

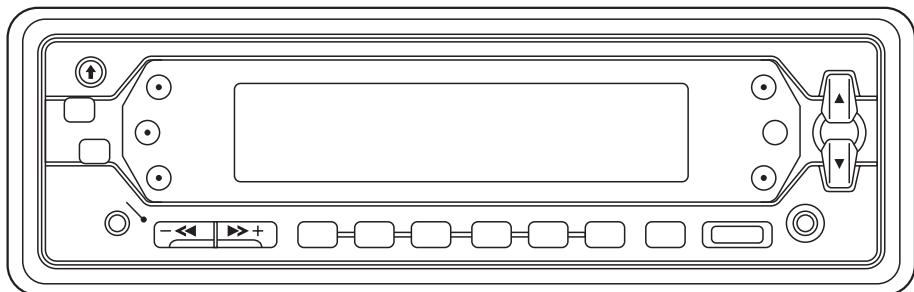
# Goodmans

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## INSTRUCTION MANUAL

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**Model GCE 7103 CD**  
**In Car Radio**  
**Compact Disc Player**

e1  
022476



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### **MULTIPATH DISTORTION / MUTING**

Please note: An integrally mounted screen aerial may give rise to increase multipath distortion or spurious muting of the audio output. This is normal and to be expected. The use of an externally mounted rod aerial may reduce or possibly eliminate such problems.

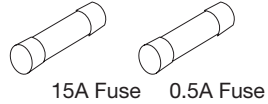
Most screen aerials require a 12 volt supply to operate correctly. Please check that this has been connected the +12 volt antenna wire of your radio. If you are in any doubt of this connection please the vehicle dealer or Goodmans installation helpline.

**IMPORTANT: Do not forget to remove the transit screws on top of the unit.  
Before removing the fixing cage and installing the unit.  
Failure to do so will result in the CD not playing.**

## **ACCESSORIES**

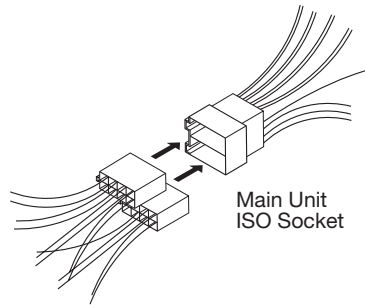
Please retain the carton and packing materials, as this is the best protection for the unit should it be necessary to return it for servicing.

- (1) 1 x 15 Amp fuse (spare fuse for + 12 volt supply wire of the unit).
- 1 x 0.5 Amp fuse (spare for memory).

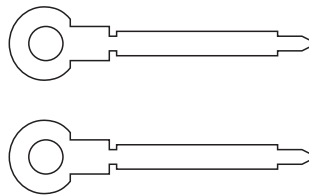


- (2) 2 x ISO Plug Connector

For use when ISO plugs are not used on your vehicle



- (3) 2 x Release key



# **PLEASE READ THIS BEFORE CONNECTING THE PLAYER TO THE VEHICLE**

## **IMPORTANT NOTES**

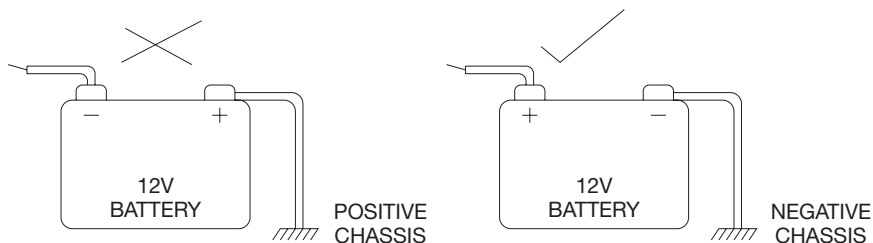
Prior to final installation carry out a sound check. If high distortion or intermittent sound is experienced it is possible that the wiring to the car's electric is poor, or that the battery needs recharging.

If the battery and its charging circuit are OK, then rewire the red fused wire of the player directly to the positive terminal (+) of the car battery. Car accessory shops stock the connector blocks and the 10 Amp cable which may be necessary for extending the fuse wire connection.

**EARTHING:** Make sure that the black wire on the wiring harness is connected to a good earthing point on the car. If the chassis of the car is used as an earthing point, make sure that the paint is scraped clean from the metal work before attaching the wire to it. It is preferable to connect the black earthing wire directly to the negative terminal (-) of the car battery.

## **WARNING: POLARITY.....**

This model is only suitable for use in vehicles which have a negative earth system. e.g.: The negative terminal of the car battery is connected to the chassis.



## **Connecting The Speakers And Power Cables**

Before you wire your system, disconnect your vehicle battery's positive (+) cable. This helps prevent damage in case of a short. When you complete the wiring, reconnect the battery cable and test your car stereo.

