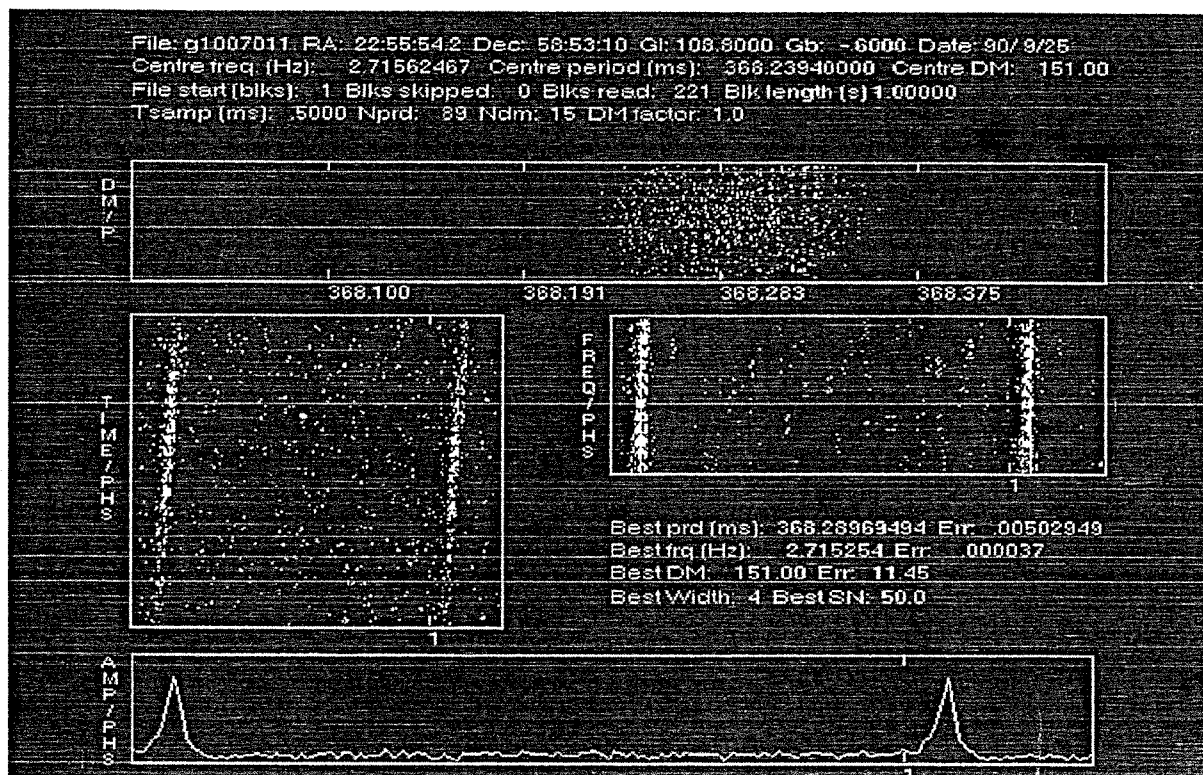


Pulsar Astronomy at the Northern Cross

(Status Report)

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Foreword

The Italian Northern Cross Radiotelescope (1) has been recently upgraded (2). Indeed, it has been recognised (3,4,5,6) that this instrument, because of its large collecting area, can be a very useful tool in pulsar astronomy.

A large technical effort has been devoted in order to exploit the whole potentiality of the antenna with respect to pulsar observation, and a high performance pulsar observing system is now available at the Cross.

In this preliminary internal note, we summarize the relevant instrument upgradings and we present a sample of pulsar profiles recently observed (with the E-W arm only), which includes some superfast pulsars, the Crab pulsar, and other interesting objects. A new setup for the (total power) observation of pulsar with the whole Cross is also nearly assessed, in order to improve the sensitivity.

We are pleased to address this document to all the people who were looking forward to see the Cross back into business.

We wish to thank the Acting Director of the Istituto di Radioastronomia, Lucia Padrielli, for its continuous encouragement.

E-W arm front-ends:

New low noise (GaAs FET) 408 MHz preamplifiers have been assembled and tested and are now installed close to the E-W arm dipole line (7). The resulting E-W arm system noise equivalent flux is 55 Jy (to be compared with the previous value of about 150 Jy).

Source tracking within the E-W arm primary beam:

A network of computer-controlled (IF) phase shifters is now used in order to track the source within the E-W arm primary beam (8), giving an effective integration time of about $2./\cos(\text{dec})$ minutes.

N-S arm:

In order to eliminate undue losses, the 8 N-S front-ends have been upgraded using preamplifiers similar to those of the E-W arm.

A network of phase shifters similar to those employed to rotate the E-W arm beam, is now being built in order to speed-up the procedure of forming a single N-S beam (9).

The two phasing networks will also be used to form a single narrow total power high sensitivity beam of the whole Cross.

Pulsar back-end:

The present configuration of the pulsar back-end includes a 64 channels dedispersor with a frequency resolution of 32 KHz and adjustable time constant, and a 64 channel (expandable up to 128 ch) 1-bit digitizer system (10,11,12). The sampling triggers are supplied by a prototype pulse generator (13) driven by the Medicina H-Maser master clock, which allows to select a sampling interval in a wide range (from 15 us up to few ms).

The system is entirely controlled by a dedicated microcomputer based on a uP386 (14). Several prototype interfaces have been designed and built in order to allow the computer system to monitor the various equipments (15,16), including a special buffered DMA card (17) dedicated to the data acquisition. A burst data transfer rate up to 2 MBytes/sec is possible, while presently the maximum continuous data recording speed is about 120 Kbytes/sec. The data are transferred

to a standard 6250 bpi tape driver or to a Digidata "Gigastore" transport system, by means of industrial standard buses.

The (continuum equivalent) sensitivity limit of the E-W arm system for a pulsar with a relatively low value of the ratio DM/P (Dispersion/Period) and a typical duty cycle is of the order of 10-15 mJy (at S/N level of about 7.5 -on cold sky).

Observations:

An extensive observing session has been devoted recently to pulsar observation (with the E-W arm only) in order to verify the system performance and sensitivity.

A large sample of pulsars with declination north of -30 has been observed, including some millisecond pulsar, the Crab pulsar, some highly dispersed pulsars, and other objects.

Fig 1 and 2 show respectively an aerial view of Medicina with the Northern Cross Radiotelescope and the VLBI dish, and the "pulsar corner" at the Cross receiver room.

The other figures show various detection records. The software used to reduce the data is a "mini" version of PDM, originally written mainly by Dick Manchester and now adapted on the pulsar microcomputer at the Northern Cross, in order to have an "on site" quick look facility.

References

- 1) Braccesi, Ceccarelli, Colla, Fanti, Ficarra, Gelato, Grueff & Sinigallia. 1969, *Il nuovo Cimento*, B 62,13.
- 2) Montebugnoli
Lo stato della Croce del Nord
I Workshop sull'uso delle antenne di Medicina e Noto.
Medicina, 27 Gennaio, 1987.
- 3) Grueff
Programmi Scientifici con la Croce del Nord.
I Workshop sull'uso delle antenne di Medicina e Noto.
Medicina, 27 Gennaio, 1987.
- 4) D'Amico
Osservazioni di pulsar con la Croce
I Workshop sull'uso delle antenne di Medicina e Noto.
Medicina, 27 Gennaio, 1987.
- 5) D'Amico
Osservazioni di pulsar a Medicina.
II Workshop sull'uso delle antenne di Medicina e Noto.
Arcetri, 22 Maggio, 1989.
- 6) Bortolotti, Cattani, Maccaferri, Montebugnoli, D'amico & Fauci. 1990, *Il Nuovo Cimento*, C 13,505.
- 7) Bortolotti & Tomassetti
Performance characteristics of the new front-ends of the Northern Cross Radiotelescope.
(Int Rep, in preparation)
- 8) Montebugnoli, Bortolotti & D'Amico
Source tracking within the Northern Cross E-W arm primary beam. (Int Rep, in preparation)
- 9) Roma, Cattani & Montebugnoli
A computer controlled phasing system for the Northern Cross N-S arm. (int Rep, in preparation)
- 10) Bortolotti, D'Amico, Fauci & Montebugnoli
The 64x32KHz filterbank of the Northern Cross Pulsar System. (Int Rep, in preparation).
- 11) Cattani, Bortolotti, D'Amico, Maccaferri & Montebugnoli
The "Detector Unit" of the Northern Cross Pulsar System
(Int Rep, in preparation)
- 12) Cattani, Montebugnoli, D'Amico & Maccaferri
The 1-bit digitizer unit of the Northern Cross Pulsar System (Int Rep, in preparation)
- 13) D'Amico, Montebugnoli, Grueff & Fauci
General characteristics of the pulsar system installed at the Northern Cross Radiotelescope. (Int Rep, in prep)

- 14) D'Amico & Montebugnoli
The on-line data acquisition software package of the Northern Cross Pulsar System. (Int Rep, in preparation)
- 15) Maccaferri
The UT phased sampling generator of the Northern Cross Pulsar System. (Int Rep in preparation)
- 16) Maccaferri & Cattani
The Computer I/O (CIO) interface of the Northern Cross Pulsar System. (Int Rep, in preparation)
- 17) Maccaferri & D'Amico
A double buffer high throughput (2 MBytes/sec) I/O card for data acquisition. (Int Rep, in preparation)

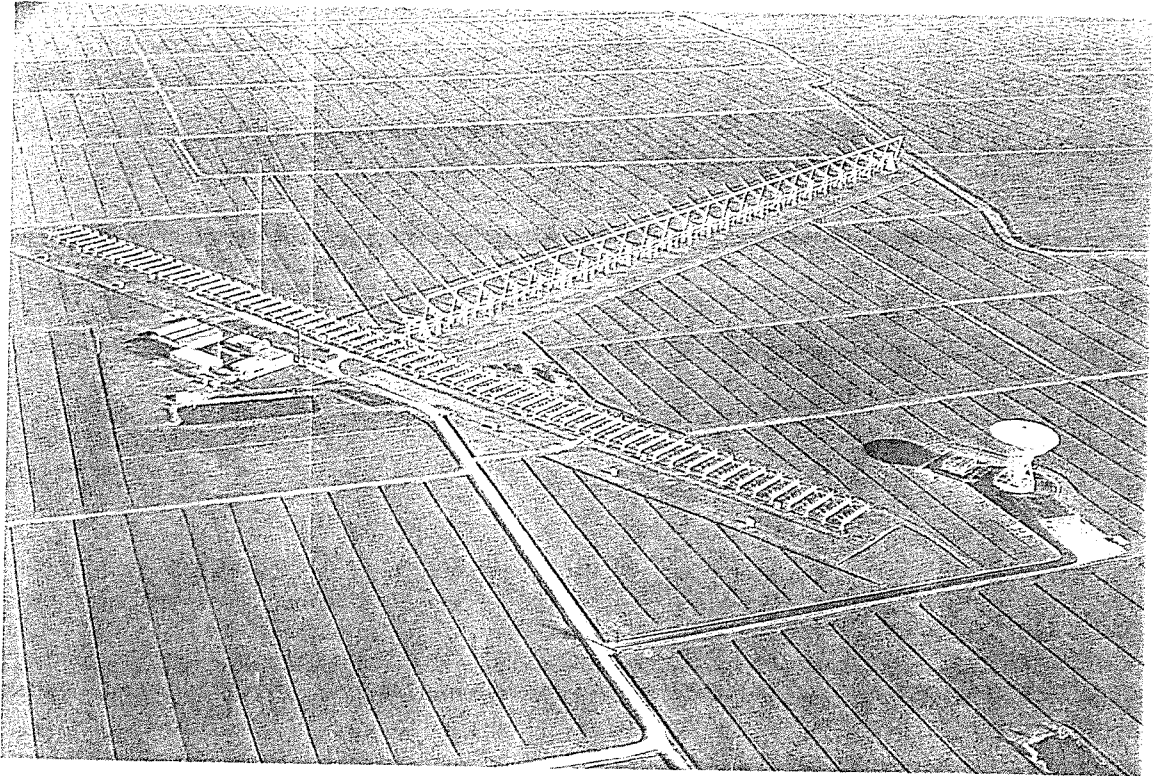


Fig. 1: The Medicina Radio Observatory

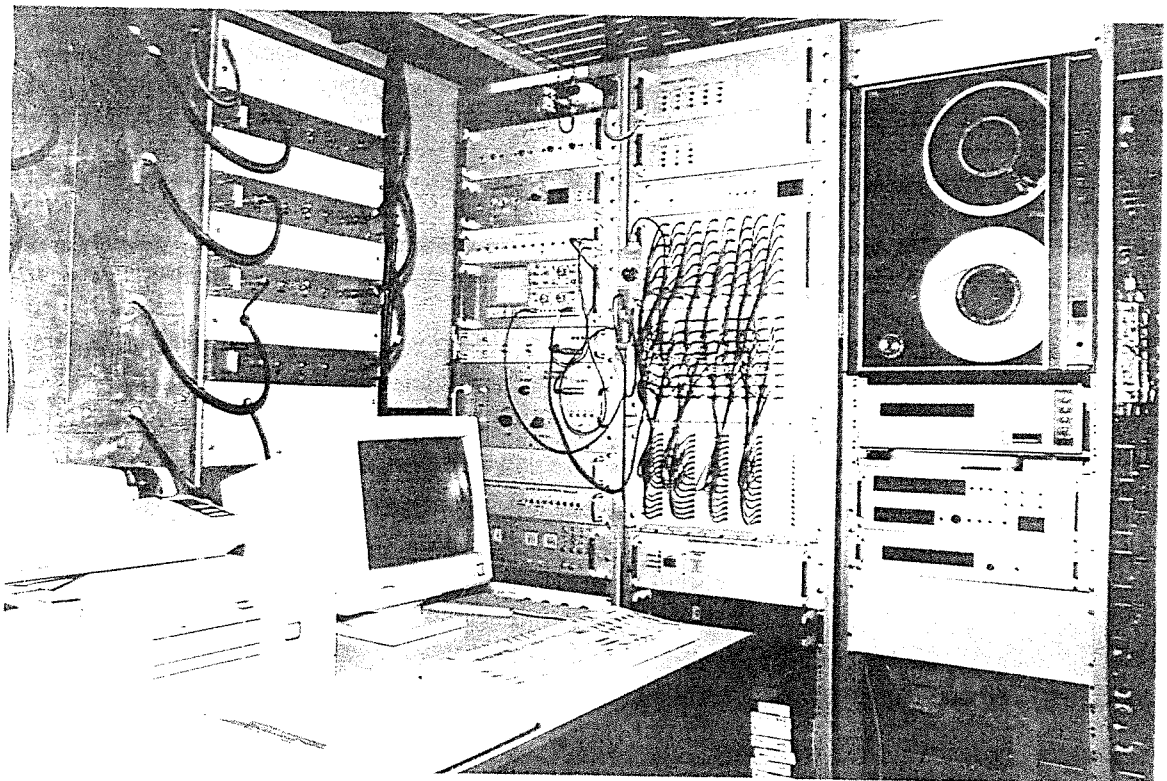


Fig. 2: The Northern Cross Pulsar Observing System

Explanation of pulsar observation records:

Each record shows four plots:

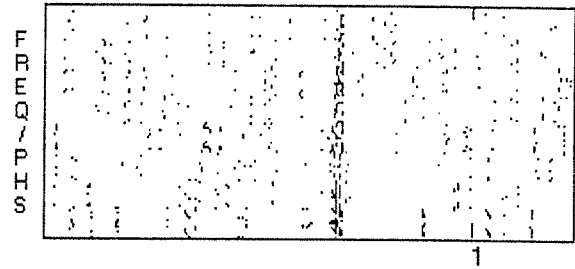
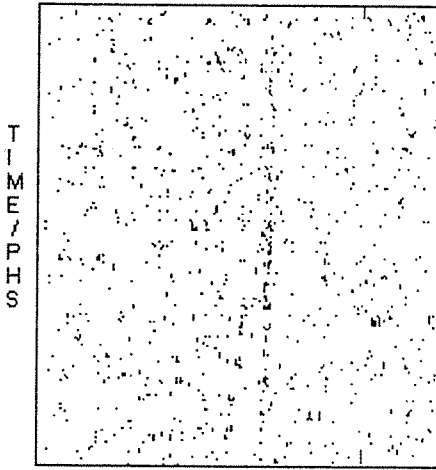
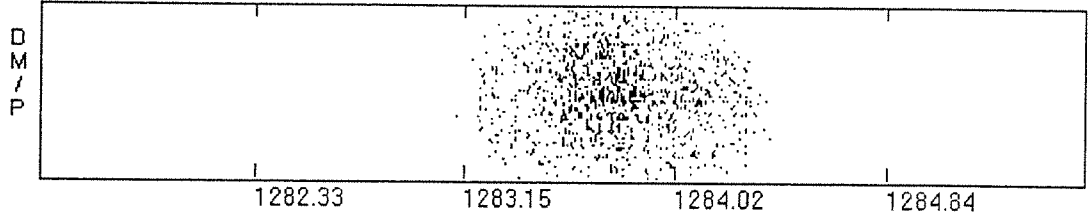
1)the first plot is a gray-scale representation of the signal/noise as a function of the adopted dispersion measure (DM) and folding period (P).

2)the second plot (left) is a gray-scale representation of the intensity as a function of time and pulse phase (in periods). The time interval in the ordinate is typically $2/\cos(\text{dec})$ minutes. Any significant difference between the adopted folding period and the actual period results in a tilted pattern.

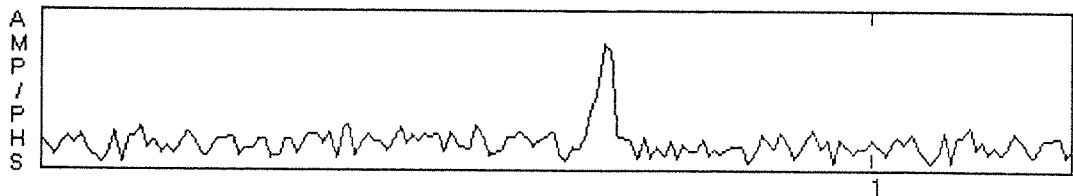
3)the third plot (right) is analogous to the second, except that intensity is shown as a function of observing frequency and pulse phase. The data are already dedispersed and a difference between the assumed Dispersion Measure (DM) and the actual value results in a tilted pattern.

4)the last plot (bottom) is the integrated pulse profile (amplitude vs pulse phase).

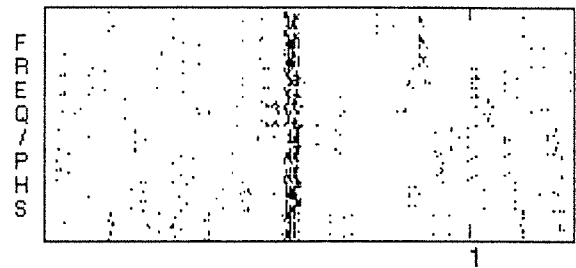
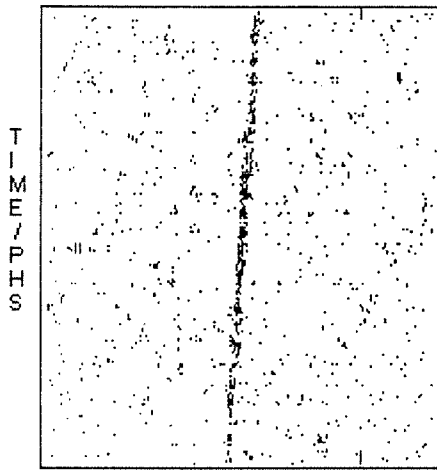
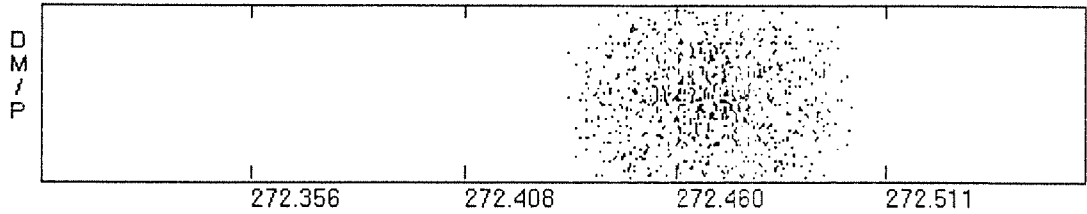
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Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



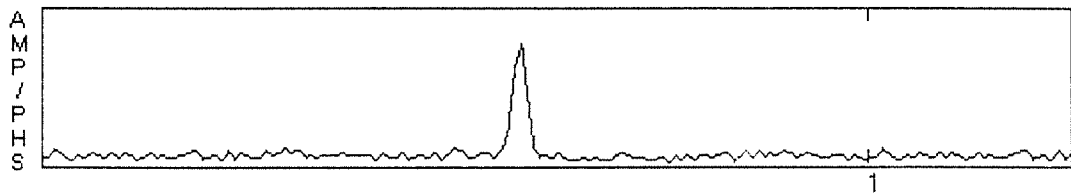
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Best Width: 4 Best SN: 19.9



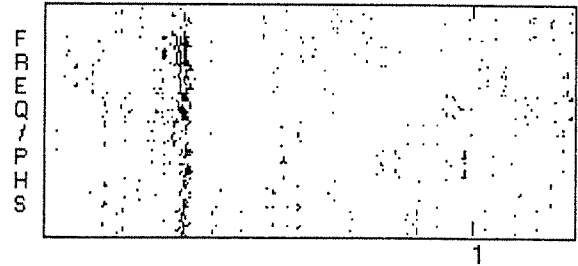
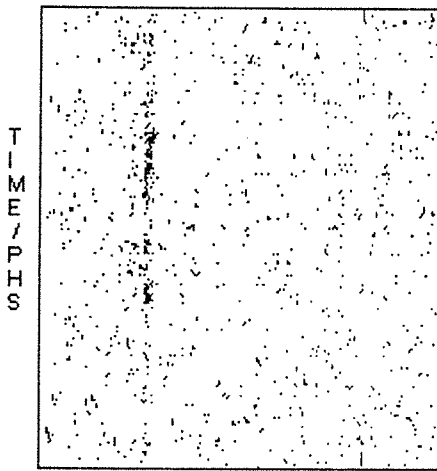
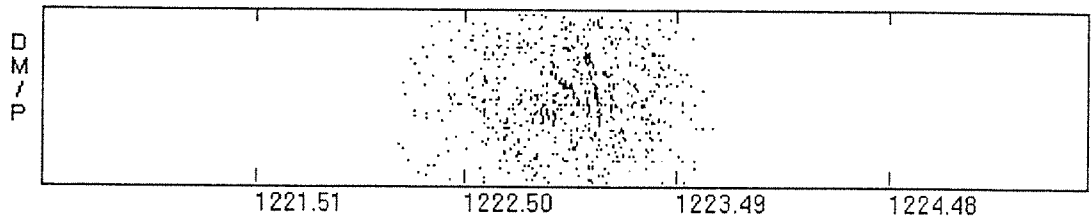
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Centre freq. (Hz): 3.67059224 Centre period (ms): 272.43560000 Centre DM: 74.00
File start (blks): 1 Blks skipped: 0 Blks read: 215 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 89 Ndm: 15 DMfactor: 1.0



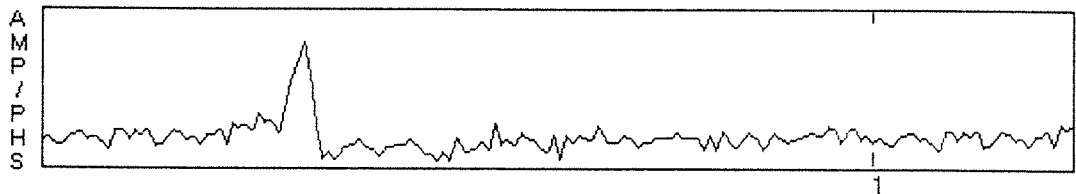
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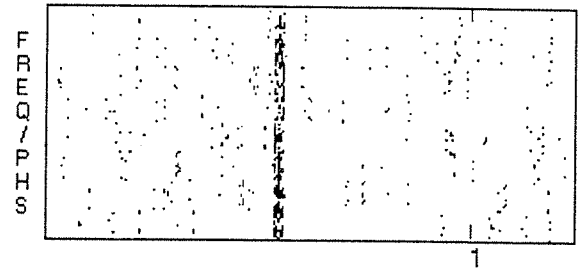
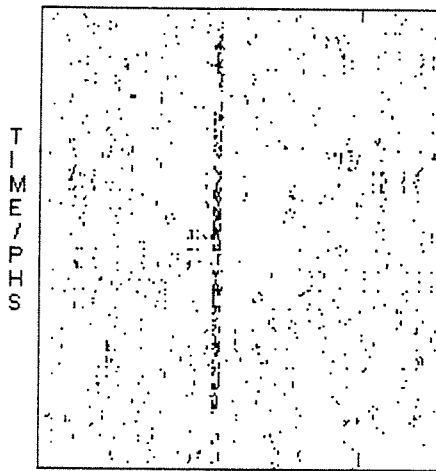
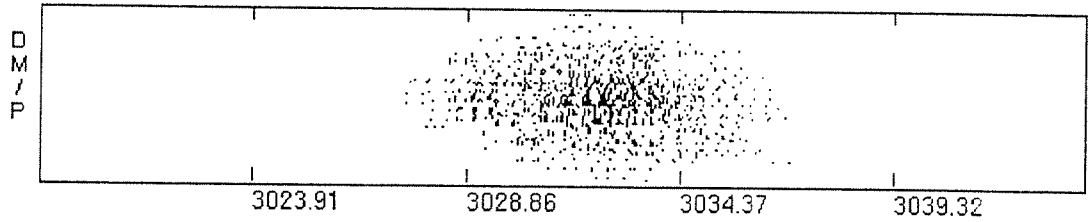
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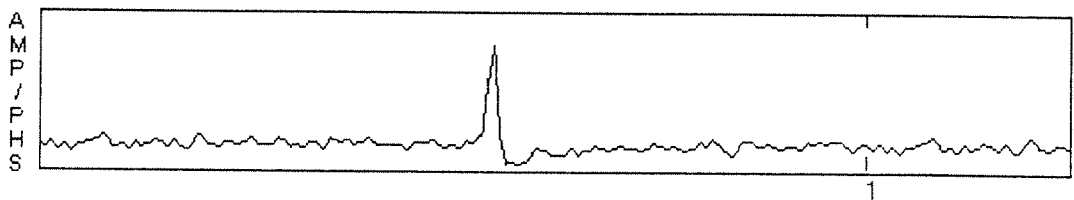
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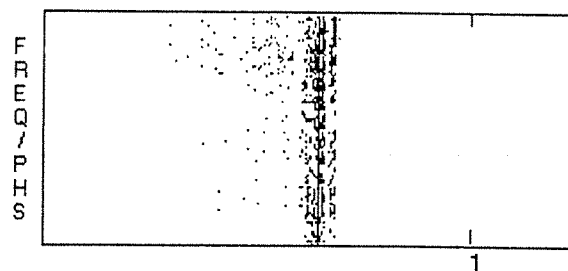
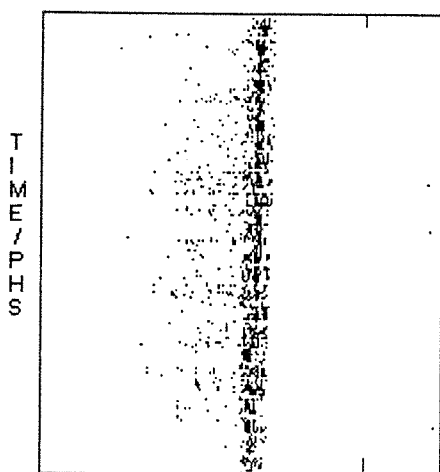
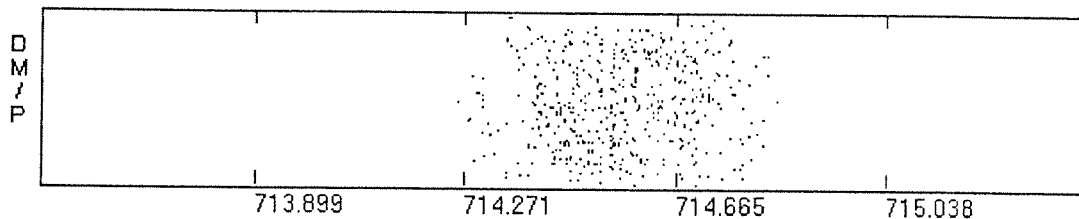
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Tsamp (ms): .5000 Nprd: 45 Ndm: 15 DMfactor: 1.0



