

dataSYNC²

Users Manual

Fifth Edition

©1997-2002 JLCooper Electronics



JL COOPER ELECTRONICS

142 Arena Street, El Segundo, CA 90245 U.S.A.

Greetings

Thank you for purchasing JLCooper's dataSYNC². The dataSYNC² converts the Alesis ADAT Sync into a variety of time code formats. The dataSYNC² is "bit-accurate", precisely synchronizing to the ADAT's sample clock output, converting it into SMPTE, MTC, or MIDI Clock.

This lets your ADAT control sequencers, hard disk recorders, drum machines, and workstation keyboards. You get accurate chase lock, and there's no need to waste a valuable digital audio tape track with SMPTE time code.

dataSYNC² sends MIDI Time Code (MTC), SMPTE Time Code and MIDI Clock with Song Position Pointer. dataSYNC² also acts as an MMC interface between your computer and the ADAT. This allows you to control ADAT transport and track arming remotely from a computer.

JLCooper's dataSYNC² is easy to set up and use. A Merging Input simplifies the MIDI setup allowing you to leave a MIDI controller keyboard connected to your sequencer, so you can record new tracks without pulling and rearranging MIDI cables.

dataSYNC² also features selectable SMPTE and MTC frame rates, a battery backed memory for storing tempo information, and the ability to perform a MIDI data dump for saving the memory.

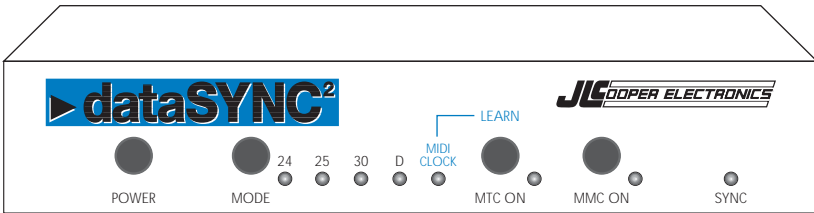
Please fill out and send in your registration card so that we can notify you of any related products as they become available.

JLCooper Electronics dataSYNC² Owners Manual by Eli Slawson.
dataSYNC²[™], Synapse[™], and Sync•Link[™] are registered trademarks of JLCooper Electronics. All other product names are the property of their respective holders.
Part Number for this manual: 932057

Table of Contents

Front Panel Switches and LEDs	4
Rear Panel Connectors	5
Read This Before Getting Started!	6
Hookup	8
Power On Sequence	14
Sample Rate Selection	15
MTC and SMPTE Operation	16
Frame Rate Selection	16
MMC On/Off and MTC On/Off.....	17
Setting Software Start Time	18
MIDI Clock Operation	19
To Clear Memory	20
To Record Tempos (Learn the Tempo Map)	20
Full Memory Indication	22
To Playback in Sync	23
To Backup the dataSYNC ² Memory	24
System Exclusive Implementation	25
Troubleshooting	26
Synchronization Terms	30
Appendix: Important Information	34
Warranty and Service	36

Front Panel Switches and LEDs



POWER

When the switch is pressed in, the power is on.

MODE

This button steps the LEDs and selects the mode of operation. For SMPTE / MTC mode, press this button until the desired frame rate LED is lit: 24, 25, 30, or 30 drop frames per second. For MIDI clock with Song Position Pointer operation, press this button until MIDI Clock LED is lit.

MTC ON / LEARN

When dataSYNC² is in SMPTE / MTC mode, this button turns on or off the MTC output. MTC on is indicated by the LED on.

When dataSYNC² is in the MIDI Clock mode, this button turns on and off the Learn mode. When in Learn mode, dataSYNC² is ready to learn the tempo of a MIDI sequence. Learn is indicated by the LED on.

MMC ON

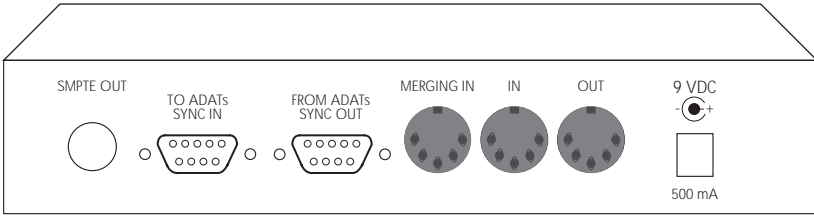
Turns on and off the transmission of MIDI Machine Control commands.

When both MTC and MMC buttons are pressed at the same time, the dataSYNC² performs a “MIDI System Exclusive Data Dump”.

SYNC LED

Sync is indicated by a yellow LED.

Rear Panel Connectors



SMPTE Time Code Output

1/4" jack, unbalanced, for SMPTE time code output.

To ADAT's Sync In

Connects to ADAT's Sync In. Uses ADAT sync cable provided.

From ADAT's Sync Out

Connects to ADAT's Sync Out. Uses ADAT sync cable provided.

MIDI IN

For MMC control of the ADAT from a computer, connect the MIDI out of the computer's interface. For MIDI Clock operation, connect the MIDI Out of a sequencer or drum machine, for learning tempo maps.

MIDI OUT

Sends MTC with or without MMC messages.

Echoes MIDI data that comes into the Merging MIDI In.

Merging MIDI IN

MIDI data coming into this MIDI input is echoed thru to the MIDI output. This data is merged with the MIDI Clock, MTC and MMC commands. This allows you to connect the MIDI output of a keyboard controller, to enable you to record new MIDI tracks on a sequencer without re-arranging MIDI cables.

POWER

Uses supplied 9 Volt DC 500 mA adaptor.

Read This Before Getting Started!

The dataSYNC² produces several kinds of synchronization formats. To get started using the dataSYNC², you must first determine your synchronization requirements.

Regarding MIDI synchronization, it is vitally important to understand that MIDI Time Code (MTC) is not the same thing as MIDI Clock and Song Position Pointer. Some sequencers read only MIDI Clock, other sequencers read both MIDI Clock and MIDI Time Code. Fortunately, the dataSYNC² produces both!

But the way that the two synchronization methods are used are radically different. You must be certain which kind of MIDI commands are required for your application before starting to work with the dataSYNC².

