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Cluster2 FGM

User's Manual Appendix J

Instrument Patches

Revisions

Issue	Rev.	Date	Sec.	Page	Change
Issue 1	0	7/12/99			Creation of Appendix J
Issue 1	1	11/01/99			Each patch given sequence number
Issue 1	2	21/03/00			Revised extended patch inserted ML2 counter patch created
Issue 3		5/7/00			Introduction altered to reflect incorporation of patch uplink into default boot sequence. IPCH files added.

This appendix lists all software patches to be uplinked to the FGM after power on. Each patch is listed as a series of ML2 commands, ~~and given a sequence number~~. These sequences are uplinked during a Boot Type 2 sequence as delta uplinked IPCH files. These are also reproduced below for the sake of completeness. ~~referenced by a Boot 2 type power on sequence i.e. the patches should be uplinked each time the FGM is switched on~~. There should be an interval of not less than one spacecraft reset pulse between patches. In the description below each patch is preceded by a justification followed by the patch itself. There are two separate sets of patches, the extended mode patch which involves 15 separate patches and the ML2 counter patch which consists of two separate patches.

Instrument Patches

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1. Extended mode patch

At the request of ESOC it was decided that it would be advantageous if the FGM could supply HK telemetry during extended mode. The FGM flight code's extended mode sequences as implemented in the FGM DPU does not gather or serve HK data. A software patch is required to implement this enhanced functionality. As the patch essentially involves a complete reconfiguration of a special telemetry mode it is necessarily very large. The complete patch is made up of 15 separate patches. These are listed and described below. The patches must be sent up in the order displayed.

SEQMP01 (PREPATCH.TXT) This patch configures the flight code to receive the subsequent 14 patches.

```
zef2pats,0x0000
zef2mlts,0xb7bc
zef2mlts,0x031b
zef2mlts,0x03a0
zef2mlts,0x0001
zef2mlts,0xb100
```

SEQMP02 (NOCALL.TXT) This patch disables the call to the extended mode routine from the main control loop.

```
zef2pats,0x0000
zef2mlts,0xad92
zef2mlts,0xcb1b
zef2mlts,0x0531
zef2mlts,0x0004
zef2mlts,0x5010
zef2mlts,0x1d11
zef2mlts,0x5310
zef2mlts,0x1d11
```

SEQMP03 (NOSUM.TXT) This patch disables the call to the sumcheck routine from the main control loop.

```
zef2pats,0x0000
zef2mlts,0x9e2e
zef2mlts,0xbbbb
zef2mlts,0x052d
zef2mlts,0x0004
zef2mlts,0x5010
zef2mlts,0x1d11
zef2mlts,0x5310
zef2mlts,0x1d11
```

SEQMP04 (PART1.TXT) This patch is the first part of a rewritten section of extended mode to provide gathering and serving of HK data.

```
send zef2pats,0x0000
send zef2mlts,0xbaf6
send zef2mlts,0xaaaa
send zef2mlts,0x18e1
```

```

send zef2mlts,0x002d
send zef2mlts,0x90f0
send zef2mlts,0x1c0b
send zef2mlts,0x80f0
send zef2mlts,0x1e63
send zef2mlts,0x7020
send zef2mlts,0x1a46
send zef2mlts,0x8510
send zef2mlts,0x0000
send zef2mlts,0x8520
send zef2mlts,0x3053
send zef2mlts,0x8530
send zef2mlts,0x305c
send zef2mlts,0x4812
send zef2mlts,0x0000
send zef2mlts,0x4813
send zef2mlts,0x0000
send zef2mlts,0x9100
send zef2mlts,0x1c4b
send zef2mlts,0x9100
send zef2mlts,0x1c47
send zef2mlts,0x9110
send zef2mlts,0x1c4d
send zef2mlts,0x9100
send zef2mlts,0x1c4e
send zef2mlts,0x9110
send zef2mlts,0x1c48
send zef2mlts,0x9100
send zef2mlts,0x1d10
send zef2mlts,0x9100
send zef2mlts,0x1c78
send zef2mlts,0x8010
send zef2mlts,0x1c82
send zef2mlts,0x4a11
send zef2mlts,0x8000
send zef2mlts,0x48f1
send zef2mlts,0x0000
send zef2mlts,0xf0f0
send zef2mlts,0x1ce9
send zef2mlts,0x75f8
send zef2mlts,0x8010
send zef2mlts,0x1c82
send zef2mlts,0x4a11
send zef2mlts,0x8000
send zef2mlts,0x4831
send zef2mlts,0x0000

