DTMediaRead API v7

User Guide

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1 Introduction

This manual is for DTMediaRead 7.x software development kit from Drastic Technologies, Ltd.

1.1 Conventions

This manual assumes the following:

That the user knows how to operate a mouse and keyboard and perform the basic functions of Microsoft Windows, macOS or Linux operating system.

That the user is familiar with the creative software in use.

That the user has access to technicians capable of placing the device on the network and setting up any SAN systems if necessary.

The name of a control or display present on the interface will be displayed in **bold** text.

Where a portion of the manual is referred to the name of section mentioned will be displayed in *italics*.

Certain images in this document may have been grayed out where it is useful or necessary to place indicator marks to show specific controls or displays above a darker background.

1.2 About DTMediaRead

The DTMediaRead interface is designed to give programmers a simple yet powerful means of access to all of the still, video, streaming and audio formats that Drastic's MediaReactor, videoQC, Net-X-Code Server, and Drastic DDR software is able to read. This document describes the various methods and properties exported by DTMediaRead.

There are two ways to access the DTMediaRead API:

- ActiveX via direct 32 bit, or 32/64 bit RPC *(deprecated)*
- Direct link to Windows 32, Windows 64, macOS 32/64 and Linux 64

Both methods share the same set of functions and properties, but in the case of direct link, all the names are preceded by 'dtmr' to avoid namespace collisions. For instance, the ActiveX function LastLtcFrame(), would be dtmrLastLtcFrame() in the direct link version.

1.3 System Requirements

1.3.1 Recommended Environment

DTMediaRead can be installed on various systems since real time performance is not an issue, but you will want a modern system capable of performing common computer functions.

Minimum Hardware Platform
Post 2000 multi core processor capable of running the host application.

Recommended Hardware Platform
Recommend hardware from the host application vendor. Multi cores and OpenCL, Cuda and shader GPUs will be used if available, but are not absolutely required.

Demo downloads of videoQC software are available for the user to confirm file read support. Faster and more powerful hardware will provide better performance. In some cases, specific hardware will be required in order to enable resource-intensive, advanced or optional features.

2 ActiveX Usage (Deprecated)

Deprecated The ActiveX will install with the required DLLs into “C:\Program Files\MediaReactor” or “C:\Program Files(x86)\MediaReactor”. The ActiveX component can be added to your project by inserting the MediaReactor ActiveX control via your IDE. For the functions below, remove the dtmrXXX start.

3 Direct Link Usage

All the functions in the direct link model have 'dtmr' prepended to the function name. This means the 'GetVideoFrame' becomes 'dtmrGetVideoFrame' to avoid naming conflicts. The direct link setup depends on the platform being used:

Windows 32
“C:\Program Files\MediaReactor”
Windows 64 – using 32 bit
“C:\Program Files(x86)\MediaReactor”
Windows 64 – using 64 bit
“C:\Program Files\MediaReactor”

macOS
/Libraries/Frameworks/DrasticDDR.framework

Linux 64
/usr/bin
/usr/lib

To use the direct link, you will need to include “dtmediaread.h” in your source file, and link to libdtmediaread.lib/.a/framework, depending on your platform.

Soft link is also an option for the direct link API. Each function prototype includes a function pointer typedef. It is the same as the prototype with a 'p_' added to the front. The SDK also ships with a C file dtmr_loader.cpp that has all the functions as point, and a load/unloader function for your convenience.

3.1 Methods and Properties

3.1.1.1 dtmrOpen

long dtmrOpen(BSTR bstrFileName, long dwFlags);

Open a new file, stream, or network source for reading. The BSTR is a UTF-8 string on all platforms (Windows will be automatically converted to Unicode). This operation will attempt to open as much media as is available automatically. Along with the specified file, any 'side bar' audio file will be added, as well as information files (XML, RDF, TCI, NDX) and time code tracks. In the case of a series of stills, only one still needs to be specified. DTMediaRead attempts to treat everything as a video stream, so if it can build a sequence out of stills, it will. Here are the basic file types that may be automatically added to your main video stream:

xxx.avi	- Main stream (could be .mov, .gen, .omf, etc.)
xxx.wav	- Will replace audio 1 & 2
xxx.A12.wav/aiff	- Also, will replace audio 1 & 2
xxx.AA.wav/aiff	- Also, will replace audio 1 & 2
xxx.A1.wav/aiff	- Mono wave pairs
xxx.A34.wav	- Add more audio channels
xxx.XML	- Metadata information (dt: space)
xxx.RDF	- Uniform description XML
xxx.TCI	- Time code information file
xxx.NDX	- Frame index file
xxx.TC	- Time code stream

3.1.1.2 dtmrOpenMulti

DTMRHANDLE dtmrOpenMulti(char * szFileNameVAA[17], unsigned long dwFlags);

Similar to dtmrOpen, but used to open a group of one (or no) video file, and up to 16 audio files. Pointers are const, and must be filled in order except for video, which may be null.

3.1.1.3 dtmrClose

long dtmrClose(DTMRHANDLE dtmr);

Close the currently open opaque handle to the stream or file.

3.1.1.4 dtmrSourceFileName

void dtmrSourceFileName(DTMRHANDLE dtmr, char * tszMAX_PATHString);

The final file name used for the source file returned as UTF-8.

3.1.1.5 dtmrSourceHeight

long dtmrSourceHeight(DTMRHANDLE dtmr, long *pVal);

Source video media's height.

3.1.1.6 dtmrSourceWidth

long dtmrSourceWidth(DTMRHANDLE dtmr, long *pVal);

Source video media's width.

3.1.1.7 dtmrSourceBitDepth

long dtmrSourceBitDepth(DTMRHANDLE dtmr, long *pVal);

Source video media's bit depth.

3.1.1.8 dtmrSourceFourCC

long dtmrSourceFourCC(DTMRHANDLE dtmr, long *pVal);

Source video media's four character code compression type.

3.1.1.9 dtmrSourceBitRate

long dtmrSourceBitRate(DTMRHANDLE dtmr, long *pVal);

Source video media's bit rate.

3.1.1.10 dtmrSourceFrameSize

long dtmrSourceFrameSize(DTMRHANDLE dtmr, long dwFrame, long *pVal);

Source video media's frame size for the requested or current frame. This will return the minimum size required for the frame, including padding, and should be used to pass into the read, unless a different padding is required.

3.1.1.11 dtmrSourceVideoChannels

long dtmrSourceVideoChannels(DTMRHANDLE dtmr, long *pVal);

Source video total channels as a bitwise array.

3.1.1.12 dtmrSourceAudioChannels

long dtmrSourceAudioChannels(DTMRHANDLE dtmr, long *pVal);

Source audio total channels as a bitwise array. Here are some examples of the dtmrSourceAudioChannels return:

Mono = 0x0001 (1)
Stereo = 0x0003 (2)
Quad = 0x000F (15)
Eight Channel = 0x00FF (255)

3.1.1.13 dtmrSourceAudioFrequency

long dtmrSourceAudioFrequency(DTMRHANDLE dtmr, long *pVal);

Source audio media frequency.

3.1.1.14 dtmrSourceAudioBitsPerSample

long dtmrSourceAudioBitsPerSample(DTMRHANDLE dtmr, long *pVal);

Source audio media bits per sample.

3.1.1.15 dtmrSourceAudioFourCC

long dtmrSourceAudioFourCC(DTMRHANDLE dtmr, long *pVal);

Source audio four character code. The most common would be 0/1 – little endian PCM and 'sowt' – big endian PCM.

3.1.1.16 dtmrDuration

long dtmrDuration(DTMRHANDLE dtmr, long *pVal);

Return the duration (total number of frames) of the media.

3.1.1.17 dtmrAudioDuration

long dtmrAudioDuration(DTMRHANDLE dtmr, long *pVal);

Return the audio duration (total number of samples) of the media.

3.1.1.18 dtmrSourceRate

long dtmrSourceRate(DTMRHANDLE dtmr, long *pVal);

Source video rate value (FPS = SourceRate / SourceScale)

3.1.1.19 dtmrSourceScale

long dtmrSourceScale(DTMRHANDLE dtmr, long *pVal);

Source video scale value (FPS = SourceRate / SourceScale)

NOTE: It is best to use standard Rate/Scale descriptors when setting up files. Here are the most common: 24/1, 24000/1001, 25/1, 30000/1001, 30/1, 50/1, 60000/1001, 60/1

3.1.1.20 dtmrSourceMetaDataDWORD

long dtmrSourceMetaDataDWORD(DTMRHANDLE dtmr, long dwMetaDataElement, long *pVal);

Return source metadata information that are numeric (DWORDs or longs). See the **Metadata Elements** section towards the end of the manual. Works for vvwiTimeCode to vvwiWhiteBalance inclusive, and vvwiVideoWidth to vvwiAudioBits inclusive.

