SMPTE Output

The Complete
SMPTE Generator
For Your Amiga

STUDIO 16
E X T R A S

SunRize

SMPTE
Output™

The Complete
SMPTE Generator
For Your Amiga

SunRize
INDUSTRIES

Credits

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Chapter 1

What You Need

Amiga Requirements

In order to run SMPTE Output here's what you need:

- an Amiga

- at least one megabyte of random access memory (RAM)

- a floppy drive or hard drive (hard drive recommended)

If you have the SunRize AD1012 or AD516 digital audio hard disk recording system, you can use SMPTE Output with them. You can also opt to use any Amiga genlock, including the Video Toaster, to give SMPTE Output the ability to output time code which is in sync with an external video source.

What Kind of Amiga?

SMPTE Output will work with any Amiga computer with AmigaDOS 1.3 or higher. SMPTE Output uses the built-in audio hardware of your Amiga to generate SMPTE time code.

How Much Memory?

If you will only be using SMPTE Output by itself you should have a total of at least one megabyte of RAM in your Amiga.

If you will be using SMPTE Output as a Studio 16 module you should have a total of at least three megabytes of RAM.

More is Better

Like mainframe computers and engineering workstations, the Amiga lets you run multiple programs at the same time. This is called "preemptive multitasking". The more RAM you have the more room you'll have to multitask. For example, with enough RAM, you can run SMPTE Output while Studio 16 is running on the screen of Bars & Pipes Professional, a MIDI sequencer from The Blue Ribbon Soundworks. You could be running other programs too, like a word processor for taking notes during a recording session; writing lyrics to a song in progress; or making changes to a video script.

Most Amigas can be expanded to at least nine megabytes of RAM. To see how much RAM you have you can use the AmigaDOS "avail" command:

- open a command line interface (CLI) window or a shell window

- type **avail** which is an AmigaDOS command for seeing how much memory you have

- hit the return key on your Amiga keyboard

Look at the column labeled "Maximum" to see how much chip RAM, how much fast RAM and how much total RAM is installed in your Amiga. Again, if you will only be using SMPTE Output by itself you should have a total of at least one megabyte of RAM in your Amiga. If you will be using SMPTE Output as a Studio 16 module you should have a total of at least three megabytes of RAM.

Note: *Chip RAM is memory your Amiga uses for showing pictures and playing 8 bit sounds using its built-in hardware, fast RAM is memory your computer uses for working with data, and total RAM is chip RAM and fast RAM added together.*

If you don't know how to open a CLI or shell window, consult your Amiga's manual.

If you find you need more RAM, check with your Amiga dealer.

Optional Hardware

AD1012/AD516

SMPTE Output will work in conjunction with the SunRize AD516, a 16 bit eight track, stereo digital audio hard disk recording system, or the SunRize AD1012, a 12 bit, four track, mono digital audio hard disk recording system. These systems come with Studio 16 software. You can install SMPTE Output as a Studio 16 module.

Genlock

SMPTE Output will work with any genlock device, including the Video Toaster. If you feed a black burst or video signal into your genlock or Toaster, SMPTE Output will generate time code which is in sync with the video signal.

Chapter 2

SMPTE Output Overview

What it Does

SMPTE Output turns your Amiga into a very flexible SMPTE Time Code Generator and SMPTE master controller. SMPTE Output lets you use your mouse to operate push button controls, much like a tape deck, for starting and stopping SMPTE generation. Rewind and fast forward buttons let you scan from one SMPTE time to another.

You can instantly jump to preset SMPTE times using the ten autolocate registers. You can enter SMPTE times using the computer keyboard or grab them on the fly using simple keyboard commands. Other keyboard shortcuts give you the option of using your computer keyboard instead of the mouse for most commands.

Applications

With SMPTE Output you can record time code onto the audio tracks of audio or video tapes. If you have an Amiga genlock your time code can be correctly synchronized to a video signal.

You can also use SMPTE Output as a master controller for controlling combinations of SMPTE hardware and software, including:

- digital audio recording with the SunRize AD1012 or AD516 digital audio hard disk recording systems

- MIDI sequencing with Bars & Pipes Professional from The Blue Ribbon Soundworks, Ltd.

- multitrack recording with SMPTE synchronized multitrack audio recorders

Time Code Support

You can choose between standard SMPTE/EBU time code signals:

- 30 frames per second (fps) time code

- 30 fps drop frame time code

- 25 fps time code

- 24 fps time code

SMPTE Output generates longitudinal time code (LTC), the type of time code which is typically recorded onto standard audio tracks on video and audio recorders and onto specialized "address" tracks on professional video recorders.

Chapter 3

Installation

Stand Alone Or Studio 16 Options

You can install SMPTE Output as a stand alone program and, if you have Studio 16 software, you can also install it as a module under Studio 16. Studio 16 is the software that comes with the SunRize AD1012 and AD516 digital audio hard disk recording systems.

How To Install The Software

SMPTE Output comes with an installation program which will automatically install the program and the needed libraries for you. You can tell it where you want the program installed.

For stand alone operation the installer program will create a drawer called "SMPTEOut" on the drive or hard drive partition you select. It will put the SMPTE Output program inside that drawer. If there is a Read_Me file, the installer program will place it in the drawer with the SMPTE Output program. The installer program will also put the SunRize gadlib.library, interface.library and studio.library in your Libs drawer.

If Studio 16 is currently installed, the SMPTE Output module installation will proceed as above, but it will also add the new module to the Applications drawer inside your Studio 16 drawer. The installer program will reinstall the gadlib.library, interface.library and studio.library in your libs directory.

To install SMPTE Output on your system:

1. **Put the SMPTE Out disk into any floppy disk drive.**

2. **Double click the SMPTE Out disk icon which will appear on your workbench.**

   A window will appear with an icon labeled "Install.SMPTEOut". This is the program which will automatically install SMPTE Output on your system.

