Vector V2
Product Manual

Manual Version 1.3.0

Vector V2

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Table of Contents

Part 1 Welcome to Vector 5

Part 2 Safety Notice 6

Part 3 Installation 7

1 Login 8
2 Configuring the Network 9
Setting the IP address in Windows XP 9
Setting the Network IP address in Vista 10

Part 4 Terminology 12

Part 5 Keyboard Shortcuts 15

Part 6 Screen Overview 17

1 Channel View 18
2 Show Overview 22
3 Cue Information 24
4 Shortcuts 26

Part 7 Channel Setup 27

1 Adding Channels 28
2 Deleting Channels 29
3 Setup 30
4 Motion Settings 32
5 Encoder 34
Encoder Scaling 34
6 Parameters 37
7 Firmware 38
8 Loadcell 39
9 Personalities 40
10 Revovle Mode 42

Part 8 Options 43

1 Access & Security 44
2 Settings 46

Part 9 Manual Operation 47

1 Running Individual Channels 48
2 Running Groups of Channels 49

Part 10 Editing Shows 50

1 Cue Editing 51
2 Select Channels 52
3 Cue Linking 54
Creating a Cue Sequence 55
Adding a Time Delay 55
Adding Positional Triggering 55
Creating a Looped Sequence 55
4 Using the Palette 57
Presets 58
Profiles 59
Groups 61

Part 11 Running Shows 63

1 Playbacks 64
2 Active vs Simulation 65

Part 12 Tilt Calculator 66

1 Screen View 67
2 Setting Co-ordinates 70
3 Tilt Calculation 71
4 Creating a Tilt Cue 72
5 Drag and Drop Position Fields 73
6 Saving Information 74

Part 13 Contact Information 75

1 Feedback 76

Part 14 Product Manuals 77

1 Micro Transform 78

1 Welcome to Vector

Manual Version 1.3.0 for Vector version 2.1 and later.

Vector is a fully featured motion control sequencing system capable of controlling both variable and fixed speed devices. It incorporates both cue editing and running facilities for ease of programming and use during a show. It also incorporates a comprehensive manual running section that allows quick and easy movement of individual or grouped devices.

Channels can be defined with default settings, software limits, unique names and drive configuration settings. This allows a system to be in a position to accurately control devices within a very short period of time. Essential for touring shows or applications where a lot of other aspects rely on the motion system being available.

Cues can be created with some very flexible functions including built in including stagger starts and time-priority running. This allows advanced cues to be created without the need for multi-level cue sequences or several separate timers. When cue sequences are required they can be setup quickly using powerful linking functions that allow cues to trigger off the start or completion of other cues, the position of another axis, and with time delays and looping facilities as well if required.

The inclusion of presets and profiles allows global positions and global movement settings to be defined. Once defined adjusting the settings of a large number of moves and cues can be as simple as adjusting the settings of the relevant preset or profile and that change will be automatically propagated throughout the entire show file.

Vector incorporates the concept of grouping. This allows several channels to be controlled as if they were one. One consequence of this is that fast selection of multiple channels and one key running and stopping of single or multiple channels becomes very simple and quick. Grouping also offers the option of having elements in a group stop the rest of the group if a fault occurs.

A simulation mode is an integral part of the system. It allows cues to be created and run off-line which in turn creates an opportunity for the safe testing of complex linked cue sequences and channel interaction avoiding potential dangerous clashes between different devices to be identified before anything is moved for real.

Vector is designed to run on Microsoft Windows XP, Windows Vista and Windows 7. All its facilities can be accessed from a standard PC keyboard allowing easy replacement of the control hardware in emergency situations. It employs an instantly recognisable Windows interface to minimise the learning curve and allows the user to customise the layout of the screen to whatever they may find most ergonomic and user-friendly for them.

2 Safety Notice

As in all motion control applications the control software should never be relied upon as the sole means of stopping motion. Alternative, software independent, means of bring all movement to a halt must be provided including a hardware emergency stop system that is compliant with all local regulations.

It is the responsibility of the user to perform a risk assessment for the whole system and to take appropriate action as a consequence of that assessment.

Although Vector provides feedback of the movement of objects a line of sight view of the actual moving pieces should always be ensured. Where necessary additional observers should be employed utilising clear lines of communication to be able to advise the operator of any issues that may arise during the movement of objects.

If in doubt about any aspect of moving objects always seek professional advice.
SAFETY MUST ALWAYS BE THE FIRST PRIORITY!

3 Installation

If the version of Vector that you are using has not been pre-installed by your motion control supplier then you will need to install it yourself. It uses a standard Windows setup program and installation is very quick and straightforward.

When you run the program for the first time you will be greeted with a licensing screen. On the right hand side of the screen is a number showing the days remaining before the software will cease to operate without a correct unlock code being entered. You will also be presented with a license key and a box in which you can enter an unlock code. This box will display itself on startup every time the program is run until the correct unlock code is entered. If you do not wish to enter the unlock code and you have days remaining in the grace period then you can press OK to start running the software.

To get your unlock key you must contact the company that supplied you with the software and quote them the license code that is displayed on the screen. They will supply you with an unlock key that must be entered into the appropriate box before clicking on OK. If the key is correct a message will be displayed to tell you that the software is now licensed. Please be aware that the unlock code that you will be supplied will be specific to the machine the software has been installed on and installing it on further machines may require the purchase of further licenses.

From version 2.1 Vector can be licensed in three modes as follows. The mode that Vector has been licensed to operate in is shown in the title Bar at the top left of the Vector screen.

DEMO Mode

In Demo mode Vector will always be in simulation mode and will never be able to communicate with devices. Simulation mode is indicated by colouring the background of the channel status yellow.

WORKSHOP Mode

In workshop mode Vector, can communicate with devices in manual mode but as soon as Cue mode is selected the software switches into Simulation mode. This mode is designed to be used in workshops to test and configure Kinesys equipment. It is not intended or licensed to be used used to operate shows.

FULL Mode

In full mode Vector will run with no restrictions.

3.1 Login

A login procedure must be completed before Vector can be used. This is done to ensure that unauthorised personnel cannot gain access to the system and also to provide different levels of access to different users. Three levels of access are possible. Operator, Programmer and Administrator.

Administrator

By default the administrator has permissions to control all aspects of the program. Only the administrator can set the permissions for the programmer and operator and can change passwords. All this is done from the "Access & Security" tab in the Options window.

Programmer

The Programmer has permissions to edit cues as well as run them by default. They can also edit some aspects of the channel properties. They cannot change their login password and they cannot change their own permissions.

Operator

The Operator has similar default permissions to the Programmer but can only run cues and cannot edit them. If you wish to change the permissions for Operators then log in as Administrator to do so.

Default Passwords

When the program is first installed separate passwords are setup for the three different access levels. The default password is the same as the login name but in lower case. So to log in as Operator use the password "operator" and as Programmer use "programmer" etc. It is recommended that you change these passwords as soon as possible to maintain security. If the passwords for the operator or programmer have been forgotten they can be viewed in plain text by the administrator in the Options window. If users logged in as Programmer or Operator try to access these passwords they will be shown as asterisks to maintain security.

3.2 Configuring the Network

Vector requires that the computer it is running on has an Ethernet network adapter setup for a fixed IP address in the range 192.168.18.x where x is the specific address of the computer. The IP address of the computer should be unique, you cannot have two devices on the network with the same IP address. Traditionally IP addresses for Kinesys products are allocated as shown below.

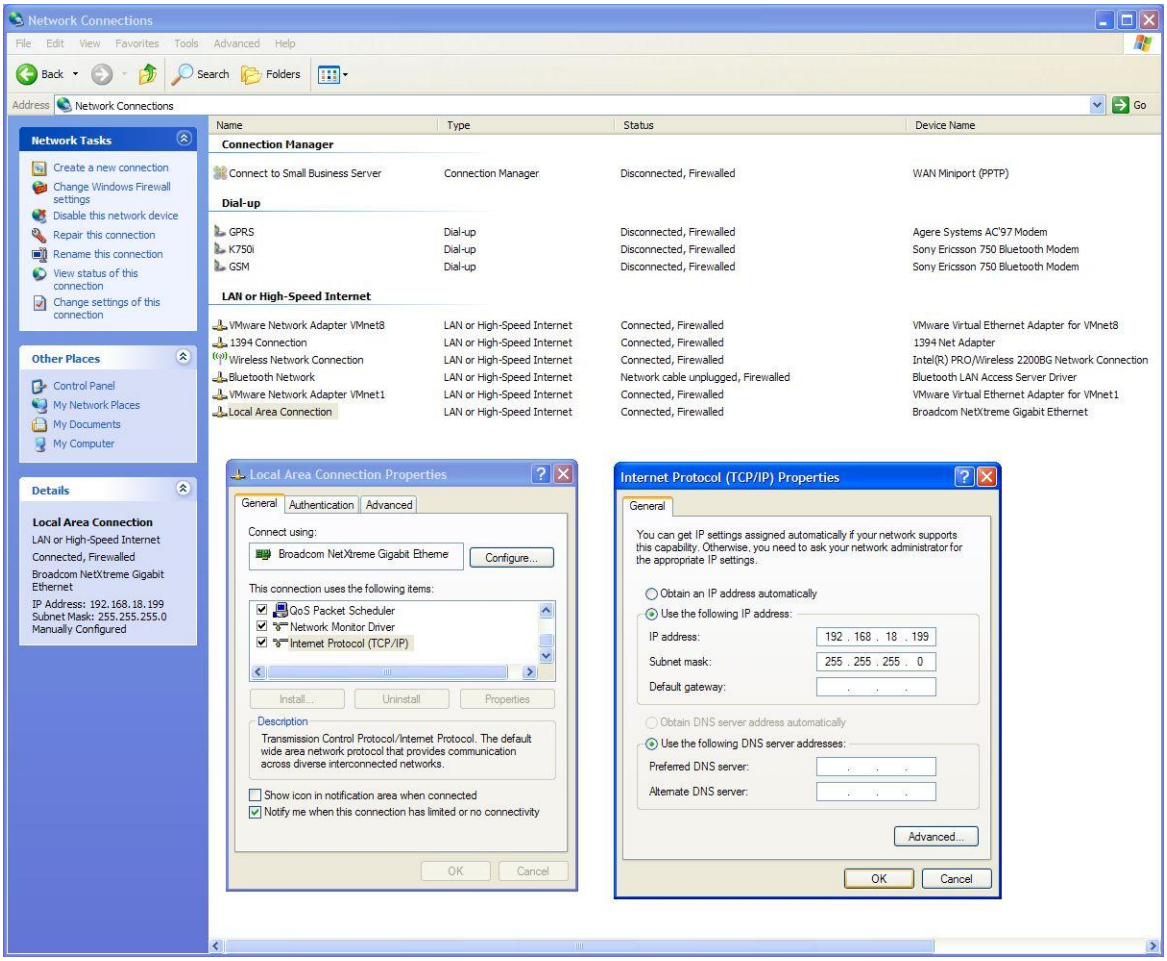
IP Range	Product	Notes
192.168.18.1 to 192.168.18.50	Velocity Drives	
192.168.18.51	Micro Transform 1	This is the default address for a Micro Transform, which is used to interface to Elevation1+ controllers
192.168.18.52	Micro Transform 2	
192.168.18.53	Micro Transform 3	
192.168.18.54 to 192.168.18.58	Micro Transform 4 to Micro Transform 8	If the Micro Transform is using firmware version 4 or greater then up to 8 units can be addressed.
192.168.18.61	Elevation 24	This is the default address for an Elevation24 controller.
192.168.18.61 to 192.168.18.81	Smart8	This is the address range allocated for Smart8 controllers
192.168.18.100 to 192.168.18.199	Control Computers	Contact Kinesys to determine what your exact IP address should be. But as long as there is only one computer on your network any address in this range should work.

3.2.1 Setting the IP address in Windows XP

On Windows XP go to the control Panel and select Network Connections. Select the network adapter that you want to change the IP address of. Usually this will be called something like “Local Area Connection”. Right click on the selected network adapter and scroll down the box marked “This connection uses the following items:” until you reach the heading “Internet Protocol (TCP/IP)”. Now press the properties button.

Within the Internet Protocol (TCP/IP) Properties window select “Use the following IP

address" and type in your required address. In the example shown below the IP address entered was 192.168.18.199. Next ensure that the subnet mask has the value 255.255.255.0. Now press OK on this window and the previous window. You should now have changed the IP address of the computer to 192.168.18.199.



3.2.2 Setting the Network IP address in Vista

1. Open Network Connections by clicking the Start button , clicking Control Panel, clicking Network and Internet, clicking Network and Sharing Center, and then clicking Manage network connections.

2. Right-click the connection that you want to change, and then click Properties. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

3. Click the Networking tab. Under This connection uses the following items, click Internet Protocol Version 4 (TCP/IPv4), and then click Properties.

4. Click Use the following IP address, and then, in the IP address box type the desired IP

address for example 192.168.18.199, in the Subnet mask type the subnet mask 255.255.255.0. You can leave the Default gateway box empty.

4 Terminology

Accel
Accel defines the rate that the object will accelerate at. It is units of mm/s/s and is a constant acceleration rate that will not change if you change the speed value in the move.

Alarms
Alarms is an optional feature that allows external digital inputs to monitored for the purposes of quick diagnosis of external switches and sensors. It communicates with external input readers using the communications protocol that is defined in the options window.

Channels
A channel represents a single controlled axis. It can be any linear device that is capable of being moved to a position and of giving positional feedback about its position.

Copy
The copy function stores the information contained in the copied cue into an internal cue clipboard. All the moves stored within the cue will be saved. However link information is reset so that when it is pasted back into the show it will show as a root cue.

Cues
A cue is a collection of moves. Cues can either be standalone in the case of un-linked root cues or can be part of a larger cue sequence. Cue sequences have cues that are linked from each other and can be made to loop back to the beginning of the sequence if desired. All cue sequences have one root cue which is the cue that starts off the sequence.

Preset
A preset is a global position that can be used instead of writing in a number when assigning a position to a move. A preset consists of a name and a position. The position can be changed whenever is needed and the corresponding position is then applied to all moves that use that preset name as their target reference.

Decel
Decel defines the rate that the object will decelerate at. It is units of mm/s/s and is a constant deceleration rate that will not change if you change the speed value in the move.

Delay
Delay allows individual moves within a cue to be delayed to create a staggered start when the cue is started running. It is displayed and entered in units of seconds but will allow values with an accuracy of two decimal places to be added (hundredths of a

second).

Group
Grouping allows multiple channels to be selected quickly. Once channels are grouped they can be run or selected in groups which allows for quick cue creation and quick manual running

Link
Links describe the conditions under which a cue will start. Every cue has a link that defines its trigger characteristics. The default settings for a link are to attach it to the root as a stand-alone cue and to assign it to the red playback. Changes to a cues link are done by highlighting the cue which you want to edit and then clicking on Link Functions.

Load
Before a cue or cue sequence can be run it must be loaded into a playback. The load button is used to do this.

Loops
Cue sequences can be set up to loop back to the beginning after certain predefined conditions are met. Loops can be set as continuous, repeat limited or time limited. Only one loop can be used per cue sequence and loops will not be allowed on stand-alone cues.

Move
A move describes the motion of a single channel from start position to end position. It defines the target position, the ramp rates and either the speed it must travel at or the time it must take to complete. In addition each move can have a delay which allows its start to be delayed from the start of the cue that contains it.

Paste
A cue copied to the clipboard can be pasted back into the show, either as a new cue or to replace an existing cue. The cue will be reinserted as a root cue irrelevant of the link information it previously contained, it will however maintain its original playback assignment.

Playback
A playback is the tool that is used to control the execution of cues. Every cue or cue sequence is assigned to one of four coloured playbacks. Each playback has a start and a stop key. A cue must first be loaded into the playback and then it can be started or stopped at any time after that. If a cue is stopped in a playback then it must be reloaded before it can be run again. The start key in the playback is also used to control the progress of a cue sequence when certain cues within the sequence are set to load and pause. This requires you to press the start key to run that particular section of the sequence and allows a sequence to be broken down into manageable

sections without the need to stop or start the whole sequence.

