Appendix A

The Nordic format

Free columns are included for two purposes:

1. To obtain a readable format

2. To have some space for possible future extensions

Here are examples, top 3 lines for positioning only.

```
          1         2         3         4         5         6         7
1234567890123456789012345678901234567890123456789012345678901234567890123456789
.         .         .         .         .         .         .         .
-------------------------------------------------------------------------------
 1996  6 3 1955 35.5 D  47.760 153.227  0.0  TES 12 1.1         5.6WHRV 5.6bPDE1
 1996  6 3 1955 35.5 D  47.760 153.227  0.0  TES 12 1.1         5.6WHRV 5.6bPDE1
 GAP=348       2.88     999.9   999.9999.9 -0.1404E+08 -0.3810E+08  0.1205E+09E
 1996 0603 1955 31.8 D  46.787153.722  33.0  PDE         5.6bPDE              1
 ACTION:SPL 08-10-02 10:19 OP:jh   STATUS:            ID:19960603195540       I
 1996-06-03-2002-18S.TEST__012                                               6
 1996-06-03-1917-52S.TEST__002                                               6
 STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
 KBS  BZ EP       20 4 40.63                              23   -1.3210 5724 351
 TRO  SZ EP       20 5 32.5                               21    1.7510 6471 343
 LOF  SZ IP     C 20 5 46.68                              21   -0.1110 6729 344
 JNW  SZ EP       20 5 49.5                               21    1.1910 6755 353
 JMI  LZ I        20 8 27.35                                        6768 353
 JMI  LZ I        2014 41.56                                        6768 353
 JMI  LZ I        2021 25.49                                        6768 353
 MOL  SZ IP     C 20 6 25.49                              19   -1.7410 7408 343
 FOO  SZ EP       20 6 35.99                              19    0.1210 7559 344
 HYA  SZ EP       20 6 36.91                              19   -0.1410 7580 343
 SUE  SZ IP     C 20 6 39.07                              19   -0.2810 7621 344
 KONO BZ IP     C 20 6 40.72                              19   -0.7010 7657 341
 ASK  SZ EP     9 20 6 37.24                              19   -4.94 0 7671 344
 BER  SZ EP     9 20 6 37.43                              19   -5.16 0 7678 344
```

```
EGD  SZ EP   9   20 6 38.42                              19   -4.95 0 7692 344
ODD1 SZ EP       20 6 45.57                              19    1.7310 7699 343
BLS5 SZ EP       20 6 46.33                              19   -0.5010 7753 343
```

Below are examples of how the last free columns of type 4 lines are used in the Nordic Databank in
Helsinki and in Bergen:

```
 1985 510 21 5 16.1 LE 60.240 6.170 30.0F BER  6 2.3 3.8LNAO 4.0bPDE 3.2sISC  1
               1.5     0.5  0.9   5.0            0.4                          5
 8505210425.WNN                                                               6
 ACTION:UPD 93-07-09 09:40 OP:jens STATUS:            ID:19920101080359    I
 STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
 NRSA SZ IPN  1 D 2105 13.44 0345 1234.6 1.33 245.2 08.6  22  2 -0.7 9  555 235
 BER  SZ IPG  2 U 2105 25.41  200
 HYA  SZ ISG  1   2105 33.1
 ODD  SZ IP   3   2105 20.1   250
 ODD  SZ EPG      2105 22.9
 ODD  SZ  LG      2105 55.8
```

Note in this example the fault plane solution line(F) and the HYP error line(E)

```
 1993 1028 0800 26.4 L 57.518 7.119 18.8  BER  6  .6 2.6CBER                  1
 GAP=201        1.20    6.4   7.0    6.8   .3359E+01 -.2719E+00    .3054E+02E
 93.2 74.8 -48.2 2 F
 ACTION:SPL 95-01-08 09:40 OP:jh   STATUS:            ID:19931028080019    I
 9310-28-0800-19S.NSN__17                                                     6
 STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
 BLS5 SZ EP      D 8 0 56.80  129                             -.110  216 349
 BLS5 SZ ESG       8 1 23.59                                  -.910  216 349
 BLS5 SZ EP        8 0 56.80  129                             -.110  216 349
 BLS5 SZ ESG       8 1 23.59                                  -.910  216 349
```

Location parameters:
AR : Azimuth residual when using azimuth information in locations
TRES: Travel time residual

W   : Actual weight used for location (inc. e.g. distance weight), i2
DIS : Epicentral distance in km
CAZ : Azimuth from event to station

Note: Type 1 line must be the first, all type 4 lines should be together and
the last line must be blank

FORMAT DESCRIPTION:

Type 1 Line:

```
Columns Format Description                    Comments
  1            Free
 2- 5   I4     Year
  6            Free
 7- 8   I2     Month
 9-10   I2     Day of Month
11             Fix o. time                    Normally blank, an F fixes origin time
12-13   I2     Hour
14-15   I2     Minutes
16             Free
17-20   F4.1   Seconds
21             Location model indicator        Any character
22      A1     Distance Indicator              L = Local, R = Regional, D = Distant, etc.
23      A1     Event ID                        E = Confirmed explosion
                                               P = Probable explosion
                                               V = Volcanic
                                               Q = Confirmed earthquake
                                               ' ' = Presumed earthquake
                                               X = Landslide
24-30   F7.3   Latitude                        Degrees (+ N)
31-38   F8.3   Longitude                       Degrees (+ E)
39-43   F5.1   Depth                           Km
44      A1     Depth Indicator                 F = Fixed, S = Starting value
45      A1     Locating indicator              --------------------------, * do not locate
46-48   A3     Hypocenter Reporting Agency
49-51          Number of Stations Used
52-55          RMS of Time Residuals
56-59   F4.1   Magnitude No. 1
60 A1          Type of Magnitude L=ML, b=mb, B=mB, s=Ms, S=MS, W=MW,
                               G=MbLg (not used by SEISAN), C=Mc
61-63   A3     Magnitude Reporting Agency
64-67   F4.1   Magnitude No. 2
68 A1          Type of Magnitude
69-71   A3     Magnitude Reporting Agency
72-75   F4.1   Magnitude No. 3
76 A1          Type of Magnitude
77-79   A3     Magnitude Reporting Agency
80 A1          Type of this line ("1"), can be blank if first
               line of event
```

If more than 3 magnitudes need to be associated with the hypocenter in the first line, a
subsequent additional type one line can be written with the same year, month, day until event
ID and hypocenter agency. The magnitudes on this line will then be associated with the main
header line and there is then room for 6 magnitudes.

Type 2 line (Macroseismic information)

```
 1-5           Blank
 6-20          a Any descriptive text
21             Free
22     a1      Diastrophism code (PDE type)
                       F = Surface faulting
                       U = Uplift or subsidence
                       D = Faulting and Uplift/Subsidence
23     a1      Tsunami code (PDE type)
                       T = Tsunami generated
                       Q = Possible tsunami
24     a1      Seiche code (PDE type)
                       S = Seiche
                       Q = Possible seiche
25     a1      Cultural effects (PDE type)
                       C = Casualties reported
                       D = Damage reported
                       F = Earthquake was felt
                       H = Earthquake was heard
26     a1      Unusual events (PDE type)
                       L = Liquefaction
                       G = Geysir/fumerol
                       S = Landslides/Avalanches
                       B = Sand blows
                       C = Cracking in the ground (not normal faulting).
                       V = Visual phenomena
                       O = Olfactory phenomena
                       M = More than one of the above observed.
27             Free
28-29 i2       Max Intensity
30     a1      Max Intensity qualifier
                       (+ or - indicating more precicely the intensity)
31-32 a2       Intensity scale (ISC type defintions)
                       MM = Modified Mercalli
                       RF = Rossi Forel
                       CS = Mercalli - Cancani - Seberg
                       SK = Medevev - Sponheur - Karnik33 Free
34-39 f6.2     Macroseismic latitude (Decimal)
40             Free
41-47 f7.2     Macroseismic longitude (Decimal)
48             Free
49-51 f3.1     Macroseismic magnitude
52     a1      Type of magnitudeI = Magnitude based on maximum Intensity.
                       A = Magnitude based on felt area.
                       R = Magnitude based on radius of felt area.
                       * = Magnitude calculated by use of special formulas
                           developed by some person for a certain area.
                           Further info should be given on line 3.
53-56 f4.2     Logarithm (base 10) of radius of felt area.
57-61 f5.2     Logarithm (base 10) of area (km**2) number 1 where
```

```
                              earthquake was felt exceeding a given intensity.
      62-63 i2        Intensity boardering the area number 1.
      64-68 f5.2      Logarithm (base 10) of area (km**2) number 2 where
                              earthquake was felt exceeding a given intensity.
      69-70 i2        Intensity boardering the area number 2.71 Free
      72    a1        Quality rank of the report (A, B, C, D) 73-75 a3 Reporting agency
      76-79           Free
      80    a1        Type of this line ("2")
```

Type 3 Line (Optional):

Columns Format Description Comments

```
       1            Free
      2-79 A        Text        Anything
      80    A1       Type of this line ("3")
```