Note: *There may also be a "Read_Me" icon. If so, double click the Read_Me icon to read about any changes or additions to SMPTE Output.*

3. **Double click the Install.SMPTEOut icon.**

   You should now see the installation window. On the bottom line it will give you instructions. The first instruction you will see is "Select a device name or help".

   In the scrolling text field at the top of the window you should see a list of all the drives and hard drive drive partitions available to your Amiga.

4. **Click the name of the drive or partition on which you want to install SMPTE Output. If you have Studio 16 you probably will want to select the hard drive partition where you previously installed Studio 16.**

Note: *if you are installing SMTPEOutput for stand-alone use on a floppy only Amiga system, you can install it on a workbench disk. Just make sure the disk has at least 150k of free space. One way to free up space on the floppy disk is to delete any fonts you may not be using.*

   For further help with the installation program, click the "Help" button. To exit the installation program, click the "Abort" button or click the close gadget on the upper left corner of the window.

5. **To start installing SMPTE Output on the drive you selected, click the large "Begin Install" button.**

   You will see a requester which will ask:

   "Are you sure you want to install SMPTE Output on Device (your device)?" OK / CANCEL

6. **Click the OK button to continue with the installation. Click the CANCEL button to abort the installation.**

   If you clicked the OK button, you will see a requester which will say:

   "Making Directory "(your device):SMPTEOut." OK

7. **Click the OK button.**

   You will then see a requester which will say:

   "Finished Installing SMPTE Output. Reset computer for changes to become active." OK

8. **Click the OK button and reboot your Amiga.**

You will now have a SMPTE Out drawer with the SMPTE Output program in it on your hard disk or floppy disk where you specified.

If you have Studio 16 software, which comes with the SunRize AD1012 and AD516 digital audio hard disk recording systems, you will also now have a SMPTE Out module available in your Studio 16 Applications menu.

Connecting the SMPTE Signal

SMPTE Output uses the internal audio hardware in your Amiga to generate time code. It outputs the time code signal through your Amiga's right channel audio jack.
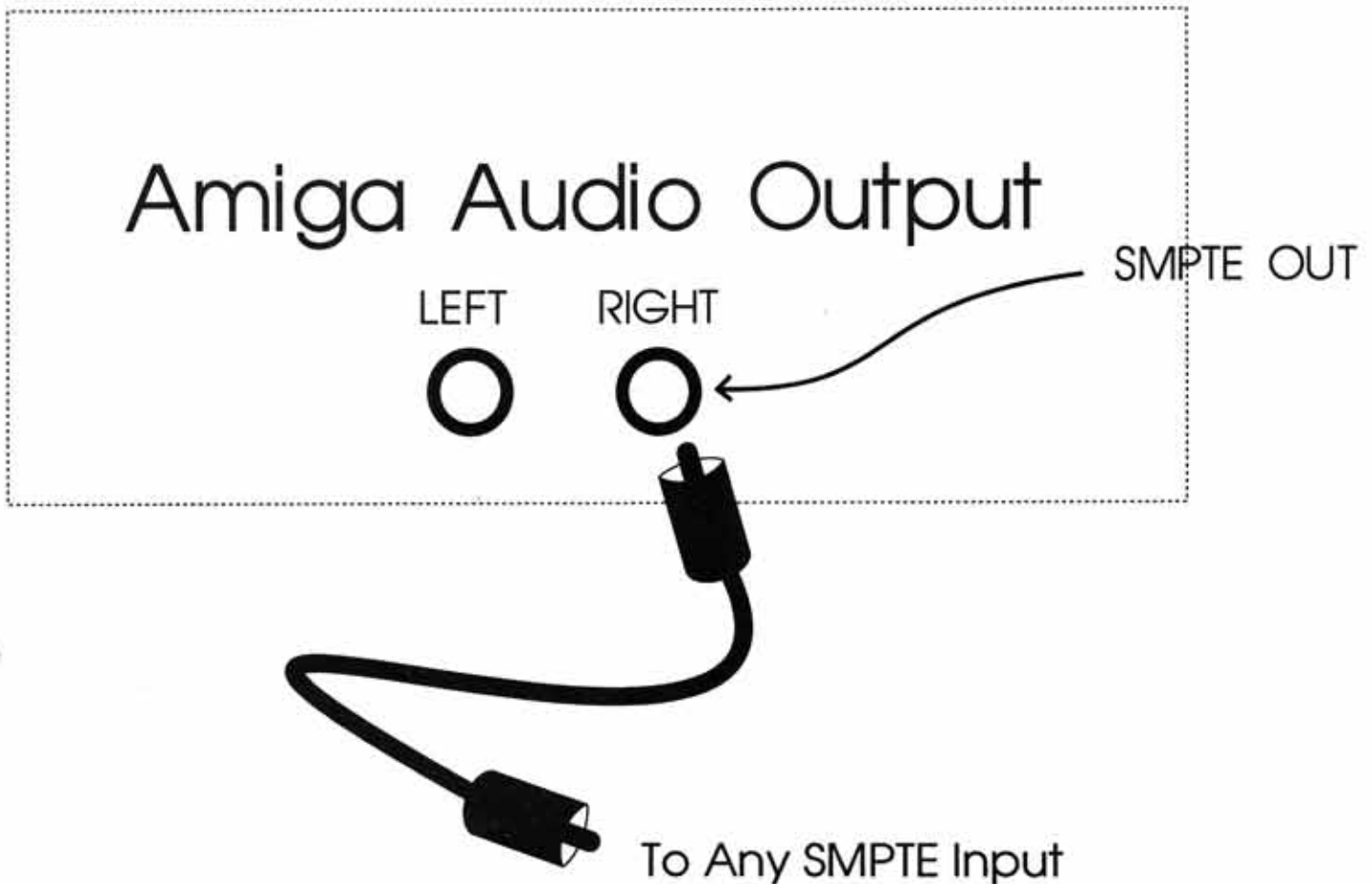

Figure 3-1. Connecting the SMPTE Signal

Use a standard audio cable to connect the Amiga's right audio channel output jack to the audio input of any device to which you want to feed time code.