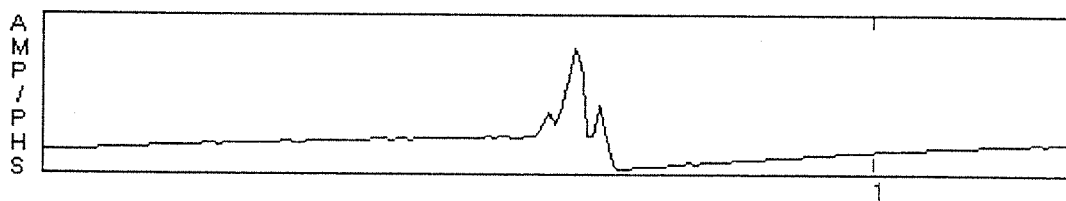
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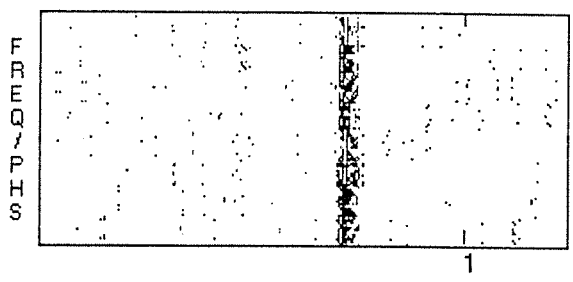
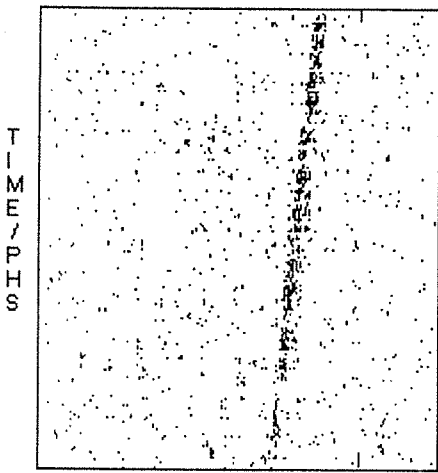
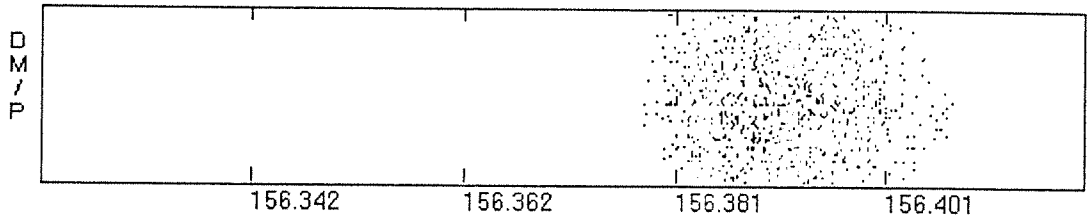
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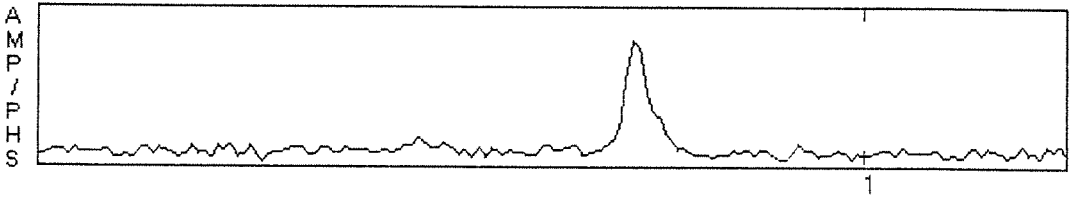
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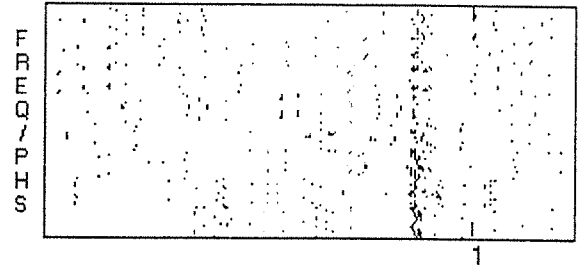
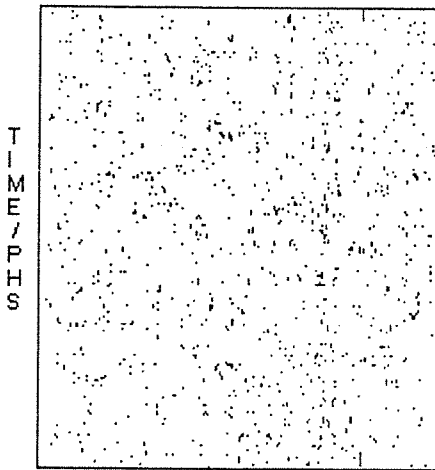
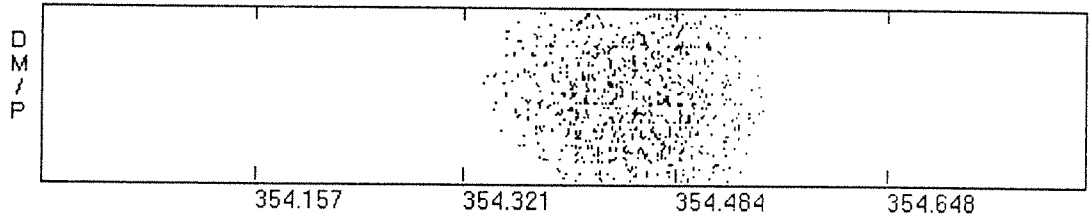
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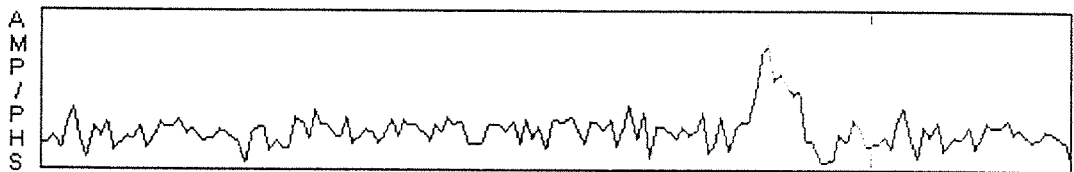
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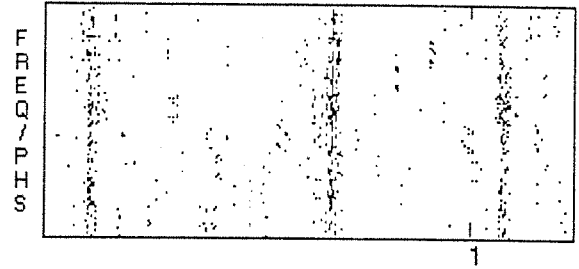
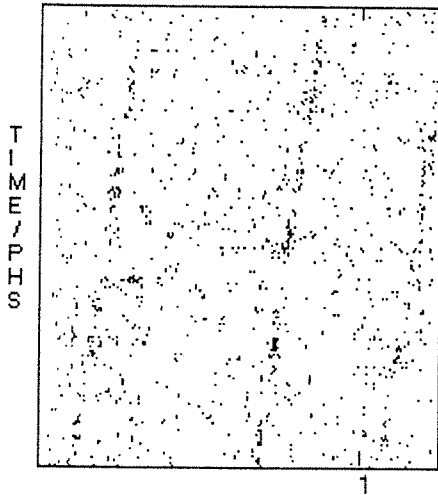
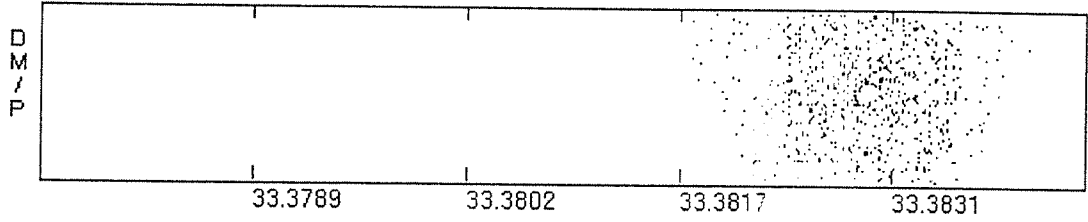
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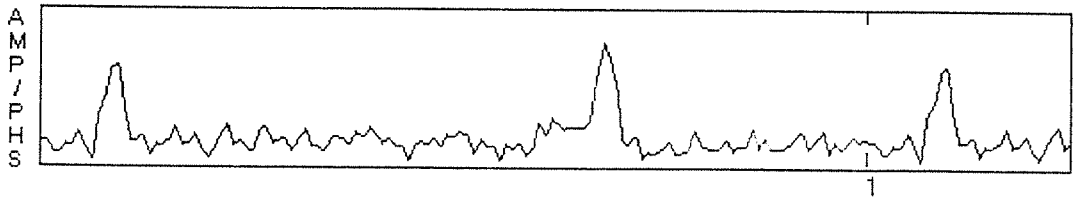
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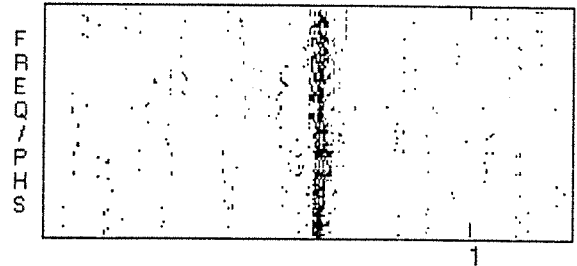
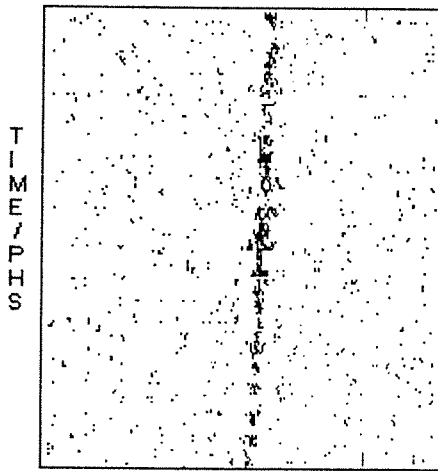
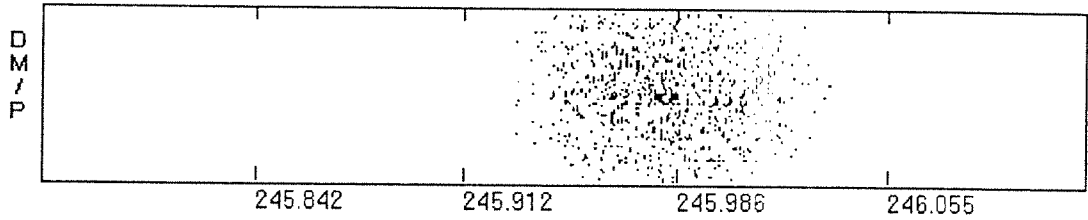
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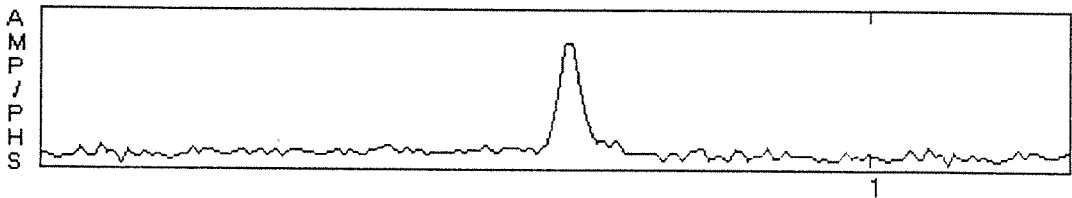
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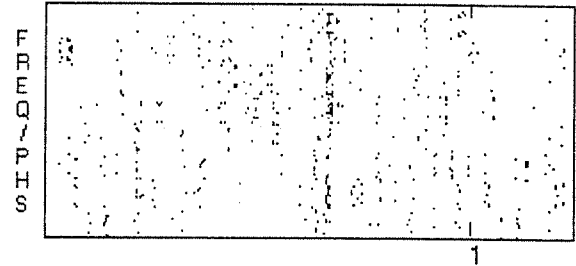
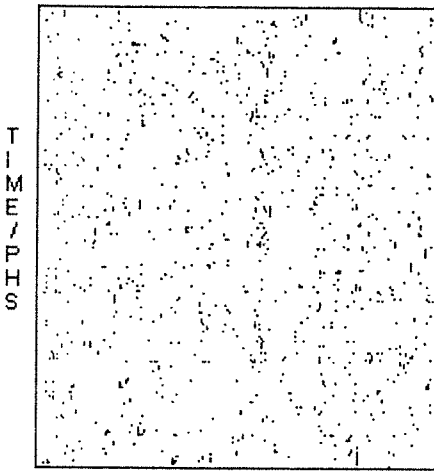
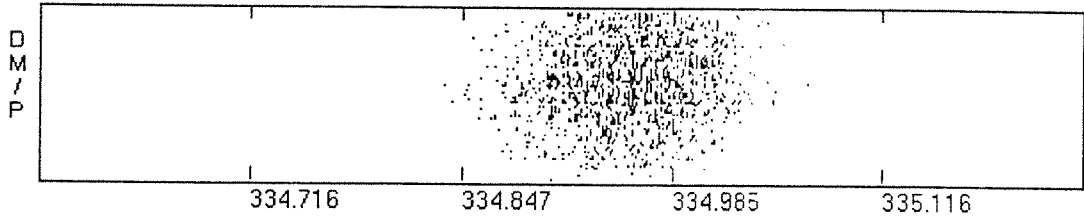
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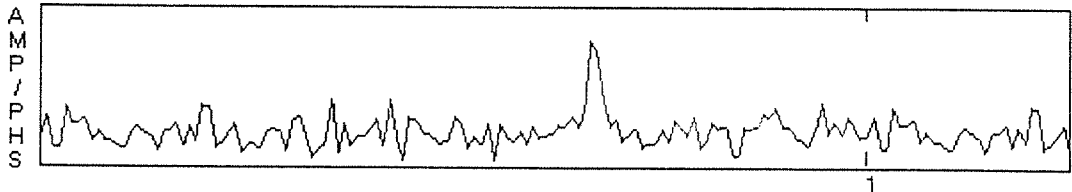
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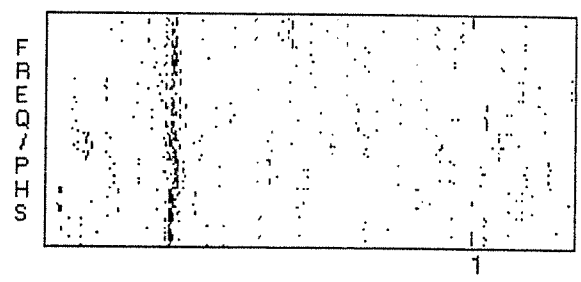
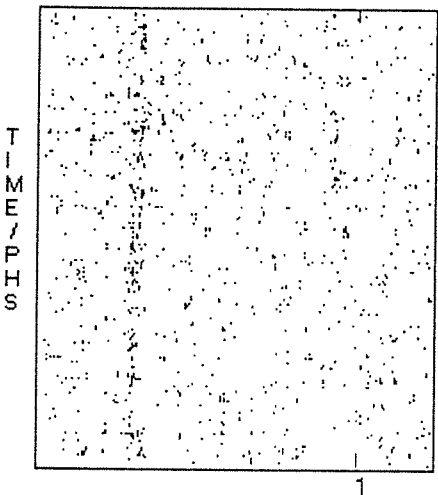
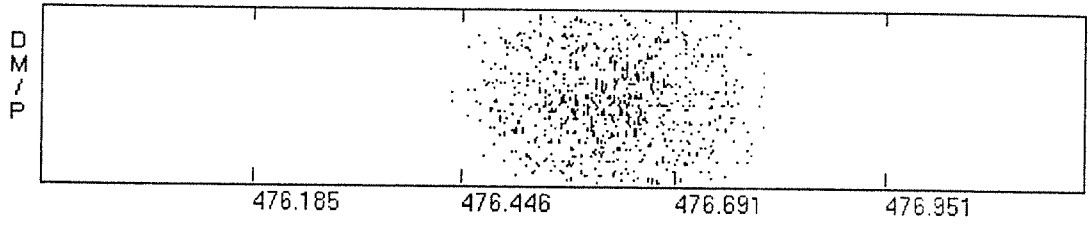
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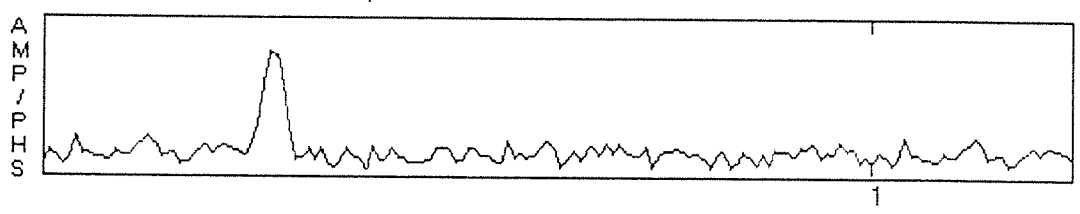
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Best Width: 2 Best SN: 12.7



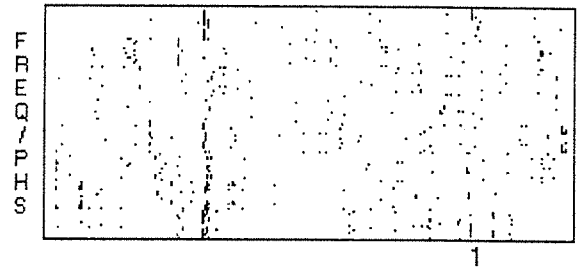
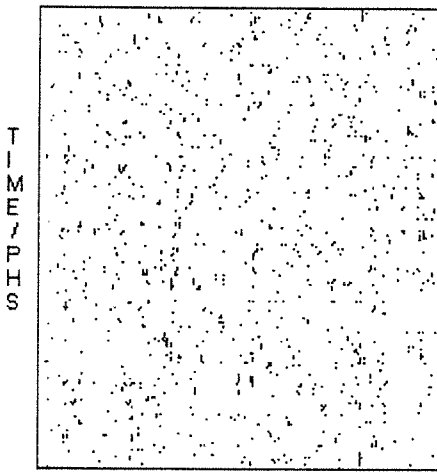
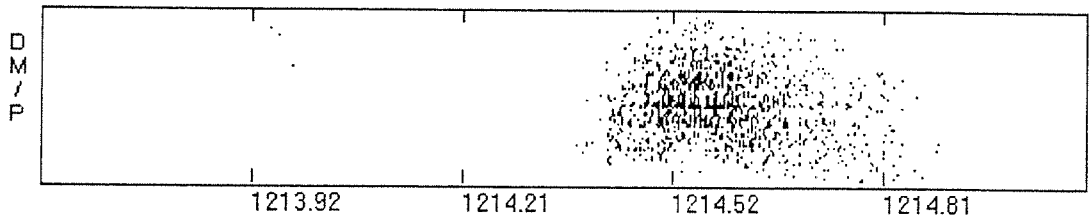
File: g1121011 RA: 6:26:2.0 Dec: 24:17:57 Gl:188.8000 Gb: 6.2000 Date: 90/10/12
Centre freq. (Hz): 2.09830122 Centre period (ms): 476.57600000 Centre DM: 84.00
File start (blks): 1 Blks skipped: 0 Blks read: 124 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 83 Ndm: 15 DMfactor: 1.0



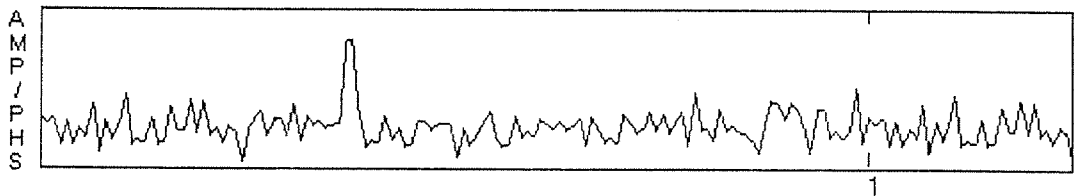
Best prd (ms): 476.59113516 Err: .01513516
Best frq (Hz): 2.098235 Err: .000067
Best DM: 84.00 Err: 14.82
Best Width: 4 Best SN: 25.4



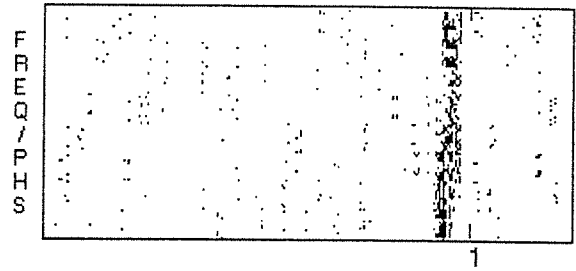
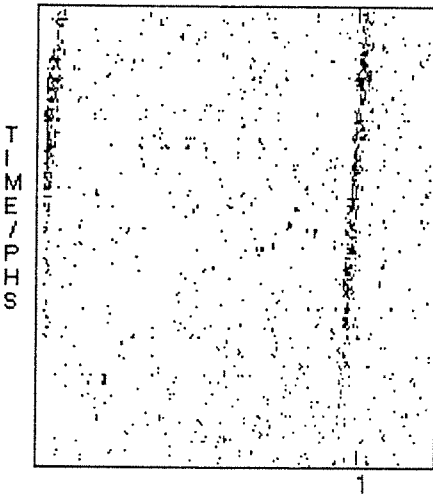
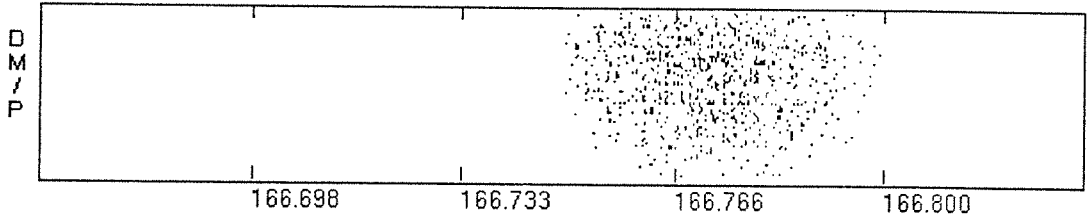
File: g1122011 RA: 6:43:53.5 Dec: 80:55:30 Gl: 133.2000 Gb: 26.8000 Date: 90/10/12
Centre freq. (Hz): .82347225 Centre period (ms): 1214.37000000 Centre DM: 32.00
File start (blks): 1 Blks skipped: 0 Blks read: 700 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DM factor: 1.0



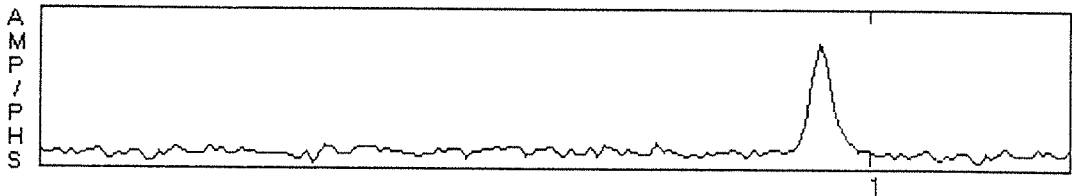
Best prd (ms): 1214.53971853 Err: .01697185
Best frq (Hz): .823357 Err: .000012
Best DM: 32.00 Err: 37.77
Best Width: 2 Best SN: 11.3



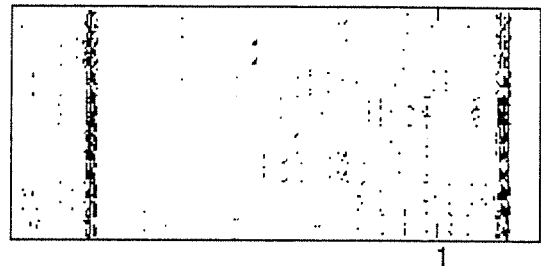
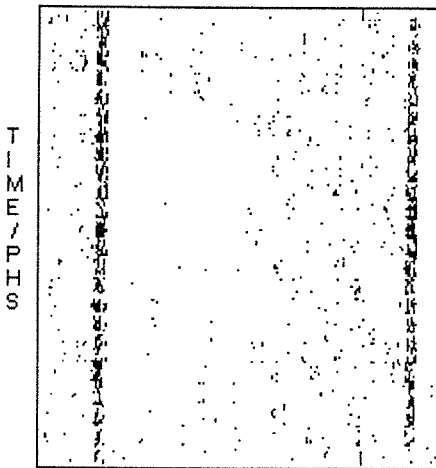
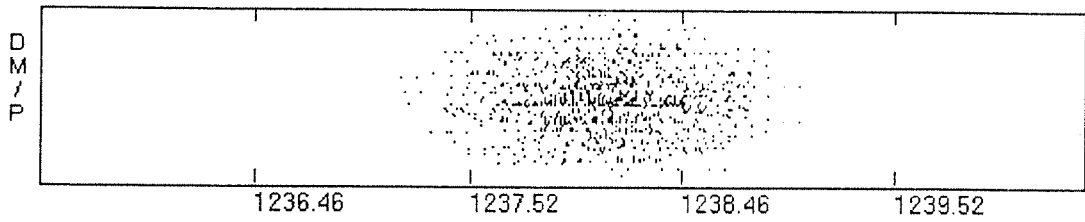
File: g1123011 RA: 7:40:47.7 Dec: -28:15:41 Gl: 243.8000 Gb: -2.4000 Date: 90/10/12
Centre freq. (Hz): 5.99700150 Centre period (ms): 166.75000000 Centre DM: 74.00
File start (blks): 1 Blks skipped: 0 Blks read: 128 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 91 Ndm: 15 DM factor: 1.0



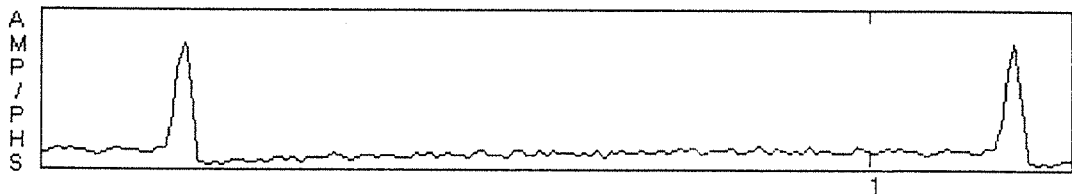
Best prd (ms): 166.77171224 Err: .00180935
Best frq (Hz): 5.996221 Err: .000065
Best DM: 56.22 Err: 5.19
Best Width: 4 Best SN: 52.7



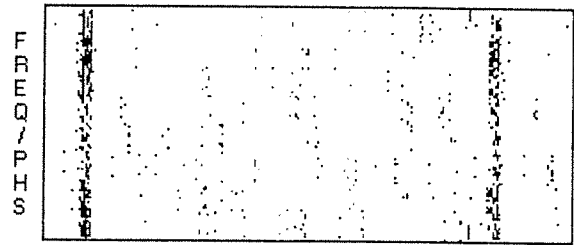
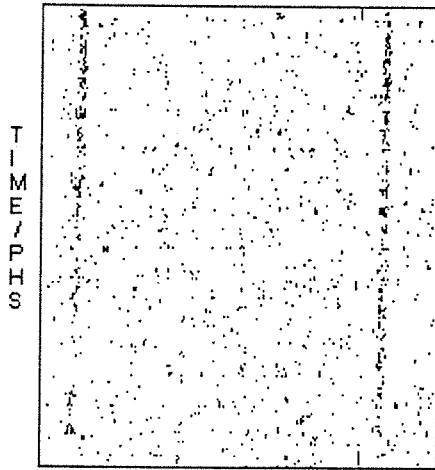
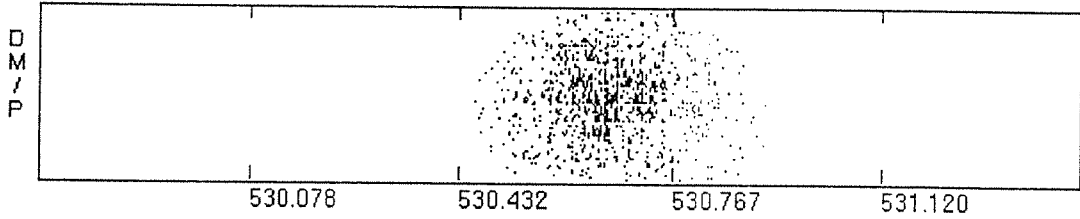
File: g1015011 RA: 8:18:6.0 Dec: -13:41:22 Gl: 235.9000 Gb: 12.6000 Date: 90/9/27
Centre freq. (Hz): .80772378 Centre period (ms): 1238.04700000 Centre DM: 41.00
File start (blks): 1 Blks skipped: 0 Blks read: 115 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 43 Ndm: 15 DMfactor: 1.0



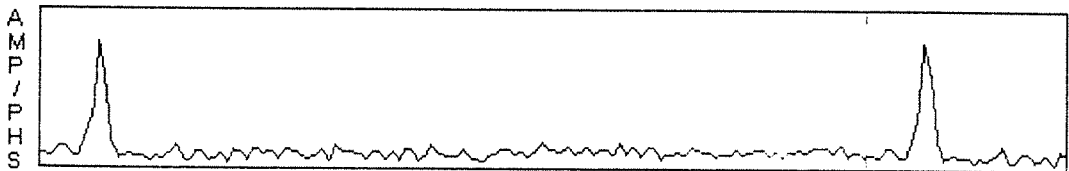
Best prd (ms): 1238.04700000 Err: .11514574
Best frq (Hz): .807724 Err: .000075
Best DM: 41.00 Err: 38.50
Best Width: 4 Best SN: 94.7



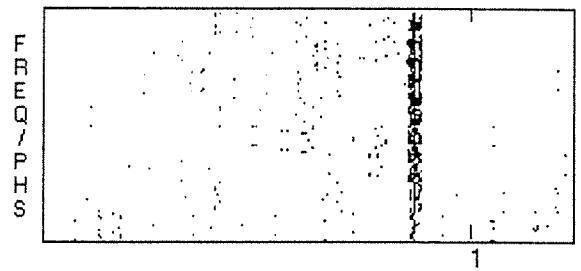
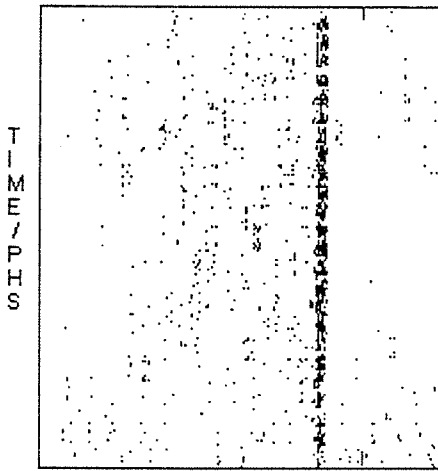
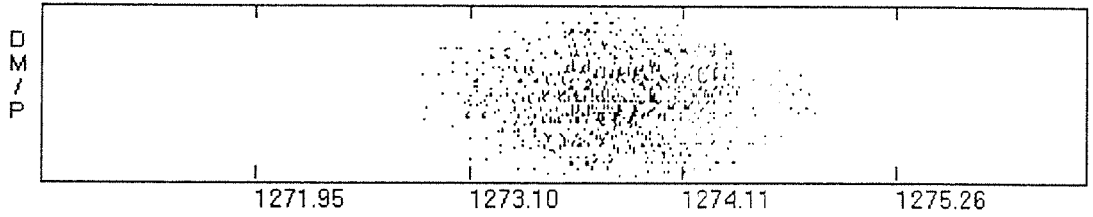
File: g1124011 RA: 8:23:50.4 Dec: 26:47:18 Gl: 197.0000 Gb: 31.7000 Date: 90/10/12
Centre freq. (Hz): 1.88462691 Centre period (ms): 530.6090000 Centre DM: 19.00
File start (blks): 1 Blks skipped: 0 Blks read: 127 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 91 Ndm: 15 DM factor: 1.0



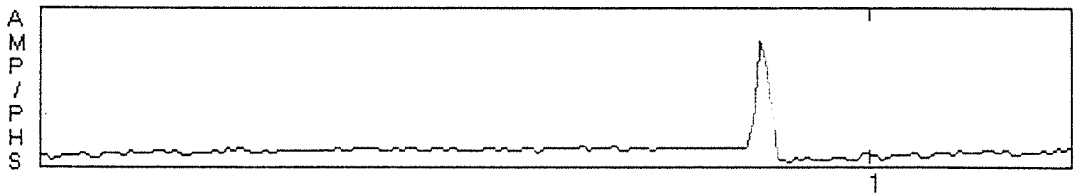
Best prd (ms): 530.66427177 Err: .01842392
Best frq (Hz): 1.884431 Err: .000065
Best DM: 19.00 Err: 16.50
Best Width: 2 Best SN: 32.4



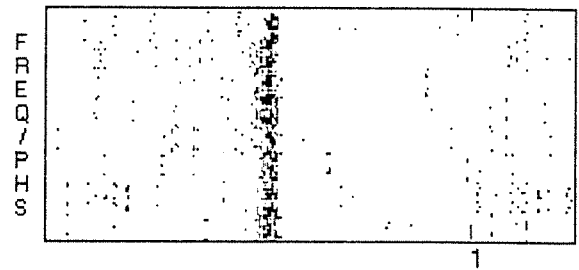
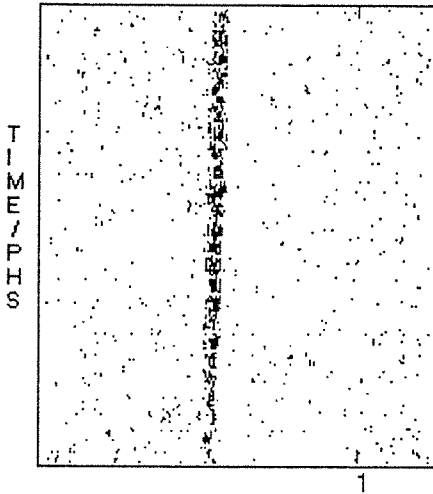
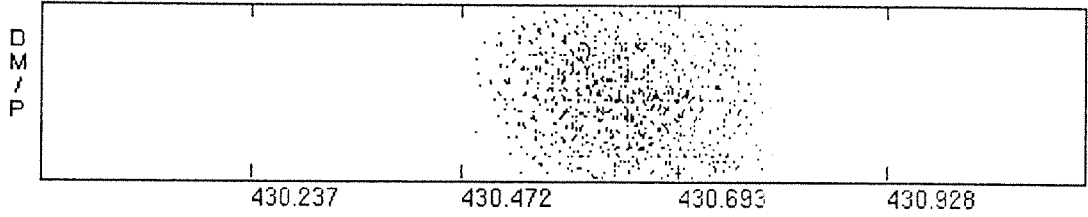
File: g1016011 RA: 8:34:26.1 Dec: 6:20:43 Gl: 219.7000 Gb: 26.3000 Date: 90/ 9/27
Centre freq. (Hz): .78513396 Centre period (ms): 1273.66800000 Centre DM: 13.00
File start (blks): 1 Blks skipped: 0 Blks read: 114 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 41 Ndm: 15 DMfactor: 1.0



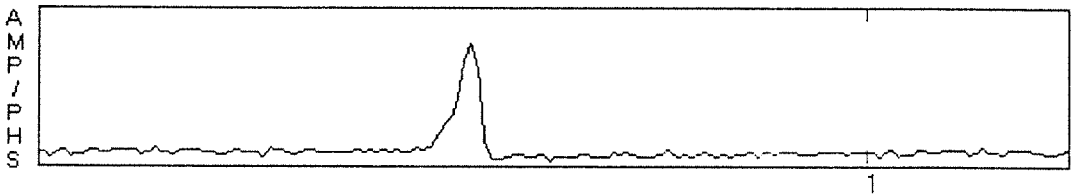
Best prd (ms): 1273.66800000 Err: .12438164
Best frq (Hz): .785134 Err: .000077
Best DM: 13.00 Err: 39.61
Best Width: 2 Best SN: 115.9



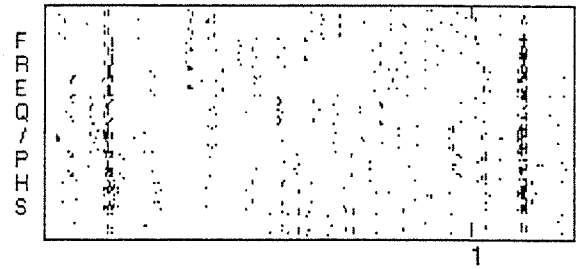
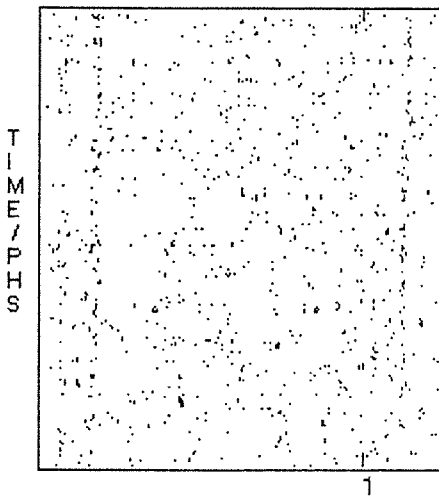
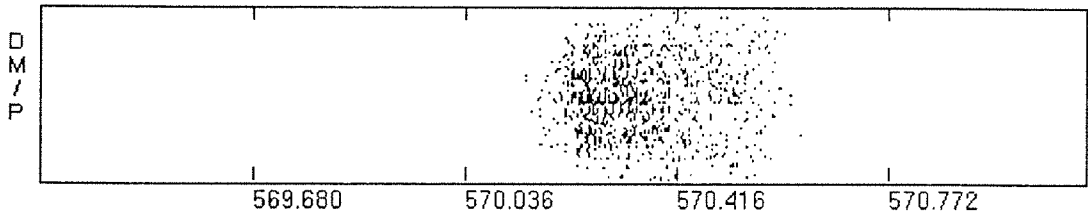
File: g1017011 RA: 9:19:35.0 Dec: 6:51:11 Gl: 225.4000 Gb: 36.4000 Date: 90/ 9/27
Centre freq. (Hz): 2.32239324 Centre period (ms): 430.59030000 Centre DM: 27.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 83 Ndm: 15 DMfactor: 1.0



