Media Control Station²
MIDI Version

User's Manual
Third Edition

JLCOOPER ELECTRONICS

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Introduction

JLCooper has designed the Media Control Station^2 to provide the professional editor, musician, multi-media artist or engineer with a comfortable, user-friendly remote control.

The MCS^2 can control hard disk recorders, digital audio workstations, sequencers, and modular digital multitracks.

The MCS^2 features a smooth, weighted and optically encoded jog/ shuttle wheel and transport keys, to make audio editing easier than ever.

Please take a moment to send in your product registration card, so we can notify you in the future about any new products or updates as they become available.

Connecting the MCS^2

The MCS^2 has a built in captive cable with one MIDI jack.
MIDI comes out of the jack labeled "**TO MIDI IN**".

Plug in a MIDI cable here. Connect the other end of this MIDI
cable to the MIDI In of the computer or machine that you want
to control.

The other cable provides the MCS^2 with power.
Plug it into the supplied external power supply.

The power supply is rated at 9 volts, DC, at 500 mA.
The center conductor is positive. Use of the wrong supply will
damage the MCS^2.

MIDI Commands Sent by the MCS^2

The MCS^2 sends **MIDI Machine Control** commands, and also simultaneously sends **MIDI Controller** commands.

MIDI Machine Control is recognized as the machine control standard for most modular digital multi track recorders, and hard disk recorders.

The **MIDI Controller** commands sent are the same as those sent by the JLCooper CS-10^2 and CS-2 Control Stations.

These controller commands have become the industry standard command set for controlling many different brands of computer-based digital audio workstations.

In addition to the standard MMC and Controller commands, the MCS^2 also sends **MIDI System Exclusive** commands. These are non-standard commands unique to the JLCooper MCS^2. They are recognized by specific platforms that have been developed to support the MCS^2.

MCS^2 Operation

Transport Keys

The Transport keys send both MMC and MIDI Controller commands.

The Transport Keys and MIDI Controller Commands

As stated earlier, the MIDI Controller commands are the same commands as those sent by the JLCooper CS-10^2 Control Station. These commands are recognized by many software based digital audio workstations.

Look in the documentation of the system that you are controlling. If CS-10 or CS-10^2 support is mentioned, then the MCS^2 will also behave in the same manner.

The Transport Keys and MMC Commands

The Transport keys control send the following MMC commands: Rewind, Fast Forward, Stop, Play, and Record.

Record only operates if tracks have been enabled ("armed") first. See Track Enabling below.

To Record, first arm tracks, and then press and release Play. Allow the machine to come up to speed if necessary.

Then press Play again and hold it down. While holding down Play, press Record. Then release both keys.

When both Shift and Option are held down, the five Transport keys can send 5 different locate commands, called GP0 - GP4. These locate commands only operate with machines designed to respond to pre-stored general purpose locates.

Track Enabling
The MCS^2 has the ability to record-enable up to 8 tracks.

Tracks one through four are enabled by holding down the Shift key while pressing either
Fast Forward (track 1)
Stop   (track 2)
Play   (track 3)
Record   (track 4)

Tracks five through eight are enabled by holding down the Option key while pressing either
Fast Forward (track 5)
Stop   (track 6)
Play   (track 7)
Record   (track 8)

Remember that the MCS^2 has no input from the device being controlled, so it has no knowledge of any track enabling done on the front panel of the machine itself. Nor does it know the status of the machine when the MCS^2 is first powered on. The MCS^2 powers-up operating under the assumption that all tracks are not enabled.

Jog / Shuttle Wheel
The wheel sends both MMC and MIDI Controller commands.

The Wheel and MIDI Controller Commands
The MIDI Controller commands are the same commands as those sent by the JLCooper CS-10^2 Control Station. These commands are recognized by many software based digital audio workstations.

Look in the documentation of the system that you are controlling. If CS-10 or CS-10^2 support is mentioned, then the MCS^2 will also behave in the same manner. The Jog button and LED have no effect on the controller commands sent.

The Wheel and MMC Commands

The wheel has two distinct modes of operation, Jog and Shuttle. The wheel defaults to Jog mode on power up. To change from Jog to Shuttle mode, press the Jog button to turn the LED off.

MMC Jog Mode

In Jog mode, playback speed and direction is proportional to the speed and direction that the wheel is rotated.

Rotate the wheel clockwise for forward playback.
Rotate the wheel counter clockwise for reverse playback.

In jog mode, continuously rotating the wheel results in 1X play speed, either forward or backward.

To stop the tape, simply stop turning the wheel.

Though there is no "Jog" command in the MMC specification, the MCS^2 has the unique ability to produce the same effect as Jog. (For the details about how this is done, see the MIDI Implementation later in this manual.)

Shuttle Mode

In Shuttle mode, playback speed is related to the extent of rotation away from the starting position of the wheel.

Rotate the wheel clockwise for forward shuttle.
Rotate the wheel counter clockwise for reverse shuttle.