```

SEQMP05 (PART2.TXT) This patch is the second part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x200f
send zef2mlts,0xaaaa
send zef2mlts,0x190e
send zef2mlts,0x002d
send zef2mlts,0x85B0

```

```

send zef2mlts,0xB101
send zef2mlts,0x48CB
send zef2mlts,0x0000
send zef2mlts,0x570C
send zef2mlts,0x7050
send zef2mlts,0x1A4A
send zef2mlts,0xF030
send zef2mlts,0x1CE9
send zef2mlts,0x7513
send zef2mlts,0x8153
send zef2mlts,0xB050
send zef2mlts,0x1CE9
send zef2mlts,0x9030
send zef2mlts,0x1CE9
send zef2mlts,0x9030
send zef2mlts,0x1D0C
send zef2mlts,0x9100
send zef2mlts,0x1D0D
send zef2mlts,0x8560
send zef2mlts,0x0000
send zef2mlts,0x6785
send zef2mlts,0x9650
send zef2mlts,0x1D0E
send zef2mlts,0x9100
send zef2mlts,0x1D0B
send zef2mlts,0x72F0
send zef2mlts,0x1993
send zef2mlts,0x72F0
send zef2mlts,0x192F
send zef2mlts,0x72F0
send zef2mlts,0x19E0
send zef2mlts,0x74DA
send zef2mlts,0x90F0
send zef2mlts,0x1C0C
send zef2mlts,0x80E0
send zef2mlts,0x1C81
send zef2mlts,0x4AE1
send zef2mlts,0x8000
send zef2mlts,0x48FE
send zef2mlts,0x0000
send zef2mlts,0xB0F0
send zef2mlts,0x1D0C
send zef2mlts,0x7110
send zef2mlts,0x1C0C

```

SEQMP06 (PART3.TXT) This patch is the third part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x9698
send zef2mlts,0xaaaa
send zef2mlts,0x193b
send zef2mlts,0x002d
send zef2mlts,0x8630
send zef2mlts,0x1D0C
send zef2mlts,0xA630

```

```

send zef2mlts,0x1D0E
send zef2mlts,0x9630
send zef2mlts,0x1D0C
send zef2mlts,0x8030
send zef2mlts,0x1C98
send zef2mlts,0x8020
send zef2mlts,0x1C8B
send zef2mlts,0x72F0
send zef2mlts,0x0BBF
send zef2mlts,0x9030
send zef2mlts,0x2000
send zef2mlts,0x6203
send zef2mlts,0x67F3
send zef2mlts,0xA630
send zef2mlts,0x1D05
send zef2mlts,0x9630
send zef2mlts,0x1D05
send zef2mlts,0x8030
send zef2mlts,0x1C98
send zef2mlts,0xA230
send zef2mlts,0x72F0
send zef2mlts,0x0BBF
send zef2mlts,0x9030
send zef2mlts,0x2001
send zef2mlts,0x6203
send zef2mlts,0x8143
send zef2mlts,0x8030
send zef2mlts,0x1C98
send zef2mlts,0xA231
send zef2mlts,0x72F0
send zef2mlts,0x0BBF
send zef2mlts,0x9030
send zef2mlts,0x2002
send zef2mlts,0x6203
send zef2mlts,0x8153
send zef2mlts,0x8164
send zef2mlts,0x8173
send zef2mlts,0x8184
send zef2mlts,0x80F0
send zef2mlts,0x1D0B
send zef2mlts,0x4AFA
send zef2mlts,0x0080

```

SEQMP07 (PART4.TXT) This patch is the fourth part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x4934
send zef2mlts,0xaaaa
send zef2mlts,0x1968
send zef2mlts,0x002d
send zef2mlts,0x760D
send zef2mlts,0xB453
send zef2mlts,0xB464
send zef2mlts,0x4AFA
send zef2mlts,0x0100

```