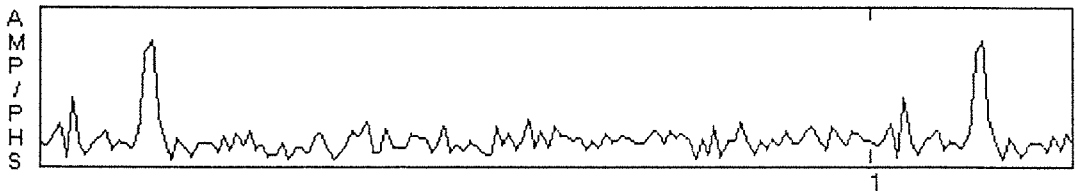
Best prd (ms): 430.65867371 Err: .01367474
Best frq (Hz): 2.322025 Err: .000074
Best DM: 27.00 Err: 13.39
Best Width: 4 Best SN: 111.9



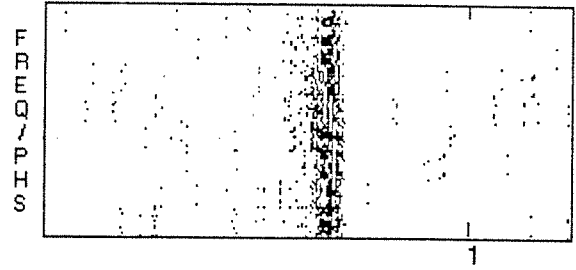
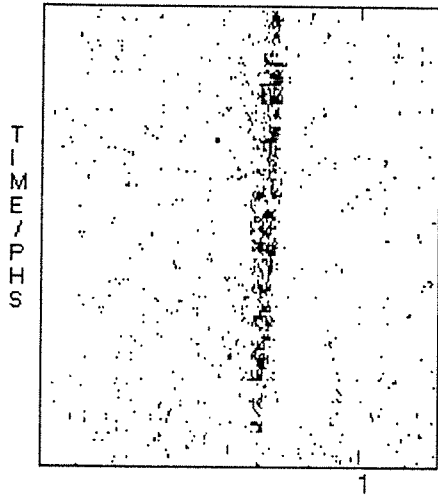
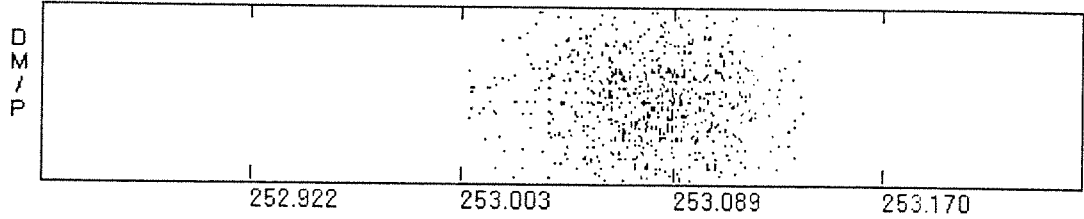
File: g1018011 RA: 9:42:4.3 Dec: -13:40:52 Gl: 249.1000 Gb: 28.8000 Date: 90/9/27
Centre freq. (Hz): 1.75365405 Centre period (ms): 570.23790000 Centre DM: 13.00
File start (blks): 1 Blks skipped: 0 Blks read: 116 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 77 Ndm: 15 DMfactor: 1.0



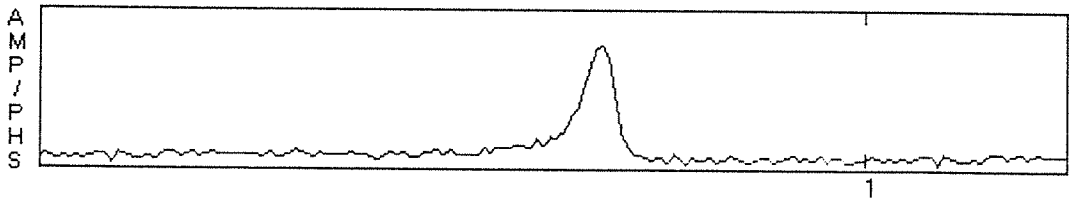
Best prd (ms): 570.30824185 Err: .02344728
Best frq (Hz): 1.753438 Err: .000072
Best DM: 13.00 Err: 17.73
Best Width: 2 Best SN: 18.8



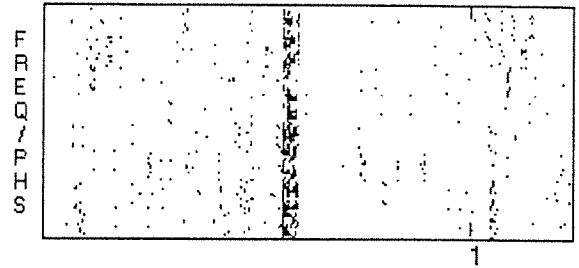
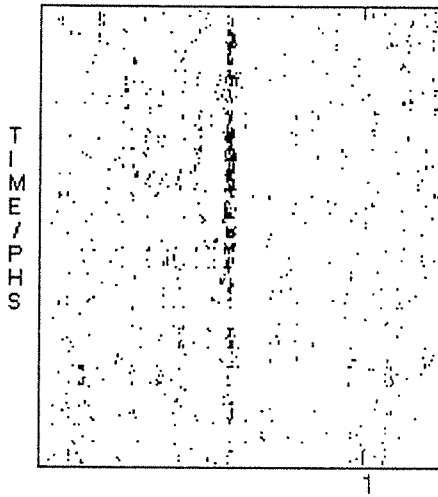
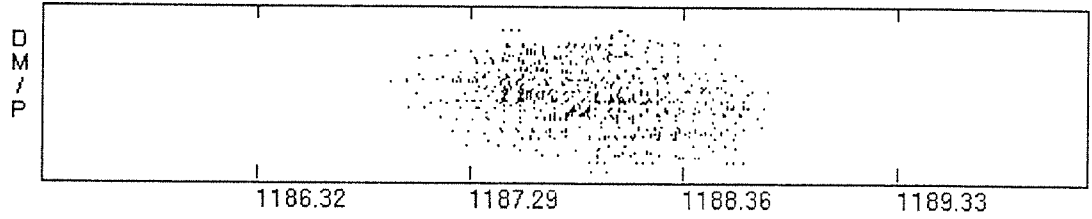
File: g1054011 RA: 9:50:30.5 Dec: 8: 9:45 Gl: 228.9000 Gb: 43.7000 Date: 90/10/3
Centre freq. (Hz): 3.95181473 Centre period (ms): 253.04830000 Centre DM: 3.00
File start (blks): 1 Blks skipped: 0 Blks read: 114 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DM factor: 1.0



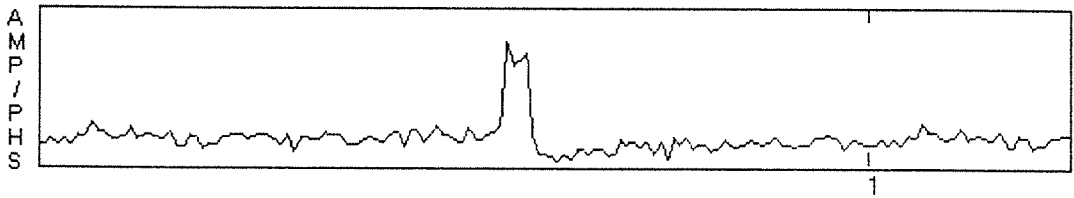
Best prd (ms): 253.08124900 Err: .00470700
Best frq (Hz): 3.951300 Err: .000073
Best DM: 11.99 Err: 7.87
Best Width: 8 Best SN: 96.9



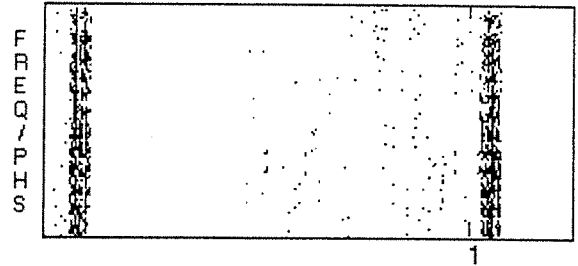
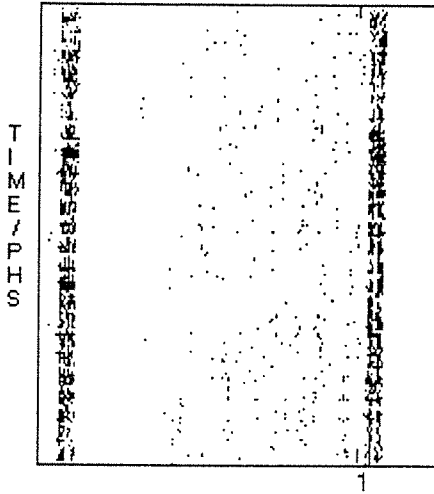
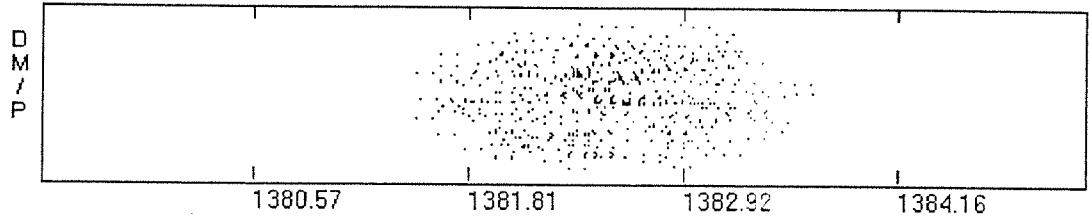
File: g1019011 RA: 11:33:27.4 Dec: 16:7:36 Gl: 241.9000 Gb: 69.2000 Date: 90/9/27
Centre freq. (Hz): .84183588 Centre period (ms): 1187.88000000 Centre DM: 5.00
File start (blks): 1 Blks skipped: 0 Blks read: 117 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 45 Ndm: 15 DM factor: 1.0



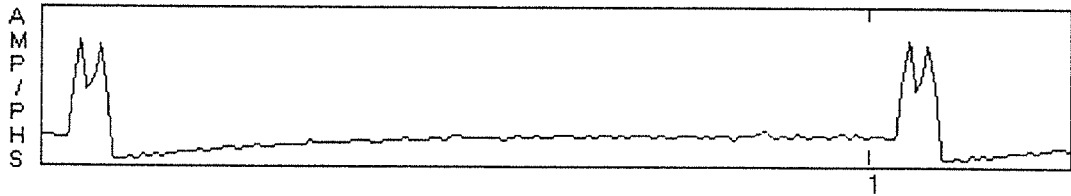
Best prd (ms): 1187.88000000 Err: .10545810
Best frq (Hz): .841836 Err: .000075
Best DM: 5.00 Err: 36.94
Best Width: 4 Best SN: 42.5



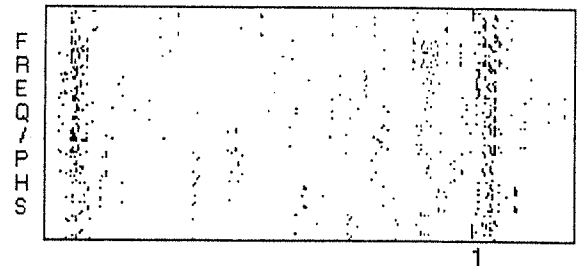
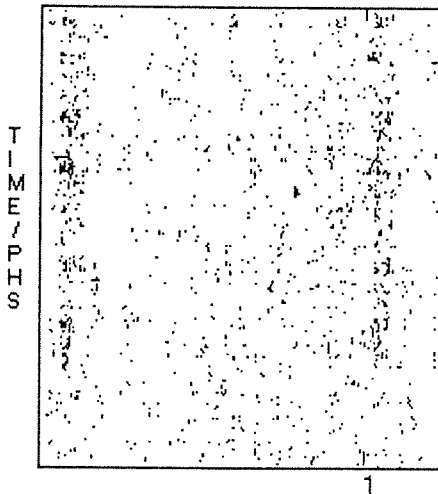
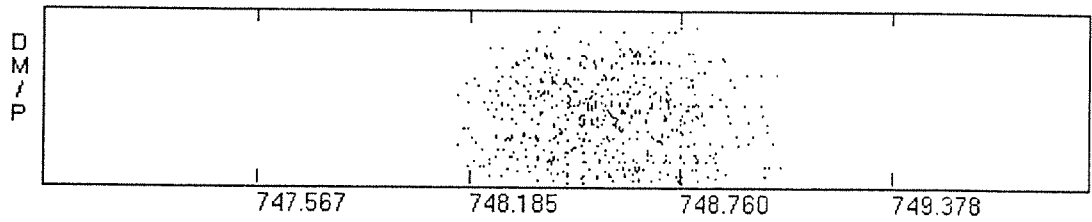
File: g1020011 RA: 12:37:11.9 Dec: 25:10:17 Gl: 252.5000 Gb: 86.5000 Date: 90/ 9/27
Centre freq. (Hz): .72336147 Centre period (ms): 1382.43470000 Centre DM: 9.00
File start (blks): 1 Blks skipped: 0 Blks read: 124 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 41 Ndm: 15 DMfactor: 1.0



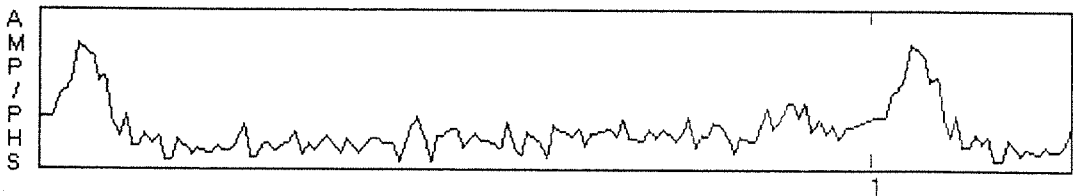
Best prd (ms): 1382.56970339 Err: .13500339
Best frq (Hz): .723291 Err: .000071
Best DM: 9.00 Err: 42.99
Best Width: 4 Best SN: 130.0



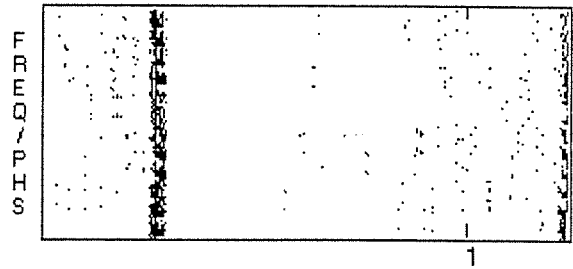
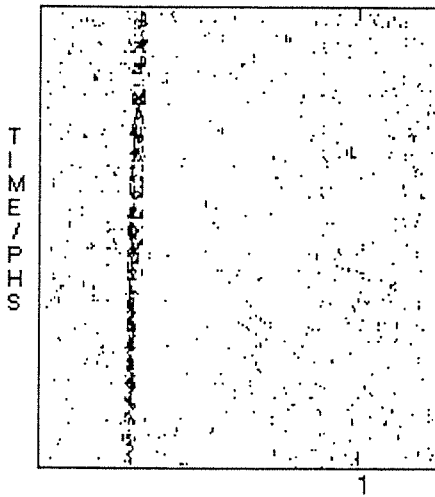
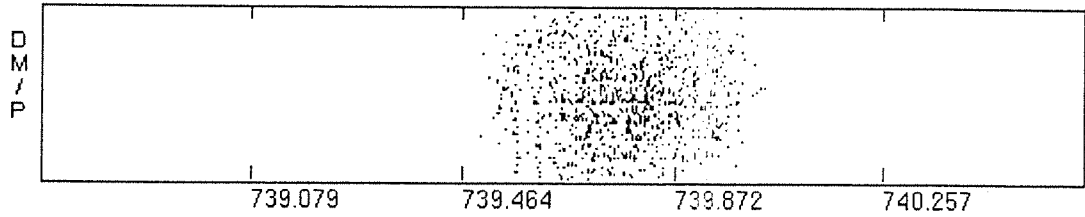
File: g1022011 RA: 15:41:14.3 Dec: 9:38:42 Gl: 17.8000 Gb: 45.8000 Date: 90/9/27
Centre freq. (Hz): 1.33601605 Centre period (ms): 748.49400000 Centre DM: 35.00
File start (blks): 1 Blks skipped: 0 Blks read: 115 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 73 Ndm: 15 DMfactor: 1.0



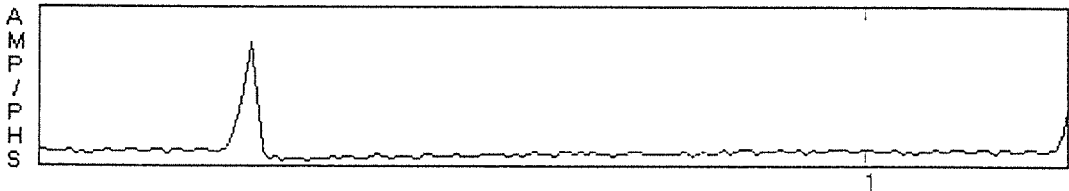
Best prd (ms): 748.53460840 Err: .04060840
Best frq (Hz): 1.335944 Err: .000072
Best DM: 61.60 Err: 23.28
Best Width: 8 Best SN: 24.9



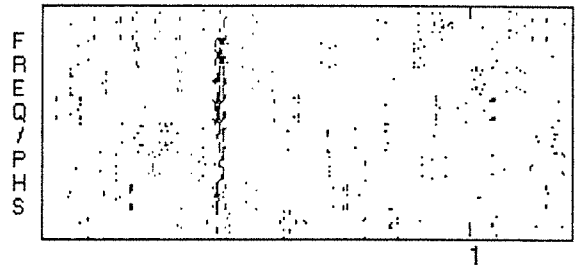
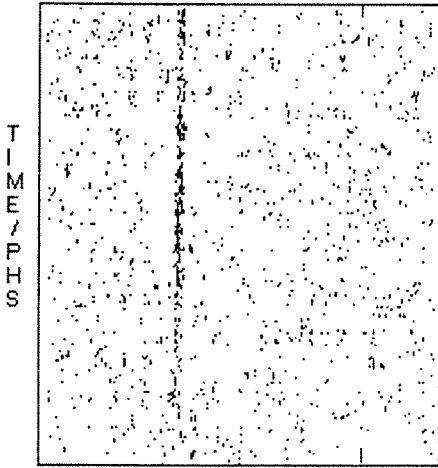
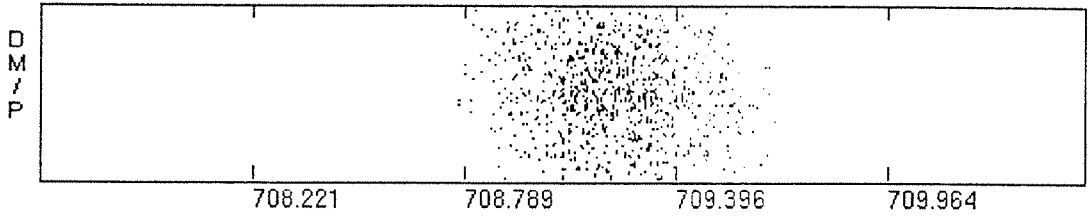
File: g1027011 RA: 15: 8: 3.7 Dec: 55:42:56 Gl: 91.3000 Gb: 52.3000 Date: 90/10/1
Centre freq. (Hz): 1.35193597 Centre period (ms): 739.6800000 Centre DM: 20.00
File start (blks): 1 Blks skipped: 0 Blks read: 200 Blk lengtr (s) 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DMfactor: 1.0



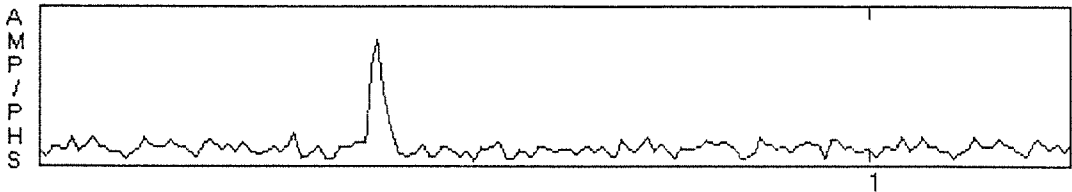
Best prd (ms): 739.79199128 Err: .02239826
Best frq (Hz): 1.351731 Err: .000041
Best DM: 20.00 Err: 23.00
Best Width: 4 Best SN: 127.8



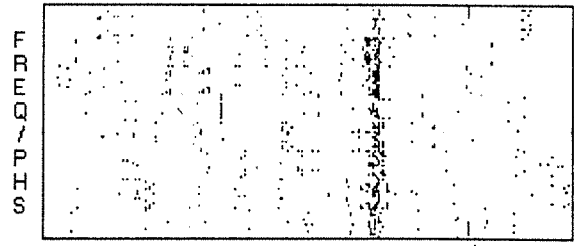
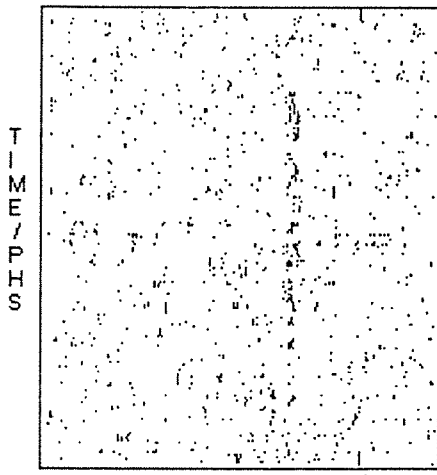
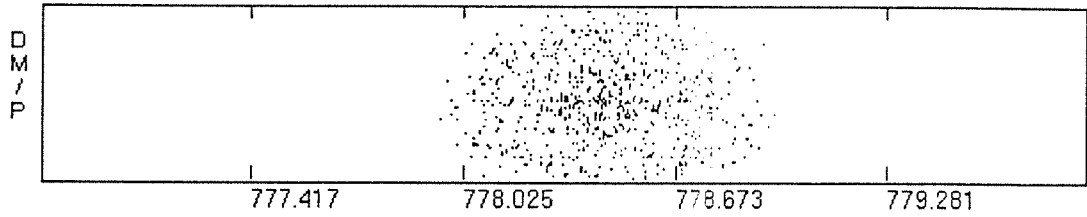
File: g1028011 RA: 15:40:50.3 Dec: -6:11:17 Gl: .6000 Gb: 36.6000 Date: 90/10/1
Centre freq. (Hz): 1.41021367 Centre period (ms): 709.11240000 Centre DM: 19.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 75 Ndm: 15 DM factor: 1.0



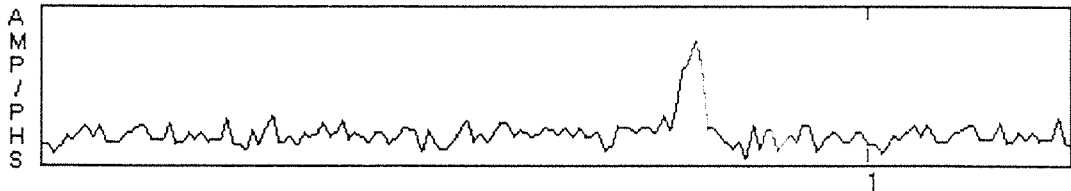
Best prd (ms): 709.18726406 Err: .03743203
Best frq (Hz): 1.410065 Err: .000074
Best DM: 19.00 Err: 22.05
Best Width: 2 Best SN: 29.8



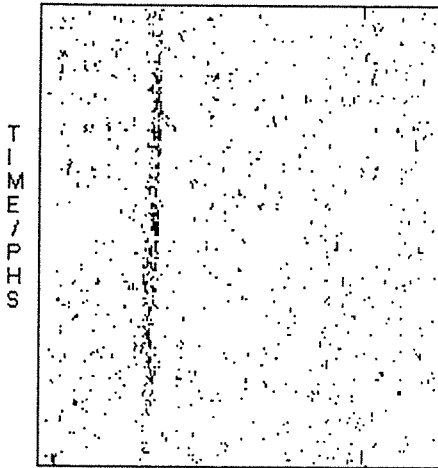
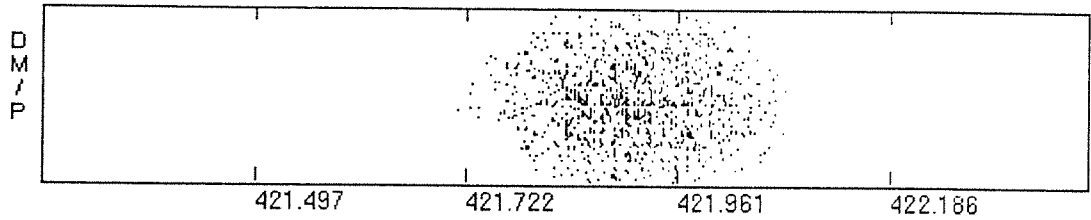
File: g1086011 RA: 16: 0: 5.0 Dec: -27: 4: 12 Gl: 347.1000 Gb: 18.8000 Date: 90/10/ 8
Centre freq. (Hz): 1.28473770 Centre period (ms): 778.36900000 Centre DM: 46.00
File start (blks): 1 Blks skipped: 0 Blks read: 127 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 77 Ndm: 15 DMfactor: 1.0



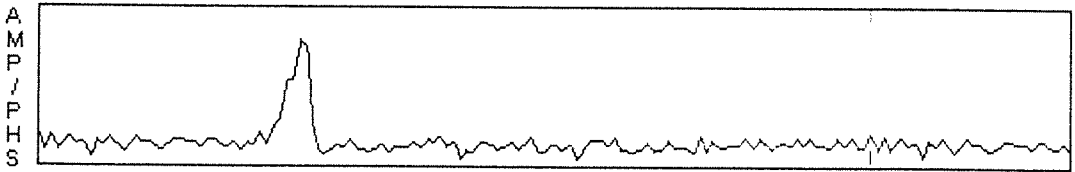
Best prd (ms): 778.44901326 Err: .04000663
Best frq (Hz): 1.284606 Err: .000066
Best DM: 46.00 Err: 24.21
Best Width: 4 Best SN: 23.2



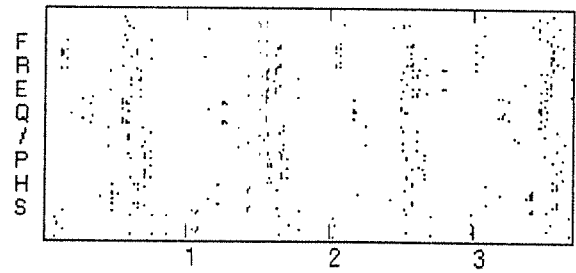
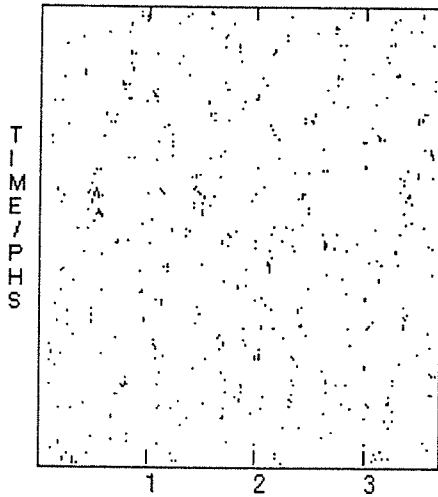
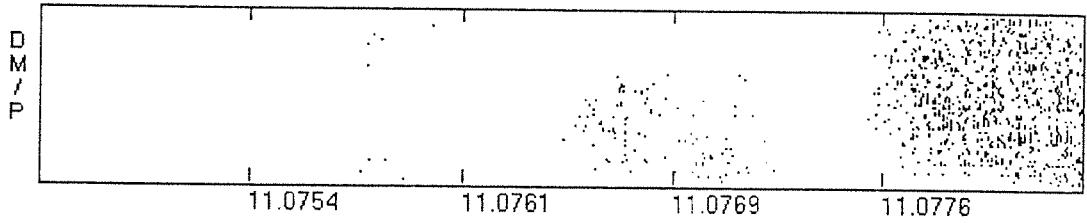
File: g1023011 RA: 16: 4:37.8 Dec: 0:24:41 Gl: 10.7000 Gb: 35.5000 Date: 90/9/27
Centre freq. (Hz): 2.37052377 Centre period (ms): 421.84770000 Centre DM: 11.00
File start (blks): 1 Blks skipped: 0 Blks read: 112 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



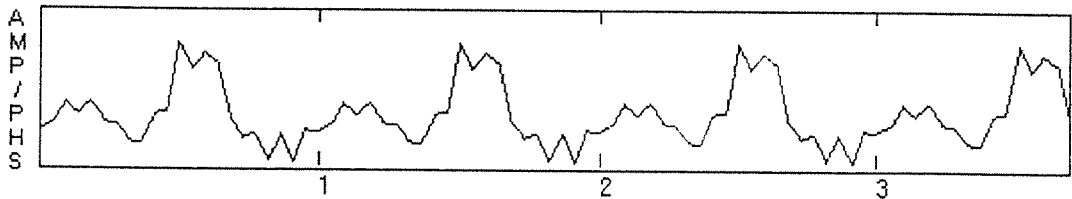
Best prd (ms): 421.90001246 Err: .01307812
Best frq (Hz): 2.370230 Err: .000073
Best DM: 11.00 Err: 13.12
Best Width: 4 Best SN: 39.9



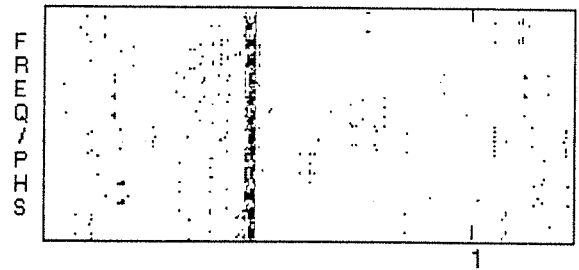
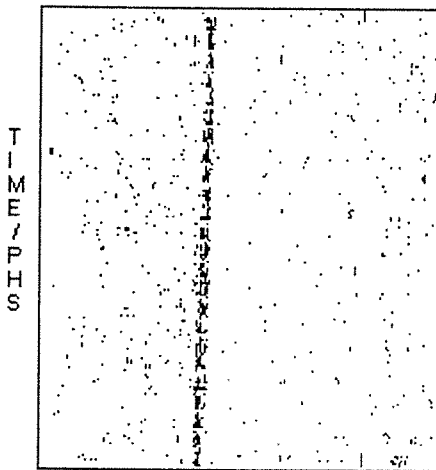
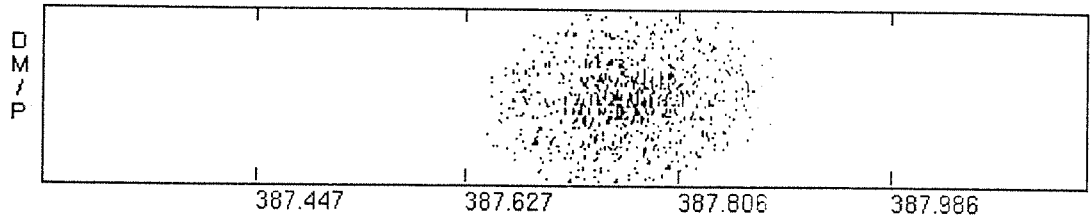
File: d8011 RA: 16:20:34.1 Dec: -26:24:58 Gl: 351.0000 Gb: 13.0000 Date: 90/10/1
Centre freq. (Hz): 90.28094075 Centre period (ms): 11.07653500 Centre DM: 62.87
File start (blks): 1 Blks skipped: 0 Blks read: 252 Blk length (s) .50000
Tsamp (ms): .2500 Nprd: 79 Ndm: 15 DM factor: 1.0



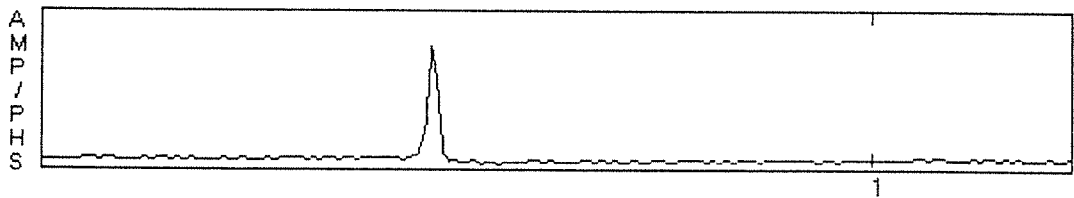
Best prd (ms): 11.07791818 Err: .00004705
Best frq (Hz): 90.269668 Err: .000383
Best DM: 62.87 Err: 2.05
Best Width: 4 Best SN: 7.8



