

DRAWMER



mc7.1 SURROUND MONITOR CONTROLLER

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ONE YEAR LIMITED WARRANTY

Drawmer Electronics Ltd., warrants the Drawmer **MC7.1 Surround Monitor Controller** to conform substantially to the specifications of this manual for a period of one year from the original date of purchase when used in accordance with the specifications detailed in this manual. In the case of a valid warranty claim, your sole and exclusive remedy and Drawmer's entire liability under any theory of liability will be to, at Drawmer's discretion, repair or replace the product without charge, or, if not possible, to refund the purchase price to you. This warranty is not transferable. It applies only to the original purchaser of the product.

For warranty service please call your local Drawmer dealer. Alternatively call Drawmer Electronics Ltd. at +44 (0)1709 527574. Then ship the defective product, with transportation and insurance charges pre-paid, to Drawmer Electronics Ltd., Coleman Street, Parkgate, Rotherham, S62 6EL UK. Write the RA number in large letters in a prominent position on the shipping box. Enclose your name, address, telephone number, copy of the original sales invoice and a detailed description of the problem. Drawmer will not accept responsibility for loss or damage during transit.

This warranty is void if the product has been damaged by misuse, modification, unauthorised repair or installed with other equipment that proved to be faulty.

THIS WARRANTY IS IN LIEU OF ALL WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESSED, IMPLIED OR STATUTORY. DRAWMER MAKES NO OTHER WARRANTY EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. PURCHASER'S SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE REPAIR OR REPLACEMENT AS SPECIFIED HEREIN.

IN NO EVENT WILL DRAWMER ELECTRONICS LTD. BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT IN THE PRODUCT, INCLUDING LOST PROFITS, DAMAGE TO PROPERTY, AND, TO THE EXTENT PERMITTED BY LAW, DAMAGE FOR PERSONAL INJURY, EVEN IF DRAWMER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states and specific countries do not allow the exclusion of implied warranties or limitations on how long an implied warranty may last, so the above limitations may not apply to you. This warranty gives you specific legal rights. You may have additional rights that vary from state to state, and country to country.

For the USA

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off on, then the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Unauthorised changes or modification to this system can void the users' authority to operate this equipment.

This equipment requires shielded interface cables in order to meet FCC class B limit.

For Canada

CLASS B NOTICE

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

CLASSE B AVIS

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Règlement des signaux parasites par le ministère Canadien des Communications.

SAFETY CONSIDERATIONS

CAUTION - SERVICING

DO NOT OPEN. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

TO REDUCE RISK OF FIRE/ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO MOISTURE.

WARNING

DO NOT ATTEMPT TO CHANGE OR TAMPER WITH THE SUPPLIED POWER SUPPLY OR CABLES.

WARNING

THERE ARE NO USER REPLACEABLE FUSES WITHIN EITHER THE MC7.1 OR ITS SUPPLIED POWER SUPPLY. IF FOR ANY REASON THE MC7.1 CEASES TO WORK DO NOT ATTEMPT TO MEND IT - CONTACT DRAWMER TO ARRANGE FOR A REPAIR/REPLACEMENT.

In the interests of product development, Drawmer reserve the right to modify or improve specifications of this product at any time, without prior notice.

MC7.1 Surround Monitor Controller

MULTIPLE SOURCE STUDIO MONITOR CONTROLLER FOR
7.1/5.1 SURROUND & STEREO APPLICATIONS

The Drawmer MC7.1 Surround Monitor Controller is a combined 7.1/5.1 and stereo monitor controller. It has the same pristine & transparent design as others from the Drawmer monitor controller pedigree, with a rugged desk top "wedge" form factor as used in the popular MC3.1.

Whether it is producing audio for film or television, or transporting the listener directly into the venue of an all encompassing orchestral piece, be it in 5.1, 7.1, quadraphonic, DTS®, Dolby Digital EX, THX Surround EX™, DTS-HD™, Dolby Atmos®, etc., one thing is sure, the number of users that wish to listen to audio within a surround setting has been growing and will continue to do so. There has been an ever increasing number of surround products coming to market, not only blueray players and home cinema but also on mobile and media devices. For example, Apple devices have been capable of reproducing 7.1 surround since iOS 9.3. Therefore, it is likely that at some point every artist and engineer will consider trying surround sound, or fear being left behind.



Boasting two sets of balanced 7.1 Inputs, a 7.1 through, 1 Balanced Stereo Input and a convenient front panel Aux Input, with Balanced 7.1 Speaker outs and an independent Stereo main out with its own sub woofer option, there are no shortage of connectivity options. The Drawmer MC7.1 is capable of supporting any speaker setu , from mono, to stereo, various modes of surround, or 8 independent channels, depending on input type and speaker positioning.

The MC7.1 is a powerful Surround Monitor Controller in its own right, but is also perfect for controlling and checking your stereo mixes. This is one area where other surround monitoring controllers fall short. All studios, whether dedicated to film audio post production, or small home studio will at some time (if not most of the time) work in stereo as well as surround. Aside from the surround capabilities, the MC7.1 contains the same comprehensive set of stereo "mix check" functions that are presented on the MC3.1 and which can of course be applied to the stereo input channel or any of the surround channels when these are routed to stereo.

The ability to "mix down" the surround mix to the FL and FR speakers OR the independent Stereo main speakers combined with the comprehensive cut or solo matrix means any combination of the surround channels can be listened to in the front mains. Want to focus in on the rear channels? Simply mix down to the front stereo speakers then solo them out of the mix! Whilst soloing out the centre or LFE channels give a central mono representation across the fronts or stereo mains!

Speaker level matching with switchable Mono/Sub output, the popular Low/Mid/High band solo feature, Internal Talkback Mic with footswitch control, and External Talkback Mic input are all brought over from the MC3.1, completing the rich array of features available on the MC7.1.

Features:

- Pristine, ultra low noise & transparent circuit design gives you an accurate representation of your mix whether it be surround or stereo.
- There are a total of 20 input sources. These include two separate 7.1 inputs (one via balanced jacks and one via 25 pin D-sub) with a through output to send to a multitrack recorder, for example. A Stereo input via Neutrik combijacks, and a Top panel 3.5mm AUX Input & Level Control for connecting MP3 players, smartphones or tablets etc.
- 3x Sets of Speaker Outputs. One 7.1 (or 8 Speakers in any configuration), one Stereo Left/Right pair, and one Mono/Sub. Each can be switched individually & simultaneously or give A/B comparisons. All eleven outputs have level trims to provide precise channel matching and ease of calibration.
- Each of the eight 7.1 speakers can be cut or soloed individually.
- 7.1 channels can be mixed down to 5.1, Stereo and Mono, though any configuration of up to 8 monitors should be possible depending on the source and the speaker layout.
- Stereo outputs (including those mixed down from surround) can be monitored via the main stereo speaker outputs or the FL and FR from the surround speakers.
- When in stereo operation comprehensive Mix Checking facilities Including Low, Mid, High Solo; Dim; L/R Mute; Phase Reverse and more, help check every aspect of your Mix & Provide Ultimate Control.
- Volume can be set via the Variable Front Panel Knob or a Preset Control. Each has excellent channel matching and smooth feel.
- 2x Headphone Amplifiers with Individual Level Control.
- Built In Talkback with Level Control, Internal or External Microphone, Switching via Desktop or Footswitch, & Internal Routing to Headphones and also a Mono Output Jack.
- The MC7.1 is all analogue so won't need to be rebooted due to software crashes, and doesn't require firmware updates.
- Desktop 'wedge' form factor with a rugged steel chassis and a Kensington security slot for added protection.

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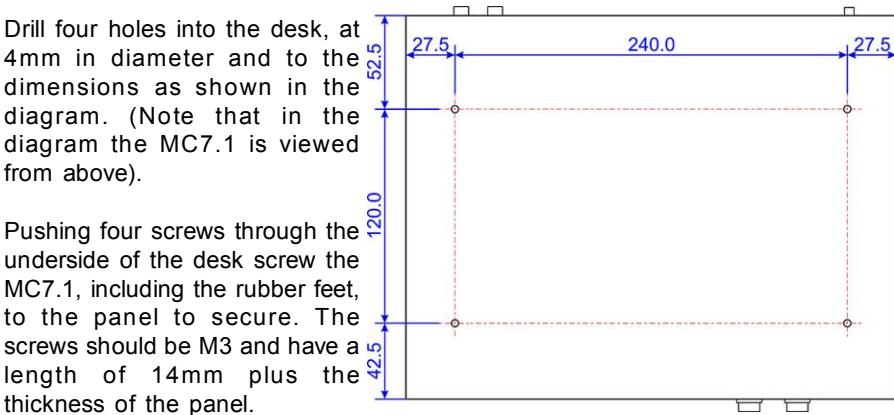
Input Channels	20
Output Channels	15 (+8 through)
Analog Inputs	1 x DB-25 (Surround A), 8 x 1/4" Jack (Surround B), 2 x XLR/Jack Combi (Stereo), 1 x 1/8" Stereo Jack (Aux.)
Analog Outputs	8 x 1/4" Jack (Surround Monitors), 2 x 1/4" Jack (Stereo Monitors), 1 x 1/4" Jack (Sub/Mono Monitor), 1 x DB-25 (through output), 2 x 1/4" Stereo Jack (Headphones)
Talkback	Yes (with internal & external mic, and footswitch)
Form Factor	Desktop wedge
Dimensions	220mm (depth) x 275mm (width) x 100mm (height)

INSTALLATION

The MC7.1 is a free standing, desktop unit, with controls and headphone jacks on the front panel and all other inputs and outputs on the rear.

Screwing the MC7.1 to a desk.

Rather than having the MC7.1 free standing it can be fastened down to a desk by utilising the holes that hold the rubber feet to the underside. Note that when fixing to a desk the speaker trims on the base of the unit will not be accessible and so the calibration procedure should be carried out before fastening the MC7.1 in place (see 'Monitor Calibration').

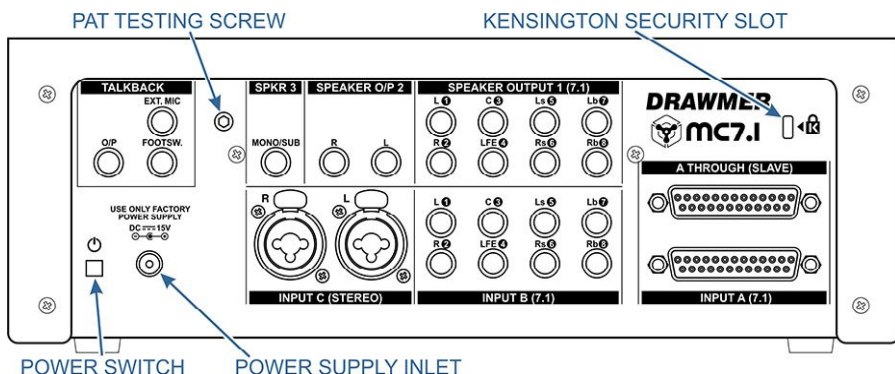


POWER CONNECTION

The MC7.1 unit will be supplied with an external switching mode power supply that is capable of 100-240Vac continuous (90-264Vac max) and so should work globally. We strongly advise that the power supply that has been supplied with the MC7.1 is used, rather than one with the equivalent ratings. In addition, should the power supply fail for any reason we strongly advise that you contact Drawmer for a replacement rather than repairing the unit yourselves. Failure to do either of these could permanently damage the MC7.1 and will also invalidate the warranty.

The power supply will be supplied with cable suitable for domestic power outlets in your country. For your own safety, it is important that you use this cable to connect to the mains supply earth. The cable must not be tampered with or modified.

Before connecting the MC7.1 to the power supply ensure that all knobs are turned off (i.e. fully anticlockwise) and that the Level Switch just below the main volume control is set to Knob. A switch next to the d.c. power inlet on the rear of the unit switches the power on/off.



SECURITY

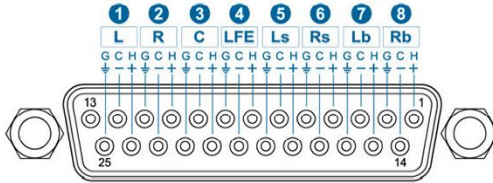
To help protect the MC7.1 from theft the side has a Kensington Security Slot (also called a K-Slot) which enables the fitting of hardware locking accessories that can attach your MC7.1 to an immovable object, making the MC7.1 more of a challenge for the potential thieves to steal.

PORTABLE APPLIANCE TESTING

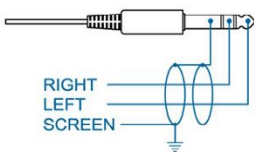
To undergo a Portable Appliance Testing procedure (commonly known as "PAT", "PAT Inspection" or "PAT Testing") use the screw that is located between the Talkback and Speaker 3 jack connectors. This screw is connect directly to the chassis and provides the earthing point.