In shuttle mode, one does not continuously rotate the wheel. The machine continues to shuttle until the wheel is returned to its starting position. Alternately, simply press Stop.

The current position of the wheel becomes its new starting position for the next shuttle operation.

Additional MCS^2 Features

Return to Zero
Pressing Option and Rewind will result in an MMC command: Locate to 00:00:00:00.

Shuttle Back at Play Speed
Pressing Shift and Rewind will result in an MMC command: Shuttle backwards at 1 X play speed.

"MMC Only" or "Controllers Only" Modes
The MCS^2 normally sends MMC, Controllers, and Sysex. It sends these commands all at the same time.

There may be some circumstances where you might want the MCS^2 to only send one command set.

There are three special modes of operation that allow it to send only one set of commands.

For Controllers only, and no MMC or Sysex, power up the MCS^2 while holding the Rewind key.

For MMC only, and no Controllers or Sysex, power up the MCS^2 while holding the Fast Forward key.

For Sysex only, and no MMC or Controllers, power up the MCS^2 while holding the Stop key.

Since the MCS^2 has no memory of the last mode used, this would be done each time the unit is powered up.

MIDI Implementation

The JLCooper MCS^2 MIDI version sends both MMC and Controller commands. All commands are given in hex notation.

All MMC commands are "ID = all", that is, 7F hex which equals 127. All Controller commands are on MIDI Channel 16 only.

All of the Transport Keys send both MMC and Controller commands upon depression, and only a Controller command upon release.

The MMC commands are modified by state of the Option and Shift keys. The Controller commands are modified by the Option key, but are not modified by the Shift key.

Option:
Sends no commands, but affects the commands sent by other keys.

Shift:
Sends Controller BF 09 7F upon depression. BF 09 00 upon release. Affects MMC commands sent by other keys.

Rewind:
Rewind sends F0 7F 7F 06 05 F7 (MMC Rewind) and BF 13 7F upon depression, BF 13 00 upon release.

Shift Rewind sends F0 7F 7F 06 47 03 41 00 00 F7 (MMC Shuttle backwards at normal speed) upon depression. Sends same controllers as Rewind.

Option Rewind sends F0 7F 7F 06 44 06 01 00 00 00 00 00 F7 (MMC Locate to 00:00:00:00) and BF 0A 7F upon depression. BF 0A 00 upon release.

Shift Option Rewind sends F0 7F 7F 06 44 02 00 08 F7 (Locate to GP0) upon depression.
Sends same controllers as Option Rewind.

Fast Forward:
Fast Forward sends F0 7F 7F 06 04 F7 (MMC Fast Forward) and BF 14 7F upon depression, BF 14 00 upon release.

Shift Fast Forward sends F0 7F 7F 06 40 04 4F 02 20 00 F7 (Track Enable Track 1) and upon depression.
Sends same controller as Fast Forward.

Option Fast Forward sends F0 7F 7F 06 40 04 4F 02 00 04 F7 (Track Enable Track 5) and BF 0B 7F upon depression, BF 0B 00 upon release.

Shift Option Fast Forward sends F0 7F 7F 06 44 02 00 09 F7 (Locate to GP1) upon depression.
Sends same controller as Option Fast Forward.

Stop:
Stop sends F0 7F 7F 06 07 F7 (MMC Record Exit), F0 7F 7F 06 01 F7 (MMC Stop), and BF 15 7F upon depression. Stop sends BF 15 00 upon release.

Shift Stop sends F0 7F 7F 06 40 04 4F 02 40 00 F7 (Track Enable Track 2) upon depression.
Sends same controller as Stop.

Option Stop sends F0 7F 7F 06 40 04 4F 02 00 08 F7 (Track Enable Track 6) and BF 0C 7F upon depression, BF 0C 00 upon release.

Option Shift Stop sends F0 7F 7F 06 44 02 00 0A F7 (Locate to GP2) upon depression.
Sends same controller as Option Stop.

Play:
Play sends F0 7F 7F 06 02 F7 (MMC Play) and
BF 16 7F upon depression, and BF 16 00 upon release.

If Record is held down, Play sends an MMC Record strobe.

Shift Play sends F0 7F 7F 06 40 04 4F 02 00 01 F7
(Track Enable Track 3) upon depression.
Sends same controller as Play.

Option Play sends F0 7F 7F 06 40 04 4F 02 00 10 F7
(Track Enable Track 7) and BF 0D F7 upon depression,
BF 0D 00 upon release.

Shift Option Play sends F0 7F 7F 06 44 02 00 0B F7
(Locate to GP3) upon depression.
Sends same controller as Option Play.

Record:
The Record key does not send a MMC command unless the
Play is pressed also. Assuming that the Play key is held,
F0 7F 7F 06 06 F7 (MMC Record Strobe) is sent upon
depression, along with BF 17 7F. BF 17 00 is sent upon release.

