

Fallguy *ULTRA DUAL*
UNIVERSAL 4-CHANNEL EMBEDDED MP3 MODULE
WITH SD-CARD SLOT
AND 2 SERIAL HIGH-SPEED-INTERFACES

STANDARD FIRMWARE V1.06

Firmware version 1.06
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General

The MP3 files are played from the main directory of the SD card.

The ULTRA DUAL module can be controlled by the following interfaces:

- Button inputs BUTTON_1 to BUTTON_8 – Direct connection for up to 8 buttons/relays/sensors
- Digital inputs GPIO_1 to GPIO_8 – 8 digital inputs
- Serial interface UART 1 with 115.200 bps and hardware handshake
- Serial interface UART 2 with 921.600 bps and hardware handshake for LAN (XPORT) or USB connections (FTDI-IC)

These interfaces can be either used separately or combined.

By using an optional configuration file *config.txt* the module could start with specific starting parameters and the different interfaces from above could be set.

Additional digital outputs are prepared to drive a LC-Display, 3 status LEDs, a RTC module (Real Time Clock) and a RF module. The LC-Display shows track information (ID3 tags), file names and status information.

SD card, MP3 files and configuration file

The SD card must be formatted with the file system FAT32.

The MP3 files **must** be within the main directory of the SD card and must **NOT** be named in a defined order.

The ULTRA DUAL module reads a maximum of **2x** 100 MP3 files into two internal lists and sorts them by their first two file name characters in alphanumerical order. The MP3 files can be accessed from this list using the button or digital inputs (00 – 99).

If the file names contain „2C“ at their third position, those files will be assigned to the second list. The MP3 files from the first list will be played through the first audio output (LINE_OUT_1L and LINE_OUT_1R), the MP3 files from the second list will be played through the second audio output (LINE_OUT_2L and LINE_OUT_2R).

The names of these MP3 files can contain additional information, only the first or four two characters are important, for example:

00ACDC-Thunderstruck.MP3 -> 1.MP3 file from the first list

01Die_Biene_Maja.MP3 -> 1.MP3 file from the first list

02_U2.MP3 -> 1.MP3 file from the first list

002C.MP3 -> 1.MP3 file from the second list

012C.MP3 -> 2.MP3 file from the second list

022C.MP3 -> 3.MP3 file from the second list

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Using the serial interfaces UART 1 and UART 2 the MP3 files can be accessed through their number of the internal list or their complete file name. File names up to 100 characters are possible.

The MP3 files are copied manually to the SD card **or** using the MP3 upload commands and the serial interfaces.

After start up the ULTRA DUAL module loads the configuration parameter from the EEPROM memory. Afterwards the configuration file *config.txt* in the main directory is searched and loaded. The configuration parameter from the EEPROM memory are overwritten. If there are no configuration parameter inside the EEPROM memory and if there is no *config.txt* in the main directory, the following standard values are loaded:

OV!0100	-	The volume level of both channels is set to 0dB
BA!08	-	The bass (200Hz) is set to 0dB
TR!08	-	The treble (3kHz) is set to 0dB
SH!00	-	The shuffle mode is deactivated
BU!01	-	The button inputs BUTTON_4 – BUTTON_8 are in DIRECT mode
RP!00	-	The repeat mode is deactivated
DU!01	-	The DUAL mode is set to parallel
IN!00	-	The interrupt function is deactivated
LO!00	-	The front buttons T1, T2, and T3 (BUTTON_1 – BUTTON_3) are activated
LC!0000	-	The LC-Display is deactivated
RS!00	-	The RS232 interface mode is activated
EC!00	-	The first serial interface (UART 1) sends answers (Echoes)
AD!00	-	No serial address is set (UART 1)
LI!00	-	The ID3 tags are not interpreted during playback
AS!00	-	The automatic playback is not activated
NW!00	-	The serial welcome message (UART 1) is activated
NH!00	-	The handshake (RTS/CTS hardware handshake, UART 1) is activated
BR!00	-	The baud rate of the serial interface (UART 1) is set to 115.200 bps
BO!0000	-	The 8 button inputs are configured for normally open buttons
NA!MODULE00	-	The name of the module is MODULE00
PO!00	-	The pause option of the button inputs BUTTON_1 and BUTTON_4 is activated
GP!00	-	The optional functions of the digital inputs GPIO_1 – GPIO_8 are deactivated
AM!01	-	The control of an external amplifier is set to Class A/B
AV!01	-	The automatic saving of the volume into the EEPROM memory is activated
VL!0100	-	The volume level of the left channel is set to 0dB
VR!0100	-	The volume level of the right channel is set to 0dB
SM!00	-	The serial master mode is deactivated
FF!00	-	The recording format is set to MP3
FQ!08	-	The MP3 recording quality is set to 128kbit/s (constant)
FM!00	-	The monitoring while recording is deactivated
FW!00	-	The WAV audio codec is set to IMA ADPCM
FS!03	-	The recording sample rate is set to 44,1kHz
FH!00	-	The channel selection while recording is set to Joint Stereo
FG!00	-	The recording input gain is set to Automatic

All settings in the file *config.txt* relate to the serial commands. Every command must be terminated like the serial commands with a 0Dh (CR character) and additionally with a 0Ah (LF character).

