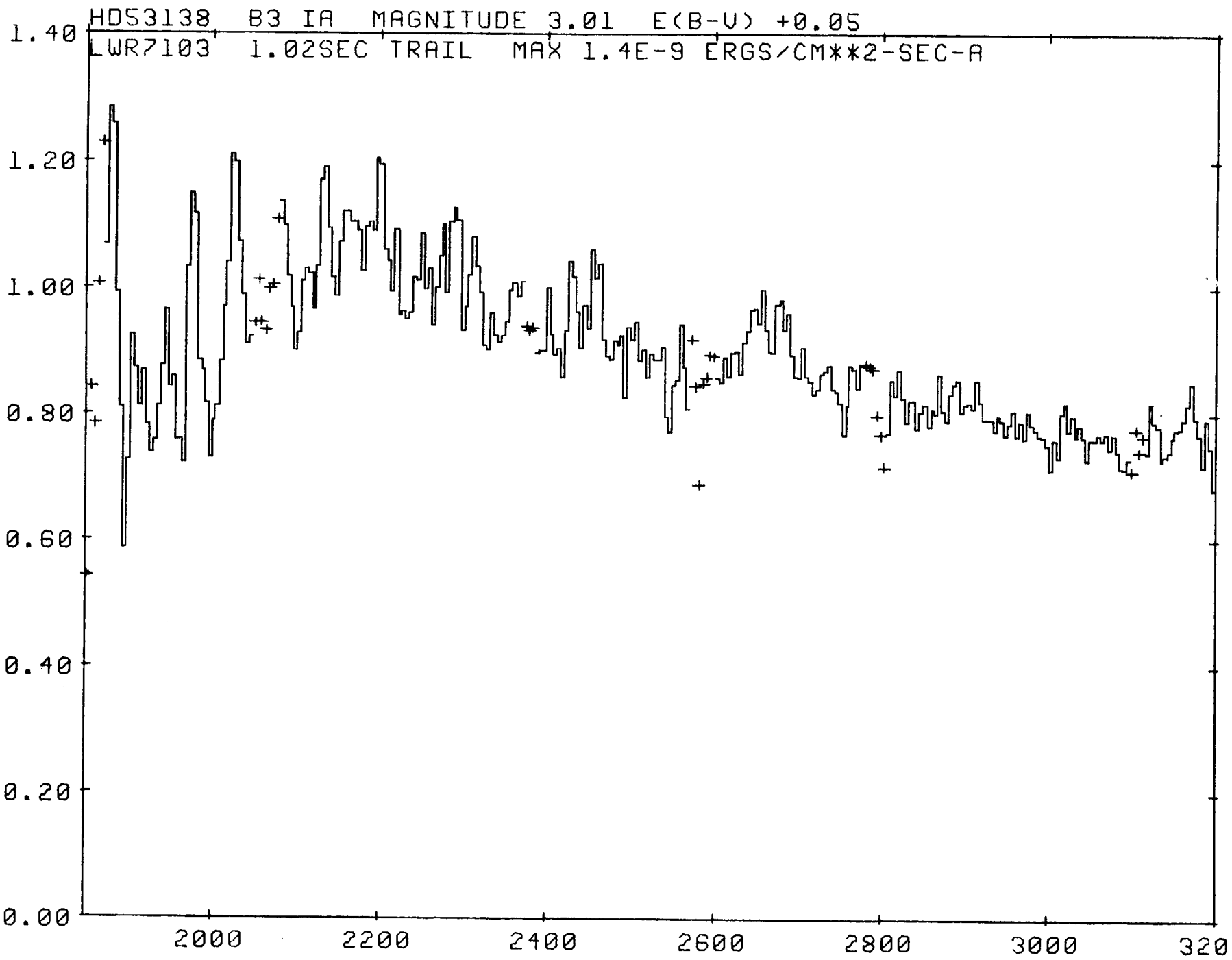

HD165024 B2 IB MAGNITUDE 3.66 E(B-V) +0.08
LWR8838 1.414SEC TRAIL MAX 1.4E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

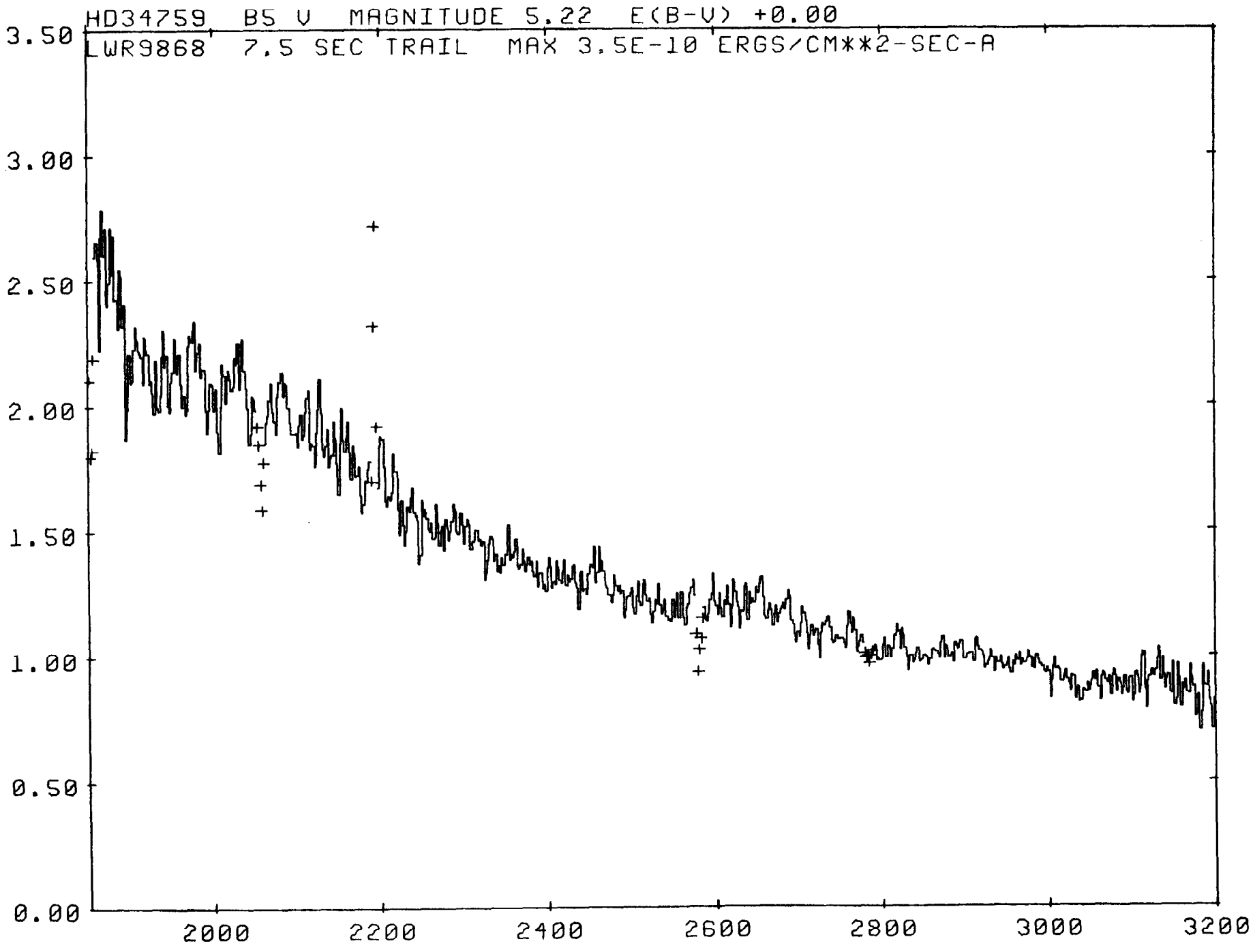

HD190993 B3 V MAGNITUDE 5.06 E(B-V) +0.02
SWP9961 5.12SEC TRAILED MAX 1.4E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

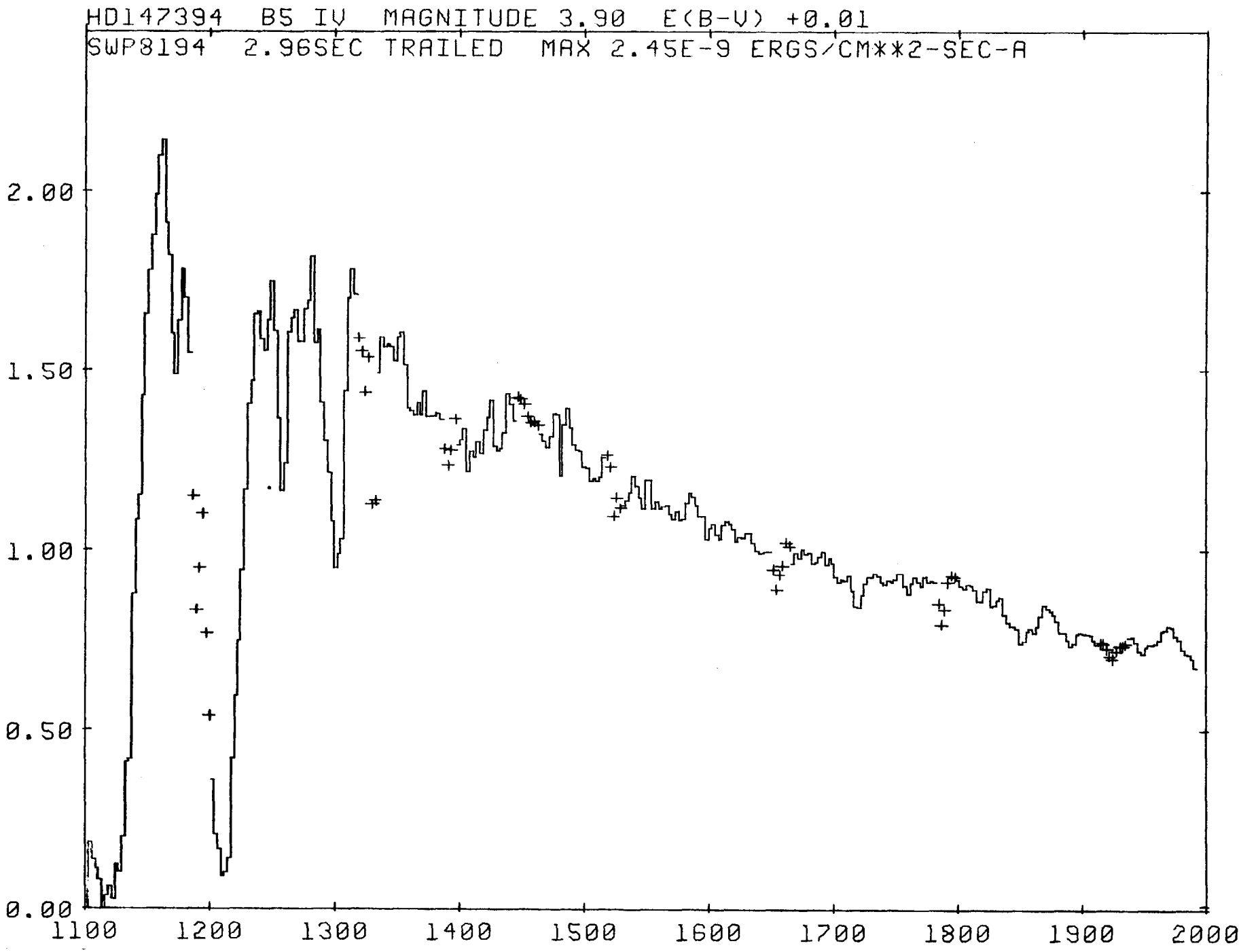

HD32630 B3 V MAGNITUDE 3.18 E(B-V) +0.02
SWP8197 0.99SEC TRAIL MAX 7.7E-9 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

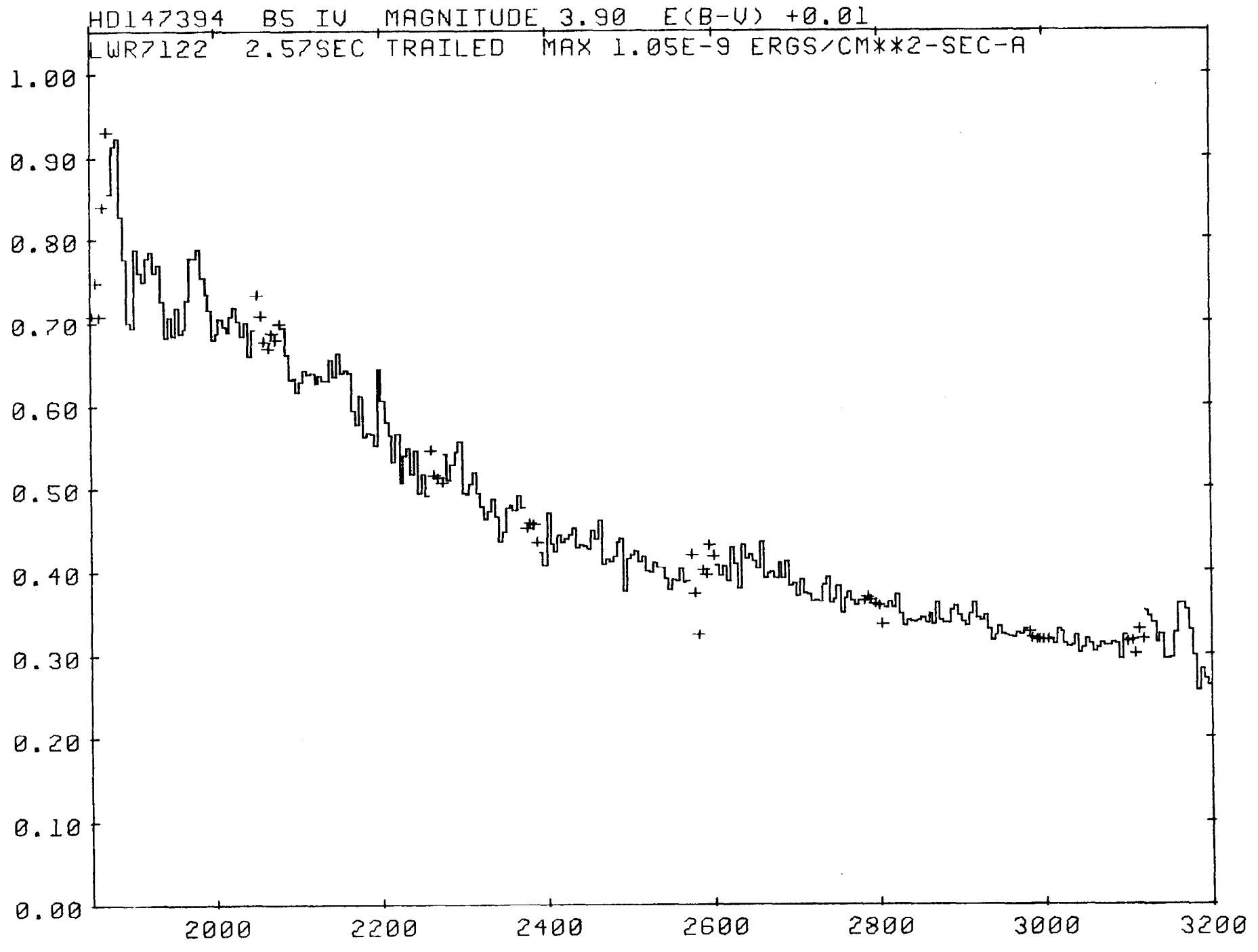

HD32630 B3 V MAGNITUDE 3.18 E(B-V) +0.02
LWR7126 0.99SEC TRAIL MAX 2.8E-9 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

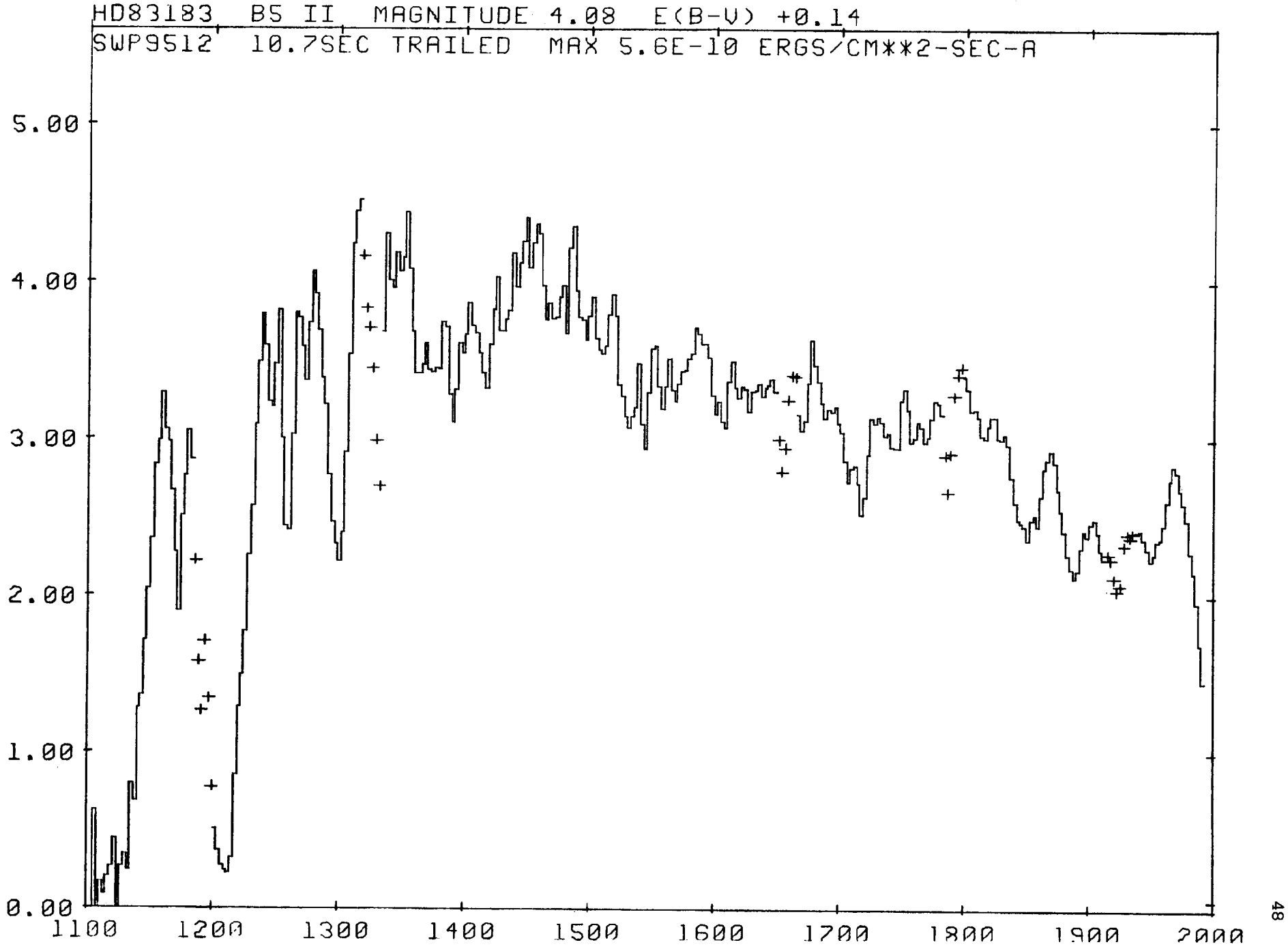

HD53138 B3 IA MAGNITUDE 3.01 E(B-V) +0.05
SWP8168 2.03SEC TRAIL MAX 2.45E-9 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

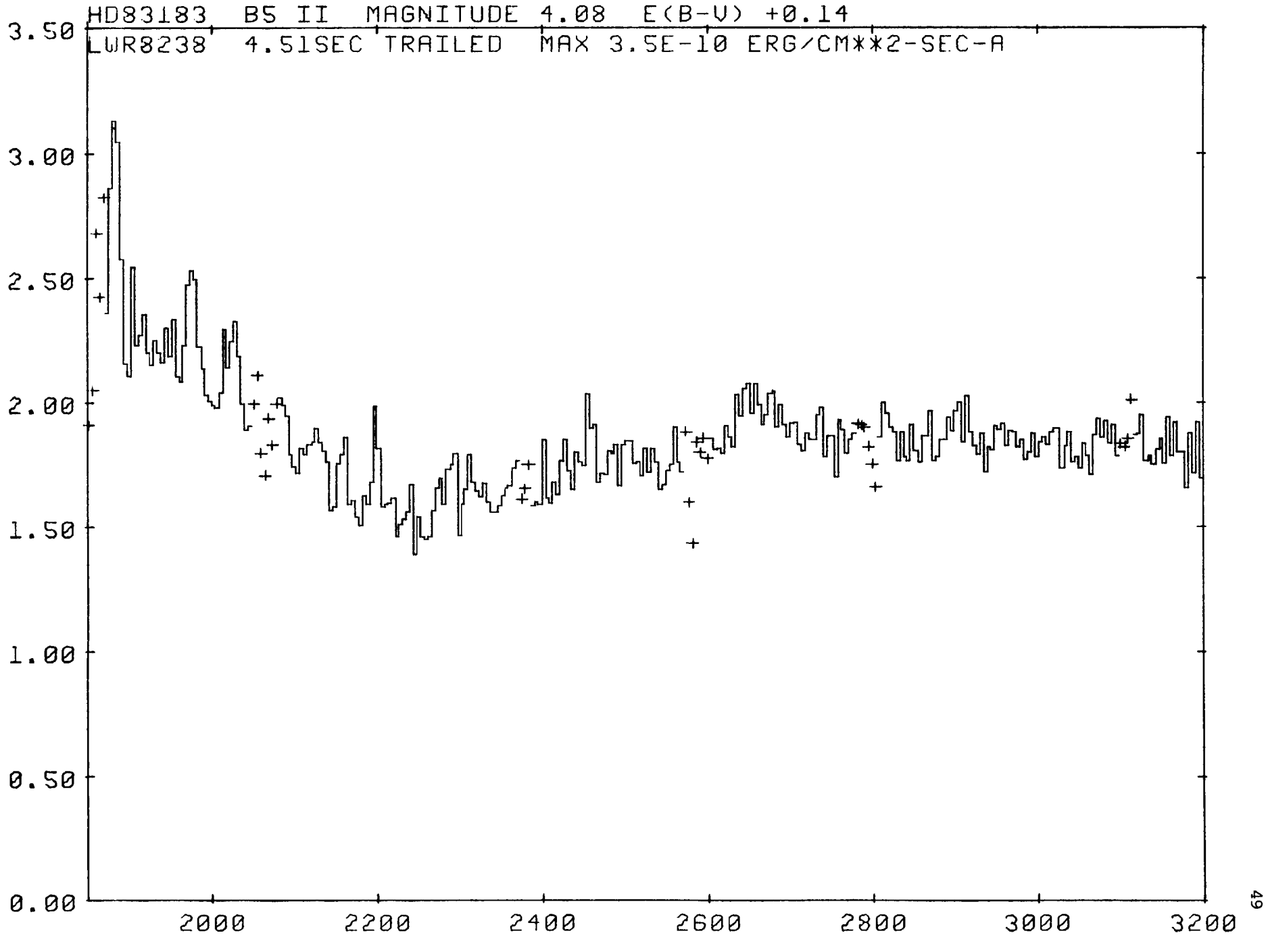

HD53138 B3 IA MAGNITUDE 3.01 E(B-V) +0.05
LWR7103 1.02SEC TRAIL MAX 1.4E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

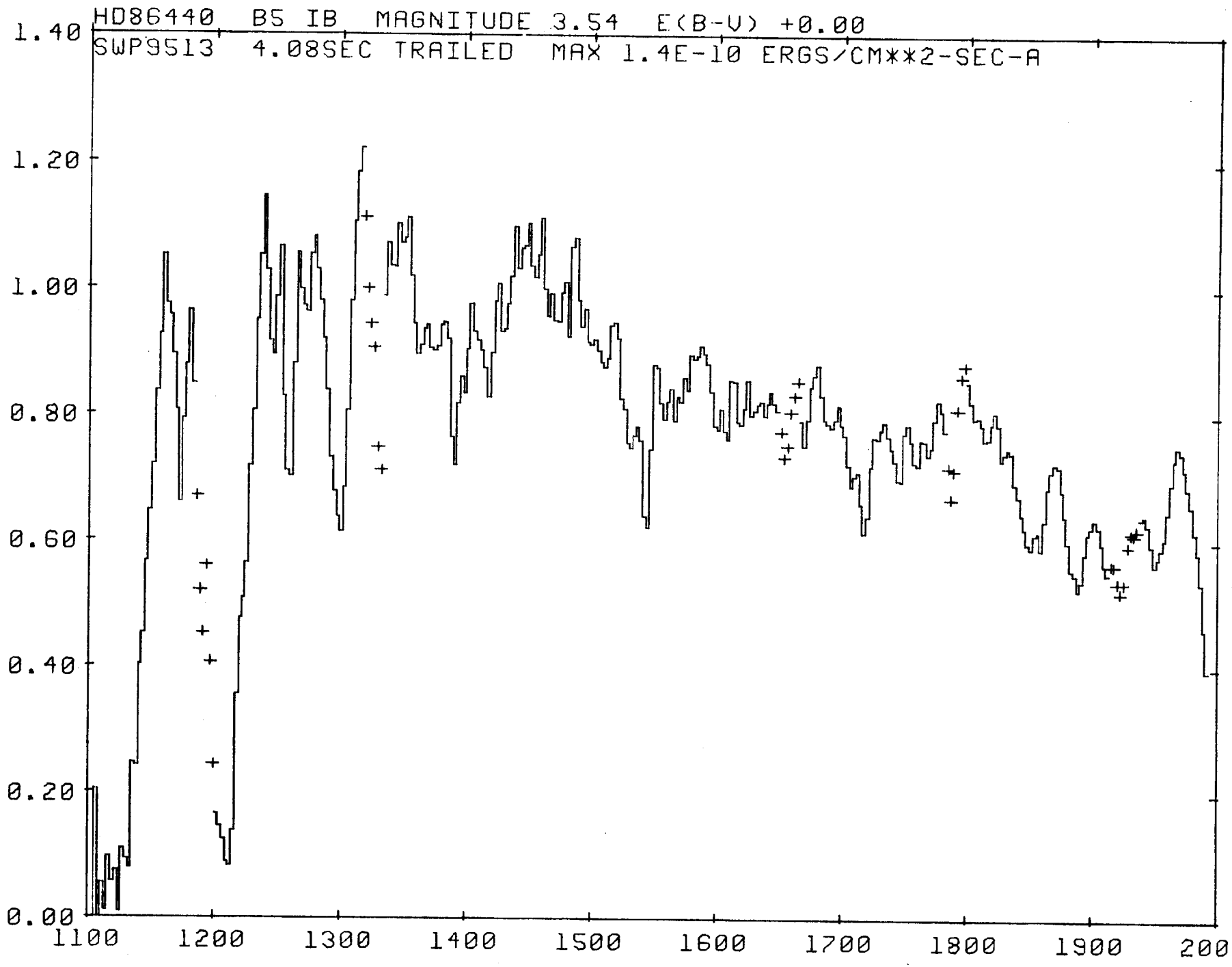

HD34759 B5 V MAGNITUDE 5.22 E(B-V) +0.00
LWR9868 7.5 SEC TRAIL MAX 3.5E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