**Note:** Check with your vehicles handbook or dealer before disconnecting the vehicle battery in case the alarm or other electronics in your vehicle requires special attention.

When connecting your car stereo's black ground wire, be sure to connect the wire to a metal part of your vehicle or preferably to the negative (-) terminal of the car battery.

## **PRECAUTIONS AND MAINTENANCE**

- This unit is designed for negative ground 12V DC operation only. The equipment can be used safely, if the negative terminal of the battery is connected to the vehicle metal work.
- Do not use speakers of impedance less than 4 ohms; and do not allow the speaker wires to be sorted together when the unit is switched on. Otherwise it may overload or burn out the power amplifier stage.
- If the car interior is extremely hot, as after being parked in the sun, do not use the player until the car has been driven for a while to cool off the interior.

### **Caution Vauxhall owners:**

Vauxhall do not follow normal ISO wiring convention which will cause Goodmans radios' to lose the radio preset memories each time the ignition switch is turned off. To prevent such occurrences swap over the Red ignition and Orange Memory wires in the bullet connectors attached to the wiring harness of the car radio.

## INSTALLATION/PRECAUTIONS

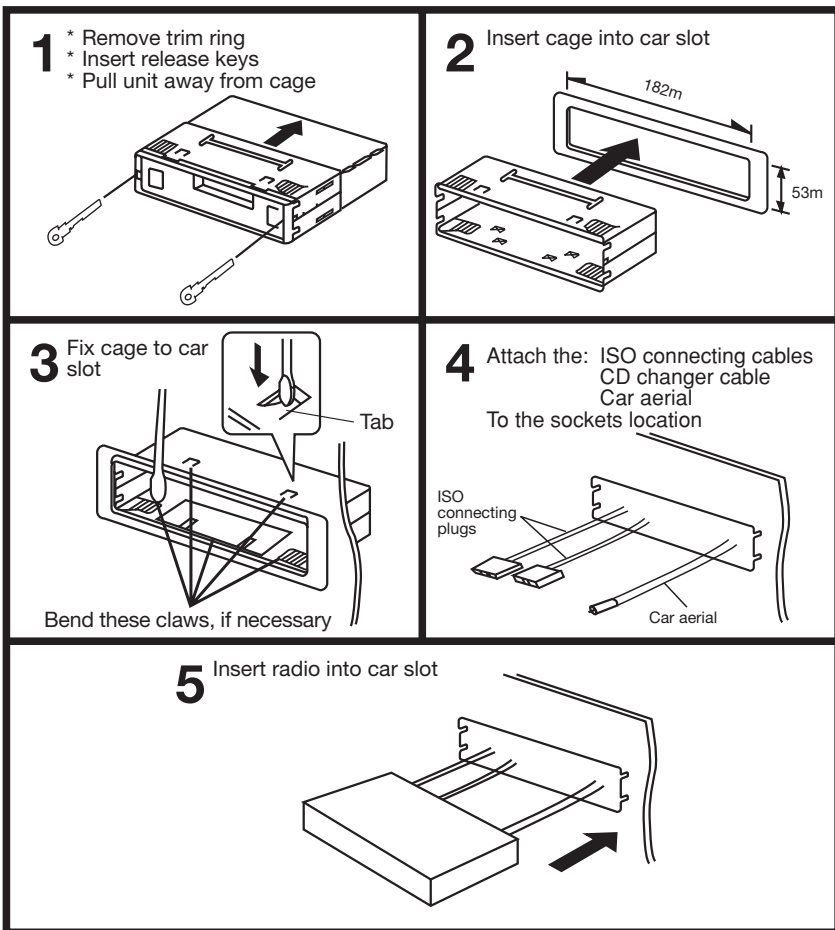
- Choose the mounting location carefully so that the unit will not interfere with the normal driving functions of the vehicle.
- Avoid installing the unit where it would be subject to high temperatures, such as from direct sunlight or hot air from the heater, or where it would be subject to dust, dirt or excessive vibration.
- Use only the supplied mounting hardware for a safe and secure installation.
- Be sure to remove the front panel before installing the unit.

### Mounting angle adjustment

Adjust the mounting angle to less than 20°.

### MOUNTING EXAMPLE

#### Installation in the dashboard



#### Note:

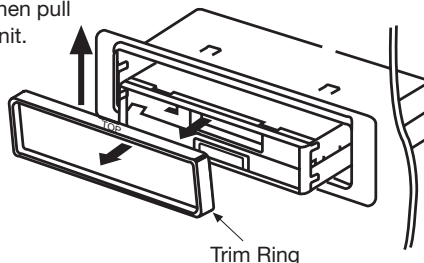
Keep the release keys in a safe place as you may need them in future to remove the unit from the car.