Button inputs

The button inputs BUTTON_1 – BUTTON_3 (Front button T1 / T2 / T3) have the following functions:

- BUTTON_1 – Starts the first MP3 file from the first internal list (00 – 99) or pauses (*PO!00*) the playback
- BUTTON_2 – Stops the playback
- BUTTON_3 – Selects the next MP3 file from the first internal list (00 – 99) during playback

The playback is started using the button input BUTTON_1. If the shuffle mode is activated (*SH!01*), an endless and random playback is started. If the shuffle mode is deactivated (*SH!00*), the playback is sequential till the last MP3 file from the first internal list (*RP!00*), sequential endless (*RP!01*), loops always the first file (*RP!02*) or it ends after the first file (*RP!03*).

Using the button input BUTTON_3 during playback the next MP3 file from the first internal list can be started. If the shuffle mode is activated (*SH!01*), a random MP3 file is selected.

The button inputs BUTTON_4 – BUTTON_8 can be configured for two different modes. Per default the DIRECT mode is activated, the STANDARD mode must be activated using the command *BU!00*.

STANDARD mode:

- BUTTON_4 – Starts the first MP3 file from the first internal list (00 – 99) or pauses (*PO!00*) the playback
- BUTTON_5 – Stops the playback
- BUTTON_6 – Selects the next MP3 file from the first internal list (00 – 99) during playback
- BUTTON_7 – Decrease the volume by 2dB
- BUTTON_8 – Increase the volume by 2dB

The playback is started using the button input BUTTON_4. If the shuffle mode is activated (*SH!01*), an endless and random playback is started. If the shuffle mode is deactivated (*SH!00*), the playback is sequential till the last MP3 file from the first internal list (*RP!00*), sequential endless (*RP!01*), loops always the first file (*RP!02*) or it ends after the first file (*RP!03*).

Using the button input BUTTON_6 during playback the next MP3 file from the first internal list can be started. If the shuffle mode is activated (*SH!01*), a random MP3 file is selected.

DIRECT mode (DUAL mode is set to separate mode, *DUI!00*):

- BUTTON_4 – Starts first MP3 file (00) from the first list
- BUTTON_5 – Starts first MP3 file (00) from the second list
- BUTTON_6 – Starts second MP3 file (01) from the first list
- BUTTON_7 – Starts second MP3 file (01) from the second list
- BUTTON_8 – Starts third MP3 file (02) from the first list

DIRECT mode (DUAL mode is set to parallel mode, *DUI!01*):

- BUTTON_4 – Starts first MP3 file (00) from the first AND simultaneously from the second list
- BUTTON_5 – Starts second MP3 file (01) from the first AND simultaneously from the second list
- BUTTON_6 – Starts third MP3 file (02) from the first AND simultaneously from the second list
- BUTTON_7 – Starts fourth MP3 file (03) from the first AND simultaneously from the second list
- BUTTON_8 – Starts fifth MP3 file (04) from the first AND simultaneously from the second list

In this mode up to 5 MP3 files from the internal list can be started using one button. The shuffle mode has no effect on the DIRECT mode. After playing one MP3 file, the playback stops (*RP!00* or *RP!01*) or the selected MP3 file is played again (*RP!02*). During the playback any other MP3 file can be started by pressing another button. Using the interrupt option (*IN!01*) the same file can also be started again. Using *IN!02* the playback cannot be interrupted by any button. If *IN!03* is set the button must be hold, otherwise the playback is stopped.

More settings (*SH! / RP! / IN! PO! / BU!*) are described in the ASCII protocol.

The button inputs must be pressed for at least 50ms to be a valid signal!

The button inputs can be configured for normally open buttons or normally closed buttons. Per default they are configured for normally open buttons (*BO!0000*).

GPIO mode

The different settings and functions of the GPIO in- and outputs correspond to those of the ULTRA 2 MP3 module and are described in the corresponding datasheet for the firmware of the ULTRA 2 MP3 module:

<http://www.loetronic.de/en/service/downloads/ultra2/>

Serial interfaces UART 1 and UART 2

The different settings and functions of the serial interfaces correspond to those of the ULTRA 2 MP3 module and are described in the corresponding datasheet for the firmware of the ULTRA 2 MP3 module:

<http://www.loetronic.de/en/service/downloads/ultra2/>