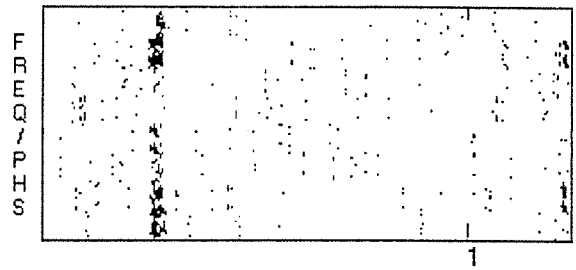
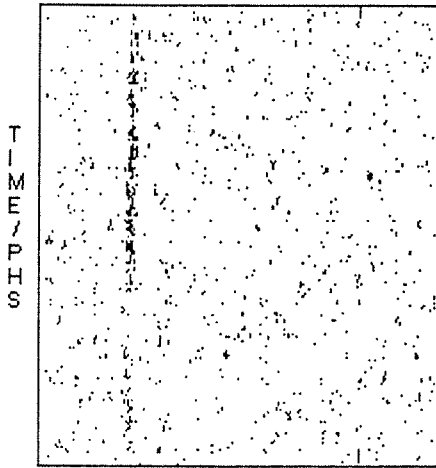
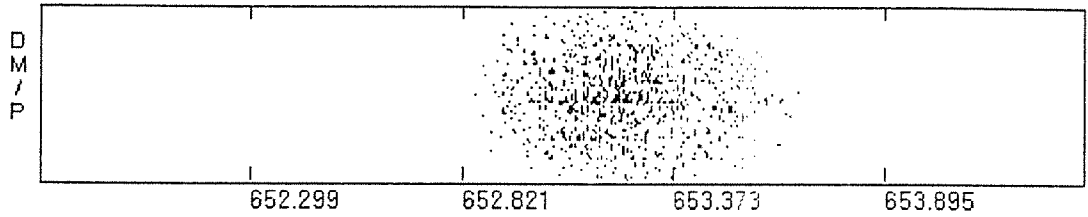
File: g1025011 RA: 16:42:24.6 Dec: -3:12:31 Gl: 14.1000 Gb: 26.1000 Date: 90/ 9/27
Centre freq. (Hz): 2.57916555 Centre period (ms): 387.72230000 Centre DM: 36.00
File start (blks): 1 Blks skipped: 0 Blks read: 112 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 79 Ndm: 15 DM factor: 1.0



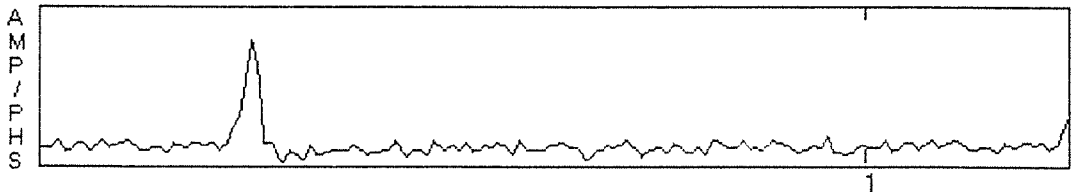
Best prd (ms): 387.77777766 Err: .01109553
Best frq (Hz): 2.578797 Err: .000074
Best DM: 36.00 Err: 12.06
Best Width: 2 Best SN: 199.5



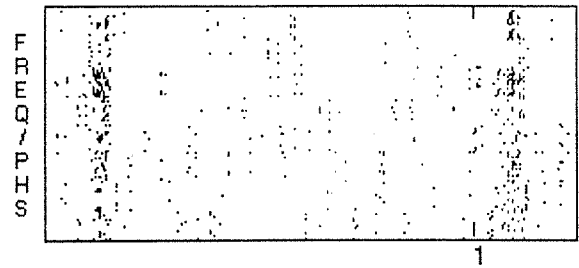
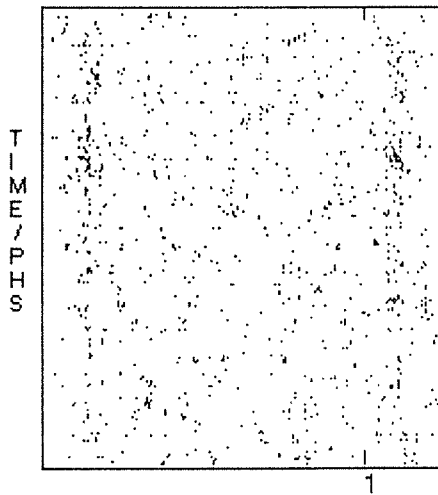
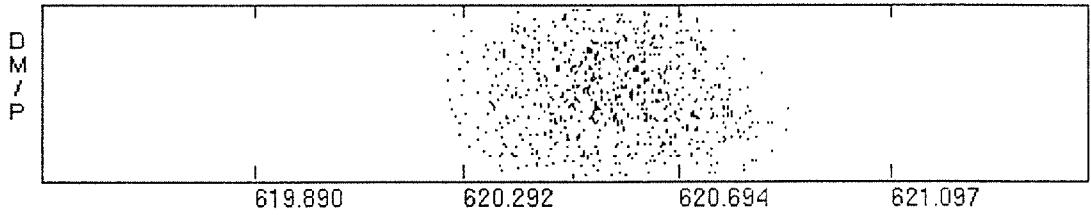
File: g1030011 RA: 17: 6:33.1 Dec: -16:37:12 Gl: 5.8000 Gb: 13.7000 Date: 90/10/1
Centre freq. (Hz): 1.53112697 Centre period (ms): 653.11370000 Centre DM: 25.00
File start (blks): 1 Blks skipped: 0 Blks read: 117 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



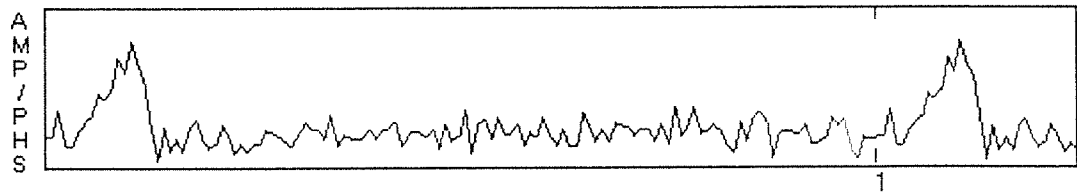
Best prd (ms): 653.20481519 Err: .03037173
Best frq (Hz): 1.530913 Err: .000071
Best DM: 25.00 Err: 20.31
Best Width: 4 Best SN: 39.0



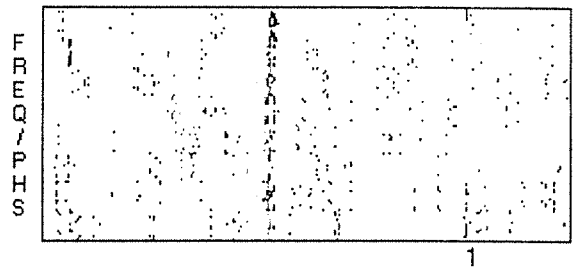
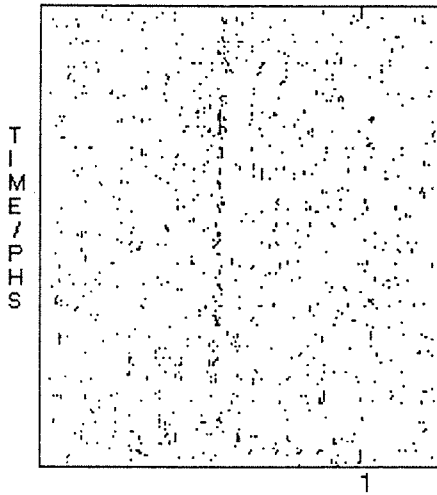
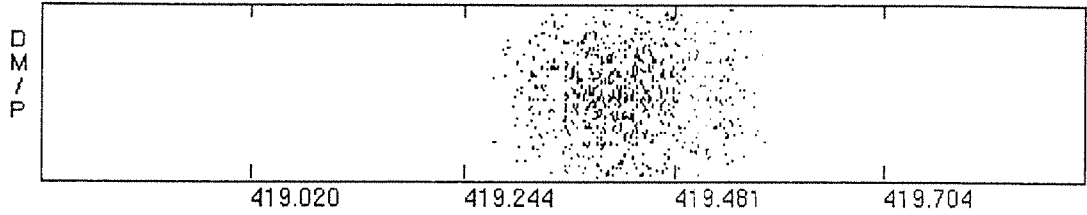
File: g1011011 RA: 17:17:23.0 Dec: -29:32: GI: 356.5000 Gb: 4.2000 Date: 90/ 9/26
Centre freq. (Hz): 1.61158536 Centre period (ms): 620.5070000 Centre DM: 43.00
File start (blks): 1 Blks skipped: 0 Blks read: 129 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 79 Ndm: 15 DM factor: 1.0



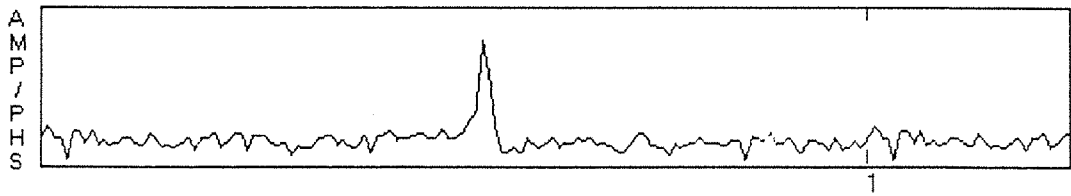
Best prd (ms): 620.58158017 Err: .02486006
Best frq (Hz): 1.611392 Err: .000065
Best DM: -1.11 Err: 19.30
Best Width: 8 Best SN: 18.5



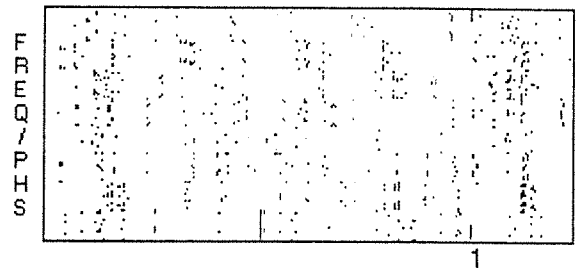
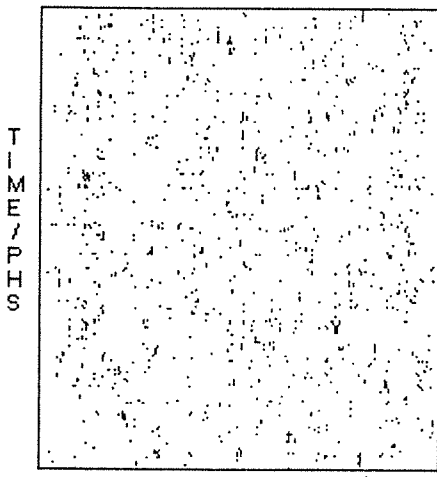
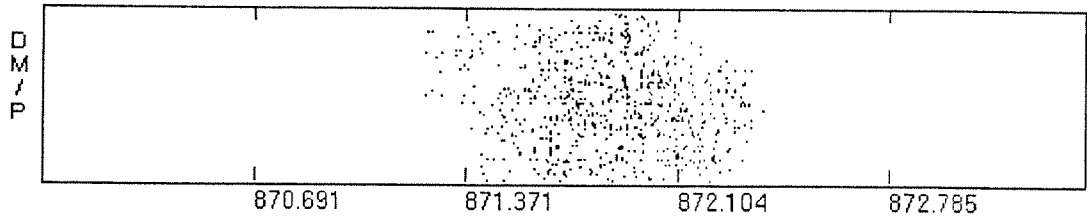
File: g1130011 RA: 17:32:22.0 Dec: -7:22:57 Gl: 17.3000 Gb: 13.3000 Date: 90/10/15
Centre freq. (Hz): 2.38453486 Centre period (ms): 419.36800000 Centre DM: 74.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DM factor: 1.0



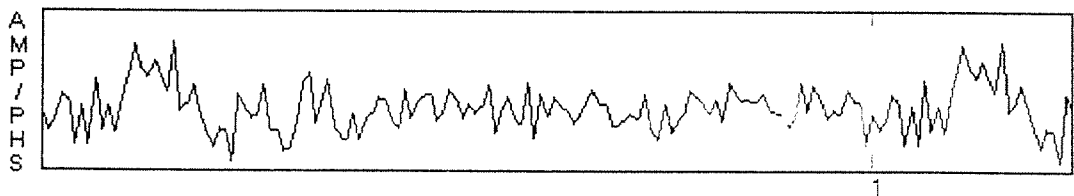
Best prd (ms): 419.42100508 Err: .01300127
Best frq (Hz): 2.384239 Err: .000074
Best DM: 74.00 Err: 13.04
Best Width: 2 Best SN: 23.9



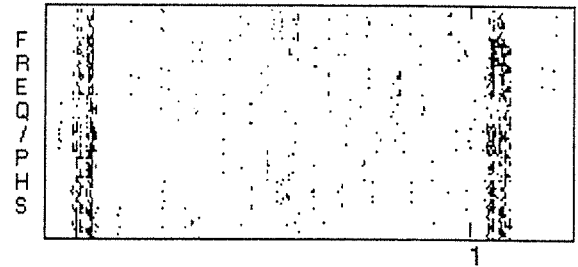
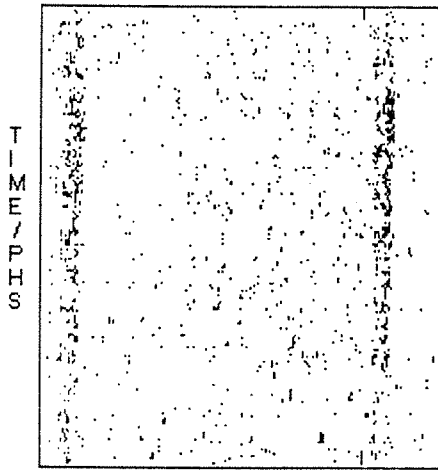
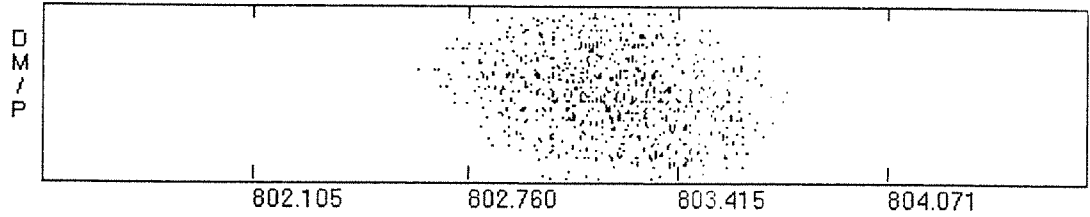
File: g1036011 RA: 17:30:25.0 Dec: -22:26:43 Gl: 4.0000 Gb: 5.7000 Date: 30/10/2
Centre freq. (Hz): 1.14709944 Centre period (ms): 871.76400000 Centre DM: 42.00
File start (blks): 1 Blks skipped: 0 Blks read: 122 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 67 Ndm: 15 DMfactor: 1.0



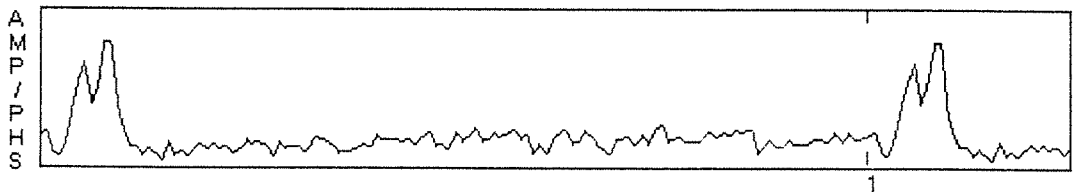
Bestprd (ms): 871.31559588 Err: .08641638
Bestfrq (Hz): 1.147032 Err: .000114
BestDM: 103.97 Err: 45.41
BestWidth: 8 BestSN: 9.6



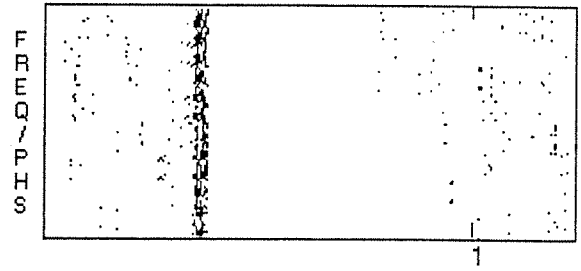
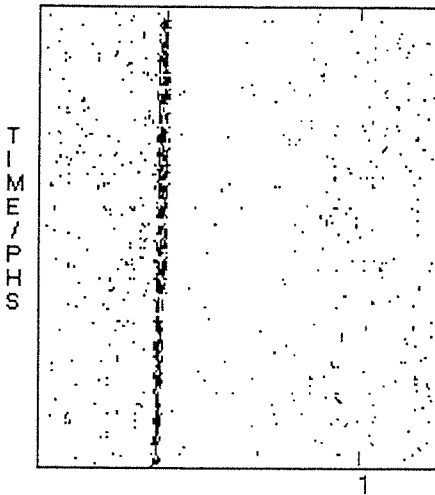
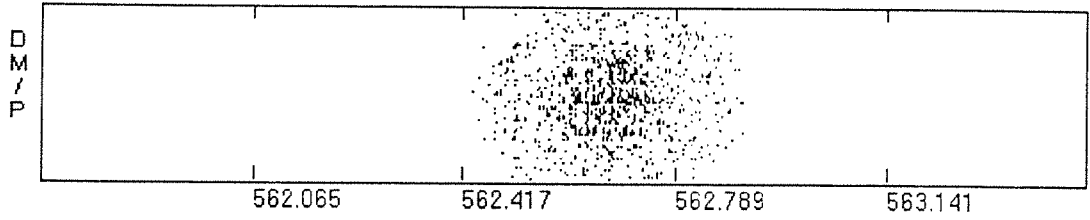
File: g1031011 RA: 17:37:49.2 Dec: 13:13:29 Gl: 37.1000 Gb: 21.7000 Date: 90/10/1
Centre freq. (Hz): 1.24515820 Centre period (ms): 803.11080000 Centre DM: 49.00
File start (blks): 1 Blks skipped: 0 Blks read: 116 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 69 Ndm: 15 DMfactor: 1.0



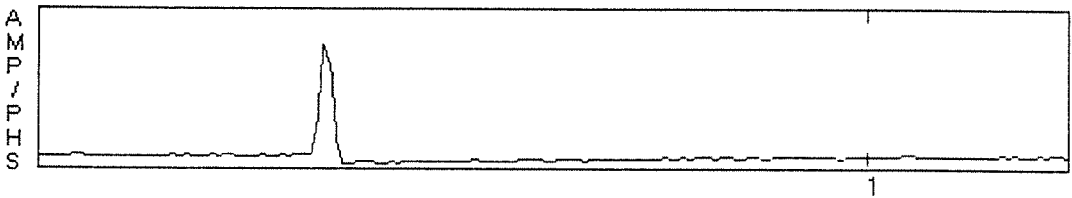
Best prd (ms): 803.15693458 Err: .04613458
Best frq (Hz): 1.245087 Err: .000072
Best DM: 20.46 Err: 24.98
Best Width: 8 Best SN: 37.3



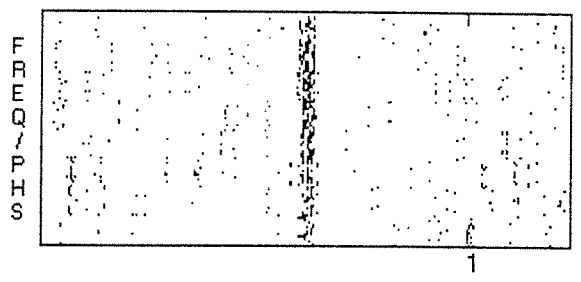
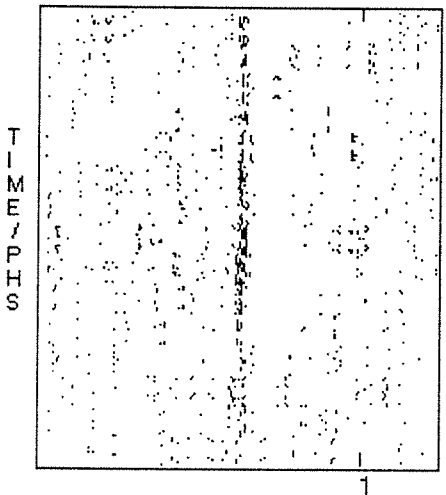
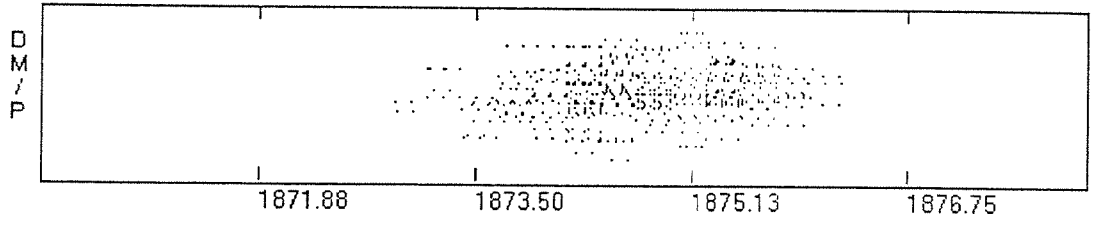
File: g1032011 RA: 17:49:49.2 Dec: -28: 6: Gl: 1.5000 Gb: - 0000 Date: 90/10/1
Centre freq. (Hz): 1.77742166 Centre period (ms): 562.61270000 Centre DM: 51.00
File start (blks): 1 Blks skipped: 0 Blks read: 128 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DMfactor: 1.0



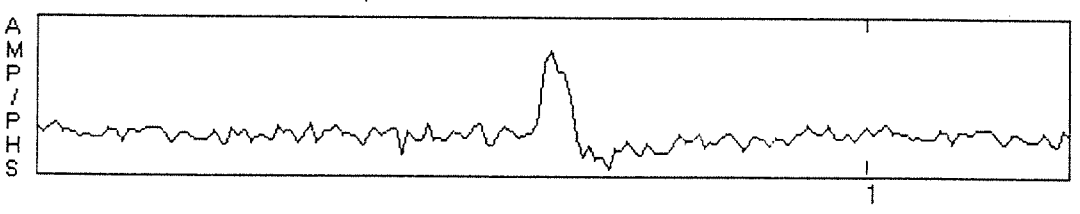
Best prd (ms): 562.67403133 Err: .02044377
Best frq (Hz): 1.777226 Err: .000065
Best DM: 51.00 Err: 17.50
Best Width: 2 Best SN: 241.5



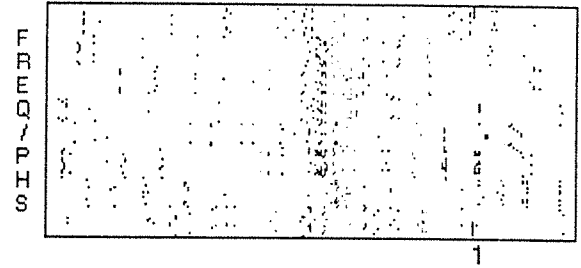
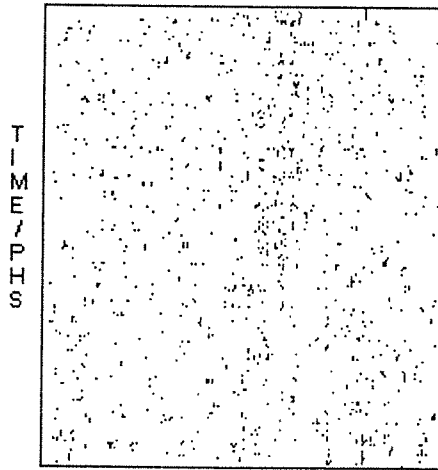
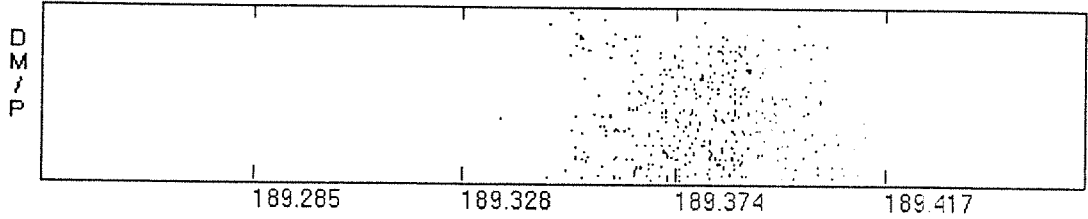
File: g1040011 RA: 18:19:57.0 Dec: -22:57:58 Gl: 9.4000 Gb: -4.4000 Date: 90/10/2
Centre freq. (Hz): .53348982 Centre period (ms): 1874.45000000 Centre DM: 123.00
File start (blks): 1 Blks skipped: 0 Blks read: 122 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 29 Ndm: 15 DM factor: 1.0



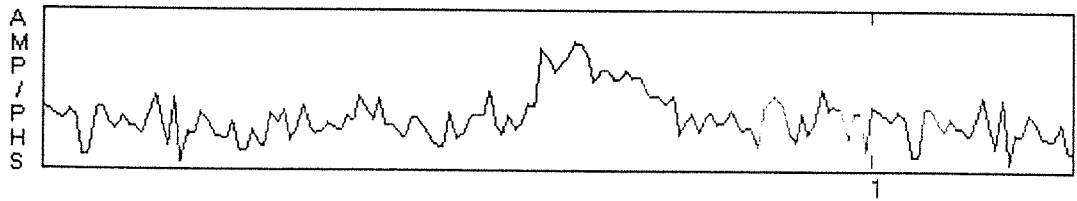
Best prd (ms): 1874.71150251 Err: .26150250
Best frq (Hz): .533415 Err: .000074
Best DM: 123.00 Err: 58.29
Best Width: 4 Best SN: 30.3



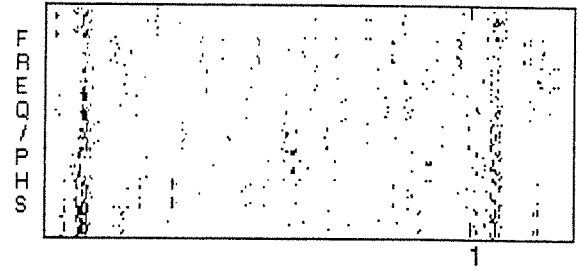
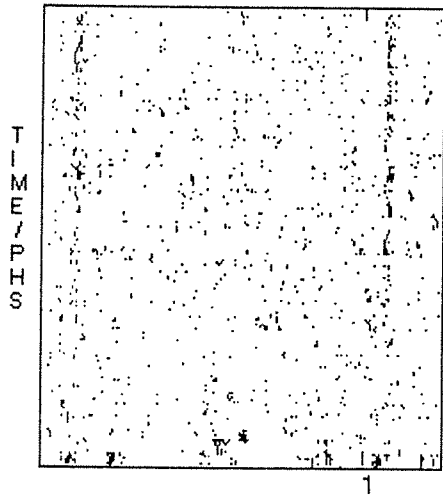
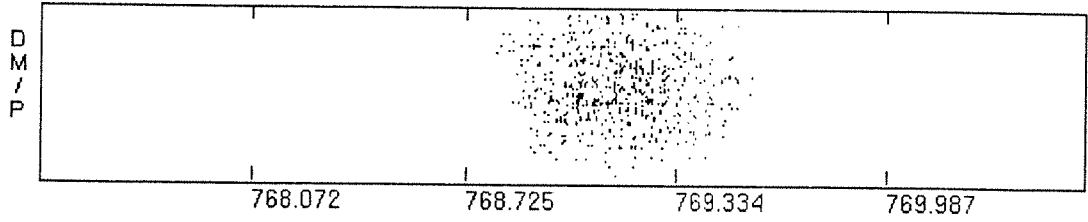
File: g1091011 RA: 18:21:2.7 Dec: -19:47:29 Gl: 12.3000 Gb: -3.1000 Date 90/10/8
Centre freq. (Hz): 5.28116946 Centre period (ms): 189.35200000 Centre DM: 224.00
File start (blks): 1 Blks skipped: 0 Blks read: 119 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DM factor: 1.0



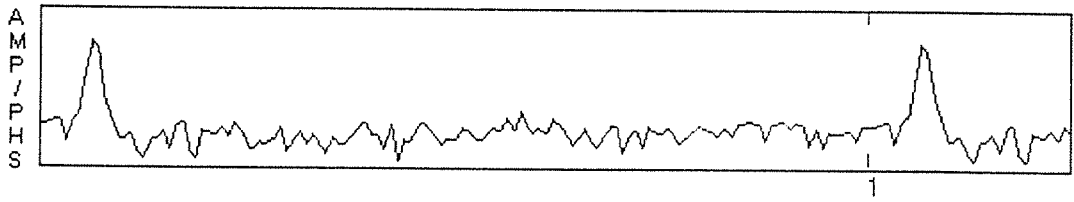
Best prd (ms): 189.37967421 Err: .00445303
Best frq (Hz): 5.280396 Err: .000124
Best DM: 230.73 Err: 10.42
Best Width: 16 Best SN: 18.1



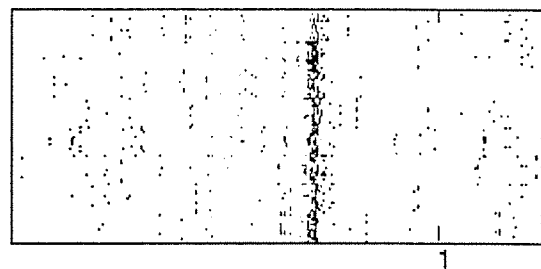
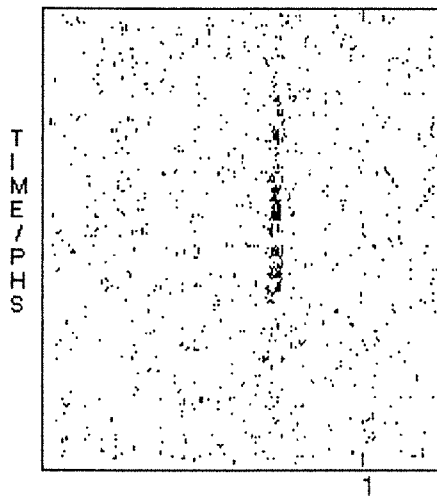
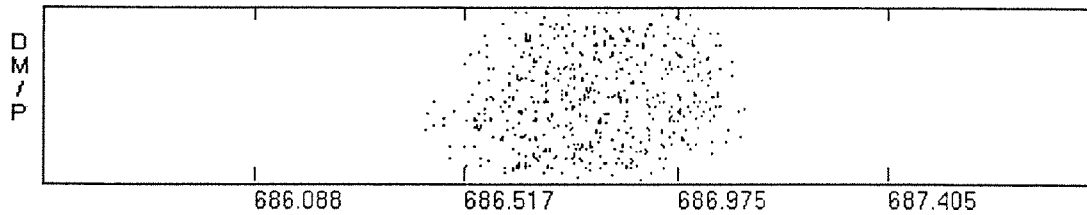
File: g1074011 RA: 18:22:46.2 Dec: -9:37:31 Gl: 21.4000 Gb: 1.3000 Date: 90/10/4
Centre freq. (Hz): 1.30030388 Centre period (ms): 769.05100000 Centre DM: 20.00
File start (blks): 1 Blks skipped: 0 Blks read: 114 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 71 Ndm: 15 DMfactor: 1.0



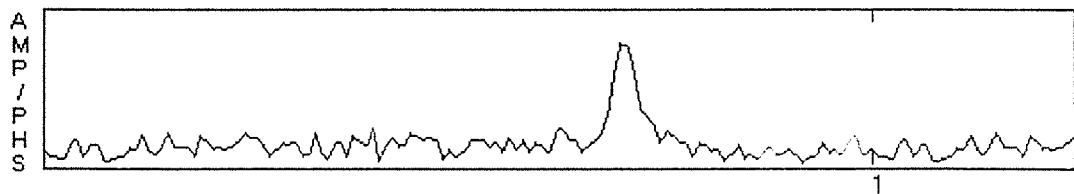
Best prd (ms): 769.17974738 Err: .04291579
Best frq (Hz): 1.300086 Err: .000073
Best DM: -7.33 Err: 23.92
Best Width: 4 Best SN: 15.1



