

# International Comet Quarterly

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## ICQ: Keys to Codes used in Tabulated Observation Format

See also the [Recommendations](#) for stellar-magnitude sources.

The International Comet Quarterly OBSERVATION KEYS [2017 Oct. 4]

### TABULATION OF COMET OBSERVATIONS

#### MAGNITUDE METHOD KEY

Following are key letters for the methods used in estimating total magnitude estimates (or occasionally, nuclear magnitude estimates); these appear under column MM in the ICQ's "Tabulation of Comet Observations":

- A = Pogson's "step method" or "Argelander method" stated; no other info provided (no longer acceptable; for historical observations only)  
\*\*\*\*\* NOTE: this was moved to special notes key [check obs.!] \*\*\*\*\*
- a = orange filter used on SOHO spacecraft with C2 and C3 coronagraphs, spanning wavelength range 540-640 nm (see Biesecker et al. 2002, Icarus 157, 323) [ICQ 123]
- B = Van Biesbroeck/Bobrovnikoff/Meisel (VBM) or simple Out-Out method
- b = VBM method using RCA #4549 image intensifier (see method 'e' below)
- C = unfiltered total CCD magnitude (fairly well approximates the Johnson V band)
- c = unfiltered nuclear CCD magnitude (fairly well approximates the Johnson V band)
- D = Cousins B filter
- d = Astrodon G filter ("the Green filter in Astrodon's RGB tri-color set; the filter is really meant for making pretty color pictures; it is close enough to Johnson V that there should not be too much difference between the two" -- Carl Hergenrother).
- E = Extrafocal-Extinction (or Beyer) method (cf. M. Beyer 1968, Astron. Nachr. 291, 257)
- e = Extrafocal-Extinction (or Beyer) method using RCA #4549 image intensifier (cf. D. A. Sutherland 1974, J.A.L.P.O. 24, 218)
- F = total magnitude obtained using Meade CCD interference filter CM-500 Visible (infrared blocking filter), supplied with their Pictor 416 CCD camera [ICQ 123]
- f = "nuclear" magnitude obtained using Meade CCD interference filter CM-500 Visible (infrared blocking filter), supplied with their Pictor 416 CCD camera [ICQ 123]
- G = CCD magnitude with a Corion NR-400 "minus-infrared" filter; William Liller, who used this combination, says that it "gave a very nice broadband-V passband" (see Liller 2001, ICQ 23, 93)
- g = CCD magnitude with Gunn g filter (+ RCA CCD w/ observer LAR)
- H = Cousins I filter with CCD
- I = In-focus [for visual observations only]
- i = visual observation using an image intensifier (observer MER used RTC XX 1390 image intensifier, which has unfiltered sensitivity from 300-950 nm)
- J = Kron-Cousins V filter employed (peak transmission at 550 nm) [initiated by observer ROQ]
- j = Kron-Cousins V filter employed (m2 estimate)
- K = clear filter used on SOHO spacecraft with C3 coronagraph, spanning wavelength range 400-850 nm (see Biesecker et al. 2002, Icarus 157, 323) [use beginning in July 2001 (see ICQ 123); note that the old "Keen method" deploying "K" as MM was changed to a special-notes code]
- k = CCD magnitude with Cousins R filter
- L = photoelectric B
- l = CCD magnitude with a Wratten 25 (red) filter, introduced in 1996 by William Liller "to reduce the atmospheric extinction"; he used the letter "R" to refer to them (Liller 1997, Planet. Space Sci. 45, 1507)
- M = "Modified Out-Out" method discussed by C. S. Morris (1979, 1980)
- N = called magnitude of nucleus or condensation, but usually some ambiguity as to whether or not the magnitude refers more to a total magnitude instead (used mostly with pre-1970 observations extracted from the literature)
- O = Out-of-focus (or extrafocal) method -- specific type not mentioned
- o = visual extrafocal comparison using RCA #4549 image intensifier (see method 'e', above)
- P = photographic
- p = photographic with Kodak 2415 film
- Q = "out-out"; supposed to be same as VBB method, but it's not always clear what observer intended
- q = R-band magnitude for nuclear condensation

