```
#ifndef __STRUCT_H

#define __STRUCT_H

/*      revised january 1993    */

static char *struct_Sccs_Id = "@(#) struct.h 1.1 3/16/93";

#ifndef u_short
#include <sys/types.h>
#endif

#include "sysop.h"
#ifndef IS_UNIX
#define LONG long
#else
#define LONG unsigned long
#endif

typedef u_short word;

/*      miscellaneous telemetry parameters      */

#define WORD_RATE       4096
#ifndef __TURBOC__
#define WRD_IN_FRA      16
#define FRA_IN_FOR      108
#define FOR_IN_REC      3
#define REC_IN_BUF      13
#else
#define WRD_IN_FRA      8
#define FRA_IN_FOR      4
#define FOR_IN_REC      1
#define REC_IN_BUF      1
#endif

#define WRD_IN_FOR      (WRD_IN_FRA * FRA_IN_FOR)
#define WRD_IN_REC      (WRD_IN_FRA * FRA_IN_FOR * FOR_IN_REC)
#define WRD_IN_BUF      (WRD_IN_FRA * FRA_IN_FOR * FOR_IN_REC *\
                         REC_IN_BUF)
#define FRA_IN_REC      (FRA_IN_FOR * FOR_IN_REC)
#define FRA_IN_BUF      (FRA_IN_FOR * FOR_IN_REC * REC_IN_BUF)

/*      miscellaneous typedef's                 */

                                        /* frame = 256 bytes */
typedef struct {
        word  ibex_word[WRD_IN_FRA];}           frame;
                                        /* format = 3456 bytes */
typedef struct {
        frame ibex_frame[FRA_IN_FOR];}          format;
                                        /* record =  10752 bytes */
#define FILL_WORD       192
typedef struct {
        format   ibex_format[FOR_IN_REC];
        word     ibex_fill[FILL_WORD];  }       record;
                                        /* buffer = 21504 bytes */
typedef struct {
        record ibex_record[REC_IN_BUF];}        data_buffer;

#endif
```

```
#ifndef __FORMAT_H

#define __FORMAT_H

static char *format_Sccs_Id = "@(#) format.h 1.2 3/16/93";

/*      this file contains the offsets of all housekeeping
            values in the format taken from FES manual, pag 3.35
            fig. 3.3.3                                  */

/*      revised January 1993;   O_DIGITAL__1    -->     O_OPTDISK   */

/*              -----   line 1  -----          */

#define O_MAJOR_FRAME   0
#define O_MASK1_T1      4
#define O_MASK1_T2      5
#define O_MASK2_T1      6
#define O_MASK2_T2      7
#define O_M_MASK1_T     8
#define O_M_MASK2_T     9
#define O_SAP_DECK_T    10
#define O_INCLIN_T      11

/*              -----   line 2  -----          */

#define O_SHA_ENC_T     16
#define O_LASER_T       17
#define O_COFFIN_T      18
#define O_AIR_T         19
#define O_BS_INSTR_T    20
#define O_M_BRAKE_T     21
#define O_BARATRON_T    22
#define O_TELESCOPE_T   23

/*              -----   line 3  -----          */

#define O_SENSOTEC_T    28
#define O_CEU_T         29
#define O_PREAMP_T      30                  /* has also pc bias */
#define O_PC_BIAS       30
#define O_GYRO_T        31
                                            /* <- dummy     */
#define O_INCLINOM_1    33
#define O_SPARE_AN_1    34
#define O_SODEME        O_SPARE_AN_1
#define O_SPARE_AN_2    35
#define O_OPTDSK_PR     O_SPARE_AN_2

/*              -----   line 4  -----          */

#ifdef REV_0
#define O_DUMMY         40
#else
#define O_BATTERIES_AMP 40
#endif
#define O_BARATRON_P    41
#define O_SENSOTEC_P    42
#ifdef REV_0
#define O_BATTERIES_AMP 43
#else
#define O_OPTDISK       43
#endif
```

```
                                        /* <- dummy    */
#define O_INCLINOM_2    45
#define O_SPARE_AN_3    46
#define O_MAGNETOMETER  O_SPARE_AN_3
#define O_SPARE_AN_4    47

/*          -----   line 5  -----         */

#define O_INT_NUMBER    52
#define O_NOW_CONF      53
#define O_NEXT_CONF     54
#define O_NOW_SLOW      55
#define O_NEXT_SLOW     56
#define O_PATH_LASER    57
#define O_DC_FLAGS      58
                                        /* <- dummy    */

/*          -----   line 6  -----         */

#define O_YEARS_MONTHS  64
#define O_DAYS_HOURS    65
#define O_MINS_SECS     66
                                        /* <- dummy    */
#define O_VOLT_MON_5    68
#define O_VOLT_MON_P15  69
#define O_VOLT_MON_M15  70
#define O_VOLT_MON_P28  71

/*          -----   line 7  -----         */

#define O_GYRO_TORQUE   76
#define O_FILT_INCLIN   77
#define O_SAP_SERVO     78
#define O_ELEV_REGISTER 79
#define O_GYRO_COMP     80
#define O_SAP_STATUS    81
#define O_GYRO_EXCIT    82
#define O_M_GYRO_AC     83

/*          -----   line 8  -----         */

#define O_DET02_VOLT1   88
#define O_DET02_VOLT2   89
#define O_DET13_VOLT1   90
#define O_DET13_VOLT2   91
#define O_DET02_BIAS    92
#define O_DET13_BIAS    93
                                        /* <- dummy    */
                                        /* <- dummy    */

/*          -----   line 9  -----         */

#define O_LASER_PRESS   100
#define O_M_SHUTTLE     101
#define O_M_LIMB        102
                                        /* <- dummy    */
                                        /* <- dummy    */
                                        /* <- dummy    */
                                        /* <- dummy    */
                                        /* <- dummy    */

/*          ----- repeated  -----         */
```

```
#define O_GYRO_PICKOFF  0
#define O_INCLIN        1
#define O_LVDT          2
#define O_SHA_ENC       3
#define O_FAST_REPEAT   12

#endif
```

```
/*
          Taken from FES manual pag 3.35 fig 3.3.2

SY AI R1 R2     ID AI R1 R2     BL AI R1 R2     HK AI R1 R2
0  1  2  3      4  5  6  7      8  9  10 11     12 13 14 15

SY AI R1 R2 R3 R4 BL ID         BL AI R1 R2 R3 R4 BL HK
0  1  2  3  4  5  6  7          8  9  10 11 12 13 14 15

N.B.    when selecting in Metraplex add 1 to offset, since
          starting is at 1
*/

/*      revised January 1993;   no changes      */

#ifndef __FRAME_H

#define __FRAME_H

static char *frame_Sccs_Id = "@(#) frame.h 1.1 3/16/93";

#define SYNC_OFFSET 0
#define AID_OFFSET 1
#define R1_OFFSET 2
#define R2_OFFSET 3
#ifdef DET4
#define R3_OFFSET 4
#define R4_OFFSET 5
#define ID_OFFSET 7
#define HK_OFFSET 15
#define CYCLE 8
#define REPEAT 2
#else
#define ID_OFFSET 4
#define HK_OFFSET 12
#define CYCLE 4
#define REPEAT 4
#endif

#endif
```