Headless Headunit

# Connections

* 24V power to car battery
* Left, Right channels to speakers
* Antenna
* Control cable to control box

# Powering up

Power up the unit by flipping the power switch.

The unit will continue playing where it left off when powering down, as long as that source is still available.

After uploading files to the Samba share, push the bottom button to update the local database and start playing.

# Remote control

Buttons:

|  |  |
| --- | --- |
| Button | Function |
|  |  |
| Source | Jump to next source:  Bluetooth → Previously playing source  FM → USB*1* → USB*2* → USB*n* → SD card → Line in → FM |
| Shuffle | Plays random track  Not available for: FM, Line-In  Setting is not stored (?) *should we?* |
| [---] | Switch between Access point / Local Network |
| Next Track |  |
| Next Folder |  |
| Previous Track |  |
| Previous Folder |  |
| Volume Up |  |
| Volume Down |  |
| Update |  |
| ATT |  |
| OFF |  |

# Sources

|  |  |
| --- | --- |
| Source | .. |
| FM | Radio |
| USB | Flash drive |
| SD card | Internal storage |
| Line-in | 3.5mm input from any device [EARLY VERSION OF HEADUNIT DOES NOT PROVIDE LINE-IN DETECTION, WHICH MAY CAUSE PROBLEMS WITH OTHER SOURCES PLAYING AUDIO AT THE SAME TIME] |
| Bluetooth | Start playback by pairing your phone or other Bluetooth device, and starting playback. Cannot be selected through [SOURCE] |

X

# Bluetooth

“Bluetooth Classic” (…)

Name = “Bluez 5.4.6”  
Pin code = 0000 (?)

# WiFi

The headunit can either connect to an existing WiFi network, or can act as a stand-alone network. Both offer the possibility to connect and:

1. Up- or download music to and from the headunit on-board SD card storage.
2. Control playback.
3. Provides SSH access for maintenance, troubleshooting and/or third party applications.

## Connect to local network

A connection file must be provided in order to connect to a local network. This connection file may reside in one of the following locations:

|  |  |  |  |
| --- | --- | --- | --- |
| Order | Medium | Partition | Filename |
| 1 | USB drive\* | First partition\* | /network.txt |
| 2 | System’s SD Card | /PIHU\_DATA | /network.txt |
| 3 | System’s SD Card | /PIHU\_BOOT | /network.txt |

*\* If there is more than one drive or one partition, the first found file will be used.*

The network.txt file must contain the following data:

|  |
| --- |
| network={  ssid="OpenWrt"  psk=f22da64fa334468e8b0ace4d544c63c5b340877327d31ad028296c875c0d8adb  } |

(not sure if the line-feeds matter….) #TODO – when in doubt, use Linux.

The network must have a DHCP server.

An Access point will be created if the connection fails.  
If in Access point mode, use the [---] to switch to the local network, this will only succeed if the network is available.

## Access point

An access point will be automatically created instead of a connection to a local network if:

* The local network is out of range
* The connection to the local network failed
* *~~The “[---]” button was pressed during powering on (hold long!)~~* (FUTURE UPDATE)
* The “[---]” button is pressed for 5 seconds (this will disconnect the connection to the local network and create an access point instead)

Access point details:

|  |  |
| --- | --- |
| Property | Value |
| Name: | Land Rover Defender |
| Password: | abovebeyond |
|  |  |

# Local music

Music can be uploaded to the headunit and stored on the internal drive.

### Windows

Connect to “HEADUNIT” via the Windows Network, using the credentials:

|  |  |
| --- | --- |
| User name | root 🡨 change this |
| Password | abovebeyond |

The following folders are available:

|  |  |
| --- | --- |
| Folder | Description |
| music | Upload local music here |
| config | Configuration settings\* 🡪 See Chapter XXX |

After uploading music, press the bottom button on the remote control to update the local music database, or restart the headunit.