AUDIO CONNECTIONS

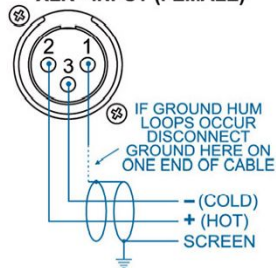
25 PIN D'SUB ANALOGUE INPUTS
wired to TASCAM's DB-25 Pinout Standard



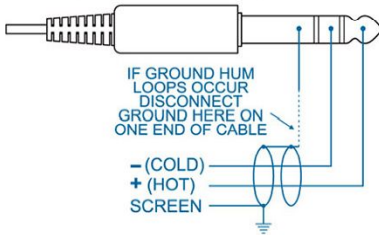
3.5mm STEREO AUX JACK



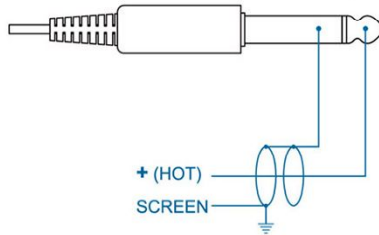
XLR - INPUT (FEMALE)



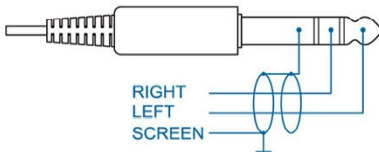
1/4" JACK - BALANCED MONO



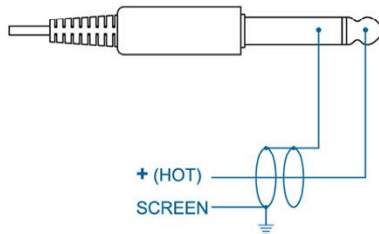
1/4" TALK BACK JACK - UNBALANCED MONO



1/4" STEREO HEADPHONE JACK



1/4" S/PDIF JACK



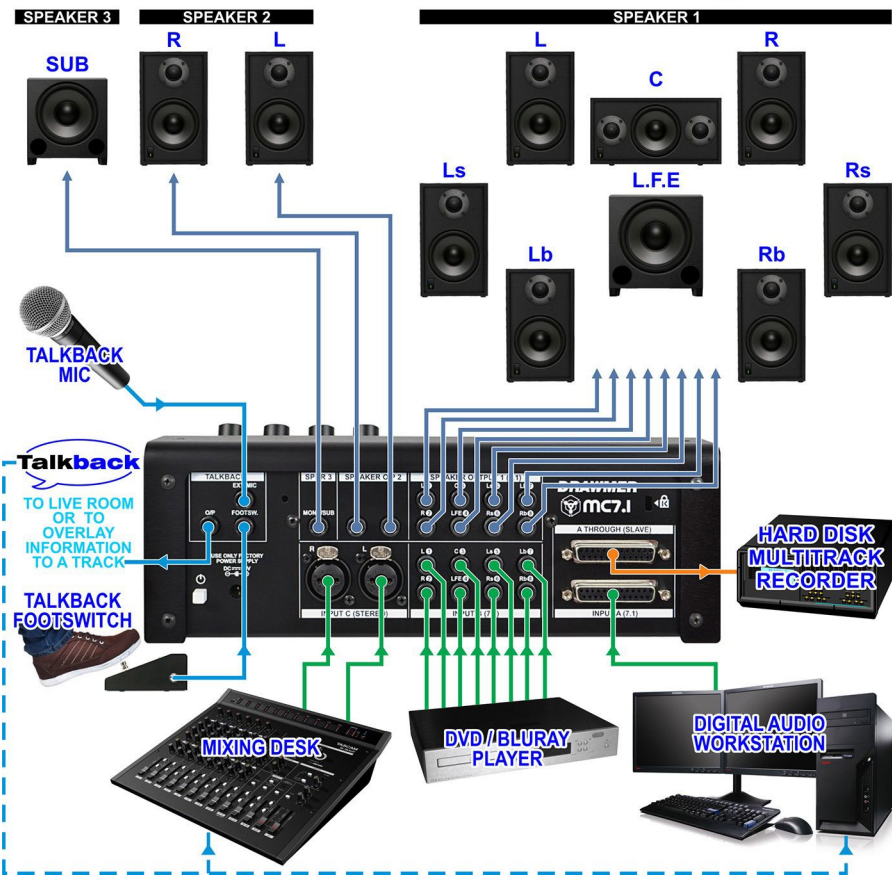
- Interference:

If the unit is to be used where it may be exposed to high levels of disturbance such as found close to a TV or radio transmitter, we advise that the unit is operated in a balanced configuration. The screens of the signal cables should be connected to the chassis connection on the XLR connector as opposed to connecting to pin1. The MC3.1 conforms to the EMC standards.

- Ground Loops:

If ground loop problems are encountered, never disconnect the mains earth, but instead, try disconnecting the signal screen on one end of each of the cables connecting the outputs of the MC3.1 to the patchbay. If such measures are necessary, balanced operation is recommended.

TYPICAL CONNECTION GUIDE



CONTROL DESCRIPTION



The MC7.1 Controls

① SOURCE SELECT

Comprises of two sections: **Surround** and **Stereo**. It is within this section that the input sources are selected and mix down of the surround signals occurs.

Surround:

Mode Switch: Selects the surround inputs from (9) or (10) to be in either 7.1 or 5.1 modes. In this way the 7.1 channels can be 'mixed down' to 5.1 at the press of a button on the MC7.1 rather than having to reconfigure or re-wire the outputs of the workstation.

To Mono Switch: With the switch active all 8 surround channels are combined/mixed down into a mono signal and output to each of the 8 speakers. This mono signal can then be monitored in various configurations using the cut and solo switches of **Surround Control** (2) and **Stereo Control** (3) sections

It is necessary when testing the audio to not only listen to the signal in surround and stereo but also in mono. It helps to outline problems in the mix, but also when testing for use on non-standard applications such as for broadcast or mobile phone.

Surround Source: Selects between the two surround inputs, **Source A** being the 25 pin d-sub (9) and **source B** the eight jacks (10).

Stereo:

From Surround Switch: Mixes down the surround inputs from the Source Select Surround section to be Stereo.

C Switch: When active selects the stereo input from the combi-jacks on the rear (11). By default this will be routed to the stereo speaker outputs.

D Switch: When active selects the stereo input from the 3.5mm stereo jack to the right in the Levels Section (4). By default this will be routed to the stereo speaker outputs.

② SURROUND CONTROL

Surround Channels:

This section provides complete control over which of the 8 surround inputs is active. In this way individual speakers can be monitored, or multiples of and also in any combination. For example, you may wish to monitor only the centre channel C, or only LFE or both.

