SharpEye Music Reader

Windows® version

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Introduction

SharpEye is a music OCR program. It converts scanned images of printed music into MIDI files. This is a difficult task for a computer program to perform, and inevitably there will be some errors when the music is complex or crowded, or the input image is of poor quality. SharpEye has a built in music notation editor which has been specially designed for checking and correcting the output before saving it as a MIDI file.

System requirements

You need a W95/W98/NT4 machine. SharpEye does use a fair bit of memory and processor time. I think a Pentium with 16MB RAM is a reasonable minimum. Memory is much more critical than processor speed. If you want to process large images such as orchestral scores or run other programs alongside SharpEye you'll probably need more than 16Mb RAM, or the system can become totally bogged down.

You will need a scanner to scan the printed music in.

Its not essential, but you will almost certainly want a MIDI editor/sequencer (if you don't already have one) so that you can play around with the output from SharpEye. Windows/IE4 comes with a simple MIDI player so you can double click on the MIDI file saved from SharpEye and hear the result, but the music will all be played on a synthesised 'piano'.

Installation

SharpEye is supplied as a single self-extracting file, usually with a name like se113.exe. Double-clicking on this will start the installation. By default, this will put the program files in the folder "Program Files\visiv-co-uk\SharpEye" and add a few icons to the start menu.

Brief guide

If you don't like reading manuals, and prefer to learn by trial and error, here is a brief guide to get you started.

Scanning

SharpEye 1.0 does not scan directly. Scan in the music and save it as a TIFF file or bitmap (.BMP) file. It should be a black and white image.

Scan at 300dpi for most music. A higher resolution may be better if the music is printed small.

Try to make the scan as straight as possible.

Either drag the file into SharpEye, or use the Open File dialog. Click on the blue arrow to start the conversion.

Music Editor

The right button is devoted to inserting new symbols.

You'll often have to insert a symbol which is not quite what you want and then select and modify it.

The black rectangles at the start of the score are for joining staves. You should normally join staves that belong to one instrument (usually a keyboard instrument).

Warnings about bars (measures) that SharpEye doesn't understand are shown at the end of each measure, and individual notes that are not understood are shown in gray.

Overall Process

Image And Music Windows

There are two important windows in SharpEye, one that displays the input image and one which displays the music output. The music output window is SharpEye's main window. It contains the main menu and toolbar, and closing it will quit SharpEye.

You can change the window positions that SharpEye uses when it starts. Arrange the windows the way you want, then click on 'Save window positions' in the Options menu.

The Image window displays the scanned image. You can drag TIFF or BMP files in here. You can move and resize it as you wish, and change the scale at which it is displayed. You can close and re-open it. You can also create a zone to process part of the image.
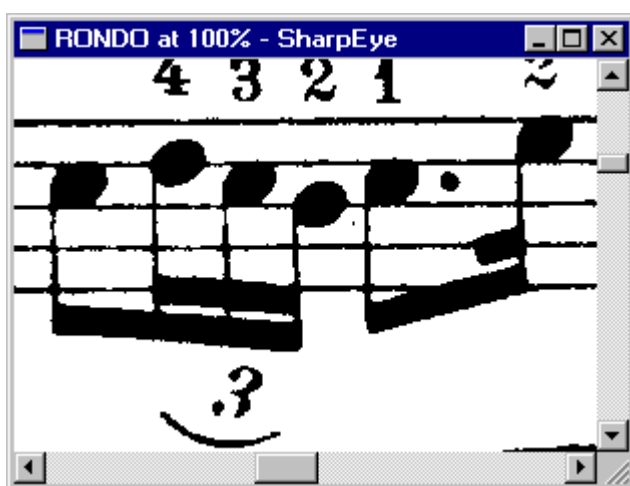
Here is the music output window:
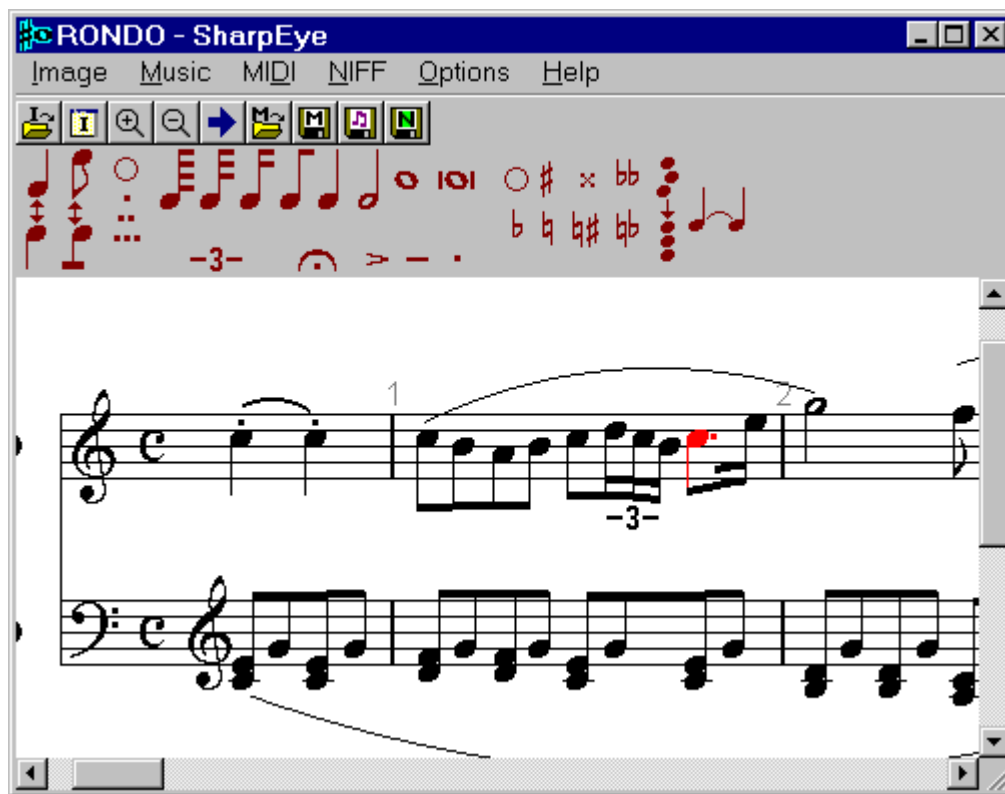
The toolbar has the following buttons, from left to right:

Open image file (BMP or TIFF)

Open the image window (if it is closed)

Zoom in image

Zoom out image

Convert image

Open music file (own format)

Save music file (own format)

Save MIDI file

Save NIFF file

Scanning

This version of SharpEye does not support direct scanning. You should scan the image(s) you want to process, save them as black and white Bitmap (.bmp) or TIFF (.tif) files, then drag them into SharpEye.

General

Make the scan as straight as possible. SharpEye automatically copes with small amounts of skew, but accuracy is highest when the scan is straight. Be sure that the printed music is flat on the scanning

surface. If the paper is not flat, it's likely that the image will be smudged or distorted, and this will confuse SharpEye.

Scanner settings - colours

You should set the colours to black and white. Different scanner drivers use different terms for a black and white image. It may be described as "Monochrome" or "Line art" or "Bi-level" or "One bit per pixel (1bpp)", or there may be an "OCR" setting which is suitable.

By default scanners will often produce a full colour image, which is no good for SharpEye. SharpEye will convert some greyscale TIFF files into the black and white format it needs, but this is not ideal since it wastes time and disc space.

Scanner settings - resolution

You should set the resolution to 300dpi for most printed music. A higher resolution (eg 400dpi) may be useful if the music is printed small or a lower resolution (eg 200dpi) if it is large.

As a check to see if you've got things right, an uncompressed scan of an A4 page at 300dpi will be about 1Mb in size.

Another check: when you have loaded the file into SharpEye, and displayed it at 100%, the distance between the staff lines should be very roughly 20 pixels. SharpEye will attempt to read music when this spacing is as low as about 10, or as high as 40 or so, but accuracy tends to suffer when the scale is too small and speed suffers when it is too large. The standard mouse pointer (in W95) is 16 pixels high.

Scanner settings - brightness

The default brightness level is usually fine. One thing to watch is that with high quality printing, the staff lines may be very thin (less than 1/300 inch) and may become broken when scanned. In this case reducing the brightness may improve things a lot. With poorer quality printing the lines are usually thicker, or already broken, and the default brightness level is usually best.

Scanner settings -   misc

Some scanners have settings such as 'photo', 'half-tone' or 'dithered'. These attempt to represent grey levels with patterns of black dots and are not helpful for OCR (music or text), so turn these settings off. Options such as 'text' or 'line-art' are probably a good thing.

See the section "Image quality" in the on-screen help to get an idea of what kind of scans SharpEye can cope with.

Loading and Editing an Image

To load an image into SharpEye, you can drag the file from Windows Explorer into the "Input Image" window. You can also load images via an Open File dialog. Choose Image - Open from the main menu, or click on the leftmost toolbar button, then double click on the file you want to load. In either case it will be displayed in the "Input Image" window.

You can zoom the view of the image to different sizes. This doesn't change the image, just the way it looks on screen. Either use Image - Zoom or the two zoom buttons.

You can invert the image if necessary (swap black and white) from the Image menu.

You can also rotate the image by multiples of 90 degrees from the Image menu.

Reading the image

To convert the image, choose Image - Read from the main menu, or click on the button with the blue arrow.

This will start another program (the "music OCR engine") which does the conversion. A small window will open which shows some information about the process as it proceeds. You can minimise this window if it is in the way.

The conversion can take some time, depending on the size of the image and the complexity of the music - and the speed of your computer of course. Once the engine has finished, the result will be loaded into the music editor for you to check and edit.

You can stop the reading process once it has started by choosing close from the "Music OCR Progress" Task Bar menu, by clicking the close icon in the "Music OCR Progress" window (if it is open), or by choosing "Stop Reading" from the Image menu in the main window.

If the recognition is poor, please see the section "Scanning" above, and the section "Image quality" in the on-screen help.

Zones

If you want to process only part of the image you can create a zone around the area. You can use the mouse to drag out a rectangle in the image window. This can then be adjusted using the eight handles around its border, or moved as a whole by picking it up in the middle. You can delete it using the Delete key or from the Image Menu.

You don't need to know what the engine is doing, but you may find it interesting. It goes through the following stages:

Starting - Loads data files and the image.

Finding edges - Traces around the shapes to model them as polygons.

Finding skew angle - Finds the skew of the image to correct for it (up to 2 degrees or so).

Finding staves - Finds the scale of the staves and locates them.

Reading text - Uses traditional text OCR to read lyrics etc.

Finding noteheads - Searches along staves and ledger lines for notes.

Finding beams - Locates shapes that may be beams.

Finding verticals - Locates shapes that may be stems or barlines.

Finding slurs - Locates shapes that may be slurs and ties.

Consistency checking - Checks the shapes found so far for consistency with one another.

Erasing objects - Removes the shapes found so far from the image

Finding symbols - Locates all the fixed size symbols: clefs, rests, flags, etc.

Analysing - More consistency checks, and joining everything together.

Music Editor

Most of the time you are using SharpEye, you will be checking and correcting the output in the music notation editor. The next chapter is devoted to this.

Saving Music Files

You can save the music as a MIDI file, a NIFF file, or in SharpEye's own format. If you save it in its own format, you can load it back later and continue editing. If you save it as a MIDI file, you can play the file or edit it in a MIDI editor/sequencer. If you save it as a NIFF file, you will need a program that imports NIFF files to make use of it. For more details see NIFF and Lime. SharpEye does not load MIDI or NIFF files.

You can find the usual Save and Save as options on the Music menu (for saving in SharpEye's own format) and the MIDI and NIFF menus. There are also three buttons. The one with the M is for SharpEye format, the one with the magenta notes on is for MIDI,and the one with an N on a green background (to remind you of Lime) is for NIFF.

There is also an option on the NIFF and MIDI menus to save a temporary file (in Windows\Temp) and then immediately open it (as if you had double-clicked on it). This provides a simple way of transferring

a NIFF or MIDI file to another program. It is not guaranteed to work with any program, and will of course depend on how you have the file associations set up for .mid and .nif files.

Saving as MIDI

There are a few options for MIDI output available from the Options menu:

You can set the tempo for the piece. The tempo is in quarter notes (crotchets) per minute, regardless of the time signature.

You can set the MIDI velocity (ie volume) for all the notes in piece. This is in the range 0-127, and the default is 64. For example, if you are using Cakewalk to work on the MIDI files, it is convenient to set this value to 100, since Cakewalk gives any new notes you insert a velocity of 100. Note that if you set the velocity to zero, you will get a silent MIDI file which can be confusing!

You can decide whether repeat signs are taken account of or ignored when generating the MIDI file.

You can choose whether to include any lyrics that SharpEye has found. Note that it is not possible to put more than one line of lyrics into a MIDI file - SharpEye puts in the top line of lyrics if there is more than one. Also note that some programs that import MIDI files ignore any lyrics.

You can make SharpEye put different voices on different channels, so that notes with up stems will get a different channel number to those with down stems. This can be set per stave using the circles at the start of the score. You can toggle between one circle (one channel output for that stave) or two by clicking on them.

You can join pairs of staves. This puts both staves on one MIDI channel. This also changes the way that SharpEye analyses the rhythm, and is described in in more detail in the section "Joining staves".

Short notes wrong

If notes have the wrong length when imported into a MIDI sequencer, check that the settings in the sequencer are appropriate. Sequencers often expect input to be played in on a keyboard, and may be set up to force notes into a particular rhythm. This may misinterpret short notes and rests in MIDI files.

Saving as NIFF

NIFF (Notation Interchange File Format) is a music notation format which can contain much more information than MIDI which stores little more than the sound of the music. For example, information about stem direction, beaming, expression marks such as staccato and accent, ties and slurs are all lost when SharpEye makes a MIDI file. Even clefs and barlines cannot be put into a MIDI file, though they may be reconstructed by the program reading the MIDI file. NIFF was designed to overcome these limitations and provide a publicly documented format for interchanging music notation information between programs.

NIFF is becoming increasingly popular, but it is a very flexible format and different people are using it in different ways. SharpEye can export two kinds of NIFF file, and you can choose via the NIFF options dialog from the Options menu.

The 'Musical' NIFF export writes a file which is rhythmically consistent, that is, notes do not overspill measures. In order to acheive this, SharpEye will omit gray notes.

The 'Graphical' NIFF export writes a file similar to that generated by SmartScore (another music OCR program). Gray notes are included. In this case, there will be some rhythmic errors unless you ensure everything is correct before exporting.

Both Musical and Graphical NIFF export include the positions of all the staves, notes and rests and some other symbols. The Graphical export leaves more work for the importing program to do, and may not be understood by some programs. On the other hand it includes the gray notes, so if the importing program can cope with rhythmic inconsistencies, this may be an advantage.

There is also an edit field where you can enter the scan resolution in DPI. It may seem strange to have this under NIFF options, but it is only when saving as NIFF that the scan resolution has any effect on the way SharpEye behaves. If you set this correctly, the dimensions in the NIFF file will be

(approximately) the same as the original. If it is set incorrectly, the whole NIFF file will be scaled, but it will still be a valid NIFF file.