Note: *The SMPTE Out module uses the right channel audio output connector on the back of your Amiga and not the SunRize AD1012 or AD516 SMPTE jack. If you have a SunRize AD1012 or AD516 card in your Amiga, remember that the AD1012 and AD516 SMPTE jacks are for SMPTE input to their built-in SMPTE readers. They are not for SMPTE Output. The AD1012 and AD516 do not generate time code.*

To connect to the Amiga right channel audio output jack you'll need a male RCA connector. On the other end of the cable you might need a male RCA connector, a BNC connector or an XLR connector depending on the device to which you want to connect. You can buy an appropriate audio cable and adaptors at your local electronics store.

Connecting Video Sync

If you have a genlock connected to your Amiga, connect your house black burst signal or the video output of the deck on which you're striping time code to the Video In jack on the genlock. If you have a NewTek Video Toaster, connect the black burst or video signal to input one.
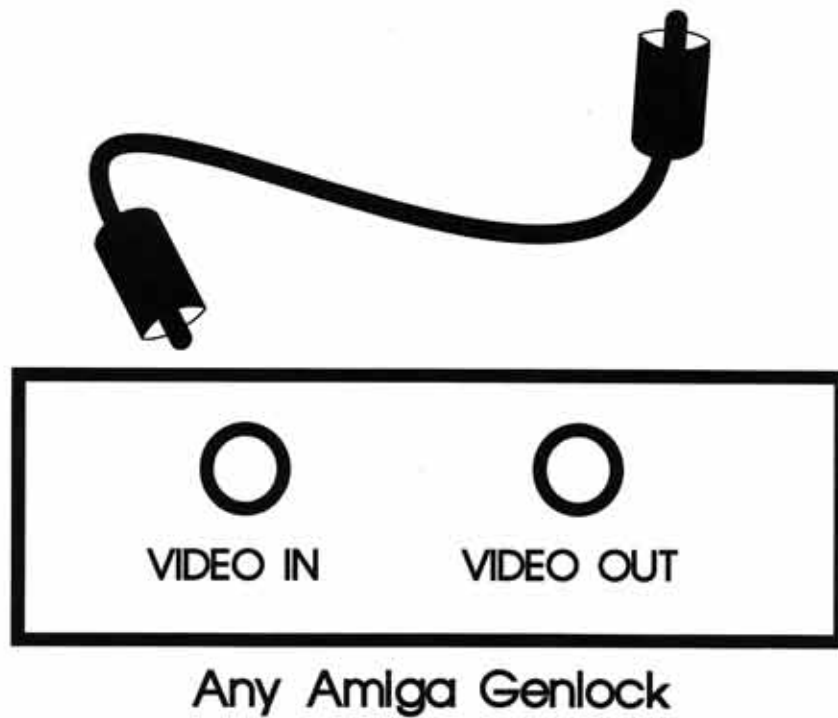

Figure 3-2. Connecting Video Sync

Chapter 4

Using SMPTE Output

Before You Start

Make sure you aren't running another program which has grabbed the audio channels. Certain games and music software will take over the audio channels, preventing SMPTE Output from using them to generate SMPTE.

Let's look at six typical applications for SMPTE Output:

- Striping a New Tape

- Striping a Previously Recorded Tape

- Striping a Tape While Locked to Video Sync

- Using SMPTE Output as the SMPTE Source for Studio 16

- Using SMPTE Output to Test an AD1012 or AD516 SMPTE Reader

- Using SMPTE Output With Studio 16 and Bars & Pipes Professional

Striping a New Tape

"Striping" a tape with time code means recording time code onto that tape. If you have a new audio or video tape on which you'd like to put time code:

1. Connect your Amiga's right audio output to an audio or address track input on the audio or video tape deck.

2. Start the SMPTE Output program by double clicking the icon of the stand-alone version or by selecting "SMPTEoutput" from the Applications menu in Studio 16.

3. Select the time code rate you want (24 fps film, 25fps PAL video, 30fps NTSC video or 30fps drop frame NTSC video)

If you're running the stand alone version of SMPTE Output you can set the time code rate in the SMPTE Output menu. If you're running SMPTE Output as a Studio 16 module you can open the Preferences window from the Studio 16 Project menu and set the time code rate by clicking the appropriate button on the right side of the window.

> *Warning: Unless you are striping timecode onto a video deck and feeding the video signal to a genlock or Video Toaster connected to your Amiga, make sure the "Sync to Video" command in the SMPTE Out menu is OFF. When it is off there is no check mark next to the command in the menu.*

4. **Set the recording input controls on your deck so you are recording time code at a level which isn't too low to be read by a time code reader and isn't so high it will produce a distorted signal.**

You may have to experiment with your particular deck, but most SMPTE readers will read a signal recorded at -5dB on a deck's VU meter. Lower signal levels, as long as they can be reliably read, are better for reducing crosstalk. Crosstalk is the leaking of the time code sound onto another channel which might be a part of your audio mix. Try -10dB or under if crosstalk is a problem. Try a higher level if your SMPTE reader is having trouble reading the time code after it's recorded.

> *Important: If your deck has an automated level control, limiter or compressor, turn it off. Using such a circuit can make time code difficult or impossible to read.*

5. **Enter a time code number into SMPTE Output you'd like to have at the beginning of the tape.**

To enter the time, click the SMPTE display area of the SMPTE Output window and type in the hours, minutes, seconds and frames using your Amiga's numeric keypad or the numbers below the function keys.

It doesn't matter what time code number you start with. Most people start striping a tape at roughly one hour, which looks like this: 01:00:00:00. That way if they should happen to start the time code a little early it will be not be a number which is before zero, which could confuse some time code synchronizers.

Some people also use the hours position to record the tape's number. For example if you're striping a tape which you have labeled "Tape 5", you might start the time code at roughly 05:00:00:00.