Cut/Solo Switch: The switch toggles between which of the 8 speakers are heard and which are mute. When the switch is out the **C (Cut)** mode is active, and when in the **Solo (S)** mode.

For example, with the **Cut/Solo** set to **Cut (C)**, and the **LFE switch** active (i.e. as indicated by the lit LFE l.e.d.) you will only hear the 7 surround channels and not the LFE/Bass. Now pressing the **Cut/Solo** switch inverts this so that the **Solo (S)** mode is active and you will only hear the LFE and not the surround.

Note:

The Cut/Solo switch has an effect when the surround is mixed down to stereo. In other words, cutting and soloing the surround mix determines the input for the 'From Surround' switch (1) and will be heard in the speakers.



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③ STEREO CONTROL

This section allows the engineer to test various aspects of the stereo mix without having to alter the signal prior to the MC7.1 and potentially effect the recording, and is a very thorough and versatile checking tool. The switches are especially useful when used in conjunction with each other.

Band Solo: The three switches allow the engineer to easily solo the **Low**, **Mid** and **High** frequencies of the stereo mix. This helps to pinpoint problems occurring at particularly frequencies or to check for unwanted signal artefacts that may bleed into each band, for example.



Each switch can be used in conjunction with each other and in any order. However, it is not recommended that all three Band Solo switches are active simultaneously as this will effect the signal at the crossover frequencies. For this very reason the MC7.1 has been designed so that with no Band Solo switches active the entire Band Solo circuit is completely relay bypassed.

Phase Reverse: Inverts the polarity of the signal on the Left Channel and is used primarily to outline any phase problems that may be occurring in the mix/recording such as phase cancellation, or an unbalanced stereo signal. As the switch is toggled any phase issues will become more apparent and easier to identify.

Mono: With the switch active both Left and Right stereo signals are combined into a single mono signal.

It is necessary when testing the audio to not only listen to the signal in stereo but also in mono. It helps to outline problems in the mix, but also when testing for use on non-standard applications such as for broadcast or mobile phone.

Left/Right Swap: Swaps the Left and Right channels of the stereo signal. It is particularly useful when checking for shifts in the stereo balance of the mix.

Under the **Cut** heading two switches have been incorporated - **Left Cut** and **Right Cut**.

Left Cut: Mutes the Left channel signal allowing only the right signal to be heard,

Right Cut: Mutes the Right channel signal allowing only the left signal to be heard.

Note that when activating **Left** or **Right Cut** whilst using headphones the signal is not 100% panned one way or the other - i.e. the signal centre moves to the side but is not completely removed from the opposite ear of the headphone - this is so that the **Left/Right Cut** sounds a little more natural, after all, if listening through speakers with only the left speaker active some of the signal will reach the right ear a few milliseconds later.

With **Left Cut** and **Right Cut** are both active it mutes both stereo channels in both the headphones and speakers.

Stereo to SPKR 1: With this switch active the stereo signal is routed through to **L** and **R** of the surround speaker outputs (12), effectively converting your surround speakers to a stereo pair. This allows for A/B comparisons for the stereo mix without the need for rewiring or the expense of more monitors.

Note that the low frequencies are extracted from every active stereo channel are sent to the Sub/Mono speaker output on the rear rather than the LFE.

4 LEVELS

Input D: A stereo **3.5mm AUX Input & Level Control** is placed on the top panel to provide convenient access for connecting MP3 players, smartphones or tablets etc. The activation switch is located to the left in the Source Select (1) section.

Headphones Level: The **Volume Level** knobs for the two independent headphone amplifiers is found in this location. The headphone output jacks themselves are found on the front face. (4b) These comprise of two 1/4" TRS jacks that are capable of driving a wide number of headphones from budget to professional - Note that they have their own level control and are not affected by the main monitor volume knob.

Note that almost all the controls effect the headphones in the same way as the monitor outputs, however the **Mute** and **Cut** switches affect them differently. (See **Cut** and **Mute**).

Warning:

It is advisable to unplug the headphones before switching the MC7.1 on or off. It is also recommended that you turn the headphone level down before inserting the jack, and turn it up to your desired listening level - these measures will not only prevent your ears from being damaged but also the headphone's drivers. Also, note that these are high quality circuits and have been designed for professional headphones, so care must be taken when using lower standard, consumer quality headphones, such as earbuds or ipod phones etc, as damage could occur at high volumes.

Talkback Level: The volume control adjusts the gain level of the talkback microphone. It can be adjusted to compensate for the distance that the operator is from the microphone, how loud his voice is, or the volume of the underlying music played, as well as several other factors. For more detail see the **Talkback (7)** section.

5 SPEAKERS

Three switches select which of the three speaker outputs **Speaker1-Surround**, **Speaker2-Stereo L/R** or **Speaker3-SUB** are heard at the outputs on the rear (see (12)).

Each switch can be operated individually or simultaneously and in any combination and is perfect for performing A/B comparisons between various monitor setups. As the switches do not toggle between outputs when doing A/B comparisons both of those switches should be pressed at the same time i.e. to compare speakers A and C, with A active press both the A and C switches to swap the output to C active, and then again to return to the previous setting - this method can be used between all four outputs if required.



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An additional benefit is derived when using a sub-bass. If the sub-bass is attached to the **SUB/MONO** (Speaker 3) output on the rear of the MC7.1, speakers 1 and 2 could deliver the higher frequencies and allow for A/B (or in this case 1+Sub/2+Sub) comparisons between the two monitor setups by pressing the Speaker 1 and Speaker 2 switches simultaneously and leaving SUB always active. In addition, a full frequency range monitor could be attached to Speaker 2, so, with the Speaker 2 switch active SUB should be disengaged.

Note that all 11 speaker outputs have individual level trimming on the base of the unit so that precise monitor level matching can be achieved - see (14) and also the **'Monitor Calibration'** section.

6 MASTER OUTPUT

The Monitor Volume control adjusts the signal level of all the channels for all speaker outputs with a range from Off (-infinity) to +6dB of gain. The Volume knob affects the volume of the monitors only and does not have a bearing on any other output such as the headphones or talkback jack.

A secondary preset volume control on the front edge provides a repeatable calibrated output level for the monitors, so that at the press of the switch just below the main volume knob the engineer can hear the mix at the same predetermined volume, time after time, without having to meticulously adjust controls. Once the system is calibrated (see chapter entitled Monitor Calibration) the

predetermined level could be set via a screwdriver to the maximum listening level, 85dB in the case of TV, film and music, for example, or to a standard listening level for radio, or even a preferred level for quiet passage. The level chosen is at the discretion of the operator. Both the volume knob and preset control circuit designs incorporate identical potentiometers for excellent channel matching and a smooth feel.

