# DFR0534

1.0.2

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# Chapter 1

# DFR0534

An Arduino Uno/Nano library for a `DFR0534` audio module. The library works with SoftwareSerial and is very similar to `https://github.com/sleemanj/JQ8400_Serial`, but is no fork.

To create a DFR0534 object pass the existing SoftwareSerial object as parameter to the DFR0534 constructor, for example

```
#include <SoftwareSerial.h>
#include <DFR0534.h>

#define TX_PIN A0
#define RX_PIN A1
SoftwareSerial g_serial(RX_PIN, TX_PIN);
DFR0534 g_audio(g_serial);
...
```

Examples how to use the library

- examples/playFileByName/playFileByName.ino
- examples/playFileByNumber/playFileByNumber.ino
- examples/playCombined/playCombined.ino

## 1.1 License and copyright

## 1.2 Appendix

### 1.2.1 DFR0534 pinout

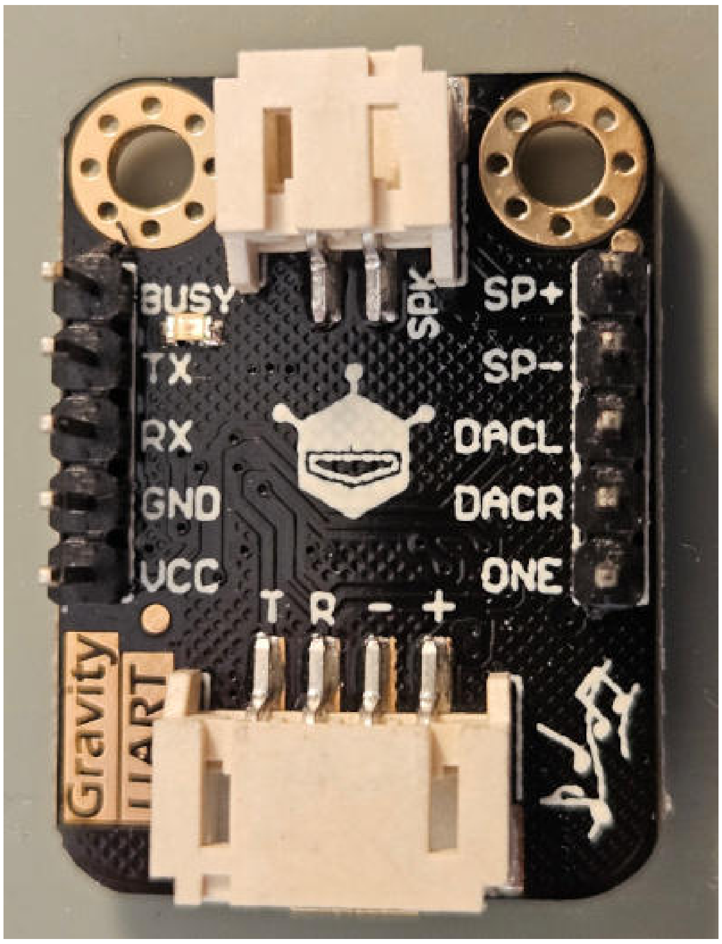


**Figure 1.1 DFR0534**

Minimal schematic to use this library

| Pin | Connected to |
|---|---|
| TX | Used SoftwareSerial RX |
| RX | Used SoftwareSerial TX∗ |
| GND | Ground |
| VCC | 3.3-5V |
| SP+ | Speaker + connector |
| SP- | Speaker - connector |

∗If your microcontroller runs at 5V use a 1k resistor between RX and SoftwareSerial TX.

# Chapter 2

# Class Index

## 2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

# Chapter 3

# File Index

## 3.1 File List

Here is a list of all documented files with brief descriptions:

# Chapter 4

# Class Documentation

## 4.1 DFR0534 Class Reference

Class for a DFR0534 audio module.

```
#include <DFR0534.h>
```

### Public Types

- enum DFR0534CHANNELS { CHANNELMP3 , CHANNELAUX , CHANNELMP3AUX , CHANNELUNKNOWN }
- enum DFR0534DRIVE {
  DRIVEUSB , DRIVESD , DRIVEFLASH , DRIVEUNKNOWN ,
  DRIVENO = 0xff }
- enum DFR0534LOOPMODE {
  LOOPBACKALL , SINGLEAUDIOLOOP , SINGLEAUDIOSTOP , PLAYRANDOM ,
  DIRECTORYLOOP , RANDOMINDIRECTORY , SEQUENTIALINDIRECTORY , SEQUENTIAL ,
  PLAYMODEUNKNOWN }
- enum DFR0534EQ {
  NORMAL , **POP** , **ROCK** , **JAZZ** ,
  **CLASSIC** , **EQUNKNOWN** }
- enum DFR0534STATUS { STOPPED , PLAYING , PAUSED , STATUSUNKNOWN }

### Public Member Functions

- DFR0534 (Stream &stream)

  *Constructor of a the DFR0534 audio module.*
- void decreaseVolume ()

  *Decrease volume by one step.*
- void fastBackwardDuration (word seconds)

  *Fast backward.*
- void fastForwardDuration (word seconds)

  *Fast forward in seconds.*
- byte getDrive ()

  *Get current drive.*
- byte getDrivesStates ()

*Checks which drives are ready/online.*
- bool getDuration (byte &hour, byte &minute, byte &second)

  *Get duration/length of current file.*
- bool getFileName (char ∗name)

  *Get name for current file.*
- word getFileNumber ()

  *Get file number of current file.*
- int getFirstFileNumberInCurrentDirectory ()

  *Get number of first file in current directory.*
- bool getRuntime (byte &hour, byte &minute, byte &second)

  *Get elapsed runtime/duration of the current file.*
- byte getStatus ()

  *Get module status.*
- int getTotalFiles ()

  *Get total number of supported audio files on current drive.*
- int getTotalFilesInCurrentDirectory ()

  *Count all audio files for the current directory.*
- void increaseVolume ()

  *Increase volume by one step.*
- void insertFileByNumber (word track, byte drive=DRIVEFLASH)

  *Pause current file and play another file by number.*
- void pause ()

  *Pause the current file.*
- void play ()

  *Play the current selected file.*
- void playCombined (char ∗list)

  *Combined/concatenated play of files.*
- void playFileByName (char ∗path, byte drive=DRIVEFLASH)

  *Play audio file by file name/path.*
- void playFileByNumber (word track)

  *Play audio file by number.*
- void playLastInDirectory ()

  *Play last file in directory (in "file copy order")*
- void playNext ()

  *Play next file (in "file copy order")*
- void playNextDirectory ()

  *Play first file in next directory (in "file copy order")*
- void playPrevious ()

  *Play previous file (in "file copy order")*
- void prepareFileByNumber (word track)

  *Select file by number, but not start playing.*
- void repeatPart (byte startMinute, byte startSecond, byte stopMinute, byte stopSecond)

  *Repeat part of the current file.*
- void setChannel (byte channel)

  *Set output for DAC to channel MP3, AUX or both.*
- void setDirectory (char ∗path, byte drive=DRIVEFLASH)

  *Should set directory, but does not work for me.*
- void setDrive (byte drive)

  *Switch to drive.*
- void setEqualizer (byte mode)

  *Set equalizer to NORMAL, POP, ROCK, JAZZ or CLASSIC.*

- void setLoopMode (byte mode)

  *Set loop mode.*
- void setRepeatLoops (word loops)

  *Set repeat loops.*
- void setVolume (byte volume)

  *Set volume.*
- void stop ()

  *Stop the current file.*
- void stopInsertedFile ()

  *Stop inserted file.*
- void startSendingRuntime ()

  *Start sending elapsed runtime every 1 second.*
- void stopCombined ()

  *Stop combined play (playlist)*
- void stopRepeatPart ()

  *Stop repeating part of the current file.*
- void stopSendingRuntime ()

  *Stop sending runtime.*

### 4.1.1 Detailed Description

Class for a DFR0534 audio module.

Definition at line 32 of file DFR0534.h.

### 4.1.2 Member Enumeration Documentation

#### 4.1.2.1 DFR0534CHANNELS

```
enum DFR0534::DFR0534CHANNELS
```

Supported input channels

**Enumerator**

| | |
|---|---|
| CHANNELMP3 | Use MP3 input channel for DAC output (=default after device startup) |
| CHANNELAUX | Use AUX input (P26 and P27) for DAC output |
| CHANNELMP3AUX | Combines MP3 and AUX audio from P26 and P27 for DAC output |
| CHANNELUNKNOWN | Unknown |

Definition at line 35 of file DFR0534.h.

```
    {
      CHANNELMP3,
      CHANNELAUX,
      CHANNELMP3AUX,
      CHANNELUNKNOWN
    };
```

#### 4.1.2.2 DFR0534DRIVE

```
enum DFR0534::DFR0534DRIVE
```

Supported drives

**Enumerator**

| | |
|---|---|
| DRIVEUSB | USB drive |
| DRIVESD | SD card |
| DRIVEFLASH | Flash memory chip |
| DRIVEUNKNOWN | Unknown |
| DRIVENO | No drive |

Definition at line 43 of file DFR0534.h.

```
    {
      DRIVEUSB,
      DRIVESD,
      DRIVEFLASH,
      DRIVEUNKNOWN,
      DRIVENO = 0xff
    };
```

#### 4.1.2.3 DFR0534EQ

`enum DFR0534::DFR0534EQ`

EQ modes

**Enumerator**

| | |
|---|---|
| NORMAL | (=default after device startup) |

Definition at line 65 of file DFR0534.h.

```
    {
      NORMAL,
      POP,
      ROCK,
      JAZZ ,
      CLASSIC,
      EQUNKNOWN
    };
```

#### 4.1.2.4 DFR0534LOOPMODE

`enum DFR0534::DFR0534LOOPMODE`

Loop modes

**Enumerator**

| | |
|---|---|
| LOOPBACKALL | Every file on drive in "file copy order" and loop afterwards |
| SINGLEAUDIOLOOP | Repeat current file |
| SINGLEAUDIOSTOP | Stops after single file (=default after device startup) |
| PLAYRANDOM | Random play order |
| DIRECTORYLOOP | Every file in current director in "file copy order" and loop afterwards |
| RANDOMINDIRECTORY | Random play order in current directory |
| SEQUENTIALINDIRECTORY | Every file in current directory in "file copy order" without loop |
| SEQUENTIAL | Every file on drive in "file copy order" without loop |
| PLAYMODEUNKNOWN | Unknown |

Definition at line 52 of file DFR0534.h.

```
    {
      LOOPBACKALL,
      SINGLEAUDIOLOOP,
      SINGLEAUDIOSTOP,
      PLAYRANDOM,
      DIRECTORYLOOP,
      RANDOMINDIRECTORY,
      SEQUENTIALINDIRECTORY,
      SEQUENTIAL,
      PLAYMODEUNKNOWN
    };
```

#### 4.1.2.5 DFR0534STATUS

`enum DFR0534::DFR0534STATUS`

Modul states

**Enumerator**

| | |
|---|---|
| STOPPED | Audio module is idle |
| PLAYING | Audio module is playing a file |
| PAUSED | Audio module is paused |
| STATUSUNKNOWN | Unkown |

Definition at line 75 of file DFR0534.h.

```
    {
      STOPPED,
      PLAYING,
      PAUSED,
      STATUSUNKNOWN
    };
```

## 4.1.3 Constructor & Destructor Documentation

#### 4.1.3.1 DFR0534()

```
DFR0534::DFR0534 (
             Stream & stream )  [inline]
```

Constructor of a the DFR0534 audio module.

**Parameters**

| | | |
|---|---|---|
| in | *stream* | Serial connection object, like SoftwareSerial |

Definition at line 87 of file DFR0534.h.

```
    {
      m_ptrStream = &stream;
    }
```

## 4.1.4 Member Function Documentation

#### 4.1.4.1 decreaseVolume()

`void DFR0534::decreaseVolume ( )`

Decrease volume by one step.

Definition at line 747 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x15);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.2 fastBackwardDuration()

```
void DFR0534::fastBackwardDuration (
             word seconds )
```

Fast backward.

Fast backward in seconds

**Parameters**

| | | |
|---|---|---|
| in | *seconds* | Seconds to go backward |

Definition at line 1024 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x22);
  sendDataByte(0x02);
  sendDataByte((seconds » 8) & 0xff);
  sendDataByte(seconds & 0xff);
  sendCheckSum();
}
```

### 4.1.4.3 fastForwardDuration()

```
void DFR0534::fastForwardDuration (
             word seconds )
```

Fast forward in seconds.

**Parameters**

| | | |
|---|---|---|
| in | *seconds* | Seconds to go forward |

Definition at line 1041 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x23);
  sendDataByte(0x02);
  sendDataByte((seconds » 8) & 0xff);
  sendDataByte(seconds & 0xff);
  sendCheckSum();
}
```

### 4.1.4.4 getDrive()

```
byte DFR0534::getDrive ( )
```

Get current drive.

**Return values**

| | |
|---|---|
| *DFR0534::DRIVEUSB* | USB drive |
| *DFR0534::DRIVESD* | SD card |
| *DFR0534::DRIVEFLASH* | Flash memory chip |
| *DFR0534::DRIVENO* | No drive found |
| *DFR0534::DRIVEUNKNOWN* | Error (for example request timeout) |

Definition at line 344 of file DFR0534.cpp.

```
{
  #define COMMAND 0x0A
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED DRIVEUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

### 4.1.4.5 getDrivesStates()

`byte DFR0534::getDrivesStates ( )`

Checks which drives are ready/online.

Returned value is a bit pattern that shows which drives are ready/online (1=online,0=offline):

- Bit 0 = DFR0534::DRIVEUSB
- Bit 1 = DFR0534::DRIVESD
- Bit 2 = DFR0534::DRIVEFLASH

**Returns**

Bit pattern for drives

**Return values**

| | |
|---|---|
| *DFR0534::DRIVEUNKNOWN* | Error (for example request timeout) |

Definition at line 277 of file DFR0534.cpp.

```
{
  #define COMMAND 0x09
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED DRIVEUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

#### 4.1.4.6 getDuration()

```
bool DFR0534::getDuration (
              byte & hour,
              byte & minute,
              byte & second )
```

Get duration/length of current file.

Get duration/length of current file in hours:minutes:seconds

**Parameters**

| | | |
|---|---|---|
| out | *hour* | Hours |
| out | *minute* | Minutes |
| out | *second* | Seconds |

**Return values**

| | |
|---|---|
| *true* | Request was successful |
| *false* | Request failed |

Definition at line 1064 of file DFR0534.cpp.

```
{
  #define COMMAND 0x24
  #define RECEIVEFAILED false
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
  m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 3) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
```

```
        hour=data;
        break;
      case 1:
        minute=data;
        break;
      case 2:
        second=data;
        break;
    }
  }
  if (firstByte == STARTINGCODE) {
    if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
    i++;
  }
  if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
} while (i<length+RECEIVEHEADERLENGTH+2);

return (data == sum); // Does checksum matches?
}
```

### 4.1.4.7 getFileName()

```
bool DFR0534::getFileName (
            char * name )
```

Get name for current file.

File name is in 8+3 format in upper case, with spaces without the dot "." between name and extension, e.g. "TEST WAV" for the file test.wav

**Parameters**

| | | |
|---|---|---|
| out | *name* | Filename. You have to allocate at least 12 chars memory for this variable. |

Definition at line 912 of file DFR0534.cpp.

```
{
  #define COMMAND 0x1E
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED false
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen
  if (name == NULL) return false;
  name[0] = '\0';

  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
  m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();
    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) length = data; // Length of receiving string
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      if ((i-RECEIVEHEADERLENGTH) < 12) { // I expect no longer file names than 8+3 chars plus '\0'
        name[i-RECEIVEHEADERLENGTH-1] = data;
        name[i-RECEIVEHEADERLENGTH] = '\0';
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);
  return (data == sum); // Does checksum matches?
}
```

#### 4.1.4.8 getFileNumber()

```
word DFR0534::getFileNumber ( )
```

Get file number of current file.

File number is in "file copy order". First audio file copied to the drive get number 1...

**Returns**

File number

**Return values**

| | |
|---|---|
| *0* | Error (for example request timeout) |

Definition at line 426 of file DFR0534.cpp.

```
{
  #define COMMAND 0x0D
  #define RECEIVEFAILED 0
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

### 4.1.4.9 getFirstFileNumberInCurrentDirectory()

`int DFR0534::getFirstFileNumberInCurrentDirectory ( )`

Get number of first file in current directory.

**Returns**

File number

**Return values**

| | |
|---|---|
| *-1* | Error (for example request timeout) |

Definition at line 594 of file DFR0534.cpp.

```
{
  #define COMMAND 0x11
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

#### 4.1.4.10 getRuntime()

```
bool DFR0534::getRuntime (
            byte & hour,
            byte & minute,
            byte & second )
```

Get elapsed runtime/duration of the current file.

Runtime is in hours:minutes:seconds. You have to call startSendingRuntime() before runtimes can be received.

**Parameters**

| | | |
|---|---|---|
| out | *hour* | Hours |
| out | *minute* | Minutes |
| out | *second* | Seconds |

**Return values**

| | |
|---|---|
| *true* | Request was successful |
| *false* | Request failed |

Definition at line 1157 of file DFR0534.cpp.

```
{
  #define COMMAND 0x25
  #define RECEIVEFAILED false
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 3) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          hour=data;
          break;
        case 1:
          minute=data;
          break;
        case 2:
          second=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  return (data == sum); // Does checksum matches?
}
```

#### 4.1.4.11 getStatus()

```
byte DFR0534::getStatus ( )
```

Get module status.

**Return values**

| | |
|---|---|
| *DFR0534::STOPPED* | Audio module is idle |
| *DFR0534::PLAYING* | Audio module is playing a file |
| *DFR0534::PAUSED* | Audio module is paused |
| *DFR0534::STATUSUNKNOWN* | Error (for example request timeout) |

Definition at line 53 of file DFR0534.cpp.

```
{
  #define COMMAND 0x01
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED STATUSUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);;
  sendDataByte(0x00);;
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

### 4.1.4.12 getTotalFiles()

`int DFR0534::getTotalFiles ( )`

Get total number of supported audio files on current drive.

**Returns**

Number of files

**Return values**

| | |
|---|---|
| *-1* | Error (for example request timeout) |

Definition at line 498 of file DFR0534.cpp.

```
{
  #define COMMAND 0x0C
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

#### 4.1.4.13 getTotalFilesInCurrentDirectory()

`int DFR0534::getTotalFilesInCurrentDirectory ( )`

Count all audio files for the current directory.

**Returns**

File count

**Return values**

| | |
|---|---|
| *-1* | Error (for example request timeout) |

Definition at line 666 of file DFR0534.cpp.

```
{
  #define COMMAND 0x12
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}
```

#### 4.1.4.14 increaseVolume()

```
void DFR0534::increaseVolume ( )
```

Increase volume by one step.

Definition at line 735 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x14);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.15 insertFileByNumber()

```
void DFR0534::insertFileByNumber (
             word track,
             byte drive = DRIVEFLASH )
```

Pause current file and play another file by number.

File number order is "file copy order". Continue original file when this file stops

**Parameters**

| | | |
|---|---|---|
| in | *track* | File number of the audio file |
| in | *drive* | Drive, where file is stored: Drive DFR0534::DRIVEUSB, DFR0534::DRIVESD or DFR0534::DRIVEFLASH (=default) |

Definition at line 764 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x16);
  sendDataByte(0x03);
  sendDataByte(drive);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}
```

#### 4.1.4.16 pause()

```
void DFR0534::pause ( )
```

Pause the current file.

Definition at line 180 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x03);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.17 play()

```
void DFR0534::play ( )
```

Play the current selected file.

Definition at line 168 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x02);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.18 playCombined()

```
void DFR0534::playCombined (
            char * list )
```

Combined/concatenated play of files.

Combined is like a playlist, for example playCombined("0103") for the two files 01 and 03. The Filenames must be two chars long and the files must be in a directory called /ZH Combined playback ignores loop mode and stops after last file.

**Parameters**

| | | |
|---|---|---|
| in | *list* | Concatenated list of all files to play |

Definition at line 857 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (list == NULL) return;
  if ((strlen(list) % 2) != 0) return;

  sendStartingCode();
  sendDataByte(0x1B);
  sendDataByte(strlen(list));
  for (int i=0;i<strlen(list);i++) {
    sendDataByte(list[i]);
  }
  sendCheckSum();
}
```

### 4.1.4.19 playFileByName()

```
void DFR0534::playFileByName (
            char * path,
            byte drive = DRIVEFLASH )
```

Play audio file by file name/path.

The file name/path is the full path of the audio file to be played in format which looks like a special unix 8+3 format:

- Without the dot for the file extension
- All characters in upper case
- maximal 8 characters
- Every file and folder whose name length is shorter then 8 chars must be filled up to the 8 chars length by space chars
- must end with WAV or MP3
- Only WAV and MP3 files are supported
- Wildcards * (=multiple arbitrary characters) and ? (=one single arbitrary character) are allowed and can be used to reduce the filling space chars

Valid examples:

- "/01 WAV" for file 01.wav

- "/99-AFR∼1MP3" for a file /99-Africa.mp3
- "/SUN∗MP3" for first file matching /sun∗.mp3, for example '/sun.mp3' (in this order for example: sun0.mp3 sun.mp3 sun1.mp3)
- "/99-AFR∗MP3" for first file matching /99-Afr∗.mp3
- "/10∗" for first audio file matching /10∗.∗
- "/10 /20 WAV" for the file /10/20.wav

**Parameters**

| | | |
|---|---|---|
| in | *path* | Full path of the audio file |
| in | *drive* | Drive, where file is stored: Drive DFR0534::DRIVEUSB, DFR0534::DRIVESD or DFR0534::DRIVEFLASH (=default) |

Definition at line 251 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (path == NULL) return;
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x08);
  sendDataByte(strlen(path)+1);
  sendDataByte(drive);
  for (int i=0;i<strlen(path);i++) {
    sendDataByte(path[i]);
  }
  sendCheckSum();
}
```

### 4.1.4.20 playFileByNumber()

```
void DFR0534::playFileByNumber (
            word track )
```

Play audio file by number.

File number order is "file copy order": First audio file copied to the drive gets number 1, second audio file copied gets number 2... )

**Parameters**

| | | |
|---|---|---|
| in | *track* | File number |

Definition at line 135 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (track <=0) return;
  sendStartingCode();
  sendDataByte(0x07);
  sendDataByte(0x02);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}
```

### 4.1.4.21 playLastInDirectory()

```
void DFR0534::playLastInDirectory ( )
```

Play last file in directory (in "file copy order")

Definition at line 567 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x0E);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.22 playNext()

`void DFR0534::playNext ( )`

Play next file (in "file copy order")

Definition at line 216 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x06);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.23 playNextDirectory()

`void DFR0534::playNextDirectory ( )`

Play first file in next directory (in "file copy order")

Definition at line 579 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x0F);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.24 playPrevious()

`void DFR0534::playPrevious ( )`

Play previous file (in "file copy order")

Definition at line 204 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x05);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.25 prepareFileByNumber()

```
void DFR0534::prepareFileByNumber (
               word track )
```

Select file by number, but not start playing.

**Parameters**

| | | |
|---|---|---|
| in | *track* | Number for file |

Definition at line 971 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x1F);
  sendDataByte(0x02);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}
```

#### 4.1.4.26 repeatPart()

```
void DFR0534::repeatPart (
            byte startMinute,
            byte startSecond,
            byte stopMinute,
            byte stopSecond )
```

Repeat part of the current file.

Repeat between time start and stop position

**Parameters**

| | | |
|---|---|---|
| in | *startMinute* | Minute for start position |
| in | *startSecond* | Second for start position |
| in | *stopMinute* | Minute for stop position |
| in | *stopSecond* | Seconde for stop position |

Definition at line 992 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x20);
  sendDataByte(0x04);
  sendDataByte(startMinute);
  sendDataByte(startSecond);
  sendDataByte(stopMinute);
  sendDataByte(stopSecond);
  sendCheckSum();
}
```

#### 4.1.4.27 setChannel()

```
void DFR0534::setChannel (
            byte channel )
```

Set output for DAC to channel MP3, AUX or both.

I found not P26/P27 for AUX on my DFR0534 => Only DFR0534::CHANNELMP3 makes sense (and is already set by default) Perhaps this function works on other audio modules with the same chip.

**Parameters**

| | | |
|---|---|---|
| in | *channel* | Output channel: DFR0534::CHANNELMP3, DFR0534::CHANNELAUX or DFR0534::CHANNELMP3AUX |

Definition at line 892 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (channel >= CHANNELUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x1D);
  sendDataByte(0x01);
  sendDataByte(channel);
  sendCheckSum();
}
```

### 4.1.4.28 setDirectory()

```
void DFR0534::setDirectory (
            char * path,
            byte drive = DRIVEFLASH )
```

Should set directory, but does not work for me.

**Parameters**

| | | |
|---|---|---|
| in | *path* | Directory |
| in | *drive* | Drive, where directory is stored: Drive DFR0534::DRIVEUSB, DFR0534::DRIVESD or DFR0534::DRIVEFLASH (=default) |

Definition at line 797 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (path == NULL) return;
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x17);
  sendDataByte(strlen(path)+1);
  sendDataByte(drive);
  for (int i=0;i<strlen(path);i++) {
    sendDataByte(path[i]);
  }
  sendCheckSum();
}
```

### 4.1.4.29 setDrive()

```
void DFR0534::setDrive (
            byte drive )
```

Switch to drive.

**Parameters**

| | | |
|---|---|---|
| in | *drive* | Drive DFR0534::DRIVEUSB, DFR0534::DRIVESD or DFR0534::DRIVEFLASH |

Definition at line 407 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x0B);
  sendDataByte(0x01);
  sendDataByte(drive);
  sendCheckSum();
}
```

### 4.1.4.30 setEqualizer()

```
void DFR0534::setEqualizer (
            byte mode )
```

Set equalizer to NORMAL, POP, ROCK, JAZZ or CLASSIC.

**Parameters**

| | | |
|---|---|---|
| in | *mode* | EQ mode: DFR0534::NORMAL, DFR0534::POP, DFR0534::ROCK, DFR0534::JAZZ or DFR0534::CLASSIC |

Definition at line 116 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (mode >= EQUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x1A);
  sendDataByte(0x01);
  sendDataByte(mode);
  sendCheckSum();
}
```

### 4.1.4.31 setLoopMode()

```
void DFR0534::setLoopMode (
            byte mode )
```

Set loop mode.

**Parameters**

| | | |
|---|---|---|
| in | *mode* | Loop mode: DFR0534::LOOPBACKALL, DFR0534::SINGLEAUDIOLOOP, DFR0534::SINGLEAUDIOSTOP, DFR0534::PLAYRANDOM, DFR0534::DIRECTORYLOOP, DFR0534::RANDOMINDIRECTORY, DFR0534::SEQUENTIALINDIRECTORY or DFR0534::SEQUENTIAL |

Definition at line 817 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (mode >= PLAYMODEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x18);
  sendDataByte(0x01);
  sendDataByte(mode);
  sendCheckSum();
}
```

### 4.1.4.32 setRepeatLoops()

```
void DFR0534::setRepeatLoops (
              word loops )
```

Set repeat loops.

Only valid for loop modes DFR0534::LOOPBACKALL, DFR0534::SINGLEAUDIOLOOP or DFR0534::DIRECTORYLOOP

**Parameters**

| | | |
|---|---|---|
| in | *loops* | Number of loops |

Definition at line 835 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x19);
  sendDataByte(0x02);
  sendDataByte((loops » 8) & 0xff);
  sendDataByte(loops & 0xff);
  sendCheckSum();
}
```

### 4.1.4.33 setVolume()

```
void DFR0534::setVolume (
              byte volume )
```

Set volume.

Volumen levels 0-30 are allowed. Audio module starts always with level 20.

**Parameters**

| | | |
|---|---|---|
| in | *volume* | Volume level |

Definition at line 154 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (volume > 30) volume = 30;
  sendStartingCode();
  sendDataByte(0x13);
  sendDataByte(0x01);
  sendDataByte(volume);
  sendCheckSum();
}
```

### 4.1.4.34 startSendingRuntime()

```
void DFR0534::startSendingRuntime ( )
```

Start sending elapsed runtime every 1 second.

Definition at line 1135 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x25);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.35 stop()

```
void DFR0534::stop ( )
```

Stop the current file.

Definition at line 192 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x04);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.36 stopCombined()

```
void DFR0534::stopCombined ( )
```

Stop combined play (playlist)

Definition at line 875 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x1C);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.37 stopInsertedFile()

```
void DFR0534::stopInsertedFile ( )
```

Stop inserted file.

Continue original file

Definition at line 782 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x10);
  sendDataByte(0x00);
  sendCheckSum();
}
```

### 4.1.4.38 stopRepeatPart()

```
void DFR0534::stopRepeatPart ( )
```

Stop repeating part of the current file.

Definition at line 1008 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x21);
  sendDataByte(0x00);
  sendCheckSum();
}
```

#### 4.1.4.39 stopSendingRuntime()

```
void DFR0534::stopSendingRuntime ( )
```

Stop sending runtime.

Definition at line 1224 of file DFR0534.cpp.

```
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x26);
  sendDataByte(0x00);
  sendCheckSum();
}
```

The documentation for this class was generated from the following files:

- DFR0534.h
- DFR0534.cpp

# Chapter 5

# File Documentation

## 5.1 playCombined.ino

```
/*
 * Example for using the DFR0534 for playing combined audio files like a playlist
 */

#include <SoftwareSerial.h>
#include <DFR0534.h>

#define TX_PIN A0
#define RX_PIN A1
SoftwareSerial g_serial(RX_PIN, TX_PIN);
DFR0534 g_audio(g_serial);

void setup() {
  // Serial for console output
  Serial.begin(9600);
  // Software serial for communication to DFR0534 module
  g_serial.begin(9600);

  // Set volume
  g_audio.setVolume(18);

  /* The parameter string for the playCombined function is just
   * a concatenation of all files in the desired order without
   * path and without extension.
   * All files have to be in the folder /ZH and the each
   * file has to have a length (without extension) of two chars.
   *
   * You can get example files from
https://github.com/codingABI/DFR0534/tree/main/assets/exampleContent
   */

  /* Plays files the custom order, like a playlist and stops after the last file:
   * /ZH/05.wav
   * /ZH/04.wav
   * /ZH/03.wav
   * /ZH/02.wav
   * /ZH/01.wav
   * /ZH/0A.wav
   */
  g_audio.playCombined("05040302010A");
}

void loop() {
  static unsigned long lastDisplayMS = millis();
  char name[12];

  // Show information about current track every 500ms
  if (millis()-lastDisplayMS > 500) {
    Serial.print("number: ");
    word fileNumber = g_audio.getFileNumber();
    if (fileNumber > 0) Serial.print(fileNumber); else Serial.print("--");

    Serial.print(" name: ");
    if (g_audio.getFileName(name)) Serial.print(name);

    Serial.print(" status: ");
    switch (g_audio.getStatus()) {
      case DFR0534::STOPPED:
        Serial.println("Stopped");
        break;
      case DFR0534::PAUSED:
        Serial.println("Paused");
        break;
      case DFR0534::PLAYING:
        Serial.println("Playing");
        break;
      case DFR0534::STATUSUNKNOWN:
        Serial.println("Unknown");
        break;
    }
    lastDisplayMS = millis();
  }
}
```

## 5.2 playFileByName.ino

```
/*
 * Example for using the DFR0534 for playing audio files by file name
 */

#include <SoftwareSerial.h>
#include <DFR0534.h>

#define TX_PIN A0
#define RX_PIN A1
SoftwareSerial g_serial(RX_PIN, TX_PIN);
DFR0534 g_audio(g_serial);

void setup() {
  // Serial for console output
  Serial.begin(9600);
  // Software serial for communication to DFR0534 module
  g_serial.begin(9600);

  // Set volume
  g_audio.setVolume(18);

  /* The file name/path for the function playFileByName() is the
   * full path of the audio file to be played in format which looks like
   * a special unix 8+3 format:
   * - Without the dot for the file extension
   * - All characters in upper case
   * - maximal 8 characters
   * - Every file and folder whose name length is shorter then 8 chars
   *   must be filled up to the 8 chars length by space chars
   * - must end with WAV or MP3
   * - Only WAV and MP3 files are supported
   * - Wildcards * (=multiple arbitrary characters) and ? (=one single arbitrary character)
   *   are allowed and can be used to reduce the filling space chars
   *
   * Valid examples:
   * - "/01      WAV" for file '/01.wav'
   * - "/99-AFR~1MP3" for a file '/99-Africa.mp3'
   * - "/SUN*MP3" for first file matching /sun*.mp3, for example '/sun.mp3' (in this order for example: sun0.mp3 sun.mp3 sun1.mp3)
   * - "/99-AFR*MP3" for first file matching '/99-Afr*.mp3'
   * - "/10*" for first* audio file matching /10*.*
   * - "/10      /20      WAV" for the file /10/20.wav
   *
   * You can get example files from
   * https://github.com/codingABI/DFR0534/tree/main/assets/exampleContent
   */

  // Play the file "test.wav"
  g_audio.playFileByName("/TEST    WAV");
}

void loop() {
  static unsigned long lastDisplayMS = millis()-500;
  char name[12];

  // Show information about current track once per second
  if (millis()-lastDisplayMS > 1000) {
    Serial.print("number: ");
    word fileNumber = g_audio.getFileNumber();
    if (fileNumber > 0) Serial.print(fileNumber); else Serial.print("--");

    Serial.print(" name: ");
    if (g_audio.getFileName(name)) Serial.print(name);

    Serial.print(" status: ");
    switch (g_audio.getStatus()) {
      case DFR0534::STOPPED:
        Serial.println("Stopped");
        break;
      case DFR0534::PAUSED:
        Serial.println("Paused");
        break;
      case DFR0534::PLAYING:
        Serial.println("Playing");
        break;
      case DFR0534::STATUSUNKNOWN:
        Serial.println("Unknown");
        break;
    }
    lastDisplayMS = millis();
  }
}
```

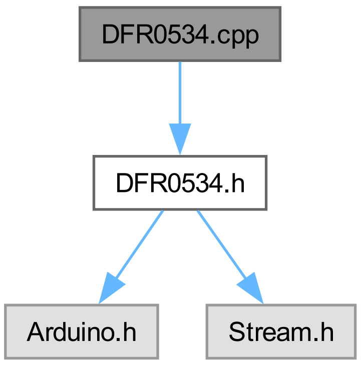
## 5.3 playFileByNumber.ino

```
/*
 * Example for using the DFR0534 for playing audio files by file number
 */

#include <SoftwareSerial.h>
#include <DFR0534.h>

#define TX_PIN A0
#define RX_PIN A1
SoftwareSerial g_serial(RX_PIN, TX_PIN);
DFR0534 g_audio(g_serial);

void setup() {
  // Serial for console output
  Serial.begin(9600);
  // Software serial for communication to DFR0534 module
  g_serial.begin(9600);

  // Set volume
  g_audio.setVolume(18);

  // Show some device infos
  Serial.print("Ready drives: ");
  byte drive = g_audio.getDrivesStates();
  if (((drive » DFR0534::DRIVEUSB) & 1) == 1) Serial.print("USB ");
  if (((drive » DFR0534::DRIVESD) & 1) == 1) Serial.print("SD ");
  if (((drive » DFR0534::DRIVEFLASH) & 1) == 1) Serial.print("FLASH ");
  Serial.println();

  Serial.print("Current playing drive: ");
  switch(g_audio.getDrive()) {
    case DFR0534::DRIVEUSB:
      Serial.println("USB");
      break;
    case DFR0534::DRIVESD:
      Serial.println("SD");
      break;
    case DFR0534::DRIVEFLASH:
      Serial.println("FLASH");
      break;
    case DFR0534::DRIVENO:
      Serial.println("No drive");
      break;
    default:
      Serial.println("Unknown");
      break;
  }

  Serial.print("Total files: ");
  Serial.println(g_audio.getTotalFiles());
  Serial.print("Total files in directory: ");
  Serial.println(g_audio.getTotalFilesInCurrentDirectory());

  Serial.print("First file: ");
  Serial.println(g_audio.getFirstFileNumberInCurrentDirectory());

  // Play the first audio file copied to the DFR0534
  // (Second file copied to the DFR0534 would be number 2...)
  g_audio.playFileByNumber(1);
}

void loop() {
  static unsigned long lastDisplayMS = millis()-500;
  char name[12];

  // Show information about current track once per second
  if (millis()-lastDisplayMS > 1000) {
    Serial.print("number: ");
    word fileNumber = g_audio.getFileNumber();
    if (fileNumber > 0) Serial.print(fileNumber); else Serial.print("--");

    Serial.print(" name: ");
    if (g_audio.getFileName(name)) Serial.print(name);

    Serial.print(" status: ");
    switch (g_audio.getStatus()) {
      case DFR0534::STOPPED:
        Serial.println("Stopped");
        break;
      case DFR0534::PAUSED:
        Serial.println("Paused");
        break;
      case DFR0534::PLAYING:
        Serial.println("Playing");
        break;
      case DFR0534::STATUSUNKNOWN:
        Serial.println("Unknown");
        break;
    }
    lastDisplayMS = millis();
  }
}
```

## 5.4 DFR0534.cpp File Reference

`#include "DFR0534.h"`

Include dependency graph for DFR0534.cpp:



### 5.4.1 Detailed Description

Class: DFR0534

Description: Class for controlling a DFR0534 audio module ( https://wiki.dfrobot.com/Voice_↩
Module_SKU__DFR0534) by SoftwareSerial

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Notes for DFR0534 audio module:

- Consumes about 20mA when idle (Vcc = 5V)
- Creates a short "click" noise, when Vcc is powered on
- Should be used with a 1k resistor on TX when your MCU runs on 5V, because the DFR0534 uses 3.3V logic (and 5V on TX causes clicks/noise)
- Can be controlled by a RX/TX serial connection (9600 baud) or one-wire protocol
- Can play WAV and MP3 audiofiles
- Can "insert" audiofiles while another audiofile is running. In this case to original audiofile is paused and will be resumed after the "inserted" audiofile
- Can play files in a playlist like mode called "combined" for files stored in a directory /ZH
- Can select the file to play by a file number∗ or file name∗∗ ∗File number is independent from file name. The first WAV or MP3 copied to the DFR0534 gets file number 1 and so on. To play a file by number use playFileByNumber() ∗∗File name is a little bit like a 8+3 file path and can be used with playFileByName(), but have special rules (see playFileByName() for details)
- Can send automatically the file runtime every second (when enabled)
- Has a NS8002 amplifier, JQ8400 Audio chip, W25Q64JVSIQ flash memory
- Has a Sleep mode 0x1B and this mode only works with one-wire protocol ( `https://github.↩ com/arduino12/mp3_player_module_wire`) and does not work for me without additional electric modifications (e.g. disconnecting speakers) => Switching off DFR0534 with a FET is a better solution

Home: `https://github.com/codingABI/DFR0534`

**Author**

codingABI `https://github.com/codingABI/`

**Copyright**

2-Clause BSD License

**Version**

1.0.2

Definition in file DFR0534.cpp.

## 5.5 DFR0534.cpp

Go to the documentation of this file.

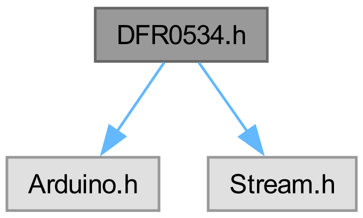
```
#include "DFR0534.h"

byte DFR0534::getStatus()
{
  #define COMMAND 0x01
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED STATUSUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);;
  sendDataByte(0x00);;
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

void DFR0534::setEqualizer(byte mode)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (mode >= EQUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x1A);
  sendDataByte(0x01);
  sendDataByte(mode);
  sendCheckSum();
}

void DFR0534::playFileByNumber(word track)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (track <=0) return;
  sendStartingCode();
  sendDataByte(0x07);
  sendDataByte(0x02);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}

void DFR0534::setVolume(byte volume)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (volume > 30) volume = 30;
  sendStartingCode();
  sendDataByte(0x13);
  sendDataByte(0x01);
  sendDataByte(volume);
  sendCheckSum();
}

void DFR0534::play()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x02);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::pause()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x03);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::stop()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x04);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::playPrevious()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x05);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::playNext()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x06);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::playFileByName(char *path, byte drive)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (path == NULL) return;
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x08);
  sendDataByte(strlen(path)+1);
  sendDataByte(drive);
  for (int i=0;i<strlen(path);i++) {
    sendDataByte(path[i]);
  }
  sendCheckSum();
}

byte DFR0534::getDrivesStates()
{
  #define COMMAND 0x09
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED DRIVEUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

byte DFR0534::getDrive()
{
  #define COMMAND 0x0A
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED DRIVEUNKNOWN
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff, result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 1) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      result = data;
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

```

```
void DFR0534::setDrive(byte drive)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x0B);
  sendDataByte(0x01);
  sendDataByte(drive);
  sendCheckSum();
}

word DFR0534::getFileNumber()
{
  #define COMMAND 0x0D
  #define RECEIVEFAILED 0
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

int DFR0534::getTotalFiles()
{
  #define COMMAND 0x0C
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

void DFR0534::playLastInDirectory()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x0E);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::playNextDirectory()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x0F);
  sendDataByte(0x00);
  sendCheckSum();
}

int DFR0534::getFirstFileNumberInCurrentDirectory()
{
  #define COMMAND 0x11
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

int DFR0534::getTotalFilesInCurrentDirectory()
{
  #define COMMAND 0x12
  #define RECEIVEFAILED -1
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) RECEIVEFAILED; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 2) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          result=data«8;
          break;
        case 1:
          result+=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  if (data != sum) return RECEIVEFAILED; // Does checksum matches?
  return result;
}

void DFR0534::increaseVolume()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x14);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::decreaseVolume()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x15);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::insertFileByNumber(word track, byte drive)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x16);
  sendDataByte(0x03);
  sendDataByte(drive);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}

void DFR0534::stopInsertedFile()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x10);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::setDirectory(char *path, byte drive)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (path == NULL) return;
  if (drive >= DRIVEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x17);
  sendDataByte(strlen(path)+1);
  sendDataByte(drive);
  for (int i=0;i<strlen(path);i++) {
    sendDataByte(path[i]);
  }
  sendCheckSum();
}

void DFR0534::setLoopMode(byte mode)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (mode >= PLAYMODEUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x18);
  sendDataByte(0x01);
  sendDataByte(mode);
  sendCheckSum();
}

void DFR0534::setRepeatLoops(word loops)
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x19);
  sendDataByte(0x02);
  sendDataByte((loops » 8) & 0xff);
  sendDataByte(loops & 0xff);
  sendCheckSum();
}

void DFR0534::playCombined(char* list)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (list == NULL) return;
  if ((strlen(list) % 2) != 0) return;

  sendStartingCode();
  sendDataByte(0x1B);
  sendDataByte(strlen(list));
  for (int i=0;i<strlen(list);i++) {
    sendDataByte(list[i]);
  }
  sendCheckSum();
}

void DFR0534::stopCombined()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x1C);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::setChannel(byte channel)
{
  if (m_ptrStream == NULL) return; // Should not happen
  if (channel >= CHANNELUNKNOWN) return;
  sendStartingCode();
  sendDataByte(0x1D);
  sendDataByte(0x01);
  sendDataByte(channel);
  sendCheckSum();
}

bool DFR0534::getFileName(char *name)
{
  #define COMMAND 0x1E
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEFAILED false
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen
  if (name == NULL) return false;
  name[0] = '\0';

  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady =
      m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();
    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) length = data; // Length of receiving string
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      if ((i-RECEIVEHEADERLENGTH) < 12) { // I expect no longer file names than 8+3 chars plus '\0'
        name[i-RECEIVEHEADERLENGTH-1] = data;
        name[i-RECEIVEHEADERLENGTH] = '\0';
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);
  return (data == sum); // Does checksum matches?
}

void DFR0534::prepareFileByNumber(word track)
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x1F);
  sendDataByte(0x02);
  sendDataByte((track » 8) & 0xff);
  sendDataByte(track & 0xff);
  sendCheckSum();
}

void DFR0534::repeatPart(byte startMinute, byte startSecond, byte stopMinute, byte stopSecond )
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x20);
  sendDataByte(0x04);
  sendDataByte(startMinute);
  sendDataByte(startSecond);
  sendDataByte(stopMinute);
  sendDataByte(stopSecond);
  sendCheckSum();
}

void DFR0534::stopRepeatPart()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x21);
  sendDataByte(0x00);
  sendCheckSum();
}

void DFR0534::fastBackwardDuration(word seconds)
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x22);
  sendDataByte(0x02);
  sendDataByte((seconds » 8) & 0xff);
  sendDataByte(seconds & 0xff);
  sendCheckSum();
}

void DFR0534::fastForwardDuration(word seconds)
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x23);
  sendDataByte(0x02);
  sendDataByte((seconds » 8) & 0xff);
  sendDataByte(seconds & 0xff);
  sendCheckSum();
}

bool DFR0534::getDuration(byte &hour, byte &minute, byte &second)
{
  #define COMMAND 0x24
  #define RECEIVEFAILED false
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen
  sendStartingCode();
  sendDataByte(COMMAND);
  sendDataByte(0x00);
  sendCheckSum();

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 3) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          hour=data;
          break;
        case 1:
          minute=data;
          break;
        case 2:
          second=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  return (data == sum); // Does checksum matches?
}

void DFR0534::startSendingRuntime()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x25);
  sendDataByte(0x00);
  sendCheckSum();
}

bool DFR0534::getRuntime(byte &hour, byte &minute, byte &second)
{
  #define COMMAND 0x25
  #define RECEIVEFAILED false
  #define RECEIVEBYTETIMEOUTMS 100
  #define RECEIVEGLOBALTIMEOUTMS 500
  #define RECEIVEHEADERLENGTH 2 // startingcode+command

  if (m_ptrStream == NULL) return false; // Should not happen

  // Receive
  int i=0;
  byte data, firstByte = 0, sum, length=0xff;
  word result = 0;
  unsigned long receiveStartMS = millis();
  do {
    byte dataReady = 0;
    unsigned long lastMS = millis();
    // Wait for response or timeout
    while ((millis()-lastMS < RECEIVEBYTETIMEOUTMS) && (dataReady==0)) dataReady = m_ptrStream->available();

    if (dataReady == 0) return RECEIVEFAILED; // Timeout
    data = m_ptrStream->read();

    if (i==0) { // Begin of transmission
      firstByte=data;
      sum = 0;
    }
    if ((i == 1) && (data != COMMAND)) {
      // Invalid signal => reset receive
      i=0;
      firstByte = 0;
    }
    if (i == RECEIVEHEADERLENGTH) {
      length = data; // Length of receiving data
      if (length != 3) {
        // Invalid length => reset receive
        i=0;
        firstByte = 0;
      }
    }
    if ((i > RECEIVEHEADERLENGTH) && (i-RECEIVEHEADERLENGTH-1<length)) {
      switch (i-RECEIVEHEADERLENGTH-1) {
        case 0:
          hour=data;
          break;
        case 1:
          minute=data;
          break;
        case 2:
          second=data;
          break;
      }
    }
    if (firstByte == STARTINGCODE) {
      if (i-RECEIVEHEADERLENGTH<=length) sum+=data; // Update checksum
      i++;
    }
    if (millis()-receiveStartMS > RECEIVEGLOBALTIMEOUTMS) return RECEIVEFAILED; // Timeout
  } while (i<length+RECEIVEHEADERLENGTH+2);

  return (data == sum); // Does checksum matches?
}

void DFR0534::stopSendingRuntime()
{
  if (m_ptrStream == NULL) return; // Should not happen
  sendStartingCode();
  sendDataByte(0x26);
  sendDataByte(0x00);
  sendCheckSum();
}
```

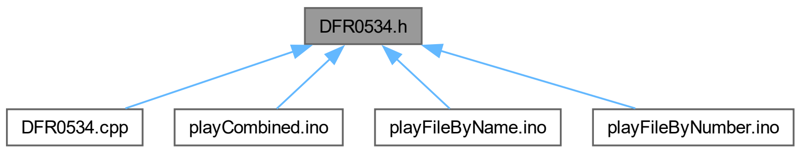
## 5.6 DFR0534.h File Reference

```
#include <Arduino.h>
#include <Stream.h>
```

Include dependency graph for DFR0534.h:



This graph shows which files directly or indirectly include this file:



### Classes

- class DFR0534

  *Class for a DFR0534 audio module.*

### Macros

- #define DFR0534_VERSION "1.0.2"

## 5.6.1 Detailed Description

Class: DFR0534

Description: Class for controlling a DFR0534 audio module ( `https://wiki.dfrobot.com/Voice_↩ Module_SKU__DFR0534`) by SoftwareSerial

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Home: `https://github.com/codingABI/DFR0534`

**Author**

codingABI `https://github.com/codingABI/`

**Copyright**

2-Clause BSD License

**Version**

1.0.2

Definition in file DFR0534.h.

## 5.6.2 Macro Definition Documentation

### 5.6.2.1 DFR0534_VERSION

```
#define DFR0534_VERSION "1.0.2"
```

Library version

Definition at line 22 of file DFR0534.h.

## 5.7 DFR0534.h

Go to the documentation of this file.

```
00001
00019 #pragma once
00020
00022 #define DFR0534_VERSION "1.0.2"
00023
00024 #include <Arduino.h>
00025 #include <Stream.h>
00026
00027 #define STARTINGCODE 0xAA
00028
00032 class DFR0534 {
00033   public:
00035     enum DFR0534CHANNELS
00036     {
00037       CHANNELMP3,
00038       CHANNELAUX,
00039       CHANNELMP3AUX,
00040       CHANNELUNKNOWN
00041     };
00043     enum DFR0534DRIVE
00044     {
00045       DRIVEUSB,
00046       DRIVESD,
00047       DRIVEFLASH,
00048       DRIVEUNKNOWN,
00049       DRIVENO = 0xff
00050     };
00052     enum DFR0534LOOPMODE
00053     {
00054       LOOPBACKALL,
00055       SINGLEAUDIOLOOP,
00056       SINGLEAUDIOSTOP,
00057       PLAYRANDOM,
00058       DIRECTORYLOOP,
00059       RANDOMINDIRECTORY,
00060       SEQUENTIALINDIRECTORY,
00061       SEQUENTIAL,
00062       PLAYMODEUNKNOWN
00063     };
00065     enum DFR0534EQ
00066     {
00067       NORMAL,
00068       POP,
00069       ROCK,
      JAZZ ,
      CLASSIC,
      EQUNKNOWN
    };
    enum DFR0534STATUS
    {
      STOPPED,
      PLAYING,
      PAUSED,
      STATUSUNKNOWN
    };
    DFR0534(Stream &stream)
    {
      m_ptrStream = &stream;
    }
    void decreaseVolume();
    void fastBackwardDuration(word seconds);
    void fastForwardDuration(word seconds);
    byte getDrive();
    byte getDrivesStates();
    bool getDuration(byte &hour, byte &minute, byte &second);
    bool getFileName(char *name);
    word getFileNumber();
    int getFirstFileNumberInCurrentDirectory();
    bool getRuntime(byte &hour, byte &minute, byte &second);
    byte getStatus();
    int getTotalFiles();
    int getTotalFilesInCurrentDirectory();
    void increaseVolume();
    void insertFileByNumber(word track, byte drive=DRIVEFLASH);
    void pause();
    void play();
    void playCombined(char* list);
    void playFileByName(char *path, byte drive=DRIVEFLASH);
    void playFileByNumber(word track);
    void playLastInDirectory();
    void playNext();
    void playNextDirectory();
    void playPrevious();
    void prepareFileByNumber(word track);
    void repeatPart(byte startMinute, byte startSecond, byte stopMinute, byte stopSecond );
    void setChannel(byte channel);
    void setDirectory(char *path, byte drive=DRIVEFLASH);
    void setDrive(byte drive);
    void setEqualizer(byte mode);
    void setLoopMode(byte mode);
    void setRepeatLoops(word loops);
    void setVolume(byte volume);
    void stop();
    void stopInsertedFile();
    void startSendingRuntime();
    void stopCombined();
    void stopRepeatPart();
    void stopSendingRuntime();
  private:
    void sendStartingCode() {
      m_checksum=STARTINGCODE;
      m_ptrStream->write((byte)STARTINGCODE);
    }
    void sendDataByte(byte data) {
      m_checksum +=data;
      m_ptrStream->write((byte)data);
    }
    void sendCheckSum() {
      m_ptrStream->write((byte)m_checksum);
    }
    byte m_checksum;
    Stream *m_ptrStream = NULL;
};
```

# Index