3.1.1.21 dtmrSourceMetaDataSTR

BSTR * dtmrSourceMetaDataSTR(DTMRHANDLE dtmr, long dwMetaDataElement, char * szMAX_PATHString);

Return source metadata information that are string data. See the **Metadata Elements** section towards the end of the manual. Works for vvwiFileName to vvwiUMID inclusive.

3.1.1.22 dtmrGetReadTypes

long dtmrGetReadTypes(DTMRHANDLE dtmr, unsigned long dwIndex, unsigned long * pdwTypes);

Returns recommended and supported read types. Please see the **Output Video Formats** section for more information on the available types. One type is returned for each index specified until DTMR_READTYPE_INVALID is returned. The first return (where dwIndex = 0) will always be DTMR_READTYPE_RGBA as all video types can decode to our native RGBA. The next return depends on the source type. For RGB(A) sources, dwIndex = 1 will return DTMR_READTYPE_INVALID indicating that only RGBA decoding is supported. Below are a few sample returns for different file types. dtmrGetReadTypes() should always be checked unless you are using dtmrSetReadType(DTMR_READTYPE_RGBA).

Type	dwIndex	Return
DPX:	0	DTMR_READTYPE_RGB10Bit
	1	DTMR_READTYPE_RGBA
	2	DTMR_READTYPE_INVALID
v210Mov:	0	DTMR_READTYPE_V210
	1	DTMR_READTYPE_UYVY
	2	DTMR_READTYPE_RGBA
	3	DTMR_READTYPE_INVALID
AbacusYUV:	0	DTMR_READTYPE_UYVY
	1	DTMR_READTYPE_RGBA
	2	DTMR_READTYPE_INVALID
MPEG:	0	DTMR_READTYPE_UYVY
	1	DTMR_READTYPE_RGB
	2	DTMR_READTYPE_INVALID
DNG:	0	DTMR_READTYPE_RGBHALFFLOAT
	1	DTMR_READTYPE_RGB48
	2	DTMR_READTYPE_RGBA
	3	DTMR_READTYPE_INVALID

(Note: Formats such as MPEG, MJPEG and MPEG-4 will return DTMR_READTYPE_UYVY as a possible type because they are YCbCr based. The DTMR_READTYPE_UYVY frame will always return 4:2:2 YCbCr interleaved samples even if the source format is a lower sampling rate such as 4:2:0 or 4:1:1)

3.1.1.23 dtmrSetReadType

long dtmrSetReadType(DTMRHANDLE dtmr, long lReadType);

Set the read type for the video frames. Please see the **Output Video Formats** section for more

information on the available types. This function should only be set to one of the types available as specified in the GetReadTypes() return.

Set read type also allows the caller to set the audio bit size returned for 16 bit or 32 bit. All audio will be decoded and converted to the requested format. If this is not set, it will return 16 for 16 and 32 for any other bit depth.

3.1.1.24 dtmrGetFrame

3.1.1.25 dtmrSetFrame

long dtmrGetFrame(DTMRHANDLE dtmr, long *pVal);
long dtmrSetFrame(DTMRHANDLE dtmr, long newVal);

Get or set the current absolute (zero based) frame.

3.1.1.26 dtmrSetVideoChannel

long dtmrSetVideoChannel(DTMRHANDLE dtmr, long lVideoChannel);

Set the video channel to be read by get video frame.

3.1.1.27 dtmrGetVideoFrame

long dtmrGetVideoFrame(DTMRHANDLE dtmr, unsigned char * psvFrame, long * plSize);

GetVideoFrame returns a safe array containing one video frame. Passing NULL psvFrame will return size of the allocation for the frame, including any temporary space. Once allocated, the plSize should include the actual frame size. This can be retrieved from dtmrSourceFrameSize() for the smallest representation. Larger values can be passed in, and this will cause the read to pad out to those sizes, if possible. This is only available for RGB frame types. Please note, this function will only return frames in a few specified formats. These formats do not change regardless of the parameters returned by the SourceXXX methods. Please see the **Output Video Formats** section for more information on the available types.

3.1.1.28 dtmrAudioChannelPair

long dtmrSetAudioChannelPair(DTMRHANDLE dtmr, long lAudioChannelPair);

Set the audio channel pair to be read by get audio frame. Since the audio frame returns a stereo set, you can then select the two channels you want to read from the available bits. Basically:

0 - 0x0003

1 - 0x000C
2 - 0x0030
3 - 0x00C0

3.1.1.29 dtmrGetAudioFrame

long dtmrGetAudioFrame(DTMRHANDLE dtmr, unsigned char * psaFrame, long * plSize);

GetAudioFrame returns a safe array containing one video frame worth of audio data. Please note that the audio data is always returned as uncompressed, stereo PCM regardless of the values describing the source material's type returned by SourceXXX methods. Please see the **Output Audio Formats** section for more information.

3.1.1.30 dtmrGetCurExtendedData

3.1.1.31 dtmrGetCurCloseCaptions

long dtmrGetCurExtendedData(DTMRHANDLE dtmr, unsigned char *pvData, unsigned long * plFlags, long *plSize);

long dtmrGetCurClosedCaptions(DTMRHANDLE dtmr, unsigned char *pvCC, long *plCCSize, long * plCCFlags);

Get current extended data or closed captions (*NOTE: to set this for a particular frame, dtmrSetFrame and dtmrGetVideoFrame() or dtmrGetFileFrameInfo() must be called first*). Normally both these calls return some combination of closed captions. With certain files, like Navy or NASA embedded data, the extended data may be something other than closed captions. The first two bytes are always CC1/CC3. If the FRAMEINFO_DATA_F1_EIA608 flag is not set, their value is undefined, but will likely be 0x80 0x80. The second two bytes are always CC2/CC4 if the FRAMEINFO_DATA_F2_EIA608 flag is set, otherwise they are undefined but will likely be 0x80 0x80. Everything from byte 4 on are 708 or OP-47 SMPTE 436 packets of closed captions, active format description and V-Chip IDs. Each ANC packet will start with its DID SDID and size (for example for 708 captions 0x61 0x01 0x49). That size can be used to run through multiple ANC packets for a given frame. The CC, if it exists, will always be first, followed by any AFD, V-Chip or other custom packets.

```
//! Data is EIA-608B SD closed caption data field one (uses 2 bytes)
#define FRAMEINFO_DATA_F1_EIA608                0x00000001
//! Data is EIA-608B SD closed caption data field two (uses 2 bytes)
#define FRAMEINFO_DATA_F2_EIA608                0x00000002
//! Data is EIA-708 HD closed caption data (uses remaining bytes = minus the above)
#define FRAMEINFO_DATA_EIA708                   0x00001000
//! Data is OP-47 closed caption data
#define FRAMEINFO_DATA_OP47                     0x00002000
```

3.1.1.32 dtmrSourceAudioFourCC

long dtmrSourceAudioFourCC(DTMRHANDLE dtmr, long *pVal)

Get the audio four character code

3.1.1.33 dtmrSetVideoChannel

long dtmrSetVideoChannel(DTMRHANDLE dtmr, long lVideoChannel);

Select the video channel to read. This is a bitwise array.

3.1.1.34 dtmrAudioChannelPair

long dtmrSetAudioChannelPair(DTMRHANDLE dtmr, long lAudioChannelPair);

Select the audio pair to read. This is NOT bitwise. Each pair is a number starting at 0:

Pair	Bitwise Channel Set
0	0x0003
1	0x000F
2	0x0030
3	0x00F0

3.1.1.35 dtmrSetMode

long dtmrSetMode(DTMRHANDLE dtmr, void * pMediCmd);

Set mediacmd (advanced). This can be used to adjust advanced settings like GPU enable, number of threads in codec, number of threads in file, white balance, matrix enable, and other settings. Please contact Drastic for more information.

3.1.1.36 dtmrLastVitcFrame

long dtmrLastVitcFrame(DTMRHANDLE dtmr, long *pVal);

Return the last dtmrGetVideoFrame VITC (vertical blank) time code as a frame value. To set this for a particular frame, dtmrSetFrame and dtmrGetVideoFrame() or dtmrGetFileFrameInfo() must be called first.