Because the circuitry is active it allows for the signal level to be increased, rather than only attenuated, making subtle problems within the mix (such as noise at low levels, or unwanted harmonics, for example) more obvious and easier to iron out, especially during dialogue or musical passages that would normally be quiet.



Before you can make full effective use of the Volume control it is necessary to calibrate the entire monitoring system (see the 'Monitor Calibration' section) - this allows for accurate level control. Note that the actual output levels, including the maximum output level and the position of unity gain (0dB) around the knob, will alter depending on the calibration of the monitors.

WARNING:

It is recommended that you turn the volume control down to a lower level before turning the MC7.1 off - this is to ensure that a sudden volume increase when turning on does not damage your speakers or your hearing.

In addition, do not use excessive force at either end of the volume knob - it's size would mean that damaging the potentiometer is possible.

DIM All: With the switch active the output level is attenuated by 20dB. It enables you to lower the volume without adjusting any of the settings.

MUTE All: Cuts both channels (especially useful in an emergency). If Left Cut and Right Cut are both active it is just the same as Mute being active.

Note that **Cut/Mute** does not affect the headphones in the same way as it does the speakers. With the **Mute** switch active the headphones will still pass audio in just the same way as if it was off, they are not affected. This allows for someone to edit audio using headphones whilst a conversation is occurring in the control room, for example.

7 TALKBACK

The MC7.1 has a dedicated talkback function including inbuilt microphone, external microphone port, gain level control and external footswitch connector.

External Mic Switch: When active disengages the inbuilt front panel microphone and routes the operator's voice through an external microphone (not supplied), which is plugged into the rear panel (see 13).

Talkback Active Switch: When active engages either the inbuilt or external microphone and routes the operator's voice through the headphones and also to the dedicated talkback output jack on the rear of the unit. The switch is non-latching and so must be held in to be active. If preferred a footswitch can be connected at the rear that does the same job (see 13).

TalkBack Microphone. An electret condenser microphone has been incorporated into the MC7.1 and is located below the Talkback Active switch on the front panel. The talkback microphone level is found above in the **Levels** section (4)

Activating the Talkback automatically engages the Dim switch (i.e. attenuates the volume by 20dB) for the headphones (4b) and also the speaker outputs (12) making it possible for the artist to clearly hear the instruction.



8

POWER

The MC7.1 will be supplied with an external switching mode power supply that is capable of 100-240Vac continuous (90-264Vac max) and so should work globally, but is supplied with a cable suitable for domestic power outlets in your country. We strongly advise that the power supply that has been supplied with the MC7.1 is used, rather than one with the equivalent ratings. The push button switch turns the MC7.1 on/off. (see Power Connection).

Note that a timed relay protection circuit has been incorporated into the MC7.1 to prevent bangs and other potentially harmful artifacts from occurring during power up and power down.

9

10

& INPUTS

The MC7.1 has a total of 20 input channels comprising a stereo Aux input for Mp3 players and smartphones etc, that can be found at **Input D (4)** on the top panel, whilst two separate surround inputs, a through and a pro stereo input are located on the rear panel.

9

INPUT A (7.1)

One set of eight balanced inputs for 7.1 surround monitoring is attached via a 25 pin D-Sub connector and wired to TASCAM's DB-25 wiring standard. This diagram can be found in the 'Audio Connections' section. Note that depending on the surround configuration not all inputs need be used, and could provide inputs for other surround configurations, such as 5.1, for example, anything from 1 to 8 speakers is possible. The unused inputs are ignored by the MC7.1.

The MC7.1 is 'all analogue' so all encoding and decoding should be carried out externally.

Input A has a direct 'through' (slave) output, also via DB-25 d-sub. This is a paralleled through, directly from the Input A 25 pin d-sub, and is not affected by the MC7.1 in any way. This allows the surround signal to be output to external devices, such as a multitrack recorder, for example.

10 INPUT B (7.1)

Another set of eight balanced inputs for 7.1 surround monitoring is attached via eight balanced 1/4" jacks. As with the d-sub input the configuration can be anything from 1 to 8 inputs. Note that these inputs are also numbered 1 to 8 as well as L, C, R, LFE etc., a feature that can also be seen on the speaker outputs above (11), and also the Surround Control section (2).

Note also that these inputs do not have a through output.

INPUT C (Stereo)

A stereo connection is provided via balanced Neutrik XLR/jack combi (combining a 3 pole XLR receptacle and 1/4" phone jack in one XLR housing).

11 SPEAKER OUTPUTS

The MC7.1 has a total of 11 speaker outputs divided into 3 sets: **7.1 Surround**, **Stereo L/R** and **MONO**. All are connected via balanced 1/4" jacks and controlled via the **Speakers Section** (5) on the front panel. Each output set is activated by the **Speakers Section** switches (see (5)) - and can be activated individually or simultaneously and in any configuration.

Speaker Output 1 are the connectors for the **7.1 surround** output and are labelled L, C, R, LFE etc as well as 1 to 8.

Speaker Output 2 are the connectors for the **Stereo** speaker output and are labelled L and R

Speaker Output 3 is the connector for the **Mono** output and is labelled mono/sub.

All of these outputs has an individual trim potentiometers on the underside of the unit to enable easy and accurate monitor level/room matching throughout (see '**Speaker Calibration Trim Controls** (13) and also '**Monitor Calibration**').

12 TALKBACK

A **TALKBACK OUTPUT**, **EXTERNAL FOOTSWITCH** and **EXTERNAL MICROPHONE** connectors can be found on the rear panel, in the form of 1/4" jacks. All are controlled via the switches found in the **Talkback Section** (7) on the front panel

EXTERNAL MICROPHONE: An external microphone can be connected to provide a more convenient location for the talkback. It is amplified by the inbuilt preamp circuitry with the volume level controlled via the Talkback Volume knob (4), however, phantom power is not supplied so a dynamic microphone should be used. When active the inbuilt microphone will be bypassed.

EXTERNAL FOOTSWITCH: An external foot or hand switch can be connected to allow easier talkback operation. This works in parallel to the front panel switch (7) so when either are active the talkback will operate.

TALKBACK OUTPUT: A dedicated talkback output is provided so that, as well as being routed through the headphones, a talkback signal can be routed to other devices at the engineers discretion. This could usually be patched into the live-room active monitor speakers for convenience when recording acoustic ensembles where the performers may not wish or need to wear headphones. The output also allows for routing into a separate channel of a DAW, or other recording facility, to allow for information overdubs to be added to a recording.