R = photoelectric R (via CCD after ca. 1990)  
r = CCD magnitude with Gunn r filter  
S = In-Out or Vsekhsvyatskij-Steavenson-Sidgwick (VSS) method  
s = VSS method using image intensifier (see method 'e', above, for observer Sutherland, who used an RCA #4549 intensifier; for observer MER, see method 'i', above)  
T = Magnitude estimated from a TV monitor  
t = total visual magnitude (no other information provided; historical obs. only)  
U = photoelectric U (via CCD after ca. 1990)  
u = CCD-derived V nuclear magnitudes (m2)  
V = photoelectric V (via CCD after ca. 1990)  
v = photoelectric with filters to match visual  
W = photoelectric (no band given)  
w = 1P21 photometer + Kodak W64 filter [R. B. Minton writes (1974) that "this surface-filter combination closely matches the spectral response of the dark-adapted eye"].  
X = orthochromatic film + yellow filter, which is a system very close to the V band [according to observer MIL02]  
Y = CCD magnitude with Wratten No. 15 (yellow) filter, "which gives an effective response at about 680 nm (and blue cutoff at 520 nm)" [initiated by observer ROQ]

Other notes: Photographic magnitudes are now indicated under MM by the letter "P", and photoelectric magnitudes are indicated there by the band letter ("L" for B, "U" for U, and "V" for V; new letters will be assigned as necessary). Photoelectric magnitudes with stated errors of > +/- 0.3 or greater get a colon (:) listed after the magnitude, as of 1982 data; such data stated as +/- 0.3 gets a '+' instead of a colon. The letter "W" under MM stands for photoelectric magnitudes in which no specific band was mentioned (visual band assumed); this will no longer be acceptable for future observations, but is retained for observations which already exist in the ICQ master file.

#### SPECIAL NOTES KEY

NOTE: A left bracket, [, before a magnitude indicates the comet was not seen. (If the comet was seen, and an observer simply says that it was fainter than a given magnitude, a '>' sign is used, instead.)

Published after the date in the ICQ (and listed in computer and on magnetic tape files between the reference and the observer code) are symbols and letters to indicate special observing conditions or factors [NOTE: some of these symbols have not yet appeared (and some will never appear) in the printed ICQ]:

? = instrumentation details uncertain (for old observations where the supplied information was rather vague, and for which it is difficult or impossible to determine the details)  
\* = an observation completely replacing one previously published in the ICQ  
& = comet observed at altitude 20 deg or less with no atmospheric extinction correction applied  
! = observation corrected for atmospheric extinction in a proper manner by the observer; prior to September 1992, this was the standard symbol for noting extinction correction, but following publication of the extinction paper (July 1992 ICQ), this symbol is only to be used to denote corrections made using procedures different from that outlined in ICQ 14, 55-59, and then only for situations where the observed comet is at altitude > 10.  
\$ = comet observed at altitude 10 degrees or lower, observations corrected by the observer using procedure in ICQ 14, 55-59 (July 1992); this note should be placed in column 75, and should accompany a proper Key letter that specifies what extinction procedure (table) was used.  
# = minor data change made in archive only (change published in textual form in ICQ, or not published at all in ICQ)  
+ = supplementary descriptive information also published in ICQ  
% = comparison star(s) were reduced to visual magnitudes via their B-V colors using one of the formulae in the ICQ Guide to Observing Comets, first ed., p. 65 (Howarth and Bailey 1980, or Stanton 1981)  
a = [formerly 'A'] atmospheric extinction correction applied by observer using Table Ia of Green (1992, ICQ 14, 55-59).  
B = a V magnitude based on a conversion from a B photoelectric magnitude (with same qualifications as for C, above)  
b = same as B, except that B-V was not measured, but assumed (usually B-V is about +0.7)  
C = a V magnitude based on a conversion from an R photoelectric magnitude (the observer must state a proper conversion formula, V-R); if an R magnitude is given with errors > +/- 0.2 mag, then V gets a colon (:) after the magnitude.  
c = same as C, except that V-R was not measured, but assumed (usually V-R is about +0.52)  
d = local extinction coefficients derived for local atmospheric conditions, and used in application of atmospheric-extinction correction; the value 'A' of Green (1992, ICQ 14, 55-59) is thus re-computed, but the remaining procedures of that paper are followed  
E = Bessel filters  
e = stated "nuclear" magnitude (intended for photographs, where the magnitude method is given as P, the default intended to infer total magnitude -- though one cannot always \*assume\* that)  
f = single 50-mm binocular objective lens was used close to the eye for defocussing images  
G = Naked eye estimate, with glasses used to defocus comparison stars

(for bright comets only)

H = Harris filters

i = ambiguity concerning which instrument was used to make coma diameter, DC, and tail information; the specified instrument was that used for the magnitude estimate

I = use of infrared-block filter with CCD; supposedly gives response similar to that of an unfiltered CCD

K = "Modified" Sidgwick method, using binoculars with the comet in-focus in one eyepiece and with the comparison stars out-of-focus in the other eyepiece (cf. R. A. Keen 1985, ICQ 7, 48). [formerly listed under MM Key, but a new code "K" for MM was defined in July 2001 (see ICQ 119)]

l = limiting stellar magnitude for a CCD observation in which the comet was not detected

m = put into computer form from the original literature by Maik Meyer

r = binoculars were reversed, such that one looked through the (larger) objective lens acting as the eyepiece, and the eyepiece acted as the objective aperture [for the magnitude estimates of bright comets]

S = CCD photometry with an R60 filter (expected to be similar to, but not the same as, that of a standard R filter)

s = [formerly 'S'] atmospheric extinction correction applied by observer using Table Ic of Green (1992, ICQ 14, 55-59).