Profile
A profile is a global speed definition that can be used instead of writing in an acceleration, speed and deceleration when assigning these details to a move. A profile consists of a name, acceleration, speed and a deceleration. The details can be changed whenever is needed and the corresponding fields are then applied to all moves that use that profile name.

Speed
Speed is defined in units of millimetres per second. It defines the maximum speed that a channel will reach during the execution of a move. In some circumstances (e.g. when the start and target positions are very close together) the target speed may not be reached as the device will have to start decelerating before it reaches full speed.

Target
Target is the position that an channel will attempt to reach when the move that it is defined in is executed. It is defined in units of millimetres and is an absolute position and NOT a relative position. This means that the direction that a channel will travel when run is dependant on whether the current position is greater or less than the target position.

Time
In some circumstances it may be desirable to state that a cue should complete in a set time instead of at a set speed. This is especially useful when the start position of the channel cannot be guaranteed. If a time is defined within a move then it will take priority over any speed that may have previously been defined.

5 Keyboard Shortcuts

Vector is designed to be operated with either a laptop or PC computer keyboard. All the normal Windows conventions are used for open, save, copy and paste etc. In addition Vector uses additional key shortcuts to enable all move commands to be issued from tactile keys instead of from a mouse click. Tables summarising the shortcuts used by Vector are shown below.

Windows Commands	Key Combination	Notes
New File	Ctrl+N	
Open File	Ctrl+O	
Save File	Ctrl+S	
Exit	Alt+F4	
Edit Commands		
Copy Cue	Ctrl+C	
Paste Cue	Ctrl+V	
Paste As New Cue	Ctrl+Ins	
Navigation Commands		
Channel Up	Up Cursor	
Channel Down	Down Cursor	
Previous Cue	Page Up	
Next Cue	Page Down	
First Cue	Home	
Last Cue	End	
Run Commands		
All Stop	Space	
Cue Load	F12	Moves the system into running mode if in editing mode when pressed
Red Playback Start	F1	
Red Playback Stop	F2	
Blue Playback Start	F3	
Blue Playback Stop	F4	
Green Playback Start	F5	
Green Playback	F6	

Stop		
Yellow Playback Start	F7	
Yellow Playback Stop	F8	
Manual Channel Up	F9	
Manual Channel Down	F10	
Manual Channel Stop	F11	
Manual Group Up	Shift+F9	
Manual Group Down	Shift+F10	
Manual Group Stop	Shift+F11	
Special Commands		
Dead Mans Handle	Ctrl	Press and hold during duration of move
Manual Channel Up (ignore Faults)	Alt + F9	Will allow movement even if other channels in a group show faults
Manual Channel Down (ignore Faults)	Alt + F10	Will allow movement even if other channels in a group show faults
Manual Group Up (ignore Faults)	Alt + Shift + F9	Will allow movement even if other channels in a group show faults
Manual Group Down (ignore Faults)	Alt + Shift + F10	Will allow movement even if other channels in a group show faults

6 Screen Overview

The main screen is made up of four main windows, Channel View, Show Overview, Cue Information and Shortcuts. These windows are always present on the screen and cannot be closed although they can be resized and moved to whatever shape and orientation suits the user and the configuration of the show best. The window sizes and positions are stored by the software when it is shutdown and restored again on start up. If you are running the software for the first time then the windows will go to default positions initially.

In addition to these four core screens a number of other screens are available to the user to allow different aspects of the system to be configured as well as to allow cues to be created, edited and run. All the common functions needed to create shows are accessible from the shortcut window and the more advanced and less common features can be accessed from the menus available at the top of the screen.

6.1 Channel View

The Channel Properties window displays all the information about channel names positions, comms status for that channel and any moves that may be contained in the current cue. As can be seen in the screen shot channels can be put in any order and can be arranged to leave gaps in the grid for easy grouping of channels. The meaning of the different columns within the grid are explained below after information about how to navigate around the grid and how to enter data.

	Name	Position	Target	Accel	Speed	Decel	Time	Delay	Weight	Status
1	Channel 1	0	1234	100	100	100	13.3	0	0	No Comms
2	Channel 2	0	1234	100	100	100	13.3	0	0	No Comms
3	Channel 3	0	1234	100	100	100	13.3	0	0	No Comms
4	Channel 4	0	1234	100	100	100	13.3	0	0	No Comms
5	Channel 5	0	1234	100	100	100	13.3	0	0	No Comms
6	Channel 6	0	1234	100	100	100	13.3	0	0	No Comms
7	Channel 7	0	1234	100	100	100	13.3	0	0	No Comms
8	Channel 8	0	1234	100	100	100	13.3	0	0	No Comms

Grid Navigation

You can move the highlight box around the grid by using the cursor keys. Pressing Enter will cause the box to move down one channel and pressing Tab will cause it to move one column to the right. You cannot move the box into the name or position columns as they are read only. If you move up and down channels then the system will automatically jump empty rows. Similarly if you click into an empty row then the system will automatically move the selection to a row with a channel in it.

Entering Information into the Grid

To change the data entered into a cell in the grid or to enter new information into an empty cell simply move to the correct cell and start typing. The box will turn turquoise and what you are typing will appear in the box. Once you have finished entering the data simply press Enter or Tab to store the information and move to the next cell. If you press Escape or click on another cell then the edit box will disappear and the original data, if any, will be restored. The format and range of the numbers that can be entered changes depending on which cell is being edited and the details for this can be found below.

Name

This column is read only and simply holds the name of the channel. Normally the name is displayed in white with a black background. The text will change to black with a violet background if that channel is the currently selected channel. This is shown above with row 30, Roll Drop 12 The final option is for violet text with a black background as shown above with row 22, Roll Drop 4. This indicates that this channel is part of a group that includes the current channel. This makes it very easy to see which channels will move if the group run commands are executed.

Position

This column simply shows the current position of each channel. Again it is read only. On startup the system will attempt to setup communications with all the channels. If this fails then a current position of zero is displayed. Otherwise the position as reported by the device on that channel will be shown. The exception to this is when the system is put into simulation mode. In this case a virtual position will be shown that will start off the same as the current position but will change as simulated movements are performed. The current position will be refreshed when the system is put back into active mode.

Target

As the name suggests this column displays the target position that has been programmed for a particular channel. Only channels with moves in the currently displayed cue will have data in this cell. The cell will normally display white text. However if the text is displayed in turquoise then this indicates that the target shown is outside the software limits. If the cue is run with the target left like this then the target position sent to the device will be adjusted automatically by the system to prevent the device running outside its limits. The target can be either positive or negative and is limited to 7 characters. This corresponds to a maximum value of 9,999,999 mm and a minimum of -999,999.

Accel

The acceleration rate is in units of mm/s/s. Only positive numbers should be entered and care should be taken to ensure that safe values are entered. Values are rarely needed outside of the range of 100 to 1000.

Speed

The speed is defined in units of mm/s. Only positive numbers should be entered and care must be taken to ensure that speeds greater than the maximum design speed of the attached device are not entered. If the text is shown in white then the move will have speed priority, which means that the device will travel at the entered speed towards its target. There are two exceptions to this. Firstly if the target is so close to the current position that there is not sufficient distance for the device to reach speed before it has to decelerate to its target position. The second is when the move has time priority. If this is the case then the speed will be displayed in grey text and the value will change as the distance between the current and target position changes. See the entry below for the time column for more information on time priority.

Decel

The deceleration rate is in units of mm/s/s. Only positive numbers should be entered and care should be taken to ensure that safe values are entered. Values are rarely needed outside of the range of 100 to 1000.

Time

The time is shown in seconds. By default this value is shown with grey text. This

indicates that the move has speed priority. In this case the value displayed in the time display is the time the device will take to travel from its current position to the target position based on the speed and ramp values entered. If you want to force how long the device will take to complete the move you can enter a value into the time field. This will change the move to a time priority move and will change the text colour to white. The system will now automatically adjust the speed value in the move to ensure that the time of travel will be what you have specified. The exception to this is when the distance between the two positions is so great that the move cannot be completed in the time specified based on the ramp rates that have been entered. In this case you either need to enter a longer time period or make the ramps faster. Please note that the time you enter is the time taken from the moment the device starts moving. Therefore if you include a delay in the move then the total move time will be the sum of the time value and the delay value. Although the time value is displayed to a resolution of 0.1 seconds values can only be entered in whole seconds.

Weight

This column is used to display the weight of the load for a channel. A none zero value is only displayed here if the channel has a load cell associated with it.

Status

The status field has a dual function. The colour of the background indicates the state of the communications for that particular channel and the text provides feedback as to what the device is doing.

Comms Status: The background can be either red, yellow or green.

Green indicates good comms between the computer and the device.
Red indicates no communications at all.
Yellow indicates intermittent comms, unknown comms error or the channel is switched to offline mode.

Devices that are turned off will show a red background and it should be noted that any offline devices have a negative effect on the overall comms speed to the other devices. In cases where you know a device will be offline for a long period it may be appropriate to make a copy of the show file and within that copy delete the channel in question. If a device is turned back on while the system is running then the colour will automatically change from red to green once comms has been re-established.

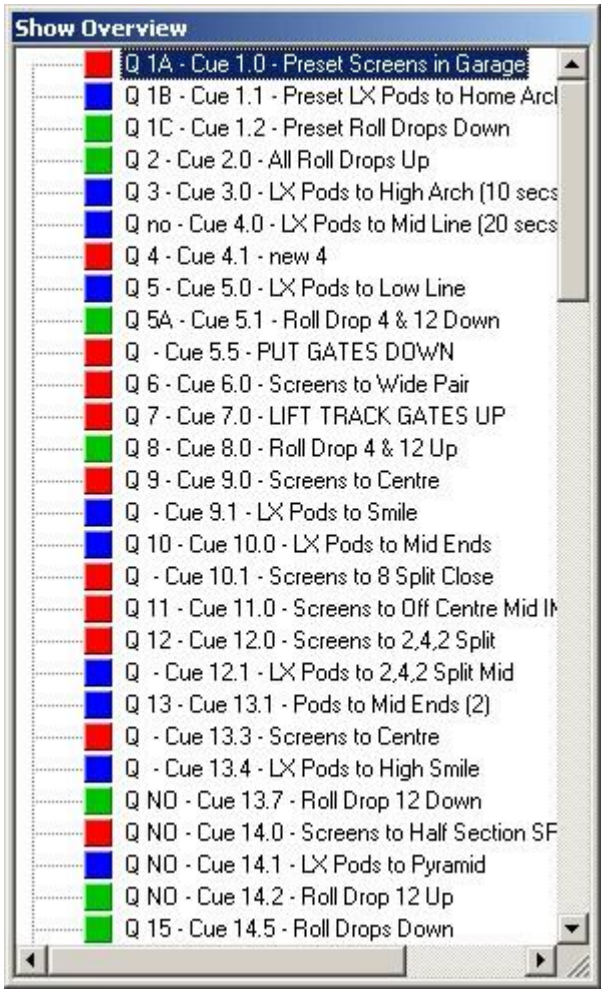
Device Status: Several messages are possible in this field and they are listed below. In the case of a drive fault message double-clicking on the field at fault will bring up a box describing the fault code that is being reported and if it is known the manufacturers description of the fault. This can help quick diagnosis of the problem.

- OK

- Moving Up
- Moving Down
- DMH (Dead Mans Handle not pressed)
- Remote Manual (A switch external to the drive has been set to manual running, computer move commands will be ignored)
- Local Manual (The manual switch on the drive has been set, computer move commands will be ignored)
- Disabled (The device is still on but has been put into a safe state that will prevent movement, this is not a full estop state)
- Drive Fault (The drive has tripped on a fault or maybe turned off)

6.2 Show Overview

The Show Overview window displays a list of all the cues currently created in the show file. It shows their cue number and name and also the colour of playback that they have been assigned to. It also shows the state of different cues be they stopped, paused or running. It is also possible to the get the window to display every move within every cue this can be useful for getting the fuller picture of what a cue will do.



All the cues are stored in ascending numeric order. The cue details shown are a combination of the cue number, the short show cue note and the cue name. The window is automatically refreshed whenever any of these elements are changed on a cue.

Cue sequences are shown in the same way that sub folders are shown within Windows Explorer. If a cue has other cues linked to it then a plus sign will be shown next to the description and clicking on that will display the cues stored beneath it. By default all cue sequences are shown fully expanded.

All the moves in the cues can be shown by double-clicking on an empty area within the

window that does not contain cue text. Alternatively there is a menu option within the View menu that allows this display to be toggled.

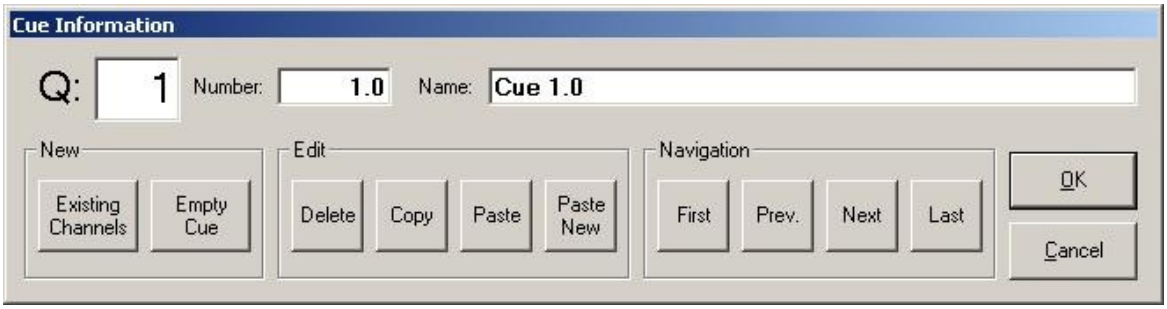
The coloured symbol next to the cue description indicates both the state of the cue and the playback to which it is assigned. While the system is in editing mode these will all be shown as squares to indicate a stopped state. Once a cue is loaded into a playback a pause symbol will be shown in its place and once the cue is running that in turn is replaced by a 'play' symbol to indicate that it is running.

The blue highlight bar indicates which is the current cue and cue navigation can be achieved by either clicking on a new cue, using the Page Up and Page Down keys or by using the Home and End keys to jump straight to the top or the bottom of the list respectively.

The window itself can be resized at anytime by using the drag handle in the bottom right hand corner. The Show Overview window is one of the systems core windows and as such if it is resized or moved the new size and position will be recorded when the application is shut down and will be reinstated when the application is next run.

6.3 Cue Information

The cue information window contains all the function relating to the creation, deletion and editing of cues and their details. During normal execution only the name and number will be useful to the user and so all the functions are disabled by default. To use the window you must first either click on the main area of the window or click on the Cue Functions button on the Shortcut Bar. This will cause the window to jump from its current position to the centre of the screen and also to change shape to allow the user full access to the functions the window offers. It also enables all these controls. The window will stay current until either OK or Cancel are pressed at which point it will return to its original size and shape on the screen.



The three boxes along the top of the window allow the cue to be easily identified. The larger white box at the top left of the window is an optional field and allows you to give the cue a short, three character, name. This is especially useful when the final order of cues has been agreed in the show and cue numbers are then finally assigned to the them. The show cue number can then be entered in this box and will be easy to see without having to change the cue number and therefore the position of the cue in the overall list.

The cue number must be unique to the show and will determine where in the cue list the cue is displayed. It can be changed at any time if a particular order of cues is required and can have one decimal place. The number must be less than 100,000.0 and greater than 0.1.

The final text field allows the user to give the cue a descriptive name and allows the cue to be easily identified when scrolling through a list. The name does not have to be unique, for example if the user chooses to repeat a cue several times in a show then this is allowed.

