Program hx5Data.exe

This program reads the data stream directly from the network controller. And stores the data on file. This file can then later be converted to timeline tag positioning data, using the program xyz in mode 1. If the program hx5Data is running; then xyz.exe running in mode 3 can tap into the data stream real time, while data from the network controller is being stored on file monData.hxm.

Please refer to the Hx5Data display window below. The first 4 digits in the data string are the hexadecimal representation of the monitor's ID. Each tag is represented with a total of 10 hexadecimal digits. The first 4 contain the tag's ID number and the remaining 6 represent the position timing data. If the same tag exists in both upper and lower acquisition cycles (see the hx5data program window), then the tag transmission rate is to high. If the xyz.exe program is used to extract 3D position out of the monData.hxm where this rule is violated, it will probably crash. Sometimes a monitor can pick up the same tag twice in the same acquisition cycle, the xyz program treats the latter pickup as echo of the first and it is ignored.

CRITICAL OPERATION RULE

A monitor or monitors should not pick up the same tag in two consecutive acquisition cycles. Run the tags at the slowest transmission rate at first, and then gradually increase the rate, to find the limit.

Hx5Data display window		
Accepted	Banned	Accepted
4E50 000218355B #	4E50 0002618BCC #	4E50 00031399AC 00021507DB #
4E52 0002186B6F #	4E52 000261C1E8 #	4E52 000313D987 0002153DE9 #
4E54 0002185317 #	4E54 000261A980 #	4E54 000313BD38 0002152578 #
4E56 0002184403 #	4E56 0002619A75 #	4E56 0003139A33 000215167B #
4E50 000348DBFA #	4E50 0002103663 #	4E50 #
4E52 0003491BC6 #	4E52 0002106C6C #	4E52 #
4E54 000348FF83 #	4E54 000210540E #	4E54 #
4E56 000348DCC6 #	4E56 0002104500 #	4E56 #

If the xyz program cannot evaluate a position it returns 0 for the scanned coordinate. Setting the reference coordinates at a nonzero value, and making (0,0,0) an impossible position, evaluation failures can be ignored from a plot.

If ? follows the monitor rather than #, then that specific monitor is not replying to the polling of the Network Controller. In this case make sure the connection is good and the monitor is turned on. **NOTE: the network controller polls only the receivers specified in the layout.hxm file.**

Note that the rule of operations specified above, also applies to the xyz program in all modes of operation.

XYZ Version 1. program description

The XYZ needs four files to run, **these files must be located in the directory where the xyz.exe is located**. These files are:

MonData.hxm	(mode 1 only)
Layout.hxm	(must access in all modes)
Parameters.hxm	(must access in all modes)
Sspeed.hxm	(must access in all modes)

MonData.hxm is created by a program called hx5Data.exe. All files with hxm extension are text files which can be read and modified using Notepad.exe.

Layout.hxm, can be created by the user, or it can be created using the layout.exe program. First column is the monitor's X coordinate, the second column is the Y coordinate and the third column is the Z coordinate. The fourth column is the tag's ID.

File: Sspeed.hxm

XYZ looks for a speed of sound parameter in a file called sspeed.hxm on startup. In the sample file the speed of sound is set at 340 (m/s). Changing this value, will effect the outcome of the (xyz) coordinate calculation

File: Layout.hxm

2040	1440	0	20048
2950	1000	0	20050
2180	450	0	20052
1000	1000	0	20054

Coordinates are always entered in millimeters; the above translates to:

Monitor 20048 location: (x,y,z) (2040,1440,0)
Monitor 20050 location: (x,y,z) (2950,1000,0)
Monitor 20052 location: (x,y,z) (2180, 450,0)
Monitor 20054 location: (x,y,z) (1000,1000,0)

Data Evaluation and Errors

If the xyz program is unable to calculate coordinates, some of the X, Y or Z coordinates will read zero. Setting the layout so that zero is an impossible coordinate, will help programs disregard unsuccessful scans. The last number in the data string i.e the result from the xyz program's position scan indicates how many lines were available to construct the coordinate. If this number is less than 3, what ever coordinates resulted should not be considered valid. Note that tags can collide, data from two or more tags may intercept and cause an erroneous reading. If a tag isn't picked up by more than two monitors (lines available number < 3); and it is picked up in one acquisition cycle (only) over a period of some time, it should be disregarded.

Suggestion

For testing using the parameter file below, set the monitors on a XY cross with about 2 meters between monitors on the XY axis. This is just a suggestion; any formation can be evaluated.

File: Parameters.hxm

The numbers in the following are arbitrary setting, these numbers should be set to suit the setup.

```
4           "Line1: Total Number of Monitors on this network "
3           "Line2: Updates per second"
1           “Line3: Communications Port”
1           "Line4: viewing 1=on 0=off"
4000        "Line5: Viewing window full scale X"
4000        "Line6: viewing window full scale Y"
0           "Line7: viewing window offset X
0           "Line8: viewing window offset Y"
1           "Line9: Mode 0 through 2"
28          "Line10: Scan Resolution"
6           "Line11: Scan Tolerance"
990         "Line12: X scan range start in mm"
990         "Line13: X scan range end in mm"
700         "Line14: Y scan range start in mm"
700         "Line15: Y scan range end in mm"
1000        "Line16: X pink dot exclusion zone"
1000        "Line17: Y pink dot exclusion zone"
2557        "Line18: average Z distance"
1000        "Line19: Z tracking"
1           "Line20: Number of Position Iterations"
8           "Line21: Iteration Scan Resolution"
3           "Line22: Iteration Scan Tolerance"
1000        "Line23: Z scan range Start in mm"
0           "Line24: z scan range End in mm"
400         "Line25: scan range around point X in mm"
400         "Line26: scan range around point Y in mm"
400         "Line27: scan range around point Z in mm"
200         "Line28: X Iteration pink dot exclusion zone"
200         "Line29: Y Iteration pink dot exclusion zone"
0           "Line30: if 0 all tags evaluated, if 1 only listed tags are
evaluated"
3,2560      "Line31 to Line N: known z for specified tag"
2,2550      "Line32 to Line N: known z for specified tag"
```

Parameters Description

Line1: Total number of monitors on the network

This value is crucial, and must be updated if a monitor is added or removed from the network. The xyz program and hx5data both rely on this number.

Line2: Sampling Rate Control (whole network)

For the standard systems the Interval between updates is calculated as follows:

Interval Between Updates= 0.131072s * (Sampling Rate Control Value)

The (Sampling Rate Control Value) must be an integer number from 1 to 255. If faster or slower update rates are desired, contact Hexamite; the HX5NC network controller needs to be modified or replaced. When the interval times out, data is recovered from all monitors on the network.

Line3: Communication Port

The value of this line selects the serial communications port used, Com1 or Com2. This parameter can have the value 1 or 2.

Line4: Viewing

This value enables graphic viewing of xyz positioning processing. While setting up a system, this feature is useful. Please note that this feature slows the processing down considerably. The computer cannot process as many tag positions per second with this feature enabled, therefore real time operations risk falling behind.

The formation and setup of the monitors will govern the integrity of the equidistance lines on the graph. The computer will attempt to evaluate the crossing points of these lines, and these crossing points are marked with pink dots. The blue dot is the average point calculated; and it is this point, which is filed and displayed in the DDE window.

Equidistance lines that are essentially parallel are ignored by the computer, the monitors/receivers should be set so as to minimize the number of parallel lines.

Line 5 and 6: View Window Scaling

The value of line 4 and 5 is the full scale of the viewing window in terms of millimeters.

Lines 7 and 8: View Window Offset

The value of these lines will pan the viewing window left/right or up/down

Line 9: xyz Operation Mode

The value of this line can be 0, 1 or 2; these values select one of the following modes.

Mode 0: (Real Time Mode)

In this mode the program taps directly into the data stream from the Network controller HX5NC, this data is converted to xyz time coordinates and made available via DDE. See visual basic sample program DDEexample below section DDE interface. Note that in real time mode the data is not time tagged. Since this is real time the computer clock can be used to log time. In case of many tags and monitors working at high sampling rates, the computer may not be able to keep up in this mode. Therefore the communication buffer will fill up and eventually overflow, this will crash the program. Operations should be restarted at lower sampling rate with fewer monitors and tags. In case high-speed real-time operations are needed, monitor networks should be divided among more high-speed computers. The computers can then be networked together for high speed and large system operations.