6. **Start recording with your deck and click the "Play" button on the SMPTE Output window.**

If your deck has a preroll time before it actually goes into record mode, you'll probably want to wait until it's actually recording before you start SMPTE Output. On the other hand, if you start SMPTE Output a little early it's really not a problem.

Striping a Previously Recorded Tape

Striping a previously recorded tape is just like striping a new tape, with one big difference: you don't want to do anything that will erase the existing audio or video on the tape!

If you're recording to a multitrack audio tape recorder, make sure it has the ability to record a single audio track while leaving existing audio tracks alone.

If you're recording onto a video deck, make sure your deck has audio dub capability. This is the ability to record on one or more audio tracks without affecting the video signal or existing audio signals.

> *Warning: If your deck does not have audio dub capability, recording a time code track may destroy the existing video, audio or both!*

Professional video editing decks are designed to allow you to record a new track of audio without affecting existing audio and video. Some even have a special track, usually called an "address" track, which is dedicated to time code use.

In a professional video editing system, you'll usually want to use the edit record deck rather than a playback deck for striping time code.

As for semi-professional decks and home decks, they vary. Some have audio dub and some don't. Check your deck's manual to find out.

What About HiFi Audio Tracks?

Some video decks have HiFi audio tracks. These are audio tracks which are recorded with the video signal.

> *Warning: For virtually all decks with HiFi audio tracks you cannot re-record these tracks without destroying the existing video!*

Fortunately, most decks which have HiFi audio tracks also have a linear audio track you can overdub. For example, the Panasonic AG-1960 SVHS deck has a linear audio track which you can use to record time code without destroying the existing video or the HiFi audio tracks. The Panasonic AG-7740 has two linear tracks in addition to the HiFi tracks.

Just make sure before you replace a linear audio track that there is nothing on that track that you want to keep. As long as the audio you want to keep is on the HiFi audio tracks you are free to overdub a linear audio track... if your deck supports audio dubbing.

What About Noise Reduction?

If your tape deck has a noise reduction scheme, like Dolby A, B or C, or DBX noise reduction, see if there's a way to defeat the noise reduction on the track where you want to record time code.

> *Warning: Noise reduction can make time code difficult or impossible to read. Turn it off when recording time code.*

Striping a Tape While Locked to Video Sync

Note: This requires a genlock or Video Toaster.

If you're striping a video tape, it's a good idea to have the SMPTE time code on the tape in sync with the video signal. Otherwise your tapes may not be compatible with some SMPTE time code based video editing systems.

You can synchronize SMPTE Output to a video signal by feeding that signal to the input of a genlock or Video Toaster connected to your Amiga.

Typically you will be "post striping" your video tape. That means you've already shot the tape and now you want to add time code.

Everything mentioned above about striping a previously recorded tape applies here. In addition, feed the video output of the video deck on which you're recording time code to the video input of your genlock. If the deck is locked to a house black burst signal you can optionally feed that same signal to the input of your Amiga genlock. If you have a Video Toaster, feed the video or black burst signal to input one and make sure you're running either the Toaster switcher program or the Toaster genlock utility program (see your Toaster manual for details).

You also need to turn on the "Sync to Video" command in the SMPTE Out menu by selecting it with your right mouse button. When Sync to Video is on there will be a check mark next to it in the menu.

Note: When locked to video, you should select an FPS that matches your video rate.

Using SMPTE Output as the SMPTE Source for Studio 16

You can use SMPTE Output instead of Studio 16's SMPTE Generator module. It will work just like SMPTE Generator, but you'll have the benefit of SMPTE Output's 10 auto-locate points and keyboard commands.

When you select SMPTE Output from the Applications menu in Studio 16, the SMPTE Output window will open. SMPTE Output will automatically become the internal SMPTE source for Studio 16. Studio 16 will no longer respond to time code coming into the AD1012 or AD516 time code reader.

When you close SMPTE Output, Studio 16 will automatically switch so it responds to time code coming into the AD1012 or AD516 time code reader.

If you want to manually switch Studio 16 to respond to time code coming into your audio card's reader while still leaving SMPTE Output open you can open the Preferences window from the Studio 16 Project menu and manually change the SMPTE time code source from SMPTE Output to the AD1012 or AD516 by clicking the drop list in the upper right corner of the Preferences window and clicking on the source you want from the list.

Note: If you have the SMPTE Output module open and you open the SMPTE Generator module, the SMPTE Generator module will become the internal time code source for Studio 16. If you have the SMPTE Generator module open and you open the SMPTE Output module, the SMPTE Output module will become the internal time code source for Studio 16. If both the SMPTE Generator module and the SMPTE Output module are open you can manually choose which one will be the internal time code source for Studio 16 by selecting it from the drop list in the Preferences window. But to avoid confusion, we recommend that you close the SMPTE Generator module before opening the SMPTE Output module.

