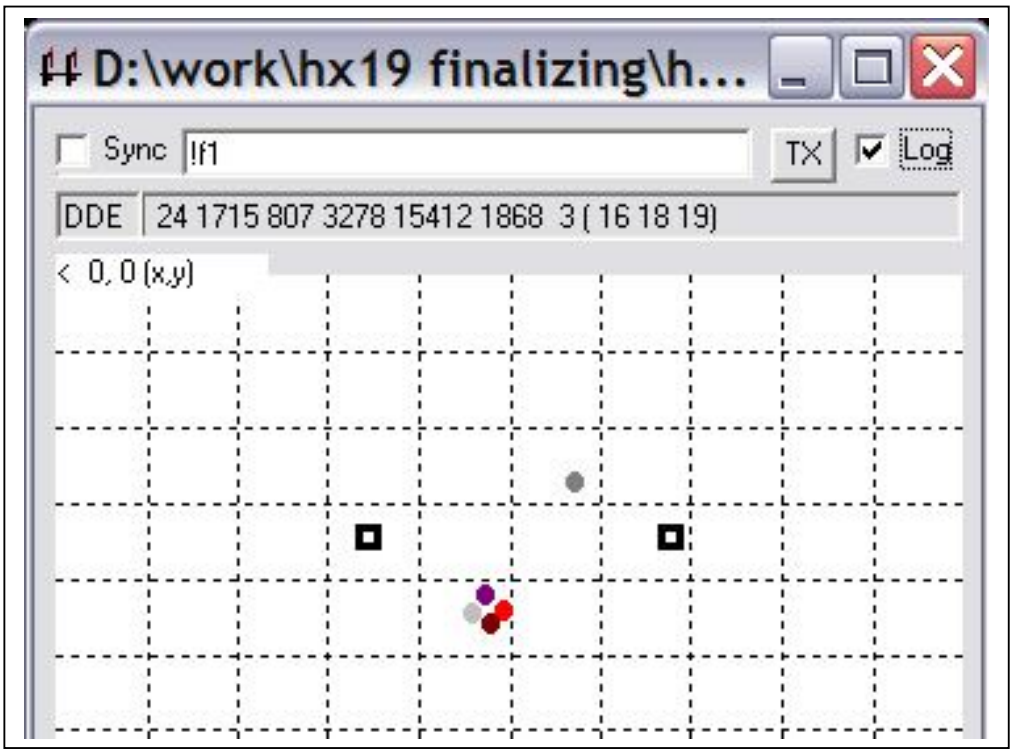
Hx19xyzDDE

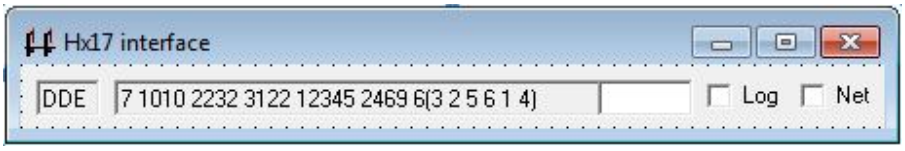
The hx19xyzDDE program reads data from the hx19ms synchronizer. It converts incoming data from all the receivers that detect a given tag, and converts to string containing the ID and XYZ coordinates for that tag. It can handle multiple tags near simultaneously. If more than 3 receivers pick up the signal from a given tag, then the hx19xyzDDE is able to determine full 3D spatial coordinates (xyz). In case there are fewer receivers detecting the tag, the hx19xyzDDE will yield the maximum dimensions it can compute using available data. I.e. if there are only two receivers that sense the tag, a position on the X-axis is made available. In case there is only one receiver detecting the tag. The coordinate of that receiver is displayed roughly to avoid multiple tags piling up on top of each other when displayed. Single point dimension is random around the **single receiver** that picked up the tag.

Data as displayed in the window below can be stored on a file for viewing or playback by selecting (log).