Mode 1: (Filing Mode)

Data from file called MonData.hxm is converted to tag positions (x,y,z) on a timeline and stored in a subdirectory [xyz Data]. If this subdirectory doesn't exist on your computer the xyz program creates it. The name of the processed positioning data becomes the time and date the data was acquired. For example:

Jun 09 040609143505.xyz is actually the date June 9th 2004 and the time is 14:35:05.

If the format of this name is changed, the layout program will not be able to display the tag and it's position on the background image.

Mode 2: (Real Time Mode.)

In this mode the xyz program gets it's data from another program called hx5data. This program must be up and running before xyz is executed in this mode. And like in mode 0 the xyz coordinates are available through DDE using the DDEexample program. In this real time mode falling behind is no problem. Program hx5data taps into the data stream from the network controller hx5nc and stores the data in raw form on a file called monData.hxm. While this data is being stored on the file; the xyz program can monitor the data, convert it to xyz coordinates and make these coordinates available via DDE to the user for real time applications.

Line10: Scan Resolution

The computer must scan along the x, y and z axis to find the equidistance points to extract the position of the tag. The scan resolution defines the steps along these axes in terms of millimeters. The finer the steps, the longer it will take the computer to determine the position of the tag. Note that the computer does position averaging so the scan resolution is not directly linked to precision. During fast real time operations, the user should carefully select steps as large as possible without serious impact on precision. The user should determine what value is best for his setup and application.

Line11: Scan Tolerance

This value sets the limits in millimeters to within which the equidistance point must fall. The size of this number does not slow the computer significantly, but does have an effect. The user should determine what value is best for his setup.

Line12: X Scan Start

Consider a monitor pair where one monitor is positioned at an X(a), a point that is lower than the other called X(b). The xyz scans from low X(a) to high X(b) for every monitor pair in the network holding tag data. Then if line 12 holds a positive value, scan starts at specified millimeters lower than (Xa).

Line13: X Scan End

Consider a monitor pair where one monitor is positioned at an X(a), a point that is lower than the other called X(b). The xyz scans from low X(a) to high X(b) for every monitor pair in the network holding tag data. Then if line 13 holds a positive value, scan ends at specified millimeters higher than (Xb).

Line14: Y Scan Start

Consider a monitor pair where one monitor is positioned at an Y(a), a point that is lower than the other called Y(b). The xyz scans from low Y(a) to high Y(b) for every monitor pair in the network holding tag data. Then if line 14 holds a positive value, scan starts at specified millimeters lower than (Ya).

Line15: Y Scan End

Consider a monitor pair where one monitor is positioned at an Y(a), a point that is lower than the other called Y(b). The xyz scans from low Y(a) to high Y(b) for every monitor pair in the network holding tag data. Then if line 15 holds a positive value, scan ends at specified millimeters higher than (Yb).

Note that the lower or negative the scan range value is, the faster the scan.

Line16: X pink dot exclusion zone

This value sets the maximum deviation error. If the pink dot falls away from the average by more than this value, it is excluded from the calculation of the blue dot average.

Line17: Y pink dot exclusion zone

This value sets the maximum deviation error. If the pink dot falls away from the average by more than this value, it is excluded from the calculation of the blue dot average.

Line18: Average Z distance

If the Z distance is similar for all tags, this value can be used to help determine the (X,Y) coordinates. In case the Z distance to the tag is not known, then by setting this value to approximate Z distance; fewer iterations will be required to lock onto the Z coordinate. If the Z distance has been set for a specific tag, then this distance will override and be used to calculate the (X,Y) coordinates. And the Average Z Distance is ignored for this particular tag.

Line19: Z tracking

If the difference between the calculated Z and the Z estimated (this can be tag specific Z or average Z) is less than the Z tracking value. Then the Tag Specific Z becomes the value calculated. This value will then be used to calculate next (X,Y).

Line20: Number of Position Iterations

This value determines how many scans are done to locate the Z position. Position Iteration can also be used to further enhance the (X,Y) positions. Note that this value significantly slows the computer, which can impact real time operations.

Line21: Iteration Scan Resolution

The computer must scan along the x, y and z axis to find the equidistance points to extract the position of the tag. The scan resolution defines the steps along these axes in terms of millimeters. The finer the steps, the longer it will take the computer to determine the position of the tag. Note that the computer does position averaging so the scan resolution is not directly linked to precision. During fast real time operations, the user should carefully select steps as large as possible without serious impact on precision. The user should determine what value is best for his setup and application.

Line22: Iteration Scan Tolerance

This value sets the limits in millimeters to within which the equidistance point must fall. The size of this number does not slow the computer significantly, but does have an effect. The user should determine what value is best for his setup.

Line23: Z scan range start

Like the x and y, the computer must scan along the Z-axis to estimate the Z position. The value is in millimeters and starts Z scan at the specified position. The greater the difference is between Z scan start and Z scan end, the slower is the processing of the point.

Line24: Z scan range end

This value specifies end of scan in terms of millimeters. If this value is 0 then the computer does not conduct Z scan and the Iterations only enhance the (X,Y) position.

Line25: Iteration Scan Range Around X

Once the X coordinates are known, fine scan around the point can be done without significant processing time. Usually 300 or 400 millimeter scan around the point is adequate.

Line26: Iteration Scan Range Around Y

Once the Y coordinates are known, fine scan around the point can be done without significant processing time. Usually 300 or 400 millimeter scan around the point is adequate.

Line27: Iteration Scan Range Around Z

Once the Z coordinates are known, fine scan around the point can be done without significant processing time. Usually 300 or 400 millimeter scan around the point is adequate.

Line28: Iteration X pink dot exclusion zone

This value sets the maximum deviation error. If the pink dot falls away from the average by more than this value, it is excluded from the calculation of the blue dot average.

Line29: Iteration Y pink dot exclusion zone

This value sets the maximum deviation error. If the pink dot falls away from the average by more than this value, it is excluded from the calculation of the blue dot average.

Line30: Tag Position Evaluation

If the value of this line is 0 the xyz program evaluates positions of all tags. If the value of this tag is 1 then the xyz program only evaluates tags listed in the lines below.

Line31: Tag Specific Z

This line consists of a tag number and it's estimated Z position. If the Tag Position Evaluation is set and a tag is encountered on the network. Then that tag must be listed below, with a nonzero value for the estimated Z position to be evaluated by the xyz. New tags added must be appended to the list.

Tags listed with nonzero values for the estimated Z position, will be subject for Z tracking.

XYZ Version 2. program description

The XYZ needs four files to run, **these files must be located in the directory where the xyz.exe is located**. These files are:

MonData.hxm	(mode 1 only)
Layout.hxm	(must access in all modes)
Parameters.hxm	(must access in all modes)
Sspeed.hxm	(must access in all modes)

MonData.hxm is created by a program called hx5Data.exe. All files with hxm extension are text files which can be read and modified using Notepad.exe.

Layout.hxm, can be created by the user, or it can be created using the layout.exe program. First column is the monitor's X coordinate, the second column is the Y coordinate and the third column is the Z coordinate. The fourth column is the tag's ID.

File: Sspeed.hxm

XYZ looks for a speed of sound parameter in a file called sspeed.hxm on startup. In the sample file the speed of sound is set at 340 (m/s). Changing this value, will effect the outcome of the (xyz) coordinate calculation

File: Layout.hxm

2040	1440	0	20048
2950	1000	0	20050
2180	450	0	20052
1000	1000	0	20054

Coordinates are always entered in millimeters; the above translates to:

Monitor 20048 location: (x,y,z) (2040,1440,0)
Monitor 20050 location: (x,y,z) (2950,1000,0)
Monitor 20052 location: (x,y,z) (2180, 450,0)
Monitor 20054 location: (x,y,z) (1000,1000,0)

Suggestion

For testing using the parameter file below, set the monitors on a XY cross with about 2 meters between monitors on the XY axis. This is just a suggestion; any formation can be evaluated.