New Cues

Cues are created from this window and can be done with or without preset moves. If the user wishes to create a new cue that uses the same channels as the current cue then clicking on the Existing Channels button will do just that. A new cue will be created with the next available whole number i.e. xx.0 assigned as its cue number and a default name. Moves will also be created on the channels that had moves in the previously current cue. All these moves will use the speeds and ramps laid down in the Channel Properties and will automatically assign the

channels current position as its target position. In this way an entire working cue can be created with a single mouse click and it will effectively be a snapshot of the channels at the moment of the cues creation. Clicking on Empty Cue creates a cue using all the rules described above but does not add any moves to it.

Edit Cues

This section allows the user to delete, copy and paste cues within the show. Clicking on the delete button will bring up a confirmation message firstly and then if you still wish to proceed it will delete the cue. The current cue will then become the next cue in the list or if you have deleted the last cue in the list the cue above it will become the current cue. Copy stores the current cue into an internal clipboard. It stores all the associated moves but resets any link information so that when the cue is pasted it will show as a root cue. Paste will paste the clipboard cue over the top of the current cue. A warning message is displayed before the cue is overwritten. Paste New creates a new cue using the cue number assignment rules outlined above and then pastes the stored cue into that. Copy and Paste use the windows standard Ctrl+C and Ctrl+V shortcuts. The shortcut for Paste New is Ctrl+Ins. Only one cue can be stored in the clipboard at a time although the contents can be overwritten by performing another copy if required.

Navigation

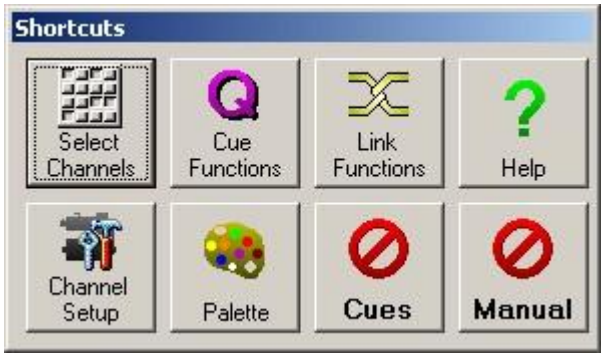
The four navigation buttons mimic the Page Up, Page Down, Home and End buttons. The buttons are disabled when appropriate, for example the First and Prev buttons are disabled if the current cue is the first cue in the list.

OK, Cancel

These buttons act in the traditional manner either accepting or rejecting changes made to the cue. Cancel will not however undelete any cues that have been deleted while the window has been active and also will not remove any cues that were created while the window was active.

6.4 Shortcuts

The Shortcut Bar gives the user quick access to the most commonly used functions of Vector. Like the other core windows on the main screen it can be resized and moved to any part of the screen. Resizing the window causes the buttons to automatically reorder themselves to make best use of the window shape. Six of the buttons are self explanatory and the last two "Cues" and "Manual" are used to turn on and off the movement capabilities of the system.



Cues

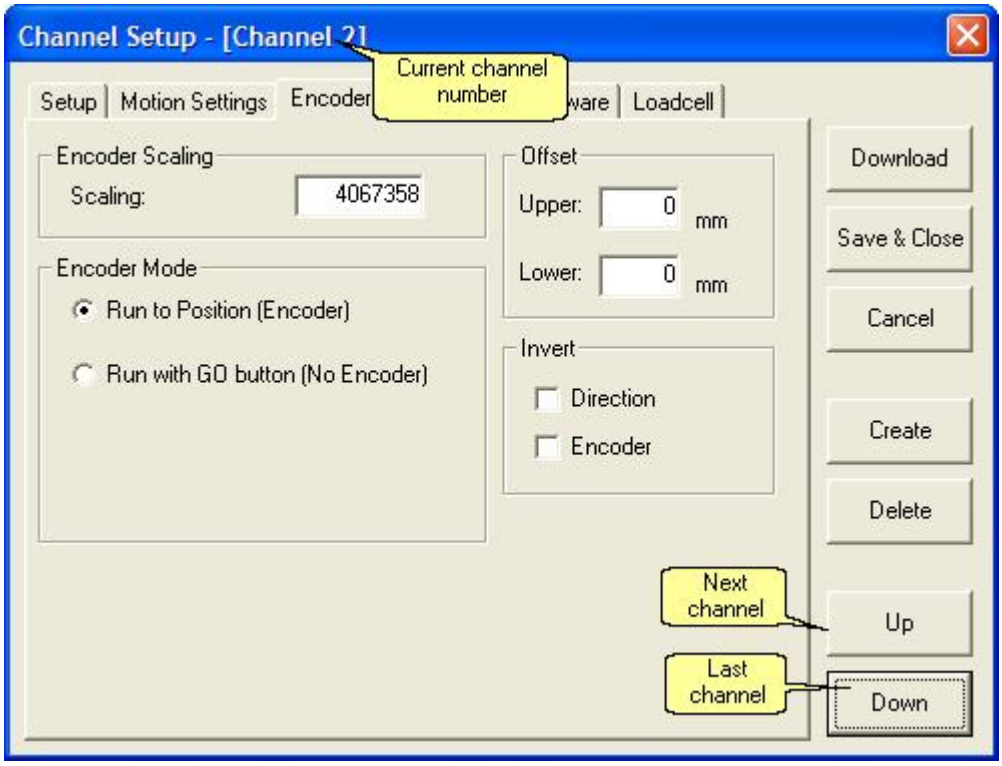
The Cues button on the Shortcut Bar switches the system between editing and running mode. With the 'No Entry' symbol showing the system is in editing mode and all cues can be edited, created and deleted. However cues cannot be loaded into playbacks and cannot be run. If the system is put into running mode the 'No Entry' symbol is replaced with a 'Green Tick' and the button remains pressed in. This turns off all editing features and allows cues to be loaded into playbacks and run. If the system is put into running mode then the Manual button is automatically selected irrespective of what state it was in before.

Manual

This button enables and disables manual running within the system. It will be turned off whenever Vector starts. This allows the manual and group running sections of the system to be used. It can be used while the system is in editing mode or running mode. Whenever the system is switched from editing to running mode the manual running is enabled. Once the system is returned to editing mode the manual button is returned to the state it was in when running mode was initiated.

7 Channel Setup

When the channel setup screen is initially entered the default setup screen is displayed. The channel highlighted in channel view window will become the current channel. Pressing the Up and Down buttons on the screen or using the pg up and pg dn buttons on the keyboard will allow the properties of different channels to be edited.



Channel navigation is very straightforward. Simply press Page Up and Page Down or use the arrow buttons at the bottom of the Channel Properties window. When you are not in the Channel Properties window then the cursor keys will move you between channels or the different fields of a channel while the Page Up and Page Down keys are used to move between cues in the show file.

7.1 Adding Channels

To add channels open the Channel Properties window by clicking on the Channel Setup button on the Shortcut bar. In the lower left hand corner of the screen is a button called Create. If you click on that then a channel will be created with the default settings. It will be assigned to the bottom of the list of channels displayed on the screen and will given the next available communications address by default. It will also be assigned a default name. You will most likely wish to change these settings to ones suited to your show. If you change the position then this will take effect when you press the Download or Create buttons. Any conflicts with channel names, communications addresses etc will be alerted to you when you try and save the changes. A lot of the channel properties are taken up with configuration settings for the machinery and drive that may be attached to your system. You would normally leave these at the settings that they are set to by default.

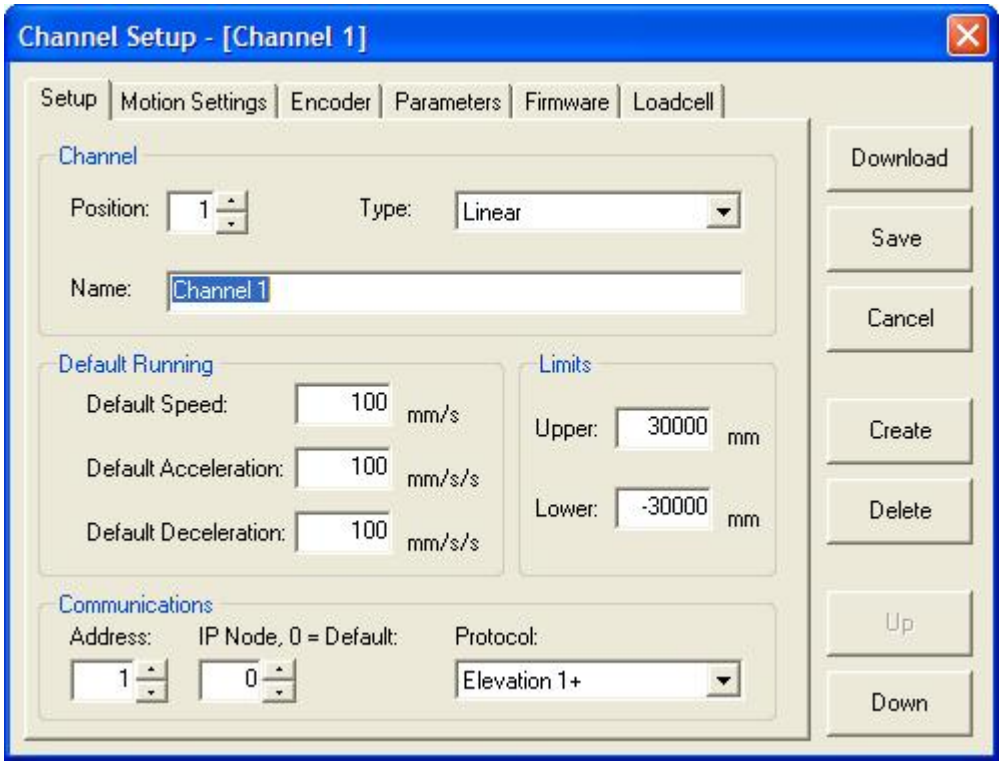
The settings that will affect you most are the upper and lower limits and the default speed, acceleration and deceleration. As the name implies the limits define the range of movement that the device attached can travel through. If you run a channel manually then it is these values that it will travel between. The default speed and ramps are used by the system every time you create a move or use manual running. If you are about to start creating a lot of cues and there is one main speed that the channels will travel at for the majority of the cues it makes sense to set the defaults to that speed. Then when you create a cue with those channels in they will already have the correct values in for speed and ramps.

7.2 Deleting Channels

To delete a channel from a show simply select the channel you wish to delete, open the Channel Properties window and click on Delete. A confirmation message will appear and if you choose Yes then the channel will be deleted. Please note that when a channel is deleted all references to it in the show file are also deleted including any moves that were created for that channel. Simply recreating the channel with the same settings will not restore the moves as well. You will have to go through all the cues in the show and re-enter all the move information.

7.3 Setup

The setup tab of the Channel Properties window allows the user to enter the basic information required by every channel. It determines the name of the channel, its type, and its position in the display. It allows the communications address and protocol to be selected and sets the software limits of travel.



Channel

Position: This number tells the software which row to put the channel on within the channel display window. It must be a unique number within that show as channels cannot share rows.

Type: This allows the channel type to be selected. At present the only supported type is Linear.

Name: This is a descriptive name for the channel that makes it easy to recognise when selecting channels or error messages are being reported.

Default Running

Default Speed, Acceleration, Deceleration: These default settings are used in two ways. Firstly they are the settings that are entered into a move when it is first created. Secondly they are the settings that are used when manually running individual and groups of channels.

Limits

Upper: The upper limit represents the maximum position that the system will allow

the device to travel to. All move requests to positions greater than this are clamped to this value. This value is also downloaded to, and used by, the remote device for position monitoring and safety.

Lower: The lower limit represents the minimum position that the system will allow the device to travel to. All move requests to positions less than this are clamped to this value. This value is also downloaded to, and used by, the remote device for position monitoring and safety.

Communications

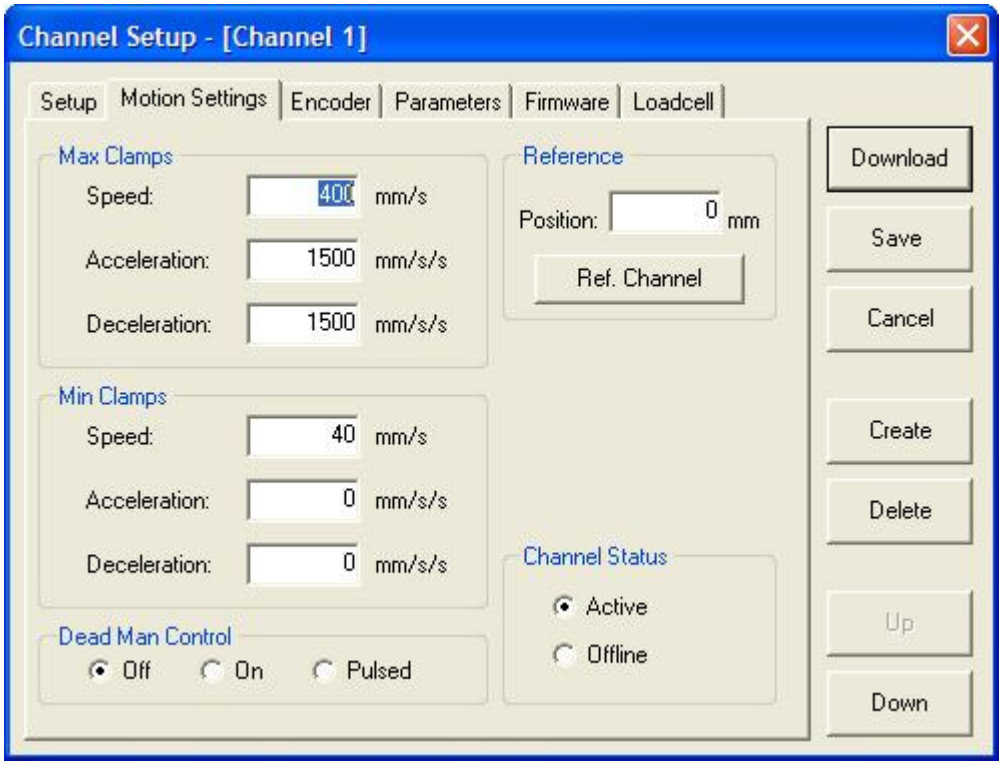
Address: This is the communications address to be used to communicate with the remote position controller. It may or may not be the same address as that of the drive itself. The drive address is set via a field in the drive tab.

IP Node: For Elevation1+ controllers this is the IP address of the required Micro Transform, for other products this is the IP address of the connected device. This field specifies the last digit of the IP address, so a value of 6 would equate to an IP address of 192.168.18,6 If the value is 0 then the default value is used for the associated controller. For Micro Transforms the default value is 51, for smart8 and Elevation24 controllers the default value is 61. Note when the protocol Ethernode is selected then the IP address is ignored as the address field is used to define the IP address.

Protocol: This drop down box contains a list of all the protocols that can be used with the version of Vector stored on the computer. Select the appropriate one for the remote device that you are using.

7.4 Motion Settings

This tab contains all the settings relating to how the channel moves. It also contains the controls to re-reference a channel (change its current position) and include or exclude it from a group. The group setting can also be done from the Palette if preferred.



Max Clamps

Speed, Acceleration, Deceleration: These settings limit the maximum speed that the device can be made to run. They also limit the ramp rates to ensure that violently fast starts and stops cannot be programmed by accident. These settings are dependent on the device being controlled and not all devices will accept these settings. If you cannot change the setting given then they are not used by the system.

Min Clamps

Speed, Acceleration, Deceleration: These settings limit the minimum speed that the device can be made to run. They also limit the ramp rates to ensure that excessively slow starts and stops cannot be programmed by accident. These settings are dependent on the device being controlled and not all devices will accept these settings. If you cannot change the setting given then they are not used by the system.

Reference

Position: The position entered is the one that the channel is set to when the Reference Channel button is pressed. Although positions outside the channels

limits will be accepted by the Vector software some remote devices will reject them if they are outside the current limits. In cases like this it is necessary to open out the limits, download the information and then reference the channel. The limits can then be reset and downloaded.

