# Appendix J. Standard DSN Block Format

This appendix shows the layout of the standard DSN block (SDB) as applied to the ACE mission.

| SYNC CODE FE6B2840 | DDD Header | Spacecraft Telemetry Data SFDU | DDD Trailer |
|---|---|---|---|
| 4 bytes | 20 bytes | 1096 bytes | 2 bytes (all 0's) |

**Figure J-1. Standard DSN Block**

| JPL Primary Label | Primary Header | Tlm Data Secondary Header | Tlm Data Block Header | Downlinked Frame |
|---|---|---|---|---|
| 24 bytes | 8 bytes | 64 bytes | 4 bytes | 996 bytes |

**Figure J-2. Standard Formatted Data Unit**

| Sync Code | Virtual Channel Transfer Frame | R-S Check Symbols |
|---|---|---|
| 4 bytes | 864 bytes | 128 bytes |

**Figure J-3. Dowlinked Frame**

| VCTF Header | Packet Header | Minor Frame Header | Telemetry Data | CLCW |
|---|---|---|---|---|
| 6 bytes | 10 bytes | 2 bytes | 842 bytes | 4 bytes |

**Figure J-4. Virtual Channel Transfer Frame**

| BIT | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WORD 1 | Destination Assembly = ACED (hex) | | | | | | | | | | | | | | | |
| 2 | Source Assembly | | | | | | | | | | | | | | | |
| 3 | Stream Description | | | | | | | | | | | | | | | |
| 4 | Total Length (bytes) = 1118 | | | | | | | | | | | | | | | |
| 5 | Block Serial Number | | | | | | | | | | | | | | | |
| 6 | Protocol = 1 | | | | | | | | Day of Year | | | | | | | |
| 7 | Time | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | Virtual Stream ID | | | | | | | |
| 9 | Year | | | | | | | | | | | | | | | |
| 10 | GOS | | | | | | | | Reserved | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

**Figure J-5. DDD Header**

| BIT | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WORD 1 | JPL Control Authority Identifier = 'NJPL' | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | Version ID = '2' | | | | | | | | Class ID = 'Z' | | | | | | | |
| 4 | Spare = '00' | | | | | | | | | | | | | | | |
| 5 | Data Description ID = '0067' | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | Length of Telemetry Data SFDU (in bytes) = 1076 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 11 | Aggregation Type Code = 1 | | | | | | | | | | | | | | | |
| 12 | Length of Aggregation = 72 | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

**Figure J-6. SFDU JPL Primary Label**

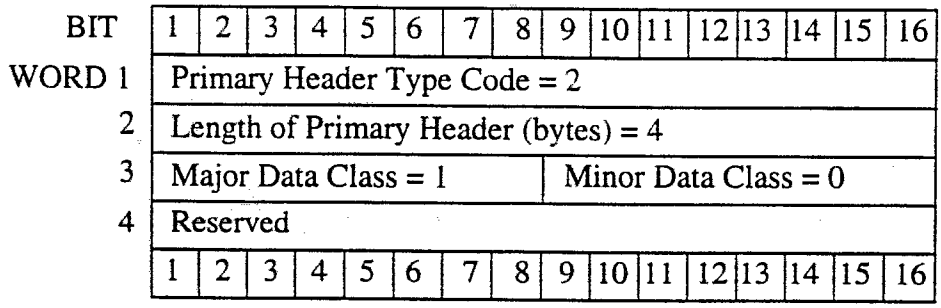


**Figure J-7. SFDU Primary Header**

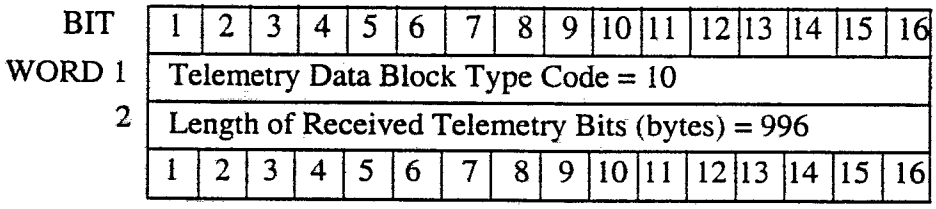


**Figure J-8. SFDU Telemetry Data Block Header**

| Ver. No. | Transfer Frame ID | | | Master Channel Frame Count | Virtual Channel Frame Count | Transfer Frame Data Field Status | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | S/C ID | Virt. Chan. ID | OP Ctrl Field | | | Sec. Head. Flag | Sync Flag | Packet Order Flag | Seg. Length ID | First Head. Pntr |
| 2 bits | 10 b. | 3 bits | 1 bit | 8 bits | 8 bits | 1 bit | 1 bit | 1 bit | 2 bits | 11 bits |