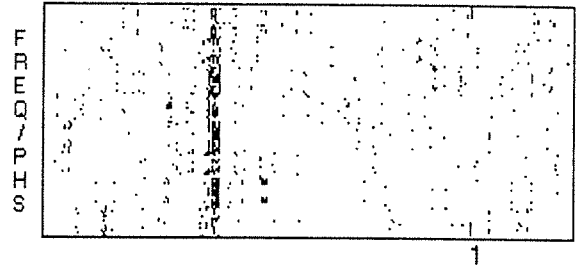
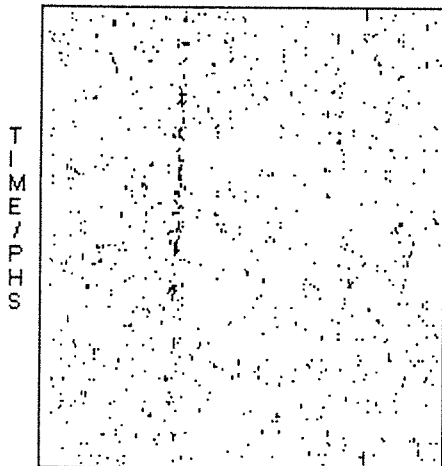
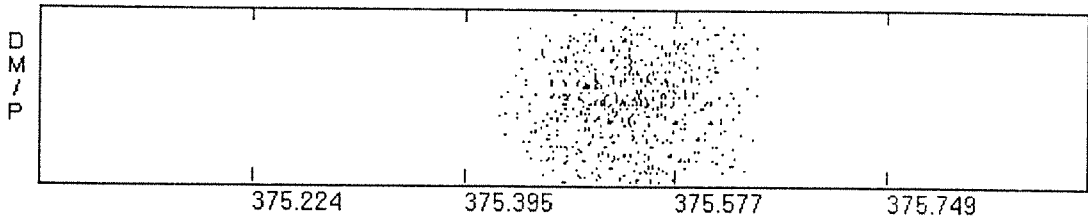
File: g1146011 RA: 18:31:4.0 Dec: -3:40: GI: 27.7000 Gb: 23000 Date: 90/10/17
Centre freq. (Hz): 1.45611276 Centre period (ms): 686.7600000 Centre DM: 236.00
File start (blks): 1 Blks skipped: 0 Blks read: 139 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 77 Ndm: 15 DMfactor: 1.0



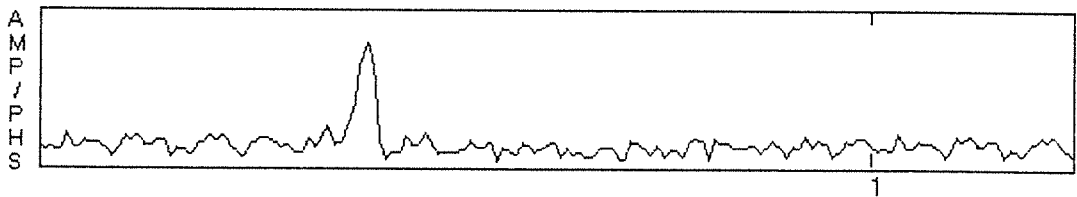
Best prd (ms): 686.87295395 Err: .02823849
Best frq (Hz): 1.455873 Err: .000060
Best DM: 211.59 Err: 21.36
Best Width: 4 Best SN: 32.5



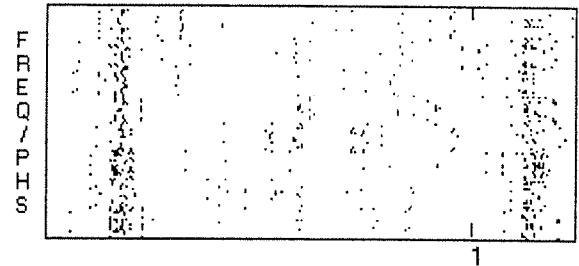
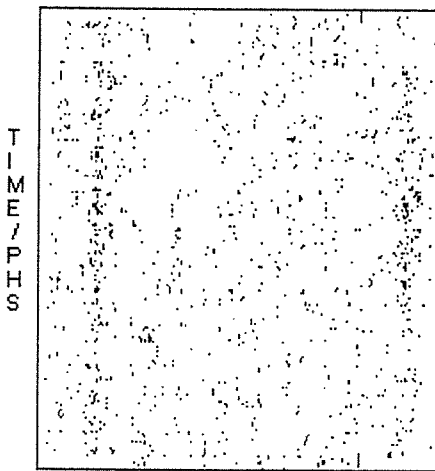
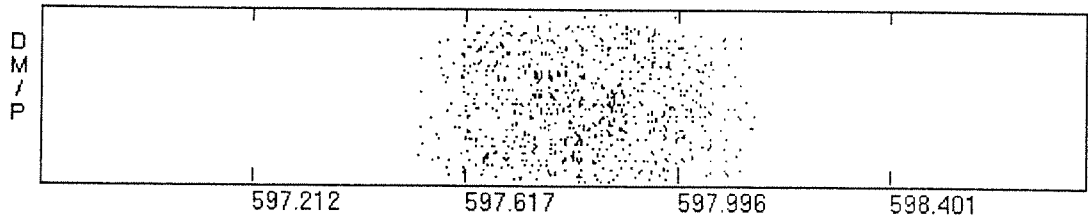
File: g1042011 RA: 18:42:38.5 Dec: 14:51:3 Gl: 45.6000 Gb: 8.1000 Date: 90/10/2
Centre freq. (Hz): 2.66317968 Centre period (ms): 375.49100000 Centre DM: 41.00
File start (blks): 1 Blks skipped: 0 Blks read: 117 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



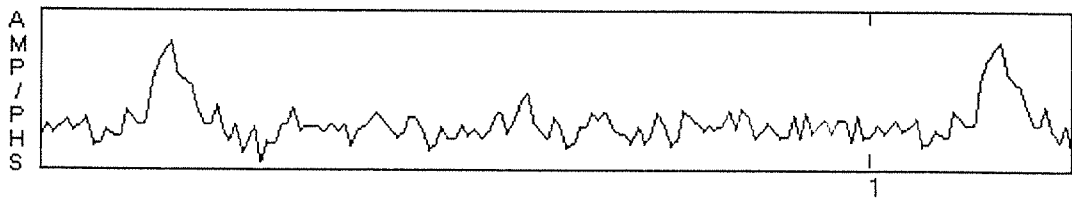
Best prd (ms): 375.53091188 Err: .00997797
Best frq (Hz): 2.662897 Err: .000071
Best DM: 41.00 Err: 11.68
Best Width: 4 Best SN: 27.6



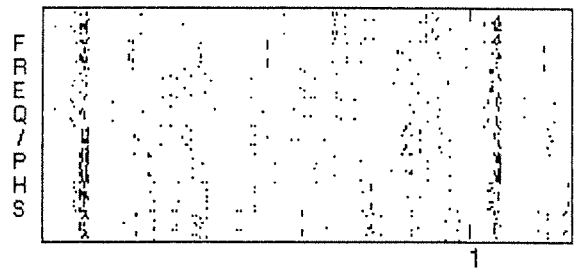
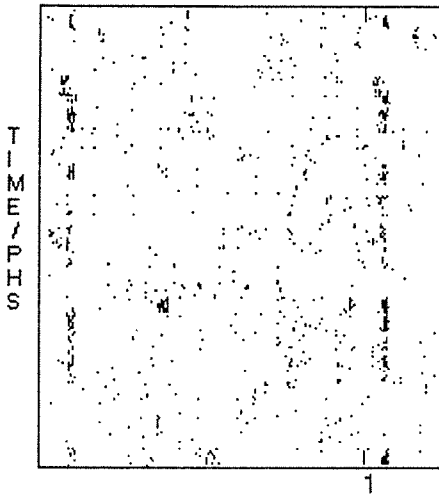
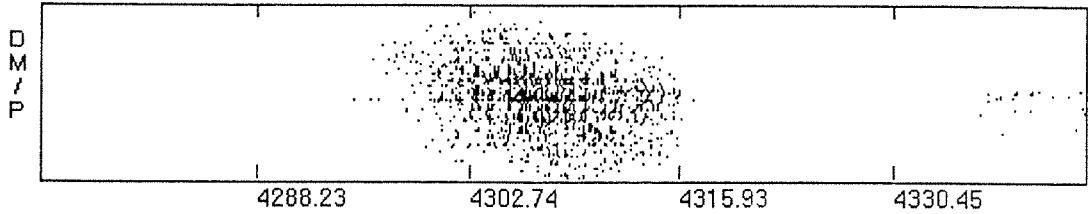
File: g1058011 RA: 18:44:45.0 Dec: -4: 5:32 Gl: 28.9000 Gb: -.9000 Date: 90/10/ 3
Centre freq. (Hz): 1.67274151 Centre period (ms): 597.82100000 Centre DM: 143.00
File start (blks): 1 Blks skipped: 0 Blks read: 112 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 71 Ndm: 15 DM factor: 1.0



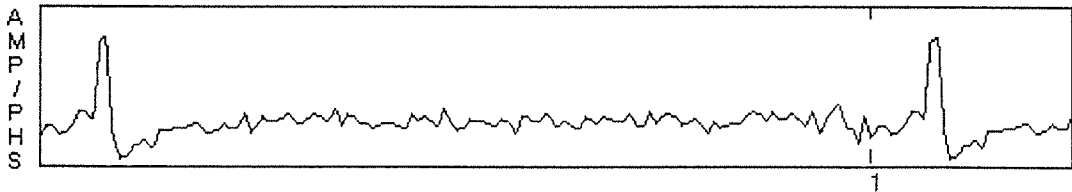
Best prd (ms): 597.84768844 Err: .02668844
Best frq (Hz): 1.672667 Err: .000075
Best DM: 164.25 Err: 18.59
Best Width: 8 Best SN: 17.3



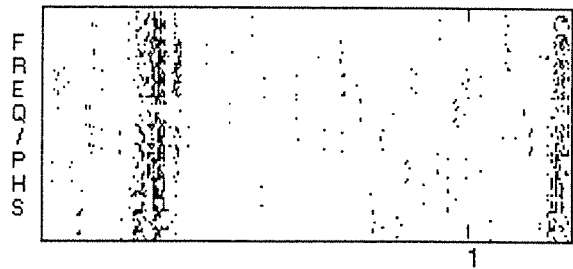
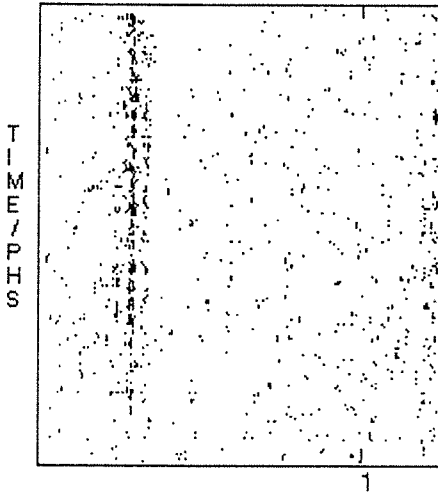
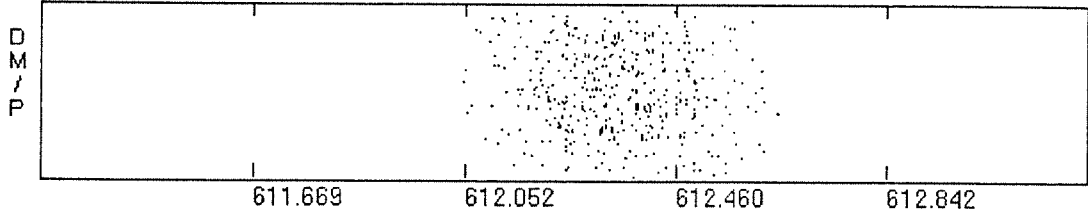
File: g1093011 RA: 18:45:20.5 Dec: -19:55:49 Gl: 14.8000 Gb: -8.3000 Date: 90/10/8
Centre freq. (Hz): .23201856 Centre period (ms): 4310.0000000 Centre DM: 18.00
File start (blks): 1 Blks skipped: 0 Blks read: 120 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 53 Ndm: 15 DMfactor: 1.0



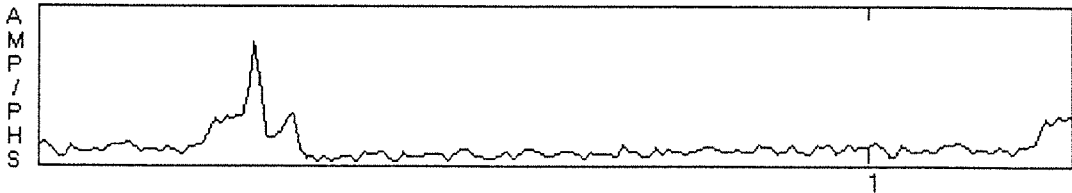
Best prd (ms): 4308.70492788 Err: 1.29507208
Best frq (Hz): .232088 Err: .000070
Best DM: 18.00 Err: 134.04
Best Width: 2 Best SN: 28.4



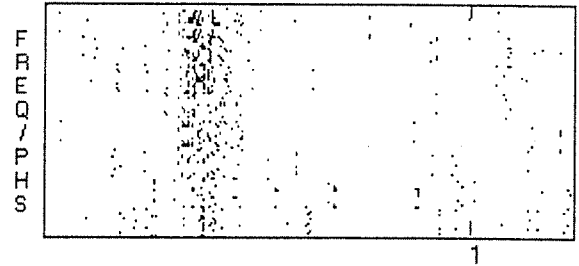
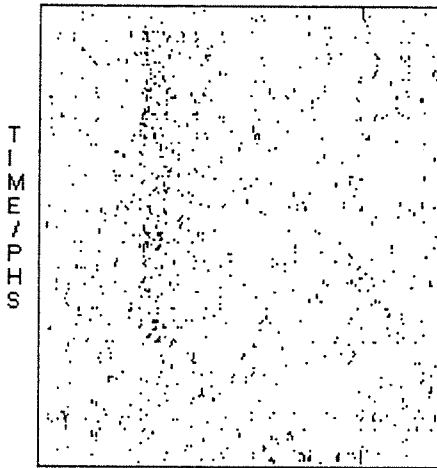
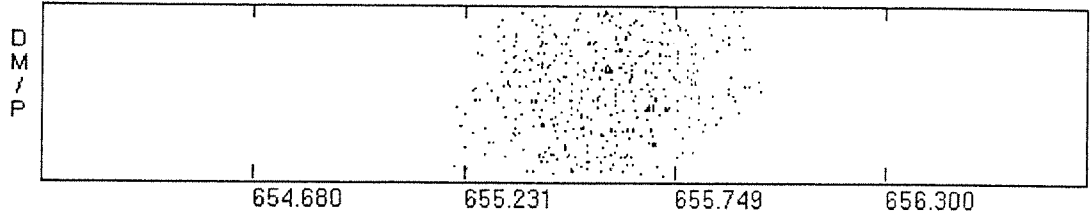
File: g1059011 RA: 18:57:43.0 Dec: -26: 4:54 Gl: 10.3000 Gb: -13.5000 Date: 90/10/3
Centre freq. (Hz): 1.63327170 Centre period (ms): 612.2680000 Centre DM: 38.00
File start (blks): 1 Blks skipped: 0 Blks read: 125 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 77 Ndm: 15 DMfactor: 1.0



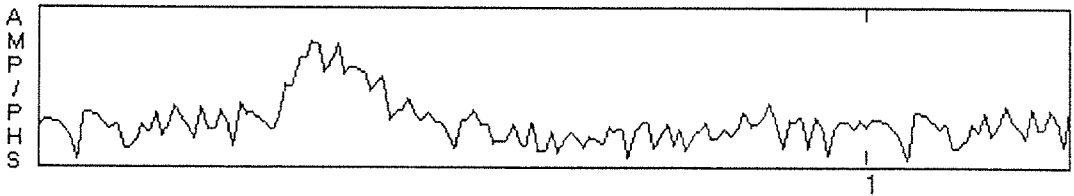
Best prd (ms): 612.34352648 Err: .02517549
Best frq (Hz): 1.633070 Err: .000067
Best DM: 38.00 Err: 19.04
Best Width: 8 Best SN: 50.7



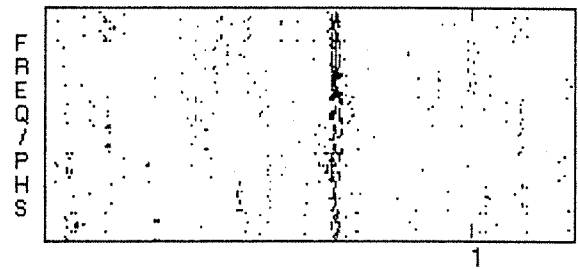
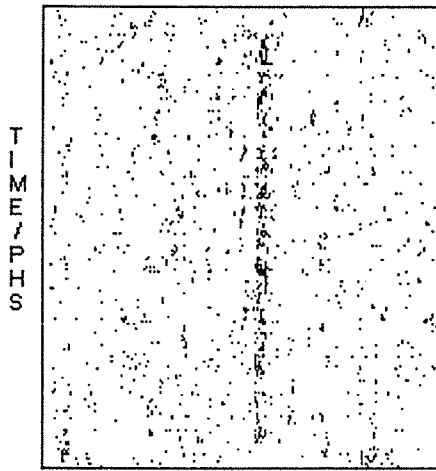
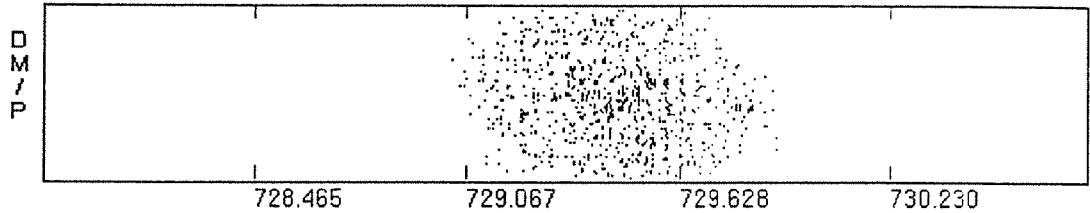
File: g1079011 RA: 18:59:1.9 Dec: 3:26:45 Gl: 37.2000 Gb: -6000 Date: 90/10/4
Centre freq. (Hz): 1.52553905 Centre period (ms): 655.50600000 Centre DM: 402.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 81 Ndm: 15 DMfactor: 1.0



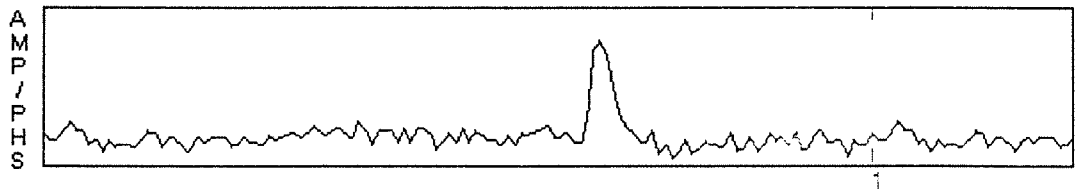
Best prd (ms): 655.44198574 Err: .03728094
Best frq (Hz): 1.525688 Err: .000087
Best DM: 378.70 Err: 23.74
Best Width: 16 Best SN: 27.5



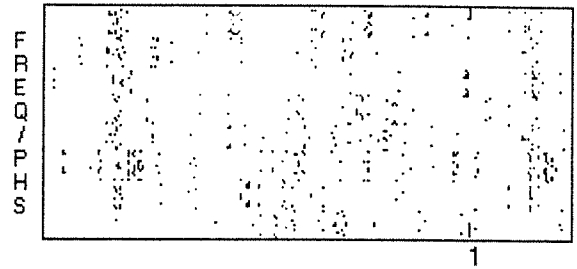
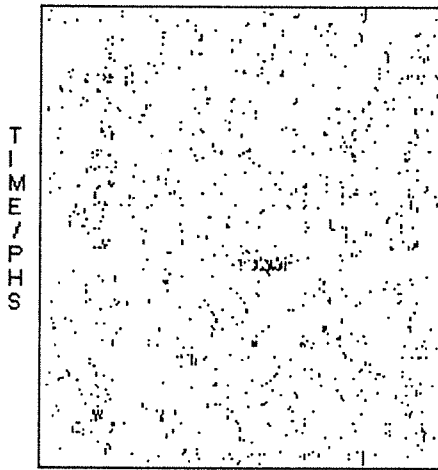
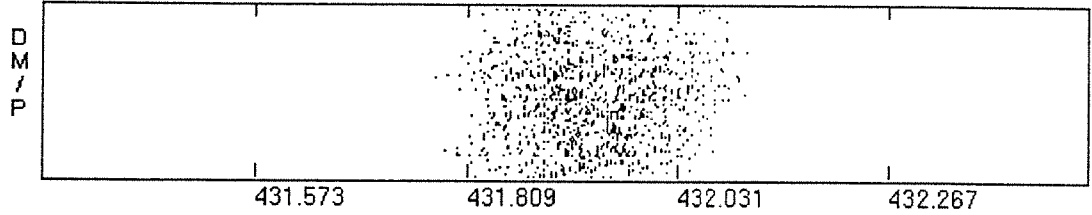
File: g1133011 RA: 19: 0:57.9 Dec: 1:31: 9 Gl: 35.7000 Gb: -2.0000 Date: 90/10/15
Centre freq. (Hz): 1.37105000 Centre period (ms): 729.36800000 Centre DM: 246.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 73 Ndm: 15 DMfactor: 1.0



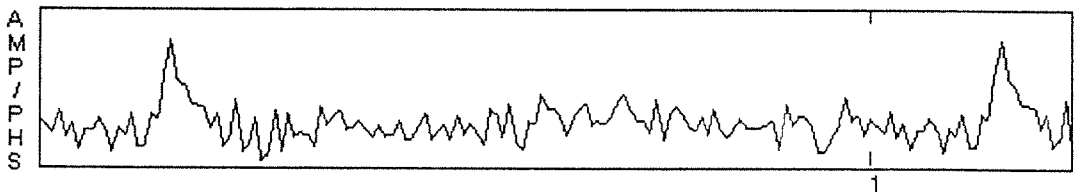
Best prd (ms): 729.40757075 Err: .03957075
Best frq (Hz): 1.370976 Err: .000074
Best DM: 246.00 Err: 22.68
Best Width: 4 Best SN: 32.7



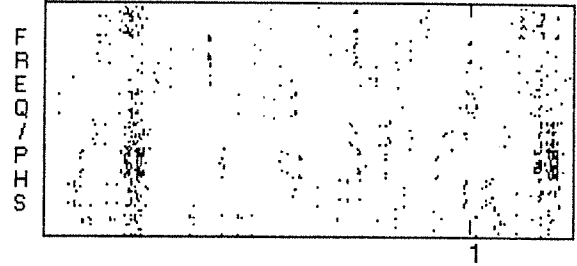
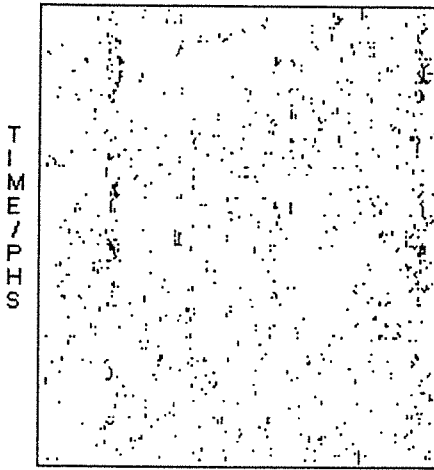
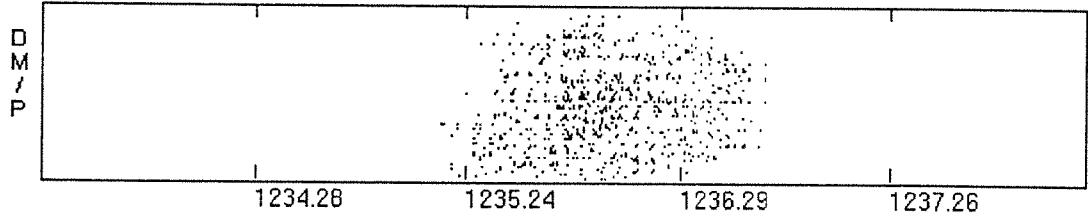
File: g1094011 RA: 19: 0:59.0 Dec: -6:36:30 Gl: 28.5000 Gb: -5.7000 Date: 90/10/ 8
Centre freq. (Hz): 2.31520604 Centre period (ms): 431.92700000 Centre DM: 196.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 83 Ndm: 15 DMfactor: 1.0



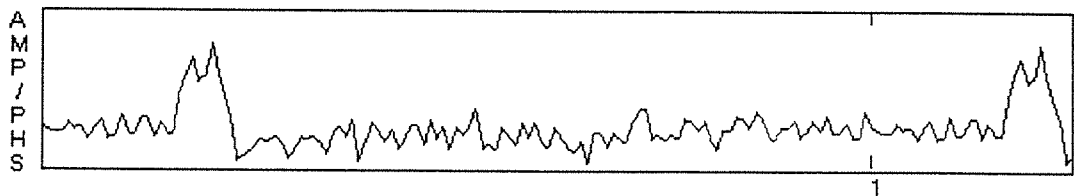
Best prd (ms): 431.95443439 Err: .01371719
Best frq (Hz): 2.315059 Err: .000074
Best DM: 211.35 Err: 13.43
Best Width: 4 Best SN: 11.5



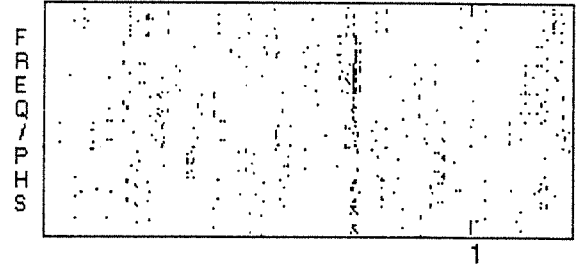
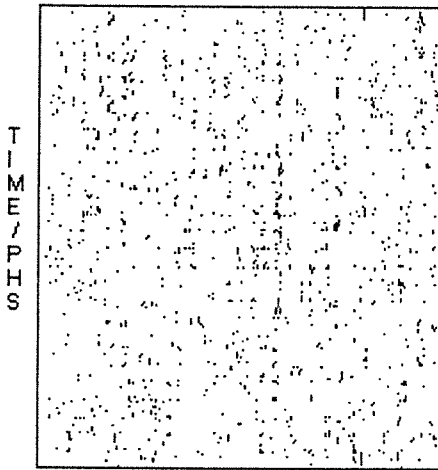
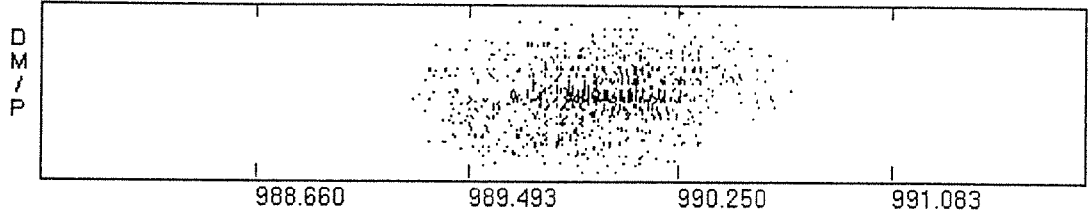
File: g1044011 RA: 19:5:54.7 Dec: 39:57:18 Gl: 70.9000 Gb: 14.2000 Date: 90/10/2
Centre freq. (Hz): .80918588 Centre period (ms): 1235.8100000 Centre DM: 30.00
File start (blks): 1 Blks skipped: 0 Blks read: 148 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 57 Ndm: 15 DMfactor: 1.0



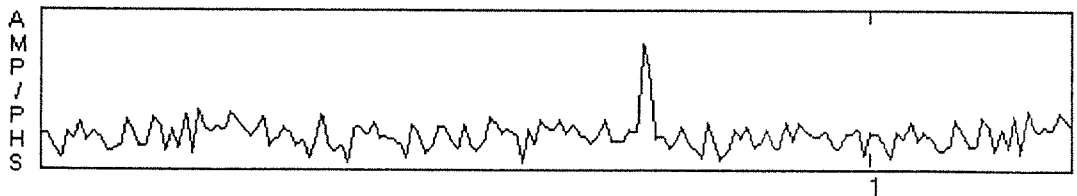
Best prd (ms): 1235.89620326 Err: .08620326
Best frq (Hz): .809129 Err: .000056
Best DM: 30.00 Err: 38.43
Best Width: 8 Best SN: 18.8



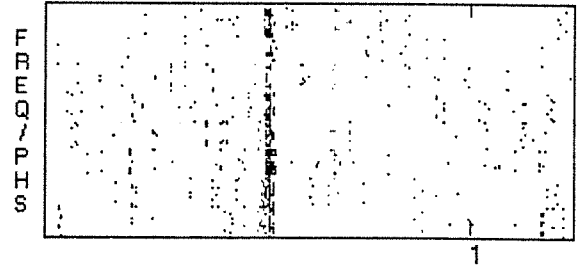
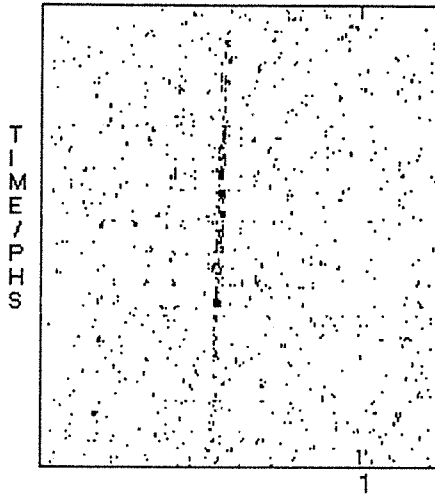
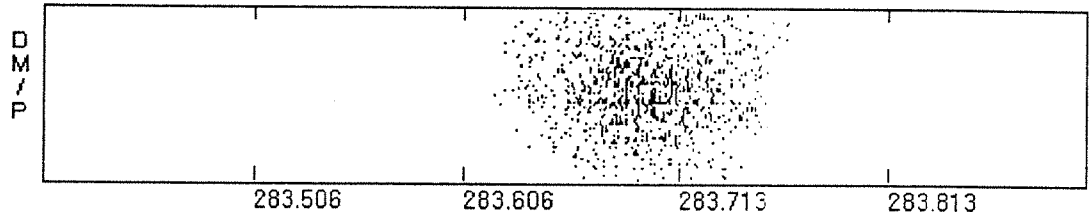
File: g1060011 RA: 19: 7: 7.7 Dec: 2:49:56 Gl: 37.6000 Gb: -2.7000 Date: 90/10/ 3
Centre freq. (Hz): 1.01019285 Centre period (ms): 989.9100000 Centre DM: 172.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 53 Ndm: 15 DMfactor: 1.0



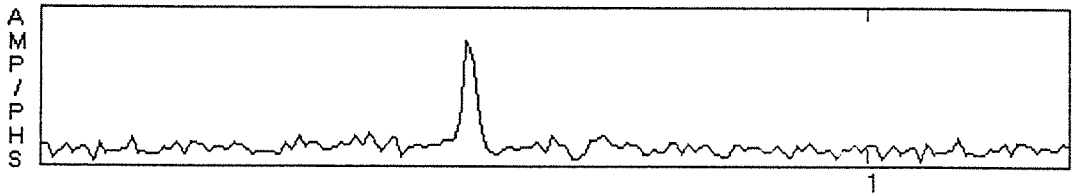
Best prd (ms): 989.98436223 Err: .07436223
Best frq (Hz): 1.010117 Err: .000076
Best DM: 172.00 Err: 30.79
Best Width: 2 Best SN: 13.6



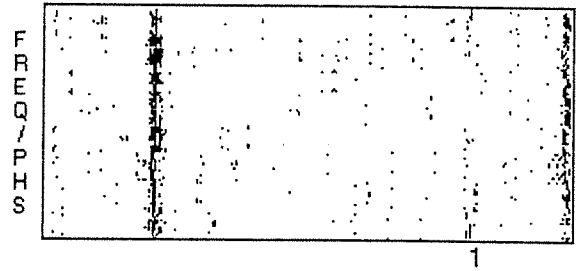
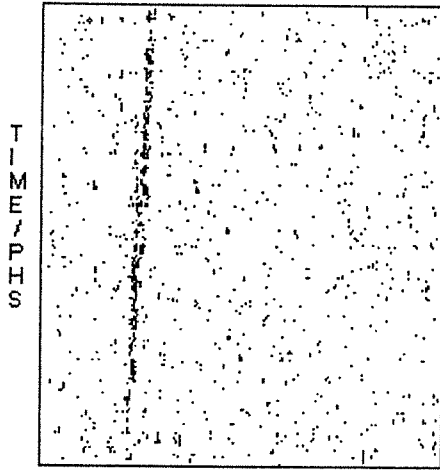
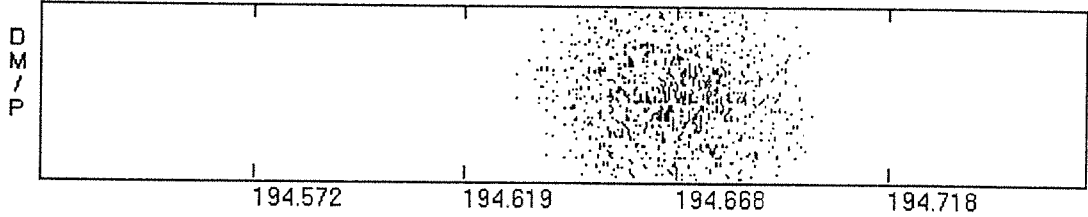
File: g1134011 RA: 19: 7:27.3 Dec: 10:57: 7 Gl: 44.8000 Gb: 1.0000 Date: 90/10/15
Centre freq. (Hz): 3.52530996 Centre period (ms): 283.66300000 Centre DM: 148.00
File start (blks): 1 Blks skipped: 0 Blks read: 115 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DM factor: 1.0