Using SMPTE Output to Test the AD1012 or AD516 SMPTE Reader

If you want to see if the time code reader on your AD1012 or AD516 is working you can physically patch the audio signal generated by SMPTE Output into your SunRize card.
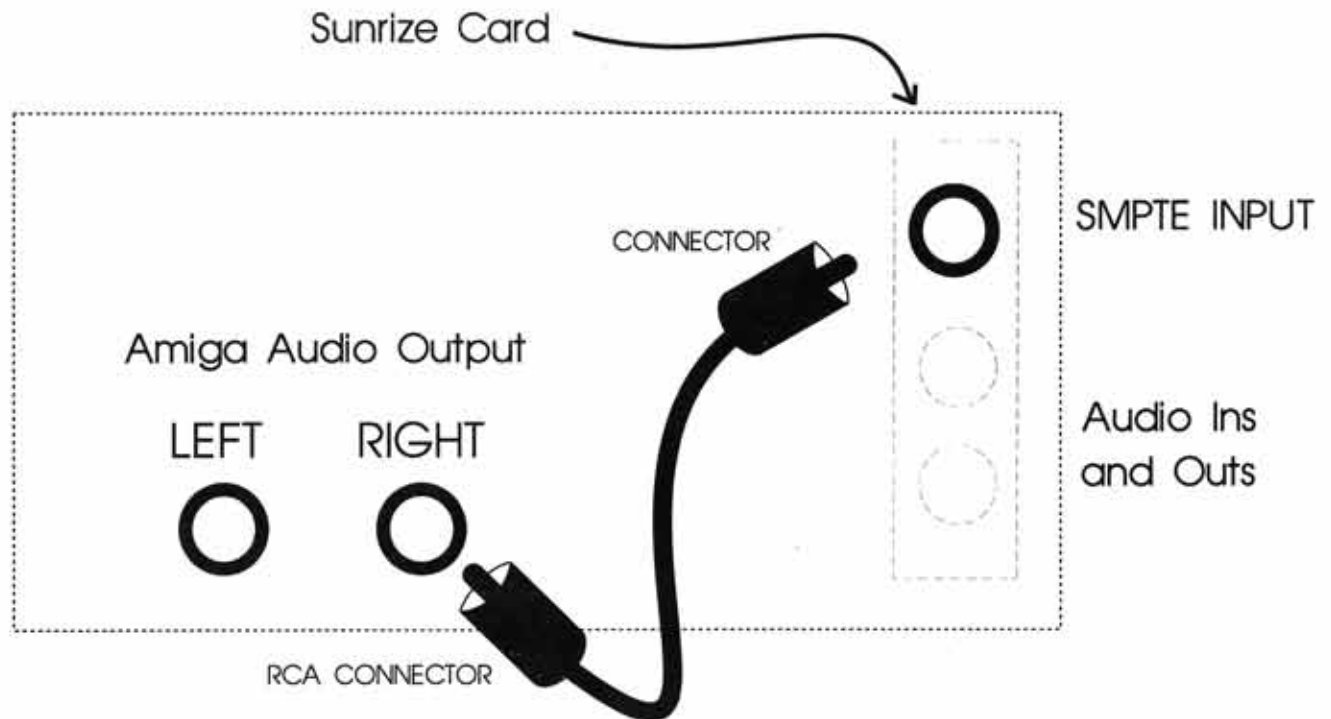

Figure 4-1. Connecting SMPTE Out to Your SunRize Card

Here's how to do it:

1. **SMPTE Output's signal comes out of your Amiga's right channel audio jack. Connect a cable from your Amiga's right channel audio output jack to the SMPTE reader input on your SunRize card.**

2. **Open the SMPTE Output module from Studio 16's Applications menu.**

3. **Open the SMPTE Monitor module open from Studio 16's Applications menu.**

4. **Open the Preferences window from the Studio 16 Project menu and manually change the SMPTE time code source from SMPTE Output to the AD1012 or AD516 by clicking on the drop list in the upper right corner of the Preferences window and clicking on "SMPTE Output" in the list.**

5. **Start time code by clicking the Play button in SMPTE Out's window.**

   You should see the SMPTE Monitor module displaying time code identical to that shown in the SMPTE Out module.

If everything is working properly and you've connected it properly this is what should be happening:

- The SMPTE Output module is displaying the time code it's generating.

- The time code is coming out of your Amiga's right channel audio port and into your AD1012 or AD516 SMPTE Reader input.

- The SMPTE Monitor module is displaying the time code coming into the AD1012 or AD516 SMPTE Reader input.

Using SMPTE Output With Studio 16 and Bars & Pipes Professional

Bars & Pipes Professional is a MIDI sequencer from The Blue Ribbon SoundWorks, Ltd.
If you have Bars & Pipes Professional and Studio 16, you can run Studio 16 on the Bars & Pipes Professional screen to combine digital audio recording with MIDI sequencing (see your Studio 16 manual).

When you're running Studio 16 on the Bars & Pipes Professional screen and you open SMPTE Out from the Applications menu, not only will SMPTE Output become Studio 16's internal time code source, but it will also become Bars and Pipes Professional's internal time code source. So Studio 16's Recorder and Cue List, and Bars & Pipes Professional's MIDI sequence will all synchronize to the time code being generated by SMPTE Output.

This gives you another way to record audio tracks which are in sync with your MIDI sequence. At the same time, it lets you provide the same SMPTE time code signal to external equipment.

Note: *One way to use this capability is to connect the Amiga's right channel audio output to a SMPTE chase lock synchronizer controlling a multitrack tape deck or video deck. You can use SMPTE Out to control the tape deck, Bars & Pipes Professional and Studio 16 simultaneously, and all three will stay in sync with each other. When you jump to a new SMPTE time using one of SMPTE Output's 10 SMPTE locate points, Bars & Pipes and Studio 16 will synchronize very quickly, but it may take some time for a tape deck to wind to the new position.*

How to use SMPTE Output with Studio 16 and Bars & Pipes Professional:

1. **Start Bars & Pipes Professional by double clicking its program icon.**

   If you need information about running Bars and Pipes Professional see your Bars and Pipes Professional manual.

2. **Load your MIDI sequence**

3. **Start Studio 16 by double clicking the SunSet icon in the Accessories window. This will open the Studio 16 Instance window.**

   If the SunSet accessory is not loaded, you will need to make sure you've installed it in Bar's & Pipe's Accessories drawer, and you will need to load it into your Accessories window. See your Bars & Pipes Professional manual for information on installing and loading accessories.

4. Click once anywhere in the Instance window to make sure it's the active window. This ensures that the Studio 16 menus will be available.

Note: Any time you click in the background of the screen or in any of Bars & Pipes Professional's windows, Bars & Pipes Professional's menus will be available. Any time you click in any of the Studio 16 windows, the Studio 16 menus will be available. All Studio 16 windows share the Project menu and Applications menu, and each window may have additional menus which are unique.