## **REMOVING AND ATTACHING THE TRIM RING**

This model can be fitted to DIN E or ISO style dashboard slots. The clip on trim ring is prefitted to the front of the unit for this purpose.

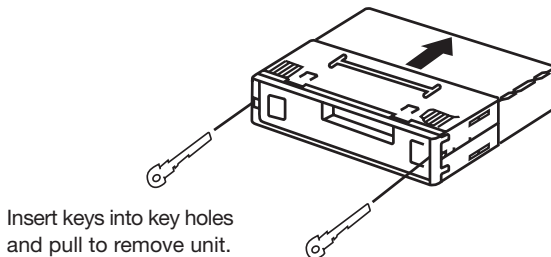
- It will be necessary to remove the trim ring:
  - a. To allow the radio to be fitted to an ISO style dashboard slot.
  - b. To gain access to the keyhole slots for removal of the unit from the car slot/fixing cage.
- To remove the trim ring first remove the front panel from the radio (press the open button and remove the front panel).
- Using your fingers lift the trim ring at its top centre and pull the ring towards you/away from the main unit.
- The trim ring can only be fitted to the main unit one way only. A removable label with TOP printed on it is placed on the top of the ring to indicate the correct placement of the ring. Simply position the trim ring over the front of the main unit and push fit the trim ring on to the unit.

Lift up and then pull  
away from unit.



## **REMOVING THE PLAYER FROM THE DASHBOARD/FIXING BRACKET**

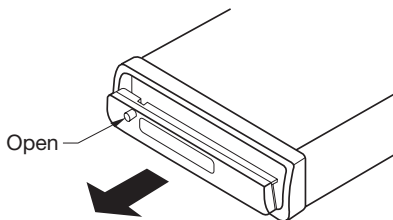
- Remove the front panel from the main unit.
- Lift off the trim ring and remove from the main unit.
- Insert the supplied release keys into the key slots located on the left and right sides of the unit. Ensure that the keys are fully pressed into the slots.
- Pull on both of the release keys to remove the unit from the fixing bracket/car slot.



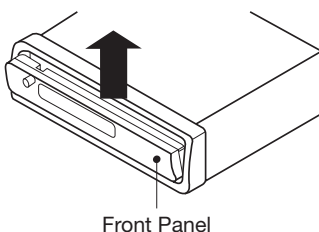
## **USING THE DETACHABLE FRONT PANEL**

### **To Detach the Front Panel**

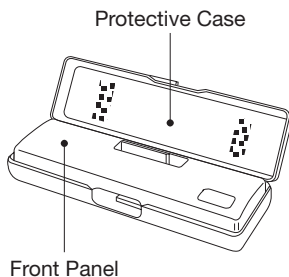
1. Press the open button (OPEN), then the front panel will be folded down.



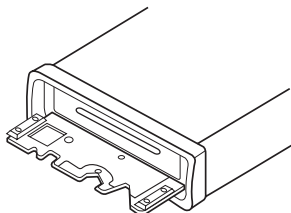
2. Remove the front panel by pulling its middle-hand outward.



3. For safekeeping, store the front panel in the supplied protective case immediately after being removed.



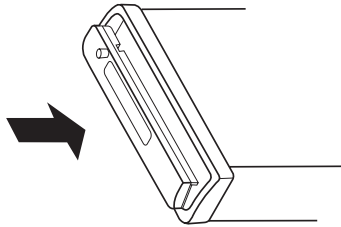
4. Push the front metal plate into the main body. A "click" sound should be heard.





## To Reinstall the Front Panel

1. Push the front panel into the main body. A 'click' sound should be heard.

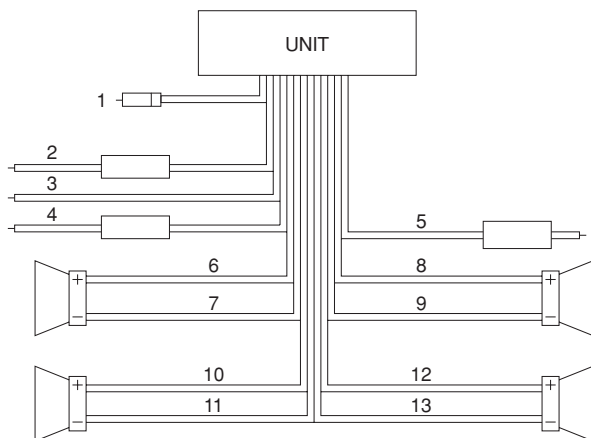


2. Note that if the front panel fails to lock in position properly, press control button may not function and LCD display may be missing some segments. Pushing the OPEN button and then reinstall the front panel again.