Fortunately again, its not really a matter of guess work. The kind of MIDI synchronization required is usually clearly documented. But do your research first, which usually starts by reading the chapters on synchronization in the owners manual for the software or hardware that you want to synchronize.

Here are some pointers to help out. For a much more detailed discussion of the synchronization terms that are used in this manual, turn to the appendix at the end of the manual.

MIDI Clock and Song Position Pointer. This is the means of synchronizing drum machines, keyboard workstation sequencers, “hardware” sequencers, and a few software-based sequencers to the ADAT.

Select this dataSYNC² mode of operation by pressing the Mode button until the MIDI Clock led is lit.

SMPTE and MIDI Time Code (MTC)

This is the means of synchronizing most software sequencers and hard disk-based digital audio workstations. You may also use SMPTE or MTC to synchronize other modular digital multitrack tape recorders, or “machine synchronizers” that lock up analogue machines and video tape recorders.

Select this dataSYNC² mode of operation by pressing the Mode button until the one of the frame rate LEDs is lit. The dataSYNC² defaults to 30 frames per second, which is fine in the U.S. for most audio work that does not involve video.

If you need SMPTE output, but do not want MTC, you may disable the dataSYNC²'s MTC output by pressing the MTC ON button so that the MTC LED is not lit.

Syncing with Both SMPTE / MTC and MIDI Clock

The dataSYNC² cannot produce both MTC and MIDI Clock at the same time. However, some software sequencers, such as Mark of the Unicorn's Performer™, and Opcode's Vision™, have the ability to send MIDI Clock commands while reading MTC.

Therefore, if you have a sequencer with this capability, it is possible to simultaneously synchronize both a software sequencer and a hardware drum machine. Use the SMPTE / MTC mode of the dataSYNC². Also connect the MIDI Output of the computer's MIDI Interface to the MIDI input of a hardware sequencer or drum machine. Follow the instructions for the sequencer with regard to sending out MIDI Clock while receiving MIDI Time Code.

If the sequencer does not have this capability, you may send the SMPTE output of the dataSYNC² into a SMPTE to MIDI Clock converter, such as the JLCopier PPS-100 SMPTE Synchronizer / Event Generator.

Hookup

Connect both ADAT Sync Cables

▶ Connect a sync cable. One end plugs into the dataSYNC² connector labeled TO ADATs SYNC IN.

The other end of the cable plugs into the SYNC IN connector on the back of the ADAT.

▶ Connect a sync cable. One end plugs into the dataSYNC² connector labeled FROM ADATs SYNC OUT.

The other end of the cable plugs into the SYNC OUT connector on the back of the ADAT.

With Multiple ADATs

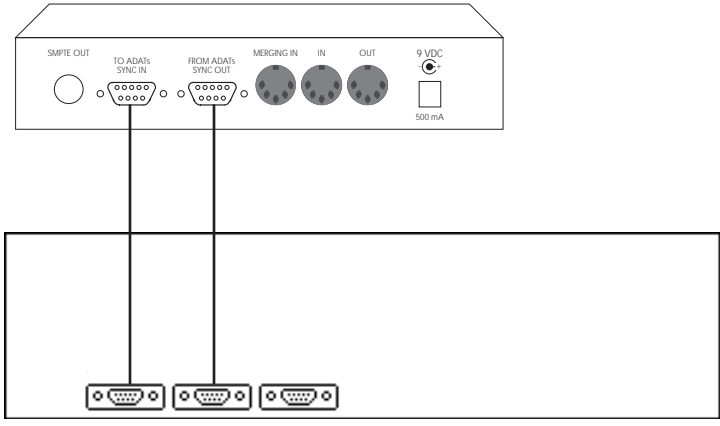
For multiple ADAT systems, the ADATs are chained together by connecting the SYNC OUT of the first ADAT to the SYNC IN of the next ADAT.

The dataSYNC²'s TO ADATs SYNC IN connects to SYNC IN on the first ADAT.

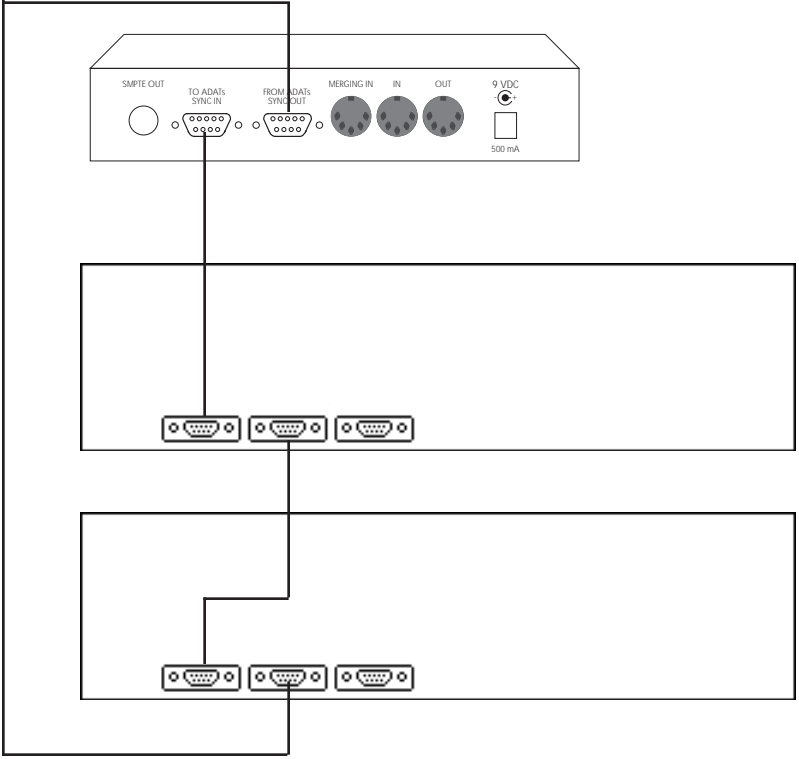
The dataSYNC²'s FROM ADATs SYNC OUT connects to the SYNC OUT of the last ADAT in the chain.