Dead Man Control

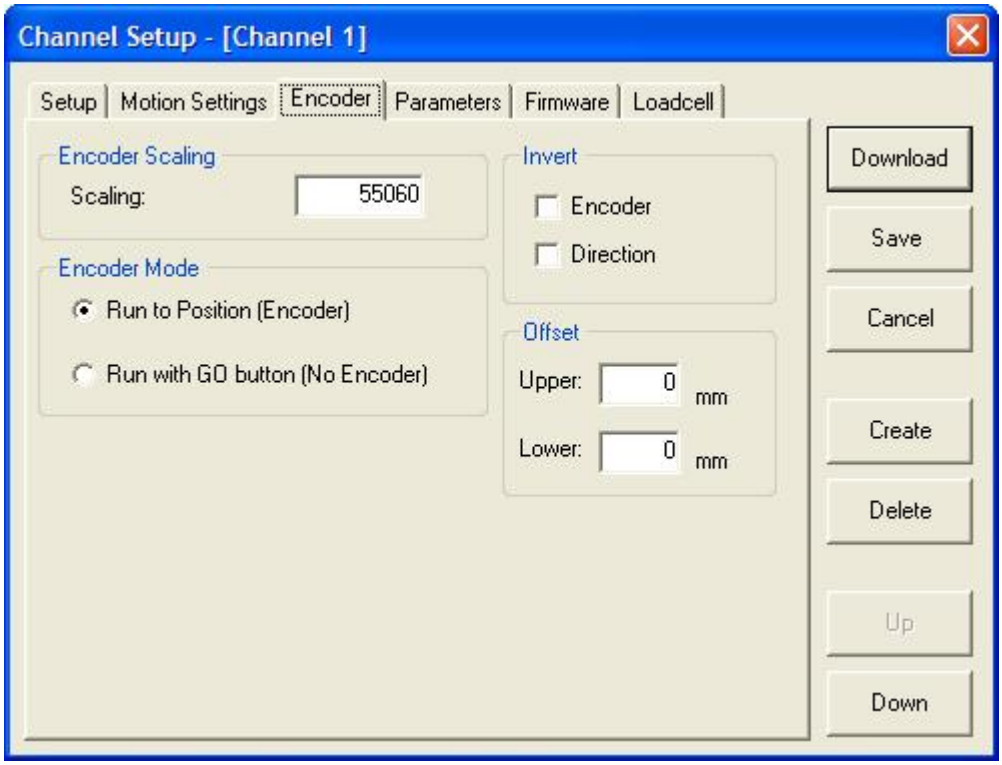
Off, On: A 'dead mans handle' can be implemented on a channel by channel basis. If a channel has this selected then the Ctrl key must be pressed before a move on this channel can be initiated. The Ctrl key must then remain depressed for the duration of the move. Releasing it prematurely will cause a stop command to be sent to that channel.

Channel Status

Active, Offline: If a channel is selected to be offline, then the Vector will not send any movement commands to that channel (It cannot be moved by Vector). The channel will continue to be polled for status information and this information will be updated on the display.

7.5 Encoder

This Tab allows remote configuration of drives. By entering correct information here a drive can calculate its own scaling and conversion factors. Not all remote devices use all the settings on this Tab, but the Encoder scaling will always need to be set.



7.5.1 Encoder Scaling

The encoder scaling parameter converts the number of encoder pulses derived from the hoist to physical distance traveled in millimeters. This value is calculated differently for different Kinesys Controllers.
If the encoder scaling value is incorrect the result may either be no movement from the hoist or it may overshoot or fail to reach its target position as well as running at incorrect speeds.

When determining the encoder scaling if the displayed position change is smaller than the actual position traveled, then the encoder scale needs to be increased.

Elevation1+

For an Elevation drive the encoder scaling is defined as the distance traveled per encoder pulse edge, this distance is measured in mm x 100,000. As an example an encoder scaling of 55060 means the encoder produces a pulse edge every 0.5506mm. The number of encoder pulse edges per encoder revolution is 4 x the number of encoder pulses per revolution (A 100 pulse encoder will produce 400 encoder pulse edges per revolution).

An example Elevation encoder calculation is shown below for a winch with a 1024 pulse encoder connected directly to a drum of 788mm circumference.

Distance traveled per encoder edge (mm) = Drum circumference / (Encoder Pulses x 4)
Distance traveled per pulse = 788/(1024x4) = 0.19238mm
This would equate to an encoder scale of 19,238

Velocity

For a Velocity drive the encoder scaling is defined as the distance traveled for one complete revolution of the motor shaft, this distance is measured in mm x 100,000. As an example an encoder scaling of 6600000 means that every rotation of the motor shaft produces an output movement of 66mm.

An example Velocity encoder calculation is shown below for a motor that is connected to a winch drum of 788mm circumference via a 10:1 gearbox.

Distance traveled per motor revolution (mm) = Drum circumference / Gearbox Ratio
Distance traveled per pulse = 788/10 = 78mm.
This would equate to an encoder scale of 7,800,000

Velocity used in Revolve Mode

For a Velocity drive in Revolve mode the encoder scaling is defined as the required count for a full revolution divided by the gearbox ratio multiplied by a scaling factor of 100,000.

An example is shown below:

Motor driving a gearbox with a 65.207:1 ratio which then drives a slew ring with a 7.75:1 ratio. This means the effective gearbox ratio is 505.35425:1 i.e. you need 505.35425 turns of the motor to turn the revolve once.

If the desired count for 1 revolution is 3600 (Degrees to a resolution of 0.1 degrees) the encoder scale is (3600 / 505.35425) * 100000 = 712372
If the desired count for 1 revolution is 10000 (Percentage to a resolution of 0.01%) the encoder scale is (10000 / 505.35425) * 100000 = 1978810
If the desired count for 1 revolution is 12000 (Clock Face to a resolution of 0.001 hours) the encoder scale is (12000 / 505.35425) * 100000 = 2374572

A simpler example where one revolution of the motor equates to 1 degree of rotation the gearbox ratio would be 360:1 and an the encoder scale would be (3600/360) * 100000 = 1,000,000

Smart8 / Elevation24

For a Smart8 or an Elevation 24 the encoder scaling is defined as the distance traveled

per encoder pulse edge, this distance is measured in mm x 100,000. As an example an encoder scaling of 55060 means the encoder produces a pulse edge every 0.5506mm.

For a quadrate encoder the number of encoder pulse edges per encoder revolution is 4 x the number of encoder pulses per revolution (A 100 pulse encoder will produce 400 encoder pulse edges per revolution).

For a pulse encoder that provides no directional information the number of encoder pulse edges per encoder revolution is 2 x the number of encoder pulses per revolution (A 100 pulse encoder will produce 200 encoder pulse edges per revolution).

NOTE Elevation 24 units with software versions lower than 1.6.5 used a different method to calculate the Encoder scaling factor. In these units the encoder scaling is defined as the number of counts per mm x 1000. To convert from an old style encoder count to a new style use the following equation

NewEncoderScaling = 10,000,000 / OldEncoderScaling

As an example an old style Encoder Scale of 780 (1mm produces 0.78 encoder counts, or more understandably 10mm movement produces 7.8 encoder counts) equates to a new style Encoder Scale of 128,205 (1.282 mm moved per encoder count).

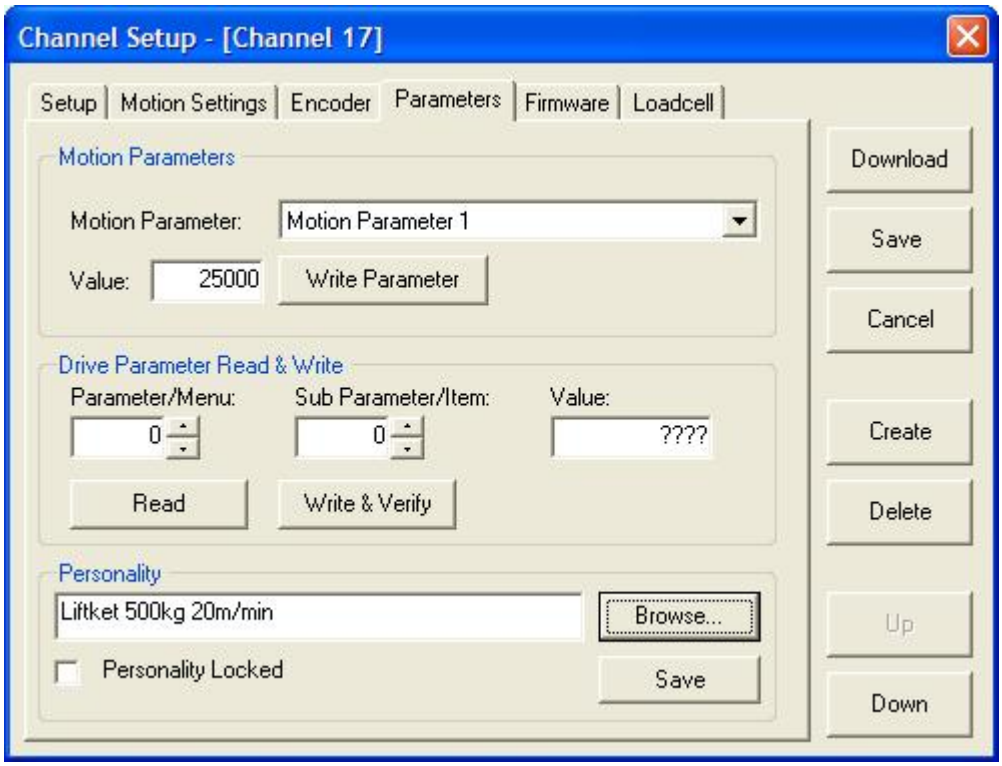
How to easily calculate an encoder scaling for a Smart8 or an Elevation24

When you change the encoder scaling, the position will instantly be recalculated using the new encoder scaling and the reported position will change. We can use this to our advantage when calculating an encoder scaling. Just follow the procedure below, using a chain hoist as an example.

1. Zero the position on the controller
2. Measure the current position of the chain hook, from the floor we call this the START
3. Run an amount of chain through the hoist and measure the new position of the chain hook from the floor we will call this the END.
4. Calculate the real distance traveled by the hook, if the hook was moving up this will be END - START. We will call this distance the REAL_TRAVEL
5. Look at the distance the controller has calculated the hook has moved, we will call this distance the CALCULATED_TRAVEL.
6. If the CALCULATED_TRAVEL is less than the REAL_TRAVEL then the encoder scaling needs to be increased by the factor of REAL_TRAVEL / CALCULATED_TRAVEL.
7. If the encoder scaling is multiplied by REAL_TRAVEL / CALCULATED_TRAVEL then the displayed position should change to match the distance calculated for REAL_TRAVEL.

7.6 Parameters

This Tab allows remote configuration of Drive parameters.



Motion Parameters

Motion parameters allow remote configuration of individual parameters within the drive. The settings change depending on the drive system you are using so no description is included, please refer to individual product manuals to which describe specific motion parameters supported by each product.

Drive Parameters

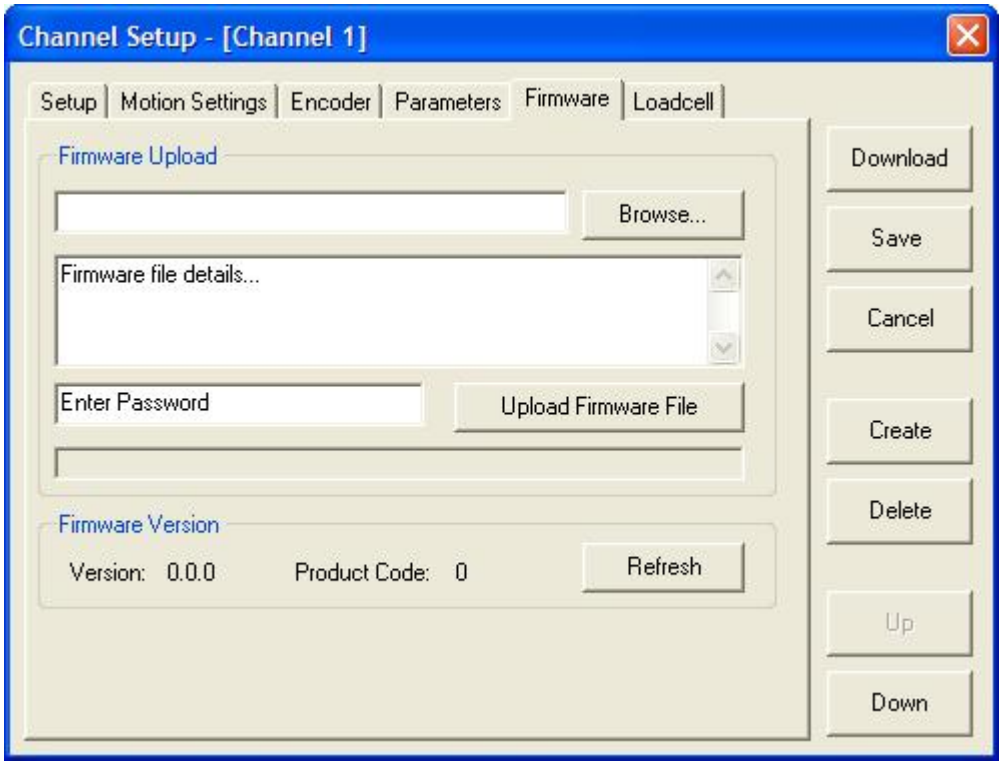
The Drive parameter section allows for special configuration of individual parameters within the drive. The settings change depending on the drive system you are using so no description is included, refer to individual product manuals which describe the specific drive parameters supported by each product.

Personalities

To allow simple configuration, the "Personality" of a device connected to a particular channel can be set, this will load in default values for a number of drive parameters. Refer to the personalities topic for more information. Vector is supplied with a number of predefined personality files.

7.7 Firmware

Some motion controllers support flash firmware upgrading from Vector. If this required then firstly find the firmware file required using the Browse button. If a correctly formatted file has been found then a description of the file will be shown along with the file name of the selected file.



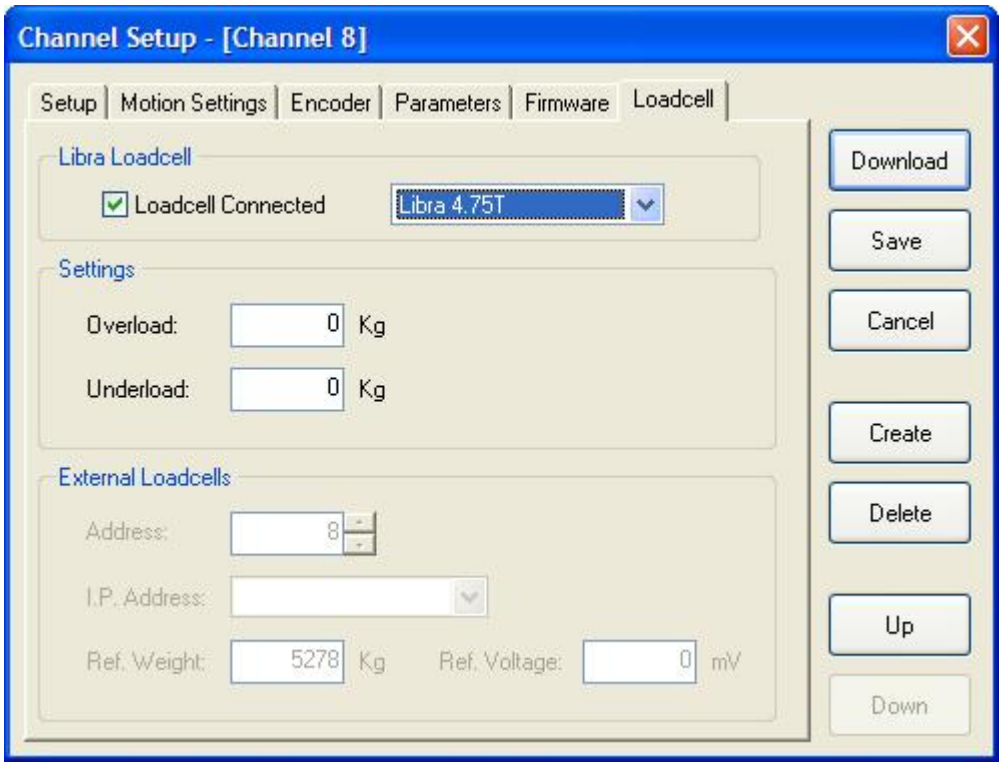
This tab can also be used to determine the current version of firmware in a device this will be shown in the Firmware version section of the screen.