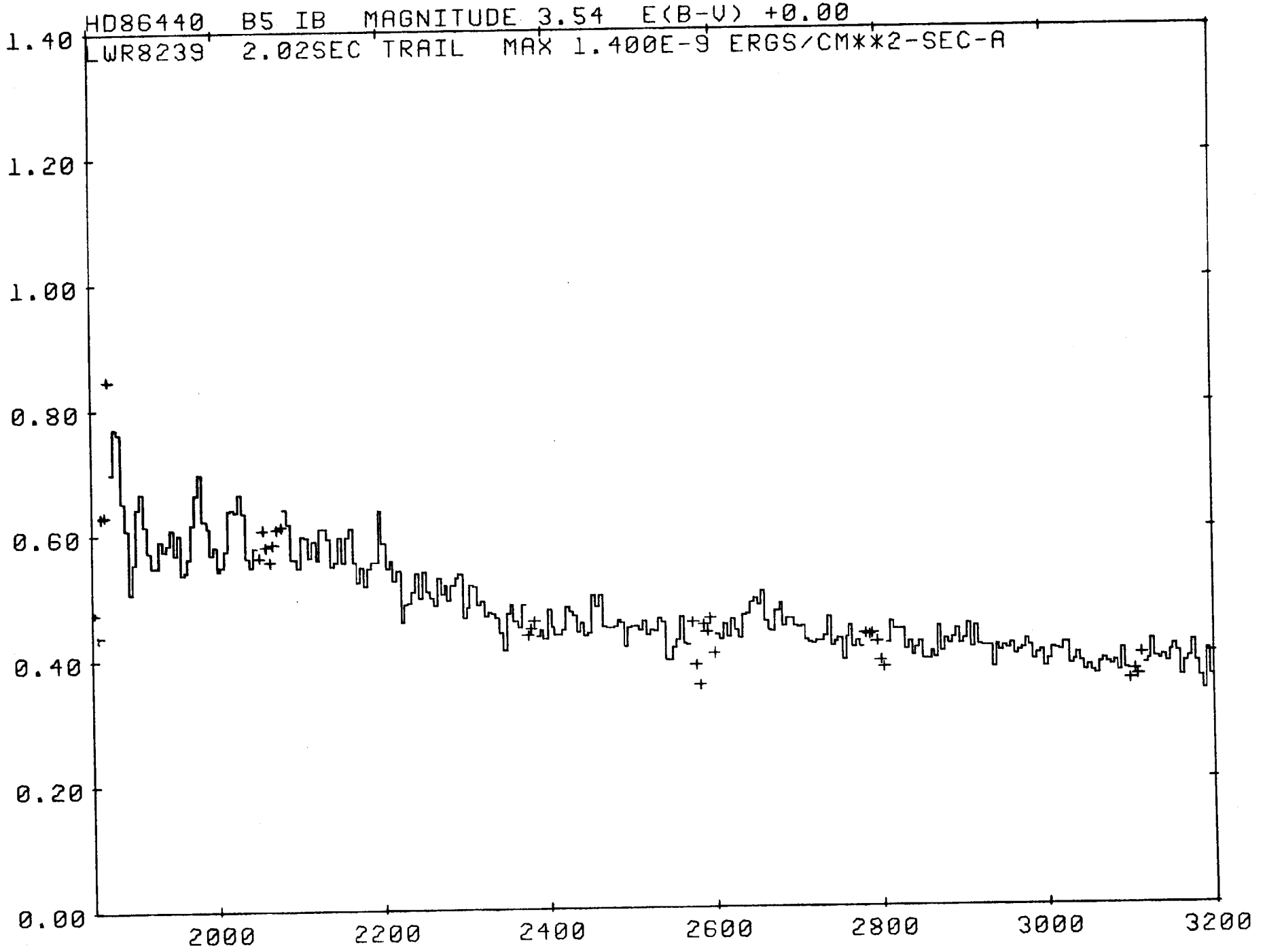

HD147394 B5 IV MAGNITUDE 3.90 E(B-V) +0.01
SWP8194 2.96SEC TRAILED MAX 2.45E-9 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

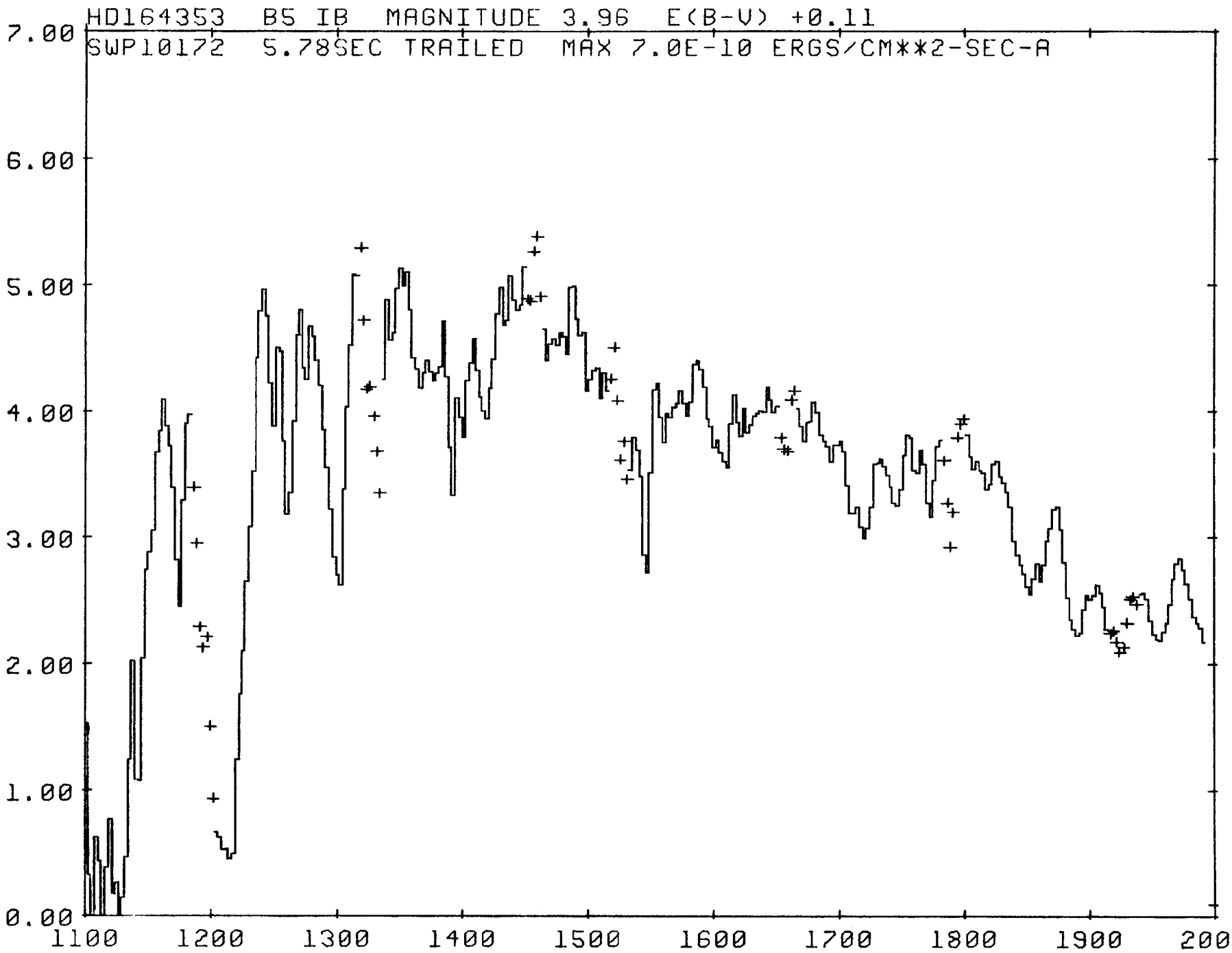

HD147394 B5 IV MAGNITUDE 3.90 E(B-V) +0.01
LWR7122 2.57SEC TRAILED MAX 1.05E-9 ERGS/CM**2-SEC-A
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2000
2200
2400
2600
2800
3000
3200

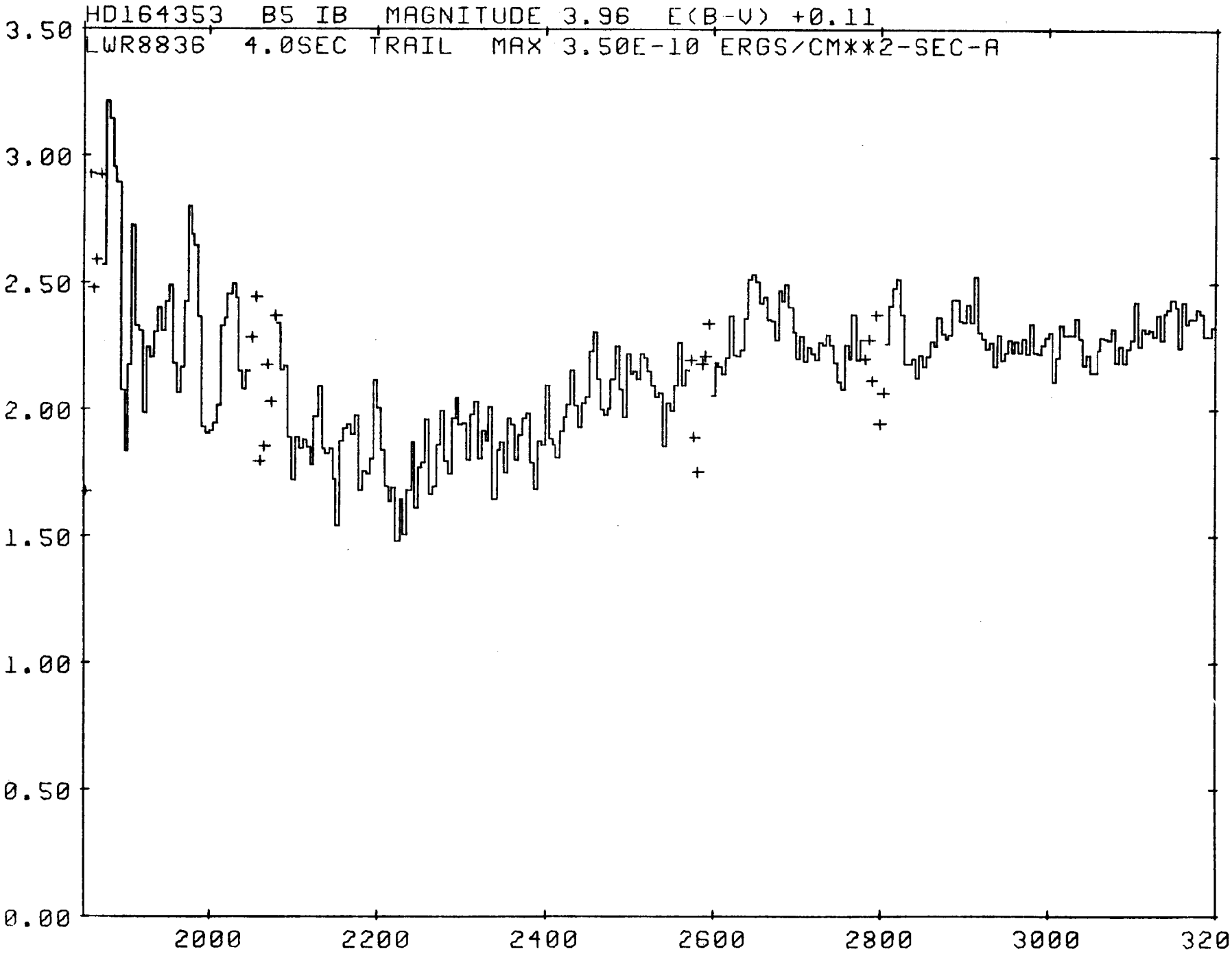

HD83183 B5 II MAGNITUDE 4.08 E(B-V) +0.14
SWP9512 10.7SEC TRAILED MAX 5.6E-10 ERGS/CM**2-SEC-A
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

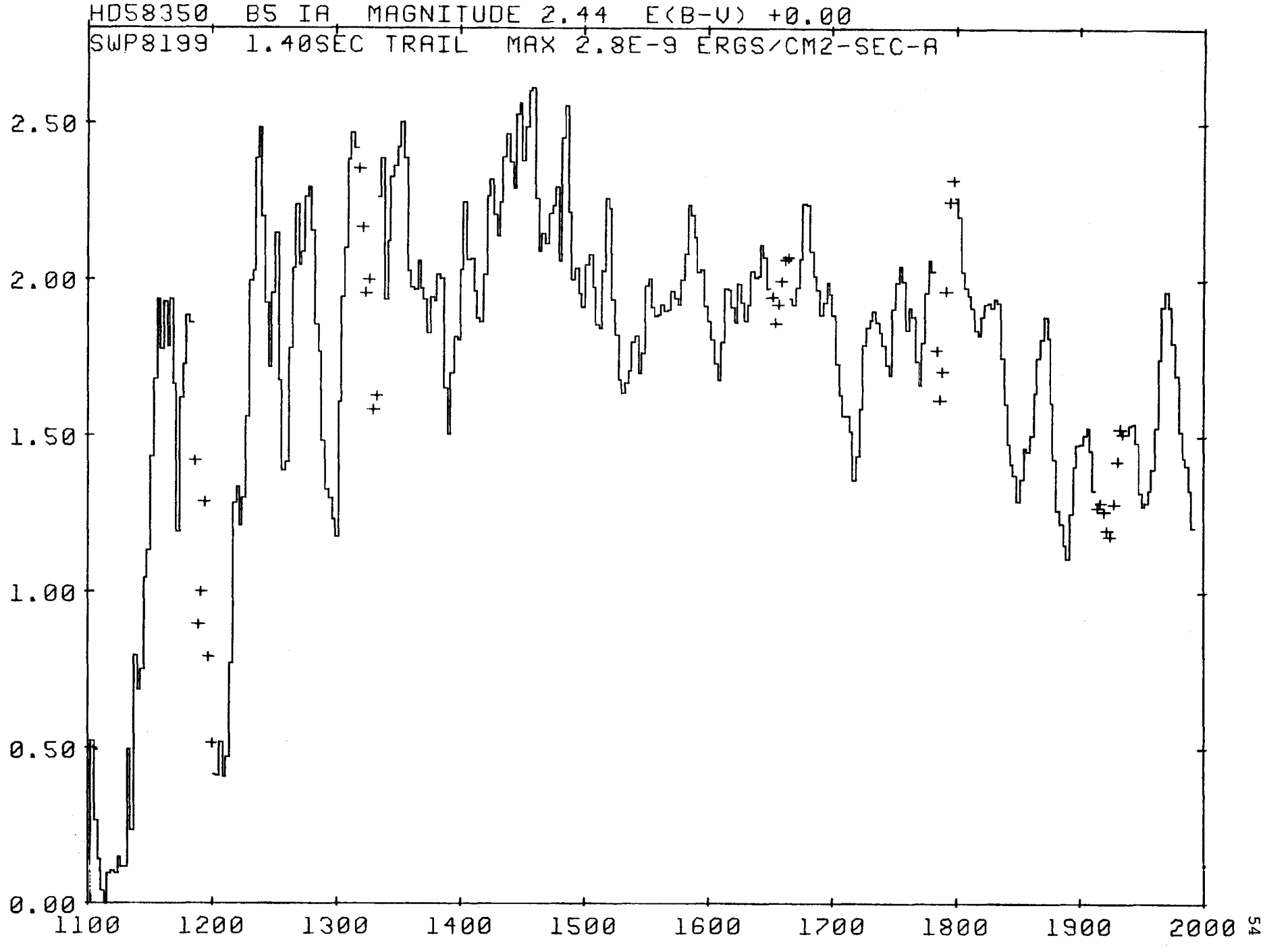

HD83183 B5 II MAGNITUDE 4.08 E(B-V) +0.14
LWR8238 4.51SEC TRAILED MAX 3.5E-10 ERG/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

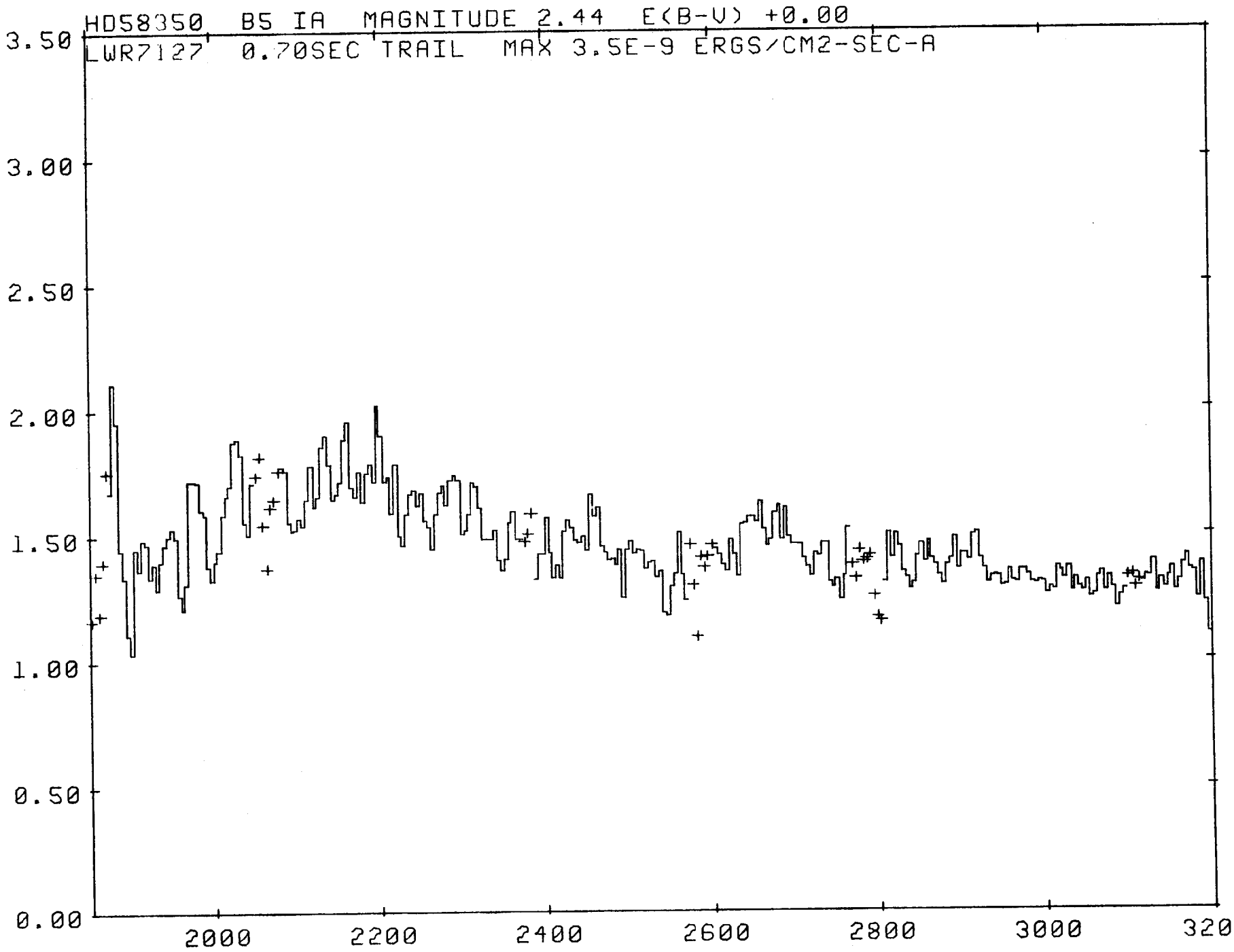

HD86440 B5 IB MAGNITUDE 3.54 E(B-V) +0.00
SWP9513 4.08SEC TRAILED MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

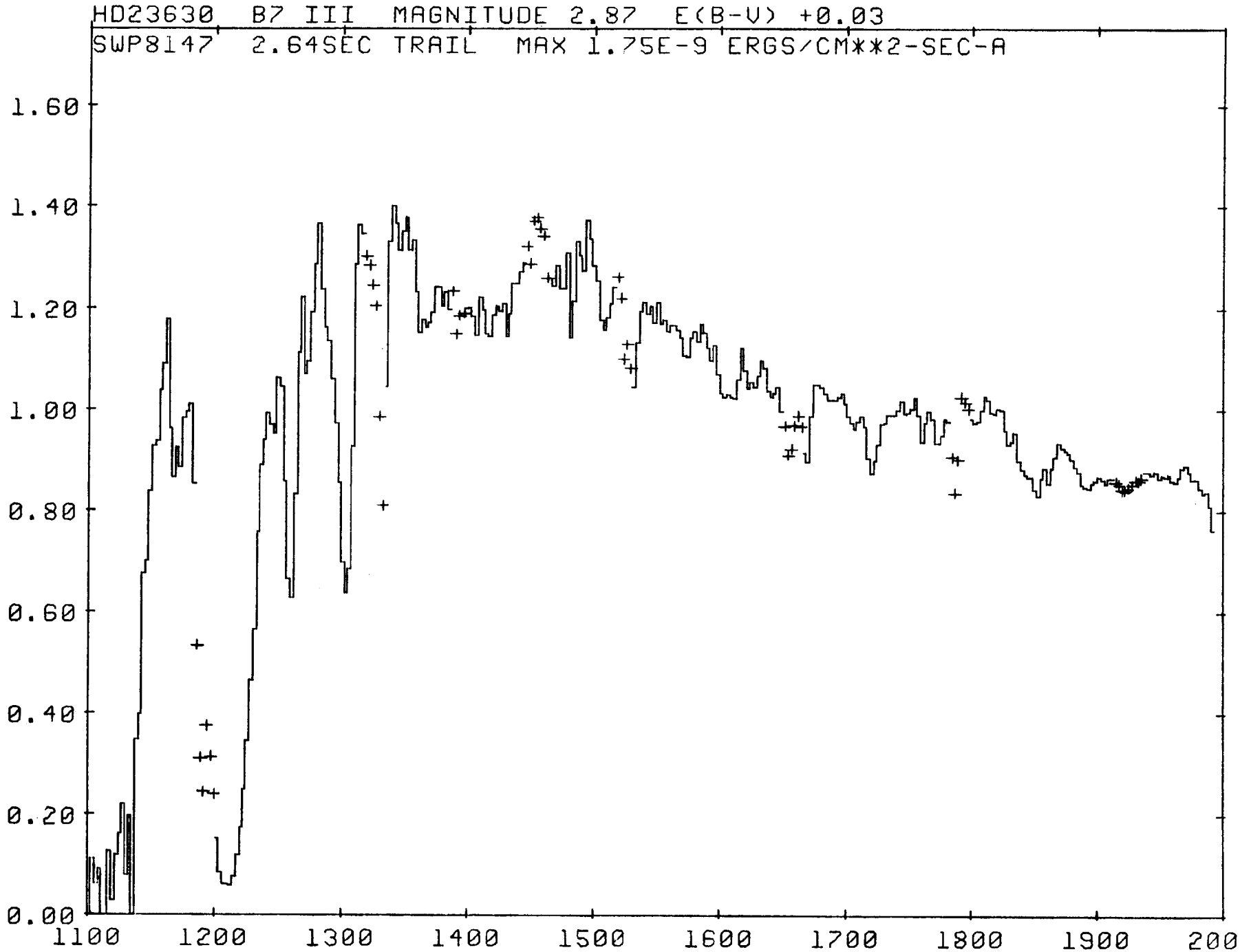

HD86440 B5 IB MAGNITUDE 3.54 E(B-V) +0.00
LWR8239 2.02SEC TRAIL MAX 1.400E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

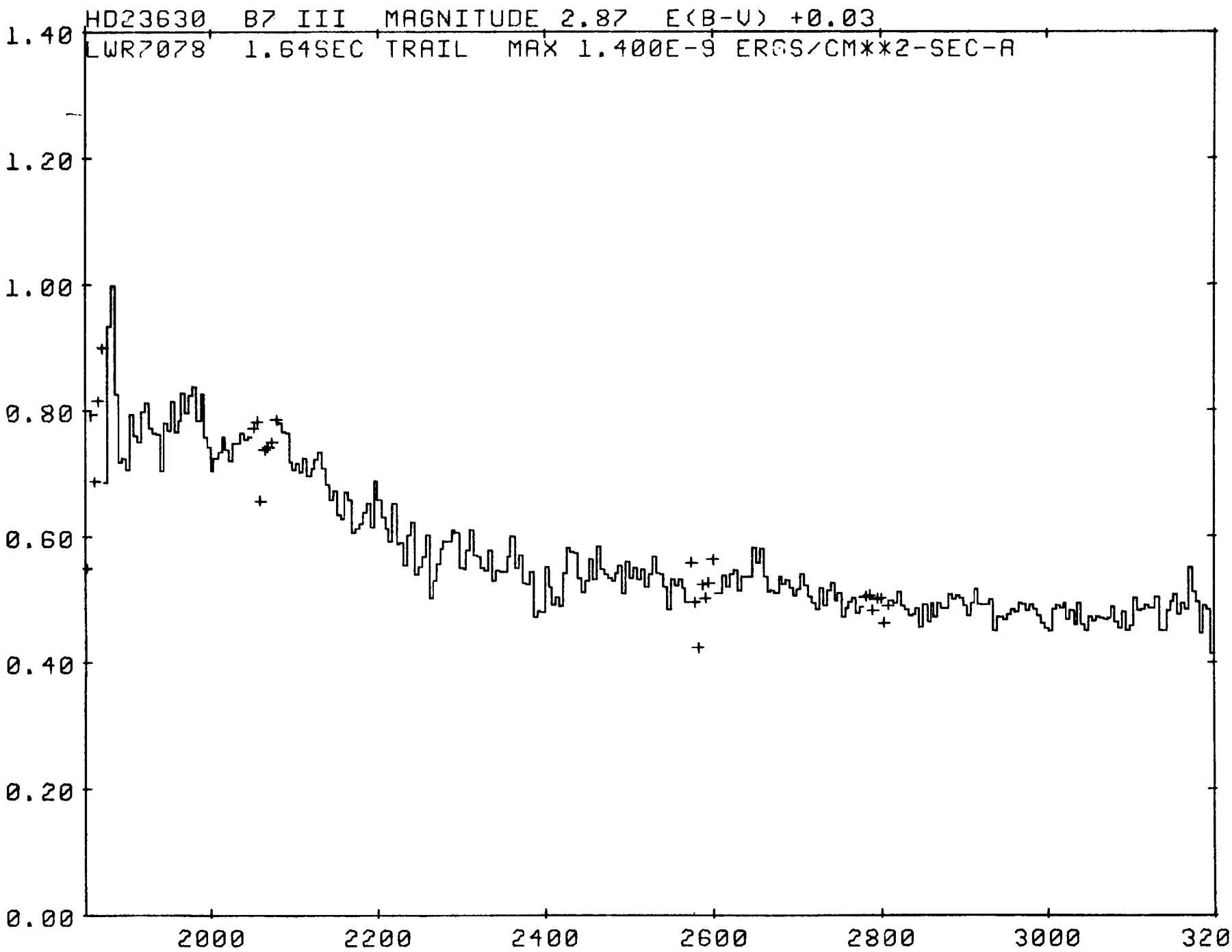

HD164353 B5 IB MAGNITUDE 3.96 E(B-V) +0.11
SWP10172 5.78SEC TRAILED MAX 7.0E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