Up to 16 ADATs may be chained in this manner.

Refer to the illustrations.



Hookup of dataSYNC² to ADAT



Hookup of dataSYNC² to Multiple ADATs

MIDI Connections

Basic System

- ▶ Connect a MIDI cable from the dataSYNC² MIDI Out to the MIDI input of the sequencer, drum machine or hard disk recorder. If the system you are synchronizing is software based, this cable will usually be connected to a MIDI Interface on a computer.

You might also connect this cable to a MIDI Patch Bay, such as the JLCoooper Synapse™. This would allow you to programmably distribute the MTC and MMC data to any suitable MIDI equipment in the studio. (The Synapse also provides a large, easy to read MTC display.)

- ▶ Connect a MIDI cable from the dataSYNC² MIDI In to the MIDI output of the sequencer, drum machine or hard disk recorder. If the system you are synchronizing is software based, this cable will usually be connected to a MIDI Interface on a computer.

With an External MIDI Controller (Optional)

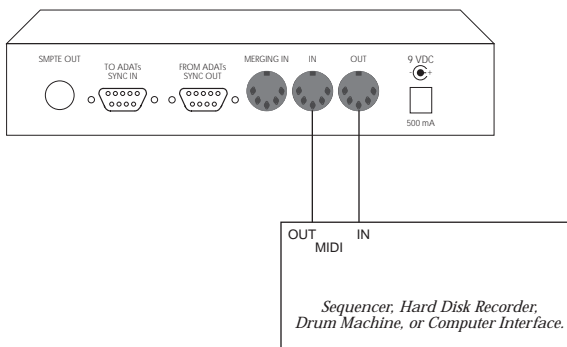
- ▶ Connect a MIDI cable from the output of a keyboard or fader controller to the dataSYNC² Merging In.

Notes played on the keyboard, or Controller commands from a fader controller, will pass through the dataSYNC² and into the sequencer. This is useful for recording new sequencer tracks, without having to pull and re-arrange MIDI cables.

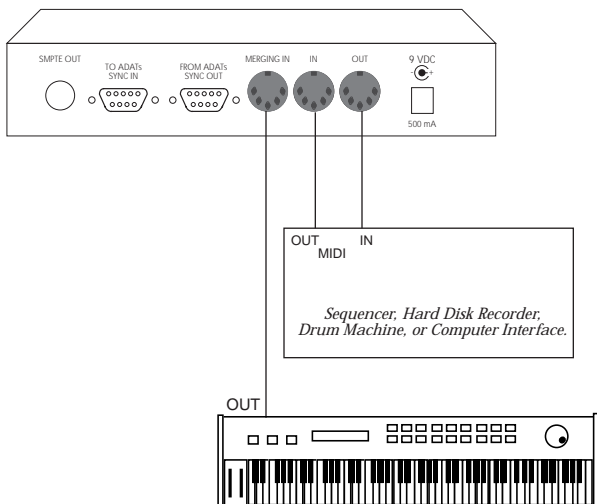
To Allow Sequencer to Play a Keyboard / Tone Module

- ▶ Start with either hookup diagram on opposite page.
Connect the MIDI Out of the sequencer or computer to the MIDI In of the keyboard. Connect the MIDI Thru of the keyboard to the dataSYNC² MIDI In.

Set the keyboard to "local off" to avoid a loop.



Hookup of dataSYNC² to Sequencer, Hard Disk Recorder, Drum Machine, or Computer Interface.



Hookup of Optional External Controller Using Merging Input

Connecting a JLCooper CuePoint Universal Autolocator

- ▶ Connect CuePoint to the dataSYNC² using 2 MIDI cables.
CuePoint MIDI Out to dataSYNC² MIDI In.
CuePoint MIDI In to dataSYNC² MIDI Out.

Connecting Additional MMC Device (DR-4, DR-8, DA-88)

- ▶ Connect MIDI Out of CuePoint to MIDI In of the additional MMC controlled device. Connect the MIDI Out of the additional MMC device to the dataSYNC²'s Merging MIDI In.

Using the Merging In allows CuePoint to receive merged MMC "tallyback" data. This allows CuePoint to keep track of the location of the ADAT and the additional device.

- ▶ Connect SMPTE Time Code Out of dataSYNC² to the SMPTE time code input of the additional MMC controlled device.

DA-88s and DR-4s and DR-8s require optional Sync Cards to be able to read SMPTE time code to slave to the ADAT.

Connecting CuePoint, Computer, and MIDI Controller

This hookup diagram, though complicated in appearance, allows either CuePoint or a Computer to control the ADAT.

A dual port MIDI interface is required, such as JLCooper's Sync•Link Macintosh MIDI interface.

The software must have the ability to send MMC commands.

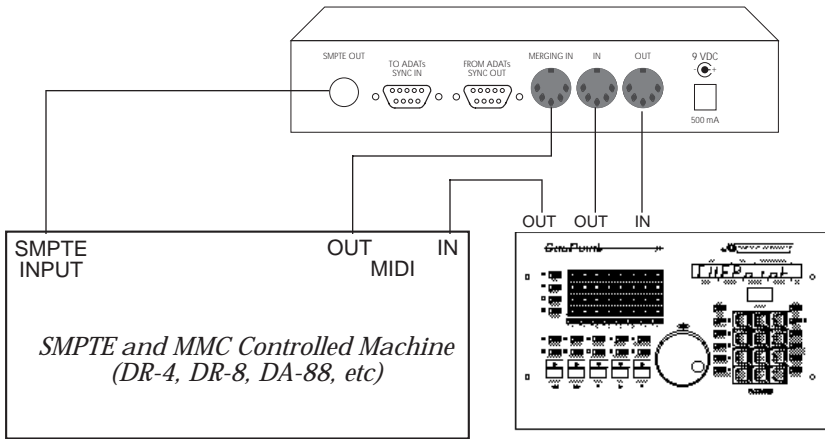
The software's MIDI Echo (or "thru) feature must also be turned on for both ports. The keyboard controller must be set to "local off".

A keyboard performance passes through dataSYNC² and is recorded on the sequencer, via the interface's "Printer In".