5. From the Studio 16 Applications menu, open the SMPTE Output, Cue List, Meters, Open List and Recorder modules.

   Handy Tip: you can double click the "B&P Save Prefs" command in the Instance window to save your window positions and sizes. Then, next time you double click the SunSet icon, the same Studio 16 windows will open on your screen exactly where they are now and you won't have to open each window separately again.

6. Click in the Open List window and use the Add New Path command in the Open List menu to specify the directory where you want to record (see your Studio 16 manual for instructions for using the Open List).

7. Click the active box in the Open List window next to the name of the directory where you want to record.

8. Enter the time code number a few seconds before where you want to begin your audio recording. You can store this as one of SMPTE Output's 10 locate points.

   You can use Bars & Pipes Professional's transport window to find the spot where you'd like to add audio, and it will show you the time code number you'll need to enter into SMPTE Output.

9. Make sure your audio source is connected to an input jack on your AD1012 or AD516 card.

10. Choose a sampling rate using the Studio 16 Recorder window's Rate slider.

11. Click the Recorder window's Monitor button so you can hear the audio source, and adjust the levels of the signal using the Gain slider.

    To adjust the record input level, if your audio source is a vocalist, have the vocalist sing one of the louder passages. If you're recording a guitar player, have the guitarist play his loudest part. You can watch the Meters window while you adjust your recording levels. Make sure the Meters window is showing the audio input level.

12. Click the SMPTE Output Play button

    Bars & Pipes Professional's sequence will begin playing at the point you set, which should be just before where you want to record audio.

13. When you get to the spot where you want to record audio, click the Recorder module's Record button.

    Now you're recording. The time code number which corresponds to when you actually hit the Record button on the Recorder window is automatically stored with the sample.

14. **To stop recording, click the Recorder module's Stop button. Then stop the sequence by clicking SMPTE Output's Stop button.**

The Recorder module will name samples for you as you record them. If you want to give a sample a name which corresponds to what you're recording (like "vocal take 1") you can either name them using the name button in the Recorder module before you record the sample, or you can rename them using the Rename Sample command from the Open List window's Open List menu.

If you stored the starting time code number in one of SMPTE Output's 10 locate points you can recall that number from the SMPTE Output Recall menu and immediately try another take. You can record as many takes as you want, limited only by disk space.

To play back your audio tracks and MIDI sequence together

1. **Drag the samples you want to hear from the Open List window into the Cue List window.**

2. **Make sure you turn the Cue List on by clicking the on/off button at the bottom of the Cue List window.**

3. **Recall or reenter your starting time code number into SMPTE Out and click the SMPTE Output Play button to hear your Studio 16 audio tracks and Bars & Pipes Professional MIDI sequence together.**

   Since each sample has its own start time stored with it, each sample will begin playing at the same SMPTE time as when it was recorded. All of your samples will play in sync with your MIDI sequence.

You can use Studio 16's editing capabilities to combine the best of several takes. When you're done recording, editing and playing back your audio tracks, don't forget to:

• Save your Cue List!

You'll want to load that same cue list next time you work on that song.

Chapter 5

Reference

Starting SMPTE Output as a Stand-Alone Program

- Double click the SMPTE Output Icon in the SMPTEOut drawer.

    The SMPTE Output window will open on your WorkBench screen. You can move it to another screen by selecting the Next Screen command in the SMPTE Output menu.

Starting SMPTE Output as a Studio 16 Module

- Start your Studio 16 software.

- Select SMPTEOut in the Application menu.

    The SMPTE Output window will open on your Studio 16 screen.

Mouse Controls

You can control many of SMPTE Outputs functions using the left button of your mouse:

Figure 5-1. SMPTE Output Window

1. Close Gadget
The SMPTE Output window has a close gadget in the upper left corner. Click on it to quit the program.

2. Title Bar
The SMPTE Output window has a title bar along the top of the window. In the title bar you can see the name of the program. When you click anywhere in the window the title bar will change color to show that it is the active window. You can drag the title bar with the mouse to move the window to a different location on your screen.

3. Front/Back Gadget
The SMPTE Output window has a front/back gadget in the upper right corner. It is a single button which will bring the window to the front of all the windows on the screen if it isn't already in front, or send it behind all windows on the screen if it's in front.

4. Zoom Gadget
The SMPTE Output window has a zoom gadget just left of the front/back gadget. Click it to toggle the window size between two sizes. You can change the window size using the size gadget in the lower right corner.

5. Size Gadget
The SMPTE Output window has a size gadget in the lower right corner. Click it with the left mouse button and drag it to resize the window. SMPTE Output will change the size of its SMPTE display and buttons to fit any size you choose.

6. Time Code Display
Clicking in the time code display puts a cursor in the time code display and allows you to directly type in a time code number from your keyboard.

7. Play Button
Click the Play button to start time code generation beginning with the number showing in the time code display.

8. Stop Button
Click the Stop button to stop time code generation, rewinding or fast forwarding. The last number generated will remain in the time code display.

9. Rewind Button
Click the Rewind button to scan rapidly backwards from the currently showing number in the time code display.

10. Fast Forward Button
Click the Fast Forward button to scan rapidly forward from the currently showing number in the time code display.

Menu and Keyboard Commands

When the SMPTE Out window is active you can use your right mouse button to select commands from SMPTE Output's drop down menus. Most of these commands also have keyboard shortcuts, which are listed in the menus next to the commands. To use the keyboard shortcuts, hold down the right Amiga key and type the key listed next

to the menu command. The SMPTE Out window must also be active for the keyboard shortcuts to work. If the window is not active, click anywhere in the window to activate it.

SMPTE Output menu

- **Sync to Video**

    Select this command when you want to synchronize your time code with a video signal. A typical use for this is when you want to add (post stripe) SMPTE time code to an already recorded video tape.

    This requires a genlock or NewTek Video Toaster connected to your Amiga, with the video signal you want to synchronize connected to the video input of the genlock or video input one of the Toaster.

    Usually you will want to connect the video output of your video deck to the input of your genlock or input one of your Toaster. If your video deck is synchronized to house black burst, you can feed the same black burst signal into the video input of your genlock or input one of your Toaster. Then do an audio dub to put the record time code on an unused linear audio track or address track.