```
send zef2mlts,0x7608
send zef2mlts,0xB473
send zef2mlts,0xB484
send zef2mlts,0x4AFA
send zef2mlts,0x0180
send zef2mlts,0x7603
send zef2mlts,0x8153
send zef2mlts,0x8164
send zef2mlts,0x8135
send zef2mlts,0xA138
send zef2mlts,0x81B6
send zef2mlts,0xB1B7
send zef2mlts,0x67F3
send zef2mlts,0xA630
send zef2mlts,0x1D09
send zef2mlts,0x9630
send zef2mlts,0x1D09
send zef2mlts,0x67FB
send zef2mlts,0xA6B0
send zef2mlts,0x1D07
send zef2mlts,0x96B0
send zef2mlts,0x1D07
send zef2mlts,0x72F0
send zef2mlts,0x1157
send zef2mlts,0xA300
send zef2mlts,0x1D0B
send zef2mlts,0x72F0
send zef2mlts,0x1507
send zef2mlts,0x80F0
send zef2mlts,0x1C78
send zef2mlts,0x7050
send zef2mlts,0x1A4A
send zef2mlts,0x48F0
send zef2mlts,0xA00F
send zef2mlts,0x7050
send zef2mlts,0x1A4A
send zef2mlts,0x7170
send zef2mlts,0x1C0C
send zef2mlts,0x90F0
send zef2mlts,0x1C0C
```

SEQMP08 (PART5.TXT) This patch is the fifth part of a rewritten section of extended mode to provide gathering and serving of HK data.

```
send zef2pats,0x0000
send zef2mlts,0x723e
send zef2mlts,0xaaaa
send zef2mlts,0x1995
send zef2mlts,0x002d
send zef2mlts,0x80F0
send zef2mlts,0x1C7C
send zef2mlts,0x4AF1
send zef2mlts,0x8000
send zef2mlts,0x48EF
send zef2mlts,0x0000
send zef2mlts,0x90E0
```



```

send zef2mlts,0x1D13
send zef2mlts,0x80F0
send zef2mlts,0x1D10
send zef2mlts,0x4AFA
send zef2mlts,0x6000
send zef2mlts,0x7021
send zef2mlts,0x0000
send zef2mlts,0x8630
send zef2mlts,0x1D05
send zef2mlts,0x6783
send zef2mlts,0x80F0
send zef2mlts,0x1C7E
send zef2mlts,0x484F
send zef2mlts,0x0000
send zef2mlts,0x85E0
send zef2mlts,0x3059
send zef2mlts,0x484E
send zef2mlts,0x0000
send zef2mlts,0x9100
send zef2mlts,0x1D05
send zef2mlts,0x9100
send zef2mlts,0x1D06
send zef2mlts,0x8630
send zef2mlts,0x1D07
send zef2mlts,0x6783
send zef2mlts,0x484F
send zef2mlts,0x0000
send zef2mlts,0x484E
send zef2mlts,0x0000
send zef2mlts,0x9100
send zef2mlts,0x1D07
send zef2mlts,0x9100
send zef2mlts,0x1D08
send zef2mlts,0x8630
send zef2mlts,0x1D09
send zef2mlts,0x6783
send zef2mlts,0x484F
send zef2mlts,0x0000

```

SEQMP09 (PART6.TXT) This patch is the sixth part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x4bb6
send zef2mlts,0xaaaa
send zef2mlts,0x19c2
send zef2mlts,0x002d
send zef2mlts,0x484E
send zef2mlts,0x0000
send zef2mlts,0x9100
send zef2mlts,0x1D09
send zef2mlts,0x9100
send zef2mlts,0x1D0A
send zef2mlts,0x8040
send zef2mlts,0x1C6B
send zef2mlts,0x8030

```

```

send zef2mlts,0x1CA0
send zef2mlts,0x80D0
send zef2mlts,0x1C98
send zef2mlts,0x7A02
send zef2mlts,0x51C3
send zef2mlts,0x6633
send zef2mlts,0x484F
send zef2mlts,0x0000
send zef2mlts,0x484E
send zef2mlts,0x0000
send zef2mlts,0x85B0
send zef2mlts,0xB101
send zef2mlts,0x48CB
send zef2mlts,0x0000
send zef2mlts,0x570C
send zef2mlts,0x7050
send zef2mlts,0x1A4A
send zef2mlts,0xA300
send zef2mlts,0x1D10
send zef2mlts,0x7170
send zef2mlts,0x1C0C
send zef2mlts,0x90F0
send zef2mlts,0x1C0C
send zef2mlts,0x80D0
send zef2mlts,0x1C83
send zef2mlts,0x4AD1
send zef2mlts,0x8000
send zef2mlts,0x48FD
send zef2mlts,0x0000
send zef2mlts,0x85B0
send zef2mlts,0xB101
send zef2mlts,0x48CB
send zef2mlts,0x0000
send zef2mlts,0x570C
send zef2mlts,0x7501
send zef2mlts,0xF0F0