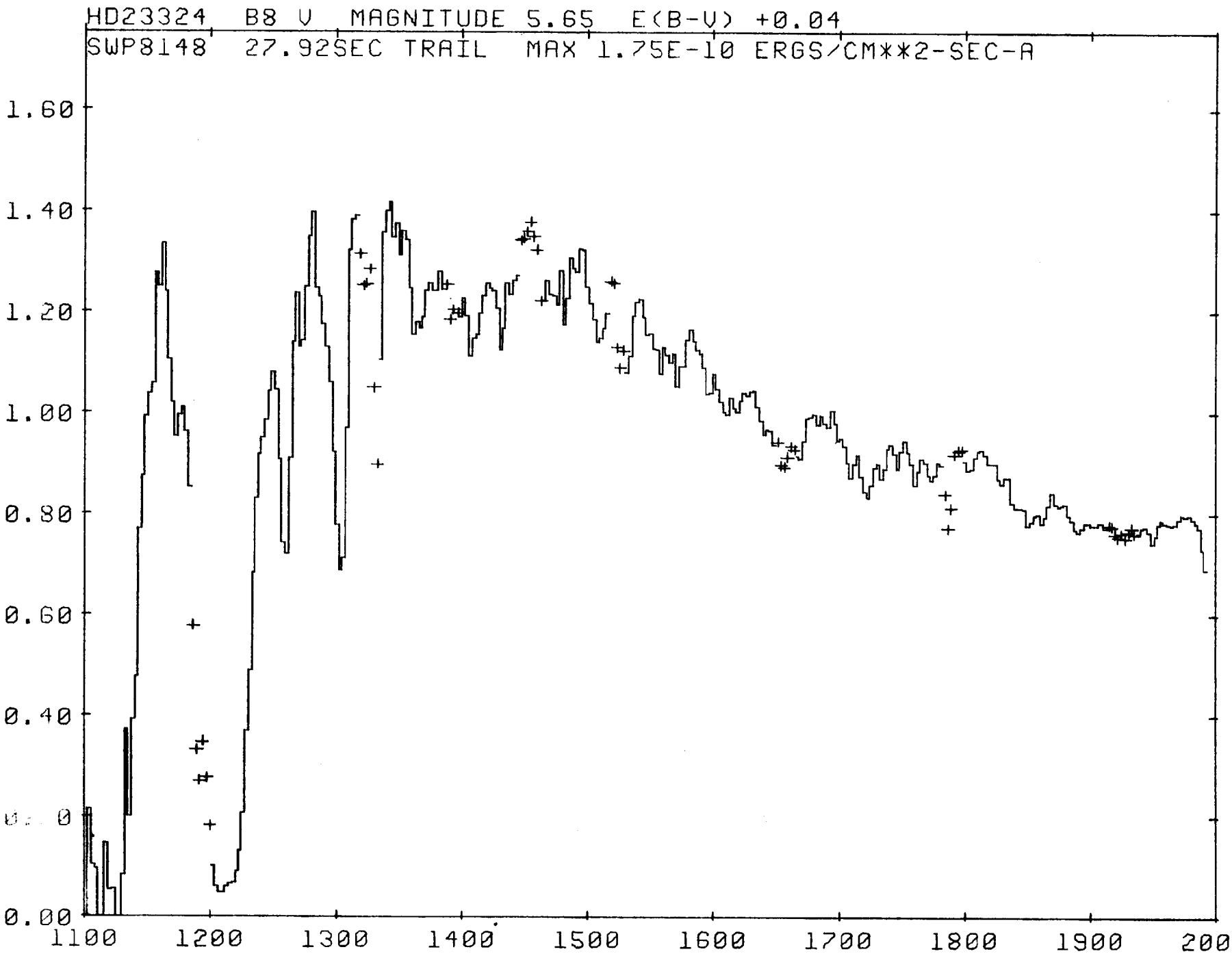

HD164353 B5 IB MAGNITUDE 3.96 E(B-V) +0.11
LWR8836 4.0SEC TRAIL MAX 3.50E-10 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

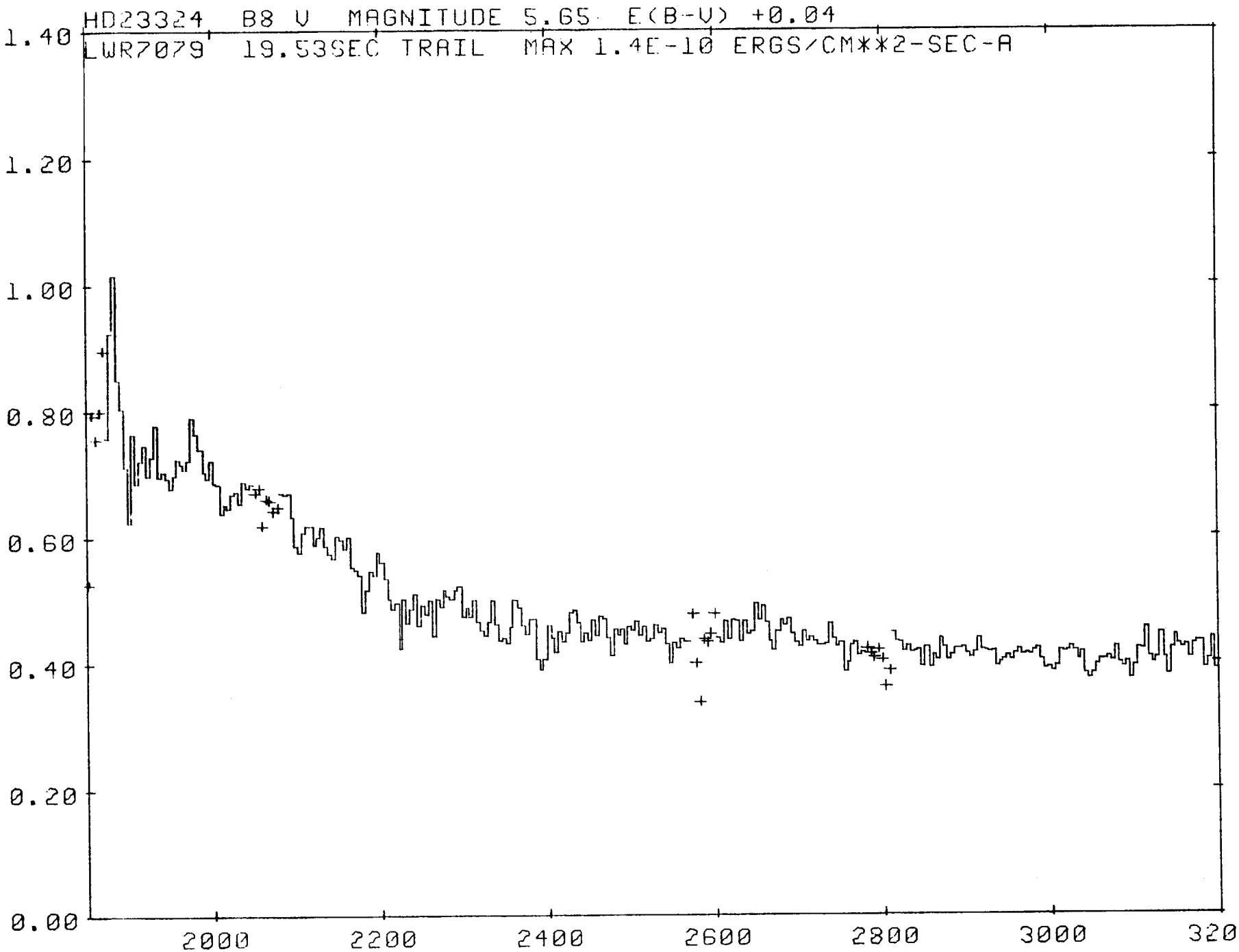

HD58350 B5 IA MAGNITUDE 2.44 E(B-V) +0.00
SWP8199 1.40SEC TRAIL MAX 2.8E-9 ERGS/CM2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

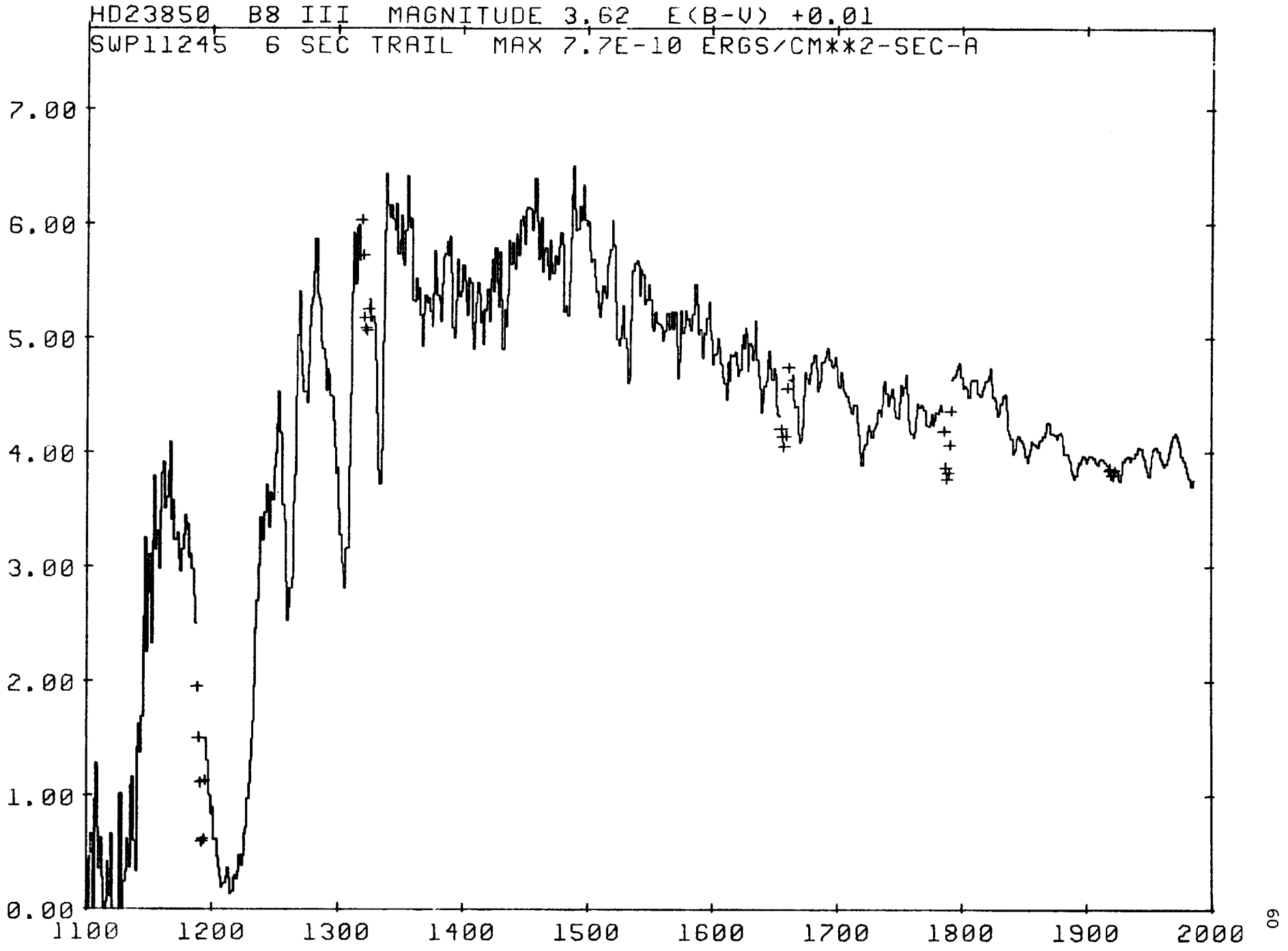

HD58350 B5 IA MAGNITUDE 2.44 E(B-V) +0.00
LWR7127 0.70SEC TRAIL MAX 3.5E-9 ERGS/CM2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

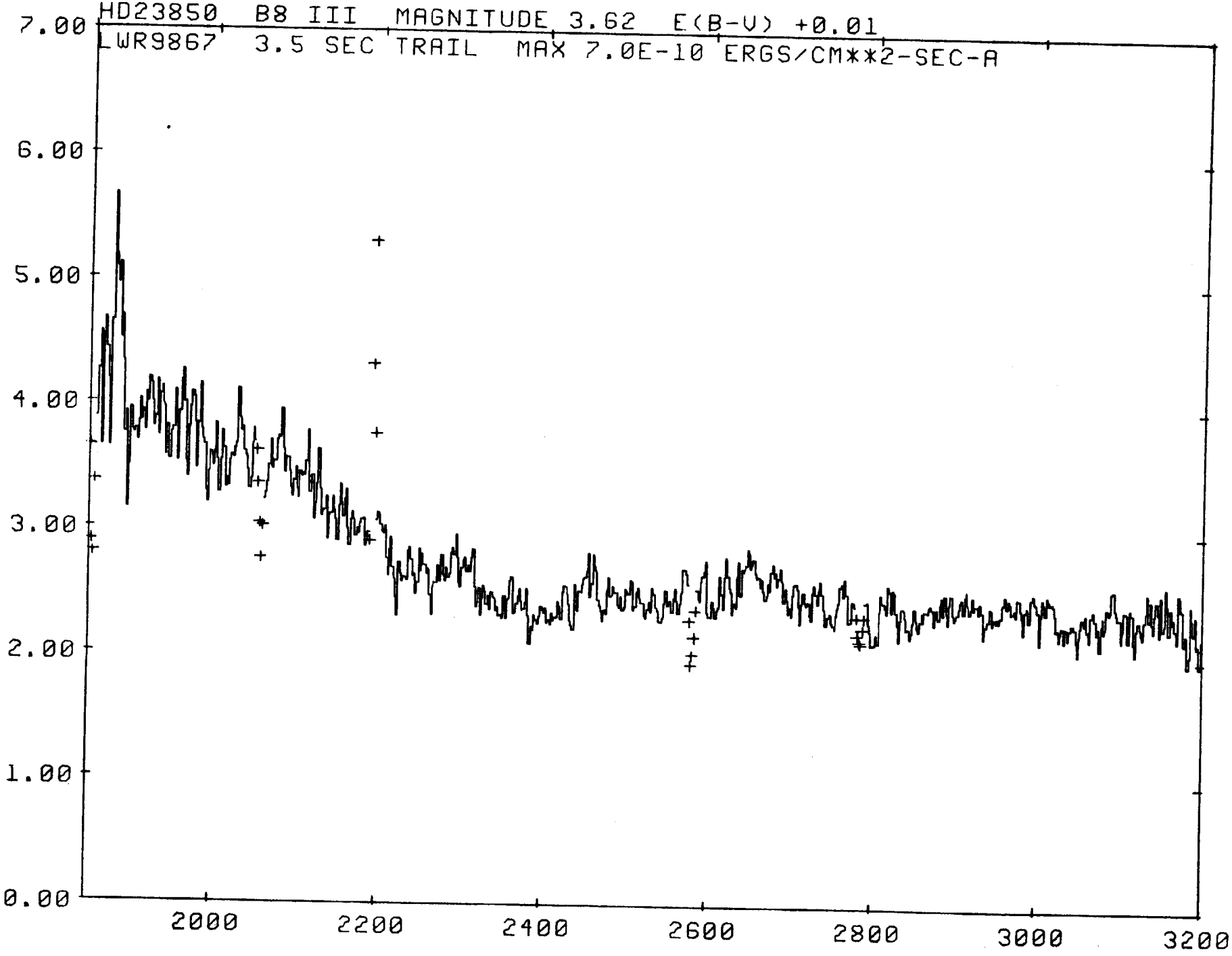

HD23630 B7 III MAGNITUDE 2.87 E(B-V) +0.03
SWP8147 2.64SEC TRAIL MAX 1.75E-9 ERGS/CM**2-SEC-A
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

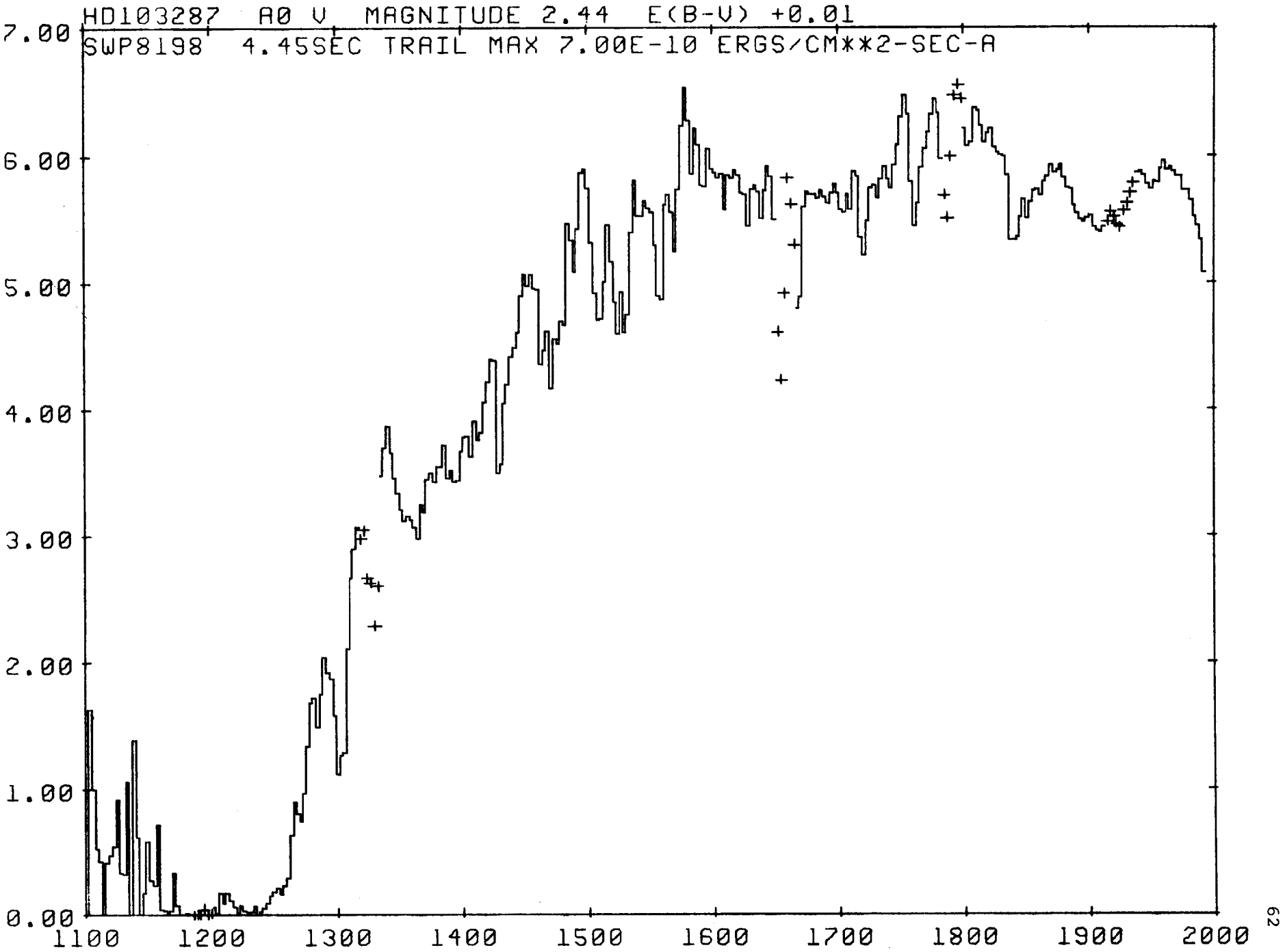

HD23630 B7 III MAGNITUDE 2.87 E(B-V) +0.03
LWR7078 1.64SEC TRAIL MAX 1.400E-9 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

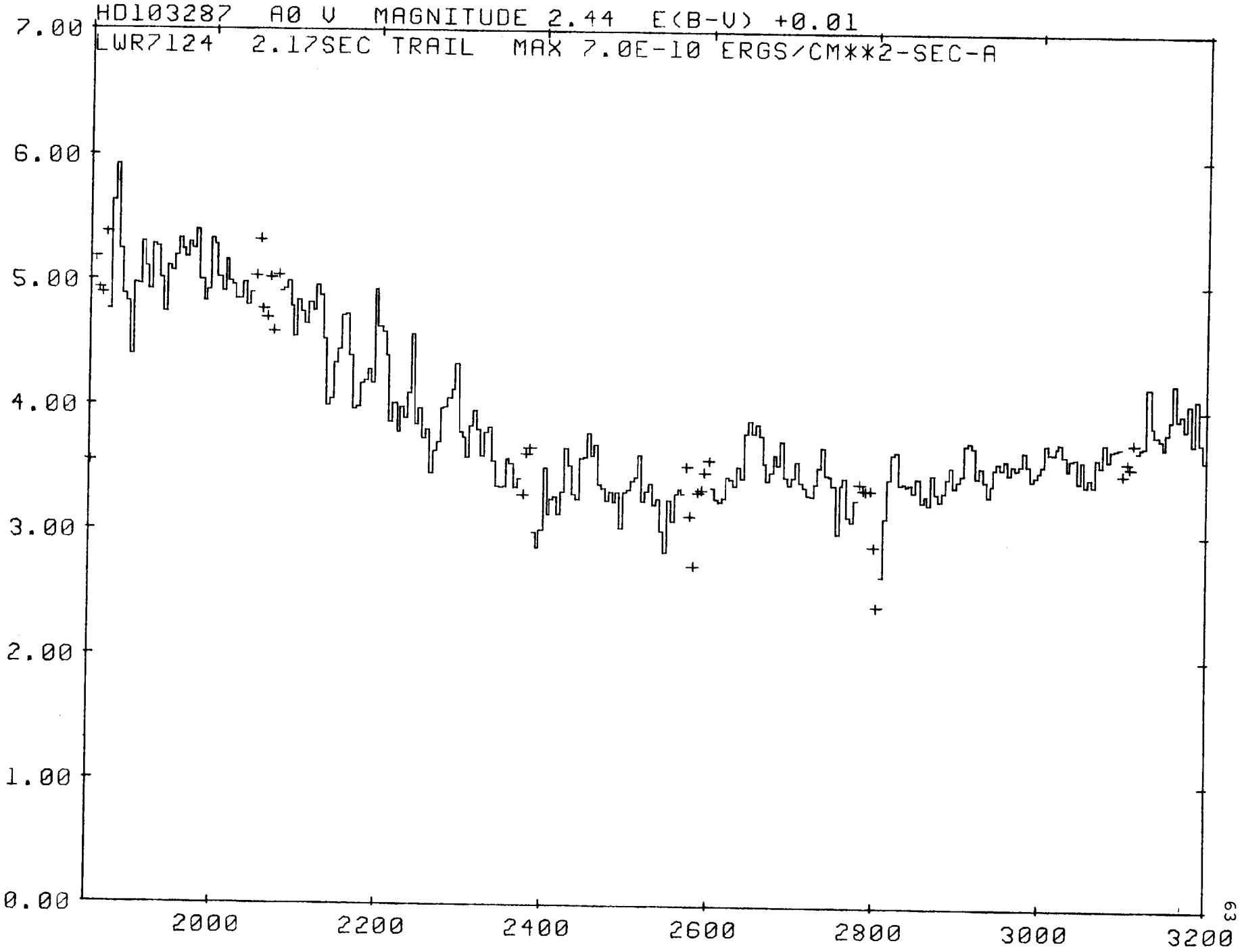

HD23324 B8 V MAGNITUDE 5.65 E(B-V) +0.04
SWP8148 27.92SEC TRAIL MAX 1.75E-10 ERGS/CM**2-SEC-A
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

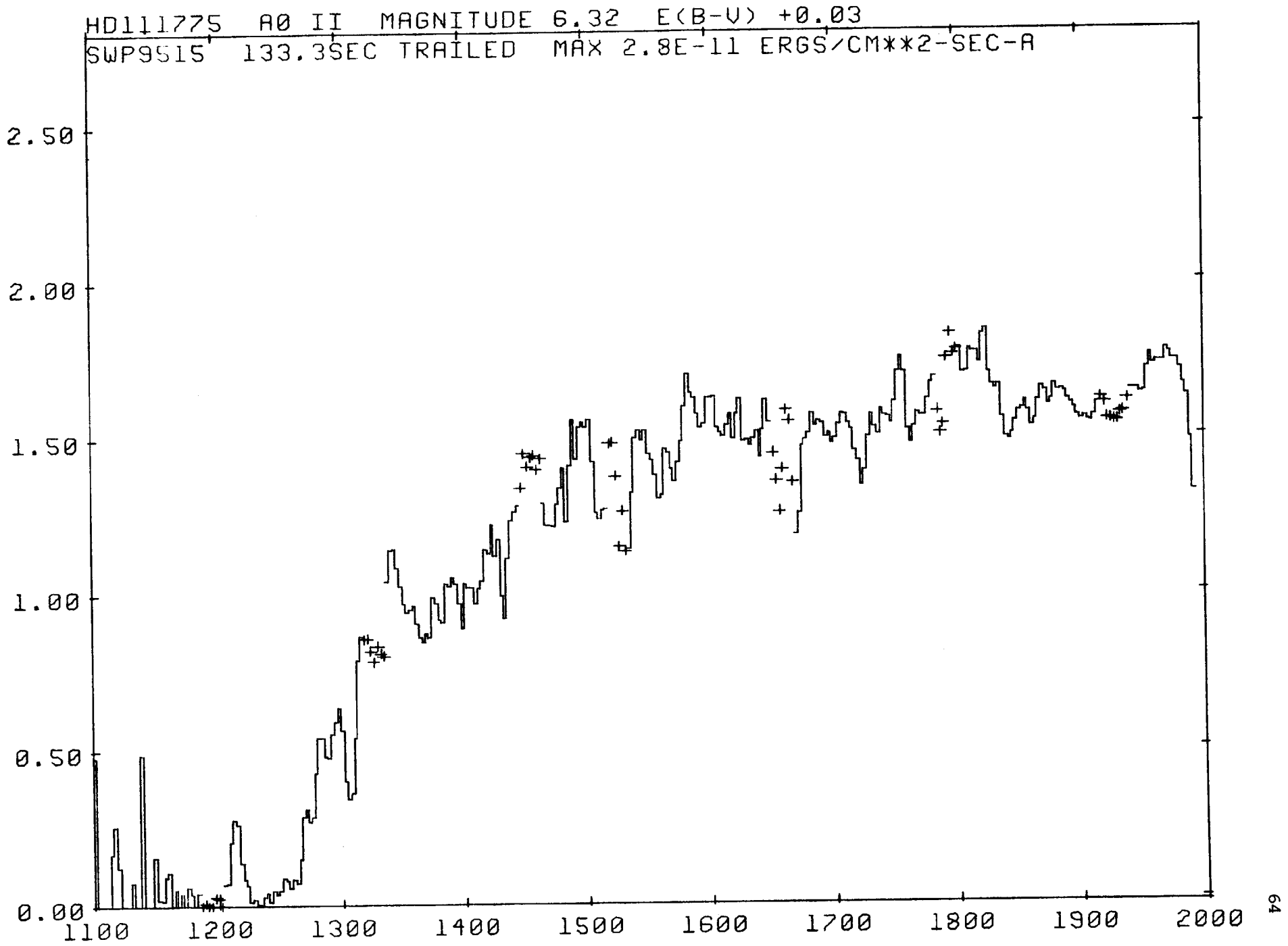

HD23324 B8 V MAGNITUDE 5.65 E(B-V) +0.04
LWR7079 19.53SEC TRAIL MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