To ensure that only authorised uploads are permitted a password must be entered before firmware uploading can commence. Once this has been done click on the Upload Firmware File button. If you accept the confirmation request then the file progress will be shown in the file details box. There is a pause of a few seconds before the file uploads. This is normal and allows the remote device to configure itself ready to receive the firmware upgrade.

The default password for firmware downloads is vector

7.8 Loadcell

This tab is used to configure the Libra loadcells attached to a channel.



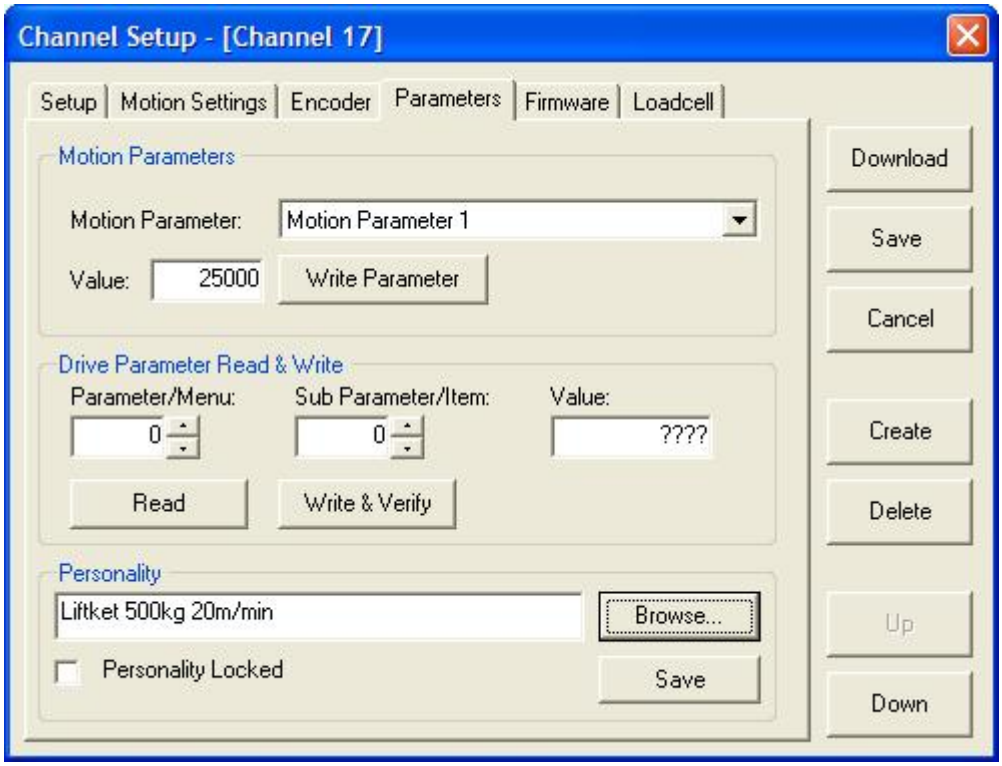
If a channel has a loadcell associated with it that the loadcell properties are setup here. The Libra Loadcell box indicates that a Libra cell is connected to an Elevation controller on this channel. The Drop down box allows the Ref Weight to be set for standard cell sizes. If a custom cell is being used select "Custom" in the drop down box and set the Ref Weight manually.

For an Elevation the Ref Weight is 1.11 * the rated load of the cell, so for a 4750kg cell the Ref Weight should be 5278kg.

If set to a value other than 0 the Overload and Underload values are used to inhibit movement up and down respectively, if the loadcell on that channel is returning a load that is out of range.

7.9 Personalities

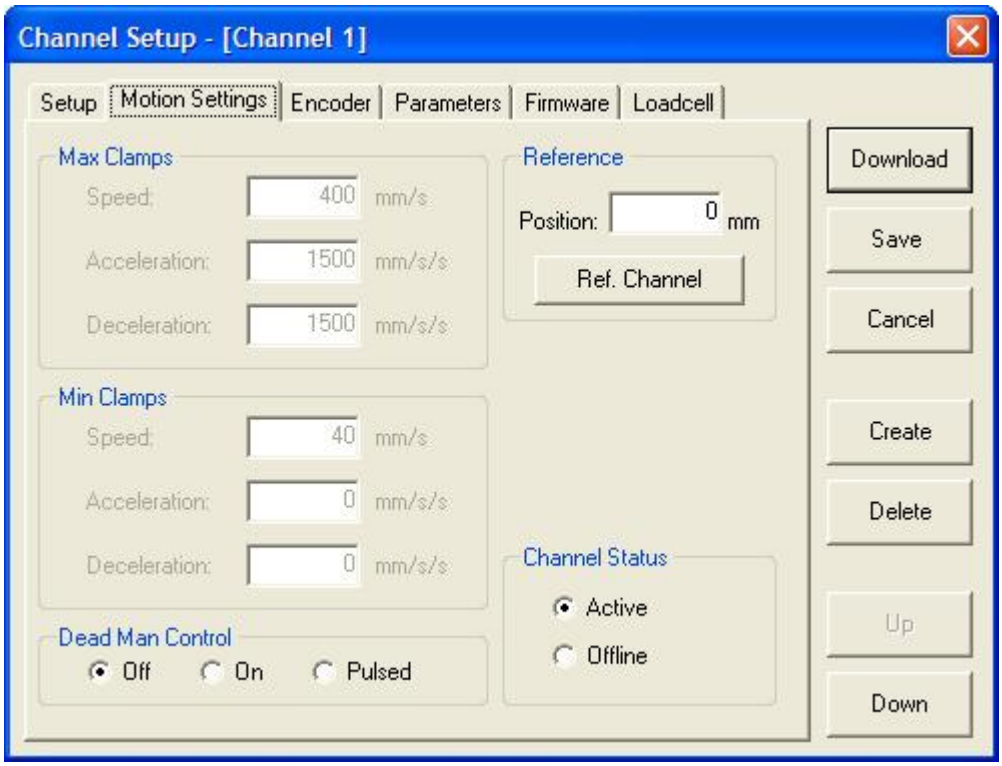
The channel parameters tab allows the personality of the device connected to a channel to be quickly set.



A personality file is chosen by pressing the browse button and selecting a personality file. Applying a personality file to a channel will set the following channel properties.

Custom personality files can be saved by pressing the save button. The user will be prompted for a file name and location to store the new personality file. By default custom personalities are stored in the "custom" subdirectory underneath the main personalities folder. This is where the user should look for any custom personalities they have saved.

The Maximum and Minimum clamps, the Default Running settings, the encoder scaling factor and the motion parameters. All these properties, apart from the Default Running properties will also be locked so they cannot be changed accidentally. Locked properties can be identified by their grayed out appearance as shown below.



When a personality is first applied to a channel, the Personality Locked check box will be set. This box will need to be unchecked to allow locked parameters to be changed.

If channel parameters are changed it is good practice to edit the Personality name to indicate this fact. When the personality applied to a channel is unlocked the personality will have "MODIFIED: " added to the start of the name, to show that parameters may have been changed from their default settings.

7.10 Revovle Mode

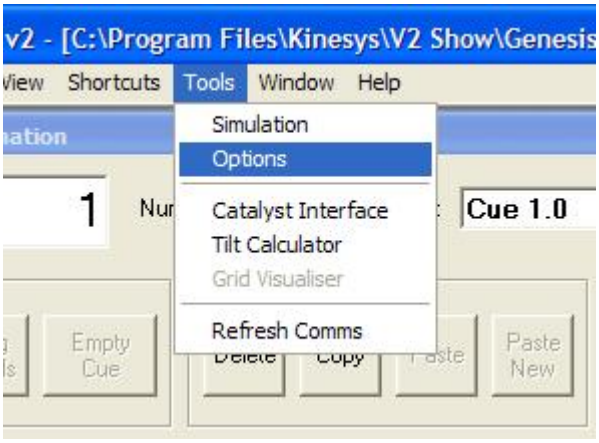
If a channel is selected to work in Revolve mode the following

1. Bottom limit is 0

1. top limit is the rollover point
2. Moves have no top bottom limit
3. can enter M into target position to indicate a move to maximum
4. +ve speeds mean a clockwise move
5. -ve speeds mean an anticlockwise move
6. The upperlimit will be used as the rollover point i.e. 12000 will give you a clock face with a resolution of 1000's
7. 3600 will give you degree's with a resolution of 10th of a degree
8. 10000 will give you 0 to 100% with a resolution of 0.01%

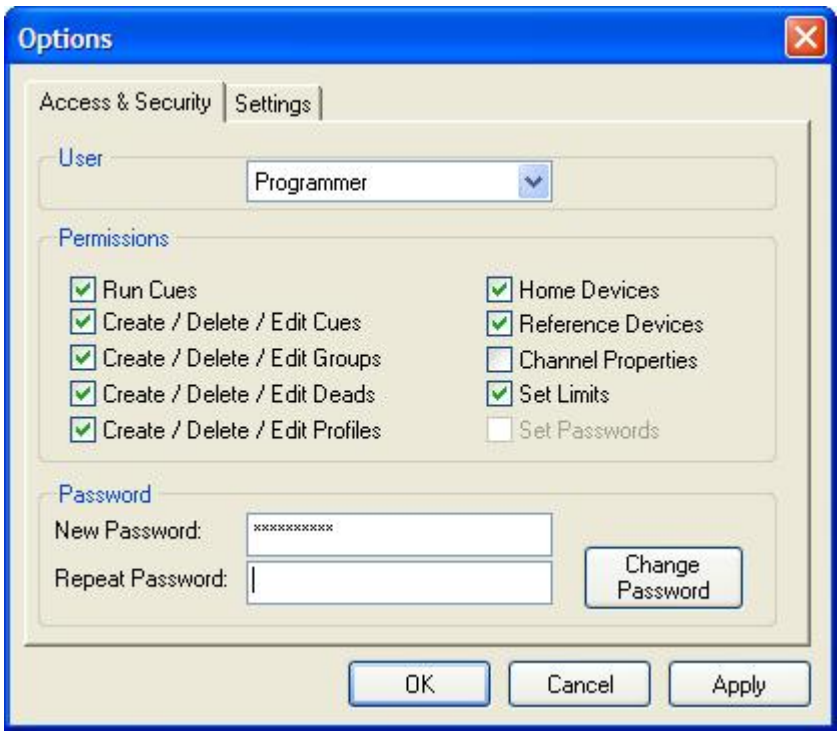
8 Options

The options dialogue accessible from the menu bar under Tools allows options to be set that effect every show loaded into Vector.



8.1 Access & Security

The Access & Security tab allows the administrator of the system to set permissions not only for themselves but also for the operator and programmer login users. In the example below the administrator is logged in but the settings for the programmer are being reviewed. If these settings are viewed when logged in as operator or programmer they are shown locked out. This means they can be viewed but cannot be altered.



User

This drop down list allows the user to select which login level they wish to review.

Permissions

This is where access to the system can be altered by the administrator. In the example above the programmer has been given permissions to everything except the Channel Properties. This would prevent them from changing the default speed and ramps and any communications settings.

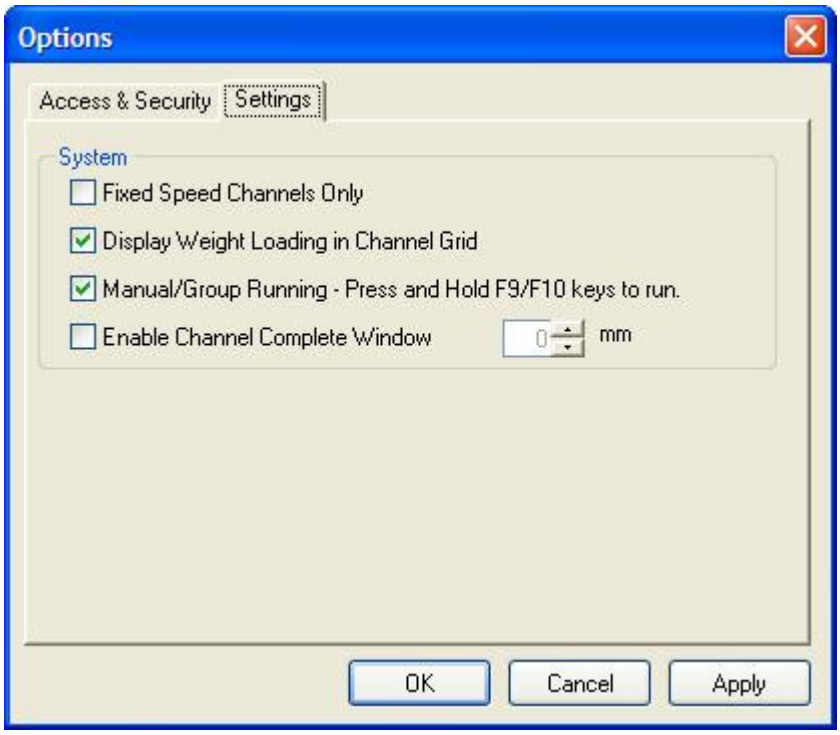
Password

As the administrator the user can change the passwords for all three login levels. This is done by entering the new password twice and clicking on the Change Password button. If the two password entries match then the change is accepted. All passwords are encrypted before being stored to avoid unauthorised users being able to access the system. Passwords can be removed for login levels if required. Simply leave the two password fields blank before clicking on the

Change Password button. A warning will appear to ensure that this is the desired outcome. Accepting this will turn off the password requirement for this login level.

8.2 Settings

This tab changes global settings for Vector.



Fixed Speed Channels Only

This option can be selected if fixed speed devices like chain hoists are being controlled, if selected the Channel View screen will not display the Acceleration, Speed and Deceleration columns. This option MUST not be selected if your show contains any variable speed devices.

Display Weight Loading in Channel Grid

If this option is selected an extra column is displayed showing a load cell reading. This value is only valid if the device supports load cell feedback.

Manual/Group Running - Press and Hold F9/F10 keys to run

If this option is checked manual operation occurs only when the F9 and F10 keys are pressed. Releasing them causes a stop message to be sent. If this option is unchecked manual operation is started as soon as either F9 or F10 are pressed. F11 must be pressed to stop manual movement.

Enable Channel Complete Windows

This option defines the how close in mm a channel needs to get to its target before Vector assumes that the move has completed.

9 Manual Operation

Vector has a built-in manual operation section. This allows quick operation of individual channels or groups of channels. With manual operation no cue needs to be created or target positions set. When a channel is run manually the speed it moves at and its target position is derived from the properties declared for that channel.

When a motor is part of a group, any motor in the group showing a fault will cause all group movement to be inhibited. Also if the groups position difference window has been exceeded this is treated as a group fault. To allow movement under these circumstances the ALT key must be held down, as well as F9, F10 or Shift+F9, Shift+F10.

9.1 Running Individual Channels

To run an individual channel it must first be selected as the current channel. To move the channel up press F9 and to run it down press F10. To stop the channel at any time press F11. When the channel is required to move it will run to its upper or lower limit depending on the direction chosen. It will run using the ramps and speed declared as the default for that channel.

Once a channel has started moving another channel can be selected if desired and it can also be made to run.

9.2 Running Groups of Channels

The operation is the same as for individual channels except that the shift key must be pressed while pressing F9, F10 or F11. If a fault develops on one of the channels and the group has the auto halt option selected then all the other channels in that group will be stopped as well. Once a group has been set running individual channels within that group can be run individually in the opposite direction if required. However once a channel is moving as an individual channel instead of as a group any fault on that channel will not halt the group. This applies even if the group was originally started as a group move.