```

SEQMP0A (PART7.TXT) This patch is the seventh part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x4b25
send zef2mlts,0xaaaa
send zef2mlts,0x19ef
send zef2mlts,0x002d
send zef2mlts,0x1C6C
send zef2mlts,0x7544
send zef2mlts,0x90F0
send zef2mlts,0x1C6C
send zef2mlts,0xA300
send zef2mlts,0x1C6B
send zef2mlts,0x85F0
send zef2mlts,0xC280
send zef2mlts,0x80D0
send zef2mlts,0x1C7C
send zef2mlts,0x48FD

```

```

send zef2mlts,0x0000
send zef2mlts,0x85F0
send zef2mlts,0x000E
send zef2mlts,0x80D0
send zef2mlts,0x1C7E
send zef2mlts,0x48FD
send zef2mlts,0x0000
send zef2mlts,0x85F0
send zef2mlts,0x212A
send zef2mlts,0x90F0
send zef2mlts,0x1CF0
send zef2mlts,0x8030
send zef2mlts,0x1C78
send zef2mlts,0x903F
send zef2mlts,0x0000
send zef2mlts,0x8040
send zef2mlts,0x1CDB
send zef2mlts,0x4A47
send zef2mlts,0xFFC0
send zef2mlts,0x8030
send zef2mlts,0x1CDC
send zef2mlts,0x4A37
send zef2mlts,0xFFC0
send zef2mlts,0x8550
send zef2mlts,0x0000
send zef2mlts,0x6694
send zef2mlts,0xE134
send zef2mlts,0x903F
send zef2mlts,0x0001
send zef2mlts,0x8030
send zef2mlts,0x1CDD
send zef2mlts,0x6013
send zef2mlts,0x6133
send zef2mlts,0xE135

```

SEQMP0B (PART8.TXT) This patch is the eighth part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0xa296
send zef2mlts,0xaaaa
send zef2mlts,0x1a1c
send zef2mlts,0x002d
send zef2mlts,0x903F
send zef2mlts,0x0002
send zef2mlts,0x8030
send zef2mlts,0x1CDE
send zef2mlts,0x4A37
send zef2mlts,0xFFC0
send zef2mlts,0xE030
send zef2mlts,0x0002
send zef2mlts,0x903F
send zef2mlts,0x0003
send zef2mlts,0x8030
send zef2mlts,0x1C6B
send zef2mlts,0x903F

```

```

send zef2mlts,0x0004
send zef2mlts,0x72F0
send zef2mlts,0x0667
send zef2mlts,0x9100
send zef2mlts,0x1D00
send zef2mlts,0x9100
send zef2mlts,0x1D01
send zef2mlts,0x72F0
send zef2mlts,0x15BF
send zef2mlts,0x9110
send zef2mlts,0x1C52
send zef2mlts,0x80D0
send zef2mlts,0x1C85
send zef2mlts,0x4AD1
send zef2mlts,0x8000
send zef2mlts,0x48FD
send zef2mlts,0x0000
send zef2mlts,0x57FF
send zef2mlts,0x7020
send zef2mlts,0x1A46
send zef2mlts,0x85E0
send zef2mlts,0x0205
send zef2mlts,0xF0E0
send zef2mlts,0x1D0B
send zef2mlts,0x7903
send zef2mlts,0x5080
send zef2mlts,0x1C78
send zef2mlts,0x7170
send zef2mlts,0x1C0C
send zef2mlts,0x9100
send zef2mlts,0x1E63
send zef2mlts,0x7170