In order to make use of the NIFF facility you need a program that imports NIFF files. The best-known program that does this is a music notation editor called *Lime*. Lime is shareware: you can find out more about it, and download a trial version from **http://www.cerlsoundgroup.org/.** There are several other notation programs which have or will soon have NIFF import. If your favorite notation program does not import NIFF, and you would like to use SharpEye with it, ask the producers to add this feature.

Parts and voices

NIFF has provision for both parts and voices, with voices being a subdivision of parts. SharpEye does not assign voices, but it does give each note a part ID. This should enable you to extract individual parts in a NIFF editor. Normally there is one part per stave. If you join two staves at the start of the score, they will become one part in the NIFF file. You can make SharpEye give notes with up stems a different part ID to those with down stems. This can be set per stave using the circles at the start of the score. You can toggle between one circle (one part ID for that stave) or two by clicking on them.

Multi page scores

Music scores are often more than one page. You can deal with these in several ways. You can process pages individually as usual, and join them together in a MIDI editor or NIFF editor.

Alternatively, you can convert the pages individually into SharpEye's own output format, and then join them in SharpEye. For example you might have scans of a three page score called page1.tif, page2.tif, and page3.tif. You can load these one by one into SharpEye and convert them, saving them as page1.mro, page2.mro, and page3.mro. Then load page1.mro into SharpEye, then page2.mro, then page3.mro. Each time you load an output file into the editor when there's already a score there, you will be asked if you want to replace the existing score or join the new one onto the end. Obviously in this case you should choose Append.

You can load the *.mro files by dragging them into SharpEye's main window, or via the Open dialog. You can do corrections before and after joining. SharpEye will automatically load the correct image as you edit different pages, as long as the image files are still where they were when first converted.

Note that there is currently no way to undo an append operation, so it is best to save your work before joining something onto it. This is particularly important if you have several pages joined together and have spent a lot of time correcting them. Make sure you save this before adding another page which might be from a bad scan or even the wrong page.

Batch processing

SharpEye has a 'batch mode', so that many images can be processed at once. These might be several pages from the same score or separate pieces of music. The batch mode converts a set of image files into music files in SharpEye's own format. If they are from the same score you will still have to join them manually as described in the section 'Multi-page scores'.

In order to set up a batch, choose 'Batch process' from the Image menu. This opens a dialogue where you can choose the images to be converted and the folder where the output music files will be put.

The 'Add files...' button opens the standard Open File dialog, where you can select one or more images (TIFF or BMP files). You can add images from several folders, but note that they must all have different names.

If you want to remove some files from the batch, select them and use the 'Remove selection' button.

You also need to choose an output folder where all the music files (*.mro files) will be put. The 'Browse...' button allows you to do this. If there are already music files in the output folder

with the same name(s) they will not be overwritten. It is advisable to use an empty folder for the output folder to avoid confusion.

Now you can click on 'Start batch' to start the processing. A window will open to show you how things are going. This shows a list of the files and their status. The image being processed will have 'Converting' next to it. Once it is finished it will become 'Done' or 'Error' if the conversion fails for some reason. You will not see the usual 'Music OCR Progress' window. If there are any errors, a log file 'SharpEye batch errors.txt' will be created in the output folder where you can look for more details. This will overwrite any previous file with the same name.

While a batch is being processed various options are disabled. You can stop the batch by clicking on the 'Stop batch' button in the Batch progress window, or by closing this window.

Miscellaneous Options

This covers the setting and saving of various options.

Window Positions

You can arrange the image and music windows as you like, and then choose Options - Save window positions. This will set the initial positions for the next time you start SharpEye.

MIDI output options

These are saved when you exit the program so that they will still be as you set them next session. The settings in the MIDI options box are used for newly converted images.

However, note that these values are also saved in the corresponding SharpEye music file (.mro file), so if you load a SharpEye file, this will replace the settings in the MIDI options box.

NIFF output options

These are saved when you exit the program. They are not stored in .mro files.

Directories for image and music files

SharpEye saves the directories you use for images, its own output files, MIDI files and NIFF files when you exit the program.

The Music Editor

What it does and doesn't do

The music editor in this version of SharpEye never formats the music. For this reason alone it is not suitable as a general purpose music notation editor. It is designed only for correcting the output from the music OCR process.

On the other hand, it has several features that are designed to help with the corrections.

The music editor window is linked to the image window, so that when you click in the editor, the image scrolls to the same place in the image.

It displays warning symbols at the end of each bar (measure) that has errors or ambiguities in the rhythm. It also draws any noteheads that it can't understand in grey. This works a bit like a spellchecker, and directs your attention to likely errors.

It is intended to be easy to learn. Almost everything can be done with the mouse and the Delete key.

SharpEye does not try to ensure that what you do looks good. There are many ways of writing a piece of music which will produce the same sound (and in most cases the same MIDI file). Some are sensible and some aren't - SharpEye doesn't try to make you sensible! SharpEye is also fairly limited in its ability to avoid clashes of symbols, and in complex or crowded music symbols may overlap one another.