File: Parameters.hxm

The numbers in the following are arbitrary setting, these numbers should be set to suit the setup.

5	"Line1: Total Number of Monitors on this network "
1	"Line2: delay between updates"
1	"Line3: Communications Port 1,2,3,4,5,6 and etc"
1	"Line4: 1 = high and 0 = low communication speed"
1	"Line5: Mode 0 through 2"
256	"Line6: Scan Step"
1000.5	"Line7: Scan Tolerance"
10000	"Line8: Maximum Distance Between Monitors"
-200	"Line9: X scan range start in mm"
+200	"Line10: X scan range end in mm"
-200	"Line11: Y scan range start in mm"
+200	"Line12: Y scan range end in mm"
2000	"Line13: Z scan range start in mm"
4000	"Line14: Z scan range end in mm"
3	"Line15: viewing 1=on 0=off"
4000	"Line16: Viewing window full scale X"
4000	"Line17: viewing window full scale Y"
6000	"Line18: viewing window full scale Z"
0	"Line19: viewing window offset X
0	"Line20: viewing window offset Y"
0	"Line21: viewing window offset Z"

Parameters Description

Line1: Total number of monitors on the network

This value is crucial, and must be updated if a monitor is added or removed from the network. The xyz program and hx5data both rely on this number.

Line2: Sampling Rate Control (whole network)

For the standard systems the Interval between updates is calculated as follows:

Interval Between Updates= 0.131072s * (Sampling Rate Control Value)

The (Sampling Rate Control Value) must be an integer number from 1 to 255. If faster or slower update rates are desired, contact Hexamite; the HX5NC network controller needs to be modified or replaced. When the interval times out, data is recovered from all monitors on the network.

Line3: Communication Port

The value of this line selects the serial communications port used, Com1, Com2 …, ComN. This parameter is an integer value representing the value of a free comport on the monitoring computer.

Line4: 1 = high and 0 = low communication speed

If you have an early version of the Hx5 monitors and network controller you will have to set this value at 0.

Line5: xyz Operation Mode

The value of this line can be 0, 1 or 2; these values select one of the following modes.

Mode 0: (Real Time Mode)

In this mode the program taps directly into the data stream from the Network controller HX5NC, this data is converted to xyz time coordinates and made available via DDE. See visual basic sample program DDEexample below section DDE interface. Note that in real time mode the data is not time tagged. Since this is real time the computer clock can be used to log time. In case of many tags and monitors working at high sampling rates, the computer may not be able to keep up in this mode. Therefore the communication buffer will fill up and eventually overflow, this will crash the program. Operations should be restarted at lower sampling rate with fewer monitors and tags. In case high-speed real-time operations are needed, monitor networks should be divided among more high-speed computers. The computers can then be networked together for high speed and large system operations.

Mode 1: (Filing Mode)

Data from file called MonData.hxm is converted to tag positions (x,y,z) on a timeline and stored in a subdirectory [xyz Data]. If this subdirectory doesn't exist on your computer the xyz program creates it. The name of the processed positioning data becomes the time and date the data was acquired. For example:

Jun 09 040609143505.xyz is actually the date June 9th 2004 and the time is 14:35:05.

If the format of this name is changed, the layout program will not be able to display the tag and it's position on the background image.

Mode 2: (Real Time Mode.)

In this mode the xyz program gets it's data from another program called hx5data. This program must be up and running before xyz is executed in this mode. And like in mode 0 the xyz coordinates are available through DDE using the DDEexample program. In this real time mode falling behind is no problem. Program hx5data taps into the data stream from the network controller hx5nc and stores the data in raw form on a file called monData.hxm. While this data is being stored on the file; the xyz program can monitor the data, convert it to xyz coordinates and make these coordinates available via DDE to the user for real time applications.

Line6: Scan Step

The computer has to scan for the rough x,y,z positions. This number represents the size of the scan step in mm. If for example the largest distance between two monitors detecting a specific tag is 2000mm. Then selecting this value as 100mm means 20 scans will determine the position. But in this case if for example there are 3000mm on the X axes, 2000mm on the Y axis and 500mm on the Z axis then the total number of steps are 30x20x5 or 3000 steps total.