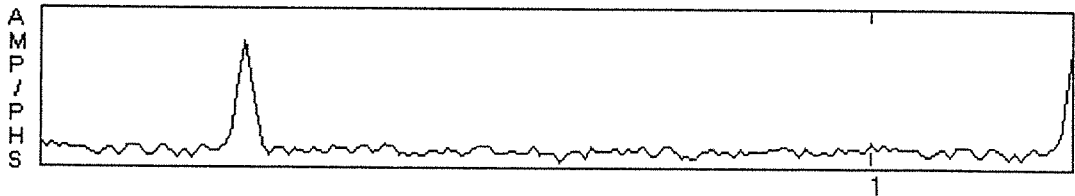
Best prd (ms): 283.69817646 Err: .00586274
Best frq (Hz): 3.524873 Err: .000073
Best DM: 148.00 Err: 8.82
Best Width: 2 Best SN: 32.9



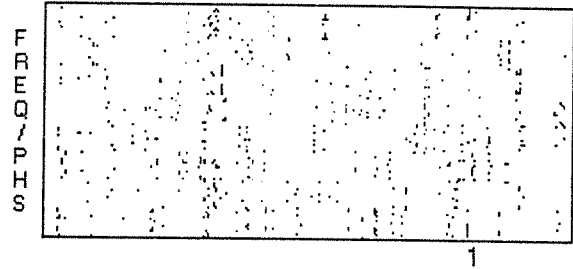
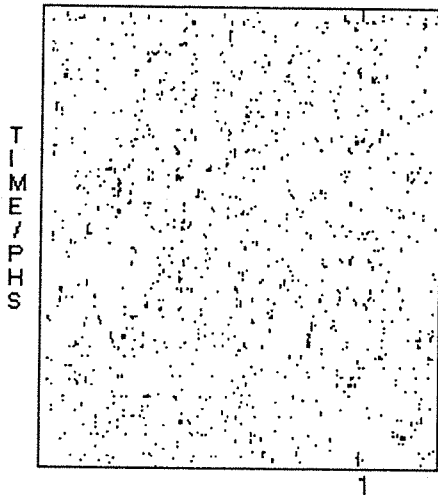
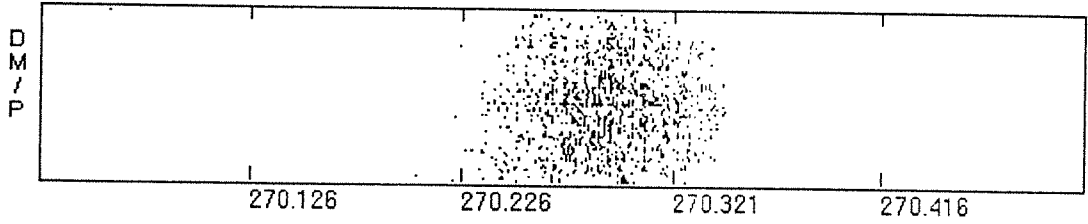
File: g1096011 RA: 19:15:21.5 Dec: 13:48:28 Gl: 48.3000 Gb: .6000 Date: 90/10/9
Centre freq. (Hz): 5.13755812 Centre period (ms): 194.64500000 Centre DM: 95.00
File start (blks): 1 Blks skipped: 0 Blks read: 116 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DMfactor: 1.0



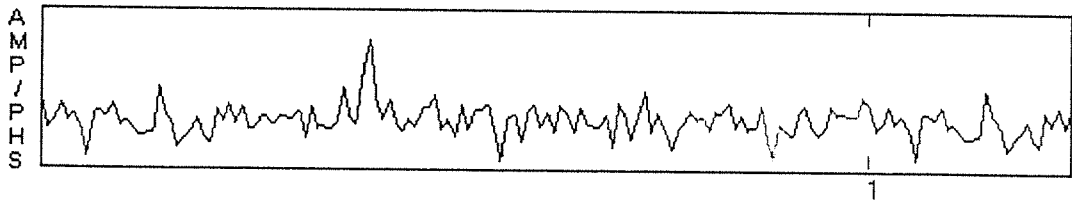
Best prd (ms): 194.66948296 Err: .00272033
Best frq (Hz): 5.136912 Err: .000072
Best DM: 95.00 Err: 6.05
Best Width: 4 Best SN: 41.3



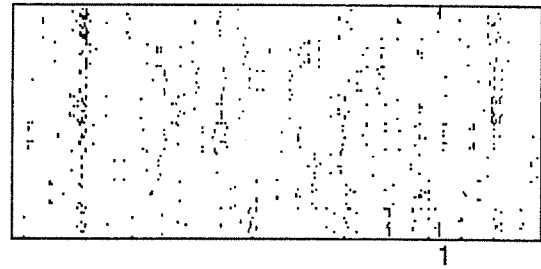
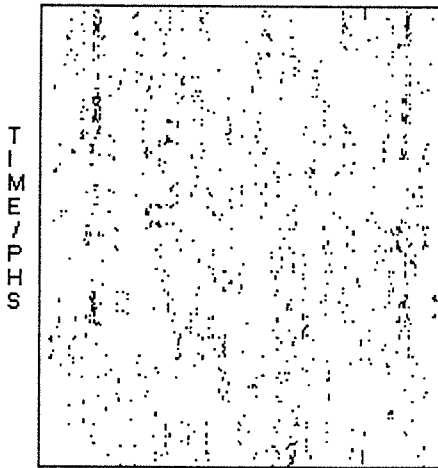
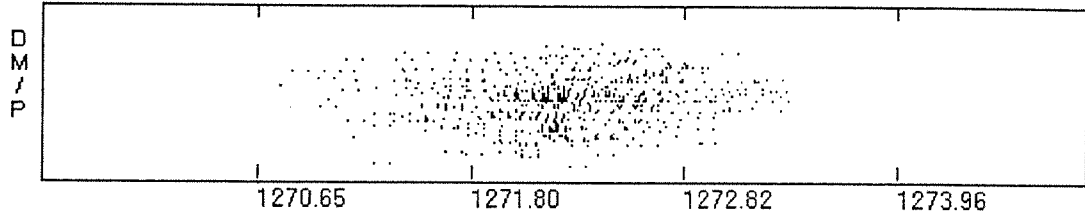
File: g1061011 RA: 19:14: 9.5 Dec: 9:46: 2 Gl: 44.6000 Gb: -1.0000 Date: 90/10/ 3
Centre freq. (Hz): 3.69992156 Centre period (ms): 270.27600000 Centre DM: 61.00
File start (blks): 1 Blks skipped: 0 Blks read: 115 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 91 Ndm: 15 DM factor: 1.0



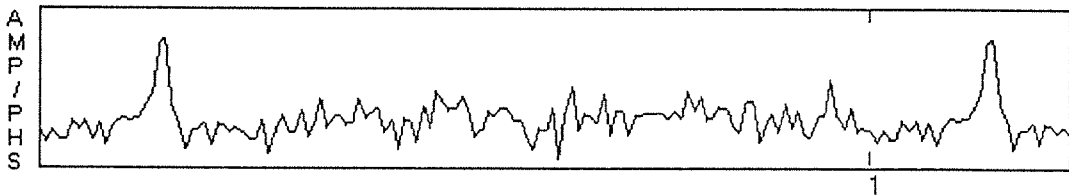
Best prd (ms): 270.31770926 Err: .00521366
Best frq (Hz): 3.699351 Err: .000071
Best DM: 89.82 Err: 8.41
Best Width: 2 Best SN: 8.4



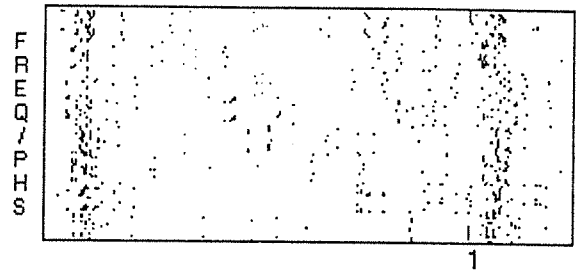
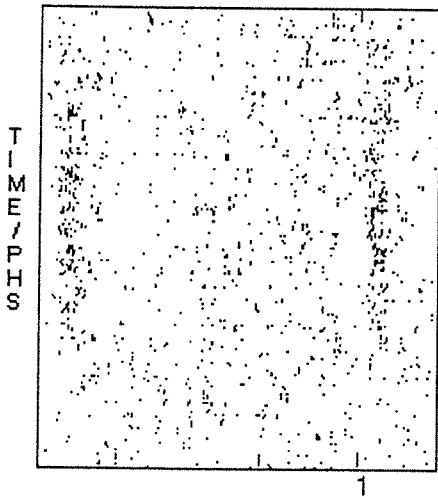
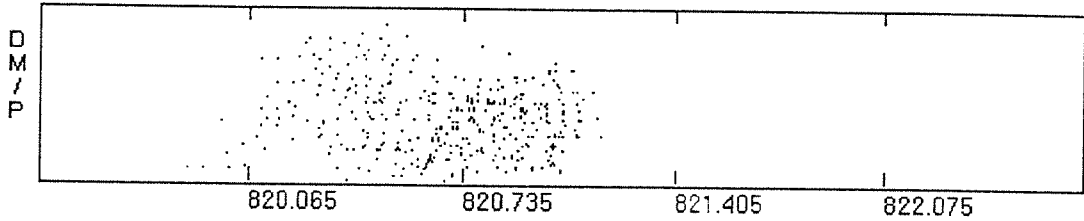
File: g1046011 RA: 19:17:17.2 Dec: 0:16:3 GI: 36.5000 Gb: -6.2000 Date: 90/10/2
Centre freq. (Hz): .78593491 Centre period (ms): 1272.37000000 Centre DM: 90.00
File start (blks): 1 Blks skipped: 0 Blks read: 112 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 41 Ndm: 15 DMfactor: 1.0



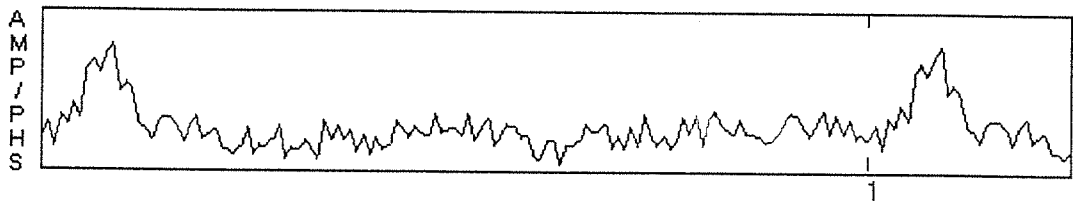
Best prd (ms): 1272.37000000 Err: .12425488
Best frq (Hz): .785935 Err: .000077
Best DM: 44.78 Err: 39.57
Best Width: 2 Best SN: 11.0



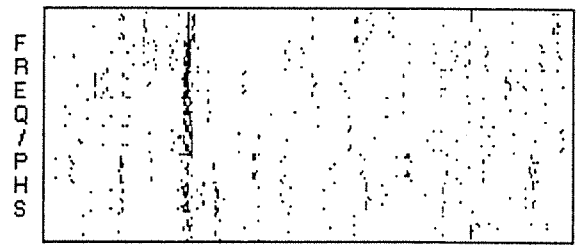
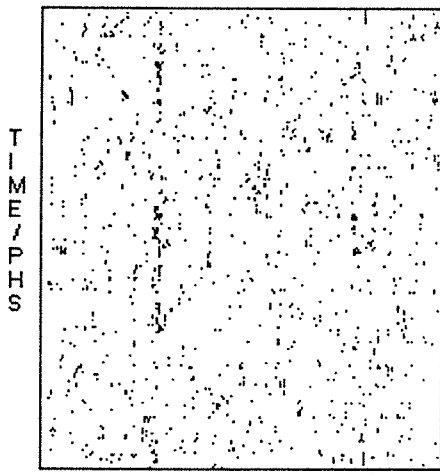
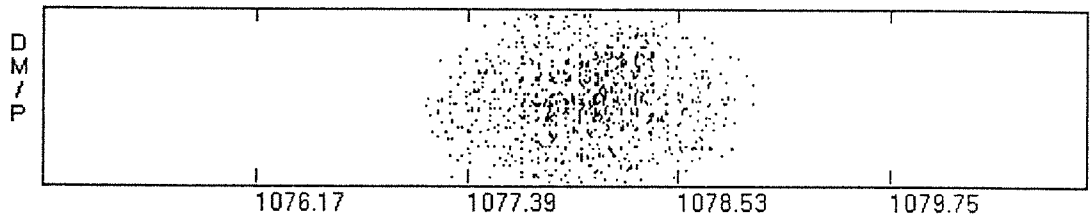
File: g1097011 RA: 19:18:52.6 Dec: 19:43:2 Gl: 53.9000 Gb: 2.7000 Date: 90/10/9
Centre freq. (Hz): 1.21788736 Centre period (ms): 821.09400000 Centre DM: 154.00
File start (blks): 1 Blks skipped: 0 Blks read: 120 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 69 Ndm: 15 DM factor: 1.0



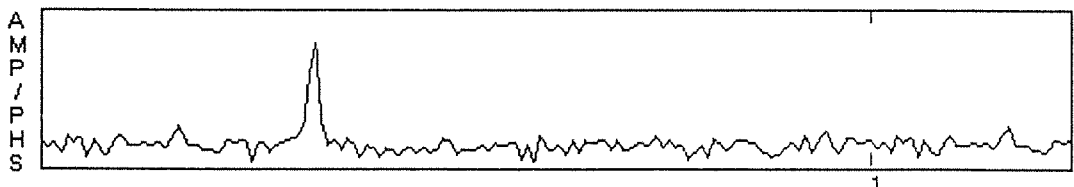
Best prd (ms): 820.95249713 Err: .04716763
Best frq (Hz): 1.218097 Err: .000070
Best DM: 212.37 Err: 25.54
Best Width: 8 Best SN: 20.0



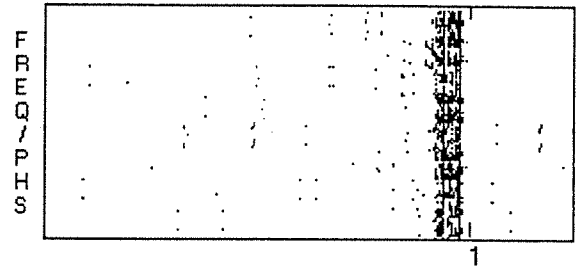
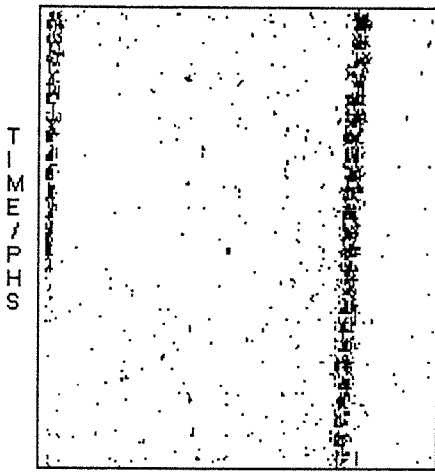
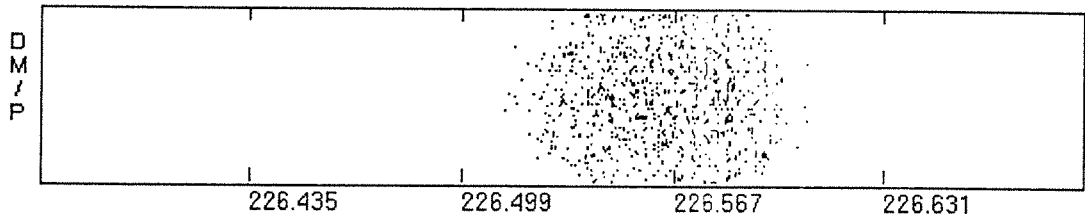
File: g1136011 RA: 19:20:43.9 Dec: 21: 4:52 Gl: 55.3000 Gb: 2.9000 Date: 90/10/15
Centre freq. (Hz): .92764378 Centre period (ms): 1078.00000000 Centre DM: 217.00
File start (blks): 1 Blks skipped: 0 Blks read: 121 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 71 Ndm: 15 DM factor: 1.0



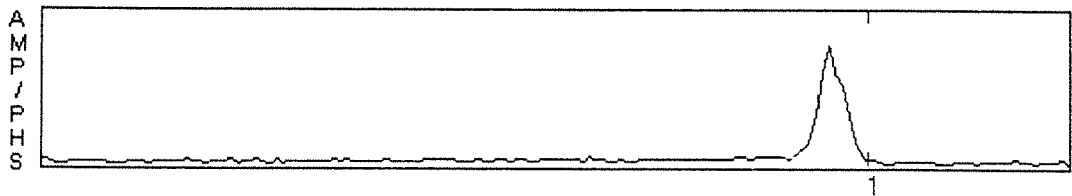
Best prd (ms): 1078.16041667 Err: .08020833
Best frq (Hz): .927506 Err: .000069
Best DM: 217.00 Err: 33.52
Best Width: 2 Best SN: 24.4



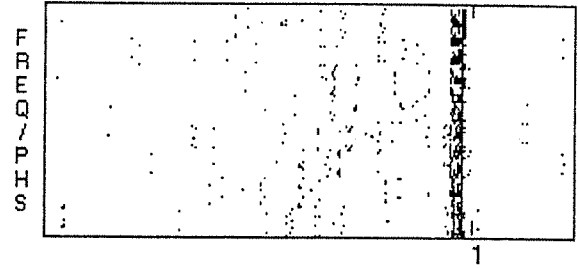
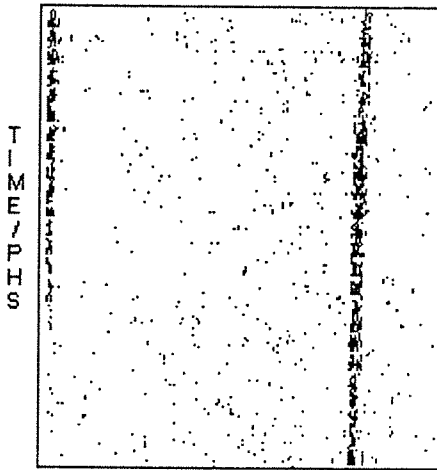
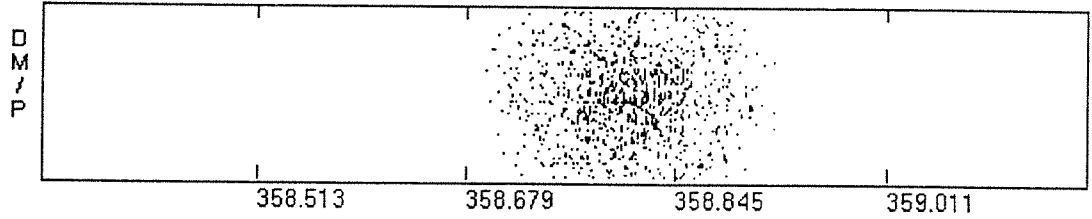
File: g1047011 RA: 19:29:51.9 Dec: 10:53:3 Gl: 47.4000 Gb: -3.9000 Date: 90/10/2
Centre freq. (Hz): 4.41432891 Centre period (ms): 226.5350000 Centre DM: 3.00
File start (blks): 1 Blks skipped: 0 Blks read: 115 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DM factor: 1.0



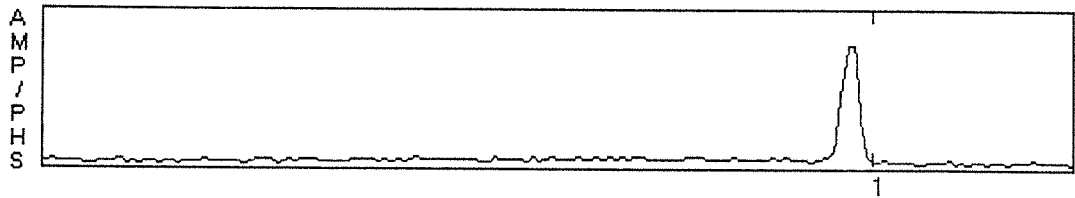
Best prd (ms): 226.56119161 Err: .00374166
Best frq (Hz): 4.413819 Err: .000073
Best DM: 3.00 Err: 7.05
Best Width: 4 Best SN: 212.8



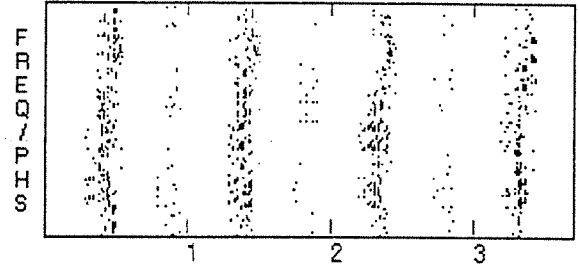
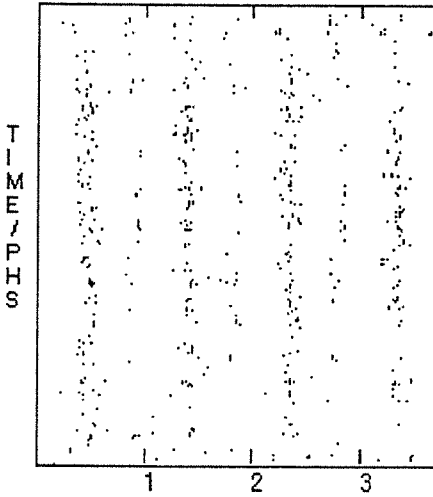
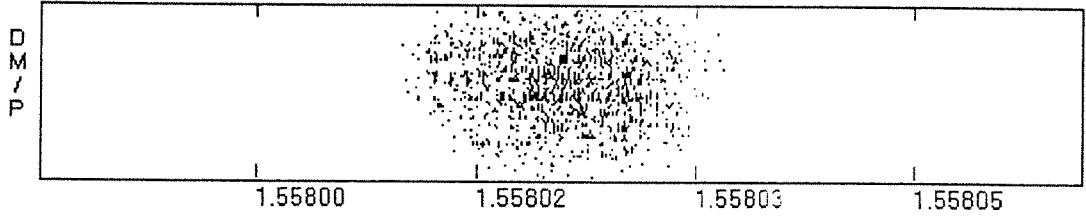
File: g1048011 RA: 19:33:31.8 Dec: 16: 9:58 Gl: 52.4000 Gb: -2.1000 Date: 90/10/2
Centre freq. (Hz): 2.78733213 Centre period (ms): 358.7660000 Centre DM: 158.00
File start (blks): 1 Blks skipped: 0 Blks read: 118 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 89 Ndm: 15 DMfactor: 1.0



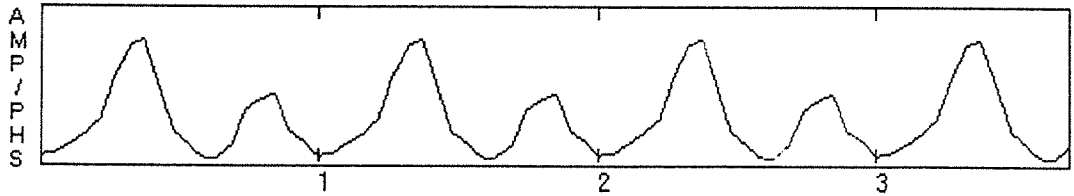
Best prd (ms): 358.81150096 Err: .00910019
Best frq (Hz): 2.786979 Err: .000071
Best DM: 158.00 Err: 11.16
Best Width: 4 Best SN: 186.6



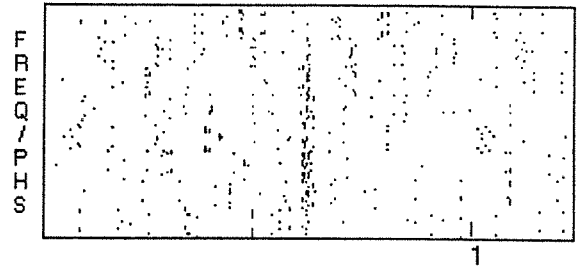
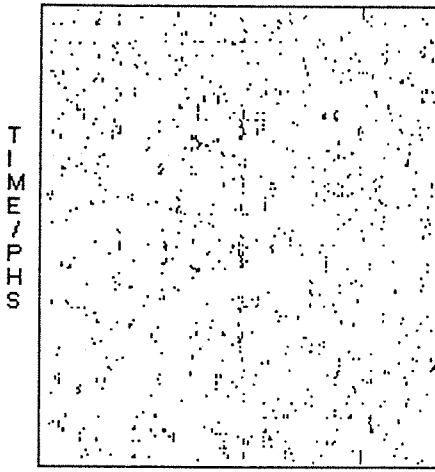
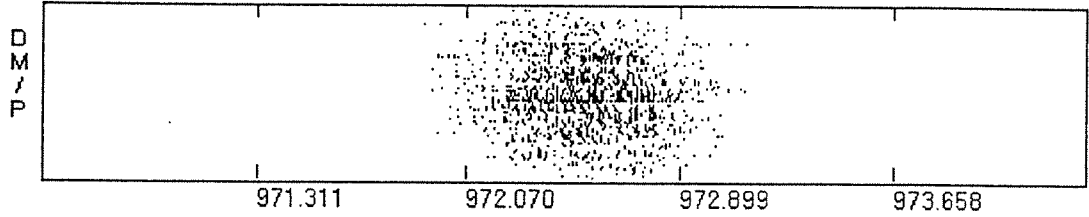
File: d2011 RA: 19:37:28.7 Dec: 21:28:1 Gl: 59.0000 Gb: -1.0000 Date: 90/9/20
Centre freq. (Hz): 641.83748315 Centre period (ms): 1.55802680 Centre DM: 71.00
File start (blks): 1 Blks skipped: 0 Blks read: 488 Blk length (s) .25000
Tsamp (ms): .0800 Nprd: 65 Ndm: 15 DM factor: 1.0



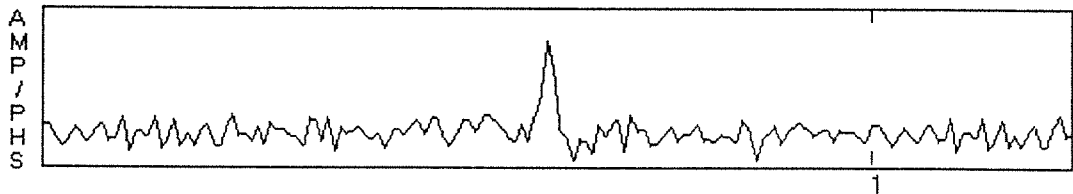
Best prd (ms): 1.55802680 Err: .00000109
Best frq (Hz): 641.837483 Err: .000451
Best DM: 71.00 Err: .33
Best Width: 4 Best SN: 15.1



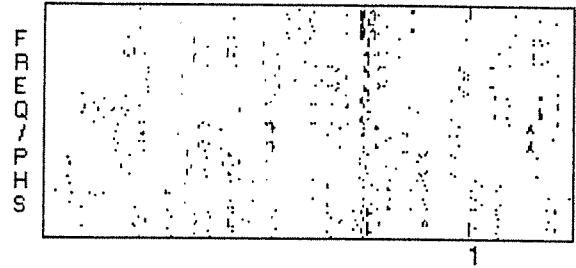
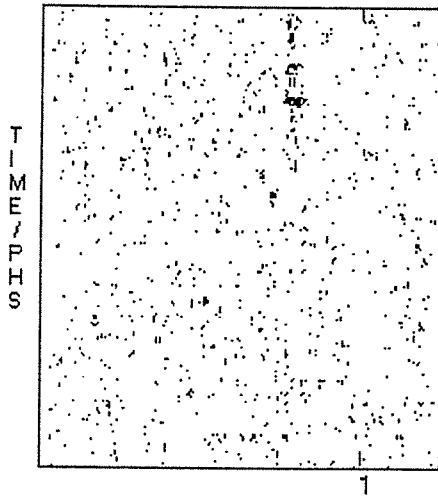
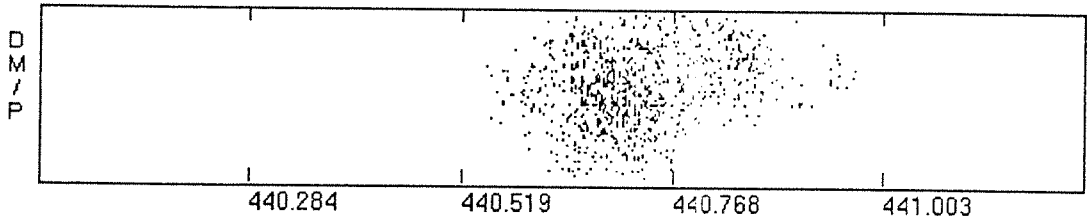
File: g1064011 RA: 19:40:38.1 Dec: -12:44:53 Gl: 27.3000 Gb: -17.2000 Date: 90/10/3
Centre freq. (Hz): 1.02825755 Centre period (ms): 972.5190000 Centre DM: 29.00
File start (blks): 1 Blks skipped: 0 Blks read: 116 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 57 Ndm: 15 DM factor: 1.0



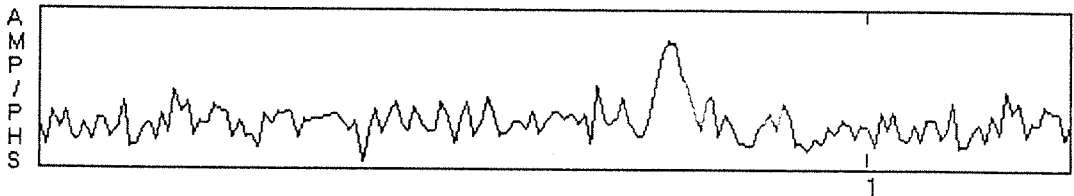
Best prd (ms): 972.58683754 Err: .06783754
Best frq (Hz): 1.028186 Err: .000072
Best DM: 29.00 Err: 30.24
Best Width: 2 Best SN: 12.8



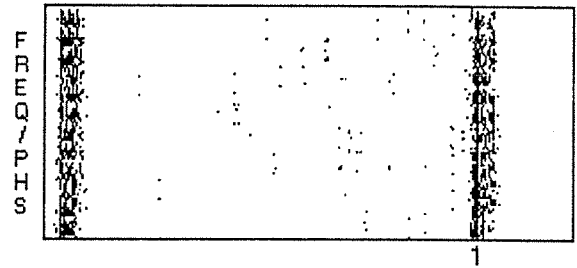
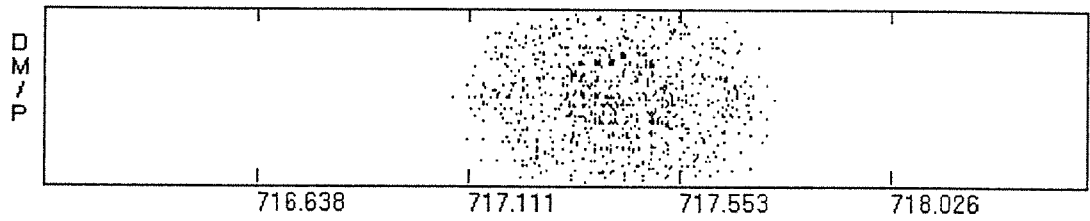
File: g1098011 RA: 19:44:38.7 Dec: 17:58:15 Gl: 55.3000 Gb: -3.5000 Date: 90/10/9
Centre freq. (Hz): 2.26937479 Centre period (ms): 440.65000000 Centre DM: 16.00
File start (blks): 1 Blks skipped: 0 Blks read: 119 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



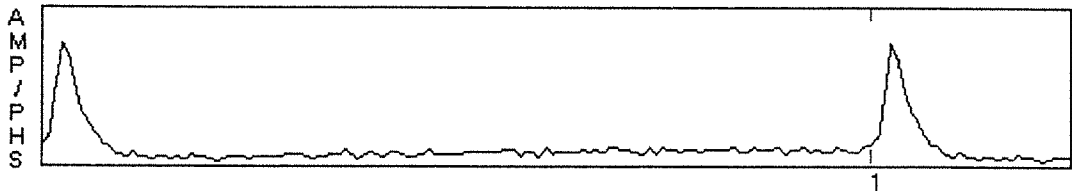
Best prd (ms): 440.69098307 Err: .01366102
Best frq (Hz): 2.269164 Err: .000070
Best DM: 16.00 Err: 13.70
Best Width: 4 Best SN: 12.9