3.1.1.37 dtmrLastVitcUb

long dtmrLastVitcUb(DTMRHANDLE dtmr, long *pVal);

Return the last GetVideoFrame VITC (vertical blank time code) user bits. To set this for a particular frame, dtmrSetFrame and dtmrGetVideoFrame() or dtmrGetFileFrameInfo() must be called first.

3.1.1.38 dtmrLastLtcFrame

long dtmrLastLtcFrame(DTMRHANDLE dtmr, long *pVal);

Return the last dtmrGetVideoFrame LTC (SMPTE) time code. To set this for a particular frame, dtmrSetFrame and dtmrGetVideoFrame() or dtmrGetFileFrameInfo() must be called first.

3.1.1.39 dtmrLastLtcUb

long dtmrLastLtcUb(DTMRHANDLE dtmr, long *pVal);

Return the last dtmrGetVideoFrame LTC (SMPTE time code) user bits. To set this for a particular frame, dtmrSetFrame and dtmrGetVideoFrame() or dtmrGetFileFrameInfo() must be called first.

3.1.1.40 dtmrGetFileFrameInfo

long dtmrGetFileFrameInfo(DTMRHANDLE dtmr, unsigned long dwFrame, unsigned long dwChannels, unsigned long dwFlags, size_t * pnPosition, size_t * pnSize, unsigned long * pdwFrameFlags, char * szFilePathAndName);

This call returns information about a frame (or group of samples) of audio or video. It will return the position, size, frame flags, and file name for a video sample or audio sample groups.

```
	//! Send this in if you just need the filename (faster than getting all the info)
#define DPOSSIZENAME_FILENAME_ONLY		0x40000000		// Same as DFRAME_SKIP_FRAME
	//! Flag for mediafile/avhal to get audio dframe
#define GetAudio	0x00000000
	//! Flag for mediafile/avhal to get video dframe
#define GetVideo	0x00000001

// dwFrameFlags
#define DPOSSIZENAME_VIDEO_FRAME		0x00000001
	//! Is this file type currently recording
#define DPOSSIZENAME_RECORDING			0x00000004
	//! This frame needs to be made black (default frame) in MediaFile
#define DPOSSIZENAME_PLEASE_BLACK		_PDFRAMEFLAGS_PLEASE_BLACK
	//		0x00000080
	//! This is a mono audio chunk
```

```
#define DPOSSIZENAME_MONO_AUDIO_FRAME        0x00000100
        //! This is a stereo audio chunk
#define DPOSSIZENAME_STEREO_AUDIO_FRAME      0x00000200
#define DPOSSIZENAME_QUAD_AUDIO_FRAME        0x00000400
#define DPOSSIZENAME_4_1_AUDIO_FRAME   0x00000800
#define DPOSSIZENAME_5_1_AUDIO_FRAME   0x00001000
#define DPOSSIZENAME_7_1_AUDIO_FRAME   0x00002000
#define DPOSSIZENAME_9_1_AUDIO_FRAME   0x00004000
#define DPOSSIZENAME_AUDIO_MASK
        (DPOSSIZENAME_MONO_AUDIO_FRAME|DPOSSIZENAME_STEREO_AUDIO_FRAME|
DPOSSIZENAME_STEREO_AUDIO_FRAME|DPOSSIZENAME_QUAD_AUDIO_FRAME|
DPOSSIZENAME_4_1_AUDIO_FRAME|DPOSSIZENAME_5_1_AUDIO_FRAME|
DPOSSIZENAME_7_1_AUDIO_FRAME|DPOSSIZENAME_9_1_AUDIO_FRAME)
#define DPOSSIZENAME_FRAME_MASK              0x0000FFFF
        //! This frame contains audio data see DFRAME::dwType
#define DFRAME_TYPE_AUDIO            0x00010000
        //! 16 bit audio
#define DPOSSIZENAME_AUD_16_16_BIT           0x00100000
        //! 20 bit audio in 24
#define DPOSSIZENAME_AUD_20_24_BIT           0x00200000
        //! 24 bit audio in 24
#define DPOSSIZENAME_AUD_24_24_BIT           0x00400000
        //! 24/32 bit audio in 32
#define DPOSSIZENAME_AUD_24_32_BIT           0x00800000
        //! 32/32 bit audio in 32
#define DPOSSIZENAME_AUD_32_32_BIT           0x01000000
        //! Audio is compressed
#define DPOSSIZENAME_AUD_COMPRESSED          0x02000000
        //! Audio is big endian, else little endian
#define DPOSSIZENAME_AUD_BIGENDIAN_BIT 0x00080000
        //! Just for completeness
#define DPOSSIZENAME_AUD_LITTLEENDIAN_BIT    0x00000000
        //! This frame is independent of other frames for decode see DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME       0x10000000
        //! This frame is independent of other frames for decode (an MPEG I Frame) see
DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME_I     0x10000000
        //! This frame requires previous keyframe(s) (for MPEG a P Frame) see DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME_P     0x80000000
        //! This frame requires more than one frame to decode (for MPEG a B Frame) see
DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME_B     0x20000000
        //! This frame should be skipped (decoded, but not displayed) - Used to reach seek frame on a
```

non key frame from key frame see DFRAME::dwType
#define DFRAME_SKIP_FRAME 0x40000000

3.1.1.41 dtmrGetCaptureDiscontinuities

long dtmrGetCaptureDiscontinuities(DTMRHANDLE dtmr, unsigned char ** pszDiscontinuities);

Return the list, or part of the list, of discontinuities that have occurred while capturing the file. The function may need to be called more than once, for long lists of discontinuities. The format is XML, with each individual <Discontinuity ...> having a single <DISCONTINUITIES> </DISCONTINUITIES> key pair. The first call will return nothing, if there are no discontinuities. If there are, the first call will start with <DISCONTINUITIES> followed by lines of <Discontinuity .. >. For small numbers the entire list will be returned on the first call with the ending </DISCONTINUITIES>. For larger lists, subsequent calls will return the next set of discontinuity lines, until all are returned along with the closing </DISCONTINUITIES> tag. In the case that the file you're checking is still writing you can treat it the same as larger lists, just keep calling dtmrGetCaptureDiscontinuities and you'll get the next piece if available.

If you want force a reread just free the pointer with dtmrFreeCaptureDiscontinuities, and the next call to dtmrGetCaptureDiscontinuities will start from the beginning.

Below is sample list:

<DISCONTINUITIES>
<Discontinuity type="video" time="10:25:24 Wednesday, July 27, 2016" frame="286" timecode="2046723" timecodetype="D">18:58:12;28</Discontinuity>
<Discontinuity type="audio" time="10:25:24 Wednesday, July 27, 2016" sample="13728000" timecode="2046723" timecodetype="D">18:58:12;29</Discontinuity>
<Discontinuity type="meta tc" time="10:25:24 Wednesday, July 27, 2016" frame="286" timecode="2046723" timecodetype="D">18:58:12;29</Discontinuity>
<Discontinuity type="timecode" time="10:25:25 Wednesday, July 27, 2016" frame="305" timecode="2046723" timecodetype="D" comment="Last I TC: 2046723 Current: 2046423">18:58:13;17</Discontinuity>
</DISCONTINUITIES>

3.1.1.42 dtmrFreeCaptureDiscontinuities

long dtmrFreeCaptureDiscontinuities(DTMRHANDLE dtmr, unsigned char ** pszDiscontinuities);

Free the buffer returned by dtmrGetCaptureDiscontinuities. This only needs to be called after all the calls to the 'get' function, and to the entire list have been returned.

3.2 Clip Detection API

DTMediaRead includes a clip detection API. This API finds clips within a directory structure, like P2 or BDMV, as well as sequences of files and other standard formats. It also includes stitching together files that were recorded as segments, and combining audio, video, closed caption and metadata files as a single entity. Once found, the clips may be opened with the read API above, and the individual elements can be retrieved, as well as reading each clip with all its components automatically.

Header: detectdir.h

ddtFileDir
Normal file directory

ddtAVCHD
Sony, JVC, Panasonic, Canon camera format
AVCHD
 AVF_INFO
 private
 AVCHD
 BDMV
    CLIPINF
    PLAYLIST
    STREAM
  SONY

ddtBDMV
BDMV - BluRay, subset of AVCHD
BDMV
 CLIPINF
 PLAYLIST
 STREAM

ddtXAVCS
Sony XAVC-S cameras
XAVC-S
 M4ROOT
 CLIP
 GENERAL
 SUB
 THMBNL

ddtP2Atom
Panasonic P2 Atom (DV25, 50, 100, AVCi 100)
CONTENTS
  AUDIO
  CLIP
  ICON
  PROXY
  VIDEO
  VOICE

ddtP2OP1b
Panasonic P2 OP1b (AVCi 100/200, Long G)
CONTENTS
  AUDIO
  AVCLIP
  CLIP
  ICON
  PROXY
  VIDEO
  VOICE

ddtXDCam
Sony XDCam
 Clip
 Edit
 General
 Sub

ddtHDV
Sony HDV Camcorder

ddtC500
Canon C Series 500/700

ddtCanonXF
Canon XF Cameras
 CONTENTS
  CLIPS001
   <NAME>
   JOURNAL

ddtGVJpeg2000

Grass Valley
 <Name>.bmp
 <Name>.xml
 <Name>_DM.xml
 <Name>-<num>_H.mxf
 <Name>-<num>_H.mxf

ddtCodex
Codex RAW formats
 <FileNameAsDir>
   <FileName><NUM>.rmf
 <FileNameBase>.xml

ddtGemini
Gemini Recorder
 <FileNameAsDir>
   <FileNameRoot>.xml
   <FileName><NUM>.rmf

ddtGF
GF (Similar to P2)
 BIN001
   ANC
   AUDIO
   CLIPINF
   PIC
   PROXY
   VBI
   VIDEO
 PLAYLIST

ddtArriRaw
ARRI Raw

ddtRed
RED camera

ddtHasSequences
Generic sequence(s)

ddtK2Server
Grass Valley server (K2)
 audio.A#

data.N#
timecode.T#
video.F#
<clipname>.xml

3.2.1 detectDirType __stdcall ddtCheckDir(char * szDirectory);

Quickly determine the type of the directory specified

3.2.2 DDTHANDLE __stdcall ddtOpenDir(char * szDirectory, detectDirType ddType);

Open a directory as a particular type

3.2.3 DWORD __stdcall ddtCloseDir(DDTHANDLE ddtH);

Close a previously open directory

3.2.4 DWORD __stdcall ddtGetTotalFiles(DDTHANDLE ddtH);

Get total files/clips

3.2.5 DWORD __stdcall ddtGetFilePath(DDTHANDLE ddtH, int nIndex, char * szFullPath);

Get a clip file name with full path

3.2.6 DWORD __stdcall ddtGetBaseName(char * szFullPath, char * szBaseName);

Get base file name for sequences

3.2.7 DWORD __stdcall ddtGetFileInfo(DDTHANDLE ddtH, int nIndex, WIN32_FIND_DATA * pFileInfo);

Get a clip's file info

3.2.8 DWORD __stdcall ddtCheckSequence(char * szFileName);

Detect if file is part of a sequence

3.3 Defines And Constants

These formats are used by dtmrGetReadTypes() and dtmrSetReadType() to set up the frame return type for dtmrGetVideoFrame(). See the **Video Output Formats** section for more information on these frame layouts.

//! Windows RGBA (like bitmap, tga, etc.)
const unsigned long **DTMR_READTYPE_ARGB** = 0;
//! RGB 8 bits per component, 24 total
const unsigned long **DTMR_READTYPE_RGB** = 0x10000000;
//! Alpha only 8 bits per component, repeated to 24
const unsigned long **DTMR_READTYPE_AAA** = 0x20000000;
//! 8 Bit YCbCr (yuv2, D1/HDSDI raw 4:2:2 video
const unsigned long **DTMR_READTYPE_UYVY** = 1;
//! 10 Bit v210 (quicktime packing) 4:2:2 video
const unsigned long **DTMR_READTYPE_V210** = 2;
//! 10 Bit RGB 4:4;4 (dpx packing)
const unsigned long **DTMR_READTYPE_RGB10Bit** = 3;
//! 16 bit per component (64 bit) RGBA 4:4:4:4
const unsigned long D**TMR_READTYPE_RGBA64** = 4;
//! RGB 16 bits per component, 48 total
const unsigned long **DTMR_READTYPE_RGB48** = 0x10000004;
//! Alpha only 16 bits per component, repeated to 48
const unsigned long **DTMR_READTYPE_AAA16** = 0x20000004;
//! 16 bit half float per component RGBA (GPU)
const unsigned long **DTMR_READTYPE_RGBAHALFFLOAT** = 5;
//! 16 bit half float per component RGB (GPU)
const unsigned long **DTMR_READTYPE_RGBHALFFLOAT** = 6;
//! Set to invert the picture vertically
const unsigned long **DTMR_READFLAG_FLIP** = 0x80000000;
//! Invalid file
const unsigned long **DTMR_READTYPE_INVALID** = -1;

3.4 Output Video Formats

These are the formats supported by GetVideoFrame(). Each of these formats only appears as specified here for this return. The SourceXXX series of methods (including SourceBitDepth and SourceFourCC) refer to the video media as it is saved on disk. The DTMediaRead library will decompress, and where necessary convert, from the file's native format to the requested format set by SetReadType(). For each file opened, the GetReadTypes() should be called to determine the available read types.

ARGB 32 (8 bits per component, vertical invert)

`DTMR_READTYPE_RGBA`

ARGB Decreasing Address Order																															
Byte 3								Byte 2								Byte 1								Byte 0							
Alpha								Red								Green								Blue							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

RGB 24 (8 bits per component, vertical invert)

`DTMR_READTYPE_RGB`

RGB Decreasing Address Order																															

AAA 24 (8 bits per component, vertical invert)

`DTMR_READTYPE_AAA`

RGB Decreasing Address Order																															
	Byte 2								Byte 1								Byte 0															
	Alpha								Alpha								Alpha															
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0								

RGB 30 (10 bits per component)

`DTMR_READTYPE_RGB10Bit`

RGB 10 Bit Decreasing Address Order																															
Byte 3								Byte 2								Byte 1								Byte 0							
Blue								Green				Blue				Red		Green						Red							
5	4	3	2	1	0			3	2	1	0	9	8	7	6	1	0	9	8	7	6	5	4	9	8	7	6	5	4	3	2

Please note: This is the standard DPX file layout, which was originally big endian, but is viewed here as little endian.

YCbCr 8 (8 bits per component 4:2:2)

`DTMR_READTYPE_UVYV`

YCbCr8 2 Pixels, Decreasing Address Order																															
Byte 3								Byte 2								Byte 1								Byte 0							
Cr								Y1								Cb								Y0							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

YCbCr 10 (10 bits per component 4:2:2)

`DTMR_READTYPE_V210`

YCbCr10 Pixels, Decreasing Address Order																															
Byte 3								Byte 2								Byte 1								Byte 0							
		Cr 0										Y 0										Cb 0									
		9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0
Byte 7								Byte 6								Byte 5								Byte 4							
		Y 2										Cb 1										Y 1									
		9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0
Byte 11								Byte 10								Byte 9								Byte 8							
		Cb 2										Y 3										Cr 1									
		9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0
Byte 15								Byte 14								Byte 13								Byte 12							
		Y 5										Cr 2										Y 4									
		9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0

3.4.1.1.1 RGBA 4:4:4:4 16 Per (64 Total) Integer

//! 16 bit per component (64 bit) RGBA 4:4:4:4
const unsigned long DTMR_READTYPE_RGBA64 = 4;

RGB 4:4:4 16 Per (48 Total) Integer

//! RGB 16 bits per component, 48 total
const unsigned long DTMR_READTYPE_RGB48 = 0x10000004;

Alpha 16 Bit Integer (48 Total Repeated 3 Times)

//! Alpha only 16 bits per component, repeated to 48
const unsigned long DTMR_READTYPE_AAA16 = 0x20000004;

RGBA 4:4:4:4 16 Per (64 Total) Half Float

//! 16 bit half float per component RGBA (GPU)
const unsigned long DTMR_READTYPE_RGBAHALFFLOAT = 5;

RGB 4:4:4 16 Per (48 Total) Half Float

//! 16 bit half float per component RGB (GPU)
const unsigned long DTMR_READTYPE_RGBHALFFLOAT = 6;

3.4.1.1.2 Image Invert

//! Set to invert the picture vertically
const unsigned long DTMR_READFLAG_FLIP = 0x80000000;

3.4.1.1.3 Invalid File

//! Invalid file
const unsigned long DTMR_READTYPE_INVALID = -1;

3.5 Supported Video IP Types

3.5.1.1 UDP and RTP

UDP [User Datagram Protocol] and RTP [Real-time Transport Protocol] streams can be elementary video or audio streams, or more commonly a transport stream with PMT/PAT (Program Association Table/Program Mapping Table) and a number of streams within it. For UDP and RTP, you can specify a TCP (direct) address, but normally it will be a multicast group address, and also a port is normally specified. Here are a few examples:

udp://239.254.40.40:5004
rtp://239.100.20.20:50004
rtp://239.100.30:31:1234

This is a server protocol on the receiver, and requires the selected port to be open to receive. On the send side, it should work without firewall adjustment.

3.5.1.2 SRT

SRT [Secure Reliable Transport] streams contain a transport stream with PMT/PAT and a number of streams within it. For SRT you can specify an address and a port. There are three modes for SRT: listener, caller and rendezvous. If you are a listener, you can only connect with a caller and vice versa. For Rendezvous, both the sender and receiver must be in rendezvous mode. A password for encrypted service can also be set. Here is some information on the modes:

listener - this has to be one of your local IP addresses, and acts as a server waiting for a connection, so it must be directly visible to the caller (not behind a firewall)
caller - this calls out to a remote IP that is running as a listener. You must be able to reach the IP directly (e.g. no firewall)
rendezvous - this connects bi directionally, allowing it to connect through firewalls without extra configuration. Each side of the rendezvous uses the external (internet facing) IP address of their internet connection. This allows the signals to connect and pass through the firewall

Here are a few examples:

srt://239.254.40.40:5004?mode=listener
srt://172.12.25.20:5006?mode=caller
srt://239.100.30:31:1234?mode=caller&password=thisisapassword&user=thisisauser

Possible parameters include

mode=
caller
listener
rendezvous
password=<string>
keylen=16|24|32
username=<string>
streamid=#
latency=#
buffering=#
maxbw=#

When using the 'listener' mode, the port it is listening on must be open in the firewall. For Caller and Rendezvous, it should work without firewall adjustment.

3.5.1.3 RIST

RIST [Reliable Internet Stream Transport] streams are UDP based self correcting connections. Drastic currently supports the following RIST profiles: Simple, and Main. Simple Profile provides ARQ (automatic repeat request) for packet loss recovery, jitter removal, optional FEC (forward error correction). The Main Profile adds encryption for secure content.

Both the sender and the receiver must be in the same mode. The receiver will be the server and listen for a connection. The sender will be the client and connect to the receiver to send the data. The protocol will use two ports, the lower of which is specified in the URL and the higher which is the lower plus one. The lower port must be even.

Here are a few examples:

rist://10.0.0.123:5000?mode=listener&profile=main
rist://192.168.1.22?mode=caller&profile=simple

Possible parameters include:

mode: listener (for server/receiver), caller (for client/sender) - Required
profile: simple. main or advanced
password: encryption key
buffering: amount of buffer in milliseconds

When using the 'listener' mode, the port it is listening on must be open in the firewall. For Caller, it

should work without firewall adjustment.

3.5.1.4 RTSP

RTSP [Real Time Streaming Protocol] streams require not only the device address, but also the description of the source of the stream you are accessing on that device. RTSP are also often user/password protected, so you may have to send a user/password in the form "<user>:<pass>@" just before the device identifier. Here are a few examples, and their sources:

rtsp://192.168.100.10/axis-media/media.amp (an Axis camera)
rtsp://192.168.199.11/user:pass@/video1+audio1 (a Marshall camera, with password)
rtsp://192.168.160.20:/onvif/media.amp (an OnVIF source)
rtps://192.168.150:11/video1?videocodec=h264 (a Marshall camera, video only, force h.264)

For sending, RTSP should work without firewall adjustment. RTSP uses port 554

3.5.1.5 RTMP

RTMP [Real-Time Messaging Protocol] is normally used to stream one video and one stereo audio channel to a website for distribution to multiple watchers. In modern sites, the RTMP is actually re-wrapped into HLS, which is then viewed by the end user. To connect to an RTMP site, like flowcaster.live, youtube.com, and twitch.com, you will need the URL/Link and the key/secret. For youtube, they are available after you 'go live' as the Stream URL and the Stream Key. Once you have them, you simply add a slash and the Stream Key to the Stream URL.. For example:

Stream URL: rtmp://a.rtmp.youtube.com/live2

Stream Key: j2bg-a6ck-8t48-w2y2-aaaa

Final URL: rtmp://a.rtmp.youtube.com/live2/j2bg-a6ck-8t48-w2y2-aaaa

For sending, RTMP should work without firewall adjustment. RTMP uses port 1935

3.5.1.6 WebRTC

WebRTC [Web Real-Time Communication] is a browser native method of sharing video, audio and data. It is primarily used in chat programs, like Google Meet. When sending via WebRTC, FlowCaster appears as a person in the chat, with whatever video and audio it is receiving being sent to the chat.

Here is an example:

webrtc://flowcaster.live?meetingid=asre-dsec-asds-seff&name=flowcaster

WebRTC uses a bunch of standard ports:

Access to ports TCP + UDP 4443, 3478, 443 for www.flowcaster.live
Access to video streaming services in VPN and Firewall settings
Ports used: 80, 443, 4443, 3478 (TCP and UDP), 5349 TCP, 40000:65535 UDP

3.5.1.7 WHIP (WebRTC - Millicast)

WHIP [WebRTC-HTTP ingestion protocol] is a simpler negotiation system for WebRTC. Currently in use by Millicast to receive streams for worldwide, low latency transmission, FlowCaster and Net-X-Code Server support sending video signals via WHIP. WHIP requires an auth code (available from the Millicast config pages) and a stream name. The stream name is added to the end of whip://director.millicast.com/api/whip/ and the auth token is a parameter that starts with auth=.

Here is an example
whip://director.millicast.com/api/whip/kwky3g6g?
auth=48ce3daa09cd8355f80fc0d37005f9422a62bebf9b6411b61cfb1cfb2fa

WHIP uses a bunch of standard ports:

Access to ports TCP + UDP 4443, 3478, 443 for www.flowcaster.live
Access to video streaming services in VPN and Firewall settings
Ports used: 80, 443, 4443, 3478 (TCP and UDP), 5349 TCP, 40000:65535 UDP

3.5.1.8 BLS (Bliss Protocol)

BLS [Browser Live Stream] is a protocol developed by Drastic to send live video via an encrypted channel directly to a user's browser. It allows for much higher quality video than WebRTC, while still not requiring any plugins or special setup to present audio and video directly in a modern, HTML5 browser.

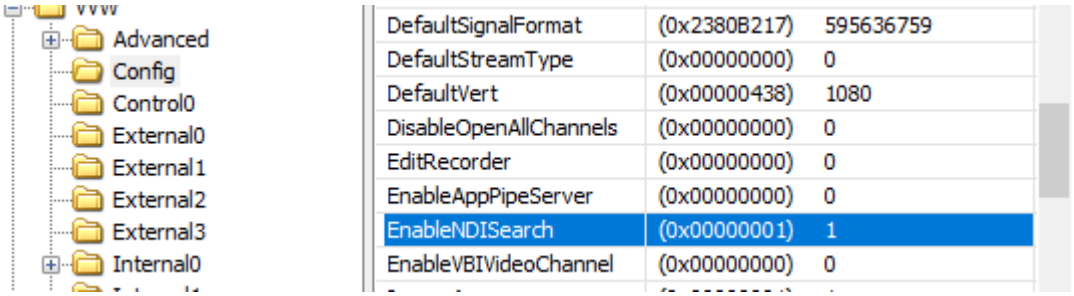
Here are a couple examples:

bls://10.0.0.234:5000
blss://192.168.202.200:3000?password=kfiwgt84jsd&remoteip=120.32.54.6

BLS uses the port explicitly set. If there is no port set, it will use 80 for unencrypted and 443 for encrypted traffic.

3.5.1.9 NDI

NDI [Network Device Interface] is a video over IP protocol originally developed by NewTek®. It requires a device name and a source name to access NDI sources. NDI sources may also be searched on the local network. To enable the search, run DDRConfig and select the Advanced tab. Go to /VVW/Config and change EnableNDISearch = 1. If it does not exist, then create a new Numeric value for it.



To specify an NDI stream, use the device name, followed by a space, and then the source name within brackets.

ndi://USER-PC (Desktop [2])
ndi://TestCameraSource (ISO_1)
ndi://PC2 (Google Chrome [1])

If you are creating an NDI stream, with FlowCaster or Net-X-Code Server, for instance, only the stream name is specified. The Computer name is added automatically by NDI, and you cannot use brackets in the name

ndi://FlowCasterOut
ndi://SDI1Out
ndi://SMPTE2110_Group1

NDI uses a range of TCP ports: NDI ports 49152 to 65535

3.5.1.10 CDI

CDI [Cloud Digital Interface] is an advanced, fully uncompressed, protocol for use within Amazon VMs. It transports video in a number of formats, as well as audio, time code and other metadata. While it is possible to use CDI with Amazon's enhanced network backbone, it is safest and most efficient, within their network stacks. The URL will include a local IP and port, with an optional remote IP, adapter and

ID.

Here are some examples:

cdi://10.0.0.2:6000
cdi://10.0.0.1:6000?remoteip=10.0.0.200&adapter=EFA&id=2

Possible parameters include:

remoteip: a remote computer to connect to exclusively
adapter: the transport, EFA (Elastic Fabric Adapter) or socket. EFA is the default.
id: a numeric value to specify the stream

The implementation for this transit occurs over the Scalable Reliable Datagram (SRD) protocol. To achieve the highest performance and lowest latency, the AWS CDI SDK relies on EC2 instances that support the Elastic Fabric Adapter (EFA) and are placed within a single Placement Group.

The AWS CDI SDK opens one specified User Datagram Protocol (UDP) port per connection to control communication between Amazon EC2 instances running AWS CDI SDK. The receiving side listens on the specified port number. The transmitting side uses a random port number from the ephemeral port range, as determined by the operating system.

For network security best practices concerning how to block UDP packets from the public Internet, see Security best practices for your VPC.

The AWS CDI SDK also relies on EC2 instances using a Security Group that allows all inbound and outbound traffic to and from the Security Group itself. For more information, see Prepare an EFA-Enabled Security Group.

3.5.1.11 S2022 and S2110

The SMPTE 2022-6 and SMPTE 2110 protocols can be accessed via SDP (Session Description Protocol) or manual setup. To access an SDP source:

s2202://192.168.101.200/channel1.sdp
s2110://mainsources.drastic.ca/crosspoint10.sdp

For some Drastic software, the source can be set up manually. For S2022, this is a single set of Source IP, Source Port, Destination IP, Destination Port and Interface address. One or any combination of these can be used to describe the source of the SMPTE 2022-6 stream, which contains all the video, audio and HANC/VANC channels. For SMPTE 2110, up to three sets of the same information are required to describe the video, audio and anc streams, which are all separate. A

PTP (Precision Time Protocol) grandmaster may also be specified.

3.6 Output Audio Formats

These are the formats supported by dtmrGetAudioFrame(). By default, it will return video frame sized chunks of audio in a 16 bit container for 16 bit files, and 32 bit containers for other bit sizes. Using dtmrSetReadType, this can be modified to return a specific bit depth for the file, and switched from video frame audio sized groups to native/audio sample based reads:

```
//! Set readtype to video frame size AUDIO to 16 bits LE
const unsigned long DTMR_READTYPE_FRAME_AUDIO_16LE = (0x00010000 | 16);
//! Set readtype to video frame size AUDIO to 32 bits (note, 16, 20, 24 will be shifted to most significant, LE)
const unsigned long DTMR_READTYPE_FRAME_AUDIO_32LE = (0x00010000 | 32);
//! Set readtype to arbitrary sample AUDIO to 16 bits LE
const unsigned long DTMR_READTYPE_SAMPLE_AUDIO_16LE = (0x00110000 | 16);
//! Set readtype to arbitrary sample  AUDIO to 32 bits (note, 16, 20, 24 will be shifted to most significant, LE)
const unsigned long DTMR_READTYPE_SAMPLE_AUDIO_32LE = (0x00110000 | 32);
```

Audio is always output as two channels of either 32 bit or 16 bit per sample PCM audio. This is written in the same format as Windows wave files.

Left Channel (2 or 4 bytes little endian)
Right Channel (2 or 5 bytes little endian)
[repeats with no padding]

The frequency is dependent on the dtmrSourceAudioFrequency return. The bit size is dependent on dtmrSourceAudioBitsPerSample. If the dtmrSourceAudioBitsPerSample is 16 or less, then it will return 16 bit samples. If it is greater than 16 bits (normally 20, 24 or 32), then it will return 32 bits, where the 20 or 24 have been shifted up to become 32 bits.

The size of the return is dependent on the frame rate of the file. This can vary from 23.98 fps, or 2000/2001 samples per frame, down to 60 fps, or 800 samples per frame. The size will also vary, depending on how the frame rate divides into the sample rate. For example:

48,000 Hz audio at 29.97 video = 1601.6 samples
Because we can only return an even number of samples, the audio is returned in a 5 frame cadence of 1601 or 1602 samples. Because these are stereo, this means the application will receive 6404/6408 bytes in 16 bit, and 12808/12816 bytes in 20/24/32 bit.

3.7 Example - Direct

Follow these steps to read using the direct interface:

1. Open the file with dtmrOpen(szUTF8FileName, 0). Keep the opaque handle returned for all further calls.

2. Get the file information via the dtmrSourceHeight/Width/FourCC/etc. and the dtmrSourceAudioChannels/Frequency/etc.

3. Optionally, get the best read type from dtmrGetReadTypes

4. Set the read type you want for audio and video. For simplicity, start with dtmrSetReadType(h, DTMR_READTYPE_ARGB) and dtmrSetReadType(h, DTMR_READTYPE_FRAME_AUDIO_16LE).

5. Set the first frame you want to read dtmrSetFrame(h, 0)

6. Get the video suggested buffer size, and allocate memory for the video frame. Sending dtmrGetVideoFrame(h, NULL, &lSize) will return the suggested buffer size in lSize.

7. Read the video frame, passing in the actual video size of the frame. The actual size, without padding, can be retrieved from dtmrSourceFrameSize(). The second call to read would be dtmrGetVideoFrame(h, pAllocation, &lSourceFrameSize)

8. Read any audio channels you need with dtmrGetAudioFrame(h, pAudAllocation, &lAudioSize), which works the same way as video size.

9. Get any per frame metadata with dtmrLastVitcType/Frame/Ub, dtmrLastLtcType/Frame/Ub and dtmrGetCurExtendedData/dtmrGetCurClosedCaptions

Repeat steps 7 through 9 for any other frames you need

Close the opaque handle with dtmrClose(h)

3.8 Example – ActiveX [deprecated]

Follow these steps to load a media file into the DTMediaRead ActiveX SDK and then get the desired data.

1. Open a file. Somewhere in your application, you must open the desired file using the CDTReadX::Open(LPCTSTR bstrFileName, long dwFlags); function call. If the function returns -1, then the file has not been opened. Otherwise, proceed to step two.

2. Set the frame. After the file has been opened, set the current frame in the ActiveX by calling the CDTReadX::SetFrame(long nNewValue); where the nNewValue is the desired frame. This procedure can be attached to a slider control or an editbox, used for setting the frame dynamically. (NOTE: the total number of frames should be known before setting the current frame.)

3. Obtaining data. Once everything has been set up correctly, we can now access the ActiveX and retrieve the frame data for both audio and video. Variables you will need include a VARIANT to get the data, a DWORD to determine the size of the data, and a LPVOID to store the data.
   DWORD dwSize;
   VARIANT vid_frame;
   void* lpVidData;
   m_dtRead.GetVideoFrame(&vid_frame, (long*)&dwSize);
   If at this point, the size of the data (dwSize) is 0, then the ActiveX was unable to find any data for this frame. Now, access the data using the lpVidData variable. Continue if successful.
   if(SafeArrayAccessData(vid_frame.parray, &lpVidData) == S_OK){
   Once we have access to the frame data, it can be manipulated however we like. It can be loaded into a device context, or saved to a bitmap, etc.

4. Freeing the data. Now that we are done with the data, it should be cleared.
   SafeArrayUnaccessData(vid_frame.parray);
   SafeArrayDestroy(vid_frame.parray);

5. To get the audio frame data from the ActiveX, perform step 3 using the CDTReadX::GetAudioFrame(VARIANT* psaFrame, long* plSize); function in place of GetVideoFrame.

3.9 Example: Reading Size/Position Via dtmrGetFileFrameInfo

Most file formats, and especially RTIndex files, can return the frame position and size, rather than the actual decoded audio/video data. This allows reading of files with your own decoders, and rewrapping of audio/video with direct reads to the data using normal OS reads. It is similar to a direct read, other than the read itself.