## Precautions when Handling

1. Do not drop the front panel.
2. Do not put pressure on the display or control buttons when detaching or reinstalling the front panel.
3. Do not touch the contacts on the front panel or on the main unit body. It may result in poor electrical contact.
4. If any dirt or foreign substances adhered on the contacts, they can be removed with a clean and dry cloth.
5. Do not expose the front panel to high temperatures or direct sunlight in anywhere.
6. Keep away any volatile agents (e.g. benzene, thinner, or insecticides) from touching the surface of the front panel.
7. Do not attempt to disassemble the front panel.

## WIRING IDENTIFICATION



### REAR VIEW OF PLAYER

- |  |   |
|--|---|
| 1) AERIAL INPUT SOCKET                         | 8) FRONT RIGHT POSITIVE: WHITE                    |
| 2) BATTERY: RED +12 VOLT IGNITION              | 9) FRONT RIGHT NEGATIVE: WHITE WITH BLACK STRIPE  |
| 3) GROUND: BLACK -                             | 10) REAR LEFT POSITIVE: BROWN                     |
| 4) MEMORY: ORANGE PERMANENT +12 VOLT           | 11) REAR LEFT NEGATIVE: BROWN WITH BLACK STRIPE   |
| 5) AUTO AERIAL: ORANGE/WHITE                   | 12) REAR RIGHT POSITIVE: YELLOW                   |
| 6) FRONT LEFT POSITIVE: GREY                   | 13) REAR RIGHT NEGATIVE: YELLOW WITH BLACK STRIPE |
| 7) FRONT LEFT NEGATIVE: GREY WITH BLACK STRIPE |   |

### RECOMMENDED MINIMUM LOUDSPEAKER POWER RATINGS

Front loudspeakers power ratings 2 x 30 Watts RMS (2 x 60 Watts Music)

Rear loudspeakers power ratings 2 x 30 Watts RMS (2 x 60 Watts Music)

### TWO SPEAKER WIRING

If you intend to use only two speakers with this radio select either front or rear wiring

### INSTALLATION NOTES

#### (APPLICABLE TO BOTH 2 AND 4 SPEAKER CONNECTION)

This radio contains two separate power amplifiers, to prevent possible damage to these amplifiers please ensure:

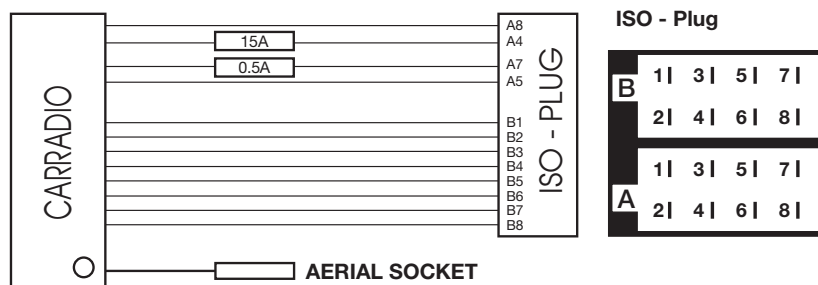
- 1) The vehicle chassis is not used as a loudspeaker earth (-ve return).
- 2) Front and Rear loudspeaker connecting wires are not joined together.
- 3) Any wires not used when completing a two speaker installation are fully insulated.
- 4) The memory wire (Orange) is connected to a permanent +12V supply.
- 5) The power wire (Red) is connected via the ignition switch of the vehicle.

Note: Before turning the unit ON for the first time after installation please ensure the RESET button is pressed to reset the microprocessor.

### IMPORTANT NOTE

If after directly connecting the unit via the vehicles ISO connector plugs it does not appear to work (fails) to power up disconnect the orange lead bullet connector and reconnect to the twin bullet connector socket on the red wire. Try the unit again it should power up and can be used normally. Note this phenomenon is most frequent in Volkswagen/Audi vehicles.

## ISO PLUG CONNECTIONS



**Block A:** This plug is used for power supply connections only.

**Block B:** This plug is used for connecting the loudspeakers.

- If your vehicle is not fitted with an ISO connector but just bare wire, then simply connect the supplied ISO plug to bare wire connector A and B to the radio's ISO socket and connect the bare wire ends to the vehicles loudspeakers according to the wiring codes as shown below. Make sure all connections and any unused wires are insulated to prevent shorting.
- ISO Connector pin A6 (Car Light Illumination) is not used on this player.

### ISO-PLUG A

ISO	Function	Colour
A4	+12 Volt memory	Orange
A5	+ 12 Volt Auto. Antenna	Orange/White
A7	+12 Volt Power	Red
A8	Earth (Ground)	Black
A6	Car light (Illumination)	---

### ISO-PLUG B

ISO	Function	Colour
B1	Speaker right rear +	Yellow
B2	Speaker right rear -	Yellow with black stripe
B3	Speaker right front +	White
B4	Speaker right front -	White with black stripe
B5	Speaker left front +	Grey
B6	Speaker left front -	Grey with black stripe
B7	Speaker left rear +	Brown
B8	Speaker left rear -	Brown with black stripe

## Recommended Minimum Loudspeaker Power Ratings

Front and Rear Loudspeakers power ratings 4 x 30 Watts RMS.