This type of line can be used to specify xnear, xfar and the starting depth for use with HYPOCENTER. For example

```
 XNEAR  200.0 XFAR  400.0 SDEP   15.0                                        3
```

```
        8-13  f6.1  Xnear
       20-25  f6.1  Xfar
       32-36  f5.1  Starting depth
```

Type 4 line:

Columns Format Description Comments

```
       1 Free
       2- 6 A5 Station Name  Blank = End of readings = end of
event
       7 A1 Instrument Type S = SP, I = IP, L = LP etc
       8 A1 Component  Z, N, E ,T, R, 1, 2
       9 Free or weight, see note below
      10 A1 Quality Indicator  I, E, etc.
      11-14 A2 Phase ID  PN, PG, LG, P, S, etc. **
      15 I1 Weighting Indicator (1-4) 0 or blank= full weight, 1=75%, 2=50%, 3=25%,
                 4=0%, 9: no weight, use difference
                 time (e.g. P-S).
      16 Free or flag A to indicate automartic pick, removed when picking
      17 A1 First Motion  C, D
      18 Note: Currently 15 to 18 can also be used for phase assuming
               column 11-14 is not blank. See note ** below.
      19-20 I2 Hour  Hour can be up to 48 to
                 indicate next day
```

```
      21-22 I2 Minutes
```

```
 23-28 F6.0 Seconds
 29 Free
 30-33 I4 Duration (to noise)  Seconds
 34-40 g7.1 Amplitude (Zero-Peak) in units of nm, nm/s, nm/s^2 or counts.
 41 Free
 42-45 F4.0 Period  Seconds
 46 Free
 47-51 F5.0 Direction of Approach  Degrees
 52 Free
 53-56 F4.0 Phase Velocity  Km/second
 57-60 F4.0 Angle of incidence (was Signal to noise ratio before version 8.0)
 61-63 I3 Azimuth residual
 64-68 F5.1 Travel time residual
 69-70 I2 Weight
 71-75 F5.0 Epicentral distance(km)
 76 Free
 77-79 I3 Azimuth at source
 80 A1  Type of this line ("4"), can be blank, which it is
                most often
```

NB: Epicentral distance: Had format I5 before version 7.2. All old lines can be read with
format F5.0 with same results, but now distance can also be e.g. 1.23 km which cannot be read
by earlier versions. However, an UPDATE would fix that.

   ** Long phase names: An 8 character phase can be used in column 11-18. There is then not
room for polarity information. The weight is then put into column 9. This format is recognized
by HYP and MULPLT.

Type 4 cards should be followed by a Blank Card (Type 0)

Type 5 line (optional): Error estimates of previous line, currently not used
                        by any SEISAN programs.

```
Columns Format Description  Comments
  1 Free
  2-79 Error estimates in same format as previous line, normallytype 4
 80 A1 Type of this line ("5")
```

Type 6 Line (Optional):

```
Columns Format Description  Comments
  1 Free 2-79 A Name(s) of tracedata files80 A1 Type of this line ("6")
```

Type 7 Line (Optional):

```
Columns Format Description  Comments

  1 Free
  2-79 A Help lines to place the numbers in right positions
```

```
 80 A1 Type of this line ("7")
```

Type E Line (Optional): Hyp error estimates

Columns Format Description

```
  1 Free
  2 - 5 A4 The text GAP=
  6 - 8 I3 Gap
 15-20 F6.2 Origin time error
 25-30 F6.1 Latitude (y) error
 31-32 Free
 33-38 F6.1 Longitude (x) error (km)
 39-43 F5.1 Depth (z) error (km)
 44-55 E12.4 Covariance (x,y) km*km
 56-67 E12.4 Covarience (x,z) km*km
 68-79 E14.4 Covariance (y,z) km*km
```

Type F Line (Optional): Fault plane solution

Columns Format Description

```
  1:30 3F10.0 Strike, dip and rake, Aki convention
 31:45 4F5.1  Error in strike dip and rake (HASH), error in fault plane and aux. plane (FPFIT)
 46:50 F5.1   Fit error:  FPFIT and HASH (F-fit)
 51:55 F5.1   Station distribution ratio (FPFIT, HASH)
 56:60 F5.1   Amplitude ratio fit (HASH, FOCMEC)
 61:65 I2     Number of bad polarities (FOCMEC, PINV)
 64.65 I2     Number of bad amplitude  ratios (FOCMEC)
 67:69 A3     Agency code
 71:77 A7     Program used
 78:78 A1     Quality of solution, A (best), B C or D (worst), added manually
 79:79 A1     Blank, can be used by user
 80:80 A1     F
```