    > *Warning: If your video deck does not have an audio dub capability, attempting to post stripe SMPTE time code onto an already recorded video tape could destroy the existing video and audio!*

    If you're not synchronizing to video make sure this command is turned off. When it's on there's a check mark to the left of the command in the menu. When it's off there's no check mark to the left of the command in the menu.

- **Zero SMPTE Time (Amiga-X)**

    Select the Zero SMPTE Time command to set the time code display to zero hours, zero minutes, zero seconds and zero frames (00:00:00:00).

- **Play (Amiga-P)**

    Select the Play command to start time code generation beginning with the number showing in the time code display. This is just like clicking the Play button with the mouse.

- **Stop (Amiga-S)**

    Select the Stop command to stop time code generation, rewinding or fast forwarding. The last number generated will remain in the time code display. This is just like clicking the Stop button with the mouse.

- **Rewind (Amiga-R)**

    Select the rewind command to scan rapidly backwards from the currently showing number in the time code display. This is just like clicking the Rewind button with the mouse.

- **Fast Forward (Amiga-F)**

    Select the Fast Forward command to scan rapidly forward from the currently showing number in the time code display. This is just like clicking the Fast Forward button with the mouse.

When Running Under Studio 16

Selecting the SMPTE Rate When Running the Studio 16 Module Version of SMPTE Output

If you're running the stand alone version of SMPTE Output you can set the time code rate in the SMPTE Output menu as shown below. However, if you're running SMPTE Output as a Studio 16 module, those menu choices do not exist. Instead you can open the Preferences window from the Studio 16 Project menu and set the time code rate by clicking the appropriate button the right side of the window.

- **SMPTE Rate - 30**

  Select this command to allow SMPTE Output to generate 30fps time code.

- **SMPTE Rate - 30DF**

  Select this command to allow SMPTE Output to generate 30fps drop frame time code.

- **SMPTE Rate - 25**

  Select this command to allow SMPTE Output to generate 25fps time code.

- **SMPTE Rate - 24**

  Select this command to allow SMPTE Output to generate 24fps time code.

- **Next Screen**

  This command is only available if you're running the stand-alone version of SMPTE Output. If you're running more than one screen on your Amiga, you can select the Next Screen command to push SMPTE Output's window onto another screen.

Storing And Recalling Time Code Numbers (Store Menu and Recall Menu)

SMPTE Output can store 10 time code numbers and jump to them instantly using the mouse or keyboard commands. You can enter a number to store by clicking in the time code display of the window and typing a time from the keyboard. You can also store a number "on the fly" as SMPTE Output is generating time code.

To store a SMPTE time:

- select a memory number in the Store menu.

  Whatever time code number is showing in SMPTE Output's time code display at that moment will be stored under that memory number. Look in the Recall menu and you'll see your stored time code number listed.

To jump to a stored time code number:

- select it from the Recall menu.

Store and Recall Keyboard Commands

For extra speed, use these store and recall keyboard commands: To store a time code number hold down the right Amiga key, hold down the shift key and type any number on the top row of the alpha-numeric section of your keyboard. To recall a time code number hold down just the right Amiga key and type the number you stored the time code under. You can also use the right Amiga key with the numeric keypad on your Amiga keyboard to recall time code numbers.

Saving Locate Times

If you are running SMPTE Output as a Studio 16 module and you close SMPTE Output and reopen it without quitting Studio 16, your 10 SMPTE Output locate times will still exist. If you want to save your locate times between Studio 16 sections, use the SaveSetup command in the Project menu, (which also saves window positions and other settings), and they will be there next time you start up Studio 16.

If you are running the stand-alone version of SMPTE Output you CANNOT save the locate times.

Keyboard-Only Commands

SMPTE Output has a few commands which are only accessible from the keyboard and are not in the menus. They only work when SMPTE Output's window is selected:

- **Backspace**

  Typing the backspace key will set the current digit to zero and move the cursor back one space in the time code display area. If you don't have a cursor active in the time code display area it will put one on the far right side and zero the farthest right number.

- **Up Arrow**

  As long as you don't have a cursor in the time code display, typing the up arrow will add one second to the time. Hold the key down for repeated incrementing of the number, much like a momentary fast forward button.

- **Down Arrow**

  As long as you don't have a cursor in the time code display, typing the down arrow will subtract one second from the time. Hold the key down for repeated decrementing of the number, much like a momentary rewind button.

- **Left Arrow**

  If you have a cursor in the time code display, typing the left arrow will move the cursor one space to the left.

- **Right Arrow**

  If you have a cursor in the time code display, typing the right arrow will move the cursor one space to the right.

- **Delete**

  If you have a cursor in the time code display, typing the delete key will turn the number under the cursor to zero.

- **Return**

  If you have a cursor in the time code display, typing the return key will remove the cursor.

Appendix A

Time Code Review

Time Code is a system for identifying each frame of a video or film with a unique electronic number. By giving each frame a unique number you can accurately find any frame. As a film or video is playing you can watch the frame numbers and know exactly where you are in the film or video.

Better yet, other electronic equipment or computer programs, including MIDI sequencers, digital audio recorders, and video decks, can know exactly what frame of video is showing at any given instant. They can do an appropriate action, like playing a sound effect or cueing up another video sequence, at a time corresponding to an exact time code number.

Synchronization

When we have multiple machines following each other on the basis of time code, it's called "synchronization". This ability is the key to keeping video decks together for electronic video editing; locking multiple multitrack recorders together for more tape tracks; locking digital audio hard disk recording systems, like the SunRize AD1012 or AD516, to video or audio tape decks for dialog, music or sound effects production; and locking MIDI sequencers to multitrack tape decks or video decks for music and sound track production.