### Two Speaker Wiring

If you intend to use only two speakers with this radio select either front or rear wiring i accordance with the power handling of the speakers fitted to you vehicle, when installing connect as per the instructions given on page 10 - 11.

### Installation Notes

#### (Applicable to both 2 and 4 speaker connection)

This radio contains two separate power amplifiers, to prevent possible damage to these amplifiers please ensure:

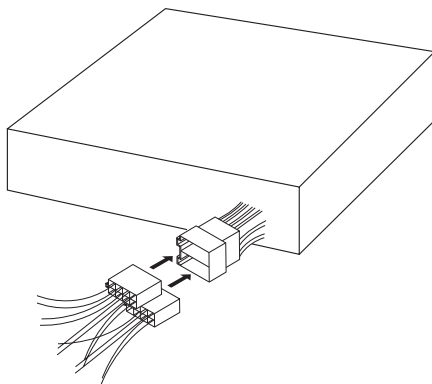
- i) The vehicle chassis is not used as a loudspeaker earth (-ve) return.
- ii) Front and Rear loudspeaker connection wires are not joined together.
- iii) Any wires not used when completing a two speaker installation are fully insulated.
- iv) The memory wire (orange) is connected to a permanent +12V supply.
- v) The power wire (Red) is connected via the ignition switch of the vehicle.

If bare wires are to be used, insert the 2 x supplied.

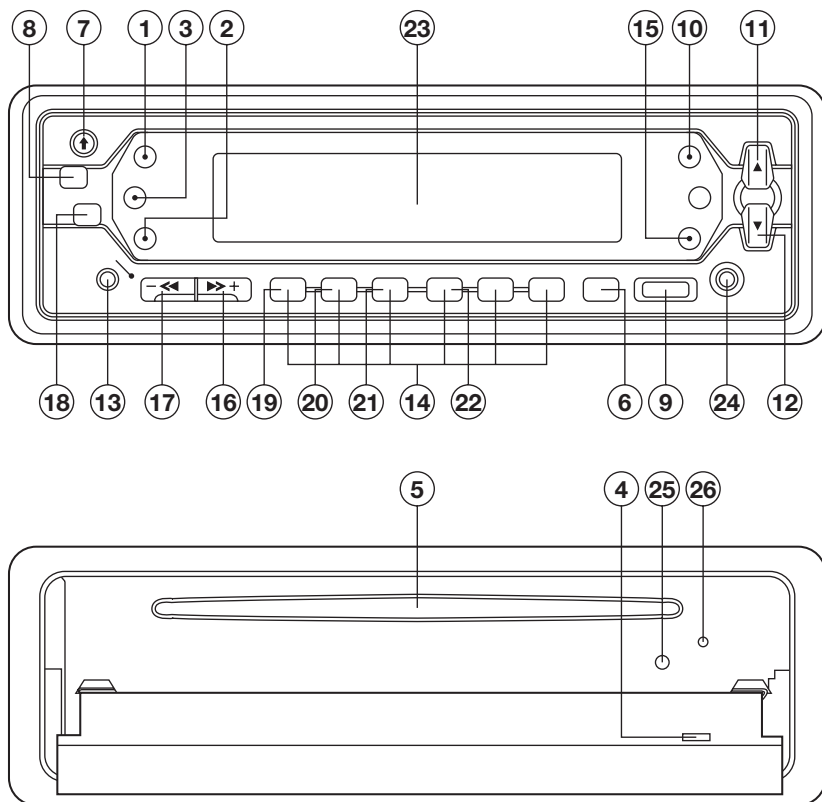
ISO plugs into the ISO socket of the car radio.

The plugs are handed and will only fit one way.

Connect the bare wire ends in accordance with the instructions given on page 10.



## IDENTIFICATION OF CONTROLS AND FUNCTIONS



### FUNCTION KEYS

- |                               |  |
|-------------------------------|--|
| 1. Mono Button                | 14. Preset Buttons                       |
| 2. Local Button               | 15. Display Button                       |
| 3. Mute Button                | 16. Manual/Skip Up Button                |
| 4. Eject Button               | 17. Manual/Skip Down Button              |
| 5. Disc Slot                  | 18. Auto Memory Store/Preset Scan Button |
| 6. Mode Button                | 19. Disc Pause Button                    |
| 7. Open Button                | 20. Disc Scan Button                     |
| 8. Equalization Button        | 21. Disc Repeat Button                   |
| 9. Power/Illumination Button  | 22. Disc Shuffle Button                  |
| 10. Select Button             | 23. Vacuum Fluorescent Display           |
| 11. Audio Control Up Button   | 24. Auxiliary Input Jack                 |
| 12. Audio Control Down Button | 25. Flashing LED                         |
| 13. Band/Loudness Button      | 26. Reset Button                         |

## GENERAL OPERATION

- **ON/OFF/ILLUMINATE**

Switch on the unit by pressing any button [except **OPEN** button (7) and **EJECT** button (4)]. When system is on, press **PWR/ILL** button (9) shortly to control the brightness of VFD. Press it for several seconds to turn off the unit.

