

DESCRIPTION AND OPERATION

4.136 FREELANDER 04MY

AUDIO SYSTEM

DESCRIPTION

General

The audio system features a centre console mounted radio and front loading single CD player. Depending on the specification of the vehicle, the CD player will be capable of holding either a single CD, or in the case of higher specification vehicles, up to 6 CD's. Higher specification vehicles are also fitted with a power amplifier and sub-woofer. For more information on audio system features and functionality, refer to the ***In-Car Entertainment*** handbook.

NOTE: The supporting circuit diagram shows the mid-range audio system fitted with optional Harmon Kardon speakers. A system fitted with standard speakers will not have a power amplifier or rear high range speakers fitted. The connector numbers applied to the high range speakers differ between the two speaker systems. For more information, refer to the 'Speakers – Standard' and 'Speakers – Harmon Kardon' sections.

OPERATION

General

Feed from the positive battery terminal (C0192) is supplied to fusible link 1 and fusible link 4 of the engine compartment fuse box (C0632) on an R wire. Fusible link 4 (C0574) is connected to fuse 12 of the passenger compartment fuse box (C0587) by an NW wire. Fuse 12 (C0584) provides a constant battery feed to the head unit (C0098) on a P wire (P then PK if fitted with a power amplifier) and the power amplifier (C0491) on a P then PK wire. Fusible link 1 is connected in series with fusible link 2, which is also located in the engine compartment fuse box. Fusible link 2 (C0571) is connected to the ignition switch (C0028) by an NR wire. When the ignition switch is turned to the 'auxiliary' position, current flows across the switch (C0028) to fuse 27 of the passenger compartment fuse box (C0588) on a PS wire. Fuse 27 (C0580) provides an auxiliary ignition feed to the head unit (C0098) on an LGW wire.

The head unit (C0098) and the power amplifier (C0491) are both earthed on B wires.

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Speakers – Standard

The head unit (C0098) is connected to the speakers as follows:

NOTE: The LH and RH speakers share the same connector numbers as they utilise the same door harness.

- A positive signal is provided by the head unit to the RH front mid-range speaker (C0369) on an OK wire. The RH front mid-range speaker (C0369) is provided a negative signal by the head unit (C0092) on an OB wire.
- A positive signal is provided by the head unit to the RH front high range speaker (C0531) on an OK wire. The RH front high range speaker (C0530) is provided a negative signal by the head unit (C0092) on an OB wire.
- A positive signal is provided by the head unit to the LH front mid-range speaker (C0369) on a YK then OK wire. The LH front mid-range speaker (C0369) is provided a negative signal by the head unit (C0092) on a YB then OB wire.
- A positive signal is provided by the head unit to the LH front high range speaker (C0531) on a YK then OK wire. The LH front high range speaker (C0530) is provided a negative signal by the head unit (C0092) on a YB then OB wire.
- A positive signal is provided by the head unit to the RH rear mid-range speaker (C0445) on a UK wire. The RH rear mid-range speaker (C0445) is provided a negative signal by the head unit (C0092) on a UB wire.
- A positive signal is provided by the head unit to the LH rear mid-range speaker (C0445) on an SK then UK wire. The LH rear mid-range speaker (C0445) is provided a negative signal by the head unit (C0092) on an SB then UB wire.

NOTE: It is essential that all speakers are connected correctly. A speaker connected incorrectly will be out of phase with the remaining speakers, causing a deterioration of sound quality.

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Speakers – Harmon Kardon

The head unit (C0098) is connected to the power amplifier (C0491) as follows:

- A positive signal is provided by the head unit to the power amplifier on a BG wire. This signal is used by the power amplifier for the RH rear speakers.
- A negative signal is provided by the head unit to the power amplifier on a BO wire. This

signal is used by the power amplifier for the RH rear speakers.