Once the rough position is found the computer iterates for the fine position 8 times cutting the scan step finer by the factor of two every time. For example if your scan step is 128 you have.

Iteration 1.	128/2 or	64mm
Iteration 2.	64/2 or	32mm
Iteration 3.	32/2 or	16mm
Iteration 4.	16/2 or	8mm
Iteration 5.	8/2 or	4mm
Iteration 6.	4/2 or	2mm
Iteration 7.	2/2 or	1mm
Iteration 8.	1/2 or	1/2mm

Experiment with this value to see what suits you best.

Line7: Scan Tolerance

The computer conducts minimum square error evaluation for the convergence of the coordinates. The resulting minima is $ErrorX^2 + ErrorY^2 + ErrorZ^2$. If the minima is greater than Scan Tolerance value that coordinate calculation is ignored.

Experiment with this value to see what suits you best.

Line8: Maximum Distance Between Monitors

This value tells the program the maximum allowable distance between the monitors which detect a given tag. For example. If there is a large setup and Tag 500 is detected by the monitors surrounding it. And it is detected by an error by a monitor elsewhere in the setup, perhaps 20 or more meters away. The XYZ program will attempt to include the error detection in the calculation for the position of Tag 500. This could delay the calculation for the point significantly, and give erroneous results. It is not likely that Tag 500 is picked up by an error, but it can happen.

Line9: X scan range start in mm

If for example two monitors pick up tag 100. Where one monitor is on the X axis at 20400 (mm) and the other at 22400 (mm). Given that this value equals (- 300) then the scan for the X position of tag 100 starts at 20100.

Line10: X scan range end in mm

Please refer to the example for line 9. This value determines where the scan for tag 100 ends. Given that this value equals (+200), the scan for tag 100 ends at X equals 22600 (mm)

Line11: Y scan range start in mm

If for example two monitors pick up tag 100. Where one monitor is on the Y axis at 20400 (mm) and the other at 22400 (mm). Given that this value equals (- 300) then the scan for the Y position of tag 100 starts at 20100.

Line12: Y scan range end in mm

Please refer to the example for line 9. This value determines where the scan for tag 100 ends. Given that this value equals (+200), the scan for tag 100 ends at Y equals 22600 (mm).

Line13: Z scan range start in mm

If for example two monitors pick up tag 100. Where one monitor is on the Z axis at 20400 (mm) and the other at 22400 (mm). Given that this value equals (- 300) then the scan for the Z position of tag 100 starts at 20100.

Line14: Z scan range end in mm

Please refer to the example for line 14. This value determines where the scan for tag 100 ends. Given that this value equals (+200), the scan for tag 100 ends at Z equals 22600 (mm).

All axis are treated equally. The setup in the parameters file is geared towards an office environment where the Z position of the monitors is 0. And the Z position for the tags can only be between 2 and 4 meters from the ceiling, this cuts down on processing time.

Line15: Viewing

This value enables graphic viewing of the xyz positioning in any mode. Please note that this feature slows the processing down considerably. The computer cannot process as many tag positions per second with this feature enabled, therefore real time operations risk falling behind.

Line 16 and 18: View Window Scaling

The value of line 4 and 5 is the full scale of the viewing window in terms of millimeters.

Lines 19 and 21: View Window Offset

The value of these lines will pan the viewing window left/right or up/down.

DDE Interface

Below is a simple DDE link program written for visual basic called DDEexample. This program reads results from the xyz program running in any of it's three modes. The results from this example are stored on file called "myFile.xyz". The scan quality indicates the number of equidistance lines extracted from the hx5Data program. If this number is under 3 the coordinates are invalid and will probably be all zeros.

```
Private Sub Form_Load()

  Text1.LinkTopic = "xyz|HX5"
  Text1.LinkItem = "text3"
  Text1.LinkMode = 1          'link mode must be set last
  Open "myFile.xyz" For Output As #1

End Sub

Private Sub Form_Unload(Cancel As Integer)

  Close #1
  End

End Sub

Private Sub Text1_Change()

  myTag = Val(Mid(Text1, 1, 4))
  myX = Val(Mid(Text1, 6, 6))
  myY = Val(Mid(Text1, 13, 6))
  myZ = Val(Mid(Text1, 20, 6))
  scanQuality = Val(Mid(Text1, 27, Len(Text1) - 1))
  Print #1, myTag, myX, myY, myZ, scanQuality

End Sub
```

Program Layout.exe

Layout requires the following file for operation

Layout.gif: This should be the image background (or floorplan) on which the tags and monitors are positioned. The user must provide this image, and it must reside in the same directory as layout.exe. This must be a gif format.