Once a group has started moving other groups or individual channels can be selected to run as well if required

10 Editing Shows

Shows are made up of a series of cues that are run in a preset order. Those cues in turn are made up from a number of moves. Each moves defines how a channel will travel from its current position to its target position. The minimum number of cues that a show can have is one and the minimum number of channels that a show can have is one. This is the setting you get to when you select New from the File menu. The main windows that are used to edit cues are:

Channel View

Select Channels

Cue Information

10.1 Cue Editing

Creating Cues

The first step in creating a show once the system is setup with the correct channels is to create a cue. This is done by clicking on Cue Functions on the Shortcut bar. The Cue Information window will move to the centre of the screen and will automatically resize to reveal all the additional function buttons. If you are currently looking at a cue that already contains moves on the channels that you want to move in the new cue then click on Existing Channels in the New section of the window. If you want to create a blank cue with no moves in it then click on Empty Cue in the New section.

Deleting Cues

Cues are deleted from the Cue Information window. Click on the Cue Functions shortcut button and then click on the Delete Cue button. A warning box will appear to ask you if you are sure. If you are then click on Yes, if not then click No. The changes are reflected immediately in the Show Overview window.

Adding Moves

Now that a cue has been created you will probably want to add moves to it so that something actually happens when the cue is run. There are two ways of doing this. The first way is to use the Select Channels window. This allows you to quickly add and remove moves from a cue. It also allows channels to be selected or deselected by group. Open the Channel Select window by clicking on the button in the Shortcut bar. Then simply turn on and off the channels that you want to move in that cue. If you have more than 25 channels patched on your system then you will need to click on the Down button to be able to view all the channels. Once you have selected the correct channels then just press OK.

You can add moves directly into the channel window by selecting either the target, accel, speed or decel field in the channel that you want to move and type in the correct information. When you exit the edit box the rest of the fields for that move will be filled in with channel default settings and with the current position if applicable.

Editing Moves

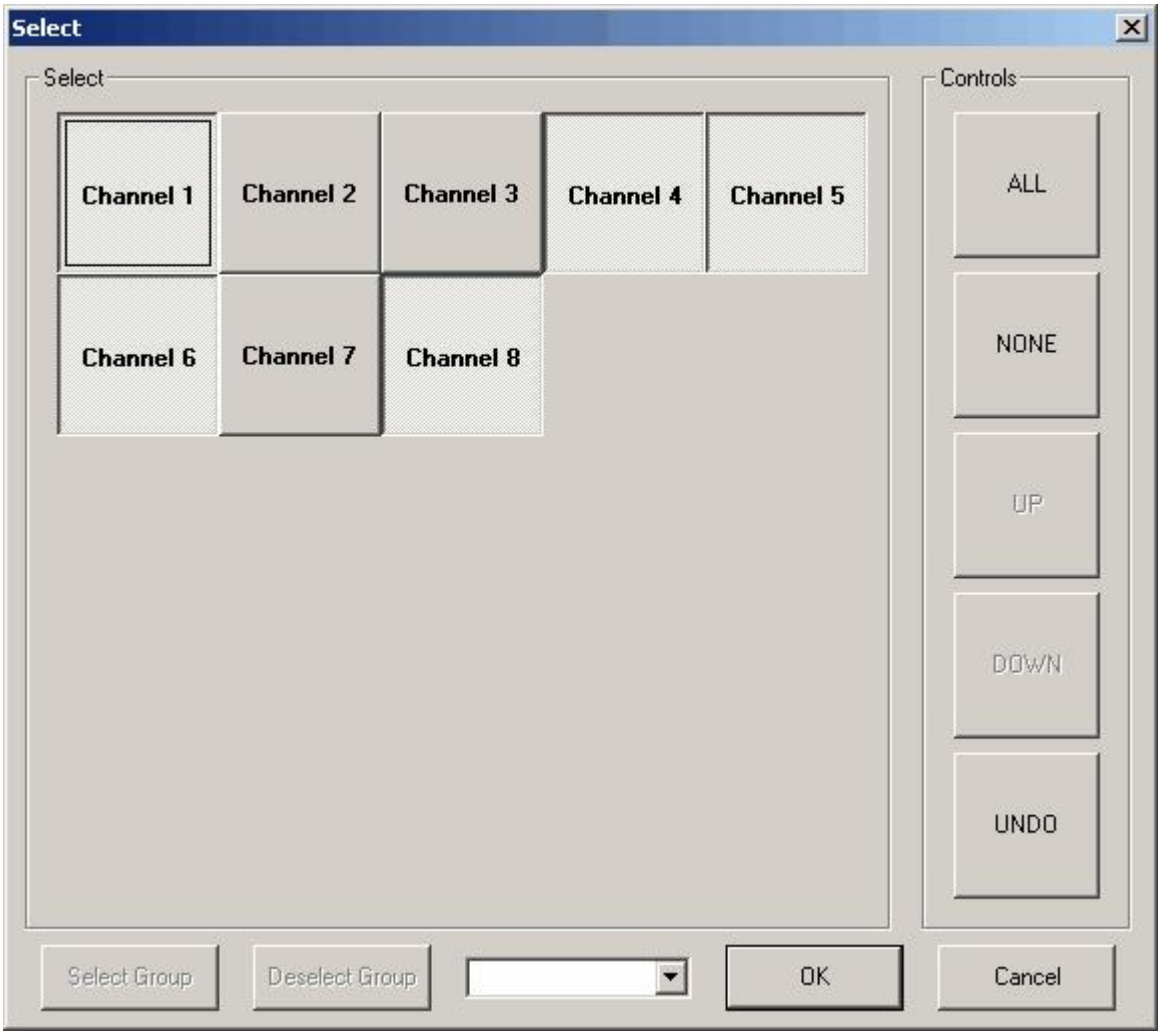
Moves are edited by simply selecting the field you want to change and then typing in the new value. If Enter or Tab is pressed then the new value is accepted, if Escape is pressed then the original value is restored.

Deleting Moves

If you want to remove a move from a cue then simply open the Select Channels window and deselect the channel in question. When you click on OK the channel(s) that you have deselected will be removed from the cue.

10.2 Select Channels

Select Channels is used to define the channels that are to be used in a cue. The large selector buttons make it quick to use with a touch screen. The following elements make up the window.



Select Buttons

These buttons toggle on and off to show whether a channel is selected or not. Clicking on the button will toggle its state. When the window is opened it will have all the channels that are already selected shown as selected on the screen.

Control Buttons

All: This selects all the channels regardless of whether they are already selected or not.

None: This deselects all the channels regardless of whether they are already selected or not.

Up/Down: The window will show up to 25 channels. If you have more than 25

channels then the Up and Down buttons will be enabled so that you can scroll through the other channels to allow them to be selected and deselected.
Undo: Undo removes all the changes that have been made since the window was opened. It has the same effect as pressing Cancel and then re-opening the window.

Group Select

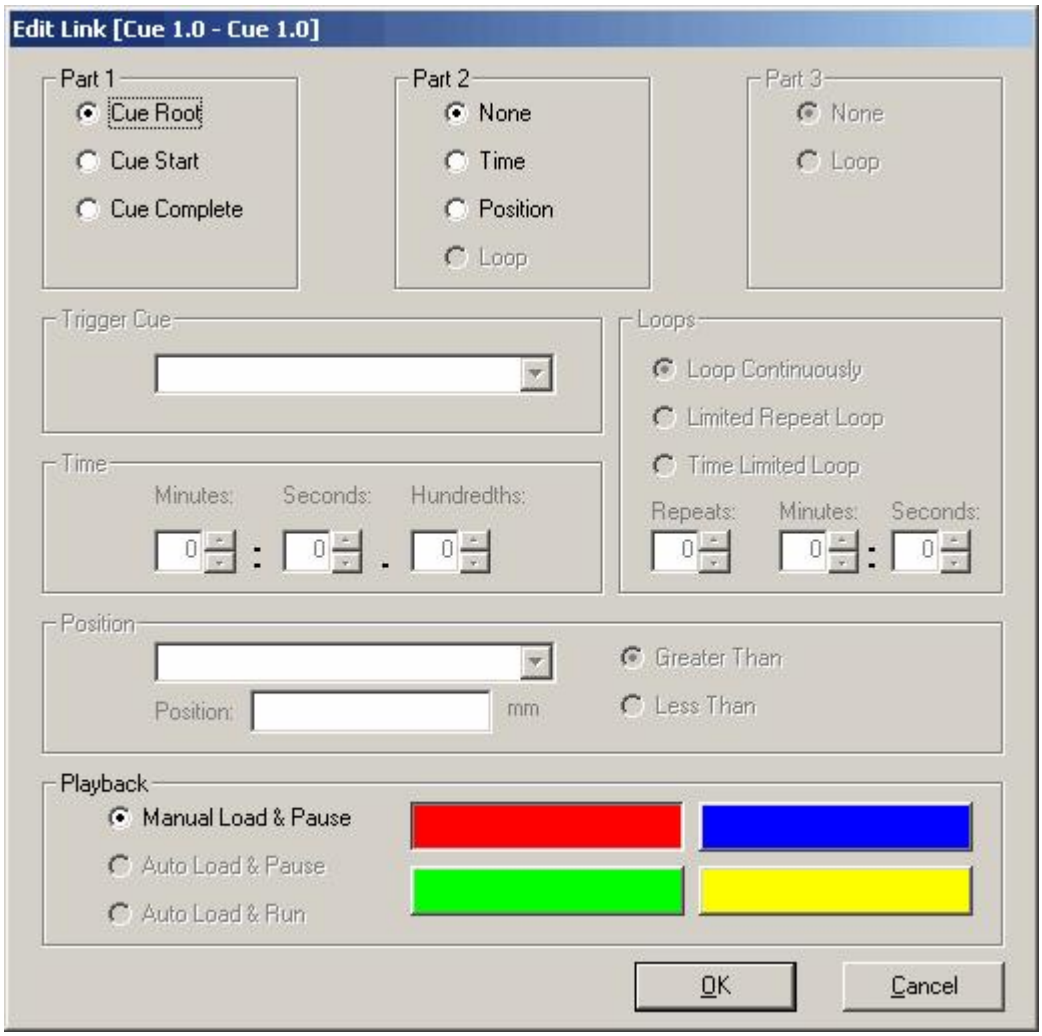
Entire groups can be selected and deselected in one go. First use the drop down list in the centre bottom of the screen to choose the group you want. Once you have selected a group the Select Group and Deselect Group buttons will become available and clicking then will select or deselect all the channels in that group.

OK & Cancel

OK saves the changes you have made to the channel selection. Moves will be created and deleted in the cue as appropriate and the window will close. Cancel ignores any changes that have been made and simply closes the window.

10.3 Cue Linking

The majority of cues that you create will be to allow straightforward point to point moves. However if more involved and inter-related movements are required then the linking settings of the cues will probably have to be changed. Every cue in a show has a link attached to it. The link describes the conditions that must be in place before the cue will run. The default is to run the cue as soon as the run button is pressed after the cue has been loaded into a playback. The default playback is red which is why unless you deliberately change the playback assignment on cues you will get a row of red symbols in the Show Overview window.



The more advanced options in the Links window allow cues to be linked from other cues, to have initial time delays, trigger from the position of other channels or to loop the entire sequence back to the beginning. Once you start linking cues to other cues you can then choose how they are triggered, either automatically or via a key press from the operator.

10.3.1 Creating a Cue Sequence

A cue sequence is created as soon as one cue is linked to another as opposed to being linked to the root. To link one cue to another follow the following instructions.

1. Choose the cue you wish to link to another cue. Remember the link effectively defines the trigger for the cue. In effect the link is run before the cue.
2. Click on the Link Functions button on the Shortcut Bar
3. You now need to decide whether the cue is to run when the triggering cue starts or when it completes. Click on the appropriate radio button at the top left of the window.
4. Next select the cue that will trigger the cue you are working on. Do this by selecting the cue you want from the drop down list in the Trigger Cue section of the window.
5. Finally decide whether you want the cue to run automatically when the moment comes or whether you want it to wait until a key is pressed. Select Auto Load & Run or Auto Load & Pause depending on what you decide. As a general rule unless you are very sure of how the different channels will interact it is probably best to select Auto Load & Pause. It can always be made automatic later when you are happy that it is operating how you would expect.
6. If the cue you are editing was using a different colour playback to the one you are linking to then this needs to be set to match. If you forget this then the system will let you know and do it for you automatically.
7. Click on OK and you will see that your cue is now sitting on the next level down in the Show Overview window and is connected to its trigger cue.

10.3.2 Adding a Time Delay

If you require an initial time delay this can be added to a cues link. This delay will happen before any delays that may have been added to any individual moves within the cue. To set a time delay to your link click on Time in the Part 2 section of the Link Functions window and then in the Time section of the window enter the length of the delay that you require. To remove a time delay click on None in the Part 2 section and the delay will be removed.

10.3.3 Adding Positional Triggering

If you do not wish the link to complete and the cue to run until another channel has reached a certain position then click on Position in the Part 2 section at the top of the window. Then, in the Position section of the window, select the channel whose position should be monitored, the trigger position and whether the position should be greater or less than the trigger value. To remove positional triggering select None from the Part 2 section of the window.

10.3.4 Creating a Looped Sequence

Sequence looping is a very powerful facility that you can incorporate into your cue sequences. It also requires very careful programming to ensure that safe movement is ensured when the sequence loops back to the beginning. For example if Device 2 is required to be down to allow safe movement of Device 1 then the following sequence would result in a potentially dangerous situation occurring.

1. Move Device 1 to position A
2. Move Device 2 Up
3. Move Device 2 Down
4. Move Device 1 to position B
5. Move Device 2 Up
6. Loop to beginning

When the sequence is started Device 2 should be down but when the sequence loops back to the beginning Device 2 is up due to the move in step 5.

Assuming you are happy with the sequence of cues that has been programmed then to set up the loop use the following steps.

1. Select the last cue in your cue sequence.
2. Open the Link Functions window
3. In Part 2 of the window select Loop. If you already have a time delay or positional trigger built into the link then use the Loop setting in Part 3 instead.
4. Choose the correct loop type in the Loops section of the window. Loop Continuously is straightforward and self explanatory. Limited Repeat Loop ensures that the loop is only executed a fixed number of times. Remember that by the time a loop executes the cue sequence will already have run once so the total number of passes through the cue sequence will be one greater than the number you set here. Finally Time Limited Loop means that every time the loop is required to execute it will check how long the cue sequence has been running. If it is longer than the time you specify then it will not execute and the cue sequence will stop.
5. Click on the OK button to store your changes

Be aware that if the cue that contains the loop command in its link also contains moves these moves will complete before the sequence is reset to the beginning. On a link with both time delays, loops and active moves the events will take place in the following order

1. Time delay will run.
2. Moves defined in the cue will run to completion.
3. If loop conditions allow the sequence will be run again from the beginning.

10.4 Using the Palette

If you want to create a show that has global positions references or global speed profiles then you will need to make use of the palette. You can access the palette in two separate ways. The first is to click on the Palette button on the Shortcut bar. The second is to double click on any field that the palette can affect. These are target, accel, decel and speed.

The palette is made up of three tabs, presets, profiles and groups. If you open the palette by clicking on the button in the Shortcut bar or by double clicking the target field then it will open with the presets tab showing. Double clicking on the accel, decel or speed fields will open it with the profiles tab showing.

Creating a Preset or Profile
To create a new palette item simply give it a unique name and enter the values required; either a position for a preset or the accel, decel and speed for a profile. Click on Add and it will be added to the list of presets or profiles.

Editing a Preset or Profile
To edit a preset or profile click on the profile in the list to bring up all its details in the correct boxes. Change the details as necessary and then click on the Apply button. The changes will be shown in the list and will also be applied globally to all the moves in the show.