Warnings about rhythm problems

SharpEye uses two methods to indicate problems with rhythm. At the end of each measure that contains a problem, just below the bar line, it displays a warning symbol (a blue triangle). In such a measure, it may also display some of the notes in gray instead of black. This means SharpEye is not sure when they should be sounded. SharpEye also displays ties, slurs and lyrics in gray if it doesn't know which notes to attach them to.

If you see the warning sign, but no gray notes, it means there are not enough notes or rests to fill the measure. This is probably because SharpEye has missed a note or has made a note too short, perhaps by missing a rhythm dot. If there are warnings on lots of measures, it may be a time signature error. If SharpEye misses, or misreads a time signature, or if the music is from the middle of a piece and so contains no time signature, it will cause lots of warnings.

If there are gray notes, there are two main causes. The first is the opposite of the problem above: SharpEye has 'seen' a note (or rest) that is isn't really there, or made a note too long by missing flags or beams, or there is a time signature error.

The second cause of gray notes is a bit more subtle. It may be that there are neither too few nor too many notes, but it is still not clear when they should sound. This typically happens in keyboard music, where two staves are used for one instrument. By default SharpEye looks at each stave individually when analysing measures. But keyboard music often only makes sense by looking at both together. The best cure here is to jointhe two staves at the beginning of the score. An alternative is to add rests to fill in the gaps in each stave, but that's usually a lot more work!

Selections

You can select objects by clicking on them, and they will become red. Once they are selected you can modify them or delete them.

Clicking on a barline or time signature will select all the ones vertically above and below in the same system (ie all the ones that occur at the same time).

When you click on a notehead that is part of a chord, it will become red and the rest of the chord will become dark red. This is to indicate that you can modify either the chord or the single note but pressing Delete will just delete the note. You can select the whole chord by double-clicking.

You can select multiple notes and chords by using Control-click, as long as they are all in the same stave.

You can select a complete line of text by double-clicking on it. It can then be deleted but not otherwise modified.

When you have selected something, you can delete it with the Delete key. Also a toolpane with dark red symbols will open at the top for modifying the selection.

Deleting objects

Symbols are deleted by selecting them and using the Delete key.

Note that some objects - rhythm dots, triplets, accidentals, and articulation marks such as staccato, tenuto, accent and the pause sign (fermata) are regarded as properties of notes and not as symbols in their own right. In order to 'delete' these, you should select the note or chord they belong to and modify it appropriately.

If you select a lyric word, the delete key operates in the editable field in the toolpane, ie deleting individual letters. If you select a whole line of text (by double-clicking) you can delete it with the delete key.

You cannot delete the rightmost barline in a system.

Modifying Symbols

The general method is to select the object(s) you want to change in the score, then click on the symbol in the toolpane that you want to change it into.

Clefs and keys

These are straightforward, the only slight complication is when a key signature changes the key to C. The natural sign in the key signature toolpane is for this. If you change an existing key signature using this, it will show as the right number of natural signs to cancel the last key signature.

Time Signatures

If you can see the symbol you want, click on it as with clefs and keys. For less common time signatures, enter the signature in the edit box (eg "12/16") and then click on the p/q symbol next to it.

Lyrics

You can edit lyrics a word (or syllable) at a time in the edit field. If you insert a space in the word, SharpEye will split the word into two at this point. It attempts to attach the parts to nearby chords. If this fails, one or both parts will become grey, and you will need to move them.

Rests

You can change the kind of rest and also set the number of rhythm dots. To remove any rhythm dots, click on the empty circle. (This circle is used to mean 'none' or 'nothing' elsewhere too.)

You can set or remove a pause sign (fermata). The fermata symbol toggles the symbol on or off.

You can set or remove a triplet on a rest and a note or rest on either side by selecting the rest and clicking on the -3- symbol. See under modifying notes for more details.

Notes and chords

If you have selected a single note head you can change the accidentals for a single note head, or remove them by clicking on the empty circle.

Most modifications apply to a note or to the whole chord if the head is part of a chord. You can select multiple chords and apply the same operation to all at once. A couple of operations only make sense if more than one note or chord is selected.

At the left of the toolpane there is a tool for swapping the stem direction of a note. This will swap all the notes in a beamed group if you select one note in the group.

Next is a tool for swapping between flags and beams. If you select some notes which are not beamed together and click here, SharpEye will attempt to join them. Note that SharpEye will join quarter notes (crotchets) in this way. This may not make musical sense, but it is useful for correcting common recognition errors (eg due to broken stems). If you select one or more notes that are all within a beamed group, this will separate them into single notes with flags. The notes must all be in the same measure and stave.

You can set the number of dots as with rests.

You can change the duration by clicking on one of the note symbols.

You can set or remove a staccato, tenuto, pause, or accent. These tools toggle the symbol on or off.

You can set or remove a triplet by selecting the middle note and clicking on the -3- symbol. You cannot set the rarer kinds of irregular notes, though duplets can be mimicked using dotted notes. Note that when you change the time signature, SharpEye will recalculate which notes it thinks are triplets, and may override what you have done. You should therefore make sure the time signature is correct first. (It is sensible to get the time signature right first for other reasons too.)