```

SEQMP0C (PART9.TXT) This patch is the ninth part of a rewritten section of extended mode to provide gathering and serving of HK data.

```

send zef2pats,0x0000
send zef2mlts,0x2d7e
send zef2mlts,0xaaaa
send zef2mlts,0x1a49
send zef2mlts,0x0025
send zef2mlts,0x1C0B
send zef2mlts,0x9100
send zef2mlts,0x1E63
send zef2mlts,0x7170
send zef2mlts,0x1C0B
send zef2mlts,0x90F0
send zef2mlts,0x1C34
send zef2mlts,0x84F0
send zef2mlts,0x1C77
send zef2mlts,0xA0F0
send zef2mlts,0x1C3C
send zef2mlts,0x90F0
send zef2mlts,0x1C3C
send zef2mlts,0xA300
send zef2mlts,0x1C77

```

```

send zef2mlts,0x8030
send zef2mlts,0x1C77
send zef2mlts,0x4A3A
send zef2mlts,0x1AFF
send zef2mlts,0x780C
send zef2mlts,0x8530
send zef2mlts,0x0010
send zef2mlts,0x9030
send zef2mlts,0x1C77
send zef2mlts,0x9100
send zef2mlts,0x1C3C
send zef2mlts,0xF0F0
send zef2mlts,0x0003
send zef2mlts,0x7503
send zef2mlts,0x50C0
send zef2mlts,0x1C78
send zef2mlts,0x7170
send zef2mlts,0x1C34
send zef2mlts,0x5010
send zef2mlts,0x1D11
send zef2mlts,0x5310
send zef2mlts,0x1D11

```

SEQMP0D (SUM2PTR.TXT) This patches the pointer to the sumcheck routine

```

send zef2pats,0x0000
send zef2mlts,0xd025
send zef2mlts,0xabcd
send zef2mlts,0x0a09
send zef2mlts,0x0001
send zef2mlts,0x1a4e

```

SEQMP0E (SUMOK.TXT) This patch re-enables the call to the sumcheck routine from the main control loop.

```

send zef2pats,0x0000
send zef2mlts,0xaddd
send zef2mlts,0xaaaa
send zef2mlts,0x052d
send zef2mlts,0x0004
send zef2mlts,0x80fa
send zef2mlts,0x0a09
send zef2mlts,0x72ff
send zef2mlts,0x0000

```

SEQMP0F (CALLOK1.TXT) This patch re-enables the call to the extended mode routine from the main control loop.

```

send zef2pats,0x0000
send zef2mlts,0xe7ee
send zef2mlts,0xe49f
send zef2mlts,0x0531

```

```
send zef2mlts,0x0004  
send zef2mlts,0x80fa  
send zef2mlts,0x0a21  
send zef2mlts,0x72ff  
send zef2mlts,0x0000
```

2. ML2 counter patch

Currently during FGM operation an ML2 command sent up on the inactive interface causes the ML2 counter to increment once per reset until the instrument is reset or powered off. The reason for this is due to a bug in the reset service routine. This results in the DPU recognising that there is a pending ML2 command (and incrementing the ML2 counter) but subsequently not reading, clearing and processing the command. The following two patches address the situation by rewriting the relevant sections of the reset service routine.

SEQMP10 (REDINT.TXT) This patch rewrites a section of the reset service routine to correctly read and clear an ML2 command from the inactive interface.

```
send zef2pats,0x0000
send zef2mlts,0xa6d3
send zef2mlts,0xcb1b
send zef2mlts,0x0b2c
send zef2mlts,0x000c
send zef2mlts,0x4af1
send zef2mlts,0x8000
send zef2mlts,0x483f
send zef2mlts,0x0000
send zef2mlts,0x9430
send zef2mlts,0x1c89
send zef2mlts,0xa300
send zef2mlts,0x1c89
send zef2mlts,0xa300
send zef2mlts,0x1c76
send zef2mlts,0x7170
send zef2mlts,0x1c28
```

SEQMP11 (BRANCH.TXT) This patch modifies the jump length of a branch command in the reset service affected by the uplink of **SEQMP10**.

```
send zef2pats,0x0000
send zef2mlts,0x8fa8
send zef2mlts,0x0a71
send zef2mlts,0x0b27
send zef2mlts,0x0001
send zef2mlts,0x7a0f
```