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8 SPEAKER CALIBRATION TRIM CONTROLS

On the underside of the MC7.1 there are eleven rotary controls that allow the individual speaker level calibration of your system. Each speaker output has a control, separated into three sections: the **Surround (Spkr 1)**, **Stereo (Spkr2)** and **Mono/Sub (Spkr 3)**, and correspond to the outputs found on the rear panel. To alter the speaker level use a small screwdriver to turn - counter-clockwise turns the speaker level down, and clockwise up.



For the calibration process see the “Monitor Calibration” section of this manual. Once the system has been calibrated these trims should not be touched.

MONITOR CALIBRATION

Whether you are installing one, two or three sets of speakers it is imperative that your system is calibrated, not only to centre the surround/stereo image and to ensure that all sets of speaker levels are the same, but also to ensure that you are mixing your music at industry standard listening levels. The MC7.1 can calibrate the speakers of any system as it has individual rotary level trim controls for every speaker attached (found on the underside of the product).

The following method is by no means the only way to calibrate your system, and a quick look on the internet will soon find many others, but is a good starting point.

Before beginning the procedure there are a couple of things that you will require:

Sound Pressure Level (SPL) Meter:

Unfortunately, it is virtually impossible to measure the level of sound from each speaker by ears alone. A good instrument that does a more accurate job is a Sound Pressure Level meter.

SPL Meters come in two varieties: with an analog meter or with a digital display, either works well, just choose your preferred type. You can purchase an SPL meter from most electronic stores, or search the internet in stores such as Amazon, with prices ranging from £25 to £800. Radio Shack is a good source for reasonably priced SPL meters in the USA, though to get better results, you may consider a more expensive SPL meter, such as Galaxy, Gold Line, Nady, etc.

The ideal meter should have the industry standard “C-weighted” curve, slow setting. Refer to your meter’s manual to learn how to select these settings.

If all else fails there are iPhone/Android apps that claim to be SPL meters - whilst these are nowhere near the quality of a dedicated meter they are better than nothing.



Test files:

Test tones can either be generated through your DAW (such as the Signal Generator plug-in in Pro Tools), but you can also download test/calibration files from the internet if you search around: wav files are preferred to mp3's due to the compression/limited frequency range of mp3's. You can also purchase good quality reference Blue Ray setup up disks from various stores.

The tones required for this calibration process are:

1. 40Hz to 80Hz bandwidth limited pink-noise file recorded at -20dBFS.
2. 500Hz to 2500Hz bandwidth limited pink-noise file recorded at -20dBFS.
3. Full-bandwidth pink-noise file recorded at -20dBFS.

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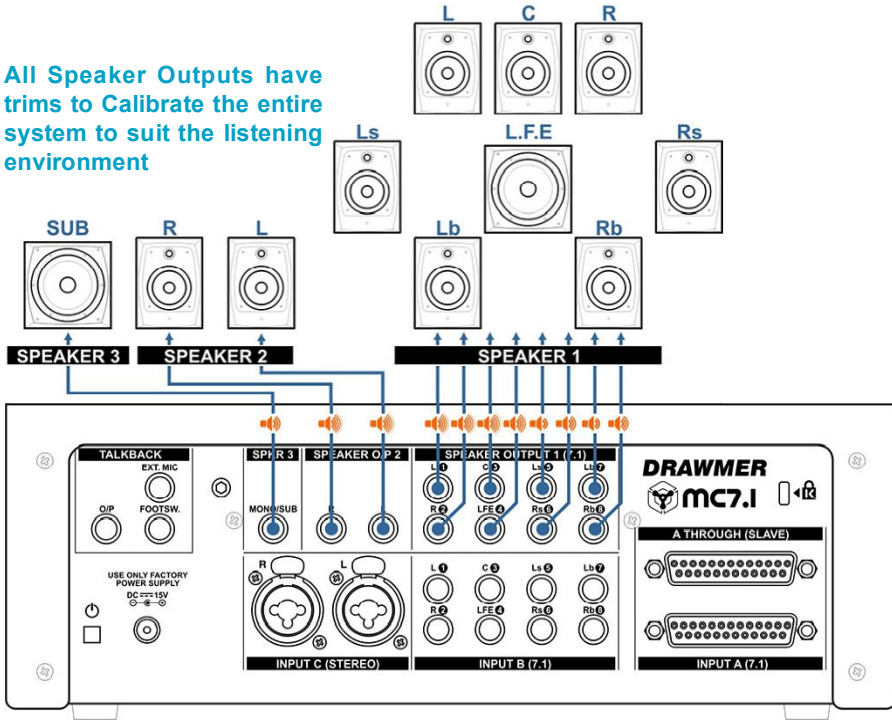
Holding the SPL - Set the meter to C weighted and on the slow scale. Start by sitting in your normal mixing position, hold the SPL meter at arm's length and at chest level with the microphone of the meter facing toward the monitor to be calibrated. Maintain this position throughout the calibration process - this could be easier if it is fixed via a stand and bracket, and moved only to point at the relevant speaker.

The following method sets the sound pressure level to 85dB - the standard listening level for film, tv and music, however, due to the sound being altered by the size of the room, this can alter, essentially, the smaller your room is, the lower your listening level should be, down to around 76dB. The following table should give an idea of the sound pressure level to use for your environment.

Room Size		SPL Reading
Cubic Feet	Cubic Metres	
>20,000	>566	85dB
10,000 to 19,999	283 to 565	82dB
5,000 to 9,999	142 to 282	80dB
1,500 to 4,999	42 to 141	78dB
<1,499	<41	76dB

Listening at appropriate levels for your specific environment will help maintain the integrity of your mixes as they move from one system to another, in rooms of varying sizes.

All Speaker Outputs have trims to Calibrate the entire system to suit the listening environment



The Procedure:

The following procedure is specifically designed for stereo calibration, however, a surround setup is much the same but may involve different SPL levels per speaker depending on the type of surround that is required, i.e. 7.1, 6.1, 5.1 etc. In which case refer to the specific surround procedure, (i.e. Dolby Digital, DTS, THX etc.) for further instructions.

1. Begin by turning off the monitoring system and ensuring that all inputs and speakers are correctly connected.
2. Set all DAW/System controls to 0dB/unity gain - this should be left at this setting from now on. Remove all e.q. and dynamics from the signal path.
3. If you have active speakers with their own level control, or speakers with an amplifier, set all of these to maximum, so that they do not attenuate the signal.
4. On the underside of the MC7.1 you will find the speaker calibration trims - using a screwdriver initially set all of them to their full attenuation position by rotating each fully counter-clockwise.
5. With the Master Volume switch set to 'Knob' (6) set the large volume on the front of the MC7.1 to 12 o'clock and leave it there throughout the calibration procedure - this will be the position that provides the 85dB listening level from now on.