**Figure J-10. VCTF Header**

| Version No. | Packet Identification | | | Packet Sequence Ctrl | | Packet Length |
|---|---|---|---|---|---|---|
| | Type | Secondary Hdr Flag | App ID | Group Flags | Source Seq Cnt | |
| 3 bits | 1 bit | 1 bit | 11 bits | 2 bits | 14 bits | 16 bits |

**Figure J-11. Packet Primary Header**

| Spacecraft Time |
|---|
| 32 bits |

**Figure J-12. Packet Secondary Header**

| Format ID | Sun Sensor ID | C&DH ID | Collection Format | Major Frame Count | Minor Frame Count |
|---|---|---|---|---|---|
| 4 bits | 2 bits | 2 bits | 1 bit | 3 bits | 4 bits |

**Figure J-13. Minor Frame Header**

| Control Word Type=1 | Cmd Exec Counter | Virtual Channel ID | Low Voltage Sense | Cmd Reject | Flags | Farm B Counter | Auton. Bin Firing | Report Value |
|---|---|---|---|---|---|---|---|---|
| 1 bit | 7 bits | 6 bits | 1 bit | 1 bit | 5 bits | 2 bits | 1 bit | 8 bits |

**Figure J-14. CLCW**

| BIT | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WORD 1 | Secondary Header Type Code = 70 | | | | | | | | | | | | | | | |
| 2 | Length of Secondary Header (bytes) = 60 | | | | | | | | | | | | | | | |
| 3 | Originator ID = 48 | | | | | | | | Last Modifier ID = 48 | | | | | | | |
| 4 | Spacecraft ID = 134 octal | | | | | | | | Virtual Stream ID | | | | | | | |
| 5 | Error Flags = 0 | | | | | | | | | | | | | | | |
| 6<br>7<br>8 | Earth Received Time | | | | | | | | | | | | | | | |
| 9 | Reserved = 0 | | | | | | | | | | | | | | | |
| 10<br>11 | Record Sequence Number | | | | | | | | | | | | | | | |
| 12 | Acquisition BET = 0 | | | | | | | | Maintenance BET = 0 | | | | | | | |
| 13 | Verify Count = 0 | | | | | | | | Flywheel Count = 0 | | | | | | | |
| 14 | Number of Received Telemetry Bits = 7968 | | | | | | | | | | | | | | | |
| 15 | Frame Sync Mode Flags = 0 | | | | | | | | Sync Status = 0 | | | | | | BitSlip=0 | |
| 16 | RS Decoder Status = 0 | | | | | | | | RS Codeword Status = 0 | | | | | | | |
| 17 | Sync Word Bit Errors = 0 | | | | | | | | Frequency Band = 53 hex | | | | | | | |
| 18<br>19 | Bit Rate | | | | | | | | | | | | | | | |
| 20 | RS Symbol Error Count | | | | | | | | | | | | | | | |
| 21<br>22 | System Noise Temperature | | | | | | | | | | | | | | | |
| 23<br>24 | Symbol SNR | | | | | | | | | | | | | | | |
| 25<br>26 | Receiver Signal Level | | | | | | | | | | | | | | | |
| 27 | Reserved | | | | | | | | | | | | | | | |
| 28 | Master Antenna Num = 128 | | | | | | | | Master Receiver Num = 1 | | | | | | | |
| 29 | DTM Group Number = 1 | | | | | | | | DTM Channel Number = 1 | | | | | | | |
| 30 | Lock Status = 0 | | | | | | | | | | | | | | | |
| 31 | DTM Software Number = 0 | | | | | | | | | | | | | | | |
| 32 | Reserved | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

**Figure J-9. SFDU Telemetry Data Secondary Header**