Shift Record sends F0 7F 7F 06 40 04 4F 02 00 02 F7
(Track Enable Track 4) upon depression.
Sends same controller as Record.

Option Record sends F0 7F 7F 06 40 04 4F 02 00 20 F7
(Track Enable Track 8) and BF 0E 7F upon depression,
BF 0E 00 upon release.

Shift Option Record sends F0 7F 7F 06 44 02 00 0C F7
(Locate to GP4) upon depression.
Sends same controller as Option Record.

More About Track Enabling

The MCS^2 has no knowledge of any track enabling done on the machine itself, or of the status of the machine when the MCS^2 is first powered on. The MCS^2 powers-up assuming all tracks are not enabled.

The MMC specification combines the eight enable bits into one command, so that the commands listed above show a condition where all tracks had previously been un-enabled. For instance, if tracks 1 thru 7 had been enabled, then an Option Record is pushed, the resulting string of MMC would be: F0 7F 7F 06 40 04 4F 02 60 3F F7, showing all eight tracks enabled.

Of course, pushing a key for an enabled track will toggle the track to un-enabled status.

The Wheel and Jog Button:

The Jog button changes the MMC command that the wheel sends. When pressed, it also sends BF 1F 00 and BF 1F 7F when released.

Approximately every 10 msec, the MCS^2 scans the wheel to determine if the wheel has been moved during that period. The way the MCS^2 deals with that information is different for the Controllers and the MMC messages sent. Even though the messages are described separately below for clarity, both types of commands are sent together.

Wheel Controller Commands

The wheel sends controller 60h. The Wheel count is in form of 2's Complement with bit 6 as the sign bit. Positive numbers are sent for Clockwise rotation. The number sent represents the number of wheel counts accumulated since last transmission (that is, a Relative position count), much like what a mouse transmits. The resolution is approximately 180 counts per revolution, and transmissions are sent at about 10 millisecond intervals when wheel is being turned.

Wheel MMC Commands
There are two different MMC "modes" that the wheel may be set to: Shuttle and Jog.

The MCS^2 powers-up in the Jog mode with the LED on. At any time, the user may switch between Jog and Shuttle mode by pressing the Jog button. This also toggles the state of the Jog LED.

Shuttle Mode:
Standard MMC Shuttle commands are sent, F0 7F 7F 06 47 03 aa bb cc F7, where aa bb cc are the "Standard Speed" values as per the MMC specifications.

In the Shuttle mode, the position of the knob when the unit enters the shuttle mode, or whenever a transport key is pushed, is considered the 'Zero' position. Movement away from this Zero position sends increasingly positive or negative shuttle commands.

The minimum value is 00 10 00. At about 45° of movement, a value of 01 00 00 (normal play speed) is sent out. At about 120° of movement, the value "max's out" with a value of 07 00 00 (7 times play speed).

Continued movement sends no new MMC commands (although controller commands continue to be sent.) If, for example, the wheel is turned clockwise about 120°, the maximum value of 07 00 00 is reached. If the wheel is turned farther, no new messages will be sent. Then, if the wheel is turned back counter clockwise, a decreasing speed value will be sent from that point. Thus, the Zero point will shift if the wheel is turned past the "maximum" point.

At any time, pressing a transport key such as Stop will reset the Shuttle value to zero.

Jog Mode:

There is no Jog mode specified in the MMC specifications. Lacking this, the MCS^2 uses the same technique as used with the Sony 9-pin equipment: wheel speed is translated into a shuttle value which is sent every 100 msec or so. When movement of wheel stops, a message with a zero value of shuttle is sent out. A rotational speed of about 1/2 turn per second results in a value of about 01 00 00, or normal play speed.

Specifications

Power Consumption: .... 20 mA
Dimensions: .... 9 $^3/_8$" x 4 $^3/_4$" x 1 $^1/_2$"
Weight: .... 24 oz.
Protocol: .... MIDI, MMC and Controllers

Care and Service
If properly cared for, your MCS^2 should provide years of trouble-free performance. Avoid dropping the MCS^2, or hard banging on the keys.

Clean with a soft cloth dampened with window cleaner. Do not allow liquids to get inside the unit.

There are no user-serviceable parts in the MCS^2. Please refer to the really fine print following for detailed warranty and service information.

Quick Reference Chart

This chart shows the MIDI Machine Control commands sent with the various key combinations:

Keep in mind that the equipment that you are controlling may only respond to a limited subset of these commands:

	Rewind	Fast Fwd	Stop	Play	Record
no Shift/Opt	Rewind	FF	Record Exit and Stop	Play	Record if Play held
Shift held	Shuttle back at play speed	Toggle Track 1	Toggle Track 2	Toggle Track 3	Toggle Track 4
Option held	Locate to 00:00:00:00	Toggle Track 5	Toggle Track 6	Toggle Track 7	Toggle Track 8
both Shift/Opt held	Locate to GP0	Locate to GP1	Locate to GP2	Locate to GP3	Locate to GP4

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.

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