# Sound effects

Pressing a button on the remote control will return a feedback beep {beep 60}.  
Other sound effects are:

|  |  |
| --- | --- |
| Effect |  |
| Jingle | Start-up jingle |
| *Beep X* | *WiFi connected* |
| Beep X | USB drive available |
| {beep 60 70} | Updating local music database |
| Beep x2 | Shuffle OFF |
| Error beep | No music available to play |
| Error beep | An error occurred |
| Error beep (2x) | A serious error occurred |
|  |  |

# Filesystem

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Device | Mountpoint | Size | FS |
| P | /dev/mmcblk0p1 | /boot | 32M | FAT32 |
| P | /dev/mmcblk0p2 | / | 1G | EXT4 |
| P | /dev/mmcblk0p3 | /mnt/PIHU\_APP | 64M | EXT4 |
| E | /dev/mmcblk0p4 | *(extended partition)* | | |
| E | /dev/mmcblk0p5 | /mnt/PIHU\_CONFIG | 32M | FAT32 |
| E | /dev/mmcblk0p6 | /media/PIHU\_DATA | \* | FAT32 |

PIHU\_APP and PIHU\_CONFIG are mounted by S04fs.

# Development

## Aliases

Aliases are defined in /etc/init.d/profile.d/aliases.sh

|  |  |
| --- | --- |
| Alias | Function |
| update | Update (S91update) and CD into headunit directory. |
| rmsett | Remove .json configuration and log files |
| firstboot | Remove firstboot log, causing the next reboot to be treated as a ‘first boot’. |
| gohu | Goto HU directory |

## Boot

|  |  |
| --- | --- |
| Range | Purpose |
| 0x | System essentials 1 |
| 1x | System essentials 2 |
| 2x | Higher level essentials (D-Bus, PulseAudio) |
| 3x | QuickPlay, essentials |
| 4x | QuickPlay |
| 5x |  |
| 6x |  |
| 7x |  |
| 8x | Non-Critical |
| 9x | Non-Critical |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Script | Purpose | St. | Stp. | Rsrt | Source |
| S01logging | Starts SYSLOGD and KLOGD | X | X | X | Buildroot |
| S02firstboot | Prepares for first use, runs at first boot only. | X |  |  | Overlay |
| S03modules | Module auto-loading script | X |  |  | Overlay |
| S04fs | Check and mount filesystems | X |  |  | Overlay |
| S05gpio | Initializes GPIO and beeps | X |  |  | Overlay |
| S10udev | Userspace /dev | X | X |  |  |
| S12watchdog | Watchdog reset/reboot | X | X |  | Buildroot |
| S14urandom | Save/Restores random seed | X | X |  | Buildroot |
| S18network | Ifup/Ifdown for /etc/network/interfaces | X | X | X | Buildroot |
| S20dbus | D-Bus | X | X | X | Buildroot |
| S25pulseaudio | PulseAudio daemon | X | X | X | Overlay |
| S30zmqfwd | ZeroMQ Pub/Sub forwarder | X | X |  | App |
| S35volume | PulseAudio to ZMQ bridge | X | X |  | App |
| S40quickplay | Starts Quickplay init scripts\* |  |  |  |  |
| S50dropbear | SSH client |  |  |  | Buildroot |
| S91update | Updater |  |  |  |  |
| S95flask | Flask HTTP server | X | X |  | App |

Quickplay:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Script | Purpose | St. | Stp. | Rsrt | Source |
| S41bluetooth | Bluetooth |  |  |  |  |
| S40wlan-ap | WiFi accesspoint |  |  |  |  |
| S40wlan-wpa | WiFi wpa client |  |  |  |  |
| S52mpd | MPD | X | X | X | Buildroot |
| S53mpdevent | MPD event forwarder | X | X |  | App |
| S60udisks-glue | Automounter |  |  |  |  |
| S70source | Source Controller | X | X |  | App |
| S80headunit | Main Headunit Application | X | X |  | App |

Quick Play: SMB

|  |  |  |
| --- | --- | --- |
| # | Script | Notes |
| 1 | S40wlan-wpa |  |
| 2 | S91smb |  |
| 3 | S91smbmusic |  |
| 4 | S52mpd |  |
|  |  |  |
| 5 | S70headunit | Only if all steps above were successful |
|  |  |  |
|  | S60udisks-glue |  |
|  | S41bluetooth |  |
|  | S40wlan-ap |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Daemons

|  |  |  |
| --- | --- | --- |
| Daemon | Purpose | Started by |
| SYSLOGD | Logging | S01logging |
| KLOGD | Logging | S01logging |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |