X-RAY

24 BIT CD PLAYER

INSTRUCTIONS FOR USE

*Thank you for purchasing the Musical Fidelity
X-RAY 24 bit CD Player.
Used properly and carefully, it should give you many
years of outstanding musical reproduction.*

*The X-RAY uses the latest 24 Bit DAC technology and
jitter reduction techniques to achieve both an excellent
technical specification and unparalled sound quality.*

*Aesthetically, the X-RAY is a perfect match for the
X-PLORA FM tuner, X-A1 or X-A100R integrated
amplifiers or the X-P100/X-AS100 Pre/Power amplifier
combination. Together these components form one of the
finest hi-fi systems available.*

*Dust regularly with a soft duster or soft brush but be
careful when using cleaning or polishing agents - they may
harm the surface finish.*

*If you have any questions about anything in your
audio system, please consult your dealer who is there to
help and advise you.*

IMPORTANT!

This unit is supplied in the UK with a mains lead fitted with a moulded 13 amp plug. If, for any reason, you need to cut off this plug, please observe the following safety precautions.

Please dispose of the cut-off plug safely. It ***must not*** be plugged into a mains power supply.

The wires in the mains lead supplied with this appliance are coloured in accordance with the following code:

> Green and yellow..............Earth
> Blue...............................Neutral
> Brown..............................Live

WARNING - This appliance must be earthed

As the colours of the wires of the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

• The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or coloured green or green-and-yellow, or by the earth symbol ⏚ .

• The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

• The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

• If connecting to a BS1363 plug, a 10 amp fuse must be used.

WARNING - Radio Frequency Interference (RFI)

This hi-fi product has been tested to ensure that its operation will not be adversely affected by normal background levels of RFI. It is possible that if this product is subjected to abnormally high levels of RFI the unit may be susceptible and not perform as expected. In the unlikely event of this happening on a regular basis, please contact Musical Fidelity's Customer Service Department.

The unit has also been tested to ensure that it does not radiate excessive levels of RFI that could affect other pieces of electronic or electrical equipment.

The electronics in modern hi-fi equipment is complex and hence may be damaged by lightning. It is possible that during electrical storms the operation of some equipment may be adversely affected. For complete protection of your hi-fi system during such storms, mains plugs should be removed and aerial leads disconnected.

Always ensure that when disconnecting and reconnecting your hi-fi equipment the mains supply is switched off.

To comply with North American regulations 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.

WARNING - ANY MODIFICATIONS OR CHANGES TO THIS UNIT NOT EXPRESSLY APPROVED BY MUSICAL FIDELITY WHO ARE THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THIS EQUIPMENT

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. As it cannot be guaranteed that interference will not occur in a particular installation the user is encouraged to try to correct any interference experienced, for instance to radio or TV broadcasts, by one or more of the following measures.

- Identify the source of interference, turn off the CD player, check whether the interference disappears.

- Re-orientate or relocate the receiving aerial.

- Increase the separation between the CD player and receiver.

- Connect the CD player into a mains outlet on a different circuit from the receiver.

- Consult a dealer or experienced TV/radio technician for help.

WARNING - THIS CD PLAYER CONTAINS A LASER

This equipment contains a laser which emits invisible radiation. Only a qualified service person should remove the cover or attempt to service this device due to possible eye injury.

Optical pick-up type: Manufacturer : Sony Corporation
Block type : BU-5BD10B. Pick-up type : KSS240A
Wavelength : 780-790 nm

CLASS 1 LASER PRODUCTS

This CD player has been designed and manufactured according to FDA regulations "title 21, CFR, chapter 1, subchapter J, based on the Radiation Control for Health and Safety Act of 1968", and is classified as a Class 1 laser product. There is no hazardous radiation during normal use because invisible radiation emitted inside this product is completely confined within the protective housing. However you must comply with the following important cautions.

CAUTION !

- **THIS CD PLAYER OPERATES WITH INVISIBLE LASER LIGHT. WHEN THE PLAYER OPERATES LASER LIGHT IS RADIATED INTERNALLY. DO NOT REMOVE THE PROTECTIVE HOUSINGS.**

- **USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.**

- **IF THIS PRODUCT DEVELOPS A FAULT PLEASE CONTACT YOUR AUTHORISED MUSICAL FIDELITY SERVICE AGENT. DO NOT ATTEMPT TO SERVICE IT YOURSELF AND DO NOT CONTINUE TO USE THIS PRODUCT IN A FAULTY STATE.**

WARNING AND INFORMATION LABELS:
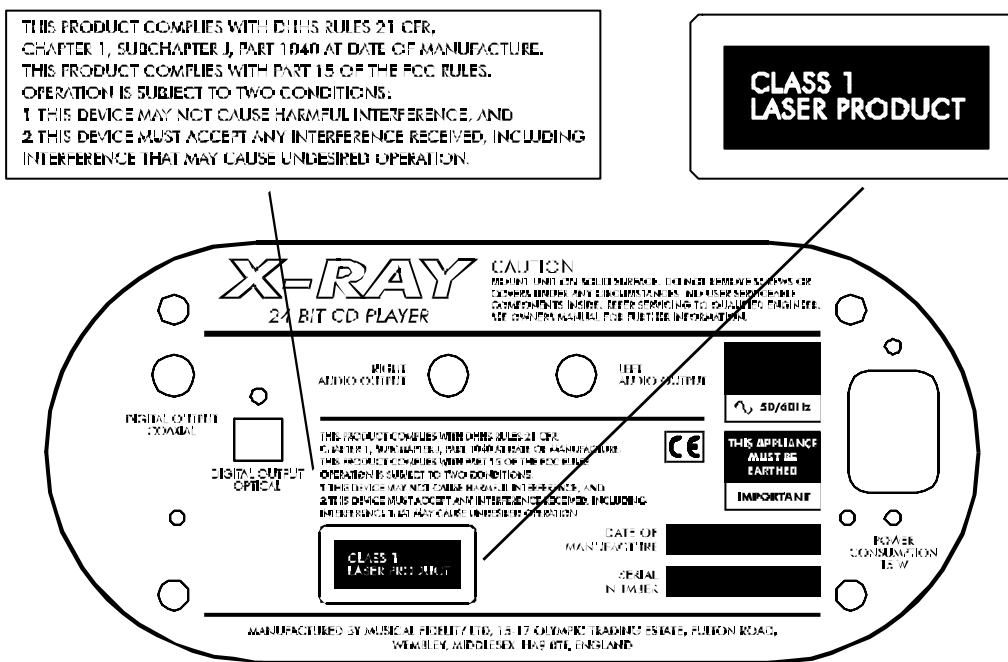

FITTED INTERNALLY TO
TOP OF MECHANISM
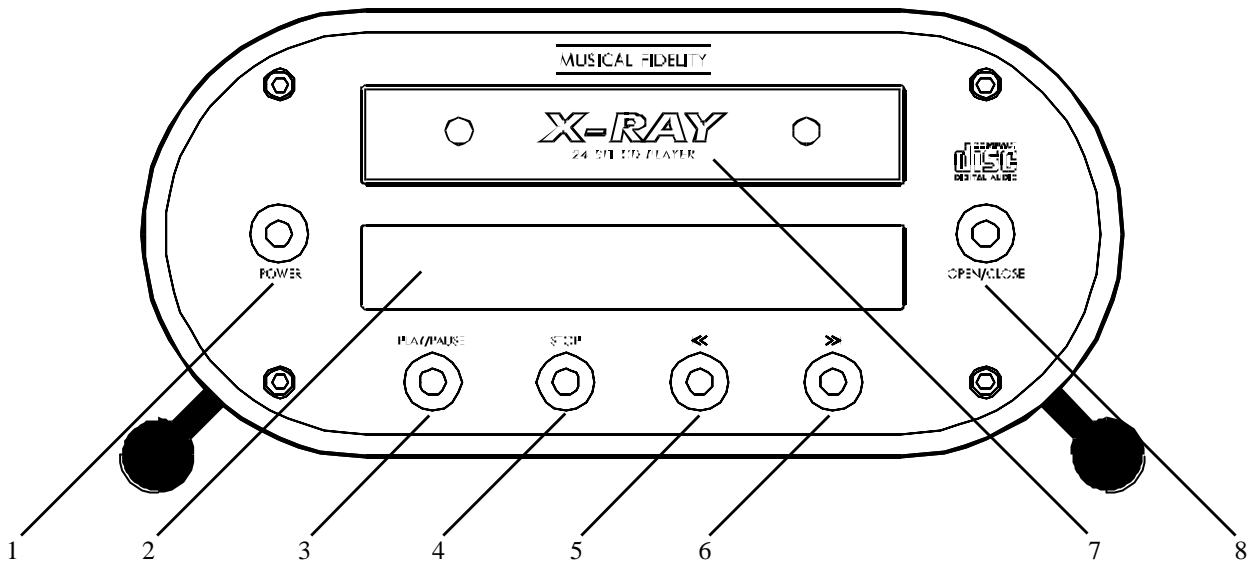
FRONT PANEL

1	POWER mains on/off switch	13	OPEN/CLOSE
2	CD player display	14	Direct track access buttons
3	PLAY /PAUSE to start CD playback / pause and resume CD playback	15	Special function buttons - see manual for details
4	STOP to stop CD playback	16	SEARCH buttons to scan forwards or backwards
5	SKIP BACK track selector	17	TRACK back/forward buttons to change to the last/next track
6	SKIP FORWARD track selector	18	INDEX back/forward buttons to select an index point
7	CD transport loading drawer	19	PLAY/PAUSE to start and pause playback
8	OPEN/CLOSE to open and close drawer	20	STOP to stop playback

REAR PANEL

9 DIGITAL OUTPUT coaxial
10 DIGITAL OUTPUT optical
11 Left and right LINE OUTPUTS
12 IEC type mains inlet
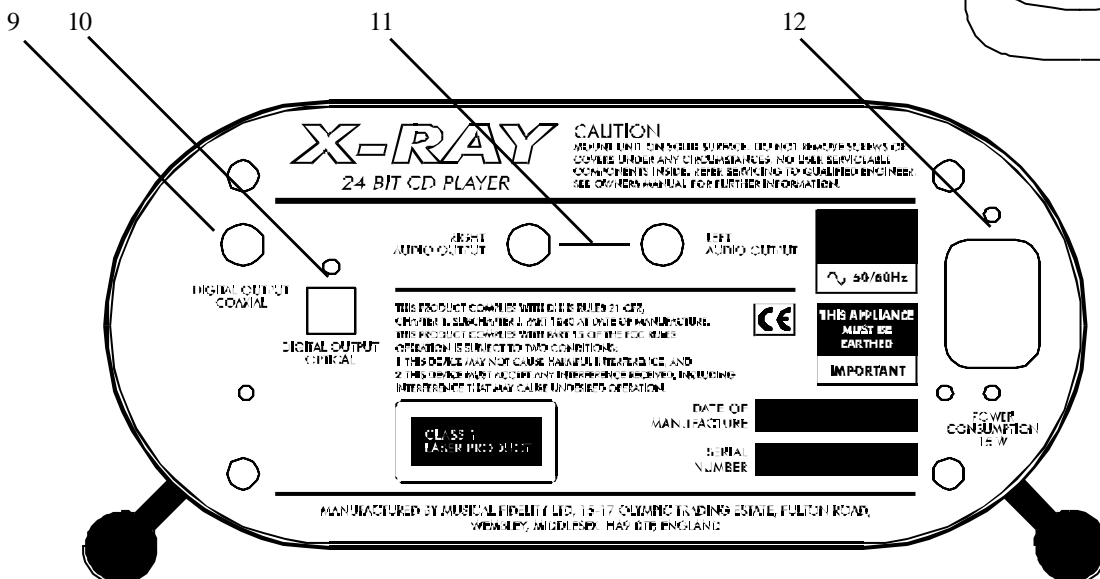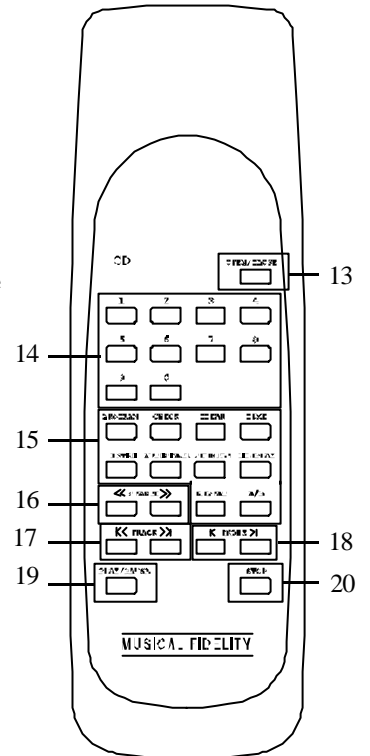
INSTALLATION PRECAUTIONS

Your new X-RAY is designed and built to provide trouble-free performance but it is sensible to observe a few precautions. Please ensure that you have complied with them before you connect any AC power to your system. Retain this guide for future reference.

☑ **Heed all warnings on the back of the unit.**

☑ **Place your X-RAY where there is adequate ventilation.**

☑ **Only connect the unit to a power supply of the type marked on the back of the unit.**

☑ **Position the power supply lead and signal interconnect leads where they are not likely to be walked on or trapped by items placed on them.**

☒ **Do not use near water.**

☒ **Do not place the X-RAY near direct heat sources such as radiators or other equipment that produces heat.**

☒ **Do not remove any covers or try to gain access to the inside. The warranty will be invalid if the unit has been tampered with. There are no user adjustments within. Refer all service work to an authorised Musical Fidelity agent.**

The remote control enables you to activate the main functions of the CD player from the comfort of your armchair. Several of the functions described in this manual are only available on the remote handset. Identical inscriptions on the remote control and CD player denote identical functions. The following should be noted when operating the player using the remote control.
- Point the remote control (transmitter) towards the display on the player.
- Visual contact must exist between the transmitter and receiver.
- If the range of the remote control decreases dramatically, replace the batteries with new ones.

Before Switching on the Stereo System
Please read carefully the instructions on the following pages. The functional arrangement of the controls makes the stereo system fairly easy to operate. You should nevertheless study these instructions carefully.

Important! Unauthorised opening of the equipment will invalidate any warranty claims.

Note: To help your dealer identify your CD player if after-sales service is required, please quote the serial number written on the rear panel of the unit.

INTRODUCTION

Congratulations on your purchase of an X-RAY 24 BIT CD player.

The X-RAY uses the latest 24 bit delta-sigma DAC technology along with clock and data re-timing circuitry and a highly stable CMOS oscillator master clock to achieve an excellent technical and sonic performance. The X-RAY's exceptionally low jitter gives both improved sound quality and very consistent results from disc to disc. In addition, for this model Musical Fidelity developed a sophisticated linear phase 5 pole analogue filter which is situated after the Digital to Analog converter to remove nearly all digital artefacts above the audio band. This greatly reduces the spurious noise and aliasing breakthrough inherent in the CD process giving improved sound quality and consistent results with a wide range of amplifiers.

INSTALLATION

Place your CD player on a stable, horizontal, vibration-free surface where there is no risk of it falling over or being subjected to vibrations. Avoid placing your CD player next to radiators or in direct sunlight.

Protect your CD player from humidity. Avoid placing it under a window. Do not place any containers filled with water on the CD player e.g. flower vases or potted plants. If water does enter the CD player, immediately pull out the mains plug from the wall socket and inform your dealer, who should then check the set before you use it again.

- Liquid entering the CD player could cause dangerous short-circuits which, in the worst case, could cause a fire.

If you move your CD player from a cold place to a warm place, leave it switched off for a few hours before using it again. Condensation could form inside the unit and must be allowed to evaporate.

CLEANING

Before cleaning the CD player always switch off the main switch and remove the mains plug from the wall outlet. Clean the housing and the remote control unit using a moist cloth. We do not advise that you use any solvents, white spirits, thinners, etc. as they could damage the surface finish of the unit.

AUDIO CONNECTION

The CD player should be connected to an amplifier (CD or Aux input) by an interconnect cable with RCA/phono type connectors. This is connected to the Left and Right AUDIO OUTPUT sockets on the rear panel of the CD player. Alternatively, you can use the DIGITAL OUTPUTS (Coaxial or Optical) for connection to an outboard Digital-to-Analogue converter or digital amplifier.
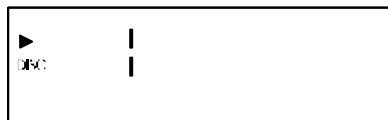
NOTES ON USING COMPACT-DISCS

Always hold discs by the edges and make sure they remain clean. Do not touch the surface. Do not stick any paper or adhesive tape to either side of the disc. Keep discs away from direct sunlight and heat sources, such as radiators. Do not leave discs in a car which is parked in direct sunlight, since the temperature inside the car can become extremely high. Clean discs with a cloth before playing them. Do not use any solvents such as benzene, thinners, commercially available cleaners or antistatic spray intended for analogue discs, to clean your compact discs. After playing, always store a disc in its case again.
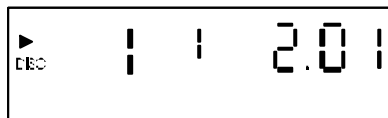
MOISTURE

If the unit is exposed to extreme temperature fluctuations, moisture can form inside. Condensation can form on the lens and on other parts inside the unit. If the CD player is operated under these conditions, the laser beam may not be able to read the disc. In this case you should remove the CD, close the disc compartment and leave the unit switched on for an hour or so. This will allow sufficient time for the moisture to evaporate and you will then be able to use your CD player again.

LOADING AND PLAYING COMPACT DISCS

After switching on the CD player, the following is displayed on the display as the machine begins to search for a disc:

The first digit indicates the number of the currently playing track, the second smaller digit indicates the current index point (see explanation later) and the final digits indicate the elapsed playing time for the current track (2 minutes 1 second in this example).

However, if no disc is loaded the X-RAY will display the following after approximately 3-4 seconds.
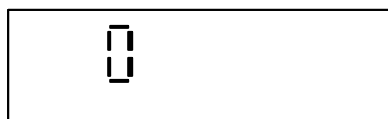
In this case, press the "OPEN/CLOSE" button to open the transport drawer and insert the desired CD.

The legend 'DISC' will light up in the display to show that the CD player is ready to load a disc.

Once the drawer is fully out, insert the CD with the labelled side facing upwards and then either press the OPEN/CLOSE or PLAY/PAUSE button to close the transport drawer again.

If PLAY/PAUSE is pressed the CD player will go straight into playback mode, the arrow indicating playback will appear and the current track, index point and elapsed track time will be displayed as previously shown.

If OPEN/CLOSE is pressed the CD player scans the contents of the disc as soon as the disc compartment is closed and a message similar to that following, will appear on the display:
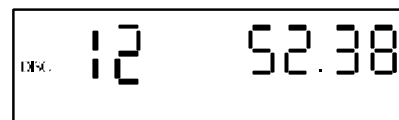
The 'DISC' legend indicates that a disc is loaded, the left-hand digits indicate the number of tracks on the CD (12 in this example). The right-hand ones, the total playing time of the CD. After 3-4 seconds if no button is pressed the display will then change to
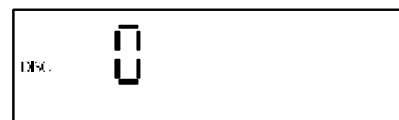
indicating that a disc is loaded but not yet playing. To start play, briefly press the PLAY/PAUSE button, an arrow appears on the display to confirm playback and the display changes to show the current track, index point and elapsed track time, again as shown previously.

When all tracks on the CD have been played, playback stops and this indication appears on the display:
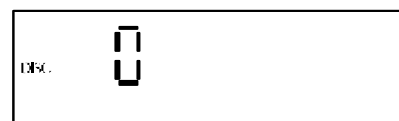
TRACK SELECTION

To change track, the track skip buttons |<< and >>| can be pressed to jump forwards or backwards one track in either direction. If either button is held down the X-RAY will quickly step through the available tracks in the required direction.

Alternatively, you can select a specific track by directly entering a track number (using the numeric push-buttons) and then pressing PLAY/PAUSE. For example to select track 2 you would press 2 (a flashing 2 will be displayed) then PLAY/PAUSE. To select track 27 similarly you would press 2 then 7 then PLAY/PAUSE.

STOP

You can stop playback at any time by pressing the STOP button once.

PLAYBACK OF A SELECTED INDEX POINT

Some CDs contain index points within a track to separate a musical piece into different movements. If used these index points will normally be listed on the CD track listing on its box. With these discs you can select a particular index point during playback.

To change index, the index skip buttons |< and >| can be pressed to jump forwards or backwards one index in either direction. If either button is held down the X-RAY will quickly step through the available index points in the required direction. Whilst playing a disc the display always shows the current index point as the smaller digit(s) to the right of the main track indication.
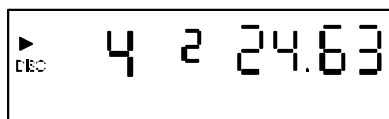
In the example above the current track is number 4 and the current index point is number 2.

PLAY/PAUSE

Pressing the "PLAY/PAUSE" button whilst a disc is playing pauses playback of the disc. The pause symbol (‖) appears in the display window (see below). The disc will continue spinning but the track does not advance and the X-RAY's output is muted.
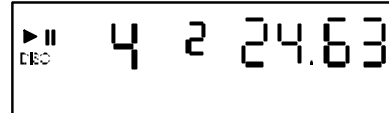
Pressing PLAY/PAUSE again restarts playback at the place where you left off.

SEARCH

You can use the SEARCH buttons to fast forward or fast rewind during playback similar to the way you can with Video or Tape cassette players. This permits you to locate particular passages at high speed with the audio playback of the CD still active.

Pressing the search forwards button (>>) fast winds forwards whilst the search backwards button (<<) fast winds backwards.

As the unit searches through a track the track time remaining display (far right digits) will be seen to rapidly advance in the required direction.

For both directions the unit will return to the normal playback mode once the button is released.
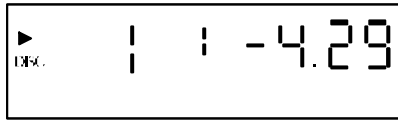
DISPLAYING PLAYBACK TIME

There are 3 playback time display modes cyclically accessed by pushing the TIME button. The default mode (e.g. after switch on) shown below indicates the *elapsed* time for the currently playing track (2 mins 1 sec for this example).
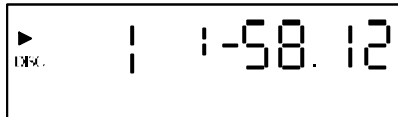

Pushing the TIME button once changes the display to show the *remaining* time for

the current track (4 mins 29 sec for this example) as below:

Pushing the TIME button again changes the display to show the remaining time for the whole disc (58 mins 12 secs below):

A third press of the TIME button will now bring the display back to the first (elapsed track time display) and so on.

REPEAT PLAYBACK

The REPEAT button allows the repeated playback of either 1 track or all tracks on the disc.

By pressing the REPEAT button once, you can repeat the entire disc (or the programmed selections - see later) over and over again. The legend REPEAT appears on the display at the same time as shown below.

If you press the REPEAT button twice, just the current track is repeated. The legends REPEAT and 1 appear on the display as below.
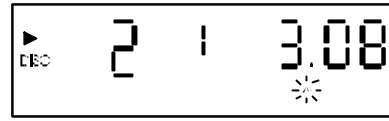

In this example, track 2 will be repeatedly played.
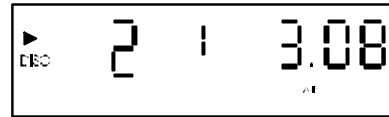
CONTINUOUS PLAY

Continuous play provides you with the option of playing just a certain section of the disc over and over again.

You can use the display to help you find the desired section or you can set it by ear. When you reach the desired starting point,

press button A/B. The display will show the flashing symbol A-

Once the disc has reached the end of the desired section, press the A-B button again. The letters A-B will now be illuminated in the display.

Now the selection you have chosen will be repeated until the continuous play is switched off by pressing button A-B again or by pressing buttons STOP, INTRO or SHUFFLE.

SHUFFLE PLAYBACK

If SHUFFLE is pressed the tracks on the discs are not played in consecutive order but in random order. The individual tracks will also be played in a different order each time the disc is played. The word SHUFFLE appears on the display to provide a visual reminder that the SHUFFLE function has been activated.
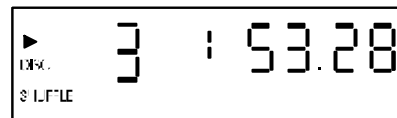

If the next track button >>| is pressed whilst in SHUFFLE mode the X-RAY will randomly select a new track to play from those available on the disc which it has not already played. Press the SHUFFLE button again to switch off the shuffle random playback function.

INTRO/TITLE SEARCH

The INTRO function allows you to play back just the start of each track on the disc to, for instance locate by ear a preferred track.

The first ten seconds of each title on the CD are played (or the first 10 seconds of the programmed titles). The playback arrow in the display window flashes to indicate that this mode is activated.

```
        ☀         6  :  10.37
  DISC.
```
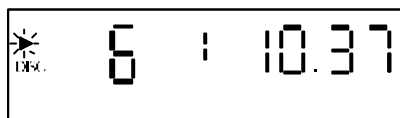
Press INTRO again and the CD player will switch to normal playback starting from the title which is currently playing.

PROGRAMMING / R.M.S

The built-in program memory (Random Music Selection function) allows you to store up to 24 tracks and to play them back in the order in which you store them. Each track is stored as a 'STEP' in the program. It is possible to store a track more than once in the same program if desired.

Example: You wish to listen to tracks 14, 7, 9, 9 and 12 in that order on a disc.

With the disc loaded and the player stopped first press the numeric button corresponding to the first track you wish to store (14 in our example). That track number will appear in the display as below.

```
  DISC      14
```

Now press the PROGRAM push-button and the display will change to show to currently programmed track (14), the step number (1) and the total playing time of all programmed tracks so far. The RMS logo also lights to show that Random Music Selection (i.e. program) mode is active.

```
  DISC    14   1    3.28
              RMS
```

Next the second track to be programmed can be selected (7 in our example) either by entering the required number with the numeric buttons or by using the track skip buttons (|<< and >>|). As the second track number is selected the step number will be seen to change to a flashing 2 indicating the program step about to be filled.

```
  DISC    7   2    12.01
              RMS
```
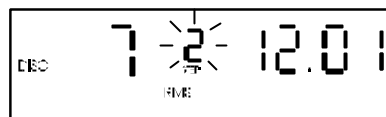
Once the second track is selected on the display, store it by pressing the PROGRAM button. The display will now change to show the second programmed step. The step number will now stop flashing, indicating that this step has been filled. The playback time of the newly programmed title is added to the total playback time shown on the min. and sec display (12 mins 1 sec in our example).

```
  DISC    7   2    12.01
              RMS
```
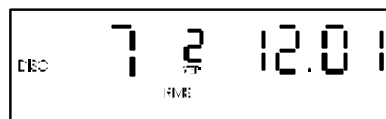
You can then store all the remaining tracks in the same way.

If you want to save a track twice in succession (for example 9 followed by 9) first program in track 9 as normal then reselect track 9 and save it again by pressing the program button.

If you should accidentally enter more than 24 tracks, the memory will stop storing tracks after it has reached 24 and the message FULL will appear in the display as shown.

```
  DISC.         FULL
          RMS
```
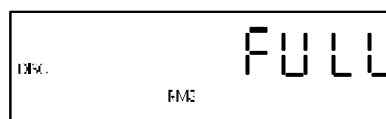
If at any time you make a mistake or wish to delete a track from the list pressing the CLEAR button will erase the last step. Repeated pressing of CLEAR will then erase each step in reverse order.

Once you have stored all your desired

tracks according to the same procedure, briefly pressing the PLAY/PAUSE button will start playback of your program.

When all programmed tracks have been played, the CD player stops. You can then if desired, play the same track selection again by pressing the PLAY/PAUSE button.

If before playing back your program you wish to check your selection, the CHECK button can be used to step through each step of the program in turn.

Note: The entire program will be cleared if you open the disc compartment to load another disc.

AUTOSPACE

The X-RAY's AUTOSPACE function can be used to insert 4 second silent spaces in between each track as it is played back. This can be useful when making cassette recordings of CDs. Some cassette recorders feature a track skip function which uses the space between tracks to locate each one individually. However, some CDs do not have enough space between tracks for this function to operate properly. AUTOSPACE can solve this problem.
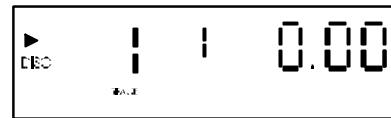
Pressing the AUTOSPACE button once activates the function. The legend SPACE will appear in the display as below
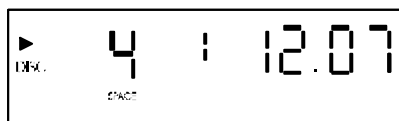
In this mode, once the X-RAY has reached the end of a track the SPACE legend will begin to flash and the elapsed time part of the display will change to count down from four seconds to zero before play of the next track commences as shown opposite:
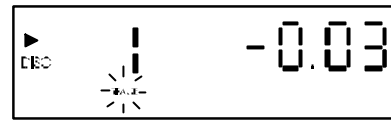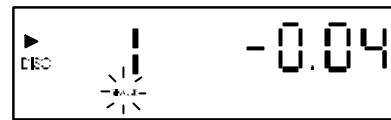
Once zero is reached the SPACE legend stops flashing and play continues at the start of the next track.

DISPLAY

The X-RAY's display can be dimmed or switched off with the DISPLAY button on the remote control. Pushing the button once switches the display off. Pushing the button a second time brings the display back on but dimmed. A third press returns the display to full brightness. When in display off mode pressing any button will cause the display to return for 2-3 seconds to confirm the new settings before again switching off.

Basic troubleshooting of a CD player is similar to troubleshooting of any other electrical or electronic equipment. Always check the most obvious possible causes first.
To give you a few ideas of what to look for, check the following:

Problem	Probable Cause	Remedy
No power when POWER is pressed	Power plug not inserted securely	Plug in securely
No playback when disc is loaded	Disc loaded with label side down	Load with label side up
	Disc dirty	Clean disc surface
No audio output (or too low level output)	Connection to stereo system is incorrect	Check connections
Playback starts when power is switched on	Compact disc left on the disc tray	Remove the disc from the player unless timer playback is required
Mistracking (sound jumping)	Player receiving vibration or shock	Change the installation position of the player
	Disc dirty	Clean disc surface
Hum	Signal connection plug not connected securely	Reconnect plug securely
Noise in tuner	Player too near tuner	Keep a reasonable distance between units or switch off player's power
Remote control unit operation is impossible	Player's POWER switch set to OFF	Set switch to ON
	Batteries not inserted in remote control unit	Insert batteries

Remember: the most vulnerable part of a CD playing system is the disc itself. The most likely cause of a non-playing disc is that the disc itself is faulty, scratched or simply dirty.

If none of these actions effect a cure, please contact your dealer, or an authorised Musical Fidelity service agent. Remember, never open the case of the X-RAY yourself, as this will invalidate the guarantee.

X-RAY

24 BIT CD PLAYER

DAC architecture	24 bit Delta-Sigma (Bitstream)
	8x oversampling
Frequency response	10Hz - 20kHz $\pm$ 0.2dB
S/N ratio	> 96dB unweighted
	> 105dB 'A' weighted
THD	< 0.006% 10Hz - 20kHz unweighted
	< 0.003% 10Hz - 20 kHz 'A' weighted
Total correlated jitter	< 170 pS
De-emphasis error	< $\pm$ 0.1dB
Linearity	< $\pm$ 0.2dB to -80dB
Wow and flutter	Unmeasurable
Power requirements	100/115/230V AC 50/60Hz
	Factory preset for country
Power consumption	15 Watts
Dimensions (approx.)	230 x 110 x 320 mm (W x H x D)
	Height and width include feet,
	depth includes terminals
Standard accessories	Remote Control Handset, 4 Batteries
	(SUM-4, AAA, LR03)

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Musical Fidelity reserves the right to make improvements which may result in specification or feature changes without notice.