To the right of the accidentals is a tool for vertically aligning selected notes. They must all be in the same measure, but not necessarily in the same stave. The horizontal positions of the selected notes will be averaged.

At the right end of the pane is a tool for adding and removing ties. If a note or chord has a tie to its right this will remove it. Otherwise SharpEye will try to add a tie from the note or chord.

Note that slurs are drawn in thin lines, and ties with thicker lines to help distinguish them. Also note that ties or slurs which are not attached at both ends are shown in grey. Ties and slurs can also be edited by dragging - see the next section.

Moving symbols

You can move some objects by dragging with left button.

Note heads can be moved up and down, and placed either side of the stem.

Rests can be moved freely, as long as they stay in the same measure and stave.

Clefs and key signatures can be moved horizontally, as long as they stay in the same measure and stave.

Lyric words can be moved horizontally within the same line.

Slurs can be moved within a system. If you drag near one end you will move that end; the other end stays fixed. If you drag near the middle you will be able to move the slur as a whole.

Creating symbols

The right button

You always use the right button to insert things.

If you have been selecting things, the first right click will not insert anything, but will show the insertion toolpane, with a symbol similar to the last selection highlighted. The insertion toolpane uses green symbols to distinguish it from the modification toolpanes.

Choosing a symbol

There are so many possible variations of musical symbols that to show all of them would make things hard to find, or complicated to choose. Instead the insertion toolpane shows the basic kinds of symbol available. You should choose a symbol that is close to what you want and then modify it after inserting it.

For example, in order to insert a 3/4 time signature, you would choose the only time signature available in the toolpane (a 4/4) and insert that in the right place. Then left click it to select it and change it to a 3/4 in the time signature toolpane. Barlines work in a similar way.

The three shapes of clef can be chosen directly. If you need a tenor clef you need to insert an alto clef (C clef) and then change it.

There are two key signature symbols, one for flats and one for sharps, which insert a single sharp or flat. For keys with more than one sharp or flat, insert either of these then modify it. If you need a key change to the key of C insert either of these then change it by clicking on the natural sign in the key signature toolpane.

You can choose all the basic durations of rests, and add rhythm dots later if need be.

Notes and chords are a little more complex. You can only insert notes with flags, not beams. You can set the stem direction using the three symbols on the left (up stem, let SharpEye decide, down stem).

To make chords, you add note heads to notes that are already there. For this use the symbol (which shows a single note and a two-note chord) just to the right of the notes and rests. Do not try to make chords by lining up two notes - SharpEye will regard them as separate notes and they will not behave as expected.

To insert a lyric word, choose the "la-la" symbol. Note that it is only possible to edit text in an existing line of lyrics but not to insert a new line. Sometimes SharpEye will miss a complete line (usually when the syllables are few and far between) and you will have to enter the text in a MIDI or NIFF editor.

To insert a slur, choose one of the curves just below the "la-la" symbol.

When you have chosen a symbol to insert, the pointer will change to indicate this, but remember to use the right button - the left button will still select things.

Joining staves

It is sometimes necessary to join two adjacent staves in a system, usually because they are both to be played by one instrument (eg keyboard or harp). This enables SharpEye to analyse the rhythm properly, and will put both staves on the same MIDI channel.

The black rectangles at the start of the score are for joining staves. Initially these are horizontal, indicating the staves are separated. If you click on one, it will become vertical, joining a pair of staves. You can reverse the operation by clicking again.

It is not always necessary to join staves in keyboard music. Sometimes the right hand and left hand parts make sense independently. Occasions when it is necessary include:

(1) Where a single melody line is written on two staves, wandering between both, and with no rests to fill in the measures where no notes are sounding.

(2) When the main rhythm is given by the left hand part of a piece for keyboard, and notes are aligned with this in the top stave without rests or other notes to indicate when they sound.

If you're wondering what the circles at the start of the score are for, see under Saving music files.

Note for experts: It might seem better if SharpEye always looked at neighbouring staves in a system to analyse the rhythm. However there are problems with this approach as well. While the rule that notes that sound together should be vertically aligned is usually followed, it is not always the case in printed music, so this assumption can lead to errors too. Also, if SharpEye makes an error in one stave, it might spread into other staves if it relied too much on vertical alignment. Future versions may handle this differently.

Irregular Systems

If SharpEye finds systems with different numbers of staves in the page (or when appending, in the score) it will add extra empty staves at the bottom to make the score 'rectangular'. This may be correct, but often it isn't.

In order to deal with this, you can use the green arrows that are shown between systems. By default they join each stave to the corresponding one in the next system, ie, they are 'parallel'. If this is wrong, you can drag the arrow heads up or down to join the correct pairs of staves.

For example, it may be that all instruments are shown on the first system of a score, but on later systems, instruments are dropped if they are not playing at that point. SharpEye will add empty staves at the bottom, but unless it happens to be the bottom instrument that was dropped, this will mean that some instruments are mismatched. However, if you change the linking arrows you can correct this, by linking the missing instruments to the empty staves.

Not every score layout can be dealt with in this way, especially when an instrument or group of instruments uses a variable number of staves throughout the piece. In such a case you may have to deal with the score in sections and join them together with a music notation or MIDI editor.

Editing guidelines

If you're not sure how to go about checking and correcting a score, here are some suggestions.

Check the time signature(s) first. There's usually just one at the start of the music, but some music has changes in the middle. If there are warnings on most of the measures, the time signature is probably wrong.

Next check the clefs and key signatures. These usually occur at the left of each system, sometimes also in the middle. If you export and play the MIDI file, and it mostly sounds OK, but it sounds horrible for some section(s), its likely to be this kind of error.

Look at all the measures marked with warnings.

Remember that the warnings are like those from a spellchecker and don't catch all errors. Proofreading music to ensure there are no errors at all is difficult. Use your ears as well as your eyes.

Editing of ties, slurs and lyrics is usually best left to last. Remember that they will be shown in gray until SharpEye can attach them to notes.

If you have a MIDI editor it is up to you how much editing you do in SharpEye and how much you leave to do later. It is almost essential to ensure the time signatures, clefs, key signatures and barlines are correct before exporting, but detailed note editing can be done either way. If you export a score which contains gray notes they will not be put into the MIDI file.

Keyboard shortcuts

There are some keyboard shortcuts to speed up the process of correcting errors. These use the function keys. Not everything can be done in this way, only the more common operations.

F1 starts the SharpEye help.

The other function keys only operate when inserting, and when modifying notes and rests. The keys F5 through F10 are assigned note durations as follows.

```
    F5        F6        F7        F8        F9       F10
  1/32      1/16      1/8       1/4       1/2        1
```

In insert mode, these select notes of these durations. In modify mode, they changed the selected rest or notes to these durations.

When in insert mode, F2, F3, and F4 can be used to set the stem direction of the note to be inserted, in the same order as the tool pane: F2=up, F3=auto, F4=down. F11 selects the 'add head to chord' option.

When modifying notes, F2 swaps stem direction, F3 changes flags to beams or vice-versa, F4 cycles through zero, one or two rhythm dots, and F11 cycles through the common accidentals: none, sharp, flat, natural.

When modifying rests, F4 cycles through zero, one or two rhythm dots.

The available shortcuts are summarised in the diagram below. The first line relates to the create tool pane, the others to modifying notes and rests.
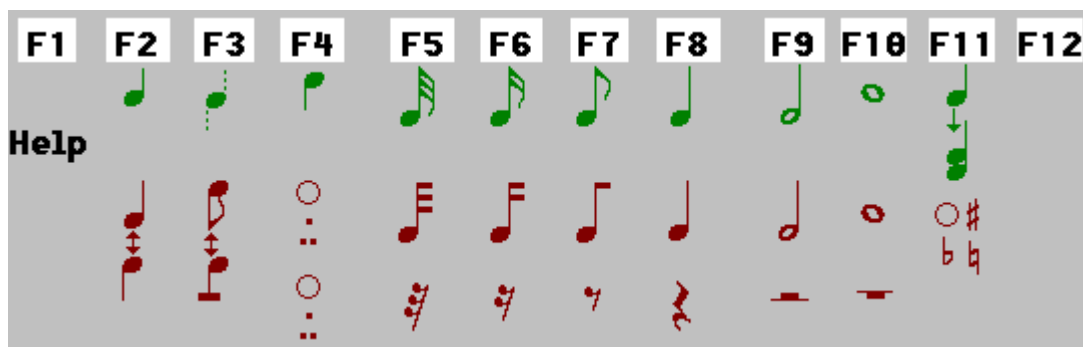
Problems and Tips

Problems and Tips - Introduction

There is a lot of variety in musical scores: both the music itself and the styles and conventions used in the layout. There is much variation in the quality of printing. There are also a lot of scanners available, often with many options, which can be confusing. All this means you may have some difficulty getting SharpEye to work well.

This section tries to deal with the most common problems you're likely to encounter, and where possible, gives advice about dealing with them.

If you have a problem that is not covered here or think you have found a bug in SharpEye, there is information on the SharpEye website and on reporting bugs in the "Other Information" section.

Limitations on notation recognised

This describes some limitations on the kind of music you can expect SharpEye to read.

It only recognises standard 5-line staves.

It can only deal with one or two different sizes of stave on the on the same page.

It does not deal properly with scores where the same instrument or instrument group uses different numbers of staves in different systems.

Chords and groups of beamed notes which span more than one stave are not read properly.

It does not currently recognise: dynamic marks such as pp, mf, and hairpins; text other than lyrics; guitar chords or guitar tablature.

There are some limits on size - maximum 50 staves per system, maximum image size 15000 width by 30000 height - which are not likely to cause practical problems. Only 15 channels are exported as MIDI. (Channel 10 is avoided since it is usually used for percussion.)

Image quality

Please see the corresponding section in the on-screen Help, since it is important to compare what you see on screen in the manual with what you see on screen in SharpEye's image window.

Tips and techniques

Adding notes to the right stave

Sometimes, notes on ledger lines may be much nearer a neighbouring stave than the one they should belong to, which can cause a problem when inserting such notes.

When deciding which stave to insert a note into, SharpEye looks at symbols already belonging to each stave as well as the position of the staves themselves. So if there are already notes on ledger lines nearby it will usually add further notes to the correct stave. But if not, add the note near the correct stave, then drag it up or down to the right position.