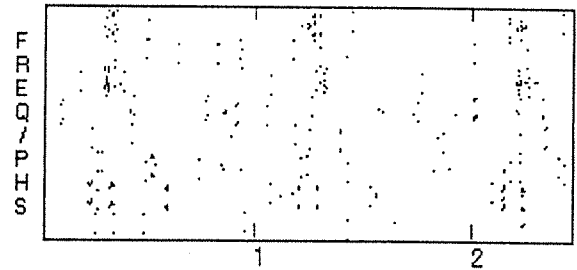
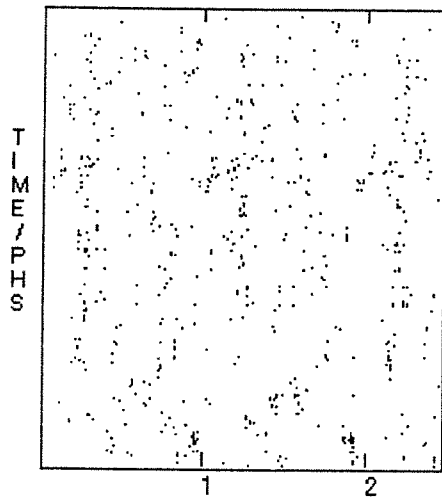
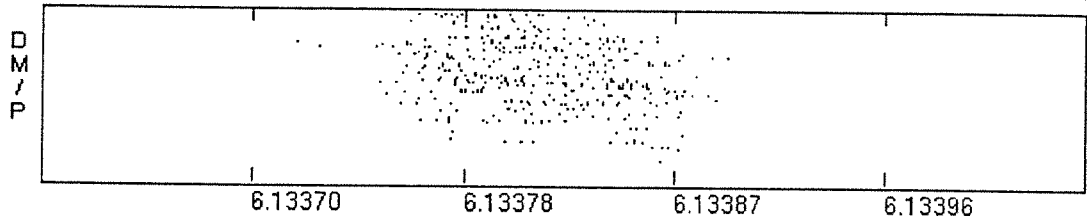
File: g1137011 RA: 19:46:33.9 Dec: 35:32:38 Gl: 70.7000 Gb: 5.0000 Date: 90/10/15
Centre freq. (Hz): 1.39402354 Centre period (ms): 717.3480000 Centre DM: 129.00
File start (blks): 1 Blks skipped: 0 Blks read: 139 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 73 Ndm: 15 DMfactor: 1.0



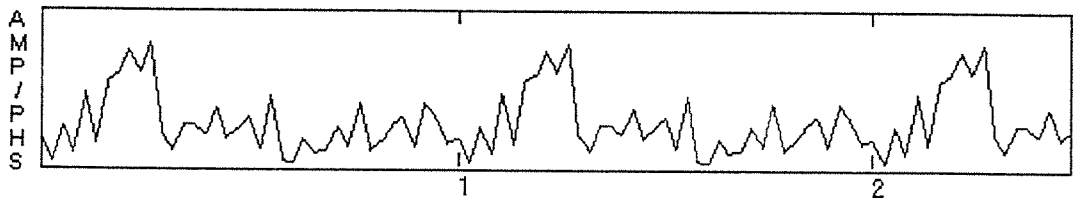
Best prd (ms): 717.44140469 Err: .03113490
Best frq (Hz): 1.393842 Err: .000060
Best DM: 129.00 Err: 22.31
Best Width: 4 Best SN: 112.7



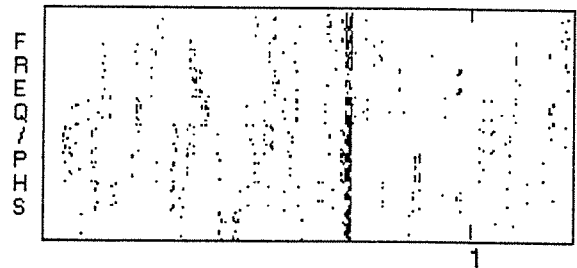
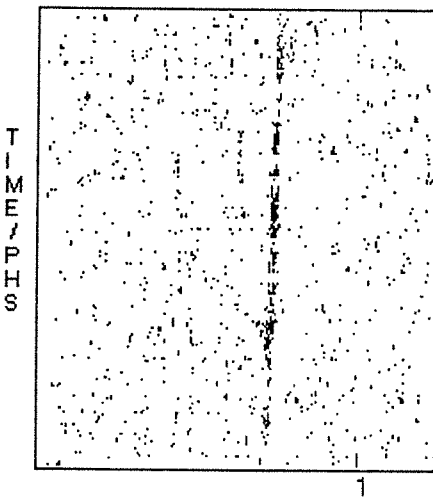
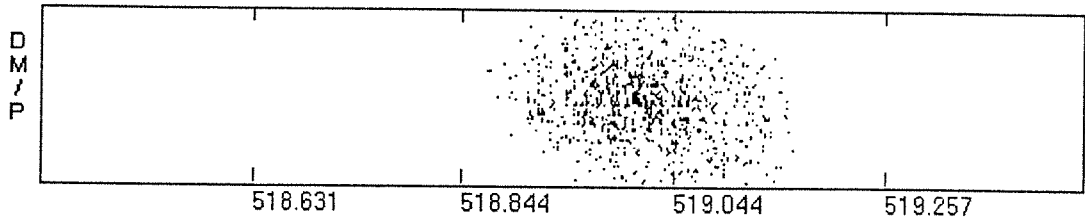
File: d1011 RA: 19:53:26.6 Dec: 29: 0:44 Gl: 65.8400 Gb: .4400 Date: 90/9/18
Centre freq. (Hz): 163.03027635 Centre period (ms): 6.13383000 Centre DM: 104.50
File start (blks): 1 Blks skipped: 0 Blks read: 516 Blk length (s) .25000
Tsamp (ms): .0800 Nprd: 49 Ndm: 15 DM factor: 1.0



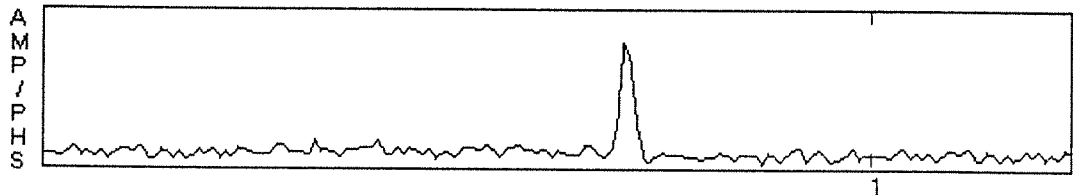
Best prd (ms): 6.13383000 Err: .00000895
Best frq (Hz): 163.030276 Err: .000238
Best DM: 103.77 Err: .69
Best Width: 4 Best SN: 7.5



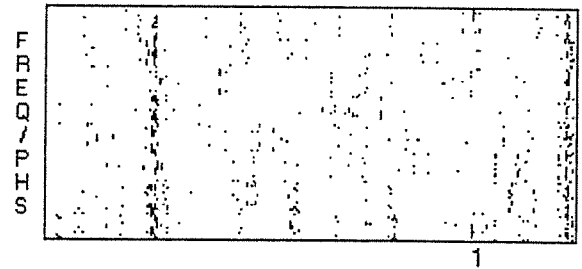
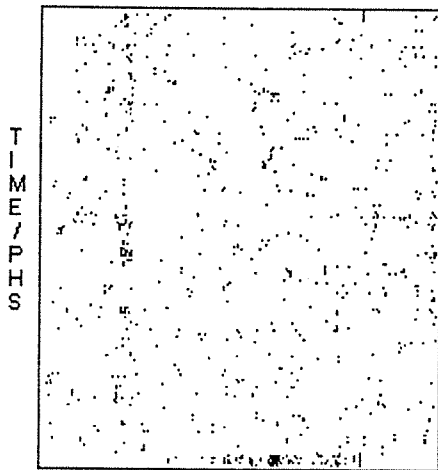
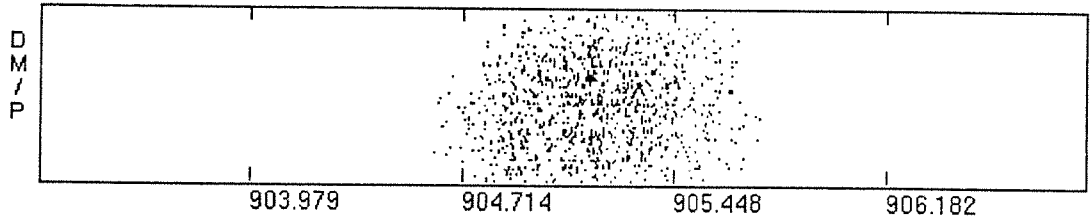
File: g1065011 RA: 19:53:57.3 Dec: 50:51:53 Gl: 84.8000 Gb: 11.6000 Date: 90/10/3
Centre freq. (Hz): 1.92696792 Centre period (ms): 518.95000000 Centre DM: 32.00
File start (blks): 1 Blks skipped: 0 Blks read: 180 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 83 Ndm: 15 DMfactor: 1.0



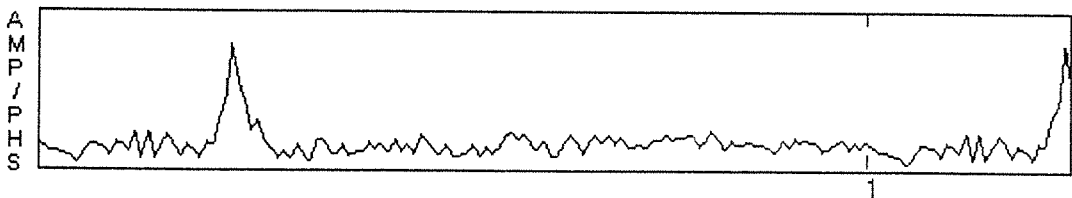
Best prd (ms): 519.01180331 Err: .01236066
Best frq (Hz): 1.926738 Err: .000046
Best DM: 32.00 Err: 16.14
Best Width: 2 Best SN: 44.3



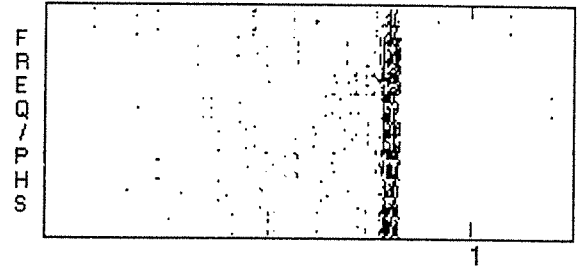
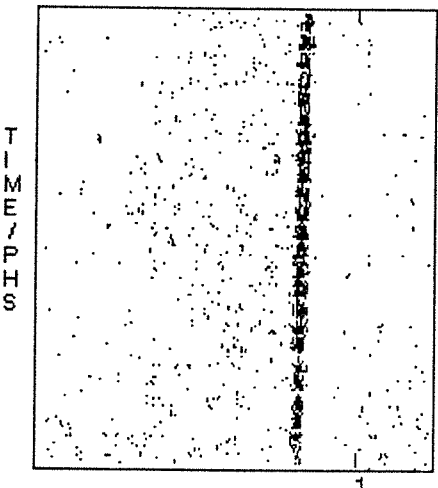
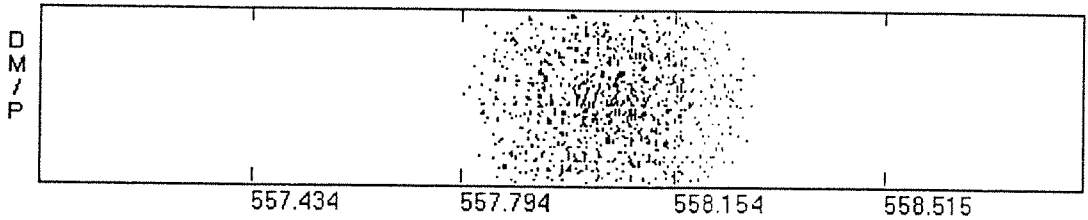
File: g1099011 RA: 20:0:59.9 Dec: 40:42:26 Gl: 76.6000 Gb: 5.3000 Date: 90/10/9
Centre freq. (Hz): 1.10484541 Centre period (ms): 905.10400000 Centre DM: 128.00
File start (blks): 1 Blks skipped: 0 Blks read: 149 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 79 Ndm: 15 DM factor: 1.0



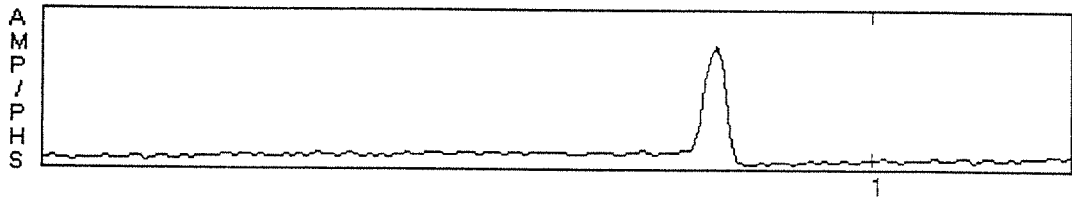
Best prd (ms): 905.19465545 Err: .04532772
Best frq (Hz): 1.104735 Err: .000055
Best DM: 128.00 Err: 28.15
Best Width: 4 Best SN: 11.3



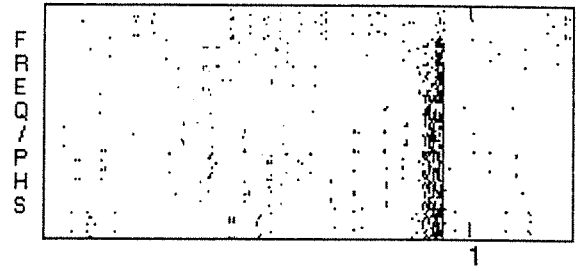
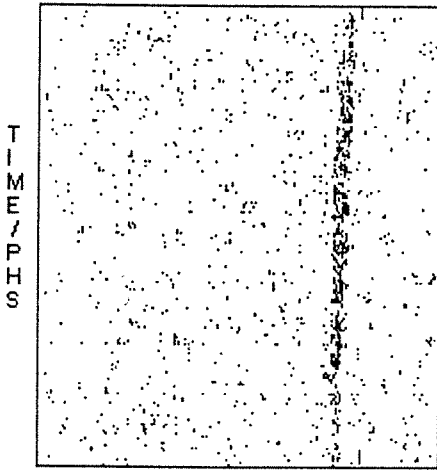
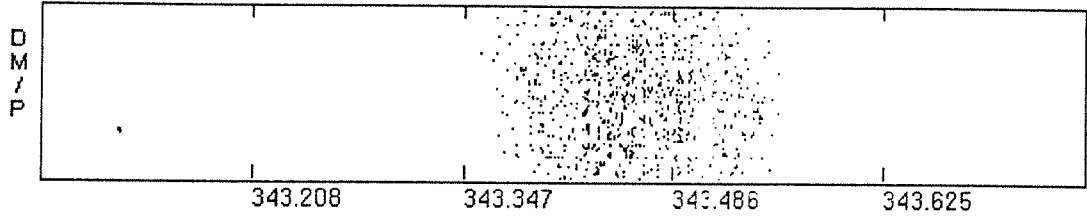
File: g1100011 RA: 20:16: .1 Dec: 28:30:30 Gl: 68.1000 Gb: -4 0000 Date: 90/10/9
Centre freq. (Hz): 1.79216287 Centre period (ms): 557.98500000 Centre DM: 15.00
File start (blks): 1 Blks skipped: 0 Blks read: 129 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 89 Ndm: 15 DMfactor: 1.0



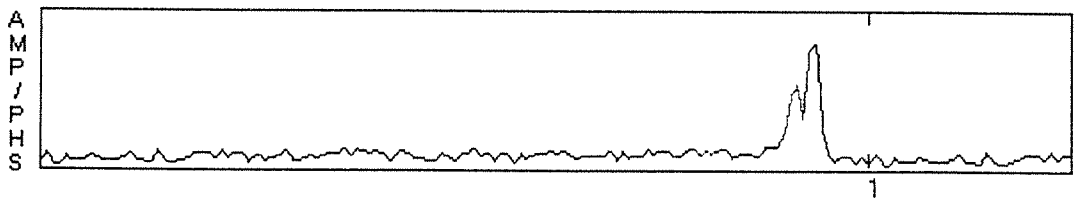
Best prd (ms): 558.06425923 Err: .01981481
Best frq (Hz): 1.791908 Err: .000064
Best DM: 15.00 Err: 17.35
Best Width: 4 Best SN: 193.0



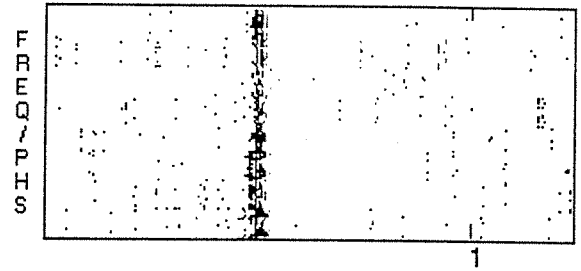
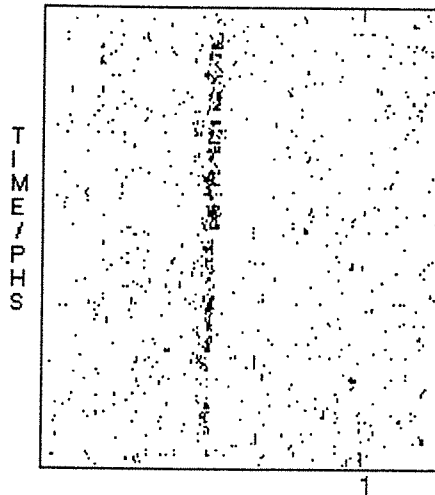
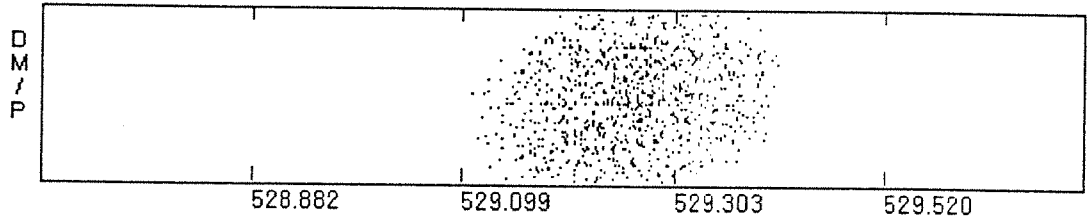
File: g1067011 RA: 20:20:33.2 Dec: 28:44:43 Gl: 68.9000 Gb: -4.7000 Date: 90/10/3
Centre freq. (Hz): 2.91188632 Centre period (ms): 343.4200000 Centre DM: 25.00
File start (blks): 1 Blks skipped: 0 Blks read: 129 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 89 Ndm: 15 DM factor: 1.0



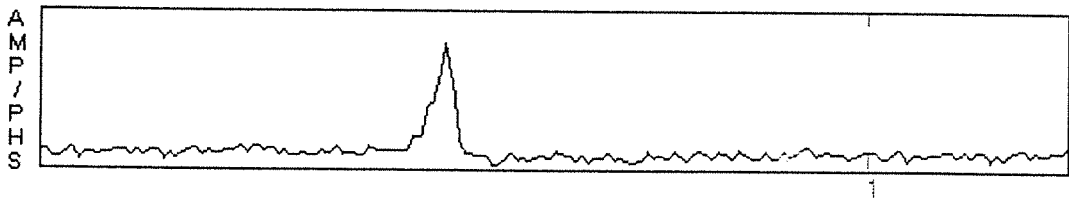
Best prd (ms): 343.45811035 Err: .00762207
Best frq (Hz): 2.911563 Err: .000065
Best DM: 25.00 Err: 10.68
Best Width: 4 Best SN: 48.6



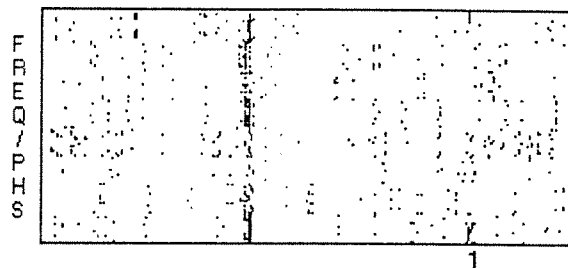
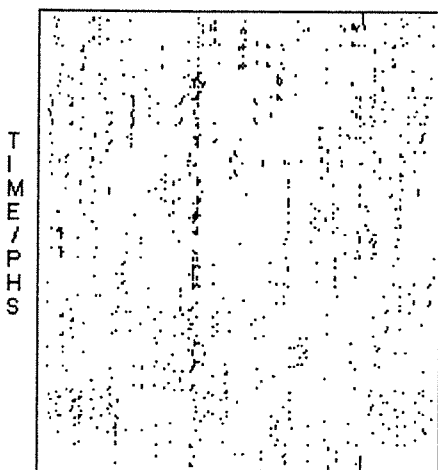
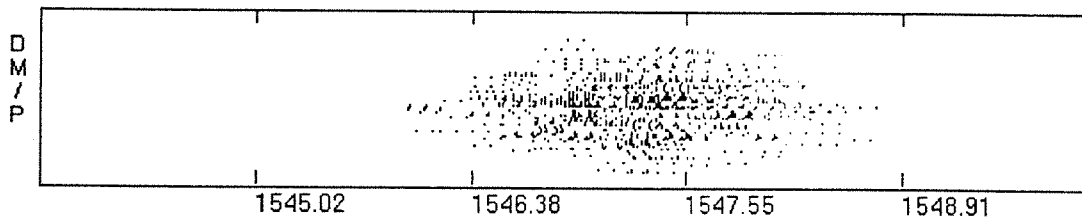
File: g1050011 RA: 20:21:25.3 Dec: 51:45:7 Gl: 87.9000 Gb: 3.4000 Date: 90/10/2
Centre freq. (Hz): 1.88961975 Centre period (ms): 529.20700300 Centre DM: 23.00
File start (blks): 1 Blks skipped: 0 Blks read: 183 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 83 Ndm: 15 DMfactor: 1.0



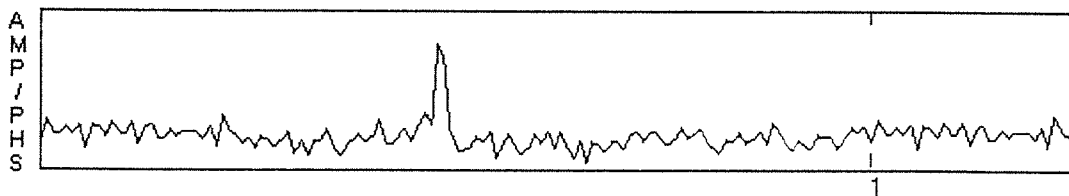
Best prd (ms): 529.27002484 Err: .01260497
Best frq (Hz): 1.889395 Err: .000045
Best DM: 23.00 Err: 16.46
Best Width: 4 Best SN: 56.8



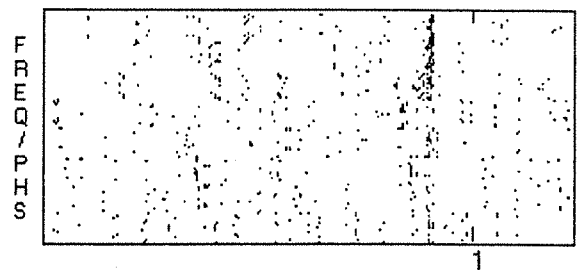
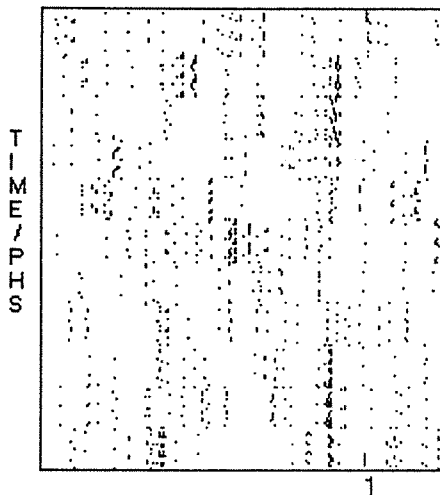
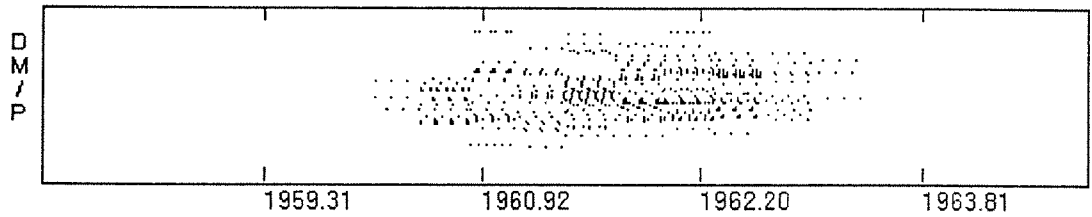
File: g1051011 RA: 20:43:22.4 Dec: -4:32:25 Gl: 42.7000 Gb: -27.4000 Date: 90/10/2
Centre freq. (Hz): .64638734 Centre period (ms): 1547.06000000 Centre DM: 36.00
File start (blks): 1 Blks skipped: 0 Blks read: 113 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 33 Ndm: 15 DMfactor: 1.0



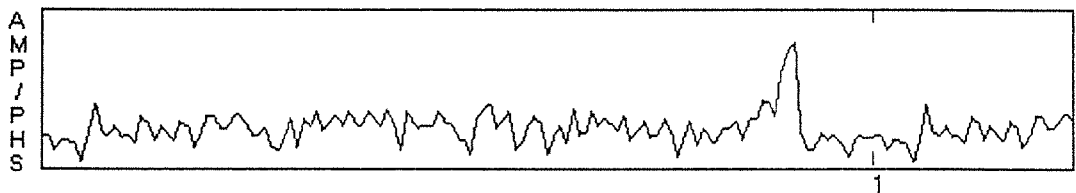
Best prd (ms): 1547.06000000 Err: .18885010
Best frq (Hz): .646387 Err: .000079
Best DM: 36.00 Err: 48.11
Best Width: 2 Best SN: 19.5



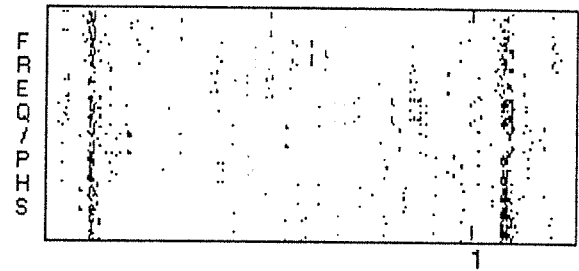
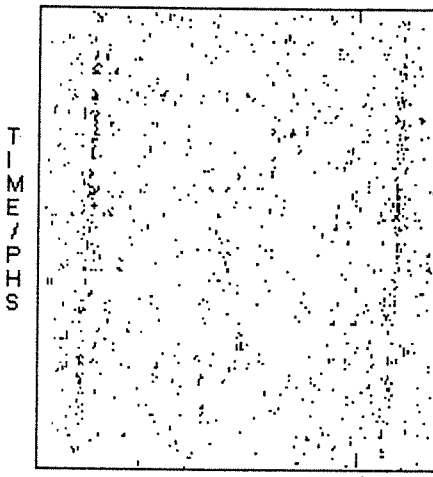
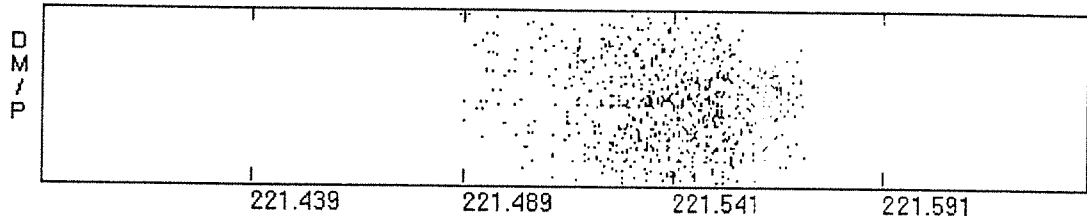
File: g1003011 RA: 20:45:46.9 Dec: -16:27:53 Gl: 30.5000 Gb: -33.1000 Date: 90/ 9/25
Centre freq. (Hz): .50975674 Centre period (ms): 1961.72000000 Centre DM: 12.00
File start (blks): 1 Blks skipped: 0 Blks read: 118 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 21 Ndm: 15 DMfactor: 1.0



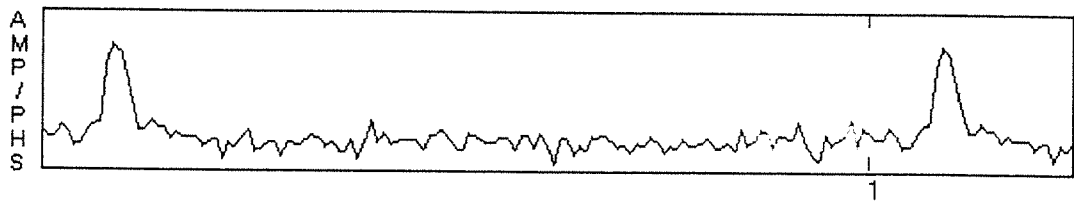
Best prd (ms): 1962.02651875 Err: .30651876
Best frq (Hz): .509677 Err: .000080
Best DM: 12.00 Err: 61.01
Best Width: 4 Best SN: 13.8



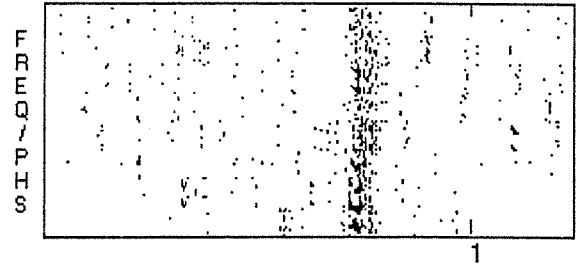
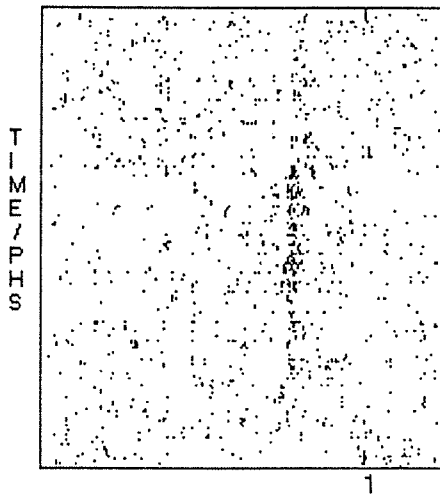
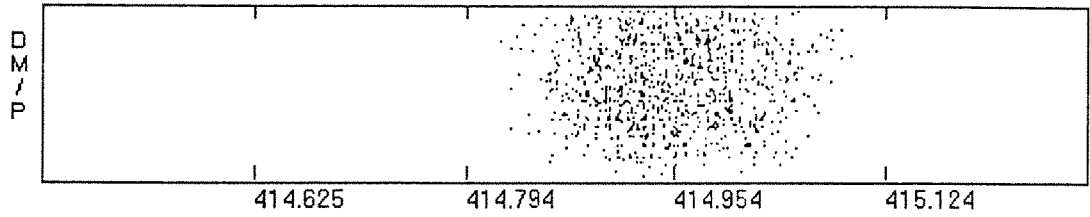
File: g1068011 RA: 20:53:33.2 Dec: 36:18:49 Gl: 79.1000 Gb: -5.6000 Date: 90/10/3
Centre freq. (Hz): 4.51434659 Centre period (ms): 221.51600000 Centre DM: 97.00
File start (blks): 1 Blks skipped: 0 Blks read: 141 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 87 Ndm: 15 DM factor: 1.0



Best prd (ms): 221.54474740 Err: .00287474
Best frq (Hz): 4.513761 Err: .000059
Best DM: 104.87 Err: 6.89
Best Width: 4 Best SN: 22.8



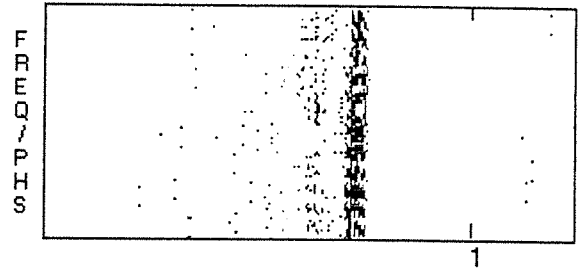
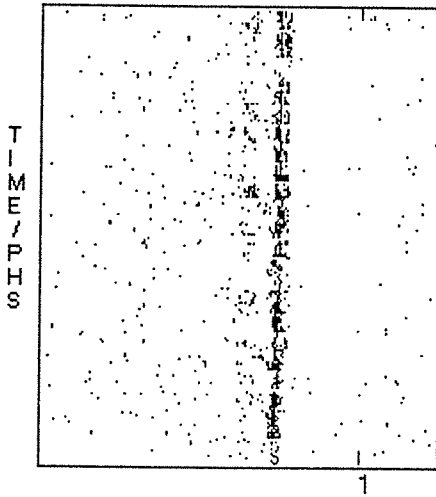
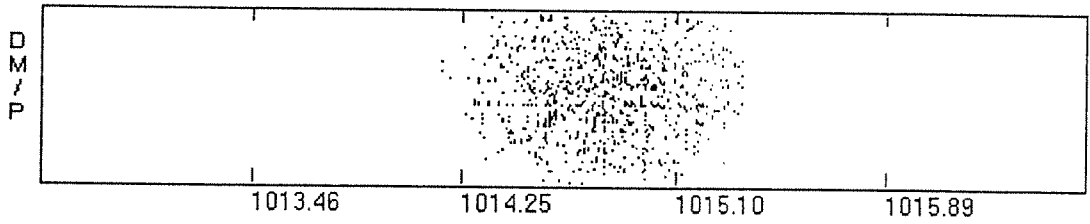
File: g1004011 RA: 21: 6:31.7 Dec: 44:29:37 Gl: 86.9000 Gb: -2.0000 Date: 90/ 9/25
Centre freq. (Hz): 2.41034598 Centre period (ms): 414.87820000 Centre DM: 140.00
File start (blks): 1 Blks skipped: 0 Blks read: 159 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 93 Ndm: 15 DM factor: 1.0