3. Extended mode patch IPCH files

lfgmex14

```
! Standard file header
IPCH 0014 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX14      FGM 1234   1
!
! File specific header (second header)
This Command Definition is the ext mode prepatch
!
! First patch (header and data)
  b7bc      5 6f78
b7bc 031b 03a0 0001 b100
!
```

lfgmex15

```
! Standard file header
IPCH 0015 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX15      FGM 1234   1
!
! File specific header (second header)
This Command Definition patches the ext mode call
!
! First patch (header and data)
  ad92      8 5b24
ad92 cb1b 0531 0004 5010 1d11 5310 1d11
!
```

lfgmex16

```
! Standard file header
IPCH 0016 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX16      FGM 1234   1
!
! File specific header (second header)
This Command Definition disables the call to the sumcheck routine
!
! First patch (header and data)
  9e2e      8 3c5c
9e2e bbbb 052d 0004 5010 1d11 5310 1d11
!
```

lfgmex17

```
! Standard file header
IPCH 0017 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX17      FGM 1234   1
!
! File specific header (second header)
This Command Definition patches ext mode part1
!
! First patch (header and data)
  baf6      31 75ec
baf6 aaaa 18e1 002d 90f0 1c0b 80f0 1e63 7020 1a46 8510 0000 8520 3053 8530 305c
4812 0000 4813 0000 9100 1c4b 9100 1c47 9110 1c4d 9100 1c4e 9110 1c48 9100 1d10
9100 1c78 8010 1c82 4a11 8000 48f1 0000 f0f0 1ce9 75f8 8010 1c82 4a11 8000 4831
0000
!
```

lfgmex18


```

Standard file header
IPCH 0018 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX18      FGM 1234    1
!
! File specific header (second header)
This Command Defintion patches ext mode part 2
!
! First patch (header and data)
200f      31 401e
200f aaaa 190e 002d 85b0 B101 48cb 0000 570c 7050 1a4a f030 1ce9 7513 8153 b050
1ce9 9030 1ce9 9030 1d0c 9100 1d0d 8560 0000 6785 9650 1d0e 9100 1d0b 72f0 1993
72f0 192f 72f0 19e0 74da 90f0 1c0c 80e0 1c81 4ae1 8000 48fe 0000 b0f0 1d0c 7110
1c0c
!

```

lfgmex19

```

! Standard file header
IPCH 0019 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX19      FGM 1234    1
!
! File specific header (second header)
This Command Definition patches ext mode part 3
!
! First patch (header and data)
9698      31 2d30
9698 aaaa 193b 002d 8630 1d0c a630 1d0e 9630 1d0c 8030 1c98 8020 1c8b 72f0 0bbf
9030 2000 6203 67f3 a630 1d05 9630 1d05 8030 1c98 a230 72f0 0bbf 9030 2001 6203
8143 8030 1c98 a231 72f0 0bbf 9030 2002 6203 8153 8164 8173 8184 80f0 1d0b 4afa
0080
!

```

lfgmex20

```

! Standard file header
IPCH 0020 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX20      FGM 1234    1
!
! File specific header (second header)
This Command Definition patches ext mode part 4
!
! First patch (header and data)
4934      31 9268
4934 aaaa 1968 002d 760d b453 b464 4afa 0100 7608 b473 b484 4afa 0180 7603 8153
8164 8135 a138 81b6 blb7 67f3 a630 1d09 9630 1d09 67fb a6b0 1d07 96b0 1d07 72f0
1157 a300 1d0b 72f0 1507 80f0 1c78 7050 1a4a 48f0 a00f 7050 1a4a 7170 1c0c 90f0
1c0c
!

```

lfgmex21

```

! Standard file header
IPCH 0021 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX21      FGM 1234    1
!
! File specific header (second header)
This Command Definition patches ext mode part 5
!
! First patch (header and data)
723e      31 e47c
723e aaaa 1995 002d 80f0 1c7c 4af1 8000 48ef 0000 90e0 1d13 80f0 1d10 4afa 6000
7021 0000 8630 1d05 6783 80f0 1c7e 484f 0000 85e0 3059 484e 0000 9100 1d05 9100

```

1d06 8630 1d07 6783 484f 0000 484e 0000 9100 1d07 9100 1d08 8630 1d09 6783 484f
0000
!