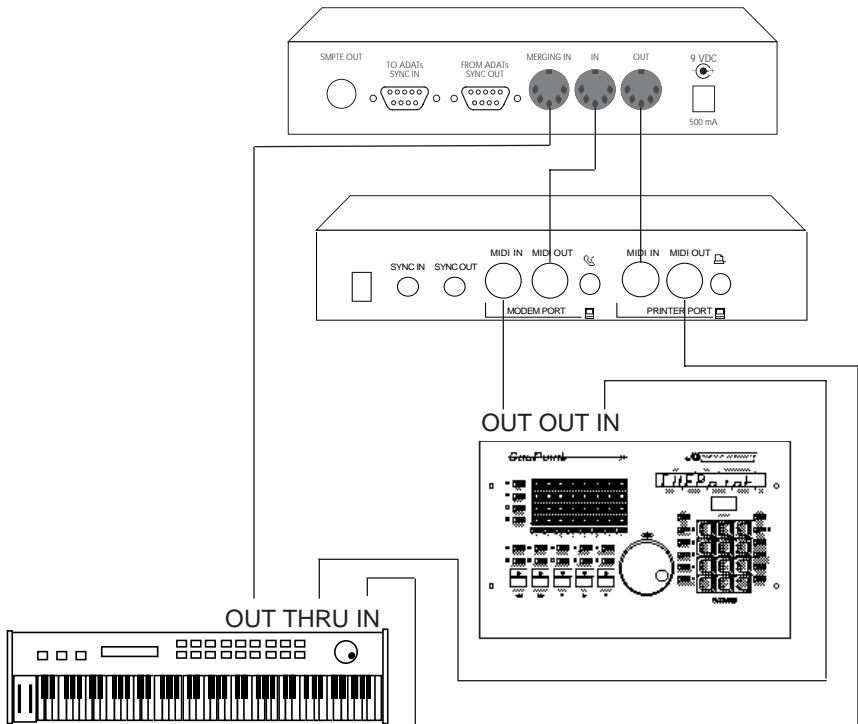
The performance is played back from the "Printer Out".

CuePoint's commands go into the interface's "Modem In".

The "Modem Out" sends both CuePoint and Computer commands into the dataSYNC² to control the ADAT.



Hookup of dataSYNC² to JLCooper CuePoint
(Optional Hookup to an Additional MMC Device Also Shown)



Hookup of dataSYNC² to JLCooper CuePoint and
Computer.
(JLCooper's Sync•Link Macintosh MIDI Inter₁₃
face is Shown)

Power On Sequence

Turn the ADAT on first, and then turn on the dataSYNC².

If you have more than one ADAT, after turning them on, let them go through their automatic ID process. Then turn on the dataSYNC².

This is necessary because the dataSYNC² sends some important commands to the ADAT at the moment that the dataSYNC² is turned on. If the units are powered up in the wrong order, the ADATs will never receive these commands, and some features of the dataSYNC² will appear to not operate correctly.

Sample Rate Selection

The dataSYNC² version 2.0 supports both 44.1 K and 48 K sample rates. On the original ADAT, the sample rate was 48 K. On the ADAT XT, the sample rate is user selectable to either 44.1 K or 48 K.

Automatic Sample Rate Selection

dataSYNC² will automatically detect the sample rate of the ADAT or ADAT XT. It is not necessary to set anything on the dataSYNC², unless you plan on using pitch shift.

Manual Sample Rate Selection and Pitch Shift

The dataSYNC² maintains sync even when the pitch is shifted.

Changing the pitch on the ADAT or ADAT XT actually changes the sample rate. When the pitch is shifted more than about 3%, the two sample rates cannot be distinguished. (In other words, you can slow down 48 K enough so it appears to be 44.1 K, and vice versa.) This problem is easily overcome by setting the dataSYNC²'s sample rate manually.

If you plan on using pitch shift, then you should set the dataSYNC²'s sample rate manually as follows:

- To manually set the dataSYNC² to 44.1 K sample rate operation, press and hold the MTC button on power up.
- To manually set the dataSYNC² to 48 K sample rate operation, press and hold the MMC button on power up.

Once the sample rate has been manually set, you can use pitch shift without the dataSYNC² automatically changing sample rates.

It will remain in the selected rate until the unit is powered-down.

MTC and SMPTE Operation

The dataSYNC² outputs SMPTE time code, with or without MTC. MTC is used to synchronize MIDI sequencers and digital audio workstations. SMPTE time code may be used to drive any device with a SMPTE time code input, including mixing console automation systems and machine synchronizers.

The time code is equal to the tape counter of the ADAT.

In the 2 minute "dAtA" section of the beginning of the tape, the time code output counts up from 23:58:00:00.

When the ADAT's counter reads 00:00, the SMPTE and MTC output of the dataSYNC² is equal to 00:00:00:00.

Important!

Set dataSYNC² to SMPTE / MTC mode by selecting a frame rate with the Mode button.

To set the dataSYNC² to output SMPTE and MTC, make sure that one of the frame rate LEDs is lit.

Frame rate selection

Press the button until desired frame rate LED is lit.

- ▶ 24 frames per second (used for 35 mm film)
- ▶ 25 frames per second (European Video)
- ▶ 30 frames per second (General purpose audio sync)
- ▶ 30-drop frames per second (U.S. Video)
This is actually 29.97 drop frames per second.

MMC ON / OFF

This button only affects whether the dataSYNC² sends MMC. When MMC is on, MMC commands generated by the ADAT are sent out of the dataSYNC²'s MIDI output.

If you are not specifically using MMC, leave this control set to off. MMC is a recent addition to the MIDI specification. So some older sequencers may not react to it predictably.

MMC commands sent by dataSYNC² initiated by ADAT's transport controls.

- ▶ Deferred Play
- ▶ Pause
- ▶ Record
- ▶ Rewind
- ▶ Fast Forward
- ▶ Search

The MMC Button Only Affects the dataSYNC² MIDI Out

The state of the MMC button does not affect the ability of the dataSYNC² to receive MMC. It is not necessary to turn "MMC ON" in order to receive MMC from, for example, a software application or a JLCooper CuePoint.

