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## VK3UM AutoTrack

### Overview

This Program has been developed as a Computer interface for the **VK5DJ Auto Tracking hardware**.

The display and format has been re-created in a Windows format along the same colour lines and features provided in the original DOS VK3UM Auto Tracking program that was first developed in 1984 and used in conjunction with the VK3UM tracking board.

The indicators as used in this program are **US Digital Optical Encoders A2 and A2T**. No other indicator type is supported by this software.

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## Display

### Opening Screen

### The opening Screen Display

The screenshot displays the VK3UM AutoTrack software interface. The main display area shows the following information:

- UTC 24 October 2011
- Large digital clock: 06:09:14
- Moon distance: 361,863 kms ... Loss 0.06 dB Diam ... 0.55° Libration ... 13 Hz
- Source Azimuth: 263.52 (Panel49)
- Source Elevation: -5.70
- Refraction Off
- Indicator Azimuth: 137.9
- Indicator Elevation: 0.2
- Buttons: Auto Track Off, Park
- Control pad with STOP button
- Version: VK3UM Ver 1.31

The right-hand panel contains tracking data:

HOME STATION		VK3UM	
Tikaluna		325m ASL	
24 October 2011	Home - Home		
17:09:14	Doppler Shift		
Local Time	Doppler Shift		
Dec -2.27°	GHA 312.17°	R.A. 11:28:57	
1296 MHz			
Dx Data Base			
DX STATION			
0m ASL			
24 October 2011	Home - Dx		
07:09:14	Doppler Shift		
Dx Local Time	Doppler Shift		
93.07	41.37		
DX Azimuth	DX Elevation		
14566.6 kms	228.7°		
Distance	Bearing		
36	Dx -Dx		
Spatial Off-Set	Doppler Shift		
18.0		15.397	
Transmit Frequency		Rx echo heard here.	
18.0		15.397	
Adjust for Rx Frequency		Tx this Freq to net.	

On screen help is provided when hovering over the various panels.

Screen size can be adjusted by taking the bottom left corner of the display and dragging it to fit your display size

or

Clicking on the resize button (center button below)



will enable you to totally fill the screen commensurate with your monitor display.

### Screen Options



- **Tracking Objects** .. takes you to an Object Tracking Selection screen where you can choose Noise, Quiet or Planet Objects.
- **Set Up** .. takes you to the Set Up Screen. (refer Set Up Screen Help)
- **Comport** .. provides set up of Comport and functions (refer Initial Set Up procedure)
- **Help** .. This Help document.
- **About** .. Author and Version of Build and Date.
- **Exit** .. closes program.

## Opening Screen Display Functions

- the **white numerical** display is the Universal Time Coordinated
- the **yellow numerical** display is the Azimuth and elevation of the Moon or Sun as selected.
- the **blue numerical** display is the Home Azimuth and Elevation indicators.
- clicking on the grey **Moon distance / loss / Diameter** display will change to the Sun as source object or vice versa.
- clicking on **Refraction** Off or On will change the refraction calculation as displayed.
- the **Home Station** provides all the information pertaining to your location .. refer Initial Set Up procedure.
- the **Dx Station** provides all the information pertaining to that location .. refer Initial Set Up procedure  
note.. the Moon needs to be above the horizon to provide relative calculation where appropriate.
- the blue **Auto Track** and **Park** panels provide selection of these functions
- the arrows provide **manual control of the motor** functions noting:  
**stop will turn off both motors if running or,**  
**clicking any where on the screen, hitting the space bar or any other key will**  
**stop all motors**

## Opening Screen Engineering Functions



**Dx Data Base**

The grey **Dx Data Base** panel allows for the selection of Home or Dx locations as well as entering your specific location data.

The **Up / Down Arrows** allow for offsetting the program computer time to check functions when the object source is below the horizon.