1fgmex22

! Standard file header
IPCH 0022 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX22 FGM 1234 1
!
! File specific header (second header)
This Command Definition patches extended mode part 6
!
! First patch (header and data)
 4bb6 31 976c
4bb6 aaaa 19c2 002d 484e 0000 9100 1d09 9100 1d0a 8040 1c6b 8030 1ca0 80d0 1c98
7a02 51c3 6633 484f 0000 484e 0000 85b0 b101 48cb 0000 570c 7050 1a4a a300 1d10
7170 1c0c 90f0 1c0c 80d0 1c83 4ad1 8000 48fd 0000 85b0 b101 48cb 0000 570c 7501
f0f0
!

1fgmex23

! Standard file header
IPCH 0023 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX23 FGM 1234 1
!
! File specific header (second header)
This Command Definition patches extended mode part 7
!
!
! First patch (header and data)
 4b25 31 964a
4b25 aaaa 19ef 002d 1c6c 7544 90f0 1c6c a300 1c6b 85f0 c280 80d0 1c7c 48fd 0000
85f0 000e 80d0 1c7e 48fd 0000 85f0 212a 90f0 1cf0 8030 1c78 903f 0000 8040 1cdb
4a47 ffc0 8030 1cdc 4a37 ffc0 8550 0000 6694 e134 903f 0001 8030 1cdd 6013 6133
e135
!

1fgmex24

! Standard file header
IPCH 0024 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX24 FGM 1234 1
!
! File specific header (second header)
This Command Definition patches ext mode part 8
!
! First patch (header and data)
 a296 31 452c
a296 aaaa 1alc 002d 903f 0002 8030 1cde 4a37 ffc0 e030 0002 903f 0003 8030 1c6b
903f 0004 72f0 0667 9100 1d00 9100 1d01 72f0 15bf 9110 1c52 80d0 1c85 4ad1 8000
48fd 0000 57ff 7020 1a46 85e0 0205 f0e0 1d0b 7903 5080 1c78 7170 1c0c 9100 1e63
7170
!

1fgmex25

! Standard file header
IPCH 0025 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX25 FGM 1234 1
!
! File specific header (second header)
This Command Definition patches ext mode part 9

```

!
! First patch (header and data)
  2d7e      29 5afc
2d7e aaaa 1a49 0025 1c0b 9100 1e63 7170 1c0b 90f0 1c34 84f0 1c77 a0f0 1c3c 90f0
1c3c a300 1c77 8030 1c77 4a3a 1aff 780c 8530 0010 9030 1c77 9100 1c3c f0f0 0003
7503 50c0 1c78 7170 1c34 5010 1d11 5310 1d11
!

```

1fgmex26

```

! Standard file header
IPCH 0026 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX26      FGM 1234      1
!
! File specific header (second header)
This Command Definition patches the sumcheck pointer
!
! First patch (header and data)
  d025      5 a04a
d025 abcd 0a09 0001 1a4e
!

```

1fgmex27

```

! Standard file header
IPCH 0027 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX27      FGM 1234      1
!
! File specific header (second header)
This Command Definition enables call to sumcheck routine
!
! First patch (header and data)
  addd      8 5bba
addd aaaa 052d 0004 80fa 0a09 72ff 0000
!

```

1fgmex28

```

! Standard file header
IPCH 0028 2000-03-22T00:00:00Z
!
! File specific header (first record)
LFGMEX28      FGM 1234      1
!
! File specific header (second header)
This Command Definition enables call to ext mode routine
!
! First patch (header and data)
  e7ee      8 cfdc
e7ee e49f 0531 0004 80fa 0a21 72ff 0000
!

```

4 ML2 counter patch IPCH files

1fgmm12

```
! Standard file header
IPCH 0029 1999-11-24T00:00:00Z
!
! File specific header (first record)
LFGMML21      FGM 1234    1
!
! File specific header (second header)
This Command Definition pathes an ML2 read in RESET
!
! First patch (header and data)
A6D3          10 4DA6
A6D3 CB1B 0B2C 000C 4AF1 8000 483F 0000 9430 1C89 A300 1C89 A300 1C76 7170 1C28
!
```

1fgmm12

```
! Standard file header
IPCH 0030 1999-11-24T00:00:00Z
!
! File specific header (first record)
LFGMML22      FGM 1234    1
!
! File specific header (second header)
This Command Definition pathes an jump command in RESET
!
! First patch (header and data)
8FA8          5 1F50
8FA8 0A71 0B27 0001 7A0F
!
```