MTC ON / OFF

Enables or disables the output of MTC from the dataSYNC².

Note

While the ADAT is playing, the buttons are temporarily disabled and the state of the MMC and the MTC functions cannot be changed.

Setting Software Start Time

A sequencer or hard disk recorder that receives MTC must be told at what SMPTE time to start. This is usually called MTC offset time, though sometimes it is simply called start time, or in the case of Mark of the Unicorn's Performer, "Chunk Start".

The dataSYNC² starts generating MTC at 23:58:00:00. This happens during the two minutes when the ADAT displays the word dAtA. When the ADAT's time indicator reads 00:00, the dataSYNC's MTC output is at 00:00:00:00.

**Your sequencer start time should be later than 00.
For example, use a start time of, say, 00:00:20:00.**

This allows 20 seconds of ADAT tape to play before the sequence starts.

On the MIDI software, set it to slave to MTC.

Verify that your software is set up to communicate to the computer's MIDI interface on the correct serial port.

MIDI Clock Operation

The dataSYNC² outputs MIDI Clock and Song Position Pointer. This mode is required to synchronize hardware sequencers, drum machines, and workstation keyboards, as well as some older software sequencers.

Important !

Set the Mode to MIDI Clock for MIDI Clock Operation

To set the dataSYNC² to output MIDI Clock and Song Position Pointer, press the Mode button until the MIDI Clock LED is lit.

Some Requirements before proceeding:

A Completed Sequenced Song is Needed

The dataSYNC² needs to learn the tempo and length of a sequence. It does this by reading the MIDI Clocks as they come out of the sequencer. Therefore, the sequence must be recorded first, before the dataSYNC² can learn the tempo of the sequence.

Suppose that you want to sync up a sequence to the ADAT, but you haven't yet finished working on the sequence. In that case, you need at least one sequencer track that runs the length of the song, at the correct tempo.

If you do not have even one track completed yet, then make a dummy (blank) track on your sequencer of the correct length and tempo.

The Sequencer Must be Set to Send MIDI Clocks

Be certain that your sequencer is set up to transmit (send) MIDI clocks. It doesn't matter whether or not it is set up to transmit MIDI Song Pointer, since it is the MIDI Clocks that the dataSYNC² needs to receive to learn the tempo of the song.

Stay Above the Minimum Tempo

The minimum tempo of the sequence must not be below 25 quarter-notes per minute.

To Clear dataSYNC² Memory

dataSYNC² holds tempo information for one ADAT tape.

When you change tapes to start on a new project, clear the dataSYNC²'s memory by doing the following:

- ▶ Check that the dataSYNC² is in MIDI Clock mode.
Press the Learn button so the LED is lit.
- ▶ Press and do not release the **Learn** and **MMC** buttons.
While holding in **Learn** and **MMC**, press the **Mode** button.
Release all three buttons.
- ▶ The LEDs blink quickly three times to confirm that the memory has been cleared.

To Record Tempos ("LEARN the Tempo Map")

- ▶ After recording your sequencer tracks (or drum machine tracks), leave your sequencer set for internal clock.
- ▶ Also be certain that your sequencer is set up to transmit (send) MIDI clocks.
- ▶ Check that the dataSYNC² has been set to MIDI Clock.
If not, press the Mode button until the MIDI Clock LED is lit.
- ▶ Set the dataSYNC² to Learn mode by pressing the MTC / Learn button so the LED is lit.
- ▶ Cue the ADAT tape to any location after 00.00.
- ▶ Start the tape. The SYNC LED on dataSYNC² flashes slowly.
That indicates that the dataSYNC² is in Learn mode and is prepared to learn the tempo of the sequence.
- ▶ Start the Sequencer. You should immediately see the SYNC led begin to flash rapidly. (If the tempo of the song changes, the flash rate will change, too.)
- ▶ A few seconds after the sequence stops, stop the ADAT.

If the sequencer is the kind that doesn't stop itself, but rather it keeps running after there are no more notes, then stop the sequence yourself. Then stop the ADAT tape.

The dataSYNC² has now recorded the "tempo map" of the sequence. That is, it knows when the sequence starts, every tempo change, and when the sequence stops. All of this information is carefully calculated to line up exactly with the ADAT tape.

To learn the tempo of additional sequences, simply cue the ADAT tape to the place on the tape where you want the next song to start. This can be anytime after the end of the first song. Again, press Play on the ADAT, followed by Play on the sequencer.

Continue to repeat this procedure for each sequence.

The dataSYNC² holds multiple song tempo maps in its battery-backed memory. It holds up to a maximum of 16 songs for one ADAT tape.

The actual available memory will vary with the meter, tempo, and number of tempo changes in each song.

For example, if a 5 minute song has almost continuous rubato tempo changes, you might be only able to get 5 or 6 songs on tape before the memory becomes full. Fast tempos eat up more memory than slow tempos.

Full Memory Indication

When memory becomes full, the SYNC LED will no longer blink rapidly at a rate related to the tempo of the song. Instead, all the LEDs will flash. At that point, the tempo of the last song has not been recorded.

This flashing memory full warning keeps going even if you stop the tape. This way you are sure to not miss this memory full condition indicator. To continue to use the dataSYNC², turn it off and back on again.

To free up memory, you can replace a song at any point in the tape. Simply cue up the ADAT tape and start the sequencer. If you start the sequencer at a point in tape where a tempo map already exists, the new tempo map will replace the older one.

To Playback in Sync

- ▶ After the dataSYNC² has learned the tempo maps of your sequences, set your sequencer for external MIDI clock.
- ▶ Check that the dataSYNC² mode is still set to MIDI Clock. If not, press the Mode button until the MIDI Clock LED is lit.
- ▶ Take the dataSYNC² out of Learn mode by pressing the MTC / LEARN button so the LED is off.
- ▶ Start the ADAT tape, either from just ahead of the start of the song, or from where ever within the song you desire.

The SYNC LED will flash slowly if you start the tape before the song begins. When the song starts, the SYNC LED will come on solid, and the sequencer will start.