Hx19xyzDDE output syntax

The program determines the best possible coordinates for hx19 tags and displays the results as follows:



[tag ID] [X position] [Y position] [Z position] [time from start] [record #] [number of receivers detecting the tag] [(list of detecting receivers)]

Syntax: 7 1010 2232 3122 12345 2469 6(3 2 5 6 1 4)

The values are separated with space (ASCII decimal code 32). This text window is made available to other applications running under windows through DDE (dynamic data exchange). The data string says tag 7 was detected at X=1010mm Y=2232mm Z=3122mm, it was detected 123.45 seconds after startup of the program (or creation of the data storage file), and this is the 2469th detection of this tag. Six receivers detected the signal, and these were chronologically 3 2 5 6 1 and 4. If the same receiver logged the same tag twice during the same record, this indicates a multi path echo and should be discarded. Only the first detection is used for the computation of the coordinates. Multi paths should be avoided when possible.

Logging example:

When the log feature is selected the data in the DDE window is stored on a file. The file name contains the date and time of recording as shown below.

E.g. Sep 24 09 12 16 08.xyz

Tag	*X*	*Y*	*Z*	*Time elapsed*	*Record#*	*Detection*
1	1023	1618	2900	25672	604	4 (4 1 3 2)
2	946	1597	2900	25678	605	4 (4 1 3 2)
1	1009	1618	2900	25744	606	2 (4 1)
1	1005	1618	2900	25815	607	2 (4 2)
2	943	1600	2900	25815	608	4 (4 1 3 2)
1	1062	1614	2900	26031	612	6 (4 1 3 2 5 6 6)
2	1003	1595	2900	26086	613	6 (4 1 3 2 5 6 5)
1	1125	1615	2900	26102	614	6 (4 1 3 2 5 6)
1	1204	1620	2900	26174	615	5 (4 1 3 2 6)
2	1067	1595	2900	26222	616	5 (4 1 3 2 5)
1	1263	1615	2900	26246	617	6 (4 1 3 2 5 6)
1	1336	1611	2900	26317	618	6 (4 1 3 2 5 6)
1	1399	1607	2900	26389	620	6 (4 1 3 2 5 6 6)
1	1406	1613	2900	26459	621	4 (4 1 3 2)
2	1130	1594	2900	26494	622	5 (4 1 3 2 5)
1	1406	1613	2900	26532	623	6 (4 1 3 2 5 6)

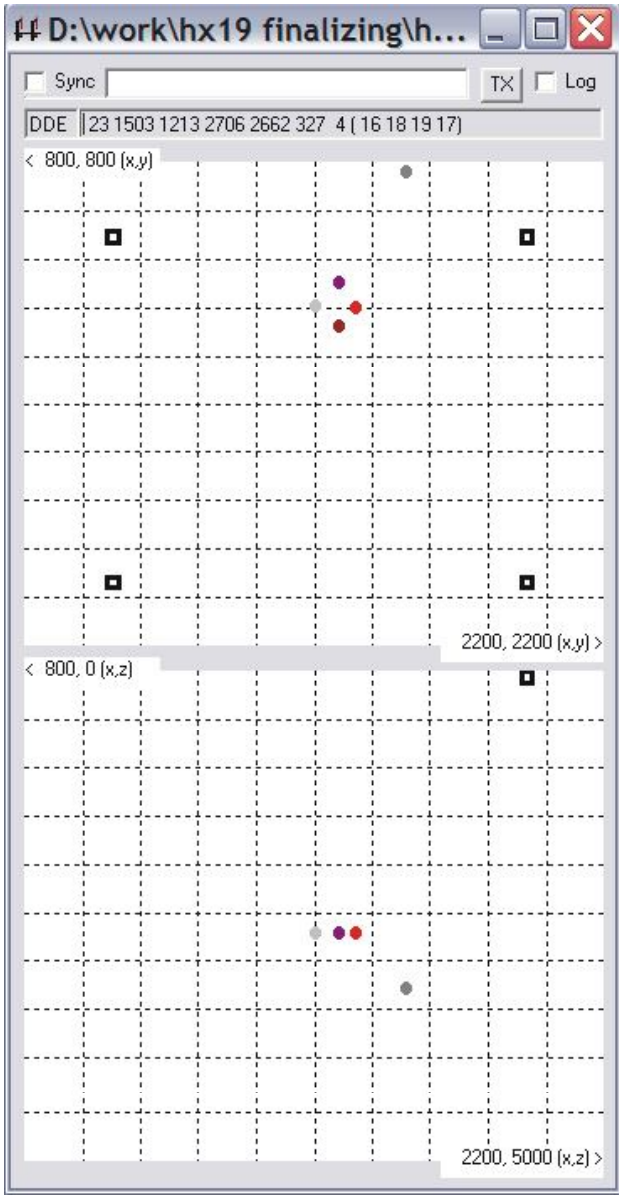
This example was recorded on September 24th 2009, at 12:16:08 256.72 seconds later the first tag is detected starting with record 604. Note that a few records are actually missed. Record 612 shows an echo on receiver 6, in most cases this is harmless. However since it happens often, it is worth a second look at the location of receiver 6 and perhaps relocation.