- **FACEPLATE RELEASE**

Press **OPEN** button (7) to detach the removable faceplate.

- **SOUND ADJUSTMENT**

Press **SEL** button (10) shortly to select the desired adjustment mode. The adjustment mode will change in the following order:



By pressing **AUDIO CONTROL UP** button (11) or **AUDIO CONTROL DOWN** button (12), it is possible to adjust the desired sound quality.

- **LOUDNESS**

Press **BND/LOUD** button (13) to increase bass output and display will show **"LOUD"**. Press it again to release this function.

- **SET THE CLOCK**

Press and hold **DSP** button (15), then press the **MANUAL/SKIP DOWN** button (17) to change minutes or **MANUAL/SKIP UP** button (16) to change hours.

- **SELECT MODE**

Press **MODE** button (6) to choose desired listening mode. (e.g. radio mode to CD mode to AUX IN mode)

- **MUTE**

Press **MUTE** button (3) to silence the receiver. Press it again to release the mode.

- **VACUUM FLUORESCENT DISPLAY**

Exhibit current frequency and activated functions on the display (23).

- **EQUALIZATION**

Press **EQ** button (8) to turn on equalization function and to select desired audio mode. There are five kinds of mode as below:



- **AUXILIARY INPUT**

The unit can be connected to a portable audio player through the **AUX IN** jack (24).

- **FLASHING LED**

If the front panel is removed from the main unit, the **LED** (25) will be flashing.

- **RESET**

**RESET** button (26) is placed on the front panel and must be activated with either a ball point pen or thin metal object. **RESET** button (26) is to be activated for the following reasons:

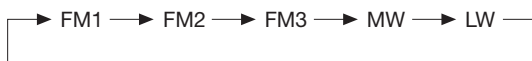
- Initial installation of the unit when all wiring is completed.
- All the function buttons do not operate.
- Error symbol on the display.

**Note:** If pressing the **RESET** button (26) fails to restore normal operation. Try cleaning the contacts on the detachable front panel with a cotton bud soaked in Isopropyl Alcohol.

## **RADIO OPERATION**

- **BAND SELECTION**

At tuner mode, press **BND/LOUD** button (13) to select the desired band. The reception band will change in the following order:



- **STATION SELECTION**

Press **MANUAL/SKIP UP** button (16) or **MANUAL/SKIP DOWN** button (17) briefly to activate automatic seek function.

Press for several seconds until **"MANUAL"** appeared on the display, the manual tuning mode is selected.

If both buttons have not pressed for several seconds, it will return to seek tuning mode and **"AUTO"** appeared on the display.

- **LOCAL/DISTANCE (FM BAND ONLY)**

Press **LOC** button (2) to select between local and distant stations.

Local setting for reception of strong station, and a distant setting for reception of weaker stations.

This function is operational only during AUTO SEEK operation.

- **MONO/STEREO**

Press **MONO** button (1) to select mono or stereo mode.

You can sometimes improve reception of distant FM stations by selection of mono operation.

- **AUTOMATIC MEMORY STORING & PROGRAM SCANNING**

- Automatic Memory Storing

- Press **AS/PS** button (18) for several seconds, the radio searches from the current frequency and checks the signal strength until one complete band search is finished. And then the 6 strongest stations are stored into the corresponding preset number button in order of reception.

- Program Scanning

- Press **AS/PS** button (18) briefly to scan preset station in each of the preset.

- **MANUAL STATION STORING**

- Tune to desired station.

- Press a preset button location 1-6 and hold for 2-3 seconds.

- The station is now stored in the that preset location number.

- To recall stations simply press preset button 1,2 - 6.

## **CD OPERATION**

- **SELECT TRACKS**

Press **MANUAL/SKIP DOWN** button (17) or **MANUAL/SKIP UP** button (16) to move to the previous track or the following track. Track number shows on display.

Hold **MANUAL/SKIP DOWN** button (17) or **MANUAL/SKIP UP** button (16) to fast reverse or fast forward. CD play starts from when you release the button.

- **PAUSE PLAYING**

Press **PAU** button (19) to pause CD player. Press it again to resume play.