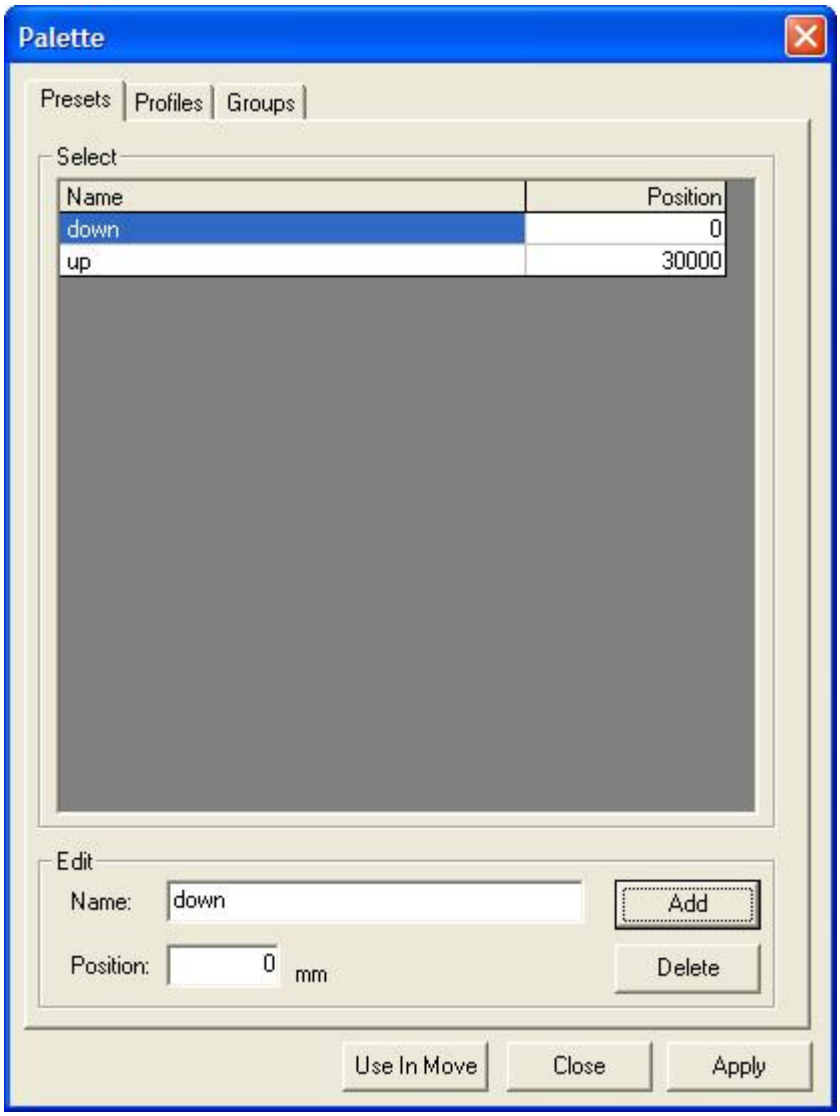
Removing a Preset or Profile
To remove a preset or profile highlight the profile in the list and click on the Delete button. A confirmation message will appear, press Yes to delete and No to cancel the operation.

Using a Preset or Profile in a Move
To use a preset or a profile in a move, make sure that the current cue already has a move created for the channel you are interested in and then open the palette. You can then attach the preset or profile to the move by either double clicking on the one you want in the list or selecting it with a single click and the clicking on Use In Move and then Close.

Removing a Preset or Profile from a Move
You can remove a preset or profile by simply overwriting the relevant fields in the displayed move. For example to remove a preset click on the preset name in the channel window and then type in the new position. The preset name will be replaced with the position you have entered. The same is true for profiles except that you can type into either the accel, decel or speed fields and as soon as you hit Enter or Tab the profile will disappear and will be replaced with the value you have entered and default information in the other two fields.

10.4.1 Presets

Presets provide a way of globally changing the positions that large numbers of cues run channels to. They enable you to set a move within a cue to run to a name instead of a position. In the presets part of the palette you can then change the position that the name refers to.



For example on a touring show the top limit may change relative to the ground from venue to venue depending on the height of the roof. Without presets you would then need to go through each cue in the show file and change all the cues that ran to that top position. With presets you just assign the channel to run to a preset name and once you know what the new top limit should be you simply change the position associated with that preset name. The change is then automatically applied to every cue that uses that preset name.

Add To create a preset simply enter a name and position and click on

Add. If the name is unique and position valid then a new preset will be created.

Delete To delete a preset select the one to removed from the list and click on Delete. A warning message will be displayed before the deletion is finally done.

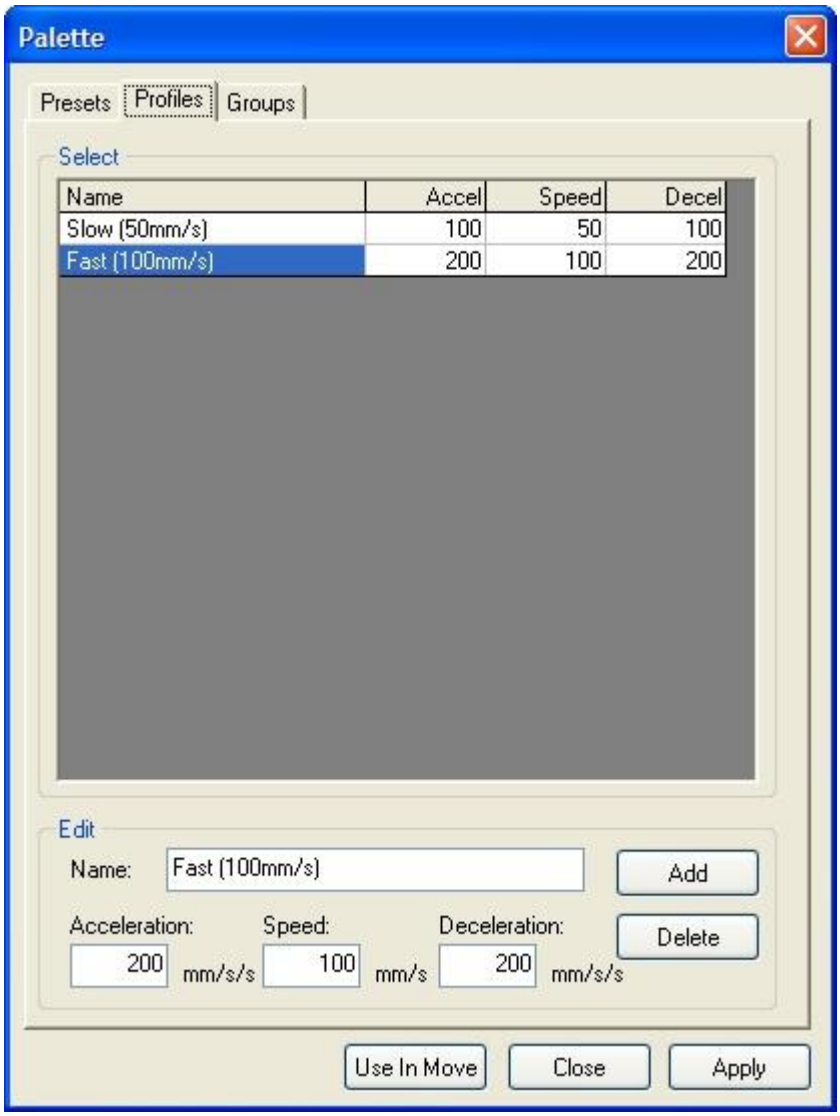
Use In Move If an existing move within a cue was selected when the palette window was selected then clicking on Use In Move will cause the currently selected preset to be loaded into the move in place of its current target information.

Close This button closes the window without applying the currently selected preset to the current cue.

Apply To change an existing preset simply select it in the list, update the details and click on Apply. As long as all the data is valid the changes will be applied to the preset and therefore will be applied to all moves using that preset.

10.4.2 Profiles

Profiles are very similar to presets in that they allow global changes to be made to a show by only changing one item. However instead of defining a global position profiles allow global move profiles to be defined. The speed and ramps can be given a name and this name can then be used in place of entering values into a move. As with presets changes can then be applied to the entire show by simply changing the definition of the profile.



Add To create a profile simply enter information into the four text fields and click on Add. If the name is unique and numeric data valid then a new profile will be created.

Delete To delete a profile select the one to removed from the list and click on Delete. A warning message will be displayed before the deletion is finally done.

Use In Move If an existing move within a cue was selected when the palette window was selected then clicking on Use In Move will cause the currently selected profile to be loaded into the move in place of its current move information.

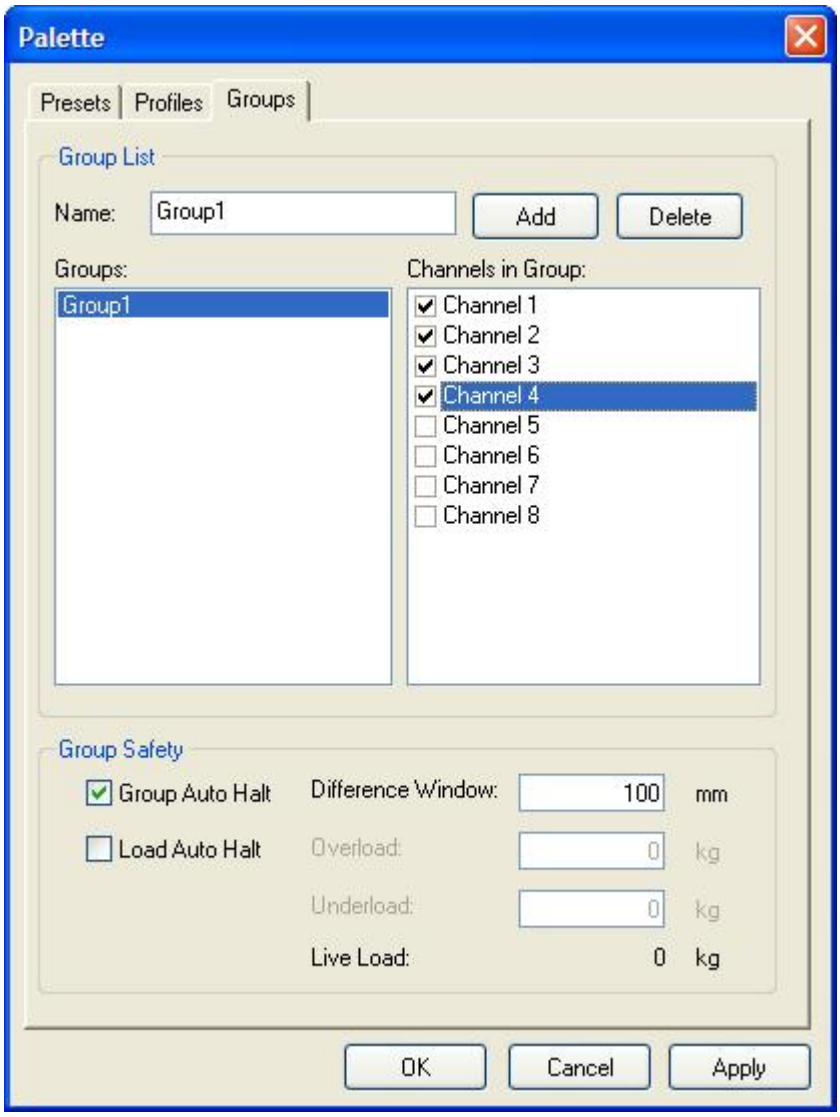
Close This button closes the window without applying the currently selected profile to the current cue.

Apply To change an existing profile simply select it in the list, update the

details and click on Apply. As long as all the data is valid the changes will be applied to the profile and therefore will be applied to all moves using that profile.

10.4.3 Groups

Groups allow channels to be accessed faster and allows multiple channels to be run with one key press.



Channels in Group
This list shows all the existing channels. If they are included in the current group then a tick will appear beside the channel name. Channels can be added or removed from a group by clicking on this tick box. If a channel is added to a group that is already a member of another group then a warning message will be displayed to make the user aware of this re-patch.

Add

To add a group simply enter a unique group name and click on Add. By default the group will be created without any channels assigned. There is no limit to the number of groups that can be created although a channel can only be assigned to one group at a time so in practice there is little use in having more groups than channels.

Delete
To delete a group select it from the groups list and click on the Delete button. A confirmation message will appear before the deletion is executed.

OK, Cancel
Clicking OK or Cancel closes the window. All changes are stored as soon as they are made in the group editor so clicking on Cancel does not cause changes to be ignored. The only exception to this is any change that may have been made to the group name but without the Apply button being clicked.

Apply
This applies any group name changes. The new name must be unique within the groups list.

Group Safety

This section allows various group safety setting to be configured.

Group Auto Halt
If the Group Auto Halt is set and a channel reports a fault while running as a group or in a cue then all other members of the group that are currently running under a group run command or a cue will also be halted.

Difference Windows
This value defines the maximum difference in mm between any motors in a group that will cause a group to halt on a position error. For this option to apply to a group the auto halt check box needs to be set for the group. When the group auto halt is active the difference window will always be active for every motor in a group. If you want to disable this feature, you should set the difference window to value larger that the maximum possible difference between any two motors in a group. To allow manual movement of a motor so that its position is more that the "difference window" different than another motor in the group the user would need to hold down the ALT key.

Load Auto Halt
If Vector is configured to poll loadcells then specific group Overload and Underload values can be set, These values will be the sum of all the loadcells in a group. The Live load field will show the current total load calculated by summing all the loadcells in a group. A value of 0 for the overload setting will turn off group overload detection for this group, similarly a value of 0 for the underload setting will turn off group underload detection for this group. See the channel setup section for details on how to configure Vector to read loadcells. Overload and Underload values are used to inhibit group movement up and down respectively.

11 Running Shows

Although the visible differences are small there is large difference in what functions are available to you when you switch into running mode. You enter running mode by clicking on the Cues button on the Shortcut bar when the No Entry symbol is showing or by pressing the Load button on the keyboard. The button will change to show a Tick symbol and an additional toolbar will appear at the bottom of the screen that shows four coloured bars representing the four playbacks available on the system. To move out of running mode simply click on the Cues button again or press Shift+Load. The No Entry sign will reappear and the playback bar at the bottom of the screen will disappear.

Once you are in running mode all editing options within the system are removed. All you can do is select and run cues or moves channels manually. If you wish to makes changes to cues or channel properties then you will need to switch back to editing mode. Changing from running to editing causes a stop command to be sent out to all channels. This is a safety feature to ensure that no channels are still running while the system is being edited.

In summary running mode allows you to:

- Select Cues by paging up and down or by clicking on them in the Show Overview window
- Load Cues into playbacks using the Load key
- Run and stop cues that have been loaded into playbacks
- Run channels manually either individually or in groups

11.1 Playbacks

Playbacks are central to the execution of shows. They allow multiple cues to be loaded and paused. Four playbacks are available and can be operated independently of each other. The only interaction occurs when cues on separate playbacks share channels in their cues. In cases like this the channels will react in a last move takes precedence manner.

The keys central to playback operation are:

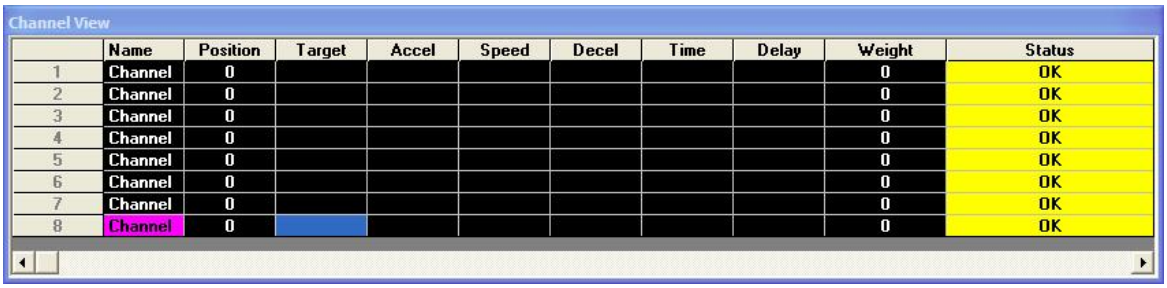
- Load : F12
- Red Start : F1
- Red Stop : F2
- Blue Start : F3
- Blue Stop : F4
- Green Start : F5
- Green Stop : F6
- Blue Start : F7
- Blue Stop : F8
- All Stop : Space

11.2 Active vs Simulation

Vector will run in either active or simulation mode. Active mode gives you full control over all channels allowing them to be programmed, edited and moved. Simulation mode still allows full editing functions but stops communications with the outside world. Any channels that are requested to move will not have the request sent to the device but instead will recreate the position change information internally to provide position changes on the screen as if the channel was moving. The position changes as it would in the real world at the speed that has been requested. Ramp information is ignored however so timed cues may show as completing in slightly different times in simulation mode.