If this is at the very beginning of the track, a MIDI Start command, followed by MIDI Clocks will be sent from the dataSYNC² into the sequencer or drum machine.

If the tape is started anywhere later than the very start, a MIDI Song Position Pointer command will be sent, followed by a MIDI Continue command, and then MIDI Clocks.

The sequencer/drum machine will “chase” to the appropriate place in the song. From there, it will stay in perfect sync.

To Backup the dataSYNC² Memory

If you are working in MIDI Clock, it is possible to backup the tempo map memory of the dataSYNC². Backup is not necessary if you are working in SMPTE / MTC mode.

To backup the memory of the dataSYNC² requires a computer running a MIDI System Exclusive librarian program, or a MIDI data disk, or a sequencer that can record System Exclusive data.

If you have the necessary equipment, backup is recommend for several reasons. For one thing, you can only program the tempo maps for one tape at a time into the dataSYNC². You have to clear memory every time you want to work with a new tape. Thus it is useful to have an “archive” copy of the tempo maps in case you want to remix the songs in the future. A backup also protects you against data loss in case of equipment failure or power surges.

To backup the memory, connect the MIDI input of the data storage device to the MIDI output of dataSYNC².

Set up the data storage device to receive dataSYNC²'s data dump.

Press both the MTC and the MMC switches at the same time to initiate the data dump.

To load the data back into the dataSYNC², simply send the data into the dataSYNC²'s MIDI input. It doesn't matter what the switch settings are. The dataSYNC² will receive the data at any time, provided that it is not in a SYNC condition.

System Exclusive Implementation

For those of you writing or customizing your own librarian software, here are more technical details about the MIDI System Exclusive implementation of the dataSYNC².

To request a dump of system exclusive data, the storage device must send the following commands into the dataSYNC²:

(MIDI data is shown in hexadecimal notation, as indicated by the “\$” before each number.)

\$F0 \$15 \$20 \$00 \$F7

This is the “dump request” command.

The dataSYNC² will reply with:

\$F0 \$15 \$20 \$01 <data> \$F7

This is a dump of all the tempo maps in memory.

The data is “nibblized”, and may be as long as 16258 bytes.

Troubleshooting

If you have followed the directions, but things still are not going quite as you expected, take a few minutes to do some troubleshooting.

Here are some clues to solve common problems.

Flashing LEDs (Full Memory Indication)

In MIDI Clock mode, when memory becomes full, all the LEDs will flash. At that point, the tempo of the last song has not been recorded.

This flashing memory full warning keeps going even if you stop the tape. To continue to use the dataSYNC², turn it off and back on again.

SMPTE and MIDI Time Code

The symptom is that the sequence immediately chases to the wrong measure number as soon as the tape is started.

The Start Time of the sequencer has probably not been set correctly. (This is sometimes called Offset Time.) Let the tape run for a few seconds so that you can observe the SMPTE time display on your sequencer.

If the sequence skips ahead only a few measures, then you did not enter an additional arbitrary offset to allow for some tape leader. That is, if you want the sequenced song to start when the ADAT's counter reads, say, 20 seconds, then your SMPTE or MTC driven device requires an offset time of 00:00:20:00.

MMC

If the symptom is that the ADAT is responding intermittently to MMC commands coming from a computer, the dataSYNC² may have been turned on first instead of last. Turn the ADAT on first, and then turn on the dataSYNC².

If you have more than one ADAT, after turning them on, let them go through their automatic ID process. Then turn on the dataSYNC².

This is necessary because the dataSYNC² sends some important commands to the ADAT at the moment that the dataSYNC² is turned on. If the units are powered up in the wrong order, the ADATs will never receive these important commands, and some features of the dataSYNC² will appear to not operate correctly.

MIDI Clock and Song Position Pointer

The SYNC LED Does Not Flicker When Attempting to Learn the Tempo Map.

Check that the sequencer or drum machine is really set up to put out MIDI Clocks. A surprising number of devices need to be “told” to do this.

The MIDI cable should go from the MIDI out of the sequencer to the MIDI in of the dataSYNC², and the LEDs should indicate MIDI Clock and LEARN.

If the memory is full, all the LEDs will flash and you will not be able to learn additional tempo maps.

The SYNC LED Does Not Come On When Playing Back.

Make sure that you are playing a section of the tape that falls within the start and end of the tempo map.

The SYNC LED Turns Off (“Drops Out”) During Learn

The minimum tempo must not be below 25 quarter-notes per minute.

If the LED is steadily flashing after the drop out, you have exceeded the memory of the dataSYNC² and the last tempo map was not recorded.

Inaccurate Chasing

First verify that the sequencer or drum machine is indeed set to external MIDI Clock. If you have inadvertently left the sequencer or drum machine set to internal clock, it may still give the illusion of locking to MIDI Clock. But it will not chase or sync properly.

(This is not a concern with Alesis sequencers and drum machines. These have a single setting for both internal and MIDI clock.)

The Sequencer is Not Playing Back

If the tape is playing and the SYNC LED is on, check that the sequencer has been set up to read external MIDI Clock (sometimes called “standard beat clocks”). If using a Macintosh computer, check the software for correct MIDI port configurations and interface clock rate.

Timing Inaccuracies When Using the Merging Input

A keyboard performance with after touch may produce large volumes of MIDI data. If this data comes into a sequencer at the same time as MIDI Clock or MTC, timing inaccuracies may result as the MIDI band width becomes full.

Also, some sequencing software packages do not permit you to simultaneously send keyboard performance data and MTC into the same computer port.

For the most accurate timing, it is recommended that MTC be sent into a different computer port than the keyboard.

Another solution is to temporarily set the sequencer to internal clock. Then record the new keyboard track on the sequencer, without the tape playing. Then, set the sequencer back to external MIDI Clock or MTC.

No Response

If none of the buttons do anything, and none of the LEDs are on, check that the unit is connected to the correct transformer. If the LEDs just stay on, this may indicate that the internal microprocessor is not running. Perhaps the unit has received an AC surge. Turn the power off and on once to see if the unit returns to life.