T = a V magnitude based on a conversion from a Thuan-Gunn g, r, or i photoelectric magnitude (with same qualifications as for C, above); cf. Jewitt and Danielson 1984, Icarus 60, 435.

t = exposure on Kodak T-Max (b&w) film using an image intensifier (for observer MER, see method 'i', above)

w = [formerly 'W'] atmospheric extinction correction applied by observer using Table Ib of Green (1992, ICQ 14, 55-59).

x = denotes that a secondary source was consulted for primary-source magnitudes; an example is extracting Tycho-catalogue magnitudes from the amateur software "Guide 6.0". THE SECONDARY SOURCE SHOULD ALWAYS BE SPECIFICALLY CITED, and will appear in the descriptive information in the ICQ to supplement the tabulated data.

#### INSTRUMENT KEY

A = camera lens

B = binoculars

C = Cassegrain reflector

D = Schmidt reflector

E = naked eye

F = twin catadioptric Newtonian binocular

G = coronagraph (introduced for the solar-orbiting SOHO LASCO C3 coronagraph, which has an external occulter that "shadows the small 9.6-mm entrance aperture from direct sunlight" -- SOHO website); it is essentially a refracting instrument [ICQ 123]

H = hyperboloid astro-camera

I = Multiple-Mirror Telescope, F. L. Whipple Observatory (when the f-ratio was 9, its at the Cassegrain focus)

J = Jones-Bird telescope\*

K = Klevtsov-Cassegrain (essentially a Maksutov-type instrument but having a sub-aperture corrector after the secondary mirror, instead of the full aperture corrector in front of the primary)

L = Newtonian reflector

M = Maksutov reflector

N = 1x monocular made by taking two identical lenses and using one as an objective and one as an eyepiece

O = opera glass

P = prime focus of a reflector

q = "small telescopes" with aperture in range 4-10 inches (see note under instrument "r", below) [FOR HISTORICAL DATA ONLY]

Q = "for observations with the largest telescopes" (see note under instrument "r", below) [FOR HISTORICAL DATA ONLY]

r = "small telescopes and finders" with aperture not exceeding 4 inches (after Bobrovnikoff 1941, Contrib. Perkins Obs. No. 15, p. 5) [FOR HISTORICAL DATA ONLY]

R = refractor

S = Schmidt-Newtonian telescope

T = Schmidt-Cassegrain reflector

U = coude focus of a reflector

V = Volosov-Newtonian reflecting telescope (has two lenses -- double-convex and planoconcave) with a Newtonian spherical mirror; designed by Pechatnikova and Volosov in Leningrad in 1943 (information provided by V. L. Korneev in 2000)

W = Wright-Schmidt reflector

Y = Ritchey-Chretien telescope

\* According to Henk Feijth, several members of the Dutch Comet Section use a 10-inch-aperture (25.4-cm) Jones-Bird telescope, which is a modified Newtonian with a spherical f/4 primary mirror: "Just before the light strikes the flat after being reflected, it passes through a Barlow-like achromatic lens that corrects the spherical aberration of the primary mirror. The system is f/6 and also corrected for coma."

#### CCD DATA KEYS

[given in brackets is the ICQ reference where the key was announced]

CCD cameras:

Key CCD Camera  
 AAL Artemis 285AL-a (see <http://www.artemisccd.co.uk/icx285.htm>) [ICQ 144]  
 AA1 Apogee Alta U16M camera (uses front-illuminated Kodak KAF-16803 chip, 4096x4096 pixels in array, 9-micron pixels) [ICQ 156]  
 AA4 Apogee Alta U42 camera (uses back-illuminated E2V CCD42-40 chip, 2048x2048 pixels in array, 13.5-micron pixels) [ICQ 156]  
 AA8 Apogee Alta U8300 camera (uses front-illuminated Kodak KAF-8300 chip, 3326x2504 pixels in array, 5.4-micron pixels) [ICQ 156]  
 Ap4 APOGEE AP47p [ICQ 124]  
 Ap7 Apogee Ap-7 or Ap-7p [ICQ 124]  
 ATI ATIK 2HS [ICQ 148, 151]  
 ATT Atik Titan (uses Sony ICX424 [ICZ] detector)  
 D41 Imaging Source DMK41AF02.AS/DMK41AU02.AS/DMK41AG02.AS monochrome (uses ICX205AL [I25] detector)  
 MG2 Moravian Instruments G2 camera (<http://www.gxccd.com/cat?id=2&lang=409>)  
 MON MONT4K (Montreal 4K CCD camera resident on University of Arizona Kuiper 1.54-m telescope near Mount Bigelow, Arizona, USA; uses CCD486 [F48] detector)  
 VAT VATT4K (4K CCD camera resident of Vatican Observatory Lennon 1.8-m telescope on Mount Graham, Arizona, USA; uses STA0500A [ST5] detector)  
 BT1 BITRAN BT-11 [ICQ 124]  
 CKD Canon Kiss Digital camera [ICQ 144]  
 Dil DillCam (used on 2.0-m Faulkes Telescope-North) [ICQ 136]  
 DSI Meade DSI Pro [ICQ 144]  
 FLD Finger Lakes Instrumentation (FLI) Dream Machine [ICQ 144]  
 FLI Finger Lakes Instrumentation (FLI) CM91E [ICQ 144]  
 FLM Finger Lakes Instrumentation (FLI) ML-8300-C (<http://www.flicamera.com/fli/microline.html>)  
 FL9 Finger Lakes Instrumentation (FLI) PL09000 [ICQ 151] (<http://www.flicamera.com/fli/proline.html>)  
 H24 Hi-Sis 24 [ICQ 121]  
 MCV Mutoh CV-16II or CV-16 [ICQ 123]  
 MX9 Starlight MX-916 [ICQ 121]  
 Nik Nikon D50 digital SLR camera [ICQ 145]  
 PIC Pictor 416 [ICQ 123]  
 PIX Pictor 216 XT [ICQ 128]  
 PSI Photometrics Star-I [ICQ 124]  
 QHY QHY-6 (website <http://ghyccd.com/>) [ICQ 144]  
 QH2 QHY-2 Pro camera [ICQ 156]  
 S1C a Russian CCD camera (chip unknown; via BOR04, BAR06) [ICQ 132]  
 SC2 SOHO LASCO C2-coronagraph camera [ICQ 123]  
 SC3 SOHO LASCO C3-coronagraph camera [ICQ 123]  
 SE7 SBIG ST-7E [ICQ 124]  
 SE8 SBIG ST-8E [ICQ 124]  
 ST0 SBIG STL-6303 [ICQ 151]  
 ST1 SBIG ST-1001E [ICQ 124]  
 ST2 SBIG ST-2000XM [ICQ 124]  
 ST3 SBIG STL1301E [ICQ 144]  
 ST4 SBIG ST402 [ICQ 151]  
 ST6 SBIG ST-6V [ICQ 121]  
 ST7 SBIG ST-7 [ICQ 121]  
 ST8 SBIG ST-8 [ICQ 121]  
 ST9 SBIG ST-9E [ICQ 121]  
 STE StarLight Express SXL8 [ICQ 140]  
 STL SBIG STL-11000M [ICQ 140]  
 STM SBIG ST-10XME (uses KAF-3200ME chip [ICQ 151])  
 STT SBIG ST-10E [ICQ 151]  
 STX SBIG ST8-XME [ICQ 145]  
 SXV Starlight Xpress SXV-H9 [ICQ 142]

Apogee Alta U8300 camera (uses front-illuminated Kodak KAF-8300 chip, 3326x2504 pixels in array, 5.4-micron pixels)  
 Apogee Alta U16M camera (uses front-illuminated Kodak KAF-16803 chip, 4096x4096 pixels in array, 9-micron pixels)  
 Apogee Alta U42 camera (uses back-illuminated E2V CCD42-40 chip, 2048x2048 pixels in array, 13.5-micron pixels)

CCD camera chips:

Key CCD Camera Chip  
 CAC 22.7-mm x 15.1-mm (APS-C) CMOS for Canon Kiss Digital camera [ICQ 144]  
 E2V E2V CCD42-40 [ICQ 156]  
 EEV 2048x2048 EEV 42-40 [ICQ 136]  
 EXV Sony ExViewHAD tm [ICQ 144]  
 F48 Fairchild CCD486 4000x4000 CCD [ICQ 140]  
 ICX Sony ICX259AL [ICQ 144]  
 ICY Sony ICX285AL [ICQ 142]  
 ICZ Sony ICX-424AL [ICQ 148, 151]  
 K10 KAF-1001E (Kodak) [ICQ 124]  
 K16 KAF-1600 [ICQ 123]  
 K26 KAF-0261E [ICQ 121]  
 K32 KAF-3200ME [ICQ 151] (<http://www.sbig.com/sbwhtmls/st10.htm>)  
 K40 KAF-0400 [ICQ 121]  
 K41 KAF-0401E [ICQ 123]  
 K42 KAF-0402ME (Kodak) [ICQ 128]