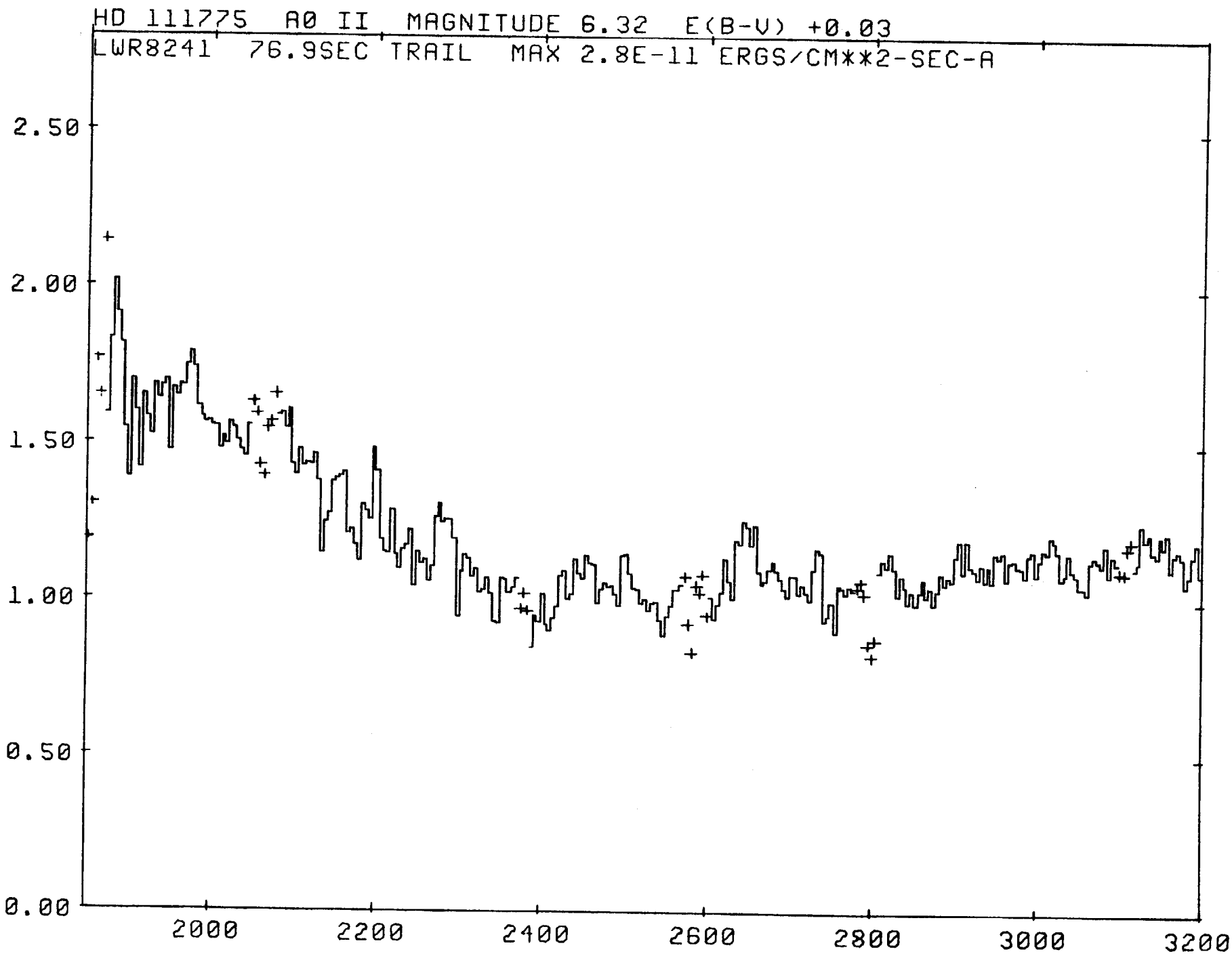

HD23850 B8 III MAGNITUDE 3.62 E(B-V) +0.01
SWP11245 6 SEC TRAIL MAX 7.7E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

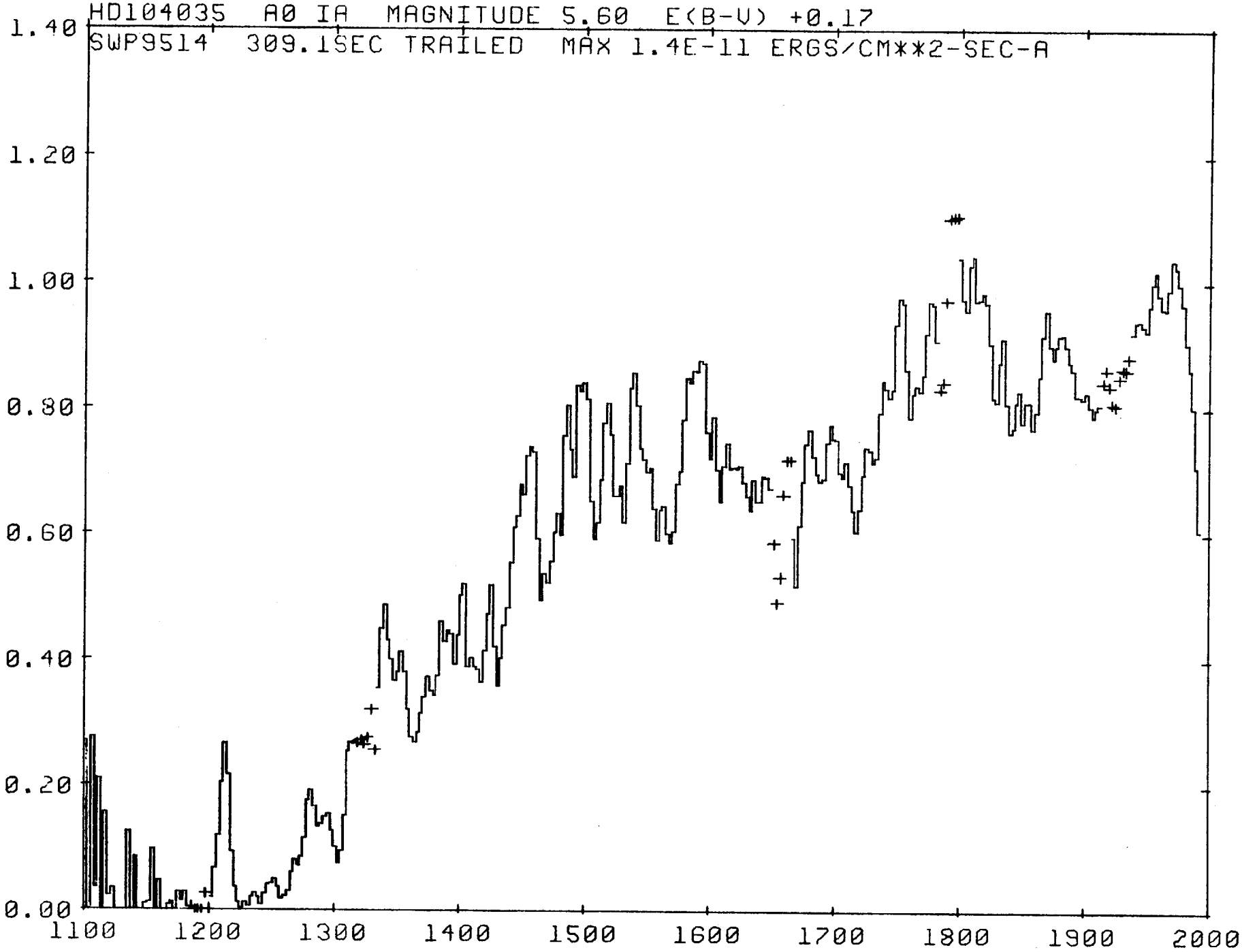

HD23850 B8 III MAGNITUDE 3.62 E(B-V) +0.01
LWR9867 3.5 SEC TRAIL MAX 7.0E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

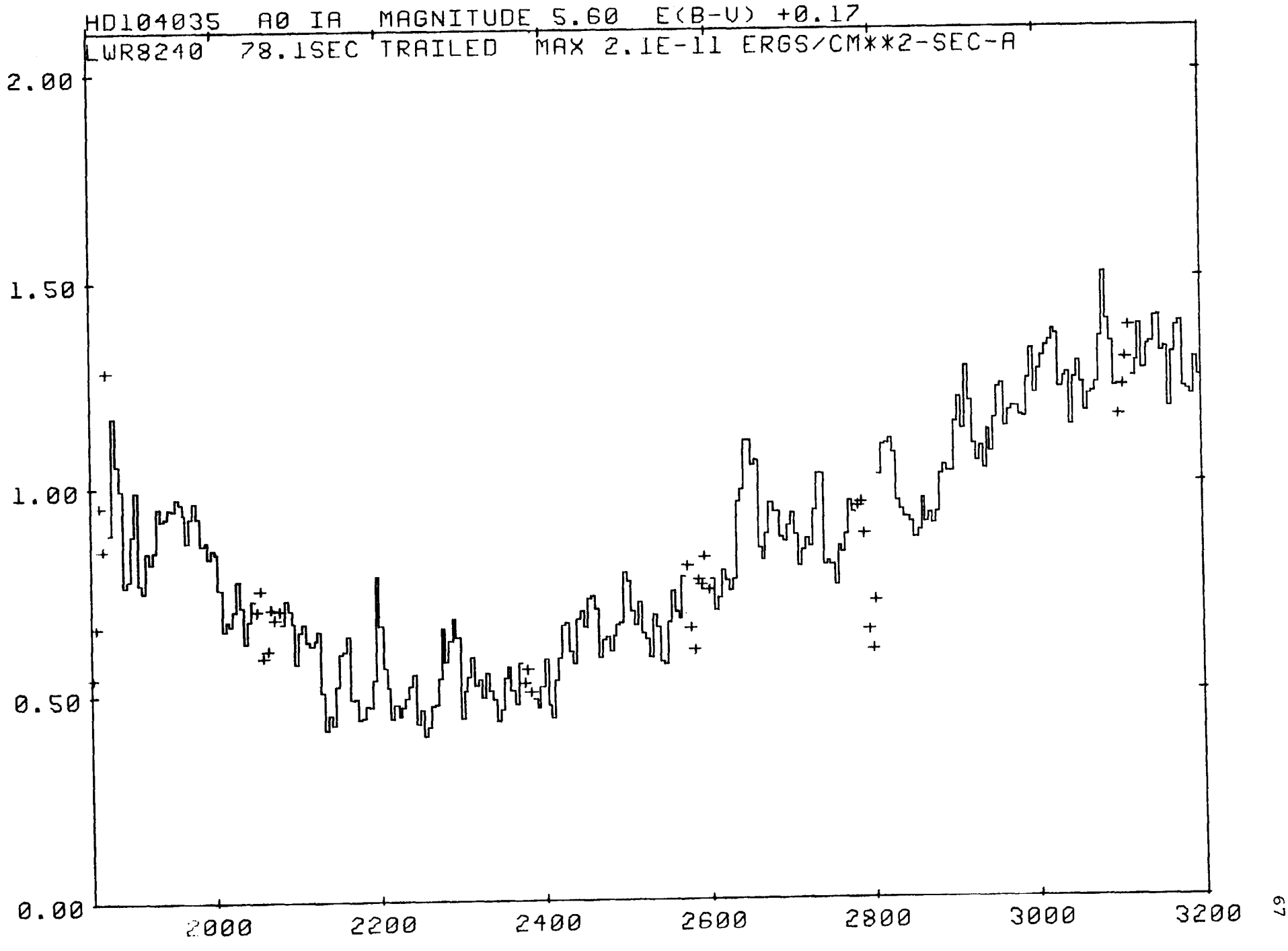

HD103287 A0 V MAGNITUDE 2.44 E(B-V) +0.01
SWP8198 4.45SEC TRAIL MAX 7.00E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

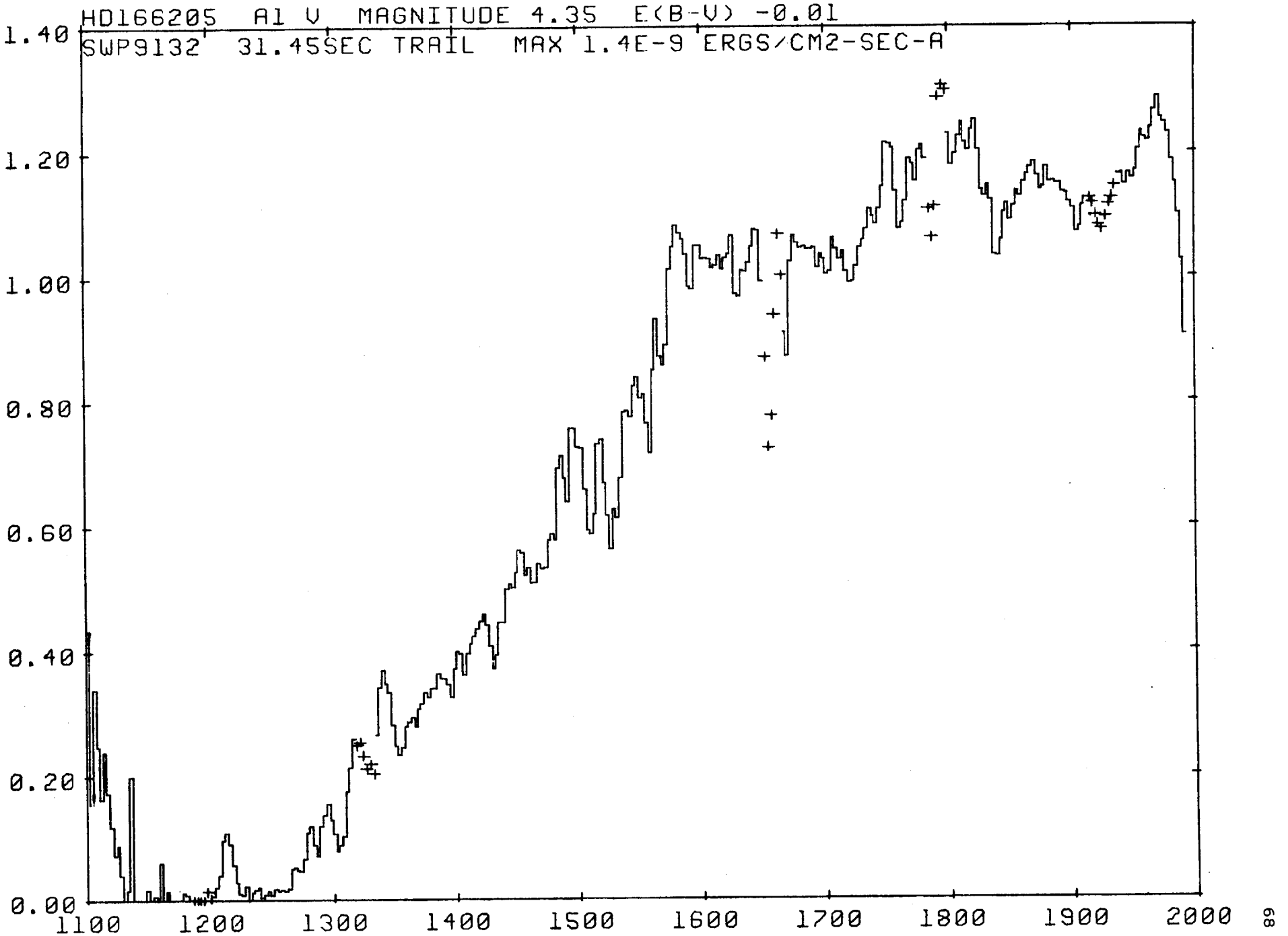

HD103287 A0 V MAGNITUDE 2.44 E(B-V) +0.01
LWR7124 2.17SEC TRAIL MAX 7.0E-10 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

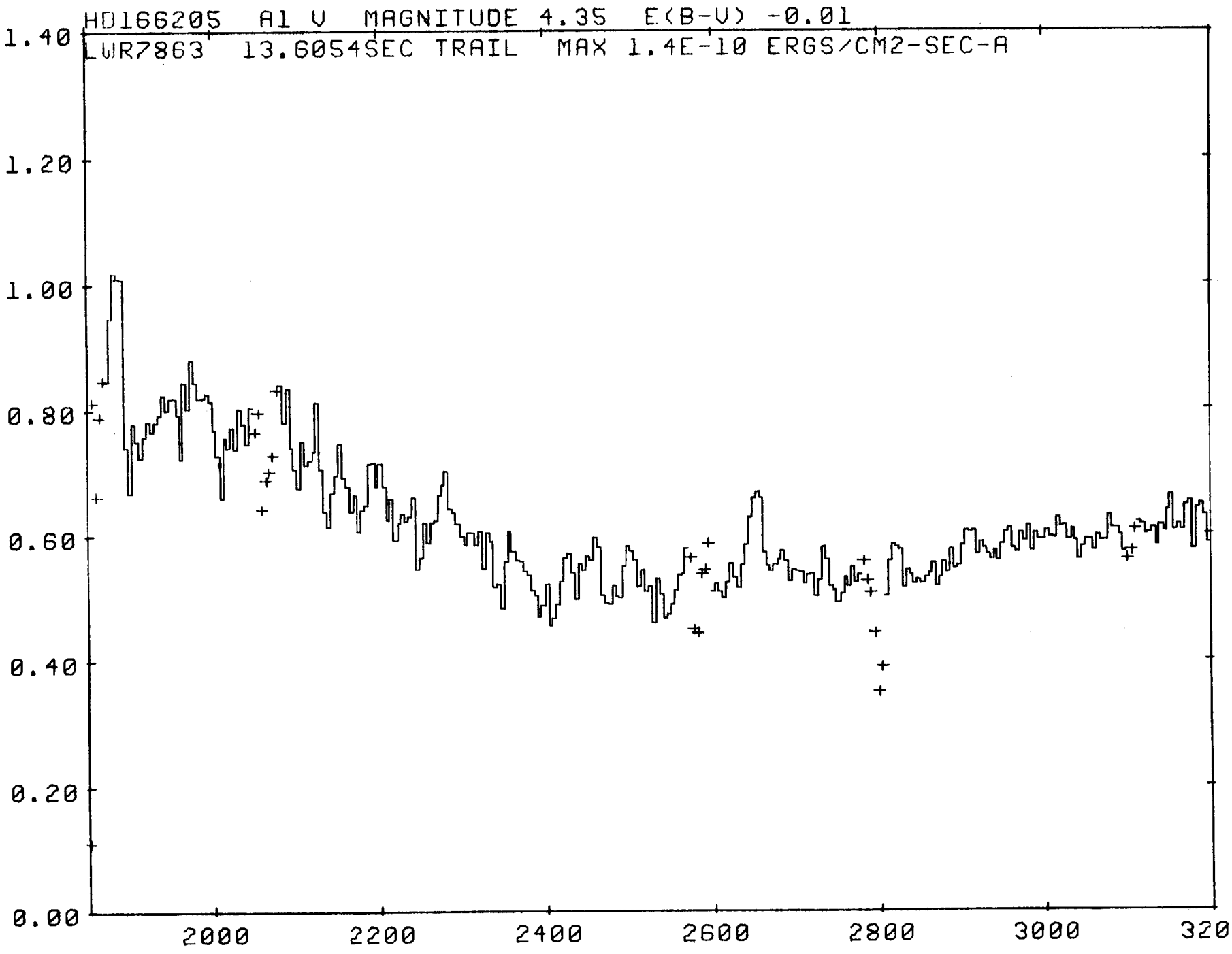

HD111775 A0 II MAGNITUDE 6.32 E(B-V) +0.03
SWP9515 133.3SEC TRAILED MAX 2.8E-11 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

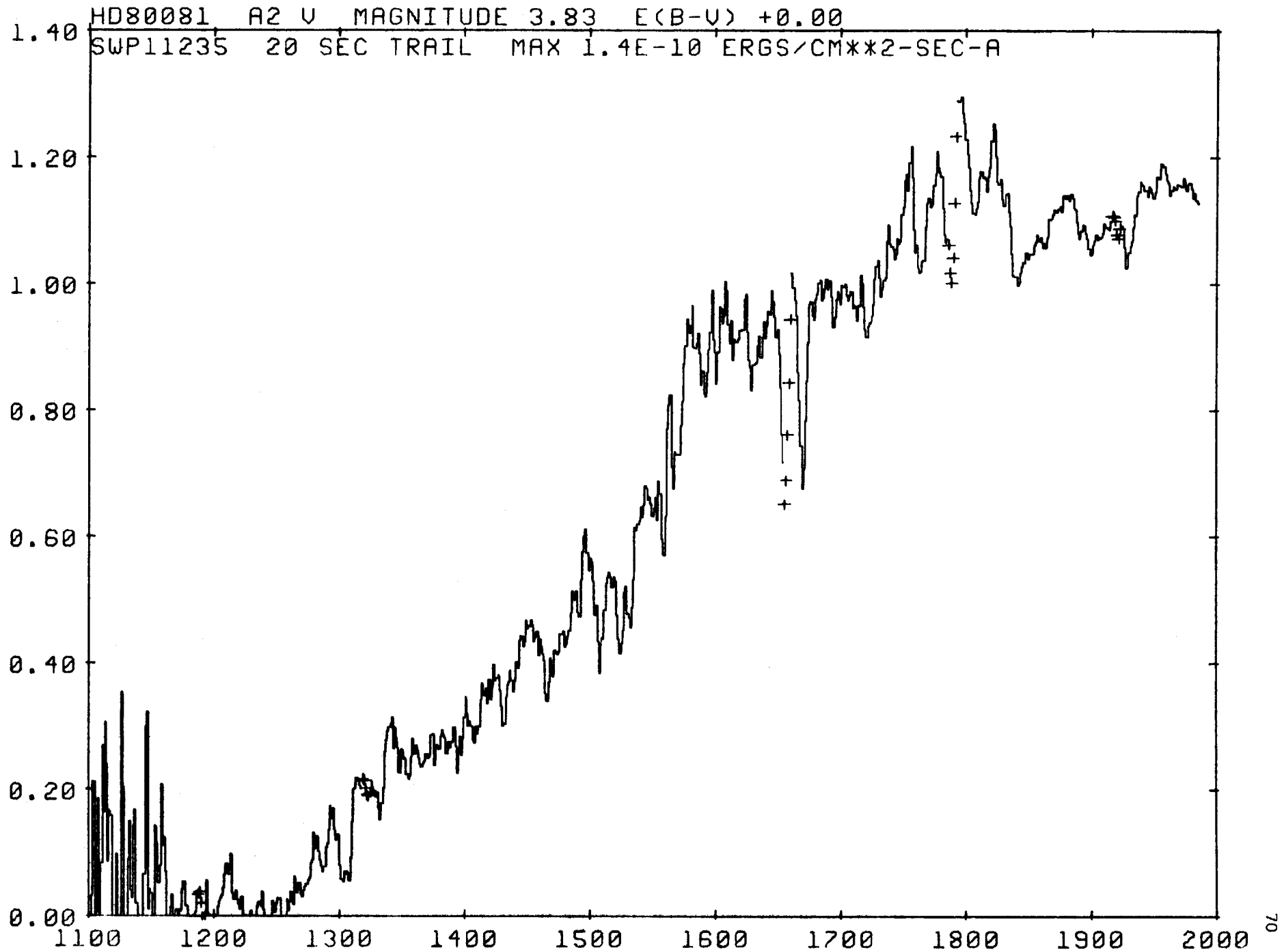

HD 111775 A0 II MAGNITUDE 6.32 E(B-V) +0.03
LWR8241 76.9SEC TRAIL MAX 2.8E-11 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

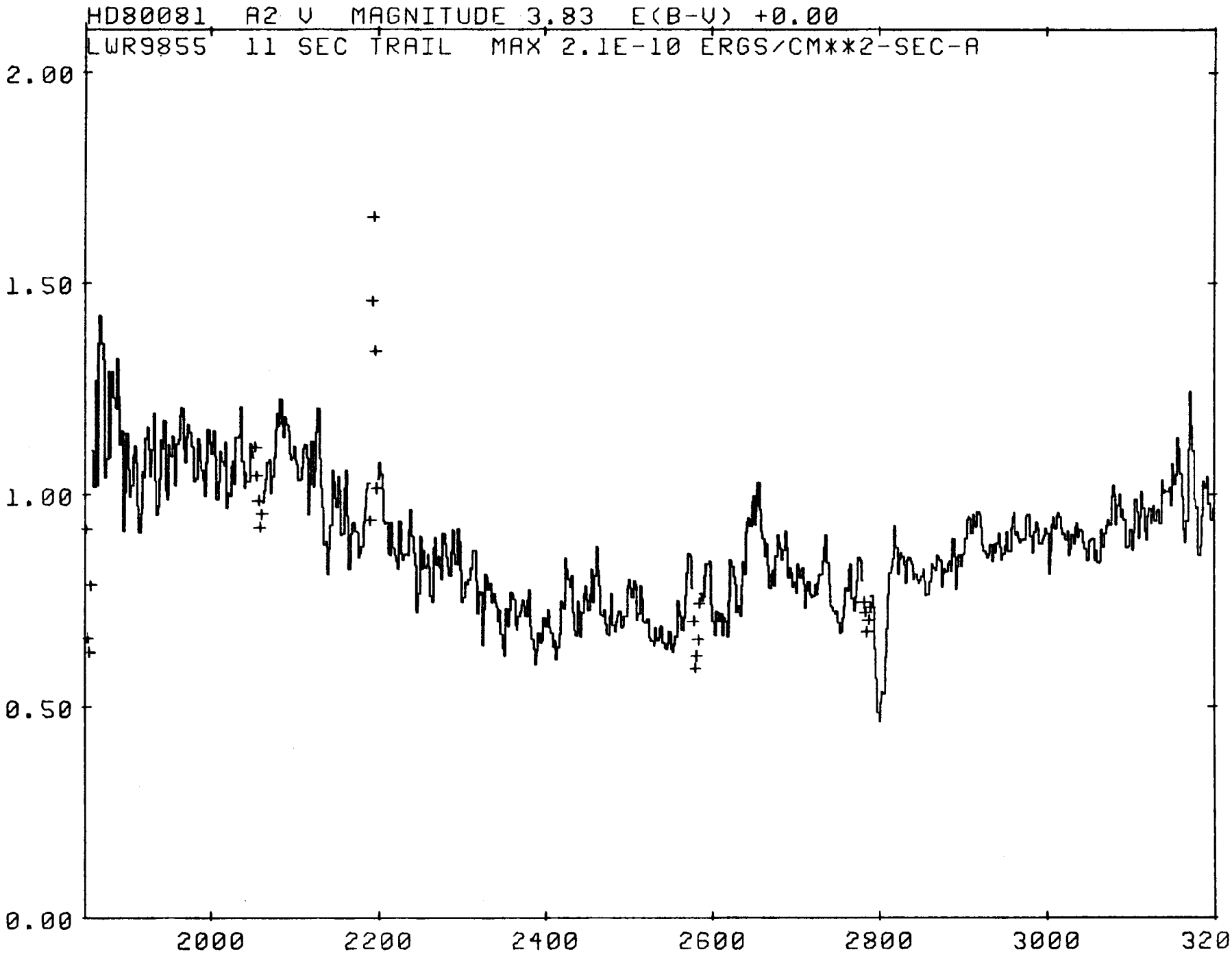

HD104035 A0 IA MAGNITUDE 5.60 E(B-V) +0.17
SWP9514 309.1SEC TRAILED MAX 1.4E-11 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