File hx19xyzDDE.txt:

```
5       "select com port 1 thru 15, verify it is either free or shareable through control panel"
3       "computes position only if this number or more receivers are detected, select a value from 1 to 20"
8       "computes position using no more than the number specified here. select a value from 1 to 20"
800     "xy viewing plane, X-left top corner"
800     "xy viewing plane, Y-left top corner"
2200    "xy viewing plane, X-right bottom corner"
2200    "xy viewing plane, Y-right bottom corner"
0       "xz viewing plane, Z-left top corner"
5000    "xz viewing plane, Z-right bottom corner"
10      "running average max 64, if less than 2 no running average is computed"
100     "Tolerance (mm): if one out of 3 previous points is outside tolerance it isn't displayed, and is excluded
from running average"
```

Hx19xyzDDE configuration

A file called Hx19xyzDDE.txt, found in the Hx19xyaDDE.exe directory is designated for the hx19 programs. It allows the user to control the operation of the hx19xyzDDE. If the values on the left are changed, the operation of the hx19xyzDDE is changed too. The XY and XZ plane can be set to zoom in or out on the tags show on the right as colored dots. The hx19xyzDDE display window on the right shows the location of the hx19 tags on the XY plane and the ZY plane. In the example on the right the tags were mounted on a small plate, so the Z axis shows the same for all the tags.



Using the HX19xyzDDE

Make sure the directory containing HX19xyzDDE.exe has the following files

Hx19xyzDDE.txt
And
Map.txt

The following map.txt file says that we have a coordinate system with the upper left corner at (1000,1000,0) mm. Note the hx19xyzDDE.tx should not present negative position, so don't place the upper left corner at 0,0,0. In this example the lower right corner is located at (2000,2000,0) mm. The tag should be detected within this square and slightly out of the edges.

```
ID   x     y    z
 41 1000 1000 0
 42 2000 1000 0
 43 2000 2000 0
 44 1000 2000 0
```

If you are using more than 4 receivers you can add as follows

```
 41 1000 1000 0
 42 2000 1000 0
 43 2000 2000 0
 44 1000 2000 0
 45 3000 1000 0
 46 3000 2000 0
 47 4000 1000 0
 48 4000 2000 0
```

You can build like this into any direction, x or y or z so long as the coordinates are specified correctly your computed xyz will correspond to the position of the device.

The order of devices or coordinates is not important.

```
‘The following is a source code for visual basic 6, it shows how the user can access real time data and work with
‘it as it comes in from the hx19ms (usb or RS232 port) and is processed by the hx19xyzDDE program.


'This program works with realtime data from the hx19 system
Dim linebuffer(100)
Dim nn As Integer

'Everytime text1 in hx19xyzDDE changes, this (application) program jumps to the following subroutine

Private Sub text1_Change()
If Check1.Value = 0 Then tScroll Text1 + vbCrLf
End Sub

‘The following routine sets up the DDE link from this program to hx19xyzDDE
Private Sub Form_Load()
Text1.LinkTopic = "HX19|hx19"    'HX19 is the title for the program hx19xyzDDE
Text1.LinkItem = "text1"              'Data from hx19xyzDDE Text1 is copied to Text1 of this program
'the program hx19xyzDDE must be running on the computer for this link to become active
Text1.LinkMode = 1                    'This sets the link process active
End Sub

‘The following routine has no significance other than to display the DDE data as it arrives.
Private Sub tScroll(nline)            'Scrolls 16 lines of text
Dim jj%

linebuffer(nn) = nline
nn = (nn + 1) And 15
jj = nn + 1
Text2 = ""
Do
 Text2 = Text2 + linebuffer(jj)
 jj = (jj + 1) And 15
Loop Until jj = nn

End Sub
```