Type H line, High accuracy hypoenter line

Columns

```
  1:55 As type 1 line
 16 Free
 17 Seconds, f6.3
 23 Free
 24:32 Latitude, f9.5
 33 Free
 34:43 Longitude, f10.5
 44 Free
 45:52 Depth, f8.3
 53 Free
```

```
 54:59 RMS, f6.3
 60:79 Free
 80 H


Type I Line, ID line

Columns Format description1 Free

  2:8 Help text for the action indicator
  9:11  Last action done, so far defined SPL: Split
           REG: Register
           ARG: AUTO Register, AUTOREG
           UPD: Update
           UP : Update only from EEV
           REE: Register from EEV
           DUB: Duplicated event
           NEW: New event
 12 Free
 13:26 Date and time of last action
 27 Free
 28:30 Help text for operator
 36:42 Help text for status
 43:56 Status flags, not yet defined
 57 Free
 58:60 Help text for ID
 61:74 ID, year to second
 75 If d, this indicate that a new file id had to be created which was
        one or more seconds different from an existing ID to avoid overwrite.
 76 Indicate if ID is locked. Blank means not locked, L means locked.


Type M Line (Optional): Moment tensor solution

Note: the type M lines are pairs of lines with one line that gives the hypocenter time,
and one line that gives the moment tensor values:

The first moment tensor line:
Columns Format Description
  1:1           Free
  2: 5   I4     Year
  7: 8   I2     Month
  9:10   I2     Day of Month
 12:13   I2     Hour
 14:15   I2     Minutes
 17:20   F4.1   Seconds
 24:30   F7.3   Latitude                    Degrees (+ N)
 31:38   F8.3   Longitude                   Degrees (+ E)
 39:43   F5.1   Depth                       Km
 46:48   A3     Reporting Agency
 56:59   F4.1   Magnitude
```

```
 60      A1     Type of Magnitude L=ML, b=mb, B=mB, s=Ms, S=MS, W=MW,
 61:63  A3     Magnitude Reporting Agency
 71:77  A7     Method used
 78:78  A1     Quality of solution, A (best), B C or D (worst), added manually
 79:79  A1     Blank, can be used by user
 80:A1          M
```

The second moment tensor line:
```
Columns Format Description
  1:1          Free
  2:3   A2     MT
  4:9   F6.3   Mrr or Mzz [Nm]
 11:16  F6.3   Mtt or Mxx [Nm]
 18:23  F6.3   Mpp or Myy [Nm]
 25:30  F6.3   Mrt or Mzx [Nm]
 32:37  F6.3   Mrp or Mzy [Nm]
 39:44  F6.3   Mtp or Mxy [Nm]
 46:48  A3     Reporting Agency
 49:49  A1     MT coordinate system (S=spherical, C=Cartesian)
 50:51  i2     Exponental
 53:62  G6.3   Scalar Moment [Nm]
 71:77  A7     Method used
 78:78  A1     Quality of solution, A (best), B C or D (worst), added manually
 79:79  A1     Blank, can be used by user
 80:80  A1     M
```

Type P line, file name of a picture file

```
  1:1          Free
  2:79         File name
 80:80         P
```

Type E13 and EC3 line, explosion information

Example

```
1980 0124 0927 CHARGE(T): 0.5 E13  LE Haakonsvern,  HAA underwater explosion  E13 EC3
```

Information on explsion site, time and agency, same format as a type 1 line, no magnitudesused, last
EC3 Information on charge and site

```
Columns
  2:11 Info text
 11:12 Blank
 13:22 Charge in tons, f10.3
 23:77 Any information, a
 78:80 EC3
```

Type MACRO3 line: File name of macroseismic observations in ISO directory

Example:

1980-03-14-0456-05.MACRO MACRO3

An example of the file is:

Sunnfjord 1980 314 456 5 GMT 1980 314 556 5 Local time
 Comment
60.500 5.270 1.0 EMS 5088 MJOELKERAAEN
60.560 5.260 1.0 EMS 5100 ISDALSTOE
60.570 5.050 1.0 EMS 5112 ROSSLAND

1. Line
Location, GMT time, Local time. Format a30,i4,1x,2i2,1x,2i2,1x,i2,'
GMT',1x,i4,1x,2i2,1x,2i2,1x,i2,1x,'Local time'
2. Line Comments
3. Line Observations: Latitude, Longitude,intensity, code for scale, postal code or similar,
location,Format 2f10.4,f5.1,1x,a3,1x,a10,2x,a. Note the postal code is an ascii string and
left justified (a10).

Type 3 line giving xnear/xfar

Definition of xnear and xfar to be used with HYPOCENTER.

Example
XNEAR 1000.0 XFAR 2000.0 3
Columns
  8-13: xnear value
 20-25: xfar value