K4E KAF-0400E [ICQ 123]  
 K6E KAF-1602E (Kodak) [ICQ 124]  
 K6F KAF-6303E [ICQ 151]  
 K6M KAF-1603ME (Kodak) [ICQ 145]  
 KA0 KAF-0401 (Kodak) [ICQ 124]  
 KA1 KAI-11000M (Kodak) [ICQ 140]  
 KA2 Kodak KAF-1301E [ICQ 144]  
 KA3 Kodak KAF-16803 [ICQ 156]  
 KA8 Kodak KAF-8300-C  
 (http://www.kodak.com/global/en/business/ISS/Products/Fullframe/  
 index.jhtml?pq-path=11937/11938/14425)  
 KA9 KAF-09000 [ICQ 151]  
 KAF Kodak KAF-8300 [ICQ 156]  
 KAI KAI-2000M (Kodak) [ICQ 124]  
 M47 Marconi 47-10 [ICQ 124]  
 PF1 Philips FT12 [ICQ 140]  
 SAL Sony 285AL [ICQ 144]  
 SIA SIA502AB (SITe); formerly called TK512 (Tektronics) [ICQ 124]  
 T24 TC-241 CCD chip (UV enhanced - CCD camera type SBIG ST-6V) [ICQ 123]  
 T25 TC255 [ICQ 120]  
 TH7 TH7883CDA (Thomson) [ICQ 124]  
 TK1 thinned TK1024, Tektronik 1K 1024x1024 [ICQ 121]  
 TK2 Tektronik TK-1024-AV [ICQ 144]

Computer software used for photometric reduction of CCD images:

Key	Software name
A32	Astrometrica 3.25 [ICQ 123]
AIP	AIP for Windows (Berry and Burnell) [ICQ 142]
Afo	Astrometrica used with Focas software (see information on WWW at <a href="http://astrosurf.com/cometas-obs/_Articulos/Focas_i/Focas_i.htm">http://astrosurf.com/cometas-obs/_Articulos/Focas_i/Focas_i.htm</a> [ICQ 133, 13]
A41	Astrometrica 4.1 [ICQ 124]
A44	Astrometrica 4.4.1.364 [ICQ 151]
AfP	ASTROART for Photometry [ICQ 123]
AA3	ASTROART for Photometry, version 3.0 [ICQ 140]
FPr	FitsPro [ICQ 120]
GAI	GAIA software ver. 2.5-3 (C) 1997-2000 Central Laboratory of the Research Councils (U.K.), authors: Peter W. Draper and Norman Gray e-mail: <a href="mailto:gaia@star.rl.ac.uk">gaia@star.rl.ac.uk</a> [ICQ 123]
IRI	Christian Buil's IRIS
IRA	IRAF [ICQ 136]
IPL	IPLab [ICQ 124]
Izm	Izmccd software [ICQ 151] ( <a href="http://izmccd.puldb.ru/index2.htm">http://izmccd.puldb.ru/index2.htm</a> )
MIm	MaxIm DL/CCD [ICQ 124]
Mir	Mira [ICQ 145]
OPS	CCDOPS (SBIG) [ICQ 121]
PHO	PHOTOM software developed by a student of R. D. Schwartz at the University of Missouri at St. Louis to reduce aperture measurements, and Schwartz's own software program to produce magnitudes
SI3	StellaImage 3 [ICQ 124]
SI4	StellaImage 4 [ICQ 126]
SI5	StellaImage 5 [ICQ 134]
SI6	StellaImage 6 [ICQ 154]
SI0	Stella Image (Japanese software programmed by K. Kadota and sold by Astro Art Co.) [ICQ 144]

NOTE: We are advised that software such as "Guide 6.0", "Guide 7.0" [ICQ 121], "Guide 8.0", and "The Sky (ver. 5)" [ICQ 121] do not have any means to measure magnitudes (they have only lists of comparison-star magnitudes), so key codes "G70" and "Sky" are withdrawn.

MAGNITUDE-REFERENCE KEY

See the table  
 at [this website](#).

[Astronomical Headlines](#)