Simulation mode is turned on and off in the Tools menu. It can only be changed in editing mode. Position updates are not performed in simulation mode so the current position displayed on the screen will not refresh until simulation mode is turned off.

If Vector is running in simulation mode the background colour of the channel Status column will change to yellow, as shown in the screenshot below. The status bar at the bottom of the screen will also display “Vector : Simulation”,



12 Tilt Calculator

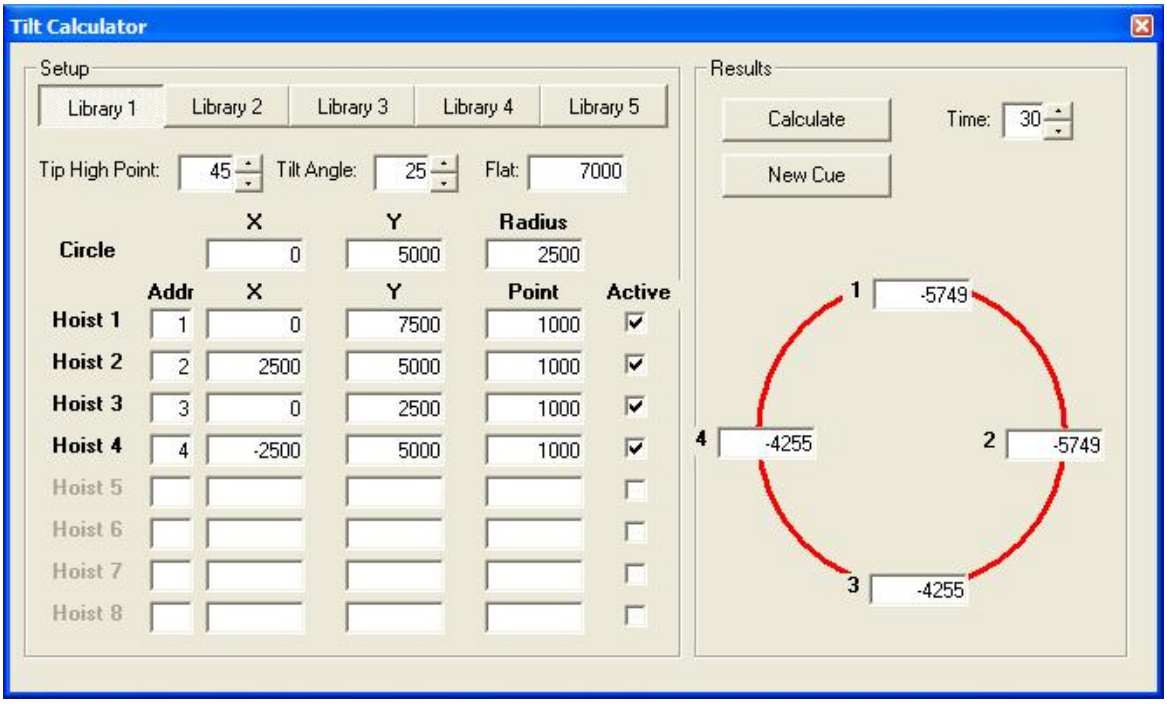
The Tilt Calculator is a software tool that allows the user to specify points of attachment around a circular truss and then easily calculate the position that each point has to reach to achieve a particular tilt angle.

The position of the circular truss, its size and the location of the truss pickups in relation to the truss must all be entered before correct calculations can be made. Once these have been entered they are stored by the computer so that they can be restored each time the program is run. Up to five libraries of truss data can be stored permitting multiple truss configurations to be used without having to re-enter data.

Once a configuration has been entered, calculating and creating tilt cues becomes a very straightforward operation. A time to complete the cue is entered and the speed that each motor must travel is calculated automatically.

Tilt cue data is stored in the same format as standard cue data and is added to the main cue list along with standard non-tilting cue data.

12.1 Screen View



NOTE: All measurements and positions are in millimetres. All heights relate to hoist positions i.e. if the floor is set to 1000 for each hoist then the point and flat measurements must all be taken from the same datum.

1. **LIBRARY SELECTION**
   The five library selection buttons along the top of the window allow the user to select from up to five different configurations. When the window is first opened it will default to library 1

2. **TIP HIGH POINT**
   This field allows the user to specify which point around the circle will be the highest. In conjunction with the Tilt Angle parameter this allows the exact tilt position to be defined

3. **TILT ANGLE**
   This is the angle from the horizontal that the circle should reach at the end of its move. This can be specified as anything between 0 and 60 degrees

4. **FLAT**
   The flat field specifies the height of the circle before the tilt move is started. It effectively represents the height of the centre of the circle as all tilts will rotate around this point

5. **CIRCLE X**

This field represents the x-coordinate (stage left to stage right position) of the centre of the circle

6. **CIRCLE Y**
   This field represents the y-coordinate (up stage to down stage position) of the centre of the circle

7. **CIRCLE RADIUS**
   The radius of the circular truss that is being moved

8. **HOIST ADDRESS**
   This field patches the tilt calculator hoist to a specific channel in Vector. Any created cues will have their positions loaded into the channel that shares the same address as this field

9. **HOIST X**
   This field represents the x-coordinate (stage left to stage right position) of the hoist pickup

10. **HOIST Y**
    This field represents the y-coordinate (up stage to down stage position) of the hoist pickup

11. **HOIST POINT**
    The point value is the height of the connection between the hoist and the roof structure. This is used to calculate any tow angle that may occur as the truss is tilted. The tow angle usually represents only a small change in the final calculated position so this value can be approximated if an exact position is not easily available

12. **HOIST ACTIVE**
    The Hoist Active box specifies how many hoists are used to suspend the circle. Putting a tick in this box includes the hoist in the calculations. A maximum of eight hoists can be used in any one configuration

13. **CALCULATE**
    Once all the setup and co-ordinate data is entered the final positions can be calculated. Clicking on the Calculate button will produce the target figures for each of the active hoists based on the tilt point and angle information specified by the user

14. **NEW CUE**
    Once the target positions have been calculated a cue can be created to enable the actual tilt to be performed. To ensure that all hoists remain in tension at all times they must all complete their individual moves in the same time, which is

set using the Time parameter described below. Clicking on New Cue will create a time priority cue for all the hoists used in the current configuration

15. TIME

The Time field sets the time the hoists should take to travel from their current positions to the new ones that have been calculated by the software

16. POSITION

The Position fields show the results of the tilt calculation for each hoist. The fields can be dragged around the circle to mimic where the hoist is placed in reality. This helps to visually tell which hoists will be in what position once the move has been completed. Each library configuration stores separate positions for each of these fields. Fields are only shown for hoists that are active

12.2 Setting Co-ordinates

For the tilt calculator to be set up correctly the user must have a rigging plot showing the positions of the circular truss and all the hoists that support it. It must be possible to derive the position of all these locations from a single datum point and calculate an x and y value for each location.

Most rigging plots will already have this information on them as it is used for ‘marking out’ before the points are rigged. The datum from which all measurements are taken is often, but not always, the downstage centre edge of the stage.

The tilt calculator interprets up/down stage positions as being in the y axis and stage left to stage right positions as being in the x axis. Therefore if the datum is set to downstage centre then any points on the centre line will have an x value of zero and their y value will get bigger the further towards the back of the stage they are located.

As well as the x,y co-ordinates of all the supporting hoists, the calculator also needs to know where the centre of the circle is. If this is not marked on the plot then it can usually be derived from other points around it and/or with the aid of a scale rule.

The last piece of positional information that is required is the height at which the hoist attaches to the roof structure. This must be measured from the same datum that the hoists are referenced to. For example if the hoists read zero when the hooks touch the stage floor then the height or the point should be measured from the same stage floor. In effect it is the reading the hoist would give if the hook could reach all the way up to the suspension point in the roof.

Once all this data is added the tool can start being used to calculate tilts.

12.3 Tilt Calculation

A tilt is described using two parameters, the tilt high point and the tilt angle. The tilt high point is entered in degrees and is the position around the circle that will be the highest once the tilting move is complete. The calculator takes the most upstage edge of the circle to be zero degrees and works around clockwise as viewed from above. To get a tilt that is lowest at the back of the stage and highest at the front, a tilt high point of 180 degrees would be entered.

The tilt angle is again entered in degrees and describes the angle from horizontal that the circle will end up at. This can have a value anywhere between 0 and 60 degrees.

Once these two values have been decided then the final height of the centre of the circle must be entered. This is entered in the ‘Flat’ field and is scaled from the same datum as the hoists.

The last task is to click on the Calculate button. This will calculate the target position that each hoist must have in order to achieve the desired tilt effect.

12.4 Creating a Tilt Cue

When moving a truss into a tilted position it is essential that all hoists have tension throughout the move. For this to occur it is likely that each hoist will have to run at a different speed to all the others as each one will have a different total distance to travel from its start position to its final target position. Vector already has the capability to calculate the speed of a move based on a time to complete. This is known as a time priority move.

To create a tilt cue a time must be entered that the circle will take to reach its final tilted position. Once this has been done click on the New Cue button and a new cue will appear in the Vector cue list with the calculated targets and the selected time entered.

It is very important to check the value in the speed column of the main Channel Display window for each hoist that is having to move. If the time is set too short then a very fast speed may be required that the hoist in question is not capable of. The speed is calculated based on the current position, therefore it is important for an accurate speed estimate that the truss be in its approximate starting position when this evaluation is done. If necessary adjust the time value in each channel until the speed value is within range. If the time is changed for one hoist it must be changed for all the hoists related to that truss.

If in any doubt always err on the side of caution and slow speed until you are sure the effect is what you intend, once you are happy that the positioning is correct then the time can be decreased and therefore the speeds increased if desired.

12.5 Drag and Drop Position Fields

The target position fields for each hoist can be moved around the screen to allow them to be placed in positions similar to the real life layout. This makes it much easier to tell which hoist will go to which target as well as to see in a glance which hoists will be highest and which will be lowest.

To move the fields around simply ‘drag and drop’ them. This simply involves clicking in the field and then with the mouse button still pressed down moving the field to its new position. Once the final position is reached simply release the mouse button to leave the field in its new location.

12.6 Saving Information

Once a tilt cue has been created it becomes part of the main show file and is saved, like all the other settings in a show file, using the traditional File|Save command.

All the co-ordinate settings entered into the tilt calculator are stored in the registry of the computer. They are not saved when the main show file is saved.

All the co-ordinate information relating to a library is saved when either the user switches to another library or the tilt calculator is closed, either individually by the user or automatically when the main Vector program is closed.

13 Contact Information

If you would to get in touch with Kinesys then please use the following methods.

email: info@kinesys.co.uk
website: www.kinesys.co.uk

Tel: +44 (0) 20 8481 9850
Fax: +44 (0) 20 8487 0396

Mail: Unit 2 Kempton Gate Business Centre
Oldfield Road
HAMPTON
Middlesex
TW12 2AF
United Kingdom

Google Map Link: http://www.google.co.uk/maps?q=tw122af

13.1 Feedback

The feedback section of this help file is designed to help you communicate any issues that using Vector may have raised for you.

If you find that Vector does not include a feature that you would find very useful then please let us know. It may be that is has just been disabled in the demonstration version of the software or alternatively it may already be in the fully licensed version of Vector. We will take all suggestions for features and changes to the operation of Vector seriously and you may find them appearing in the next release.

In the unlikely event that you find that Vector is not behaving how you would expect then please let us know this as well. If we don't know the problem then it can't be fixed. Please give as much detail as you can about what you have found and if you think it will help us please send us the file you were working on when it happened.

Of course if you just want to say that you really enjoyed using the Vector software then that is also welcome.

Please send all your feedback to:

vector.feedback@kinesys.co.uk

and please include in your message the following information.

- **Name**
- **Company**
- **Email address**
- **Your feedback**
- **The computer and operating system you are using**
- **Where you found out about Kinesys and Vector**

All this information will help us to get back to you as quickly as possible.

Thank you

14 Product Manuals

Kinesys produce a number of products that can be controlled by Vector, Their user manuals can be found in this section

14.1 Micro Transform

The Micro Transform is used to convert between Ethernet and the Kinesys 7 pin XLR communication cable.

The same converter is also built into a PDES and a Mini PDES.

There are 4 Switches on the front panel of the Micro Transform and their functions vary slightly depending on what version of software the Micro Transform contains.

Software Versions less than V4.00 (products sold before 2009)

Switch 1 when ON selects 'user programmed IP address' instead of a hard coded IP address (This is factory defaulted to 192.168.18.53).

Switches 2 and 3 are used to select which hard coded IP address is used, they are coded as follows:-

2:3
0:0 IP: 192.168.18.51, Subnet: 255.255.255.0
0:1 IP: 192.168.18.52, Subnet: 255.255.255.0
1:0 IP: 172.16.0.51, Subnet: 255.255.255.0
1:1 IP: 172.16.0.51, Subnet: 255.255.255.0

Switch 4 on forces boot from ROM firmware rather than Flash firmware (This is a factory setting and this switch should always be off)

To Select the following common IP addresses the DIP switches should be set as follows:-

-- indicates the switch is off

IP Address	Switch 1	Switch 2	Switch 3	Switch 4
192.168.18.51	--	--	--	--
192.168.18.52	--	--	ON	--
192.168.18.53	ON	--	--	--

Software Versions Greater than V4.00

Switch 1 when ON selects 'user programmed IP address' instead of a hard coded IP address (This is factory defaulted to 192.168.18.53, on products made before 2009, and 192.168.18.55 on products made after 2008).

Switches 2 and 3 are used to select which hard offset is added to the IP address selected above:-

2:3
0:0 IP: Add 0 to last digit of IP address
0:1 IP: Add 1 to last digit of IP address
1:0 IP: Add 2 to last digit of IP address
1:1 IP: Add 3 to last digit of IP address

Switch 4 on forces boot from ROM firmware rather than Flash firmware (This is a factory setting and this switch should always be off)

To Select the following common IP addresses the DIP switches should be set as follows:-

-- indicates the switch is off

IP Address	Switch 1	Switch 2	Switch 3	Switch 4
192.168.18.51	--	--	--	--
192.168.18.52	--	--	ON	--
192.168.18.53	--	ON	--	--
192.168.18.54	--	ON	ON	--
192.168.18.55 (192.168.18.53 on pre 2009 products)	ON	--	--	--
192.168.18.56 (192.168.18.54 on pre 2009 products)	ON	--	ON	--
192.168.18.57 (192.168.18.55 on pre 2009 products)	ON	ON	--	--
192.168.18.58 (192.168.18.56 on pre 2009 products)	ON	ON	ON	--

Notes about software versions

If your Micro transform contains software version V3.20 or less, the hardware may not be compatible with V4 software. Contact Kinesys before upgrading.

To determine which version of software your Micro Transform contains, follow this procedure.

1. Ensure that all the DIP switches are in the off position on the Micro Transform.
2. In Vector create a new test show.
3. Change the address of the first channel to 65535 (this is the address of a Micro Transform).
4. Go to the channel setup page and select the Firmware Tab, This should display the firmware of your Micro Transform.
5. You can use the firmware upload feature to upload a new version of Firmware. (Contact Kinesys before doing this to ensure that your hardware is compatible).