6. Turn the system on and play the 500 Hz – 2.5 kHz bandwidth-limited pink noise at -20 dBFS. Select the required Source on the front of the MC7.1 -7.1, C or D. You should not hear it, yet.

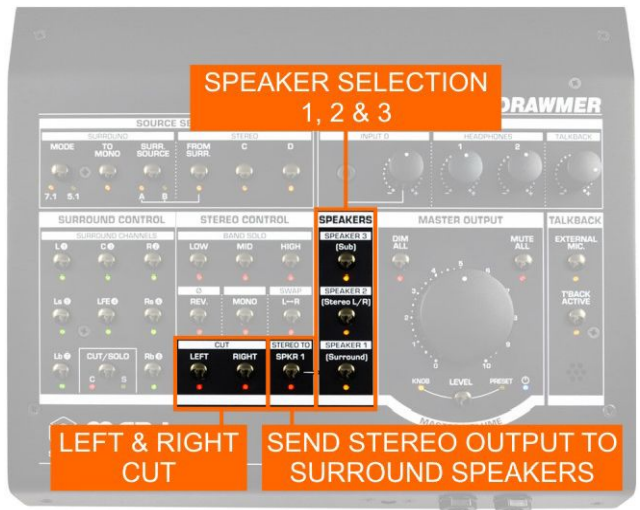
7. Activate Speaker 2 by having only the Speaker 2 switch active in the speakers section on the front panel.

8. In order to hear only the Left speaker remove the right speaker by activating the Right Cut switch.

9. On the underside of the MC7.1 rotate the Left Speaker 2 trim clockwise. You will now start to hear the signal, but only for that speaker. Rotate until the SPL meter reads 85dB.

10. In order to hear only the Right speaker switch in Left Cut and deactivate the Right Cut.

11. On the underside of the MC7.1 rotate the Right Speaker 2 trim clockwise until the SPL meter reads the desired level.



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12. To calibrate each speaker repeat steps 7 to 11 - replacing the speaker on step 7 for each set. For surround control use the **Surround Control (2)** to Cut/Solo the various speakers.

13. To calibrate the sub - play the 40-80Hz signal, but this time have only the SUB switch active - Left and Right Cut need not be active as the frequency of the signal is limited to only the sub.

14. On the underside of the MC7.1 increase the Mono trim increasing the volume of the sub until the desired SPL meter reading is reached.

15. Repeat steps 7 to 12 whilst playing the full bandwidth pink noise and adjusting to suit. The readings should be pretty close and only require fine adjustment.

16. Now the system is calibrated it is time to set the **PRESET** volume control. Set the Master Volume switch to 'PRESET' (6) and with only one set of speakers active in the Speaker Select switches (5) adjust the preset level on the front of the MC7.1 using a screwdriver until the SPL meter reads your desired listening level.



PRESET VOLUME

16. You are finished and the calibration process has been completed.

The volume control will have a few dB's of headroom so care must be taken to both your hearing and system when increasing the volume passed the 12 o'clock position. As with all things that are calibrated it's a good idea to regularly check the calibration of your monitors to ensure that nothing has changed.



Mix Checking Tips

Due to the versatility of the MC7.1, and it's thorough array of controls, some very useful techniques for checking your mix can easily be achieved, especially for stereo mixes, that can help improve the balance within a mix, pinpoint stereo width, phase and mono problems, and also aid when monogising.

The following are a few handy tips to help eradicate problems and bring about a balance within the mix:

Not too loud

Give your ears a break. Do not have the volume too loud - frequent monitoring at anything above 90dB will only make your ears tired, meaning that you won't really hear the problems that may be occurring, and give you a false sense that the mix sounds nice and loud. Also, constant listening at anything above 100dB will probably have a long term detrimental effect on your hearing.

Shhhh...

Get into a habit of listening to your mix at very low levels quite often. Remember that not everyone listening to your song has music blasting out. As well as giving your ears a break, it will heighten problems in the mix - Do the key elements have a good balance, or are some instruments more prominent than they should be? If something is too quiet or loud adjust its volume or use E.Q. to fix it. If the mix sounds good at low levels it's likely that it will when loud.

Note that on the MC7.1 it is better to lower the volume level using the DIM switch and then turn the volume up, rather than only turning the volume down, as you maintain greater control over the volume.

Increase the Volume of Quiet Passages.

Because the MC7.1 circuitry is active it allows for the signal level to be increased, rather than only attenuated, making subtle problems within the mix, such as noise at low levels, or unwanted harmonics, more obvious and easier to iron out, especially during passages that would normally be quiet.

Hear, There and Everywhere.....

Listen to your all your mixes, whether surround or stereo, in as many environments and on as many systems as possible. Remember not everyone will have a 7.1 system, many will have stereo, and some will be listening via smartphones in mono. In such conditions you may find that an instrument drops out of the mix, or another is too prominent, or that it doesn't capture the ambience and adjustments to the mix need to be made.

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Cut It Out...

Using the left and right cut switches will highlight the stereo balance of each channel. In stereo the mix sounds ok, however, it may be that you want an instrument to be panned so far left that it doesn't occur at all in the right channel, by cutting the left and only hearing the right channel you will hear whether the instrument bleeds across, and panning adjustment can be made.

Phase Reverse

Make use of the phase reverse switch. If the sound doesn't become less focused when the polarity is flipped then there is something wrong somewhere. Not only will the switch help confirm that the monitor speakers are wired up in the correct polarity, phase inversion on a particular instrument can at times improve the way the instrument interacts with the rest of the mix by removing the phase cancellation.

Monogising

Check your mix in mono - often! Just because a mix sounds good in stereo doesn't mean it will sound good when the channels are combined. Why should you care if your mix sounds good in mono? Well, most live music venues and dance club sound systems are mono - running the PA or sound system in mono is common practice to ensure music sounds good everywhere in the room because it removes the 'sweet spot' and the complex phase issues of stereo. Note that if you press 'mono' in the **surround section of 'Source Select' (1)** ALL 8 channels of the surround speakers will output the mono signal - emulating a nightclub impressively.

In many cases the low frequencies will be put through a crossover and summed to mono before being sent to the sub. Monogising is also necessary when testing the audio for use on nonstandard applications such as for broadcast or mobile phone.

In addition, monogising will highlight phase problems. In some cases, when you activate the Mono switch you may hear comb-filtering, which will colour the sound of your mix and cause peaks and dips in its frequency response. When a stereo mix is combined into mono any elements that are out of phase will drop in level or may even disappear completely. This could be because left and right outputs are wired out of phase but its more likely to be due to phase cancellation.