Selecting overlapping note heads

When two note heads coincide (as when two voices sound together) you can select one head by clicking towards its stem. Eg, click just above the centre of the head to select the one with the up stem.

Partial measures

At the start of a score, and next to bar lines which are double lines, or repeat signs, there is a 'partial measure' which may or may not be a complete measure. In such cases SharpEye tries to guess the length by looking at the notes. This means that in such 'partial measures' the warnings may be confusing, and you need to check these areas carefully. The warnings should disappear when everything is right, but they may point to the wrong measure as being the source of the problem.

Split measures

Occasionally, scores are written with a measure split across two systems. SharpEye doesn't really understand such things, and will assume that there are two measures. However, if you make the bar line at the end of the first system a double bar line and make sure the notes are right, you should be able to get SharpEye to 'join' the two partial measures together.

Gray notes won't go

There can be several causes for this. Here are some things to check:

Vertical alignment

Sometimes notes which should sound together are not vertically aligned. SharpEye can correctly analyse some measures where this happens, but not all. You may have to move some notes to make things clear. If the heads overlap significantly, or the stems are very close,they will be regarded as sounding together. More rarely the opposite problem happens, and notes which should sound separately overlap enough to confuse SharpEye.

Chords entered as two notes

It is possible, for example, to insert two or more 1/4 notes (crotchets) so that together they look like a chord. However SharpEye will still regard them as separate notes which may confuse the rhythm analysis.

Missed notes in beamed groups

If SharpEye misses a note in the middle of a group of notes that are beamed together, it is not enough to just add a note of the right duration. You must also join it to the group.

Rests in the wrong voice or stave

This is normally only a problem with multiple voices per stave. SharpEye expects rests in a voice to be horizontally aligned with the nearby notes in that voice. You may have to move a rest up or down to ensure this is the case. It is also possible for a rest to be put into the wrong stave if it is nearer the wrong one than the right one. In this case you will have to delete the rest and insert a new one in the right stave.

Hidden overlaps

Occasionally, a symbol may be hidden by another symbol. When note heads are very close, a dot on a note may be hidden by another notehead. Or a rest (eg whole or half note rest) may be hidden by something. If you can't guess what the problem is, you may have to delete symbols until you can see what is going on.

Incomplete voices

When there are two voices in one stave, and one of the voices is incomplete (ie it doesn't contain enough notes or rests to fill the measure) some of the notes may be grey. If the notes line up with ones in the other voice, SharpEye will understand them but if they don't line up, it won't. Here is a simple example. In order to make the eighth note black, you can add rests to the up stem voice.

SharpEye is more 'strict' about these things than some programs, but it does greatly reduce the chance that errors end up in the MIDI file without you noticing.

Images from unusual sources

Sometimes you may want to convert an image that was not scanned from printed music. It may have been generated by another program, or found on the internet, or scanned as a grey scale or colour image and then converted by some image processing program. These images often look OK to a person but convert badly or not at all with SharpEye.

A few points:

Often the scale of such images is too small. A typical scan at 300dpi will have the staff lines about 20 pixels apart, and SharpEye can cope with a range of about 10 to 40 pixels. If the spacing is less than 10, SharpEye will probably give up with a "Can't find any staves in image. Music-OCR abandoned" message. Even if you scale the image, it is likely the shapes will be too "chunky" and the recognition poor.

If the image is grey scale or coloured, it may look good to the human eye, but converting to the black and white image that SharpEye needs can cause a lot of damage. Just as scanners often have a 'dithering' option, image conversion programs have a similar option, which makes matters worse, so make sure any such option is turned off.

Finally, don't judge SharpEye's performance on such images - unless these are the main kind of images you want to process.

Black rectangles in display

A few people with ATI graphics cards have reported that the music display shows black rectangles instead of musical symbols. This appears to be due to a bug in the device driver. It can be cured by going to Settings, Control Panel, System, Performance, Graphics, and moving the slider down to position 2 (out of 4).

Other information

Web site

The website **www.visiv.co.uk** contains the latest version of SharpEye, work arounds for problems when using SharpEye, the latest information about registering, and so on.

This should be the first place you look if you can't find what you want here.

Reporting Bugs

(This does not apply if you obtained SharpEye from another company such as Optek Systems who provide support: in that case please contact them.)

If you find a bug when using SharpEye, please visit the website **www.visiv.co.uk** if possible. There may be a version of SharpEye with the problem fixed or an explanation or work-around for the problem you're having.

If that doesn't help, please send a description of the problem to me. You can use the form below as a starting point.

If you have a particular image or one of its own format music files that causes SharpEye to crash or otherwise misbehave, please don't delete it! I know it is pain for you, but that file may be valuable to me, and I may well ask you to send it.

Please try to be as precise as you can about how to make the problem occur. If I can reproduce the problem on my machine I can almost certainly fix it (assuming it is my fault). If I can't reproduce it I almost certainly can't fix it.

SharpEye version:

Windows version:

Memory:

Other system details that seem relevant:

Problem happens always/sometimes/once

Description:

Email address: support@visiv.co.uk

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