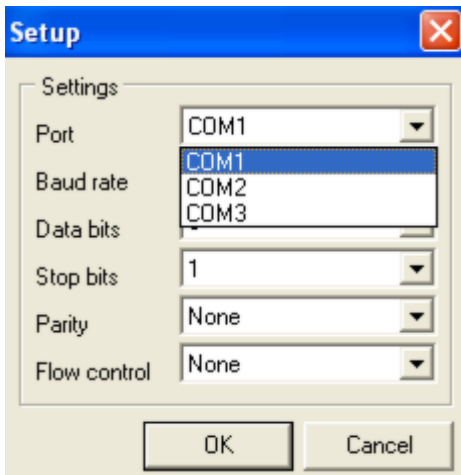
The **Reset** button provides **updating of time and other data functions** direct to the VK5DJ interface.

## Initial Set Up procedure

### Select the Com Port

The VK5DJ interface controller requires a Serial Com Port. This may be provided by a standard Serial Com Port available on older computers or if such a port is not available then a USB to serial adaptor is necessary.

The program upon initializing will look for a serial port and you may select the appropriate Com Port as connected to the VK5DJ Controller.



In the above example you may have selected Comport (or the program may have initialized with a blank Port) and it shows the active ports available on your computer. Choose the one associated with the VK5DJ interface.

### Display the VK3UM Dx Data Base

Click on this panel

**Dx Data Base**

This shows the bottom of the Dx Data Base listing (scroll down), where you can add your own location.

LOCATION	CALL	UTC	GRID	HiASL	LAD	LAM	LASE	LAS	LOD	LOM	LOSE	LOS
Nebraska	W0 - NE	-6	EN10pt		40	49	0	N	96	41	0	W
Nevada	W7 - NV	-8	DM09ce		39	10	0	N	119	46	0	W
New Hampshire	W1 - NH	-5	FN43ff		43	13	0	N	71	34	0	W
New Jersey	W2 - NJ	-5	FN20pq		40	15	0	N	74	43	0	W
New Mexico	W5 - NM	-7	DM75aq		35	41	0	N	105	57	0	W
New York	W2 - NY	-5	FN32cq		42	40	0	N	73	49	0	W
North Carolina	W4 - NC	-5	FM05qs		35	46	0	N	78	39	0	W
North Dakota	W0 - ND	-7	DN96ot		46	50	0	N	100	48	0	W
Ohio	W8 - OH	-6	EM89ix		39	59	0	N	83	3	0	W
Oklahoma	W5 - OK	-6	EM35fl		35	28	0	N	93	33	0	W
Oregon	W7 - OR	-8	CN84lw		44	57	0	N	123	1	0	W
Pennsylvania	W3 - PA	-5	FN10nq		40	17	0	N	76	54	0	W
Rhode Island	W3 - RI	-5	FN41ht		41	50	0	N	71	25	0	W
South Carolina	W4 - SC	-5	EM94ma		34	0	0	N	81	0	0	W
South Dakota	W4 - SD	-5	DN94tj		44	23	0	N	100	20	0	W
Tennessee	W4 - TN	-7	EM76be		36	10	0	N	85	50	0	W
Texas	W5 - TX	-6	EM10ch		30	18	0	N	97	47	0	W
Utah	W7 - UT	-6	DN40bs		40	45	0	N	111	55	0	W
Vermont	W1 - VT	-7	FN34rq		44	16	0	N	72	34	0	W
Virginia	W4 - VA	-5	CN87to		47	36	0	N	122	20	0	W
Washington	W7 - WA	-5	CN87nb		47	3	0	N	122	53	0	W
West Virginia	W8 - WV	-8	EM98ej		38	23	0	N	81	40	0	W
Wisconsin	W9 - WI	-5	EN53hb		43	4	0	N	89	22	0	W
Wyoming	W7 - WY	-6	DN71od		41	8	44	N	104	48	44	W
-												
USER Additions												
Tikaluna	VK3UM	10	QF22ro	325	37	22	53	S	145	29	51	E
Person	SM2CEW	1	KP15bp		65	43	55	N	22	12	50	E
Talvia Finland	OH2PO	2	KP10xh		60	17	30	N	23	55	20	E
Algonquin	VE3ONT	-6	FN05xw		45	56	45	N	78	2	9	W
Canberra	VK1BG	10	QF44ms		35	14	55	S	149	1	44	E
Berlin	DK0TU	1	JO62pm		52	31	0	N	13	18	0	E
Niedermhausen	DL9KR	1	JO40de		50	11	45	N	8	17	10	E
Pomport	F5VHX	1	JN04ft		44	49	15	N	0	27	50	E
Kyabram	VK3VG	10	QF23mq		36	17	58	S	145	3	30	E
Talmans Hill	VK7MO	10	QE37pc		42	54	28	S	147	18	13	E
Millicent	VK5DJ	9.5	QF02ek	10	37	35	18	S	140	21	11	E
San Font	EA6VQ	1	JM19mp	120	39	38	44	N	3	2	30	E
Hatherleigh	VK5MC	9.5	QF02dm	20	37	28	34.9	S	140	15	44.6	E
Jamesburg	W6 - CA	-8	CM96ej		36	24	11	N	121	38	50	W
Parkes	VK2	10	QF47ca		32	59	59	S	148	14	44	E
Island Magee	MJ/DL1YM	0	IO74du	0	54	51	25	N	5	42	50	W

## Set up your Home Station

You may either choose a default QTH from the VK3UM Data Base or enter your own QTH into the VK3UM Data Base.

1. Click on the grey Dx Data Base button
2. Scroll down the Data Base and choose a QTH that is closest to your own
3. Highlight the chosen QTH and click Home selection .. this QTH becomes your Home Station

or

1. Click on the grey Dx Data Base button
2. Scroll down to the *very end of the VK3UM Data Base*
3. On a new line *enter you own QTH details* as per the format
4. Save the Data base (top center button)
5. Choose this QTH as your Home Selection (left hand top button) .. .. this new QTH

becomes your Home Station

## Set up your Dx default Station

1. Click on the grey Dx Data Base button
2. Scroll down the Data Base and choose a default Dx QTH.
3. Click on Dx selection .. this becomes your default Dx QTH on program initialisation.

or

1. Click on Delete Dx Selection and any previously selected Dx Station will be removed from the screen.

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## Tracking Objects Screen

Object	Azimuth	Elevation	R A	Declination	GHA
Sagittarius A	86.15	57.79	17.76	-29.02	177.04
Cassiopeia A	40.58	-47.45	23.39	58.80	92.60
Cygnus A	46.95	-11.48	19.99	40.73	143.59
Taurus A	252.61	-56.44	5.57	22.01	359.83
Virgo A	313.74	26.95	12.51	12.39	255.75
Centaurus A	246.31	68.30	13.43	-43.00	242.08
Orion M42	224.93	-36.29	5.59	-5.38	359.64
M17 NGC6618	75.11	44.07	18.35	-15.99	168.26
Perseus A	349.77	-85.79	3.33	41.51	33.51
Aquarius	101.51	-14.63	22.50	0.00	105.96
Leo	287.74	2.71	10.14	12.31	291.34
Pictor	203.02	-2.23	5.50	-44.99	0.96
User RA/Dec	117.86	-31.44	0.00	0.00	83.46
Mercury	287.74	19.02	10.96	1.78	278.78
Venus	307.09	52.81	13.28	-11.19	243.94
Mars	309.06	48.94	13.18	-7.41	245.45
Jupiter	120.22	-31.93	0.10	-1.05	81.67
Saturn	302.21	34.18	12.28	0.54	258.93
Uranus	119.00	-31.45	0.03	-0.67	82.76
Neptune	106.46	0.39	21.90	-13.25	114.65

