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| Field | Position  (size, type) | Description |
| Instrument | 01 (2, a) | Instrument identifier.  PIXL imaging instrument identifier:   * PC : PIXL Micro Context Cam (MCC)   PIXL non-imaging instrument identifiers:   * PE : PIXL Engineering * PS : PIXL Spectrometer   Note: there are other instrument identifiers not associated with PIXL that have been omitted from this document. |
| Color/Filter | 03 (1, i/a) | Color flag - see Section X.X.  For image RDRs only (otherwise it is set to ‘\_’ for N/A). The PIXL MCC captures only grayscale images. In the event of no LED illumination (see below), this flag is always set to ‘M’ for grayscale (Monochrome/Panchromatic).  In the event of LED illumination, the flag is set based on the LEDs used to illuminate the target.   |  |  | | --- | --- | | LED Color | Flag | | Red | R | | Green | G | | Blue | B | | Multiple | W | | UV | U | | SLI-A (Dense) | D | | SLI-B (Sparse) | S | | Off | \_ |   Other color flags may be defined in the future. |
| Special flag | 04 (1, a) | Special Processing flag.  Applicable to image RDRs only, otherwise set to ‘\_’ for N/A.  The special processing character is used to indicate off-nominal or special processing of the image.  Examples include use of different correlation parameters, special stretches to eliminate shadows, reprocessing with different camera pointing, etc.   The meaning of any individual character in this field (other than "\_" which means nominal processing) will be defined on an ad-hoc basis as needed during the mission.  Within one Sol or a range of sols, the character will be used consistently.  So, this field can be used to group together all derived products resulting from one kind of special processing.  An attempt will be made to maintain consistency across different sols as well, but this may not always be possible; thus the meaning of characters may change across different individual or ranges of sols.   A database will be maintained containing all special processing designators that are used, the sols they relate to, and a description of the special processing that was done.  This information will be included in the PDS archive. |
| Primary timestamp | 05 (4, i/a) | The Primary timestamp of coarser granularity than the Secondary timestamp (documented later). Value type is based on either of four scenarios:  Flight Cruise  Year-DOY (4 alphanumeric) - This field stores two metadata items in the order:   1. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042 2. Three integers in range “001-365” representing Day-of-Year (DOY)   Flight Surface  Sol (4 integer) - This field stores the 4-integer Sol (Mars solar day) of the first (i.e., lowest Clock time) acquired instrument data.  Ground Test in which SCLK in NOT reset  When SCLK continuously increments and does NOT repeat, there are two variants:   1. Year-DOY (4 alphanumeric) - This field stores two metadata items in the order:    1. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042    2. Three integers in range “001-365” representing Day-of-Year (DOY)   – OR –   1. Sol (4 integer) - This field stores the 4-integer Sol (Mars solar day) of the first (i.e., lowest Clock time) acquired instrument data.   Ground Test in which SCLK is reset  When SCLK is reset and repeats, we lose time “uniqueness”. So, we have to change from SCLK to using “wall clock” derived from ERT and represent with a UTC-like format:  DOY-Year (4 alphanumeric) - This field stores two metadata items in reverse order compared to the previous “Year-DOY” cases, indicating that the Secondary Time field (described later) contains ERT   1. Three integers in range “001-365” representing Day-of-Year (DOY) 2. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042   This field’s value type (Sol or Year/DOY) dictates the value type for the Secondary time field (SCLK or UTC-like).   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Scenario** | **Time**  **Type** | **Value**  **Format** | **Valid**  **Values** | **Time**  **Range** | | Flight  Cruise | Year-DOY | A<ddd>,  B<ddd>,  .  .  .  Z<ddd> | A001, A002, … A365,  B001, B002, … B365,  .  .  .  Z001, Z002, …, Z365 | 2017 DOY 1 – 365,  2018 DOY 1 – 365,  .  .  .  2042 DOY 1 – 365 | | <aaaa> | “\_ \_ \_ \_” (4 underscores) | Value is out of range | | Flight  Surface | Sol | <nnnn> | 0000, 0001, … 9999 | 0 thru 9999 | | <aaaa> | “\_ \_ \_ \_” (4 underscores) | Value is out of range | | Ground  Test  SCLK  NOT  reset | Year-DOY | (same as Flight Cruise) | (same as Flight Cruise) | (same as Flight Cruise) | | Sol | <nnnn> | “0000”, “0001”, … “9999” | 0 thru 9999 | | <aaaa> | “\_ \_ \_ \_” (4 underscores) | Value is out of range | | Ground  Test  SCLK  Reset | DOY-Year | <ddd>A,  <ddd>B,  .  .  .  <ddd>Z | 001A, 002A, … 365A,  001B, 002B, … 365B,  .  .  .  001Z, 002Z, … 365Z | DOY 1 – 365 2017,  DOY 1 – 365 2018,  .  .  .  DOY 1 – 365 2042 | | <aaaa> | “\_ \_ \_ \_” (4 underscores) | Value is out of range | |
| Venue | 9 (1, a) | Mission venue identifier:   * \_ : Flight (surface or cruise) * A : AVSTB * F : FSWTB * M : MSTB * R : “ROASTT” * S : “Scarecrow” * V : VSTB   Other venue identifiers may be defined later. |
| Secondary timestamp | 10 (10, i) | Secondary timestamp of finer granularity than the Primary timestamp. Value type is based on either of four scenarios:  Flight Cruise  SCLK – This field stores the 10-integer SCLK (seconds). Which specific SCLK count (Start or End) is used depends on the instrument, but nominally it is the starting count of the first (i.e., lowest Clock time) acquired instrument data.  Flight Surface  SCLK – Same as for “Flight Cruise”  Ground Test in which SCLK in NOT reset  SCLK – Same as for “Flight Cruise”  Ground Test in which SCLK is reset  ERT - This field stores the ERT time portions Month, Day-of-month, Hour and Seconds as 10 integers in a UTC-like format  This field’s value type associates with the value type of the Primary timestamp field.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Scenario** | **Time**  **Type** | **Value**  **Format** | **Valid**  **Values** | **Time**  **Range** | | Flight Cruise | SCLK | <ssssssssss>  (Seconds) | 0000000000,  0000000001,  •  •  •  9999999999 | 0 thru 9999999999 | | <aaaaaaaaaa> | “\_ \_ \_ \_ \_ \_ \_ \_ \_ \_”  (10 underscores) | Value is out of range | | Flight Surface | SCLK | (same as Flight Cruise) | (same as Flight Cruise) | (same as Flight Cruise) | | Ground Test  SCLK  NOT reset | SCLK | (same as Flight Cruise) | (same as Flight Cruise) | (same as Flight Cruise) | | Ground Test  SCLK  reset | ERT | <MMDDHHmmss>  (Month, Day-of-month, Hour, Minute, Second) | “0101010000”,  “0101010001”,  •  •  •  “1231235959” | January 1, 01:00:00  thru  December 31, 23:59:59 | | <aaaaaaaaaa> | “\_ \_ \_ \_ \_ \_ \_ \_ \_ \_”  (10 underscores) | Value is out of range | |
| \_ | 20 (1, a) | Underscore for readability. Always set to “\_”. |
| Milliseconds | 21 (3, i) | Milliseconds of either the SCLK or UTC. |
| Product type | 24 (3, a) | Product identifier. See **Table 4**. |
| Geometry | 27 (1, a) | Linearization flag. Applicable to image RDRs only, otherwise it is set to ‘\_’ for N/A.   * \_ : Non-linearized (raw geometry) * L : Product has been linearized with nominal stereo partner * A : Product has been linearized with an actual stereo partner.   Note that for the “A” case, an image can have multiple stereo partners and the linearized images will be different for each partner. A user will need to look in the ODL/VICAR label to determine which partner was used for linearization. |
| Thumbnail | 28 (1, a) | Thumbnail flag.  Applicable to image RDRs only, otherwise it is set to ‘\_’ for N/A.   * T : Product is a thumbnail * N : Nominal Product is a non-thumbnail (full-frame, sub-frame, downsample) |
| Site | 29 (3, i/a) | Site identifier.See Section 6.1.7 on Site frames.  Site location count from the RMC where the data was acquired.   |  |  | | --- | --- | | Values | Range | | 000, 001, …, 999 | 0 thru 999 | | A00, A01, …, A99 | 1000 thru 1099 | | B00, B01, …, B99 | 1100 thru 1199 | | … | … | | Z00, Z01, … Z99 | 3500 thru 3599 | | AA0, AA1, …, AA9 | 3600 thru 3609 | | AB0, AB1, …, AB9 | 3610 thru 3619 | | … | … | | ZZ0, ZZ1, …, ZZ9 | 10350 thru 10359 | | AAA, AAB, …, AAZ | 10360 thru 10385 | | ABA, ABB, …, ABZ | 10386 thru 10411 | | … | … | | ZZA, ZZB, …, ZZZ | 27910 thru 27935 | | 0AA, 0AB, …, 0AZ | 27936 thru 27961 | | 0BA, 0BB, …, 0BZ | 27962 thru 27987 | | … | … | | 7CA, 7CB, …, 7CZ | 32720 thru 32745 | | 7DA, 7DB, …, 7DV | 32746 thru 32767 | | \_ \_ \_ | Value out of range | |
| Drive | 32 (4, i/a) | Drive identifier.  Drive count (position within a Site location) from the RMC where the data was acquired.   |  |  | | --- | --- | | Values | Range | | 0000, 0001, …, 9999 | 0 thru 9999 | | A000, A001, …, A999 | 10000 thru 10999 | | B000, B001, …, B999 | 11000 thru 11999 | | … | … | | Z000, Z001, … Z999 | 35000 thru 35999 | | AA00, AA01, …, AA99 | 36000 thru 36099 | | AB00, AB01, …, AB99 | 36100 thru 36199 | | … | … | | AZ00, AZ01, …, AZ99 | 38500 thru 38599 | | BA00, BA01, …, BA99 | 38600 thru 38699 | | BB00, BB01, …, BB99 | 38700 thru 38799 | | … | … | | LJ00, LJ01, …, LJ35 | 65500 thru 65535 | | \_ \_ \_ \_ | Value is out of range | |
| Seq-ID/RTT | 36 (9, i/a) | Sequence-ID or Round-Trip Tracking token (RTT):   * Sequence-ID : Identifier indicating the command sequenced the image was acquired from. Specific values will be assigned by the uplink team. * RTT : Unique identifier used for tracking activities. Used in filename for PIXL ONLY.   Note: All cameras will have an RTT associated with their images but not included in the filename. PIXL is a special case where RTT and PMC are required for filename uniqueness. |
| Camera specific | 45 (4, i/a) | Camera specific identifier. Applicable to image RDRs only, otherwise it is set to ??? for N/A.  For the PIXL MCC, this field has the format ‘PPPP’ representing the PMC. Valid values are TBD. |
| Downsample | 49 (1, i/a) | Downsample resolution identifier.Applicable to image RDRs only, otherwise it is set to ??? for N/A.  This value (n) indicates the level of downsampling applied to the image by the following equation:  Resolution = 2n x 2n   |  |  | | --- | --- | | Valid values | Resolution | | 0 | 1x1 | | 1 | 2x2 | | 2 | 4x4 | | 3 | 8x8 | | … | ... | |
| Compression | 50 (2, i/a) | Compression type identifier. Applicable to image RDRs only, otherwise it is set to ??? for N/A.  There are several modes of compression available, varying per instrument. The uplink team will decide which algorithm will provide the best results on a per sequence basis. For ECAM reconstructed images, compression value represents the compression level of the best tile(s) in the reconstruction.   |  |  |  | | --- | --- | --- | | Type | Valid values | Description | | JPEG  (lossy) | 00  01-99  A0 | Thumbnail  Jpeg quality level  Jpeg quality level 100 | | ICER  (lossy) | I1, I2, …, I8  I9 | 1 bpp, 2 bpp, …, 8 bpp  Anything higher than 8 bpp | | Lossless | LI  LL  LM  LU | ICER  LOCO  Malin  Uncompressed | |
| Producer | 52 (1, a) | Identifier for the institution/team that created this product:   * J : JPL (IDS/MIPL) * P : Principal investigator of instrument.  |  |  | | --- | --- | | Instrument | PI | | ECAM | JPL | | MCZ | ASU (Tempe, AZ) | | SCAM RMI | IRAP (France) | | PIXL MCC | TBD | | SHERLOC | JPL | | MEDA Skycam | Ministry of Education and Science (Spain) | | EDL Cameras | JPL | | HELI RTE/NAV | JPL |  * A – I, K – O, Q – Z : Co-I to be identified per instrument at the discretion of the instrument PI. * \_ : undefined/other   Other producer codes will be added in the future. |
| Version | 53 (2, a) | Product version number which increments by one whenever a previously generated file with an otherwise identical filename exists.   |  |  | | --- | --- | | Values | Range | | 01, 02 …, 99 | 1 thru 99 | | A0, A1, …, A9 | 100 thru 109 | | AA, AB, …, AZ | 110 thru 135 | | B0, B1, B2 …, B9 | 136 thru 145 | | BA, BB, …, BZ | 146 thru 171 | | … | … | | Z0, Z1, …, Z9 | 1000 thru 1009 | | ZA, ZB, …, ZZ | 1010 thru 1035 | | \_ \_ | Value is out of range |   Every version need not exist. E.g. version 01, 02, and 04 may exist but not 03. In general, the highest-numbered version represents the best version of that product. This field increments independently of all fields. |
| . | 55 (1, a) | Separator for filename and extension. Always set to “.” |
| Extension | 56 (3, a) | File extension   * CSV : comma separated file * VIC : VICAR file * IMG : Same as .VIC with ODL label * LBL : Label file * PNG : PNG formatted image file (no label) * TXT : ASCII text file * XML : xml file * msa : Mission Support Area file   Note: other file extensions to be added in the future |