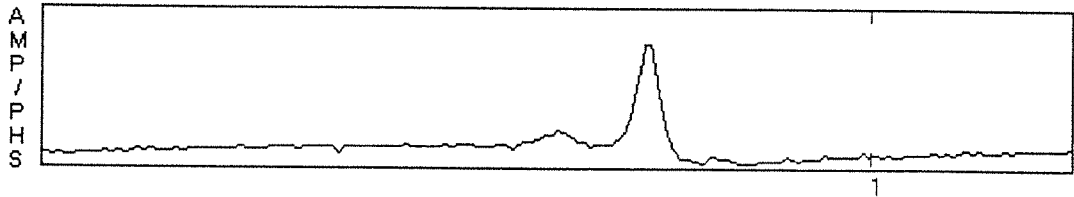
Best prd (ms): 414.96627706 Err: .00880771
Best frq (Hz): 2.409834 Err: .000051
Best DM: 125.25 Err: 12.90
Best Width: 8 Best SN: 26.6



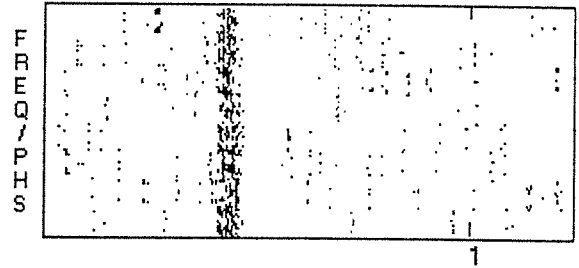
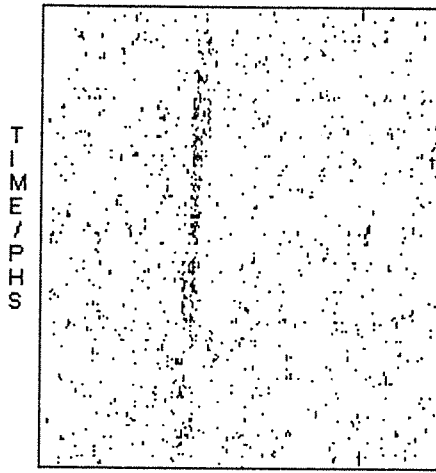
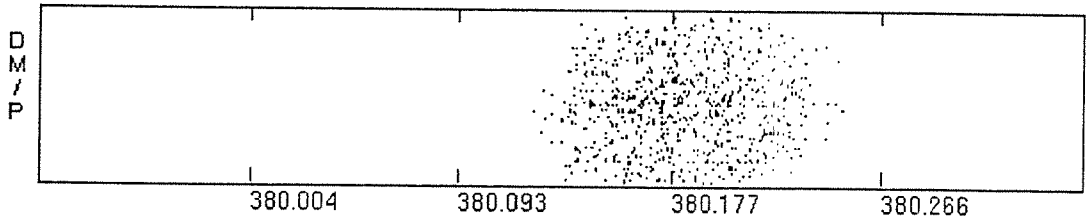
File: g1052011 RA: 21:11:37.7 Dec: 46:31:42 Gl: 89.0000 Gb: -.3000 Date: 90/10/2
Centre freq. (Hz): .98551296 Centre period (ms): 1014.70000000 Centre DM: 141.00
File start (blks): 1 Blks skipped: 0 Blks read: 165 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 77 Ndm: 15 DMfactor: 1.0



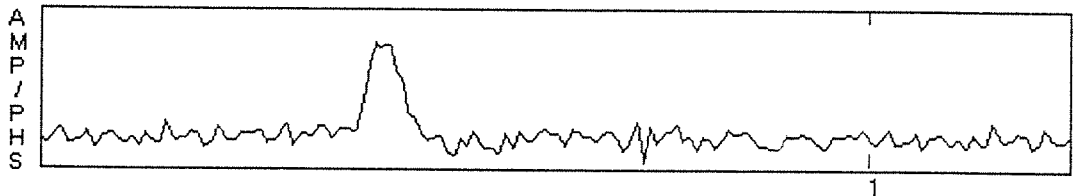
Best prd (ms): 1014.65646073 Err: .05215358
Best frq (Hz): .985361 Err: .000051
Best DM: 141.00 Err: 31.56
Best Width: 4 Best SN: 149.9



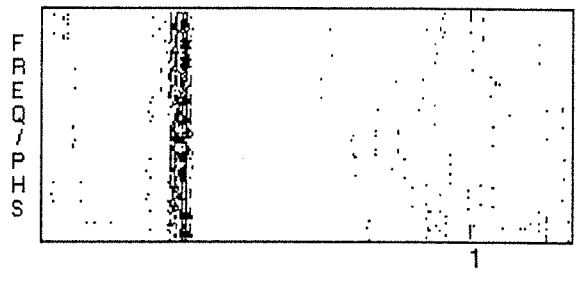
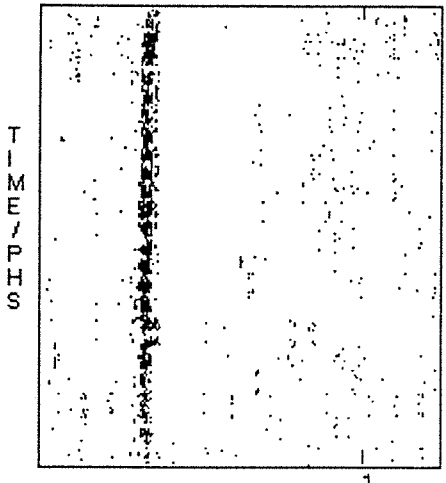
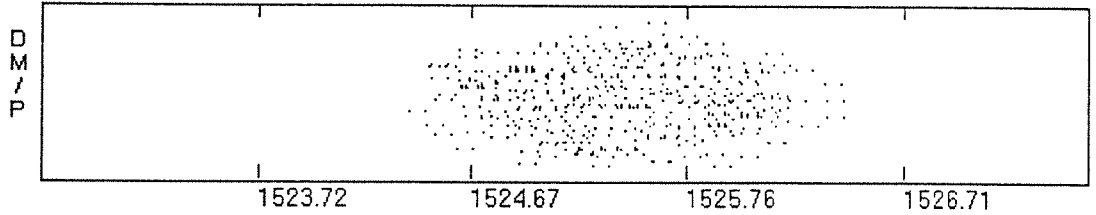
File: g1070011 RA: 21:48:36.7 Dec: 63:15:40 Gl: 104.3000 Gb: 7.4000 Date: 90/10/3
Centre freq. (Hz): 2.63063054 Centre period (ms): 380.13700000 Centre DM: 128.00
File start (blks): 1 Blks skipped: 0 Blks read: 254 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 93 Ndm: 15 DMfactor: 1.0



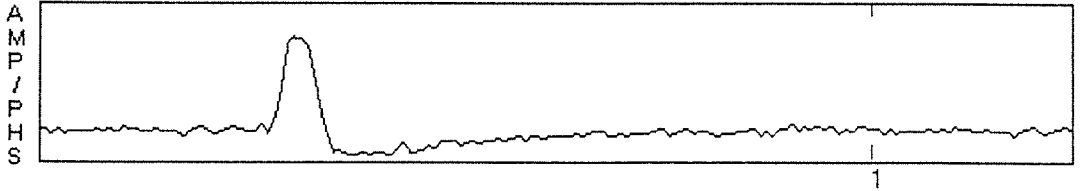
Best prd (ms): 380.18311522 Err: .00461152
Best frq (Hz): 2.630311 Err: .000032
Best DM: 128.00 Err: 11.82
Best Width: 8 Best SN: 34.8



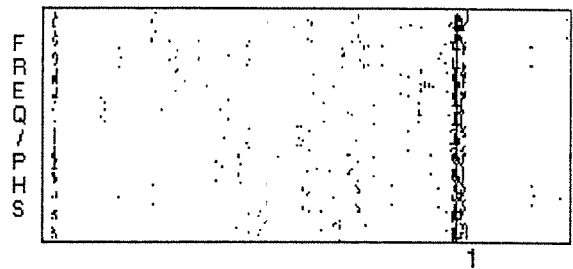
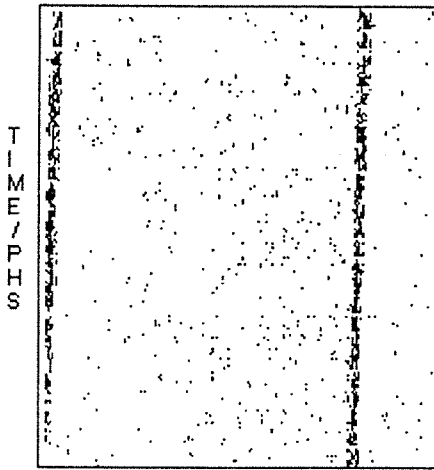
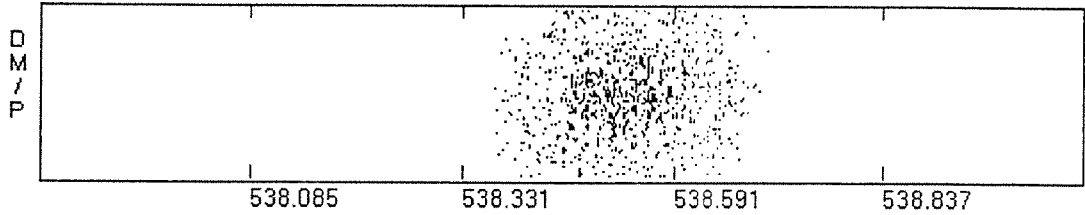
File: g1005011 RA: 21:54:57.2 Dec: 40: 3:26 Gl: 90.5000 Gb: -11.3000 Date: 90/ 9/25
Centre freq. (Hz): .65561518 Centre period (ms): 1525.28500000 Centre DM: 71.00
File start (blks): 1 Blks skipped: 0 Blks read: 148 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 37 Ndm: 15 DMfactor: 1.0



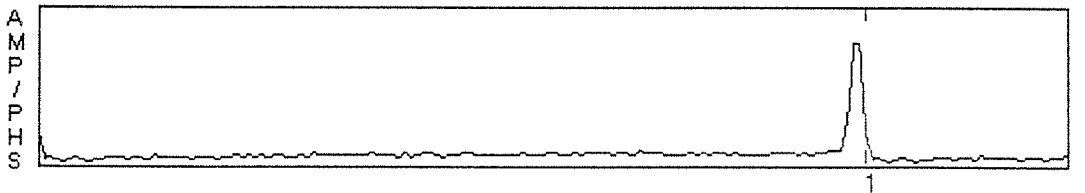
Best prd (ms): 1525.28500000 Err: .13240321
Best frq (Hz): .655615 Err: .000057
Best DM: 71.00 Err: 47.44
Best Width: 8 Best SN: 107.5



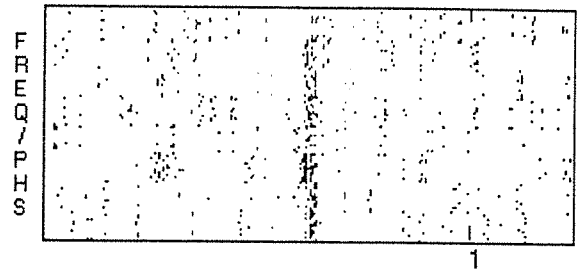
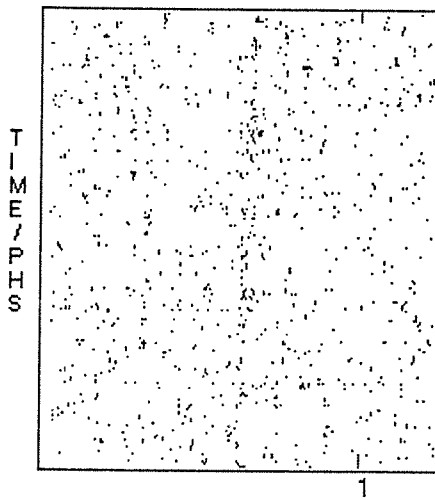
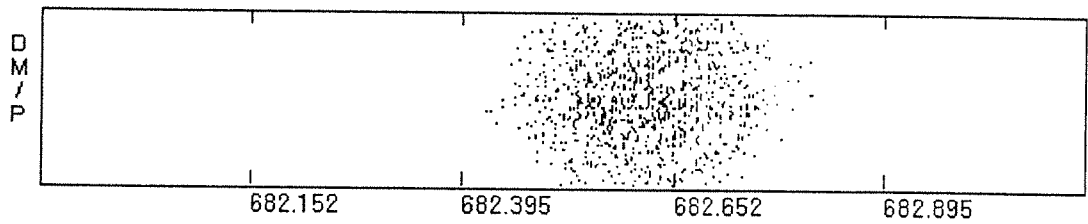
File: g1006011 RA: 22:17:45.8 Dec: 47:39:48 Gl: 98.4000 Gb: -7.6000 Date: 90/9/25
Centre freq. (Hz): 1.85711781 Centre period (ms): 538.4688000 Centre DM: 44.00
File start (blks): 1 Blks skipped: 0 Blks read: 168 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



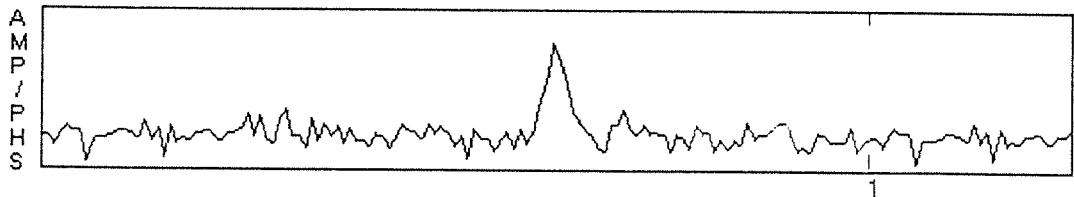
Best prd (ms): 538.54034401 Err: .01430880
Best frq (Hz): 1.856871 Err: .000049
Best DM: 44.00 Err: 16.75
Best Width: 2 Best SN: 157.7



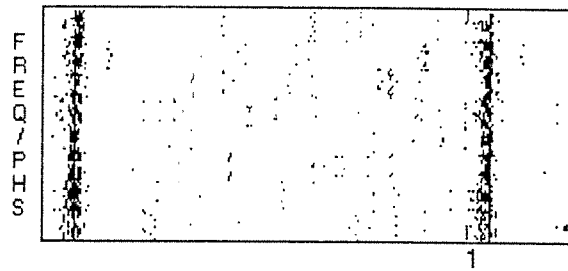
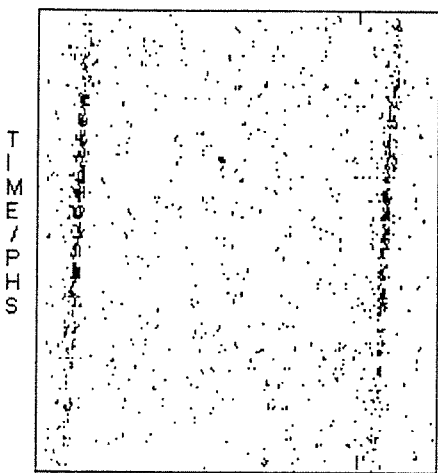
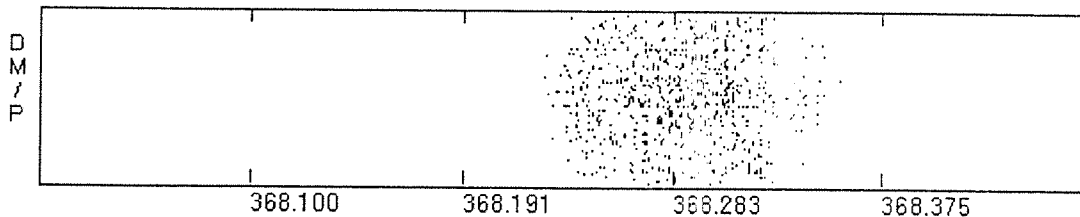
File: g1101011 RA: 22:24:17.3 Dec: 65:20:14 Gl: 108.6000 Gb: 6.8000 Date: 90/10/9
Centre freq. (Hz): 1.46513706 Centre period (ms): 682.5300000 Centre DM: 35.00
File start (blks): 1 Blks skipped: 0 Blks read: 273 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DMfactor: 1.0



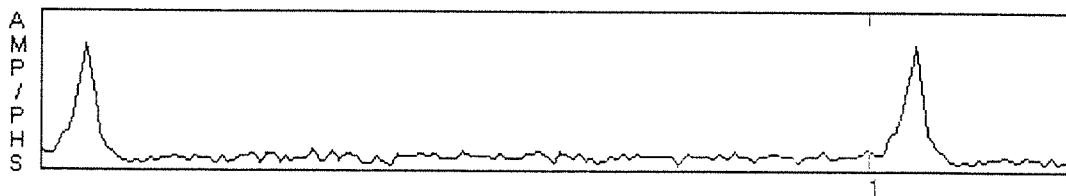
Best prd (ms): 682.60053261 Err: .01410652
Best frq (Hz): 1.464986 Err: .000030
Best DM: 35.00 Err: 21.23
Best Width: 4 Best SN: 18.9



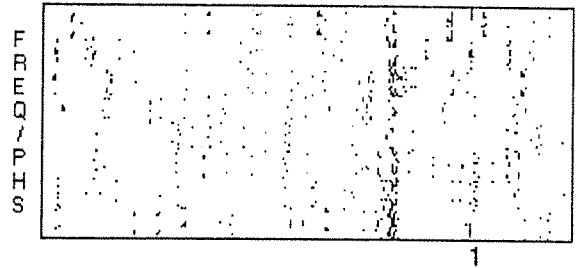
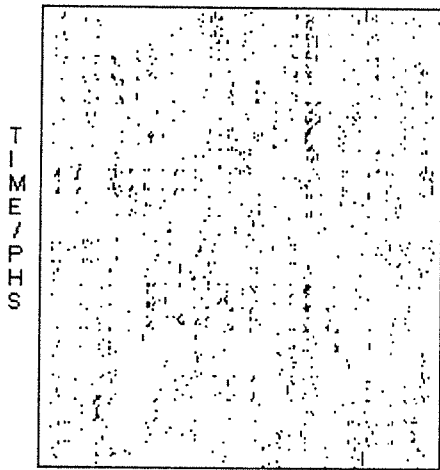
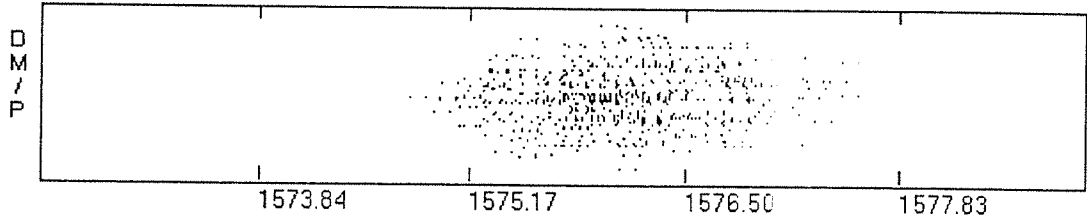
File: g1007011 RA: 22:55:54.2 Dec: 58:53:10 Gl: 108.8000 Gb: -6000 Date: 90/9/25
Centre freq. (Hz): 2.71562467 Centre period (ms): 368.23940000 Centre DM: 151.00
File start (blks): 1 Blks skipped: 0 Blks read: 221 Blk length (s): 1.00000
Tsamp (ms): .5000 Nprd: 89 Ndm: 15 DM factor: 1.0



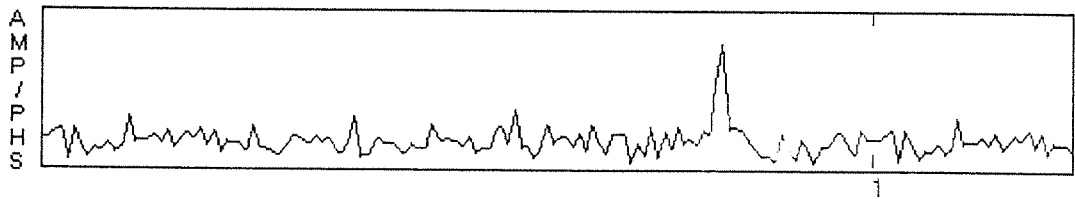
Best prd (ms): 368.23969494 Err: .00502949
Best frq (Hz): 2.715254 Err: .000037
Best DM: 151.00 Err: 11.45
Best Width: 4 Best SN: 50.0



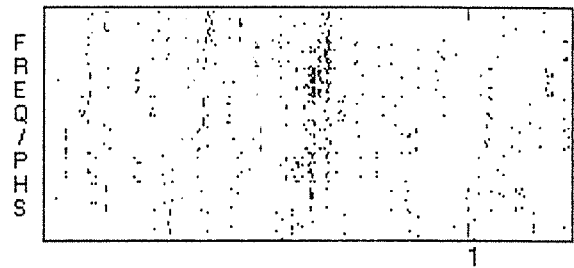
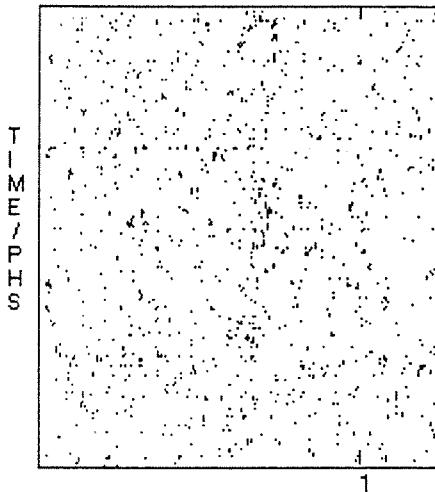
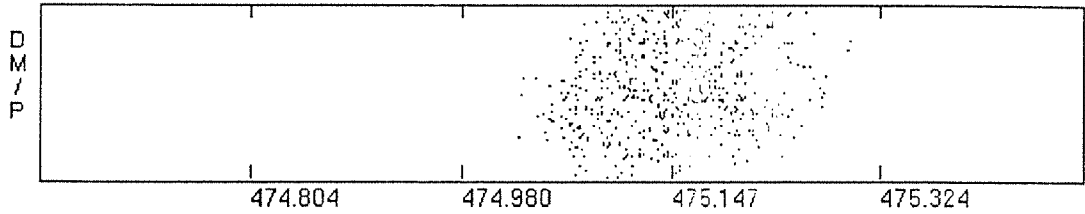
File: g1102011 RA: 23:3:34.0 Dec: 30:43:48 Gl: 97.7000 Gb: -26.7000 Date: 90/10/9
Centre freq. (Hz): .63454998 Centre period (ms): 1575.92000000 Centre DM: 50.00
File start (blks): 1 Blks skipped: 0 Blks read: 131 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 39 Ndm: 15 DM factor: 1.0



Best prd (ms): 1576.08199836 Err: .16199836
Best frq (Hz): .634485 Err: .000065
Best DM: 50.00 Err: 49.01
Best Width: 2 Best SN: 14.4



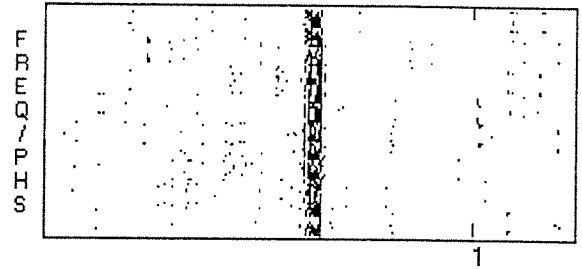
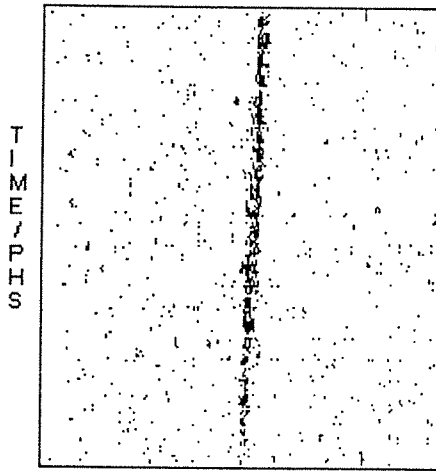
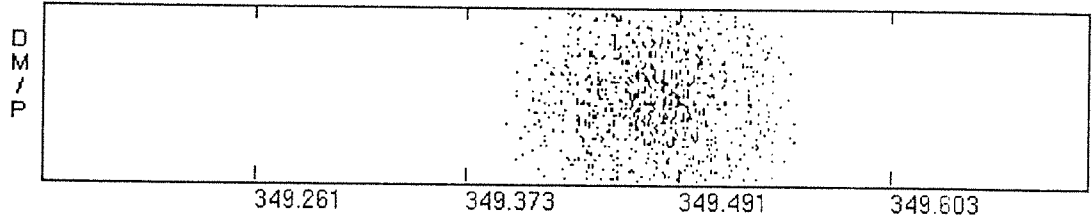
File: g1138011 RA: 23: 6: 2.5 Dec: 55:31:19 Gl: 108.7000 Gb: -4.2000 Date: 90/10/15
Centre freq. (Hz): 2.10496182 Centre period (ms): 475.06800000 Centre DM: 47.00
File start (blks): 1 Blks skipped: 0 Blks read: 200 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 91 Ndm: 15 DMfactor: 1.0



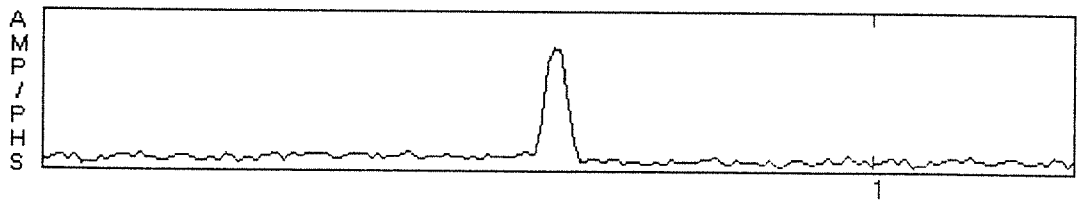
Best prd (ms): 475.14131296 Err: .00929113
Best frq (Hz): 2.104637 Err: .000041
Best DM: 47.00 Err: 14.98
Best Width: 8 Best SN: 15.8



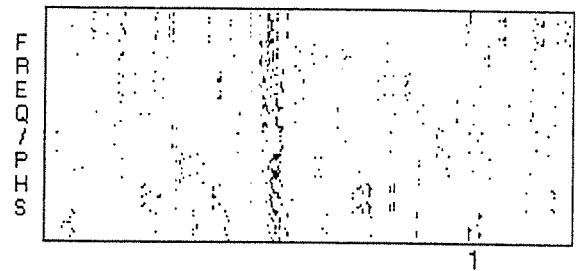
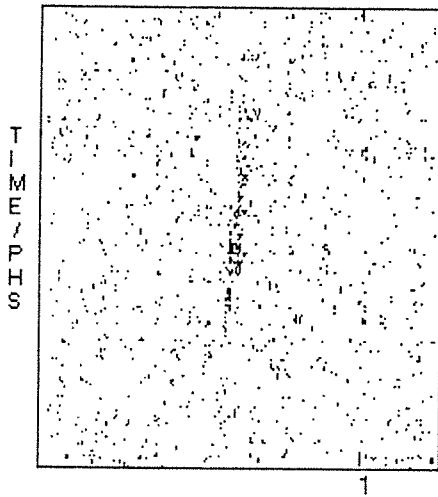
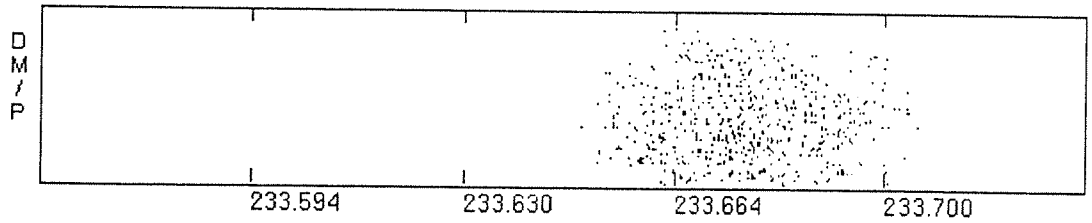
File: g1103011 RA: 23:10:47.6 Dec: 42:36:52 Gl: 104.4000 Gb: -16.4000 Date: 90/10/9
Centre freq. (Hz): 2.86175437 Centre period (ms): 349.4360000 Centre DM: 17.00
File start (blks): 1 Blks skipped: 0 Blks read: 154 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 85 Ndm: 15 DM factor: 1.0



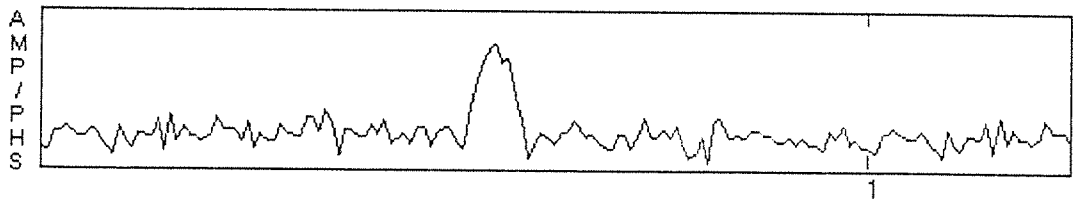
Best prd (ms): 349.48149948 Err: .00649993
Best frq (Hz): 2.861382 Err: .000053
Best DM: 17.00 Err: 10.87
Best Width: 4 Best SN: 97.6



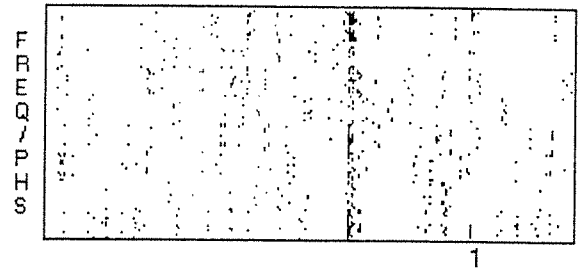
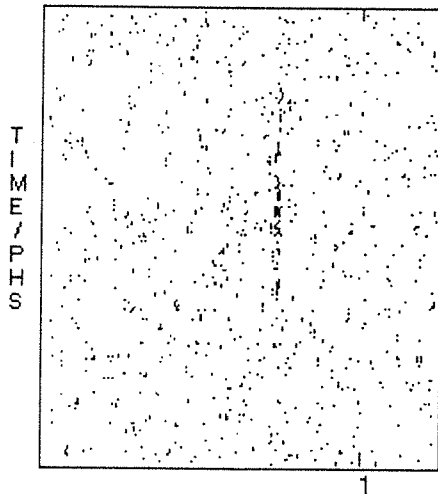
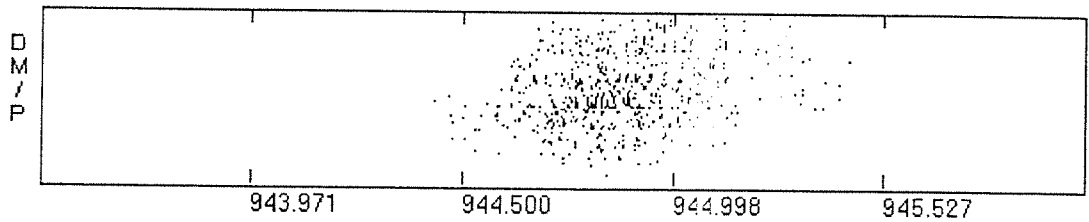
File: g1104011 RA: 23:24:26.8 Dec: 60:55:53 Gl: 112.9000 Gb: .0000 Date: 90/10/9
Centre freq. (Hz): 4.27994248 Centre period (ms): 233.64800000 Centre DM: 123.00
File start (blks): 1 Blks skipped: 0 Blks read: 235 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 93 Ndm: 15 DM factor: 1.0



Best prd (ms): 233.67634433 Err: .00332765
Best frq (Hz): 4.279423 Err: .000061
Best DM: 147.91 Err: 12.80
Best Width: 8 Best SN: 9.1



File: g1105011 RA: 23:51:34.8 Dec: 61:39:6 Gl: 116.2000 Gb: -.2000 Date: 90/10/9
Centre freq. (Hz): 1.05846427 Centre period (ms): 944.76500000 Centre DM: 95.00
File start (blks): 1 Blks skipped: 0 Blks read: 241 Blk length (s) 1.00000
Tsamp (ms): .5000 Nprd: 81 Ndm: 15 DM factor: 1.0



Best prd (ms): 944.85726221 Err: .03075407
Best frq (Hz): 1.058361 Err: .000034
Best DM: 95.00 Err: 29.38
Best Width: 2 Best SN: 18.1