- **REPEAT THE SAME TRACK**

Press **RPT** button (21) to continuously repeat the same track. Press again to stop repeat.

- **PREVIEW ALL TRACKS**

Press **SCN** button (20) to play first several seconds of each track on the current disc. Press again to stop intro and listen to track.

- **PLAY ALL TRACKS IN RANDOM**

Press **SHF** button (22) to play all tracks on CD in random order. Press again to cancel the function.

- **EJECT**

When the front panel is sliding down, press **EJECT** button (4) to stop CD playing and eject the disc from the disc slot (5).



**NOTE ON CD-R/CD-RW DISCS**

- On this unit, in addition to an audio CD, you can play your original CD-R or CD-RW.
- However, depending on the conditions of the recording equipment or the CD-R/CD-RW disc itself, some CD-Rs or CD-RWs cannot be played on this unit.
- DO NOT stick paper or tape, etc. onto the label side or the recording side of any CD-R/CD-RW, as it may cause a malfunction.
- Due to the many CD Writer programmes available for burning Home recorded CDR and CDRW discs. It is not possible to comment on which ones will and will not work on this player. It is however essential that the "Drag and Drop" method to compile the disc before burning MUST NOT be used as this format can only be used on your home computer.

## **AERIALS AND AERIAL FITTING**

The normal standard telescopic aerial is designed to be used fully extended. If any segments are damaged or missing this will result in a deterioration of the radio reception. It is important to keep the aerial clean which will prevent corrosion and subsequent high resistance occurring within the segments which will lead to noisy or poor reception.

**NOTE:** Special aerial cleaning fluid is available from most garages and car radio specialists.

The ISO connector is supplied with a wire for use with an electrically powered aerial. Each time the radio cassette player is turned on +12 Volts appears on this wire. This wire must only be connected to the +12 Volt input terminal of the relay supplied with an electric aerial (refer to the instructions supplied with the aerial). When the aerial has been fitted correctly it will automatically extend when the power control of the radio cassette player is turned on, and will retract when turned off. This type of aerial is excellent against vandalism if you are prone to forgetting to retract your manual type aerial.

When fitting an aerial always try to sight the aerial as far away from the engine electric as possible, this will ensure that any ignition interference is kept to a minimum. Always make sure that the aerial is secured to a paint/underseal/rust free surface.

## **RADIO RECEPTION**

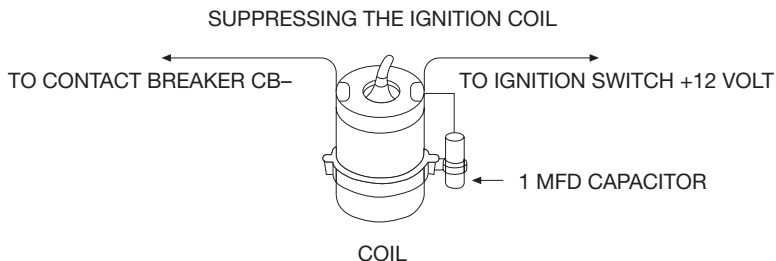
**FM BAND:** FM (Frequency Modulated) transmissions are far superior in sound quality than AM transmissions (MW, LW).

The signal can be affected by many factors such as car ignition, tall buildings, metal objects such as cranes or gasometers, hills, trees, wet weather, hot weather etc. In general, an increasing amount of noise and interference will be picked up by the radio the further away it is from the transmitter. When driving through built up areas or along a motorway, the FM reception may be patchy, this is due to the signal being momentarily blocked or reduced by an object and then reappearing when the object has been passed, this is heard as a shushing noise and is unfortunately unavoidable.

**AM BAND:** AM (amplitude modulated) in addition to the FM band, the receiver is capable of receiving Medium Wave (MW) and Long Wave (LW) bands. These signals may be received over very long distances because the transmitting signal will bend around the curvature of the earth. These transmissions are affected by similar factors to the FM band, but in addition to this the reception will alter as night falls. The ionised layer in the upper atmosphere changes at night and allows more distant signals to be reflected back down to the earth. Subsequently more stations will appear on the waveband and this may cause tuning difficulties or co-channel interference (where 2 or more stations occupy the same frequency on the waveband). If the interference is severe, retuning to an alternate frequency (BBC often use more than 1 frequency) or selecting and tuning into a different waveband may be necessary.

## **RADIO INTERFERENCE**

In the event that your player suffers from interference from your vehicles ignition or charging system, please read carefully the guidance given below. It should be noted that in the majority of cases, interference is mostly caused by a missing or defective device or the ignition HT leads are worn or are of poor quality.



The ignition circuit consists of the coil, distributor, spark plug leads, and spark plugs, all of these components pass very high voltage and unless they are screened or suppressed will cause electrical interference to the radio. This can occur in any of the following ways:

- a. Travel along the +12 Volt supply cable to the radio or
- b. As a radio frequency which is received by the car aerial and processed as a signal or
- c. By both points a and b shown above.

Before replacing or adding any suppression devices or filters, check carefully that the car aerial and screened lead are not damaged and that the radio cassette player is properly earthed and tuned to the correct frequency. As radio interference can be caused by many factors, locating the exact cause of the problem can often be very difficult, and trouble shooting is usually best left to a professional car radio installer, or to the main agent of your vehicle.

If you decide to try and cure the problem yourself, the large array of suppression kits/devices currently available from high street motor factors or your vehicles main agent may be confusing you. Each type of device is designed to filter out electrical interference at specific frequencies it is unfortunately trial and error, if one device works and another does not, therefore you may have to try several different types of filters before you have any success. Instructions on fitting the filters etc. are usually supplied with the kits.

Another source of interference is the alternator or dynamo, this can cause a whining noise relative to the engine speed. The alternator/dynamo should be fitted with a 2.2 MFD capacitor which should be connected between the +B lead (usually the thickest lead) and the car chassis or body of the alternator.

## **TROUBLE SHOOTING**

The following indicator appears.

E1, E2, E3	Press the RESET button. If this indicator still appears after pressing the RESET button, consult your nearest service dealer.
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## **BEFORE SET REMOVAL**

1	Take out the disc.	If a disc remains in the CD player, the disc or set may be seriously damaged in transportation.
2	Turn off the power switch.	
<b>CAUTION:</b> Metal parts of this unit (especially on the back) become quite hot during operation, be careful to avoid touching parts immediately after removing the unit.		

## **TROUBLE SHOOTING**

The following checks will assist in the correction of most problems which you may encounter with your unit. Should any problem persist after you have made these checks consult your nearest service dealer.

Before going through the check list first refer back to the connection and operating procedures.

Symptom	Cause	Solution
No power.	The car's ignition switch is not on.	If the power supply is connected to the car's accessory circuits, switch the ignition key to "ACC".
	The fuse is blown.	Replace the fuse with another 15A or 0.5A fuse.
Disc will not play.	You are trying to put in the compact disc up-side down.	Insert the compact disc with the label side facing up.
	The compact disc is extremely dirty or defective disc.	Clean the compact disc, try to play the new one.
	The temperature in the car is too high.	Cool off the inside of the car, then try again.
	Condensation.	Leave the disc player off for an hour or so, then try again.

Symptom	Cause	Solution
No sound.	Adjust the volume control.	Adjust the sound to the level you want.
	Unit is not connected properly.	Double check the connections.
	The connection cords are not connected properly.	Check the speaker cords and the other connection cords.
The operation keys do not work.	The built-in microcomputer is operating incorrectly.	Remove the compact disc, then insert it again. Press the reset button.
Sound skips.	The installation angle is greater than 30°.	Adjust the angle to less than 30°.
	The disc player is not correctly secured.	Fasten the disc player securely.
Sound skips.	The compact disc is extremely dirty or defective disc.	Clean the compact disc, try to play a different disc.
	Condensation.	Leave the disc player off for an hour or so, then try again.
The sound quality is poor.	The compact disc is defective.	Try another disc. If that disc plays properly, the first disc is defective.
	The compact disc is dirty.	Clean the disc.
The radio does not work. The radio station automatic selection does not work.	The aerial cable is not connected.	Insert the aerial cable solidly.
	The signals are too weak.	Select a station manually.

## **SPECIFICATIONS**

### **GENERAL**

Power Supply Requirements	: DC 12 Volts, Negative Ground
Chassis Dimensions	: 178 (W) x 165 (D) x 50 (H)
Tone Controls	
- Bass (at 100 Hz)	: $\pm 10$ dB
- Treble (at 10 KHz)	: $\pm 10$ dB
Maximum Output Power	: 4 x 20 Watts RMS (4 x 40 Watts Music)
Current Drain	: 15 Ampere (max.)

### **CD PLAYER**

Signal to Noise Ratio	: More than 60 dB
Channel Separation	: More than 60 dB
Frequency Response	: 20 Hz - 20 KHz

### **RADIO**

#### **FM**

Frequency Coverage	: 87.5 to 108 MHz
IF	: 10.7 MHz
Sensitivity (S/N = 30 dB)	: 3 $\mu$ V
Stereo Separation	: > 30 dB

#### **MW**

Frequency Coverage	: 522 to 1620 KHz
IF	: 450 KHz
Sensitivity (S/N = 20 dB)	: 32 dBu

#### **LW**

Frequency Coverage	: 144 to 288 KHz
IF	: 450 KHz
Sensitivity (S/N = 20 dB)	: 35 dBu