Save User RA/Dec    Select Tracking Object by clicking over Object Name.    Decimal Hours Selected

- **Selection of an Object for tracking.** Click over object (eg Cygnus A)  
The screen will close and re open the Main Tracking screen where the selected object will replace the Moon or Sun previously selected.  
To return to the Moon or Sun as the tracking object click over the object name on the main screen.
- **User RA/Dec ..** The default setting is RA 0.00 and Dec 0.00. The user may change either of these values to suit an object of known co-ordinates by over typing the above values
- **Save User RA/Dec ..** this option saves the above changed RA/Dec co-ordinates as the new default
- **Decimal Hours Selected ..** this option changes from decimal hours to display hours, minutes and seconds.

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## Setup [Screen options]

### Set Up [Screen options]

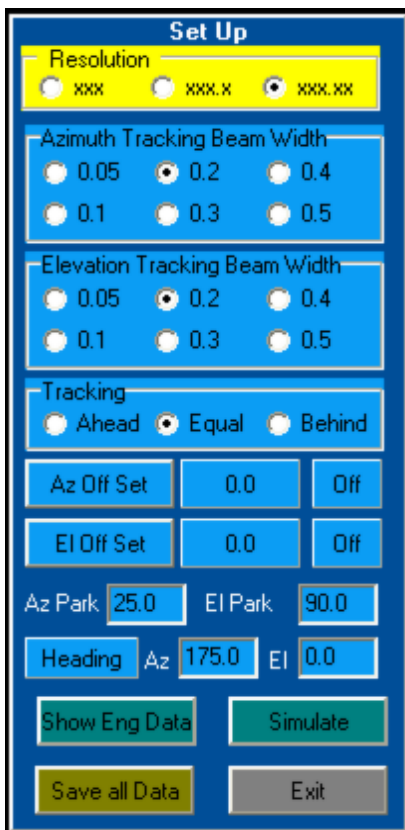


The **Up / Down Arrows** allow for offsetting the program computer time to check functions when the object source is below the horizon.

The **Hour panel** is the computer time offset set by the up/down hour arrows.

The grey **Dx Data Base** panel allows for the selection of Home or Dx locations as well as entering your specific location data.

The **Reset** button provides updating of time and other data functions direct to the VK5DJ interface.



- **Screen Resolution.** Yellow Panel. This provides for the selection of the numerical screen display. The user may select Degree, Degrees + single digit decimal or two digit decimal displays.
- **Azimuth Tracking Beamwidth.** The user may choose the actual window where the motor will start and stop relative to the Object Source. If 0.2 is selected then the motor will start when the source is greater than 0.2 degrees offset from the indicator.
- **Elevation Tracking Beamwidth.** As above for the elevation motor control.
- **Tracking.** Commensurate with the Azimuth and Elevation Tracking Beamwidth settings the motors will stop at that value before, equal or ahead of the source position relative to the indicator positions.
- **Az Off set.** Clicking on this panel will provide the offset between the actual source

position and the indicator position. This function may be used when offset feeds are used that differ in their true positioning of the feed. You may initiate this offset tracking function by clicking on the Off button.

Double right clicking over the offset degree display will reset the off set back to zero.

- **EI Off set** . Same as above for elevation tracking.
- **Az and EI Park panels**. Enter your Antennae Park positions as required.
- **Heading Azimuth and Elevation**. Clicking on Heading button will drive the array to the position input in the Az and EI panels. The Author uses this function to position the Dish over the Feed Access Platform.
- **Simulate button**. This is an engineering programmer function to check tracking functions.
- **Show Eng Data**. This will display multiple engineering panel displays in association with the simulate button function
- **Save all Data**.. This will save all the above presets and functions.
- **Exit**. closes the Set Up Screen

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## Author and Acknowledgements

This Program has been jointly developed with John Drew VK5DJ to interface the VK5DJ Auto Tracking hardware.

This program is written by Doug McArthur (VK3UM) ©

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