What causes phase cancellation?

Many stereo widening effects and techniques, such as chorus;

Simultaneous direct box and mic recording - If you've ever recorded a guitar simultaneously through a direct box and a microphone, you may have noticed the time alignment problems this causes. This type of situation can often be fixed by careful mic placement, or realigning the waveform in a DAW;

Any situation where more than one microphone is used to record a source - on a multi-miked drumkit two mics may pick up exactly the same signal and cancel each other out. It may sound unlikely but one handy tip is to adjust the panning of your drums whilst in mono - suddenly all the phase cancellation of the drums will improve, and sound even better when reverted back to stereo.

Listening in mono also highlights problems with the stereo width and balance of the mix and is more apparent when you use a lot of width-enhancing techniques and tools. Switching mono in and out fairly quickly may make it apparent that the centre of the mix is shifting to the left or right, something that may go unnoticed if only working in stereo.

True Mono

As a mono signal would normally originate from a single source it would be wrong to simply activate the mono switch - as both left and right speakers are still active. When you listen to a mono signal on two speakers, you hear a false or 'phantom' image which is derived midway between the speakers, but because both speakers are contributing to the sound, the level of the bass seems to be over-inflated. To truly hear a monogised signal via one speaker (the way everyone else will hear it) the mono switch should be active but also either Left Cut or Right Cut should also be activated (depending on preference/location) to derive the signal from a single location.

Not so Sweet

Your mix may sound perfect when sat in the centre of the mix, but bare in mind that many people in the theatre or in front of their home entertainment system will not be sat in the 'sweet spot'. Move around the room - does the audio still have the same impact, do you notice audio dropping out, or that's too prominent. Make adjustments to the mix as you see fit.

Listen to the 'Stereo difference' or side signal

A very useful facility of the MC7.1 is the ability to listen to the 'stereo difference' or side signal, very quickly and easily. The side signal is the difference between the two channels, and describes those elements that contribute to the stereo width.

Hearing the stereo difference is so simple using the MC7.1: with the stereo signal playing, activate the **Phase Reverse** switch, and then sum the left and right channels using the **Mono** switch (in other words Left minus Right). It's that simple.

Being able to audition the 'side' signal is particularly useful for judging the quality and quantity of any ambience or reverberation in a stereo mix. It is also an invaluable facility if the stereo recording has timing differences between channels (such as caused by an azimuth error on a tape machine), or for aligning a pair of desk channels for use with X-Y stereo mic pairs. In both cases, listening for a deep cancellation null, as the two signals cancel each other out, is a very fast and accurate way of matching levels in each channel, which is the basis of accurate alignment.

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Going Solo

Whilst working on a mix you can get so used to hearing the entire audio as a whole that it's difficult to pinpoint any problems in certain frequency ranges, using the **low**, **mid** and **high solo** buttons can really help. A common problem within many mixes is that there is too much going on in any given frequency range leading to an unbalanced mix. Perhaps the bass is overpowering the vocals, or there is an undesirable noise somewhere that you can't quite put your finger on. Using the **solo** buttons of the MC7.1 you can easily remove the bass to hear what's going on in the mids and highs, or to hear just how the mid range panning is working, for example, and correct the mix to redress the balance.

A common problem when using high levels of compression across the mix is pumping, this can be really desirable in the case of dance music, but not elsewhere. If the majority of energy within the mix is in the bass, every time the kick drum beats it will trigger the compressor, thus lowering the volume, but not only of the bass, but across the whole mix, creating a pumping effect. Soloing the mid and high makes it very easy to hear the extent of the pumping and to rectify it if desired.

Know your Left from your Right

It is useful to get into the habit of using the **Left / Right Swap** button every now and then when working on a stereo mix. We get so used to hearing a mix as it's developing that it's easy to get a stereo imbalance. If when pressing the **Swap** button the stereo image is mirrored around the centre, and you notice that it's more prominent in a certain ear then the stereo image is likely to be out of balance. If it is unclear that it has altered then the stereo mix should be balanced.

The **Swap** button also highlights problems with the monitoring system such as if piece of audio that is panned centrally but actually sounds off centre. If by pressing the button the stereo image remains the same then it shows one speaker is louder than the other and the system should be recalibrated. If the same audio is mirrored around the centre then it shows that the fault is within the mix itself.



MC7.1 GENERAL INFORMATION**IF A FAULT DEVELOPS**

For warranty service please call Drawmer Electronics Ltd. or their nearest authorised service facility, giving full details of the difficulty. A list of all main dealers can be found on the Drawmer webpages. On receipt of this information, service or shipping instructions will be forwarded to you.

No equipment should be returned under the warranty without prior consent from Drawmer or their authorised representative.

For service claims under the warranty agreement a service Returns Authorisation (RA) number will be issued.

Write this RA number in large letters in a prominent position on the shipping box. Enclose your name, address, telephone number, copy of the original sales invoice and a detailed description of the problem.

Authorised returns should be prepaid and must be insured.

All Drawmer products are packaged in specially designed containers for protection. If the unit is to be returned, the original container must be used. If this container is not available, then the equipment should be packaged in substantial shock-proof material, capable of withstanding the handling for the transit.

CONTACTING DRAWMER

We will be pleased to answer all application questions to enhance your usage of Drawmer equipment.

Please address correspondence to:

DRAWMER Electronics LTD
Coleman Street
Parkgate
Rotherham
South Yorkshire
S62 6EL
United Kingdom

Telephone: **+44 (0) 1709 527574**

Fax: **+44 (0) 1709 526871**

Contact via E-mail: **tech@drawmer.com**

Further information on all Drawmer products, dealers, Authorised service departments and other contact information can be found on our website: **www.drawmer.com**

SPECIFICATION

CROSSTALK >80dB

THD & NOISE 0.01% @ 0dBu


FREQUENCY RESPONSE
20Hz-20kHz +/- 0.2dB

PHASE RESPONSE
20Hz-20kHz +/- 2degrees max

POWER REQUIREMENTS

External Power Supply

Input: 100-240V ~ 50-60Hz, 1.4A MAX.

Output: 15V  4.34A

Voltage automatically selected by PSU



Use only the external PSU supplied by Drawmer or an accredited partner. Failure to do so could permanently damage the MC7.1 and will also invalidate the warranty.

CASE SIZE

Depth (with Controls & Sockets) 220mm

Width 275mm

Height (with Feet) 100mm

WEIGHT

2.6kg

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Drawmer Electronics Ltd, Coleman St, Parkgate,
Rotherham, South Yorkshire, U.K.