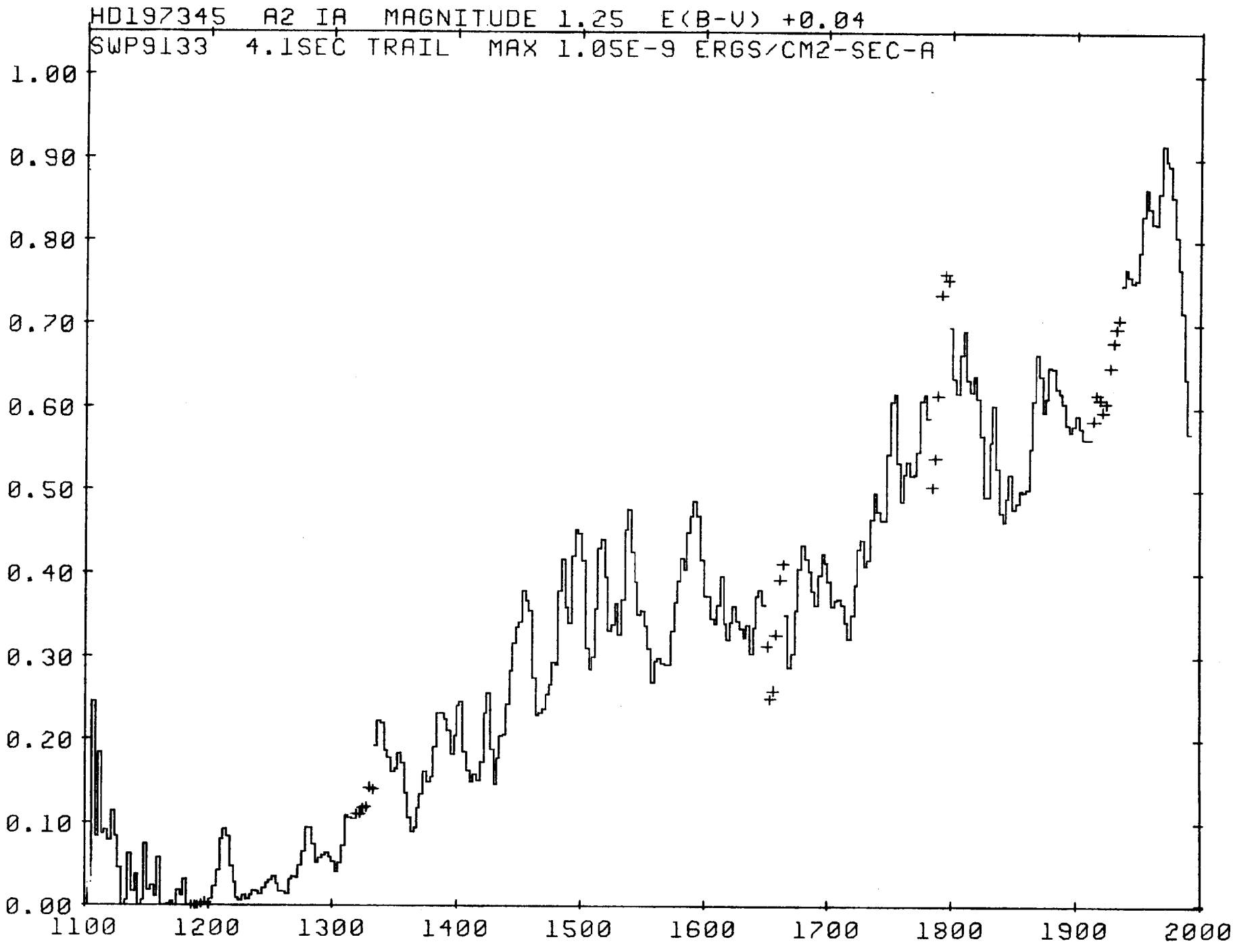

HD104035 A0 IA MAGNITUDE 5.60 E(B-V) +0.17
LWR8240 78.1SEC TRAILED MAX 2.1E-11 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

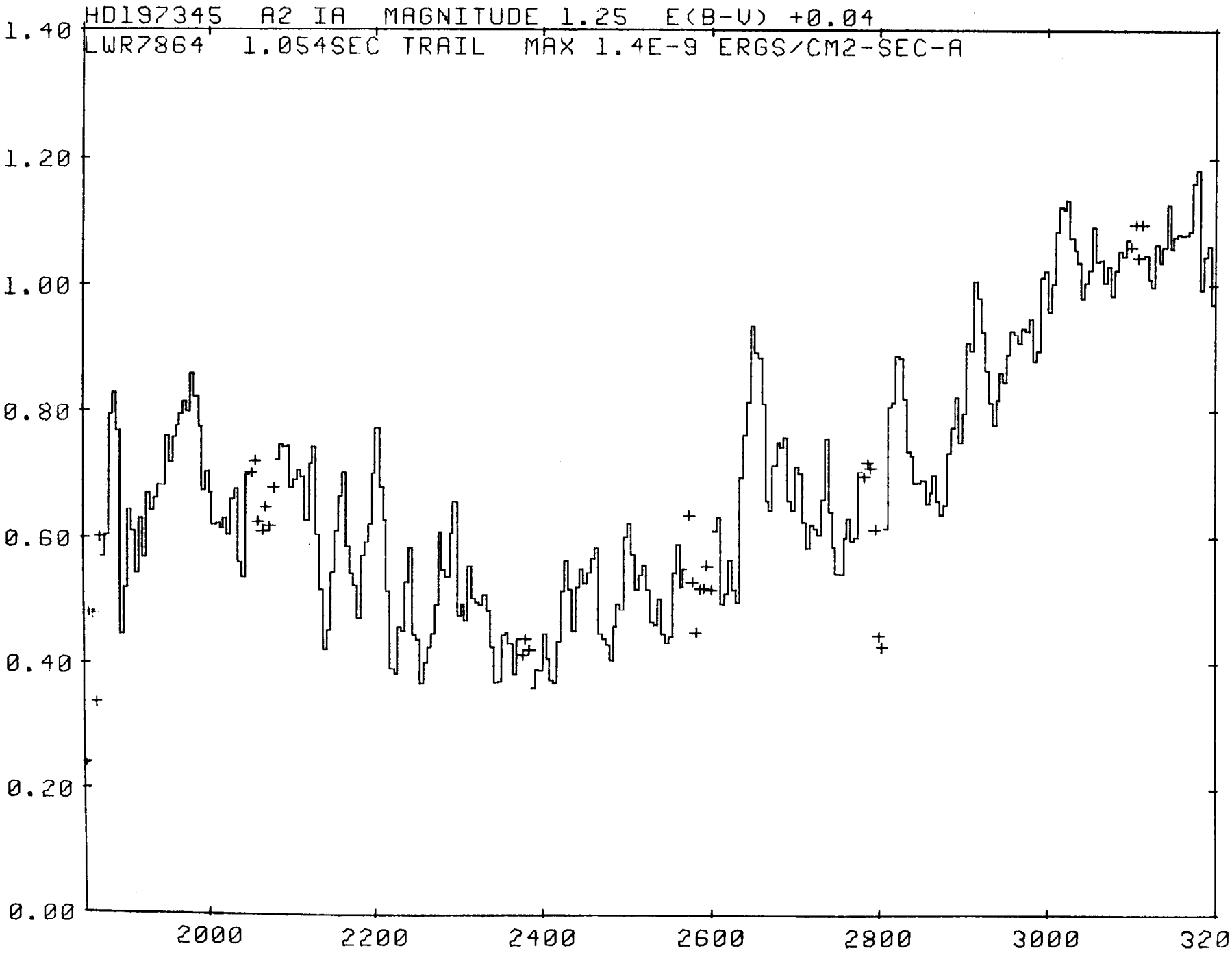

HD166205 A1 V MAGNITUDE 4.35 E(B-V) -0.01
SWP9132 31.45SEC TRAIL MAX 1.4E-9 ERGS/CM2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

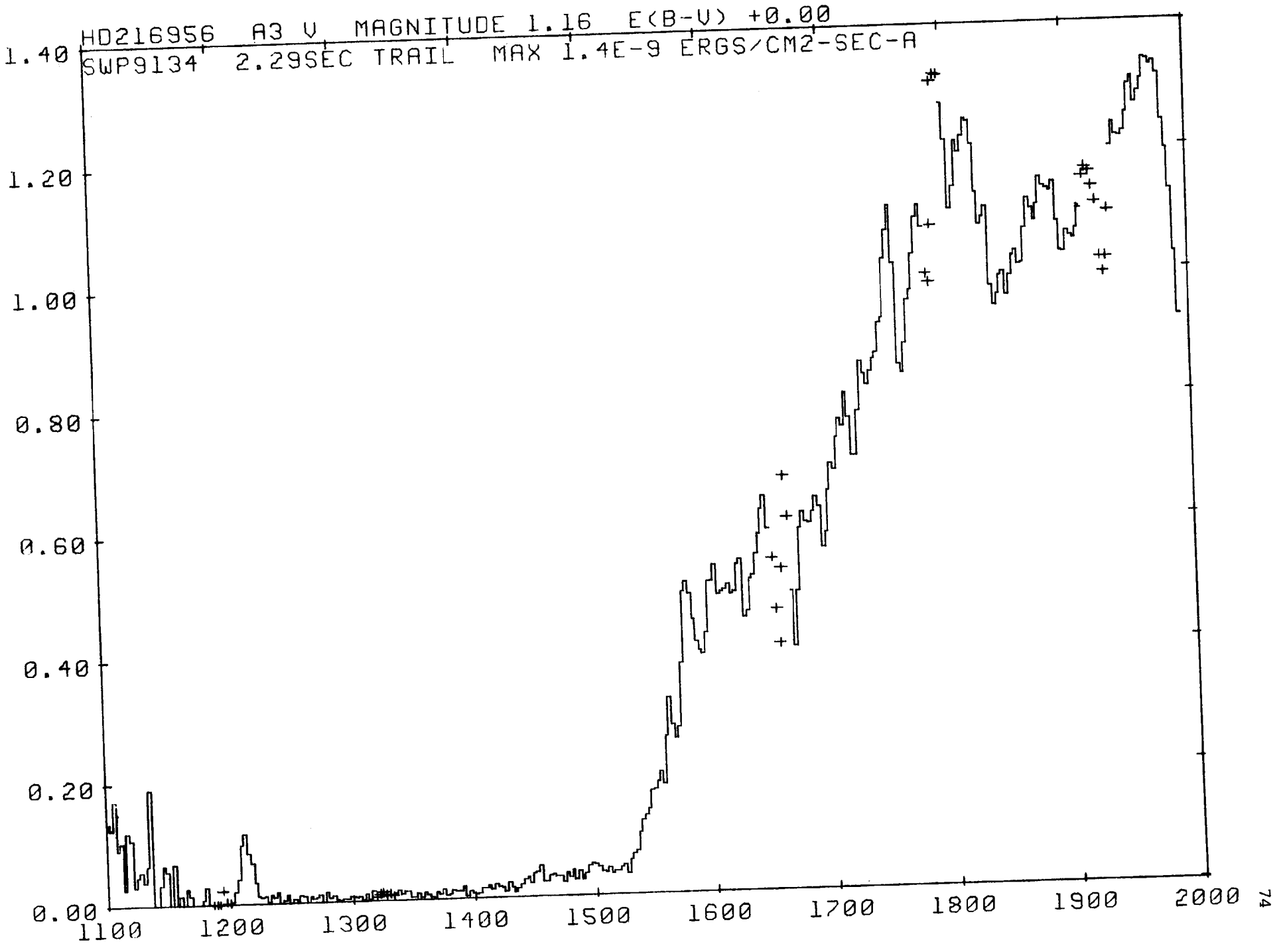

HD166205 A1 V MAGNITUDE 4.35 E(B-V) -0.01
LWR7863 13.6054SEC TRAIL MAX 1.4E-10 ERGS/CM2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

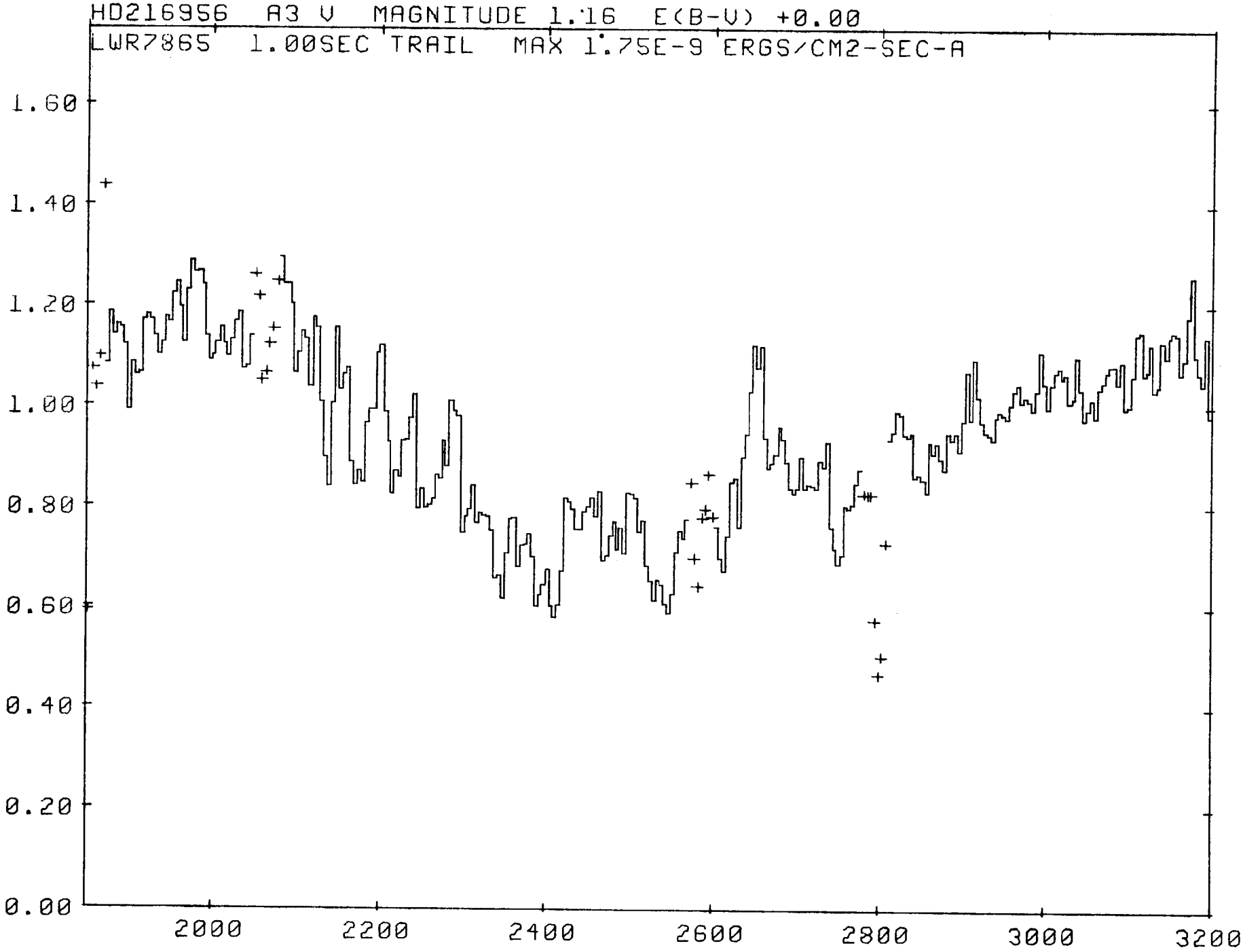

HD80081 A2 V MAGNITUDE 3.83 E(B-V) +0.00
SWP11235 20 SEC TRAIL MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000


HD80081 A2 V MAGNITUDE 3.83 E(B-V) +0.00
LWR9855 11 SEC TRAIL MAX 2.1E-10 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

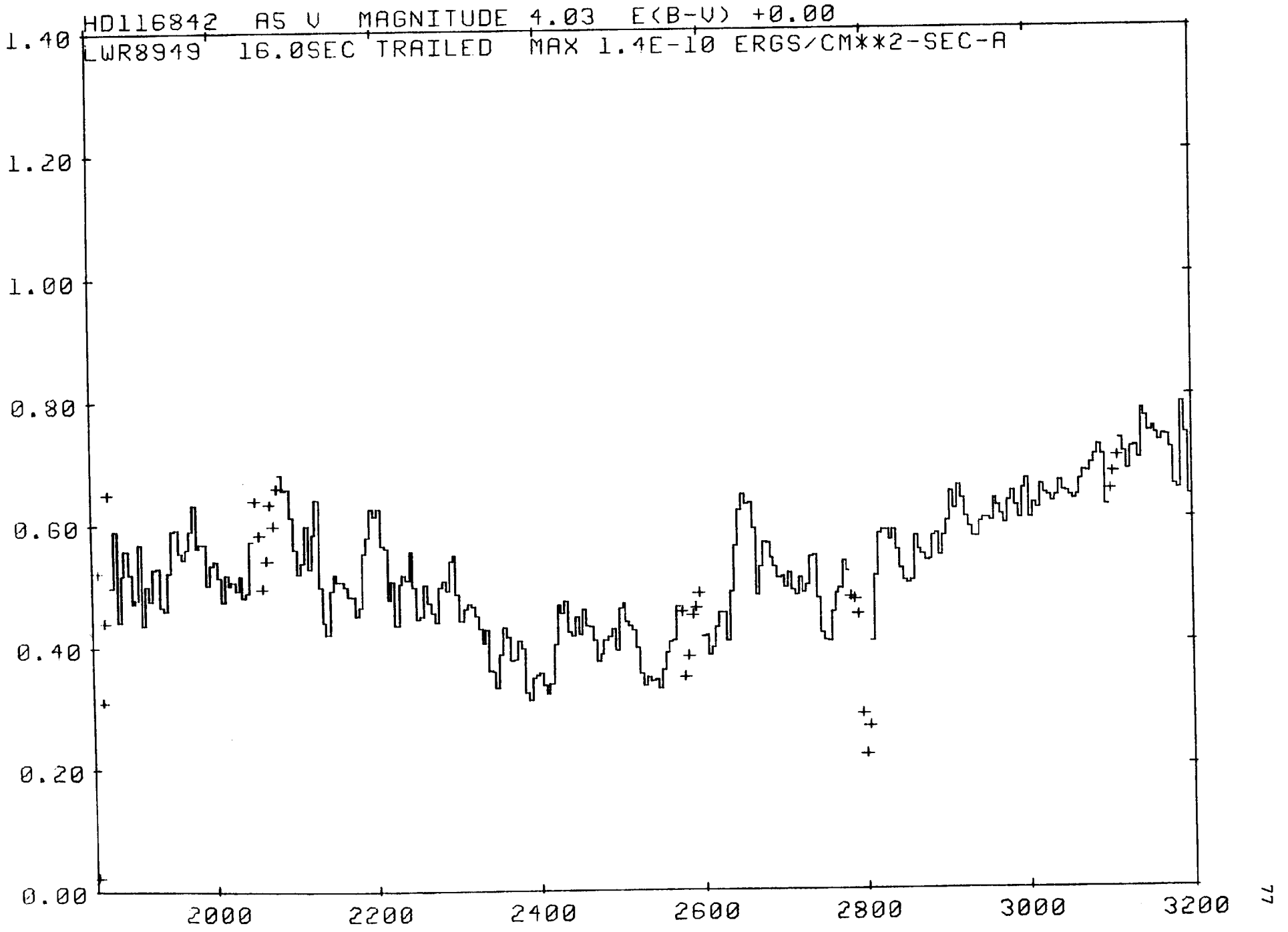

HD197345 A2 IA MAGNITUDE 1.25 E(B-V) +0.04
SWP9133 4.1SEC TRAIL MAX 1.05E-9 ERGS/CM2-SEC-A
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

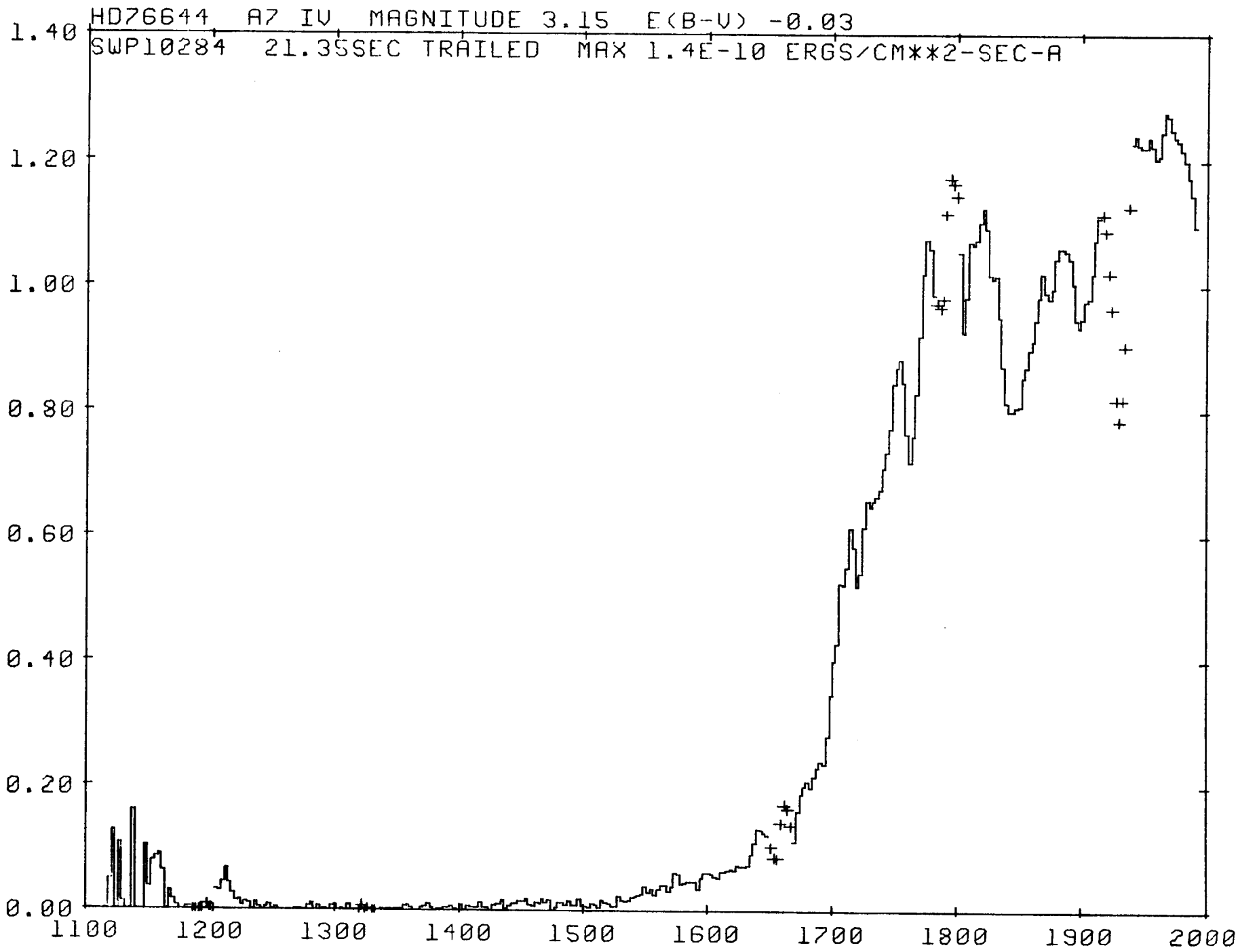

HD197345 A2 IA MAGNITUDE 1.25 E(B-V) +0.04
LWR7864 1.054SEC TRAIL MAX 1.4E-9 ERGS/CM2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

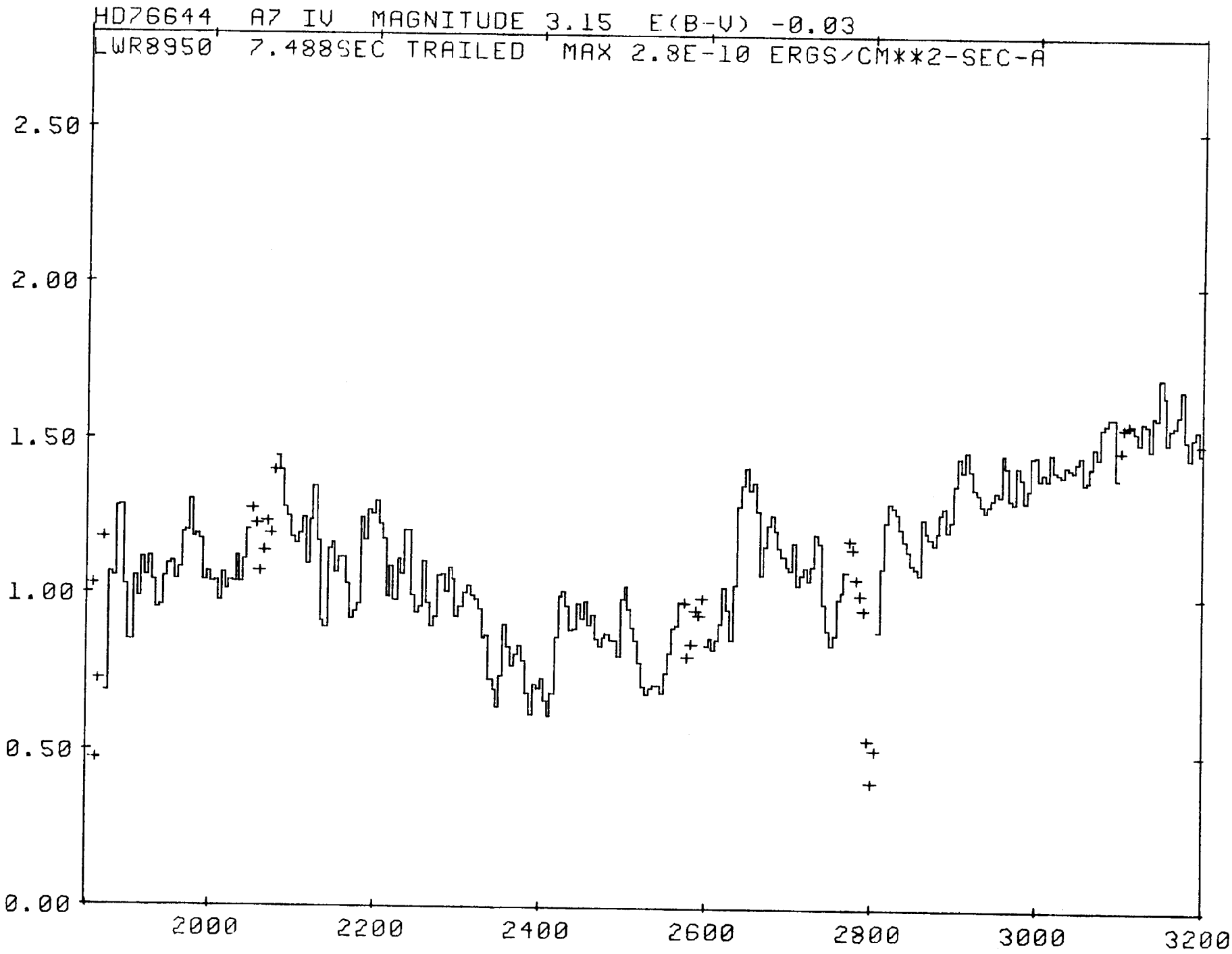

HD216956 A3 V MAGNITUDE 1.16 E(B-V) +0.00
SWP9134 2.29SEC TRAIL MAX 1.4E-9 ERGS/CM2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