1. Open the file with dtmrOpen(szUTF8FileName, 0). Keep the opaque handle returned for all further calls.

2. Get the file information via the dtmrSourceHeight/Width/FourCC/etc. and the dtmrSourceAudioChannels/Frequency/etc.

3. Set the first frame you want to read dtmrSetFrame(h, 0)

4. Call dtmrGetFileFrameInfo with the frame, channel, and Audio/Video flags for the media you want. It will return the position, size, flags and file that media exists in. The flags will have audio info or video IPB flags.

5. Call dtmrGetFileFrameInfo for any other audio channels you want in the media file.

6. Get any per frame metadata with dtmrLastVitcType/Frame/Ub, dtmrLastLtcType/Frame/Ub and dtmrGetCurExtendedData/dtmrGetCurClosedCaptions

Repeat steps 3 through 6 for any other frames you need

Close the opaque handle with dtmrClose(h)

3.10 Metadata Elements

The functions dtmrSourceMetaDataDWORD() and dtmrSourceMetaDataSTR() use the defines below to return specific metadata from the file. The first enums are string values for dtmrSourceMetaDataSTR() (from vvwiFileName to vvwiUMID). The second set of enums are the DWORD values (from vvwiTimeCode to vvwiAudioBits).

```
/** Numeric values for all the metadata information types available in MR and VVW
*/
enum vvwInfoMetaTypes {
        //! see VVWINFO::szFileName
        vvwiFileName,
        //! see VVWINFO::szNativeLocator
        vvwiNativeLocator,
        //! see VVWINFO::szUniversalName
        vvwiUniversalName,
        //! see VVWINFO::szIP
        vvwiIP,
        //! see VVWINFO::szSourceLocator
        vvwiSourceLocator,

        //! see VVWINFO::szChannel
        vvwiChannel,
        //! see VVWINFO::szChannelName
        vvwiChannelName,
        //! see VVWINFO::szChannelDescription
        vvwiChannelDescription,
        //! see VVWINFO::szTitle
        vvwiTitle,
        //! see VVWINFO::szSubject
        vvwiSubject,
        //! see VVWINFO::szCategory
        vvwiCategory,                   // <-- 10
        //! see VVWINFO::szKeywords
        vvwiKeywords,
        //! see VVWINFO::szRatings
        vvwiRatings,
        //! see VVWINFO::szComments
        vvwiComments,
        //! see VVWINFO::szOwner
        vvwiOwner,
        //! see VVWINFO::szEditor
        vvwiEditor,
        //! see VVWINFO::szSupplier
        vvwiSupplier,
```

```
//! see VVWINFO::szSource
vvwiSource,
//! see VVWINFO::szProject
vvwiProject,
//! see VVWINFO::szStatus
vvwiStatus,
//! see VVWINFO::szAuthor
vvwiAuthor,                                    // <-- 20
//! see VVWINFO::szRevisionNumber
vvwiRevisionNumber,
//! see VVWINFO::szProduced
vvwiProduced,
//! see VVWINFO::szAlbum
vvwiAlbum,
//! see VVWINFO::szArtist
vvwiArtist,
//! see VVWINFO::szComposer
vvwiComposer,
//! see VVWINFO::szCopyright
vvwiCopyright,
//! see VVWINFO::szCreationData
vvwiCreationData,
//! see VVWINFO::szDescription
vvwiDescription,
//! see VVWINFO::szDirector
vvwiDirector,
//! see VVWINFO::szDisclaimer
vvwiDisclaimer,                          // <-- 30
//! see VVWINFO::szEncodedBy
vvwiEncodedBy,
//! see VVWINFO::szFullName
vvwiFullName,
//! see VVWINFO::szGenre
vvwiGenre,
//! see VVWINFO::szHostComputer
vvwiHostComputer,
//! see VVWINFO::szInformation
vvwiInformation,
//! see VVWINFO::szMake
vvwiMake,
//! see VVWINFO::szModel
vvwiModel,
//! see VVWINFO::szOriginalArtist
vvwiOriginalArtist,
//! see VVWINFO::szOriginalFormat
vvwiOriginalFormat,
//! see VVWINFO::szPerformers
```

```
    vvwiPerformers,                         // <-- 40
    //! see VVWINFO::szProducer
    vvwiProducer,
    //! see VVWINFO::szProduct
    vvwiProduct,
    //! see VVWINFO::szSoftware
    vvwiSoftware,
    //! see VVWINFO::szSpecialPlaybackRequirements
    vvwiSpecialPlaybackRequirements,
    //! see VVWINFO::szTrack
    vvwiTrack,
    //! see VVWINFO::szWarning
    vvwiWarning,
    //! see VVWINFO::szURLLink
    vvwiURLLink,
    //! see VVWINFO::szEditData1
    vvwiEditData1,
    //! see VVWINFO::szEditData2
    vvwiEditData2,
    //! see VVWINFO::szEditData3
    vvwiEditData3,                  // <-- 50
    //! see VVWINFO::szEditData4
    vvwiEditData4,
    //! see VVWINFO::szEditData5
    vvwiEditData5,
    //! see VVWINFO::szEditData6
    vvwiEditData6,
    //! see VVWINFO::szEditData7
    vvwiEditData7,
    //! see VVWINFO::szEditData8
    vvwiEditData8,
    //! see VVWINFO::szEditData9
    vvwiEditData9,
    //! see VVWINFO::szVersionString
    vvwiVersionString,
    //! see VVWINFO::szManufacturer
    vvwiManufacturer,
    //! see VVWINFO::szLanguage
    vvwiLanguage,
    //! see VVWINFO::szFormat
    vvwiFormat,                         // <-- 60
    //! see VVWINFO::szInputDevice
    vvwiInputDevice,
    //! see VVWINFO::szDeviceModelNum
    vvwiDeviceModelNum,
    //! see VVWINFO::szDeviceSerialNum
    vvwiDeviceSerialNum,
```

```
    //! see VVWINFO::szReel
    vvwiReel,
    //! see VVWINFO::szShot
    vvwiShot,
    //! see VVWINFO::szTake
    vvwiTake,
    //! see VVWINFO::szSlateInfo
    vvwiSlateInfo,
    //! see VVWINFO::szFrameAttribute
    vvwiFrameAttribute,
    //! see VVWINFO::szEpisode
    vvwiEpisode,
    //! see VVWINFO::szScene
    vvwiScene,                                  // <-- 70
    //! see VVWINFO::szDailyRoll
    vvwiDailyRoll,
    //! see VVWINFO::szCamRoll
    vvwiCamRoll,
    //! see VVWINFO::szSoundRoll
    vvwiSoundRoll,
    //! see VVWINFO::szLabRoll
    vvwiLabRoll,
    //! see VVWINFO::szKeyNumberPrefix
    vvwiKeyNumberPrefix,
    //! see VVWINFO::szInkNumberPrefix
    vvwiInkNumberPrefix,
    //! see VVWINFO::szPictureIcon
    vvwiPictureIcon,
    //! see VVWINFO::szProxyFile
    vvwiProxyFile,
    //!
    vvwiCustomMetadataBlockPointer,
    //!
    vvwiImageInfo,
    //!
    vvwiUMID,
    //
    vvwiEND_OF_STRINGS,

    vvwiNumericStart = 0x1000,
    //! see VVWINFO::dwTimeCode
    vvwiTimeCode,
    //! see VVWINFO::dwUserBits
    vvwiUserBits,
    //! see VVWINFO::dwVITCTimeCode
    vvwiVITCTimeCode,
    //! see VVWINFO::dwVITCUserBits
```

```
vvwiVITCUserBits,
//! see VVWINFO::dwVITCLine3
vvwiVITCLine3,
//! see VVWINFO::dwPosterFrame
vvwiPosterFrame,
//! see VVWINFO::dwAFrame
vvwiAFrame,
//! see VVWINFO::dwAspectRatio
vvwiAspectRatio,
//! see VVWINFO::dwOriginalRate
vvwiOriginalRate,
//! see VVWINFO::dwOriginalScale
vvwiOriginalScale,
//! see VVWINFO::dwConversions
vvwiConversions,
//! see VVWINFO::dwVersionNumber
vvwiVersionNumber,
//! see VVWINFO::dwFileSize
vvwiFileSize,
//! see VVWINFO::dwFileDate
vvwiFileDate,
//! see VVWINFO::dwFileTime
vvwiFileTime,
//! see VVWINFO::dwSequenceNumber
vvwiSequenceNumber,
//! see VVWINFO::dwTotalStreams
vvwiTotalStreams,
//! see VVWINFO::dwTotalLength
vvwiTotalLength,
//! see VVWINFO::dwFilmManufacturerCode
vvwiFilmManufacturerCode,
//! see VVWINFO::dwFilmTypeCode
vvwiFilmTypeCode,
//! see VVWINFO::dwWhitePoint
vvwiWhitePoint,
//! see VVWINFO::dwBlackPoint
vvwiBlackPoint,
//! see VVWINFO::dwBlackGain
vvwiBlackGain,
//! see VVWINFO::dwBreakPoint
vvwiBreakPoint,
//! see VVWINFO::dwGamma1000
vvwiGamma1000,
//! see VVWINFO::dwTagNumber
vvwiTagNumber,
//! see VVWINFO::dwFlags
vvwiFlags,
```

```
        //! see VVWINFO::dwTimeCodeType
        vvwiTimeCodeType,
        //! see VVWINFO::dwLTCTimeCodeType
        vvwiLTCTimeCodeType,
        //! see VVWINFO::dwVITCTimeCodeType
        vvwiVITCTimeCodeType,
        //! see VVWINFO::dwProdDate
        vvwiProdDate,
        //End: v3.0
        //! see VVWINFO::dwUniqueID
        vvwiUniqueID,
        //!
        vvwiCustomMetadataBlockType,
        vvwiCustomMetadataBlockSize,
        vvwiNorthSouthEastWest,
        vvwiLatitude,
        vvwiLongitude,
        vvwiExposure,
        vvwiRedGain,
        vvwiBlueGain,
        vvwiWhiteBalance,

        vvwiEND_OF_DWORD_V2,
        // Add elements here
        //VVVID STRUCT
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoWidth = 0x10000,
        //! XML tag name for width
#define VVWINFOTAG_woVideoWidth                 "Width"