Service

The most common cause of mysterious problems is a “noisy” AC outlet. We recommend the use of a AC surge suppressor and line filter with all computer-related equipment. These can be purchased at any hardware or computer store, and many music stores also now carry them.

Your dataSYNC² is covered in the United States by a one year limited warranty. As you might expect, there are no user-serviceable parts inside the dataSYNC². Refer to the really fine print at the end of this manual for detailed warranty and service information.

Synchronization Terms

This chapter provides you with definitions of the synchronization terms that relate to the dataSYNC². We will conclude with a discussion of the criteria for choosing the ideal synchronization procedure for your application.

Although you probably already have an application for the dataSYNC² in mind, you might find it helpful to review this chapter because there still seems to be a good deal of confusion in the industry over the differences between MIDI Clock and MIDI Time Code.

We have for the most part avoided the use of the term “MIDI Sync” in this manual. Although that term used to refer to MIDI Clock, these days it may refer to anything, and thus has become almost useless as an expression! This confusion is not helped by the fact that more than one popular sequencer manufacturer invents their own sync terminology, using words not even found in the Detailed MIDI Specification. This leaves many musicians, engineers, and producers justifiably perplexed.

Definition of Terms

MIDI Clock with Song Position Pointer

Generally, these terms are also used to refer to a whole group of MIDI messages, including Start, Stop, and Continue.

MIDI Clock is known as a Real Time MIDI message. It is sent and received by most sequencers and drum machines continually, 24 times each quarter note. Thus the clock rate varies with the tempo. Nearly all sequencers can read MIDI Clock. (Continued.)

Song Position Pointer

Song Position Pointer is a MIDI message that indicates how many sixteenth notes have elapsed since the beginning of a song.

MIDI Song Position Pointer by itself cannot synchronize anything. It must be used along with MIDI Continue and MIDI Clock messages to be useful.

The MIDI Song Position Pointer message is sent out only once when the dataSYNC² is in MIDI Clock mode and the ADAT is put into play at some location other than the beginning of the song. MIDI Song Position Pointer is never sent continually.

A sequencer that has been set up to receive MIDI Clock will slave its tempo to MIDI Clocks coming from the dataSYNC². When the tape is started, dataSYNC² sends a Song Position Pointer message into the sequencer. If the sequencer can recognize the message, it will internally prepare to playback at the right location within the song.

SMPTE

SMPTE was developed in the 1960's as a way to uniquely number each frame of a video tape for the purposes of editing. On audio tape, SMPTE consists of a sync tone that is recorded onto one track. One might say that the tone is recorded along the length of the tape. For this reason, it is known as Longitudinal Time Code or simply LTC. (There are other ways of encoding SMPTE onto various media, but we will limit the scope of our discussion to LTC.)

SMPTE Format

The frame rate may be either 24 frames per second (used for 35 mm film), 25 frames per second (European and Australian video), 30 frames per second (general purpose tape sync), or 30 drop-frame (U.S. video). The 30 drop-frame format selectively removes certain frames to create an average of 29.97 frames per second.

The dataSYNC² generates any of these forms of SMPTE. When the dataSYNC² is generating SMPTE, it also may send MIDI Time Code.

MIDI Time Code (MTC)

MTC is a way of sending SMPTE time on a MIDI cable. While generating SMPTE, the dataSYNC² can directly convert the hour, minute, second, frame data into MTC, which your computer in turn can decode and sync to.

MTC is very different from ordinary MIDI Clock. This is because MIDI Clock messages are sent out at a rate that varies with the tempo. That is to say, the faster the sequence, the faster the MIDI Clock messages are transmitted. MTC however does not vary in tempo. Rather, it represents a steadily “upcounting” number stream that can be decoded by a computer to represent a time.

For this reason, sequencers and hard disk recorders that read MTC must also allow the user to specify a start time. In addition, sequencers (but not hard disk recorders) allow the user to enter tempos. So the software is providing the "tempo map" saved as part of a sequence.

In SMPTE / MTC Mode, as soon as the tape begins to play, the dataSYNC² immediately converts the 48 K sample clock into SMPTE and MTC. But the sequencer or hard disk recorder will not start until the SMPTE time equals the pre-programmed starting time.

Choosing MIDI Clock or SMPTE / MTC

If your sequencer reads MIDI Clock, but cannot read MTC, then choose MIDI Clock. MIDI Clock is used for hardware sequencers, workstations, and drum machines, including devices by Alesis, Roland, Kawai, Yamaha, Korg, Ensoniq, Emu, etc. This allows the ADAT to control these devices starting at any place in tape. dataSYNC² will synchronize these machines during tape play back, overdubs, and mix down.

dataSYNC² decodes the previously learned tempo map and sends a MIDI Song Position Pointer. The sequencer responds by chasing to the appropriate measure in the song. Then dataSYNC² will generate MIDI Clocks, so that the sequencer stays in perfect sync.

If your sequencer or hard disk recorder reads MTC, then choose SMPTE / MTC. SMPTE and MTC are used for nearly all sequencing software packages and hard disk recorders.

SMPTE / MTC allows greater flexibility in that you can make changes to the starting time, length and tempo of a song or sequence even after the your project is well under way.

Appendix: Important Information

Here is additional useful information regarding using the dataSYNC², including answers to some frequently asked questions.

When You Should First Try a Data Dump

When you are operating the dataSYNC² using MIDI Clock, the tempo, tempo changes and length of the songs are actually stored inside the dataSYNC² memory. This information, called "the tempo map data" will be different for each tape.

This data can be backed up by performing a MIDI "data dump" to a suitable storage medium, usually saving the data to a disk, much in the same way that you would save patch data from a sound module.

Unfortunately, this is not always as easy as it seems it should be. Some sequencers and workstations have a procedure for recording MIDI data dumps that is entirely different from the way you record a MIDI musical performance.

Based on past experience, if you are using MIDI Clock and plan on making backup copies of your dataSYNC² tempo map data, it is strongly recommended that you practice first.

This would be better than learning how to back up while under time pressure, risking a mistake and possible loss of valuable data.

Try doing a backup on non-critical data, and verify that you can successfully re-load the data back into the dataSYNC². That way you can familiarize yourself with the technique and become comfortable with it.