Layout creates the following files

Layout.scl: This file stores the scaling information. The image on the screen needs to be scaled, in order for the monitor layout and the position of the tags to be properly and proportionally displayed.

Layout.hxm: This file contains the layout of the monitors, and is used by the xyz program to calculate the position of the tags.

The Layout Program
Moving the Background Image

Double click on the image and hold the left mouse button down while moving the mouse.
Scaling

Before saving the scale parameters, the text boxes Origin and XY scale must be placed in the upper left hand corner and bottom right hand corner respectively. The XY distance from Origin to XY scale can be entered by imperial or metric notation. The values must be entered using the enter key. Please make sure the values are entered and the Origin and XY boxes are in place before saving the scale.
Erasing Monitors

Double click on the monitor to be erased and then press the Delete Key.
Moving Moveable Objects

Double click on the object and hold the left mouse button down while moving the mouse. Note that the upper left hand corner of the object is the locus of the object.
The Reference Object

This object can be placed anywhere on the image, and the relative coordinates in the status line on the bottom indicates the distance from the reference to the mouse.

Real Time Display on Background Image

The layout program can be used to display the position of the monitors real time. Positions are acquired via DDE from the xyz program. The xyz program must be running in the background for this feature to operate.

Monitor Formation (Setup Hints.)

The formation of the monitors should suit your application, if the application requires high sampling rates, precision and accuracy may have to be reduced. The higher the number of monitors picking up a tag (or the greater the number of lines plotted by the xyz), the longer will the xyz program take to calculate the position. For most 2D applications, only 3 monitors will be needed to pick up the tag. For high-speed 2D real time operation, the formation should tend to keep only 3 monitors in range. 3D operations will require more monitors to pick up the tag, and iteration scans will be needed to evaluate the Z position.

IMPORTANT

All files used by hx5 must reside in the same directory, 4 separate programs should be installed. Use install.bat it will guide you through the process. All files are installed in directory:
\program files\hx5

Caution:

Make sure either serial port 1 (com1) or serial port 2 (com2) is available for the hx5

Power the network controller and then network simultaneously. If the receivers are powered on and no controller is retrieving data from the receivers, the receiver buffers may overflow. If this unlikely condition occurs, power down the receivers and restart.

Helpful Hint:

The processing time of the xyz program is taken by code execution and number crunching rather than peripheral access. Increasing the speed of the microprocessor effectively increases processing of the xyz coordinates.

If the power is momentarily interrupted, (try to avoid this) the whole system will reboot, hx5Data will attempt to reconnect. If this happens it may become necessary to restart the whole operation.

HX5 Easy start

A. Make sure all the programs and files are in the same directory (hx5), and the network controller is connected to your computer and the receivers.
B. Place the receivers in a square formation one for each corner of the 2m x 2m square. Make sure there are close to 2 meters between the sensing elements on the receivers.
C. Place a tag somewhere in the square 2-4 meters away from the receiver plane (ceiling).
D. Set the tag at the second or third slowest transmission rate
E. Run the hx5data program and collect positioning data for a few minutes.
F. Shut the hx5data program down and run the xyz program. (during DDE both program run simultaneously)

The following files must be in the hx5 directory where all the programs should be.

USE A TEXT EDITOR TO OPEN layout.hxm MAKE SURE THE TAG IDENDIFICATION NUMBERS CORRISPOND TO YOUR RECEIVERS. AND THAT THE RECEIVER'S COORDINATES IN RELATION TO THE OTHER RECEIVERS ARE CORRECT.

In the parameter file the average Z coordinate is fixed at 2557 millimeters, change it to represent the distance from the plane of the receivers (which in many cases is the ceiling) to the objects on the floor or below.