- A positive signal is provided by the head unit to the power amplifier on a BP wire. This signal is used by the power amplifier for the RH front speakers.
- A negative signal is provided by the head unit to the power amplifier on a BU wire. This signal is used by the power amplifier for the RH front speakers.
- A positive signal is provided by the head unit to the power amplifier on a BW wire. This signal is used by the power amplifier for the LH front speakers.
- A negative signal is provided by the head unit to the power amplifier on a BS wire. This signal is used by the power amplifier for the LH front speakers.
- A positive signal is provided by the head unit to the power amplifier on a BN wire. This signal is used by the power amplifier for the LH rear speakers.
- A negative signal is provided by the head unit to the power amplifier on a BR wire. This signal is used by the power amplifier for the LH rear speakers.

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The power amplifier (C0491) receives inputs from the head unit (C0098) and relays them to the speakers as follows:

NOTE: The LH and RH speakers share the same connector numbers as they utilise the same door harness.

- A positive signal is provided by the power amplifier to the RH front mid-range speaker (C1577) on an OK wire. The RH front mid-range speaker (C1577) is provided a negative signal by the power amplifier (C0491) on an OB wire.
- A positive signal is provided by the power amplifier to the RH front high range speaker (C0680) on an OK wire. The RH front high range speaker (C0680) is provided a negative signal by the power amplifier (C0491) on an OB wire.
- A positive signal is provided by the power amplifier to the LH front mid-range speaker (C1577) on a YK then OK wire. The LH front mid-range speaker (C1577) is provided a negative signal by the power amplifier (C0491) on a YB then OB wire.
- A positive signal is provided by the power amplifier to the LH front high range speaker (C0680) on a YK then OK wire. The LH front high range speaker (C0680) is provided a negative signal by the power amplifier (C0491) on an YB then OB wire.
- A positive signal is provided by the power amplifier to the RH rear mid-range speaker (C1428) on a UK wire. The RH rear mid-range speaker (C1428) is provided a negative signal by the power amplifier (C0491) on a UB wire.
- A positive signal is provided by the power amplifier to the RH rear high range speaker (C0679) on a UK wire. The RH rear high range speaker (C0679) is provided a negative signal by the power amplifier (C0491) on a UB wire.
- A positive signal is provided by the power amplifier to the LH rear mid-range speaker (C1428) on an SK then UK wire. The LH rear mid-range speaker (C1428) is provided a negative signal by the power amplifier (C0491) on an SB then UB wire.
- A positive signal is provided by the power amplifier to the LH rear high range speaker (C0679) on an SK then UK wire. The LH rear high range speaker (C0679) is provided a negative signal by the power amplifier (C0491) on an SB then UB wire.

NOTE: It is essential that all speakers are connected correctly. A speaker connected incorrectly will be out of phase with the remaining speakers, causing a deterioration of sound quality.

Remote Audio Controls

The head unit (C0098) provides a feed via the rotary coupler (C0082) to the remote audio controls (C1254) on a BR wire. The remote audio controls contain a number of normally open switches and resistors. When either of the controls are moved, one of the switches closes and a voltage is returned to the head unit (C0098) on a BW wire. The value of the voltage returned to the head unit is dependent upon which way the controls are moved (and how many resistors are brought into the circuit). By measuring this returned voltage, the head unit determines which function has been requested.

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Speed Dependent Volume Control

The ABS ECU (C0501) provides a road speed signal to the power amplifier (C0491) (if fitted) and the head unit (C0098) on a WO wire. This signal is used to raise or lower the volume level from the speakers as road speed changes.

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NAVIGATION SYSTEM

DESCRIPTION

General

The satellite navigation head unit is located in the centre console, and also incorporates a radio and a front loading single CD player. Some vehicles are also fitted with a CD autochanger.

The system operates when the ignition switch is turned to the 'auxiliary' position. For more information on audio system features and functionality, refer to the **Audio and Navigation System** handbook. For detailed information on satellite navigation operation, refer to the **Navigation System** section of the System Description and Operation Workshop manual.

NOTE: The supporting circuit diagram shows the Navigation system fitted with optional Harmon Kardon speakers. A system fitted with standard speakers will not have a power amplifier or rear high range speakers fitted. The connector numbers applied to the high range speakers differ between the two speaker systems. For more information, refer to the 'Speakers – Standard' and 'Speakers – Harmon Kardon' sections.