SMPTE, MTC or MIDI Clock: Which is Better?

Your JLCooper dataSYNC² can be setup to send MIDI Clock with Song Position Pointer, or SMPTE, or MIDI Time Code. In other words, it can cover just about any synchronization need.

Though the dataSYNC² owners manual gives you very detailed information on choosing and using these different sync methods, we are often asked simply, "which is better."

The answer is very much dependent upon your application, that is, what is connected to the dataSYNC². For example, keyboard workstations, drum machines, and "hardware" sequencers almost without exception cannot recognize or respond to SMPTE or MIDI Time Code. This kind of musical equipment synchronizes by means of MIDI Clocks only. If you are using the dataSYNC² to synchronize a keyboard workstation to the ADAT, then MIDI Clock is your only choice.

Most software sequencing applications permit synchronizing to either MIDI Clock or MTC. If you have a choice, then setup your software for MTC. Setting the software to sync to MTC has several advantages, including the fact that the tempo is usually saved as part of the sequence. This makes your work more "portable" to other studios and other synchronizers.

If you are using a computer MIDI interface with a built-in SMPTE reader, then set your software to read MTC, but connect the dataSYNC² to the interface using SMPTE instead of MTC. In other words, an audio cable instead of a MIDI cable carries the sync signal. This allows you to "free up" one more MIDI input on your computer interface. And some interfaces seem work more efficiently when they are doing their own SMPTE-to-MTC conversion, rather than simply reading MTC straight from a MIDI cable.

Lastly, if you are syncing an analogue machine synchronizer, these are most likely to use SMPTE only, and not MTC.

Whichever synchronization method that you decide to use, you will find that the dataSYNC² is fast, accurate, and reliable.

JLCooper Electronics Limited Factory Warranty

JLCooper Electronics ("JLCooper") warrants this product to be free of defects in materials or workmanship for a period of 12 months from the date of purchase.

This warranty is non-transferable and the benefits apply to the original owner. Proof of purchase in the form of an itemized sales receipt is required for warranty coverage.

To receive service under this warranty, customers in the United States should contact the JLCooper factory at (310) 322-9990 and talk to a service technician. If necessary, a Return Authorization number may be issued.

For our customers outside the United States, it is recommended that you first contact your Dealer or Distributor, since they may offer their own service or support policy.

If local support is not obtainable, please send a FAX to JLCooper's Service Department at (310) 335-0110, with a detailed description of the service required.

Upon issuance of return authorization, the product should be properly packed and shipped to Service Department, JLCooper Electronics, 142 Arena St., El Segundo, CA 90245.

Please include the following: copy of the sales receipt, your name and address (no P.O. Boxes, please), a brief description of the problem, and any other related items discussed with the service department and considered necessary to evaluate the product or effect a repair. The return authorization number must be clearly written on the outside of the package.

JLCooper will, without charge for parts or labor, either repair or replace the defective part(s). Shipping costs are not covered by this warranty.

JLCooper's normal repair turn around time at the factory is approximately 15 business days, from receipt of product to shipping. Your actual turn around time will include return shipping.

Actual turn around time will vary depending upon many factors including the repeatability of the customer's reported complaint, the availability of parts required for repair, the availability of related products needed to evaluate the product if necessary.

Priority services are available. These should be discussed with the service technician at the time the return authorization is issued.

This warranty provides only the benefits specified and does not cover defects or repairs needed as result of acts beyond the control of JLCooper including but not limited to: abuse, damage by accident/negligence, modification, alteration, improper use, unauthorized servicing, tampering, or failure to operate in accordance with the procedures outlined in the owner's manual; nor for acts of God such as flooding, lightning, tornadoes, etc.

THE DURATION OF ANY OTHER WARRANTIES, WHETHER IMPLIED OR EXPRESS, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN. JLCOOPER HEREBY EXCLUDES INCIDENTAL AND CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO: LOSS OF TIME, INCONVENIENCE, DELAY IN PERFORMANCE OF THIS WARRANTY, THE LOSS OF USE OF THE PRODUCT OR COMMERCIAL LOSS, AND FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY, APPLICABLE TO THIS PRODUCT. JLCOOPER SHALL NOT BE LIABLE FOR DAMAGES OR LOSS RESULTING FROM THE NEGLIGENT OR INTENTIONAL ACTS OF THE SHIPPER OR HIS CONTRACT AFFILIATES. THE CUSTOMER SHOULD CONTACT THE SHIPPER FOR PROPER CLAIMS PROCEDURES IN THE EVENT OF DAMAGE OR LOSS RESULTING FROM SHIPMENT.

dataSYNC² 2.0 Addendum

44.1 and 48 K Sample Rates Are Supported

February 19, 1997

dataSYNC² version 2.0 supports both 44.1 K and 48 K sample rates. On the original ADAT, the sample rate was 48 K. On the ADAT XT, the sample rate is selectable to either 44.1 K or 48 K.

Automatic Sample Rate Selection

dataSYNC² will automatically detect the sample rate selected on the XT. It is not necessary to set anything on the dataSYNC², unless you plan on using pitch shift. In that case, read on.

Manual Sample Rate Selection and Pitch Shift

The dataSYNC² can maintain accurate sync when the pitch is shifted.

It should be understood that changing the pitch on the ADAT or ADAT XT actually changes the sample rate. When the pitch is shifted more than about 3%, the two sample rates cannot be distinguished. (In other words, you can slow down 48 K enough so it appears to be 44.1 K, and vice versa.)

This means that pitch shifting will be interpreted as a change in sample rates. This would prevent your project from syncing correctly.

This problem is easily overcome by setting the dataSYNC²'s sample rate manually.

If you plan on using pitch shift, then you should set the dataSYNC²'s sample rate manually as follows:

- To manually set the dataSYNC² to 44.1 K sample rate operation, press and hold the MTC button on power up.
- To manually set the dataSYNC² to 48 K sample rate operation, press and hold the MMC button on power up.

Once the sample rate has been manually set, you can use pitch shift without the dataSYNC² automatically changing sample rates.

It will remain in the selected rate until the unit is powered-down.