Four Common Time Code Rates

There are four common time code rates. They all use numbers representing hours, minutes, seconds and frames, like this:

01:20:15:03 (one hour, twenty minutes, fifteen seconds and three frames)

The four rates of time code have the same number of minutes per hour (60), the same number of seconds per minute (60), but they differ in how many frames occur in a second.

Film is often shot with 24 frames per second (fps), so there is a corresponding 24 fps time code. PAL video, a standard in many parts of the world, has a speed of 25 fps so there is a corresponding 25 fps time code. The NTSC video standard started out at 30 fps when it was black and white, but changed speed slightly (to 29.97 fps) when color capability was added to the old system.

So there are two time code rates commonly used for NTSC video: 30 fps and 30 fps drop frame. You can use 30 fps drop frame SMPTE time code, which earned its name because it leaves out 108 frames every hour to keep the indicated running time accurate. Even though it isn't quite accurate in measuring the actual time going by, you might sometimes find it useful to use straight 30 fps with NTSC color video because the math is easier if you have to do any time code calculations.

SMPTE Output will generate any of the four time code rates mentioned.

User Bits

There is a second number encoded into time code called, obscurely, the user bits number, or just "user bits". The name is jargon from the computer world which refers to the fact that the time code numbers are represented as binary data in a string of "bits" and you, the user, can put any number you want into the user bits. The important thing is that "user bits" is a number which is the same for each frame. It's used, when its used, to store things like the date, the tape reel number, or other non-changing information about a tape. It's often simply ignored.

SMPTE Output does not generate user bits.

Two Ways to Record Time Code

The time code signal can be recorded in two ways: As an audio track, called "longitudinal time code" (LTC), or hidden in a part of the video picture signal, and called "Vertical Interval Time Code" (VITC). It's the same timing information either way; it's just recorded differently. You can buy boxes to convert VITC to LTC and vice versa.

SMPTE Output generates LTC.

Audio decks and many video decks use LTC. Some video decks use VITC. VITC lets a deck read time code even when it's paused, but VITC is hard to read when rewinding. LTC is better for reading when rewinding but it can't be read when a deck is paused. For really fast rewinding neither type can be read and decks guess at where they are by counting a non-numbered pulse, available on most video formats and some digital audio tape formats, called a "control track", until the tape slows down enough for the actual time code to be read.

Matching the Time Code Number to the Picture

If you're recording time code with a video deck you'll want to make sure the time code signal starts writing the number for a frame as that frame is beginning to draw. SMPTE Output lets you write LTC SMPTE synchronized correctly with the picture if you have a genlock connected to your Amiga.

Note: When locked to video, SMPTE Output can only generate the time code rate that matches your video rate. For example, if you are feeding a PAL video signal into your genlock, SMPTE Out can only generate 25 fps time code. If you are feeding an NTSC video signal into your genlock or Video Toaster, SMPTE Out can only generate either 30 fps or 30 fps drop frame time code.

WWWDWA (What Would We Do Without Acronyms)

By the way, SMPTE stands for "Society of Motion Picture and Television Engineers", and EBU stands for "European Broadcast Union", two standards setting organizations who have adopted these time code standards.

The Evolution of Time Code

Time code has proven to be so useful for synchronizing that you'll find people using it for things that have nothing to do with film or video. For example a lot of people use time code to synchronize their MIDI sequencer to a multitrack audio tape deck for producing songs. When they start their multitrack tape deck, even if it's in the middle of a song, the MIDI sequencer knows exactly where to start so that the MIDI instruments are in perfect sync with the instruments on tape.

Time code is a great tool. It can make your life easier. Enjoy.

Appendix B

Troubleshooting

If you aren't getting any noise at all out of your Amiga's right channel audio output:

- Make sure you aren't running another program which has grabbed the audio channels. (Certain games and music software will take over the audio channels, preventing SMPTE Output from using them.)

- Make sure you have clicked SMPTE Output's Play button and the time code display shows time code being generated.

If you aren't getting readable SMPTE time code out of your Amiga's right channel audio output:

- Make sure you've selected the time code rate in SMPTE Out that you want.

   You can choose between 24 fps, 25 fps, 30 fps or 30 fps drop frame time code rates. If you're running the stand alone version of SMPTE Output you can set the time code rate in the SMPTE Output menu. If you're running SMPTE Output as a Studio 16 module you can set the time code rate in the Preferences window.

- Make sure you are recording time code at a level which isn't too low to be read and isn't so high it's recording a distorted signal.

   You may have to experiment with your particular deck, but most SMPTE readers will read a signal recorded at -5dB on a deck's VU meter. Lower signal levels, as long as they can be reliably read, are better for reducing crosstalk. Crosstalk is the leaking of the time code sound onto another channel which might be a part of your audio mix. Try -10dB or under if crosstalk is a problem. Try a higher level if your SMPTE reader is having trouble reading the time code after it's recorded.

   If your deck has an automated level control, audio limiter or compressor, make sure you turn it off.

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The Complete
SMPTE Generator
For Your Amiga

SMPTE Output is software for your Amiga Computer that generates LTC SMPTE time code. This time code comes out of your Amiga's audio out jack, and can be used to stripe video or audio tapes. SMPTE Output will run stand alone, or as an expansion module for Studio 16. (Studio 16 is SunRize's audio editing environment.) SMPTE Output combines the two Studio 16 modules *SMPTE Generator* and *SMPTE Monitor* with the ability to generate LTC time code.

SMPTE Output provides you with an industry standard timing source. Now your Amiga can act as a timing master. When used with an external synchronizer, your external VTRs or ATRs can lock to SMPTE Output.

- Stripe your tapes with LTC SMPTE time code.
- 24, 25, 30, 29.97 frames per second.
- Drop frame or non-drop frame.
- Multiple (10) reset/set points for quickly jumping to a new time code.
- Locks to video sync (requires Amiga genlock or Video Toaster for this feature).
- Type directly into SMPTE window.
- Fast forward, rewind, play, and pause buttons.
- Fully multitasking.
- Compatible with any Amiga (1MB RAM required).

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