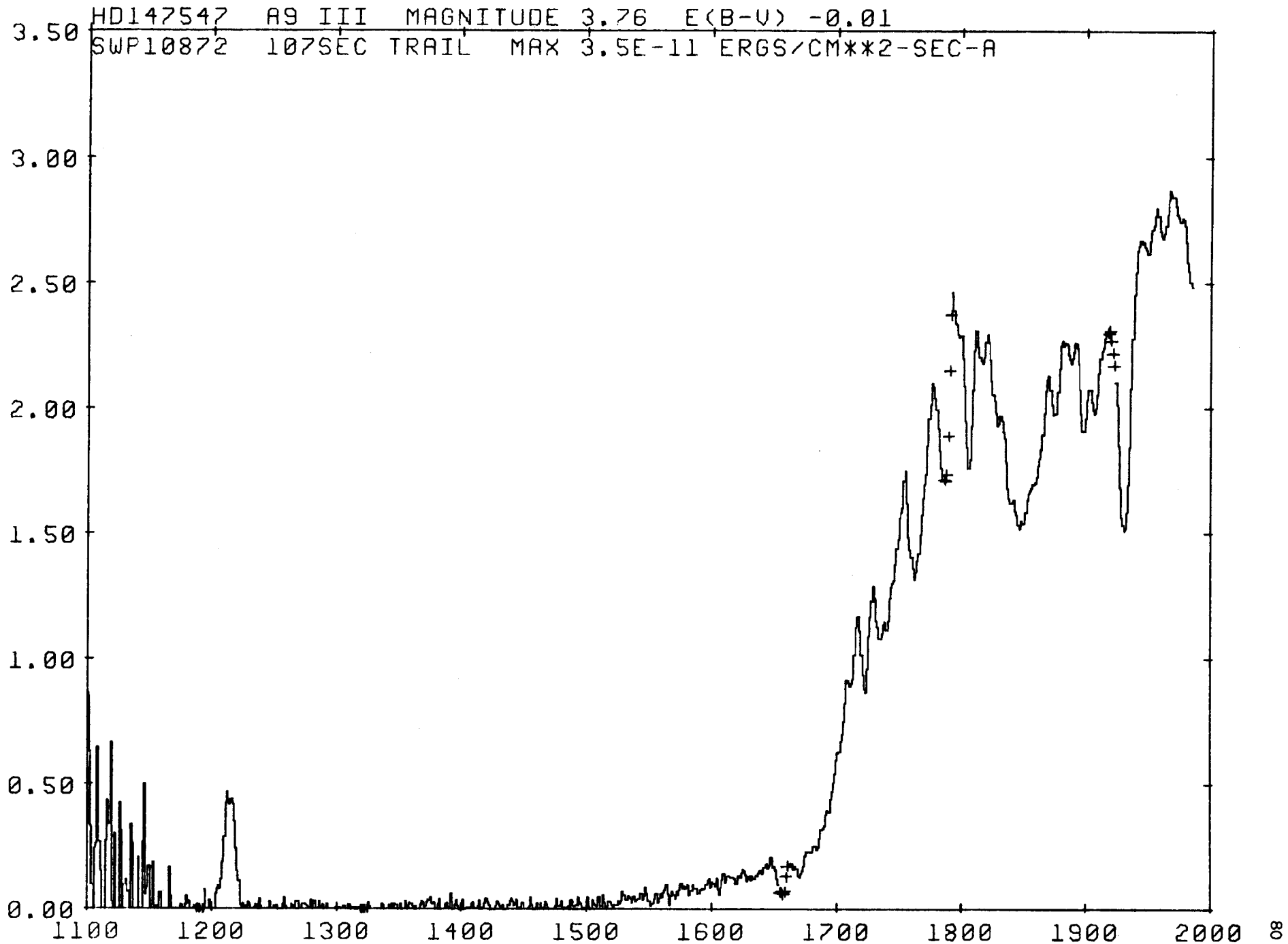

HD216956 A3 V MAGNITUDE 1.16 E(B-V) +0.00
LWR7865 1.00SEC TRAIL MAX 1.75E-9 ERGS/CM2-SEC-A
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

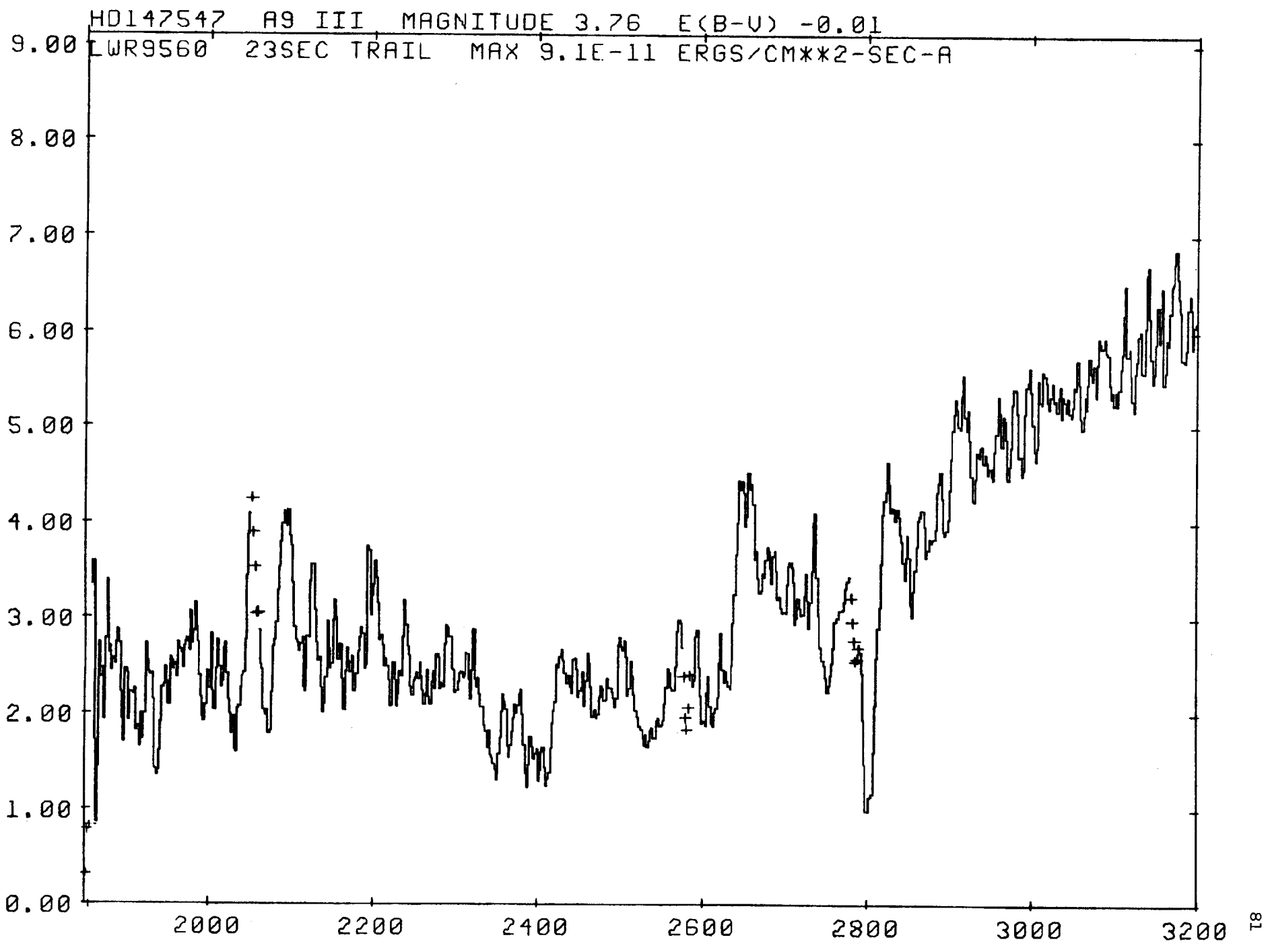

HD116842 AS V MAGNITUDE 4.03 E(B-V) +0.00
SWP10283 18.47SEC TRAILED MAX 6.3E-11 ERGS/CM**2-SEC-A
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

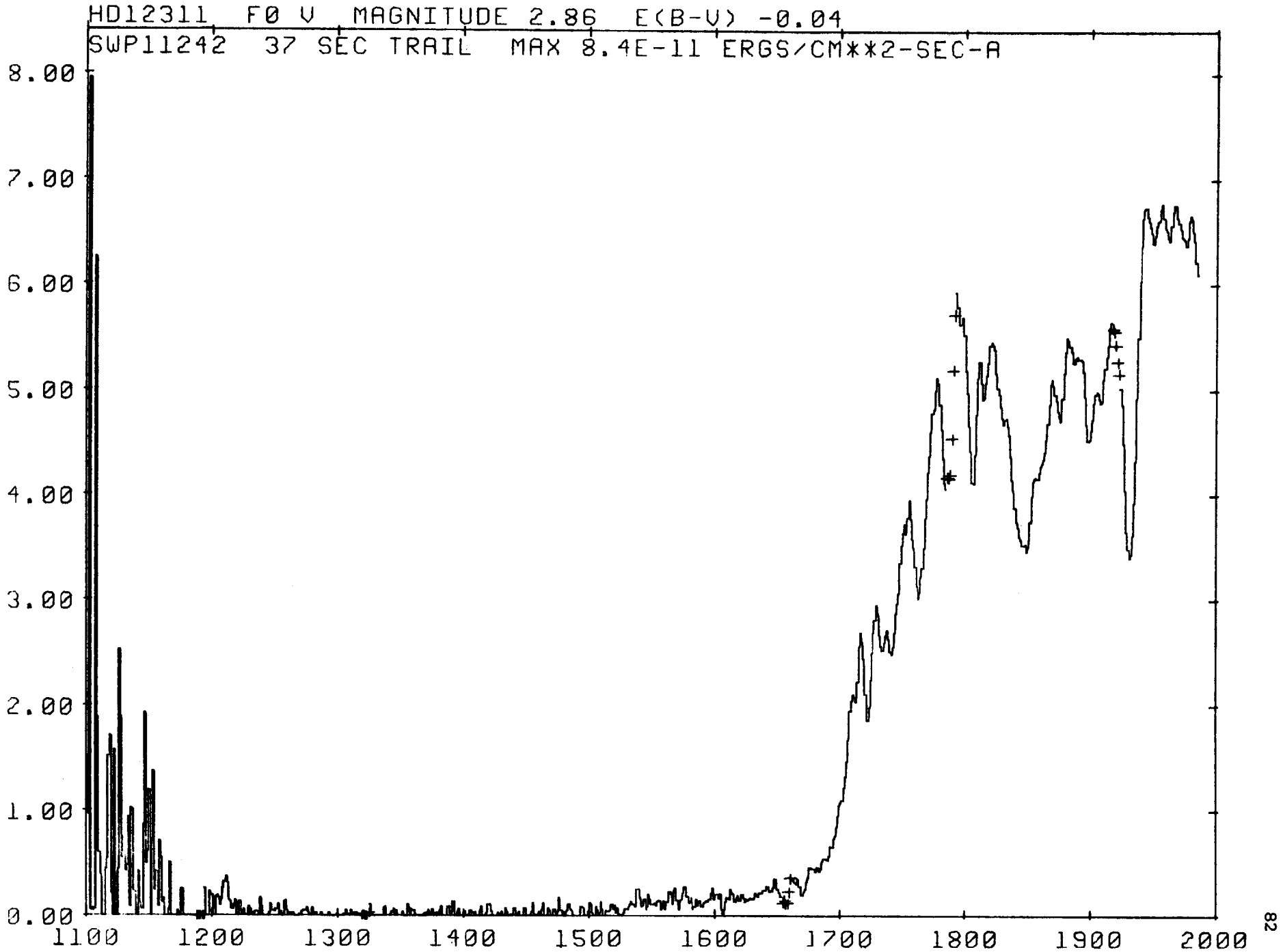

HD116842 A5 V MAGNITUDE 4.03 E(B-V) +0.00
LWR8949 16.0SEC TRAILED MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200

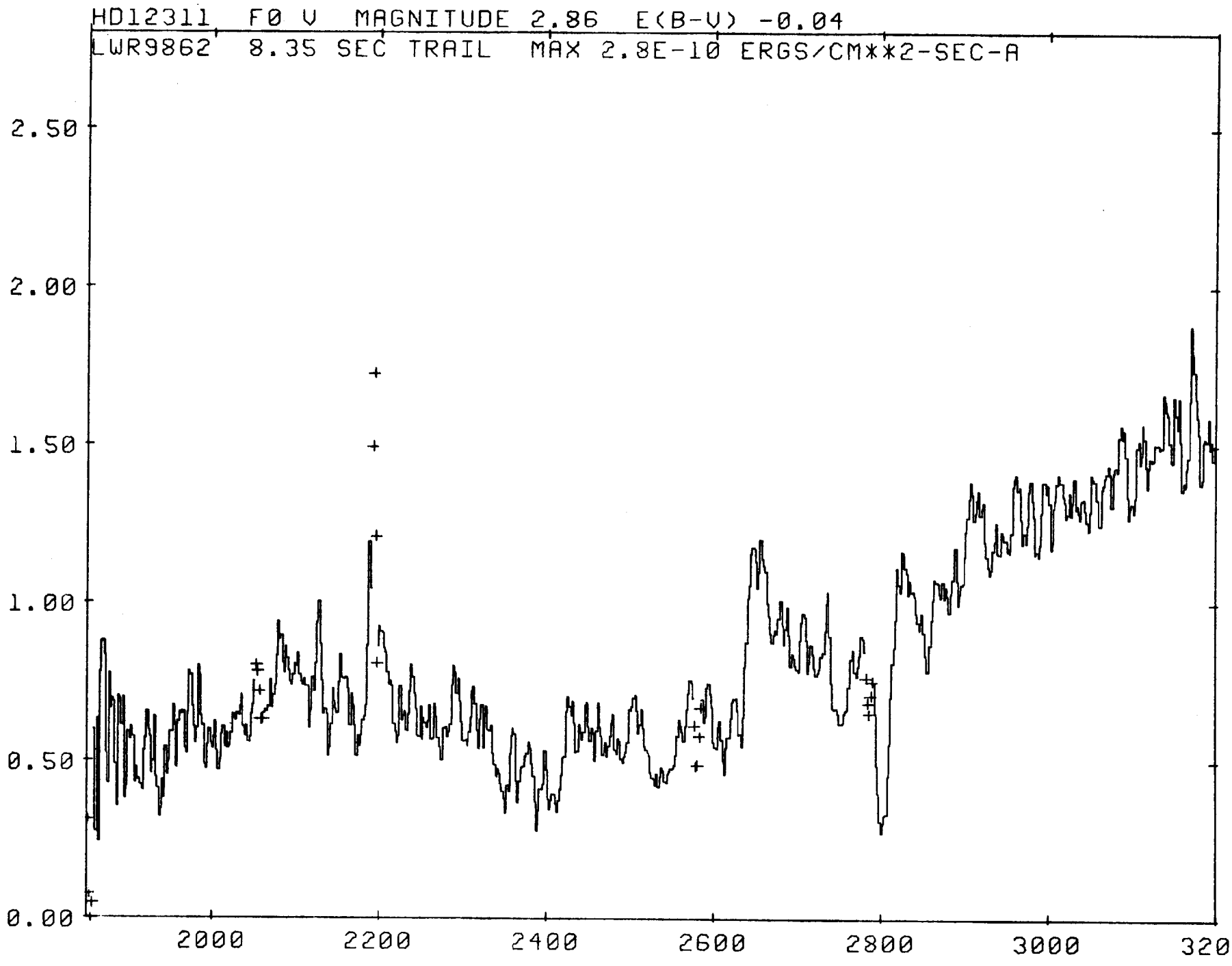

HD76644 A7 IV MAGNITUDE 3.15 E(B-V) -0.03
SWP10284 21.35SEC TRAILED MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

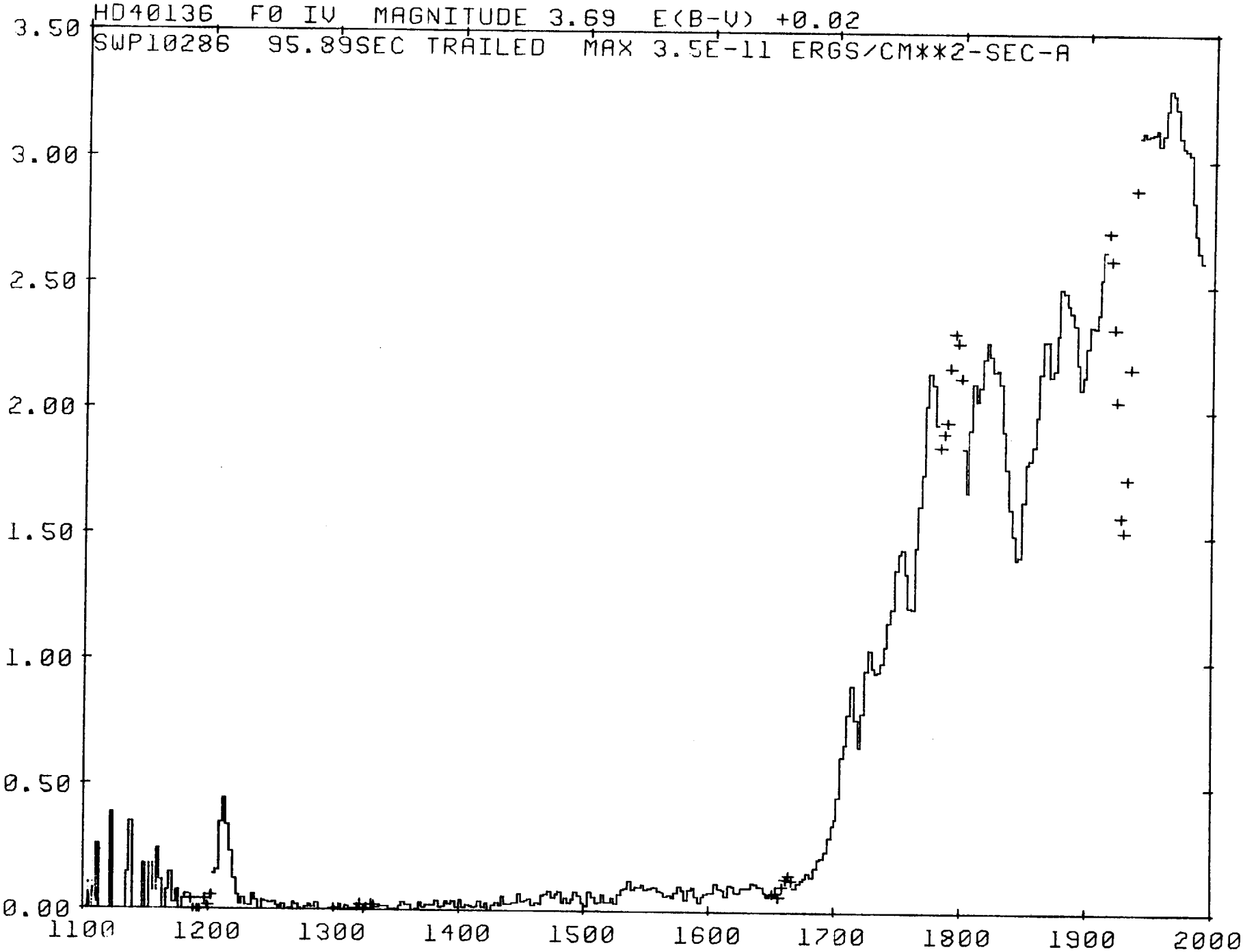

HD76644 A7 IV MAGNITUDE 3.15 E(B-V) -0.03
LWR8950 7.488SEC TRAILED MAX 2.8E-10 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

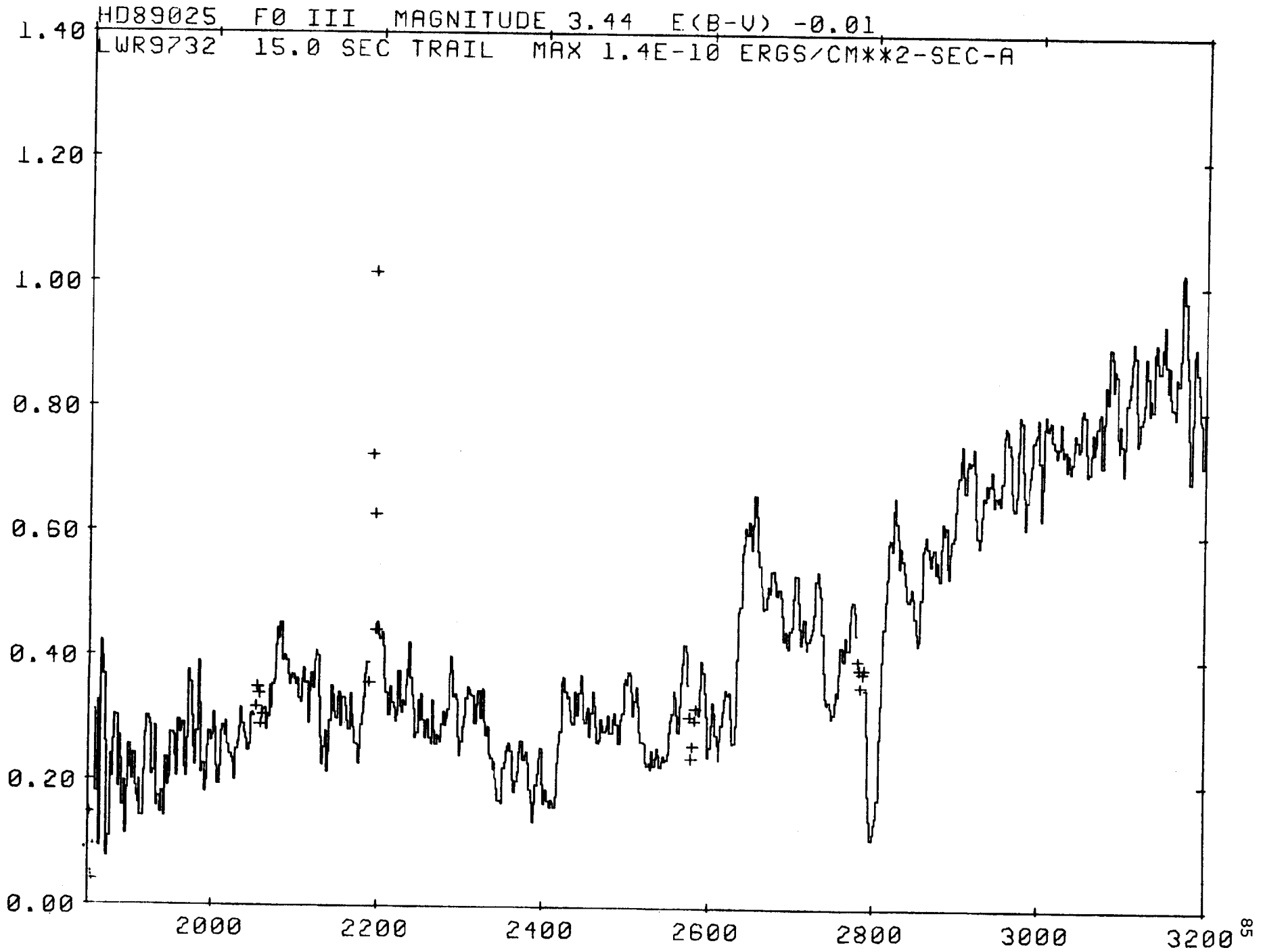

HD147547 A9 III MAGNITUDE 3.76 E(B-V) -0.01
SWP10872 107SEC TRAIL MAX 3.5E-11 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
A

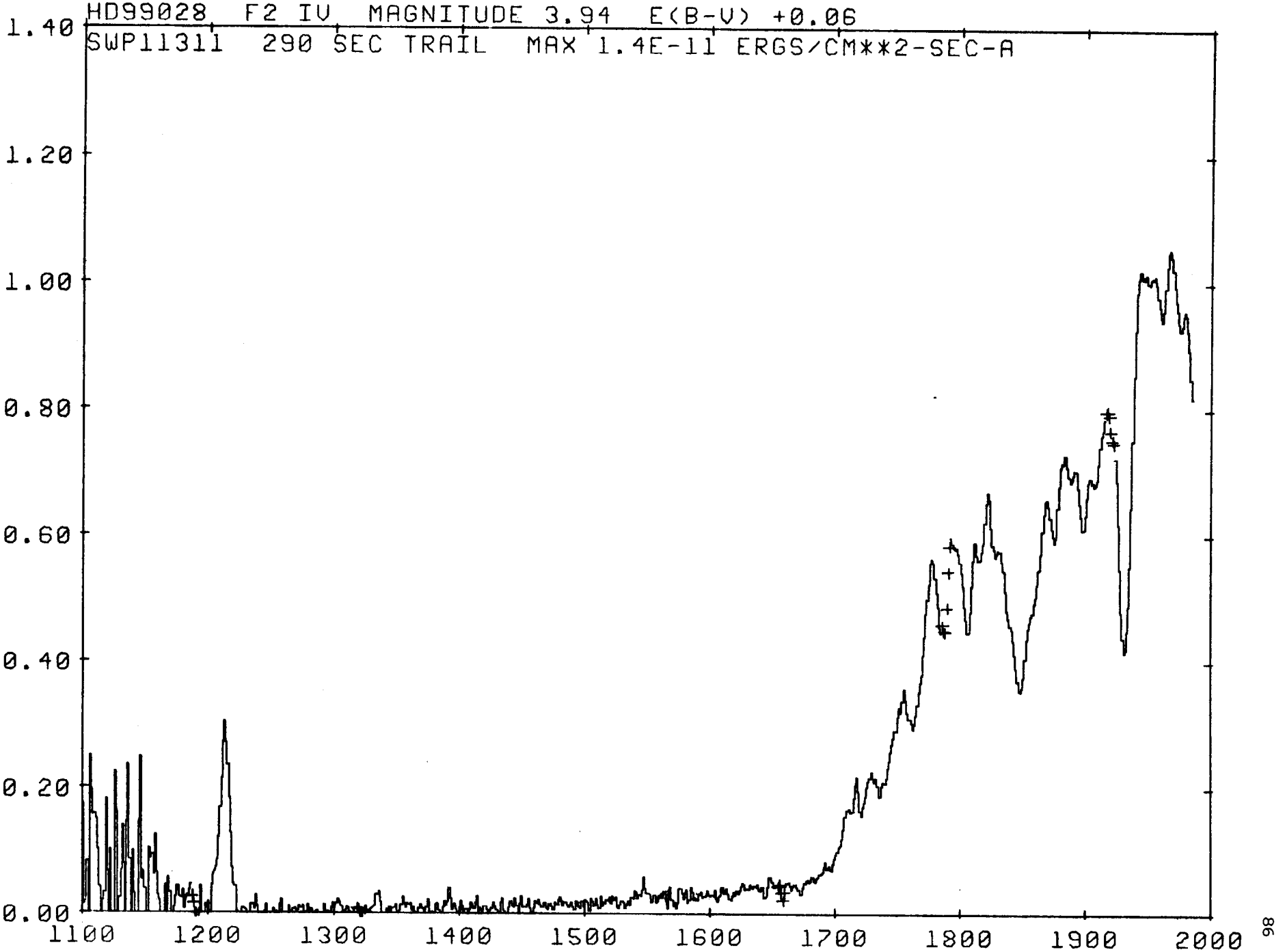

HD147547 A9 III MAGNITUDE 3.76 E(B-V) -0.01
LWR9560 23SEC TRAIL MAX 9.1E-11 ERGS/CM**2-SEC-A
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

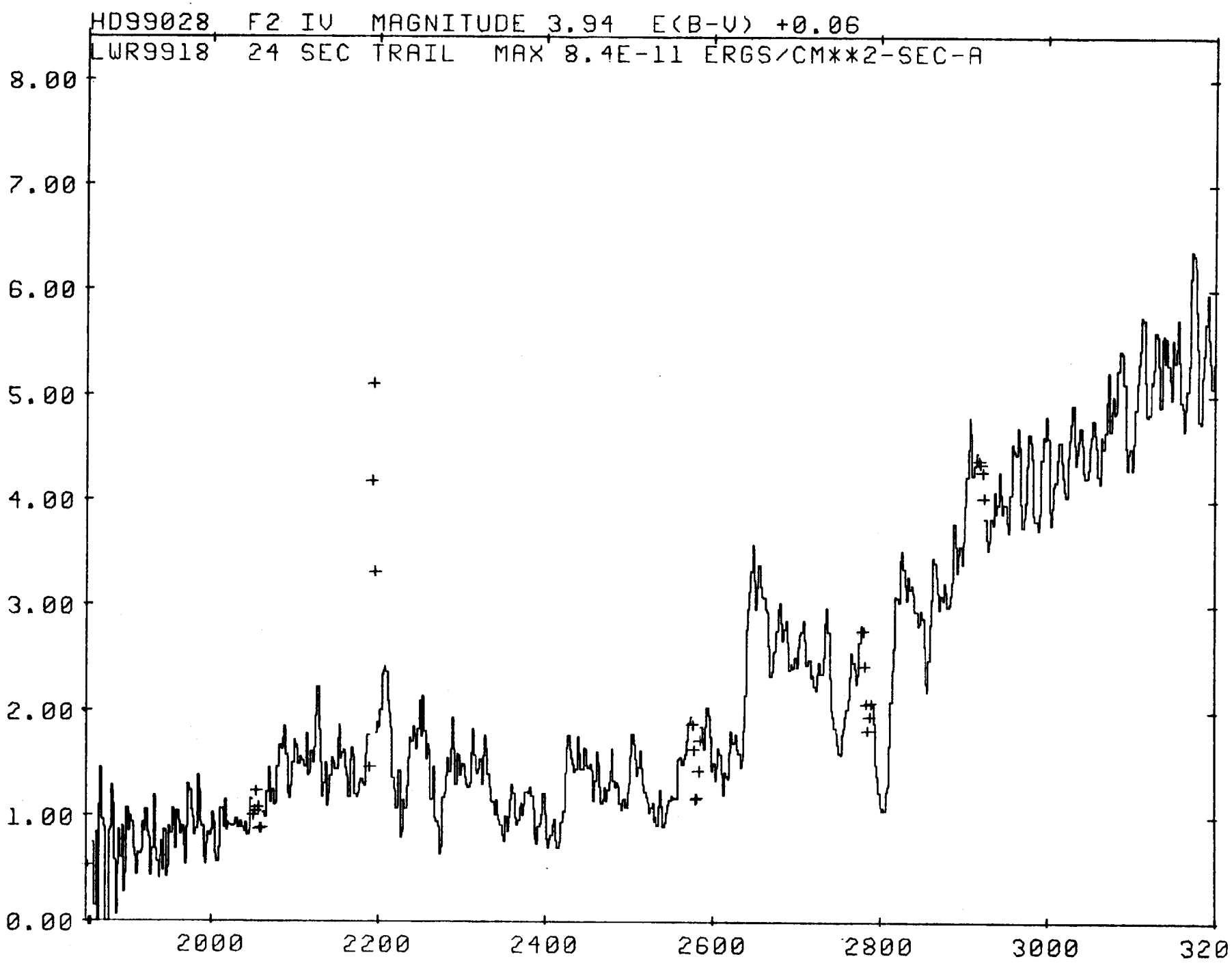

HD12311 F0 V MAGNITUDE 2.86 E(B-V) -0.04
SWP11242 37 SEC TRAIL MAX 8.4E-11 ERGS/CM**2-SEC-A
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

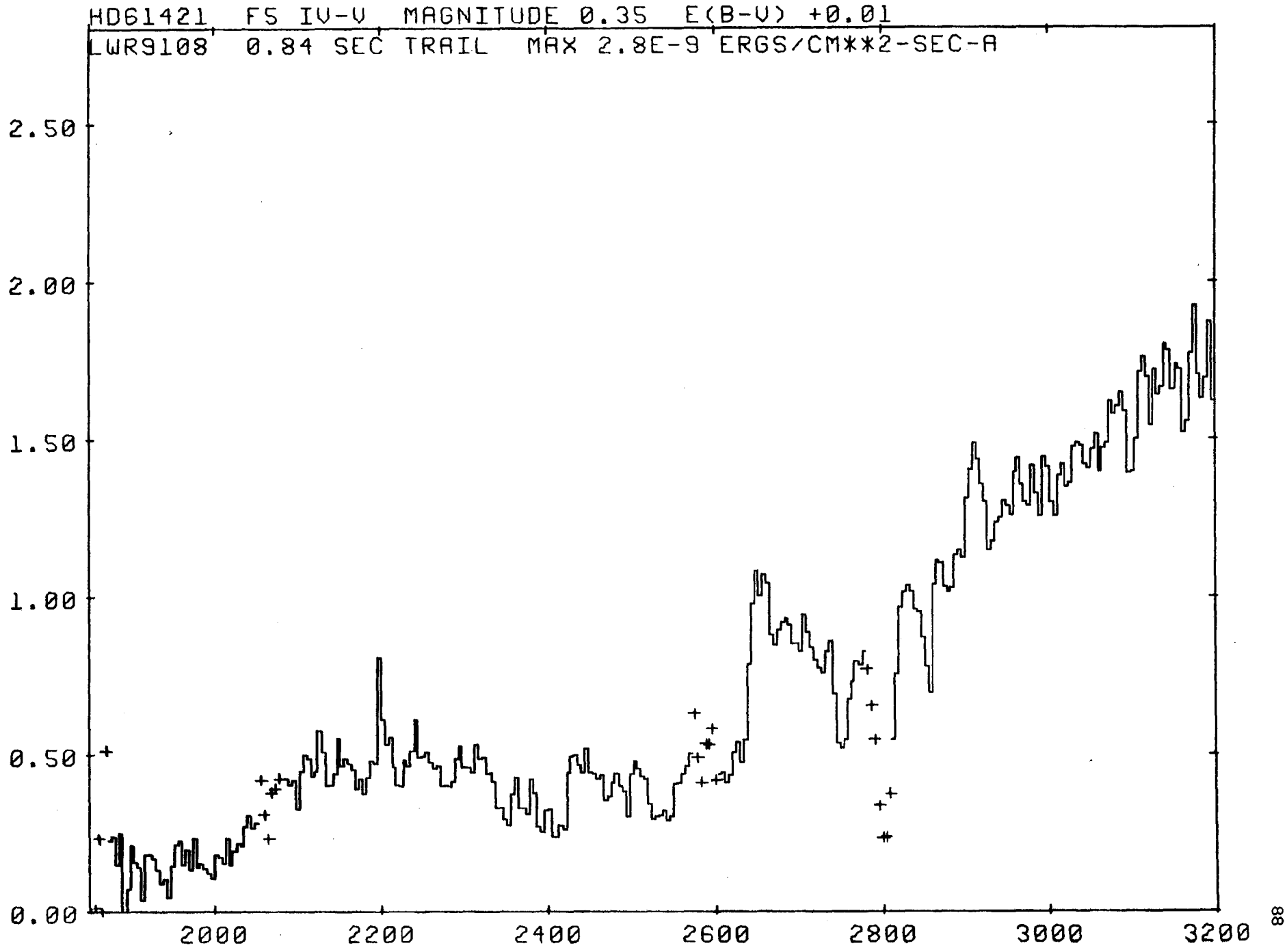

HD12311 F0 V MAGNITUDE 2.86 E(B-V) -0.04
LWR9862 8.35 SEC TRAIL MAX 2.8E-10 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

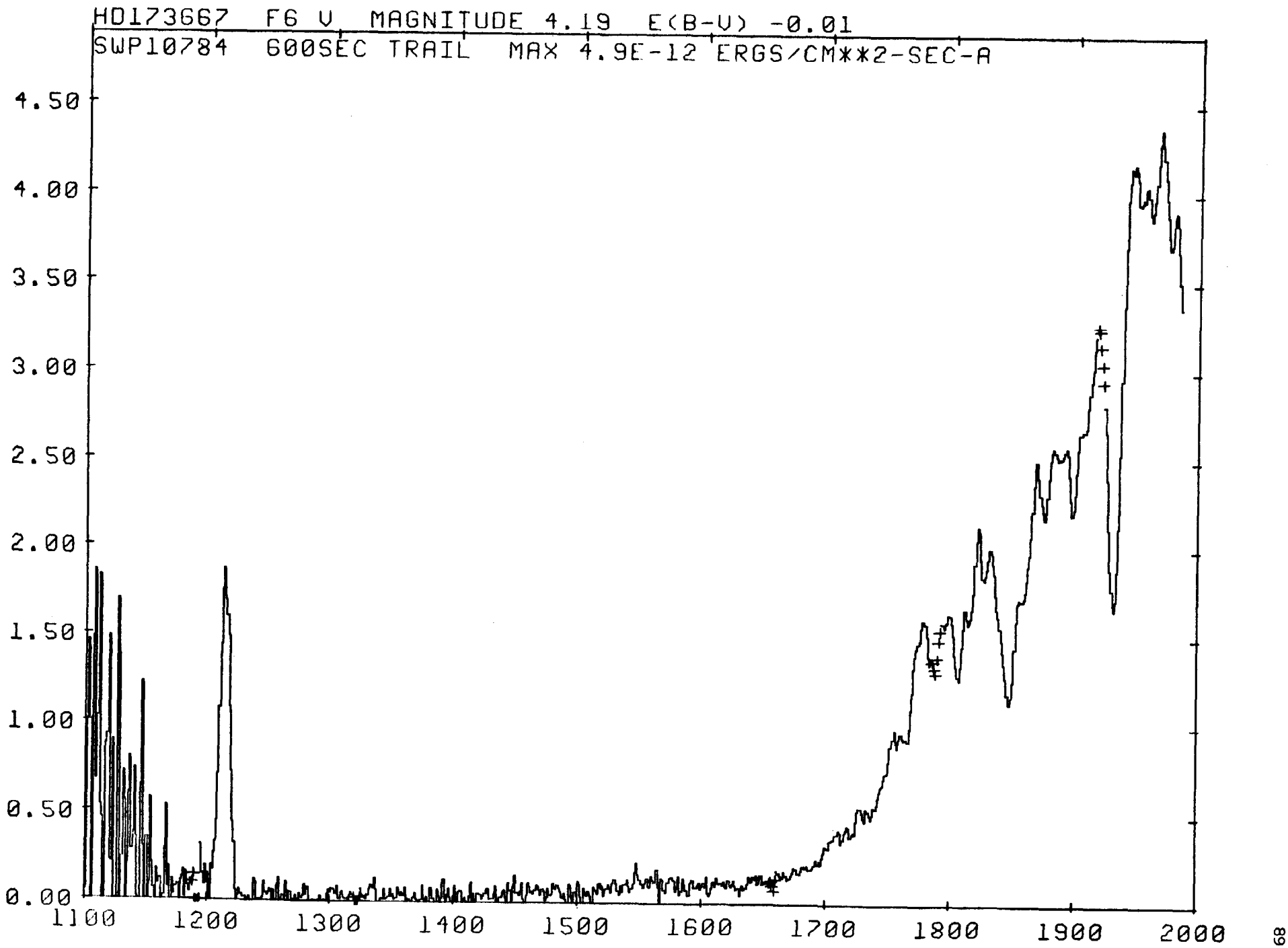

HD40136 F0 IV MAGNITUDE 3.69 E(B-V) +0.02
SWP10286 95.89SEC TRAILED MAX 3.5E-11 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

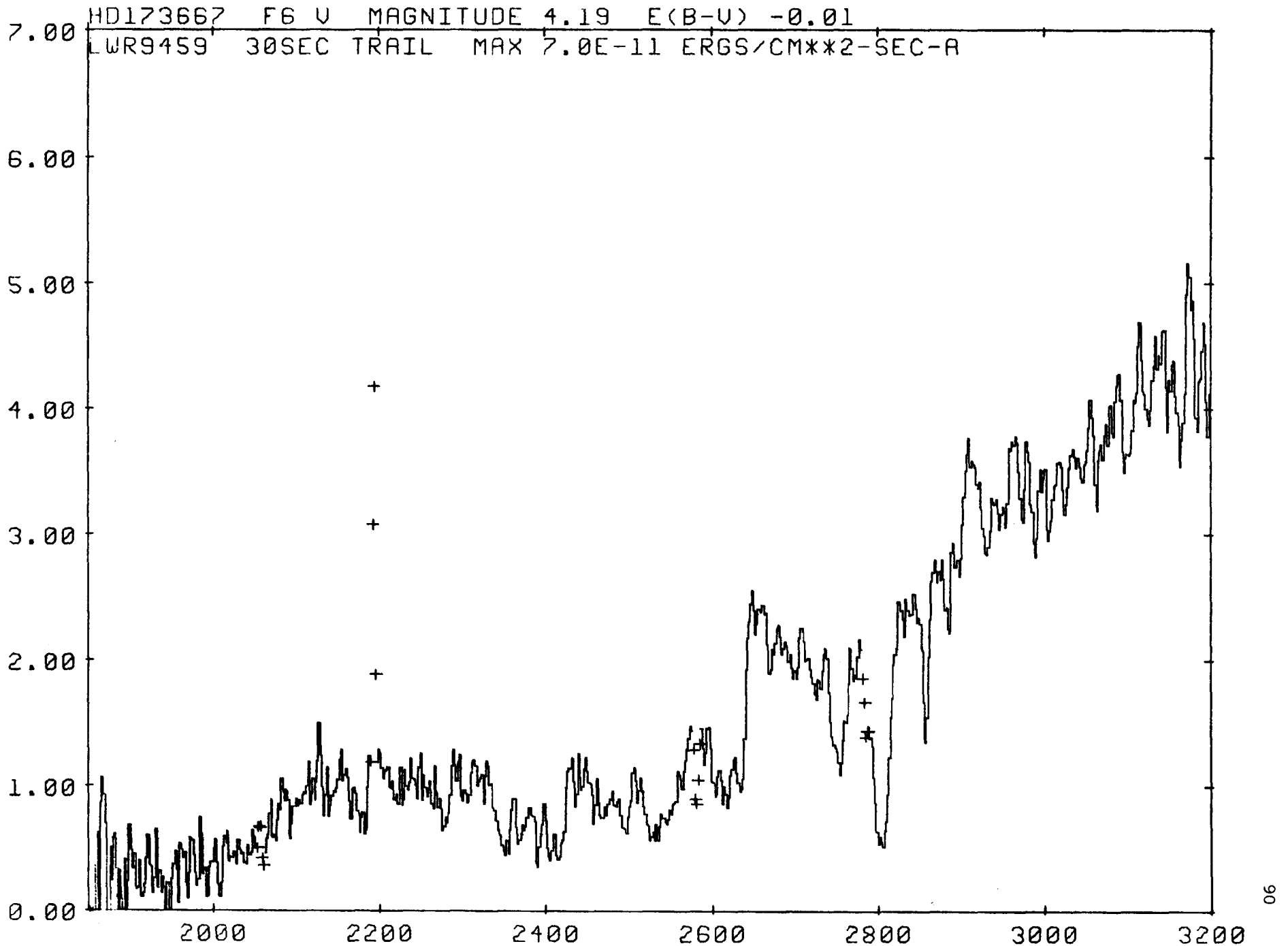

HD89025 F0 III MAGNITUDE 3.44 E(B-V) -0.01
LWR9732 15.0 SEC TRAIL MAX 1.4E-10 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200
85

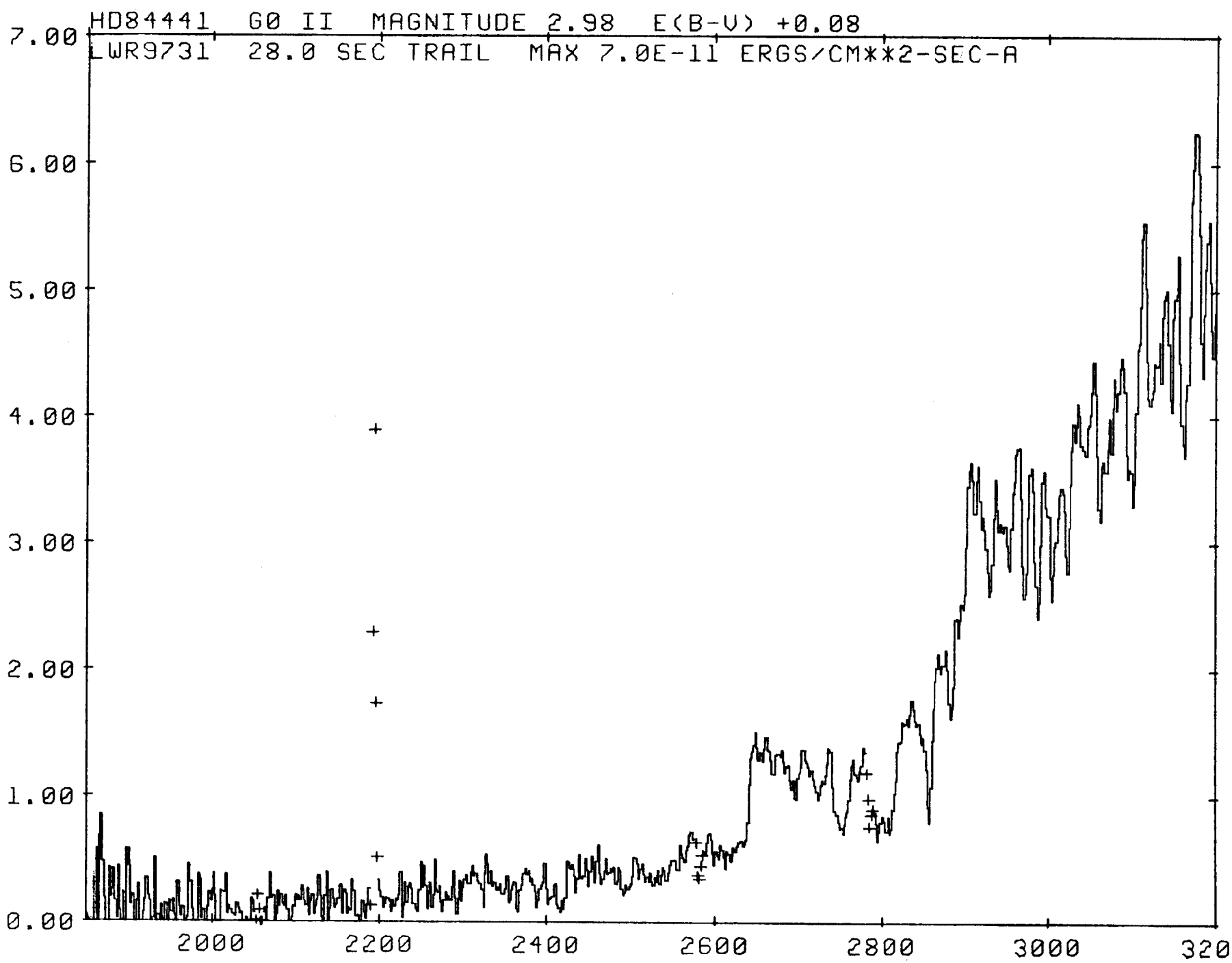

HD99028 F2 IV MAGNITUDE 3.94 E(B-V) +0.06
SWP11311 290 SEC TRAIL MAX 1.4E-11 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

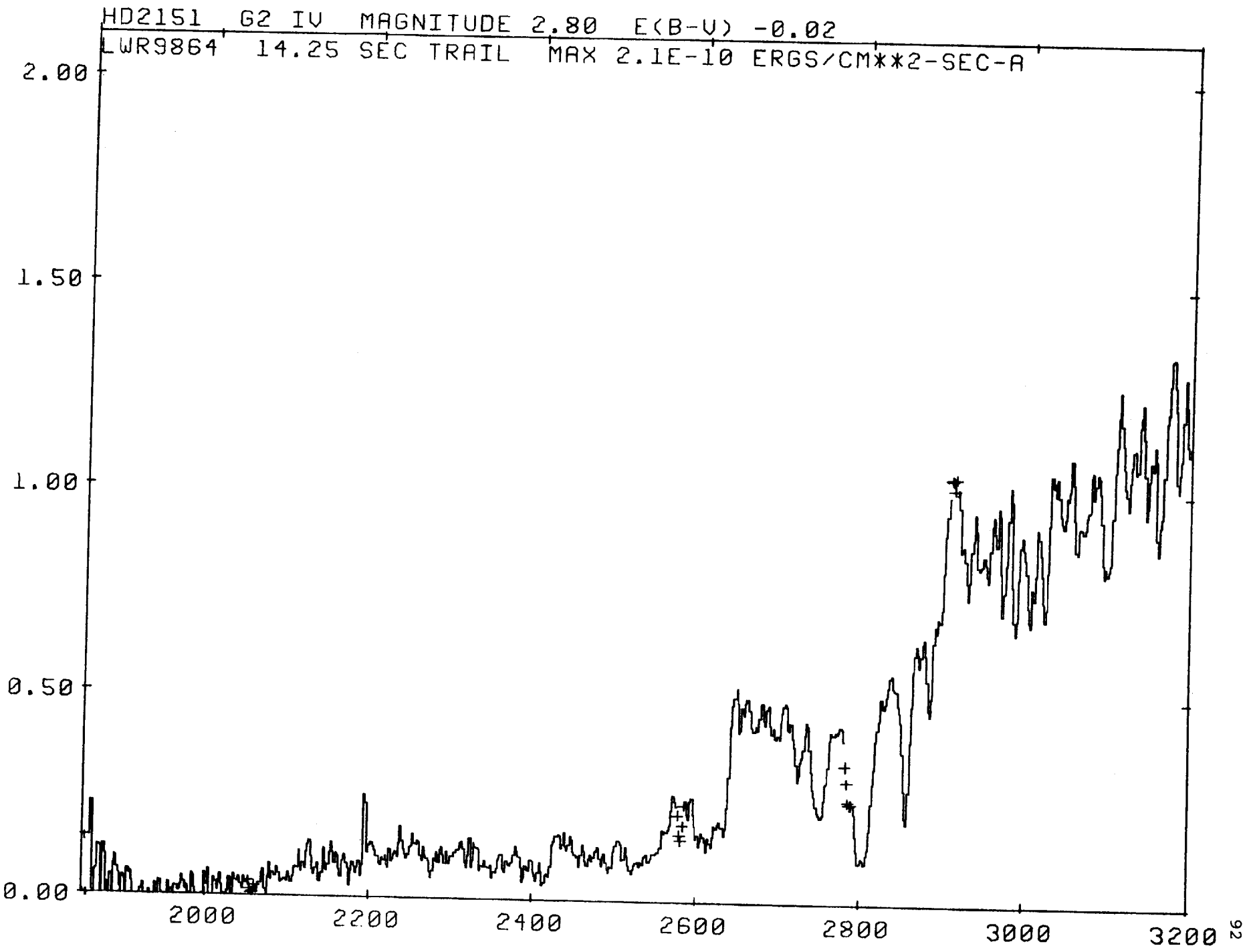

HD99028 F2 IV MAGNITUDE 3.94 E(B-V) +0.06
LWR9918 24 SEC TRAIL MAX 8.4E-11 ERGS/CM**2-SEC-A
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

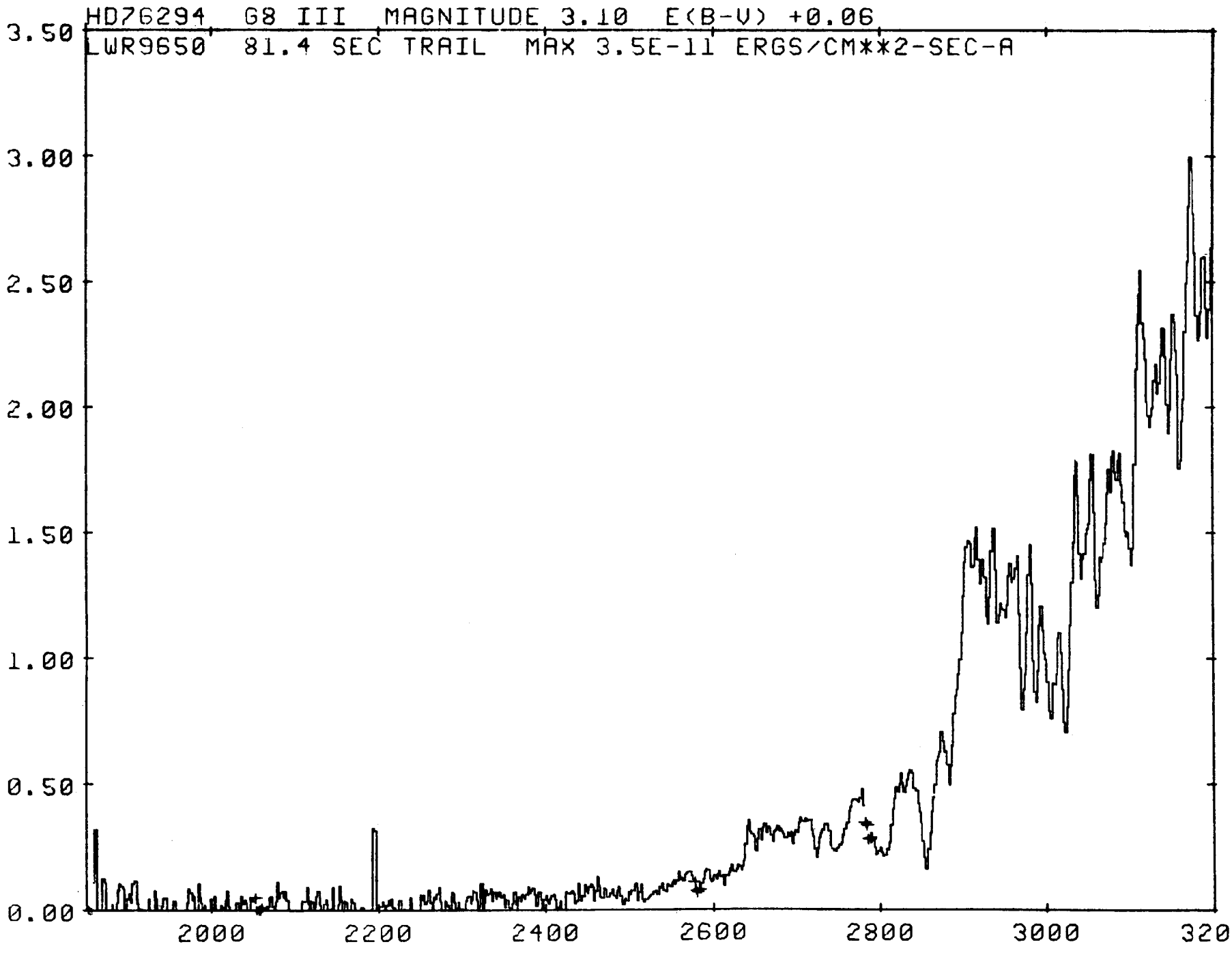

HD61421 F5 IV-V MAGNITUDE 0.35 E(B-V) +0.01
LWR9108 0.84 SEC TRAIL MAX 2.8E-9 ERGS/CM**2-SEC-A
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

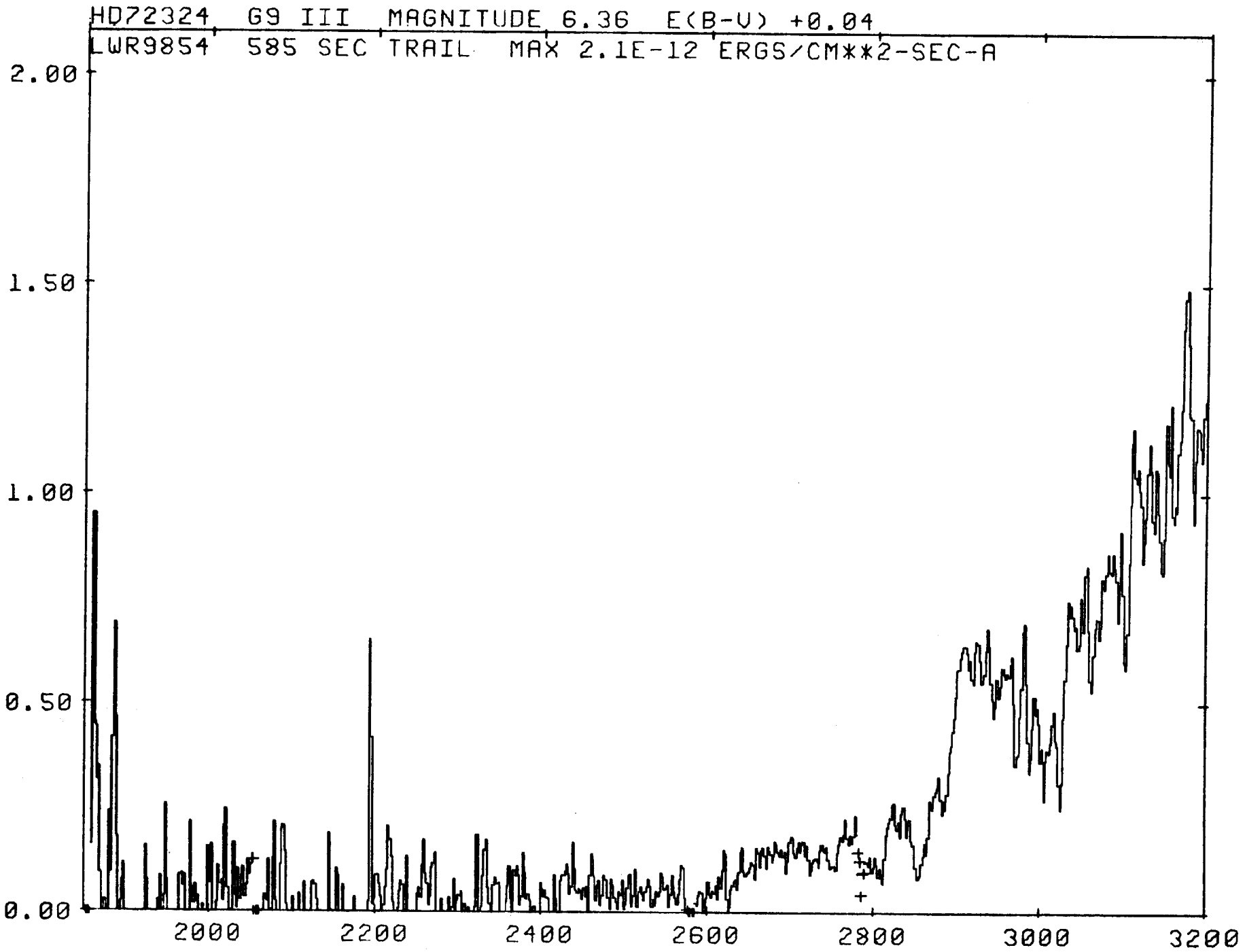

HD173667 F6 V MAGNITUDE 4.19 E(B-V) -0.01
SWP10784 600SEC TRAIL MAX 4.9E-12 ERGS/CM**2-SEC-A
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

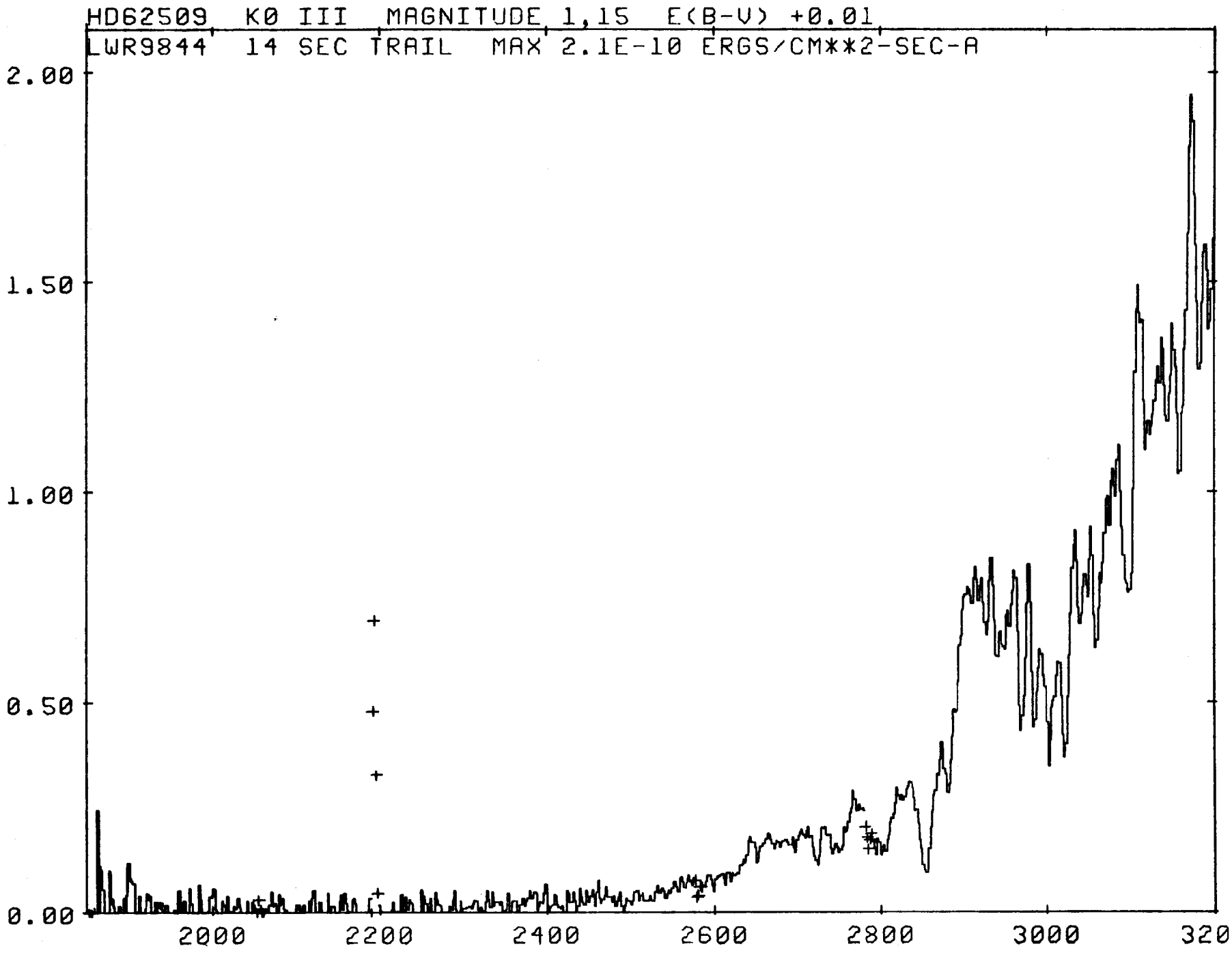

HD173667 F6 V MAGNITUDE 4.19 E(B-V) -0.01
LWR9459 30SEC TRAIL MAX 7.0E-11 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

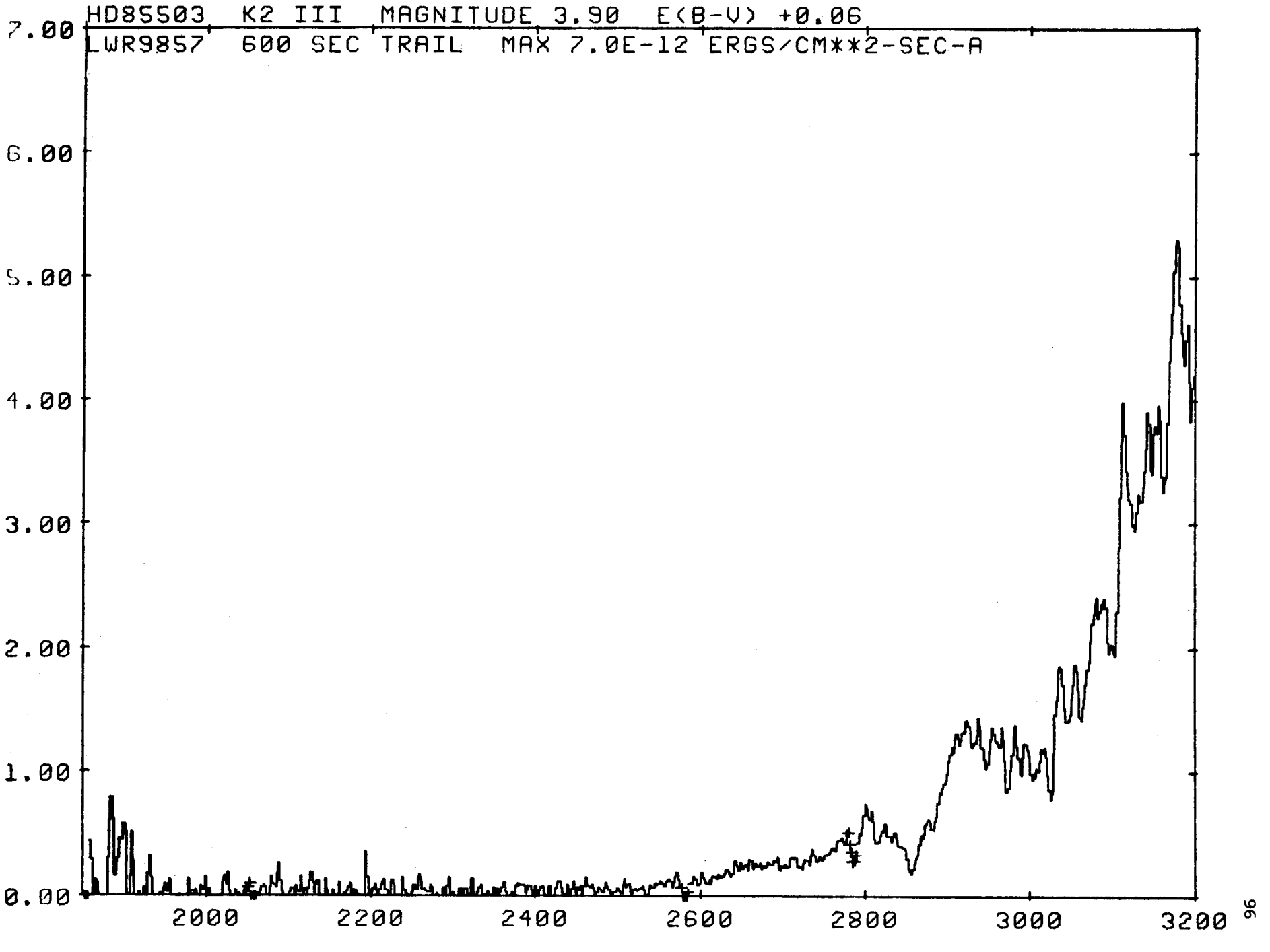

HD84441 G0 II MAGNITUDE 2.98 E(B-V) +0.08
LWR9731 28.0 SEC TRAIL MAX 7.0E-11 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200

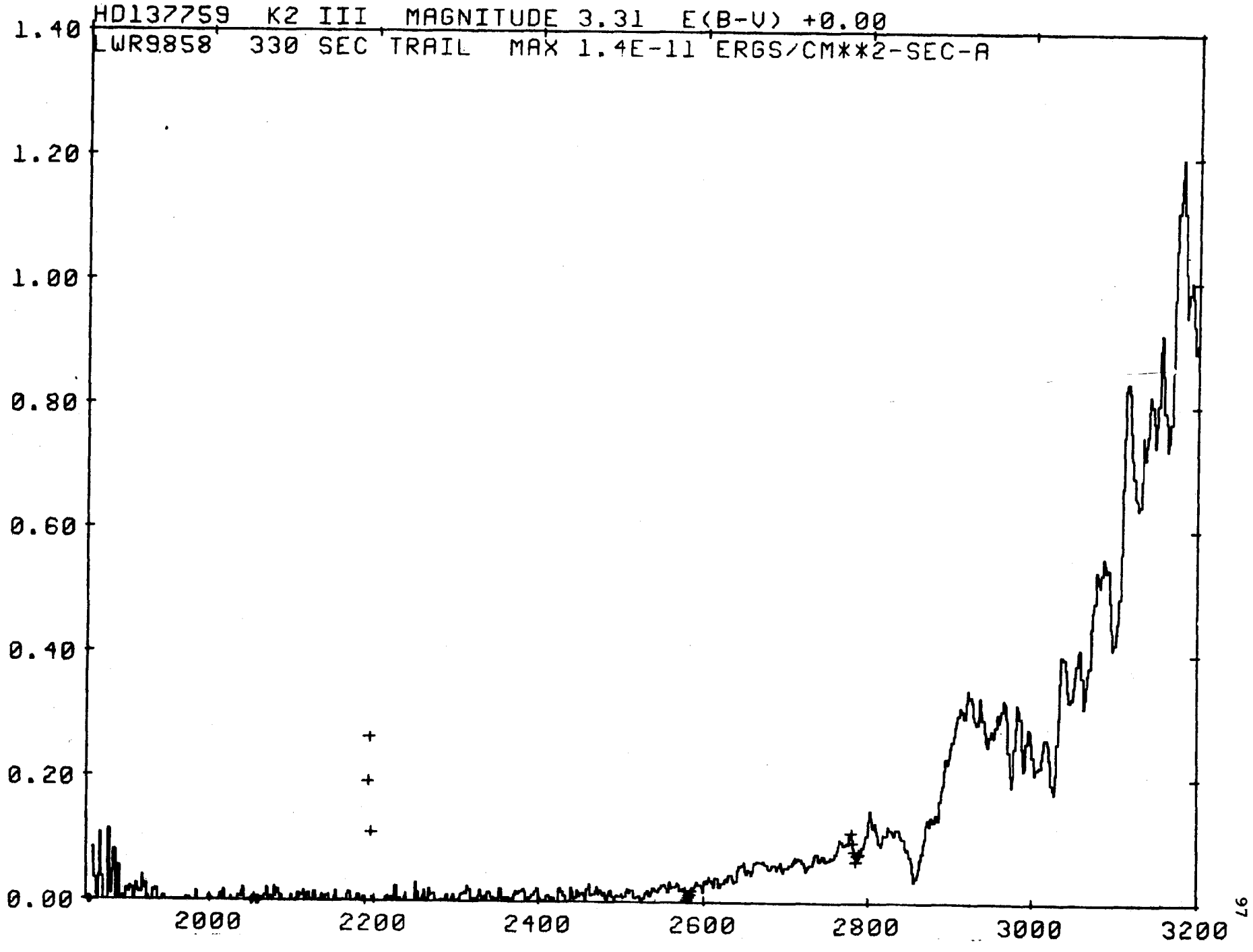

HD2151 G2 IV MAGNITUDE 2.80 E(B-V) -0.02
LWR9864 14.25 SEC TRAIL MAX 2.1E-10 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

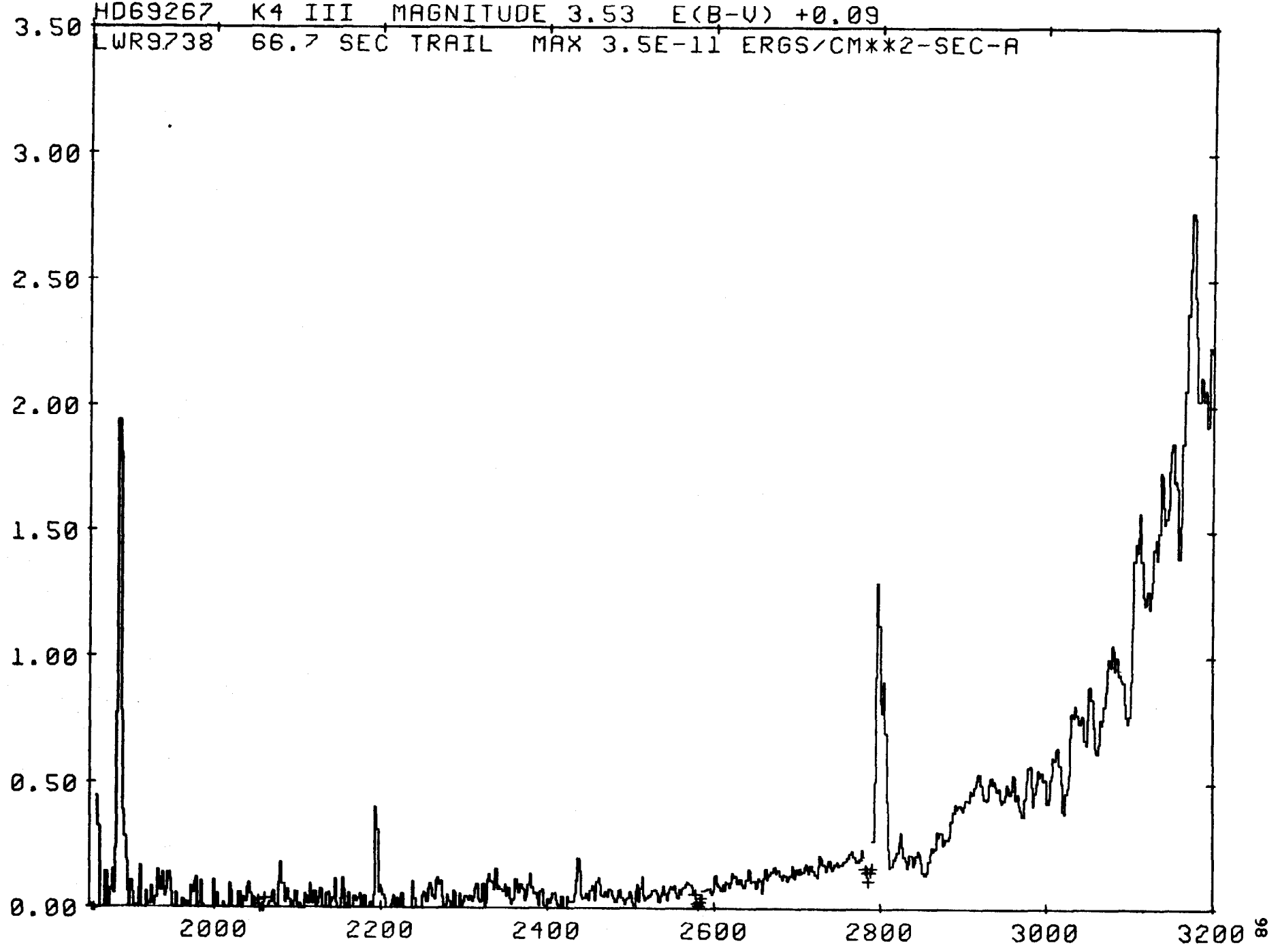

HD76294 G8 III MAGNITUDE 3.10 E(B-V) +0.06
LWR9650 81.4 SEC TRAIL MAX 3.5E-11 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200

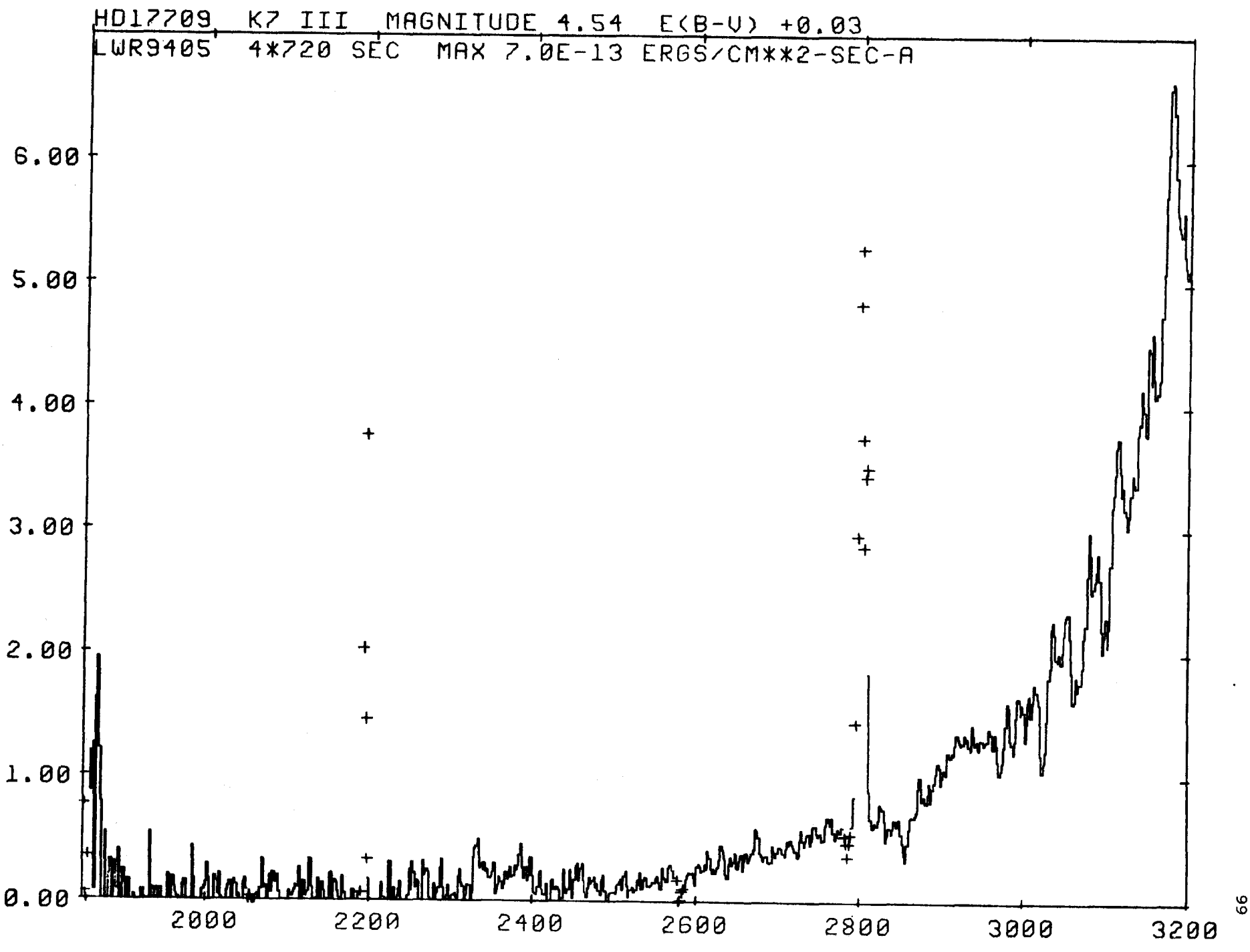

HD72324 G9 III MAGNITUDE 6.36 E(B-V) +0.04
LWR9854 585 SEC TRAIL MAX 2.1E-12 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200


HD62509 K0 III MAGNITUDE 1.15 E(B-V) +0.01
LWR9844 14 SEC TRAIL MAX 2.1E-10 ERGS/CM**2-SEC-A
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200


HD85503 K2 III MAGNITUDE 3.90 E(B-V) +0.06
LWR9857 600 SEC TRAIL MAX 7.0E-12 ERGS/CM**2-SEC-A
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200


HD137759 K2 III MAGNITUDE 3.31 E(B-V) +0.00
LWR9858 330 SEC TRAIL MAX 1.4E-11 ERGS/CM**2-SEC-A
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000
2200
2400
2600
2800
3000
3200


HD69267 K4 III MAGNITUDE 3.53 E(B-V) +0.09
LWR9738 66.7 SEC TRAIL MAX 3.5E-11 ERGS/CM**2-SEC-A
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2000
2200
2400
2600
2800
3000
3200
86


HD17709 K7 III MAGNITUDE 4.54 E(B-V) +0.03
LWR9405 4*720 SEC MAX 7.0E-13 ERGS/CM**2-SEC-A
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000
2200
2400
2600
2800
3000
3200