OPERATION

General

Feed from the positive battery terminal (C0192) is supplied to fusible link 1 and fusible link 4 of the engine compartment fuse box (C0632) on an R wire. Fusible link 4 (C0574) is connected to fuse 12 of the passenger compartment fuse box (C0587) by an NW wire. Fuse 12 (C0584) provides a constant battery feed to the following on P then PK wires:

- The head unit (C0921)
- The CD autochanger (C0941)
- The power amplifier (C0491).

Fusible link 1 is connected in series with fusible link 2, which is also located in the engine compartment fuse box. Fusible link 2 (C0571) is connected to the ignition switch (C0028) by an NR wire. When the ignition switch is turned to the 'auxiliary' position, current flows across the switch (C0028) to fuse 27 of the passenger compartment fuse box (C0588) on a PS wire. Fuse 27 (C0580) provides an auxiliary ignition feed to the head unit (C0921) and the remote interface unit (C1897) on LGW wires.

The head unit (C0921), CD autochanger (C0941), power amplifier (C0491), and the remote interface unit (C1897) are all earthed on B wires.

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Speakers – Harmon Kardon

The head unit (C0092) is connected to the power amplifier (C0491) as follows:

- A positive signal is provided by the head unit to the power amplifier on a BG wire. This signal is used by the power amplifier for the RH rear speakers.
- A negative signal is provided by the head unit to the power amplifier on a BO wire. This signal is used by the power amplifier for the RH rear speakers.
- A positive signal is provided by the head unit to the power amplifier on a BP wire. This signal is used by the power amplifier for the RH front speakers.
- A negative signal is provided by the head unit to the power amplifier on a BU wire. This signal is used by the power amplifier for the RH front speakers.
- A positive signal is provided by the head unit to the power amplifier on a BW wire. This signal is used by the power amplifier for the LH front speakers.
- A negative signal is provided by the head unit to the power amplifier on a BS wire. This signal is used by the power amplifier for the LH front speakers.
- A positive signal is provided by the head unit to the power amplifier on a BN wire. This signal is used by the power amplifier for the LH rear speakers.
- A negative signal is provided by the head unit to the power amplifier on a BR wire. This signal is used by the power amplifier for the LH rear speakers.

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The power amplifier (C0491) receives inputs from the head unit (C0092) and relays them to the speakers as follows:

NOTE: The LH and RH speakers share the same connector numbers as they utilise the same door harness.

- A positive signal is provided by the power amplifier to the RH front mid-range speaker (C1577) on an OK wire. The RH front mid-range speaker (C1577) is provided a negative signal by the power amplifier (C0491) on an OB wire.
- A positive signal is provided by the power amplifier to the RH front high range speaker (C0680) on an OK wire. The RH front high range speaker (C0680) is provided a negative signal by the power amplifier (C0491) on an OB wire.
- A positive signal is provided by the power amplifier to the LH front mid-range speaker (C1577) on a YK then OK wire. The LH front mid-range speaker (C1577) is provided a negative signal by the power amplifier (C0491) on a YB then OB wire.

- A positive signal is provided by the power amplifier to the LH front high range speaker (C0680) on a YK then OK wire. The LH front high range speaker (C0680) is provided a negative signal by the power amplifier (C0491) on an YB then OB wire.
 - A positive signal is provided by the power amplifier to the RH rear mid-range speaker (C1428) on a UK wire. The RH rear mid-range speaker (C1428) is provided a negative signal by the power amplifier (C0491) on a UB wire.
 - A positive signal is provided by the power amplifier to the RH rear high range speaker (C0679) on a UK wire. The RH rear high range speaker (C0679) is provided a negative signal by the power amplifier (C0491) on a UB wire.
 - A positive signal is provided by the power amplifier to the LH rear mid-range speaker (C1428) on an SK then UK wire. The LH rear mid-range speaker (C1428) is provided a negative signal by the power amplifier (C0491) on an SB then UB wire.
 - A positive signal is provided by the power amplifier to the LH rear high range speaker (C0679) on an SK then UK wire. The LH rear high range speaker (C0679) is provided a negative signal by the power amplifier (C0491) on an SB then UB wire.
- NOTE: It is essential that all speakers are connected correctly. A speaker connected incorrectly will be out of phase with the remaining speakers, causing a deterioration of sound quality.*

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Speakers – Standard

The head unit (C0092) is connected to the speakers as follows:

- A positive signal is provided to the RH front mid-range speaker (C1577) on an OK wire. The RH front mid-range speaker (C1577) is provided a negative signal by the head unit (C0092) on an OB wire.
- A positive signal is provided to the RH high range speaker (C0680) on an OK wire. The RH high range speaker (C0680) is provided a negative signal by the head unit (C0092) on an OB wire.
- A positive signal is provided to the LH front mid-range speaker (C1577) on a YK then OK wire. The LH front mid-range speaker (C1577) is provided a negative signal by the head unit (C0092) on a YB then OB wire.
- A positive signal is provided to the LH front high range speaker (C0680) on a YK then OK wire. The LH front high range speaker (C0680) is provided a negative signal by the head unit (C0092) on a YB then OB wire.
- A positive signal is provided to the RH rear mid-range speaker (C1428) on a UK wire. The RH rear mid-range speaker (C1428) is provided a negative signal by the head unit (C0092) on a UB wire.
- A positive signal is provided to the LH rear mid-range speaker (C1428) on an SK then UK wire. The RH rear mid-range speaker (C1428) is provided a negative signal by the head unit (C0092) on an SB then UB wire.

NOTE: The LH and RH front speakers and the LH and RH rear speakers share the same connector numbers as they utilise the same door harness.

NOTE: It is essential that all speakers are connected correctly. A speaker connected incorrectly will be out of phase with the remaining speakers, causing a deterioration of sound quality.

Remote Interface Unit

The remote interface unit (C1897) is provided an ignition feed via fuse 27 of the passenger compartment fuse box (C0580) on an LGW wire. The interface unit enables the head unit to communicate with the remote audio controls, and is earthed on a B wire.

The interface unit (C1897) communicates with the head unit (C0922) and the CD autochanger (if fitted) (C0941) via the Instrument (I) bus on a K wire.

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Remote Audio Controls

The remote interface unit (C1897) provides a feed via the rotary coupler (C0082) to the remote audio controls (C1254) on a BR wire. The remote audio controls contain a number of normally open switches and resistors. When either of the controls are moved, one of the switches closes and a voltage is returned to the interface unit (C1897) on a BW wire. The value of the voltage returned to the interface unit is dependent upon which way the controls are moved (and how many resistors are brought into the circuit). By measuring this returned voltage, the interface unit determines which function has been requested. The interface unit (C1897) converts this input into an Instrument (I) bus protocol message which it outputs to the head unit on a K wire. If a CD autochanger is fitted, this message is also relayed to the CD autochanger (C0941) on a K wire.

Speed Dependent Volume Control

The ABS ECU (C0501) provides a road speed signal to the power amplifier (C0491) on a WO wire. The amplifier uses this signal to raise or lower the volume level from the speakers as road speed changes.

CD Autochanger

The CD autochanger (C0941) is provided a constant battery feed via fuse 12 of the passenger compartment fuse box (C0584) on a P wire. The autochanger (C0941) is earthed on a pair of B wires.

The CD autochanger (C0941) provides the following signals to the head unit (C0983):

- A LH speaker positive signal on a KB wire.
- A LH speaker negative signal on a BK then B wire.
- A RH speaker positive signal on a YB wire.
- A RH speaker negative signal on a BY wire then B wire.

Navigation Inputs

The ABS ECU (C0501) provides a road speed signal to the Central Control Unit (CCU) (C0428) and the head unit (C0921) on a pair of WO wires. A reverse gear signal is provided by the reverse gear switch (C0166 on K1.8 vehicles, C0163 on Td4 manual vehicles) or the reverse lamp relay (C2624) on automatic transmission vehicles on a pair of GN wires.

For detailed information on satellite navigation operation, refer to the **Navigation System** section of the System Description and Operation Workshop manual.