#define VVWINFODESC_woVideoWidth                "Width"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoHeight,
        //! XML tag name for height
#define VVWINFOTAG_woVideoHeight                "Height"
#define VVWINFODESC_woVideoHeight               "Height"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoPlanes,
        //! XML tag name for planes
#define VVWINFOTAG_woVideoPlanes                "Planes"
#define VVWINFODESC_woVideoPlanes               "Planes"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoBitCount,
        //! XML tag name for bit count
#define VVWINFOTAG_woVideoBitCount              "BitCount"
#define VVWINFODESC_woVideoBitCount             "BitCount"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoCompression,
```

```
        //! XML tag name for compression (fourcc)
#define VVWINFOTAG_woVideoCompression           "Compression"
#define VVWINFODESC_woVideoCompression          "Compression"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoSizeImage,
        //! XML tag name for size of the image in unsigned chars
#define VVWINFOTAG_woVideoSizeImage                     "SizeImage"
#define VVWINFODESC_woVideoSizeImage                    "SizeImage"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoXPelsPerMeter,
        //! XML tag name for X pels per meter
#define VVWINFOTAG_woVideoXPelsPerMeter                 "XPelsPerMeter"
#define VVWINFODESC_woVideoXPelsPerMeter                "XPelsPerMeter"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoYPelsPerMeter,
        //! XML tag name for Y pels per meter
#define VVWINFOTAG_woVideoYPelsPerMeter                 "YPelsPerMeter"
#define VVWINFODESC_woVideoYPelsPerMeter                "YPelsPerMeter"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoClrUsed,
        //! XML tag name for color elements used
#define VVWINFOTAG_woVideoClrUsed                       "ClrUsed"
#define VVWINFODESC_woVideoClrUsed                      "ClrUsed"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoClrImportant,
        //! XML tag name for color important
#define VVWINFOTAG_woVideoClrImportant          "ClrImportant"
#define VVWINFODESC_woVideoClrImportant         "ClrImportant"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoReserved,
        //! XML tag name for reserved array
#define VVWINFOTAG_woVideoReserved                      "Reserved"
#define VVWINFODESC_woVideoReserved                     "Reserved"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoFccType,
        //! XML tag name for four cc type (video/audio)
#define VVWINFOTAG_woVideoFccType                       "FccType"
#define VVWINFODESC_woVideoFccType                      "FccType"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoFccHandler,
        //! XML tag name for four cc handler
#define VVWINFOTAG_woVideoFccHandler            "FccHandler"
#define VVWINFODESC_woVideoFccHandler           "FccHandler"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoFlags,
        //! XML tag name for flags
#define VVWINFOTAG_woVideoFlags                         "Flags"
```

```
#define VVWINFODESC_woVideoFlags                    "Flags"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoCaps,
        //! XML tag name for capabilities
#define VVWINFOTAG_woVideoCaps                      "Caps"
#define VVWINFODESC_woVideoCaps                     "Caps"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoPriority,
        //! XML tag name for priority
#define VVWINFOTAG_woVideoPriority                  "Priority"
#define VVWINFODESC_woVideoPriority                 "Priority"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoLanguage,
        //! XML tag name for language
#define VVWINFOTAG_woVideoLanguage                  "Language"
#define VVWINFODESC_woVideoLanguage                 "Language"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoScale,
        //! XML tag name for scale (fps = rate / scale)
#define VVWINFOTAG_woVideoScale                     "Scale"
#define VVWINFODESC_woVideoScale                    "Scale"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoRate,
        //! XML tag name for rate (fps = rate / scale)
#define VVWINFOTAG_woVideoRate                      "Rate"
#define VVWINFODESC_woVideoRate                     "Rate"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
    vvwiVideoStart,
        //! XML tag name for start frame
#define VVWINFOTAG_woVideoStart                     "Start"
#define VVWINFODESC_woVideoStart                    "Start"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoLength,
        //! XML tag name for the length in frames
#define VVWINFOTAG_woVideoLength                    "Length"
#define VVWINFODESC_woVideoLength                   "Length"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoInitialFrames,
        //! XML tag name for number of initial frames to load
#define VVWINFOTAG_woVideoInitialFrames             "InitialFrames"
#define VVWINFODESC_woVideoInitialFrames            "InitialFrames"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
    vvwiVideoSuggestedBufferSize,
        //! XML tag name for suggested maximum buffer size
#define VVWINFOTAG_woVideoSuggestedBufferSize   "SuggestedBufferSize"
#define VVWINFODESC_woVideoSuggestedBufferSize"SuggestedBufferSize"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
```

```
        vvwiVideoQuality,
        //! XML tag name for quality
#define VVWINFOTAG_woVideoQuality                   "Quality"
#define VVWINFODESC_woVideoQuality                  "Quality"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoSampleSize,
        //! XML tag name for recommended sample size
#define VVWINFOTAG_woVideoSampleSize            "SampleSize"
#define VVWINFODESC_woVideoSampleSize           "SampleSize"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoEditCount,
        //! XML tag name for number of edits done on this file
#define VVWINFOTAG_woVideoEditCount                 "EditCount"
#define VVWINFODESC_woVideoEditCount                "EditCount"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoFormatChangeCount,
        //! XML tag name for number of format changes
#define VVWINFOTAG_woVideoFormatChangeCount         "FormatChangeCount"
#define VVWINFODESC_woVideoFormatChangeCount        "FormatChangeCount"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoPitch,
        //! XML tag name for video line pitch
#define VVWINFOTAG_woVideoPitch                     "Pitch"
#define VVWINFODESC_woVideoPitch                    "Pitch"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoDrFlags,
        //! XML tag name for internal drastic flags
#define VVWINFOTAG_woVideoDrFlags                   "DrFlags"
#define VVWINFODESC_woVideoDrFlags                  "DrFlags"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoFileType,
        //! XML tag name for drastic 'mft' file type
#define VVWINFOTAG_woVideoFileType                  "FileType"
#define VVWINFODESC_woVideoFileType                 "FileType"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiVideoResDrastic,
        //! XML tag name for reserved drastic array of DWORDs
#define VVWINFOTAG_woVideoResDrastic            "ResDrastic"
#define VVWINFODESC_woVideoResDrastic           "ResDrastic"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiAudioType,
        //! XML tag
#define VVWINFOTAG_woAudioType                      "AudioType"
#define VVWINFODESC_woAudioType                     "AudioType"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiAudioChannels,
        //! XML tag
```

```
#define VVWINFOTAG_woAudioChannels                      "AudioChannels"
#define VVWINFODESC_woAudioChannels                     "AudioChannels"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiAudioFrequency,
        //! XML tag
#define VVWINFOTAG_woAudioFrequency                     "AudioFrequency"
#define VVWINFODESC_woAudioFrequency                    "AudioFrequency"
        //! INTERNAL: Auto generated for XML output from #VVWVIDEO/#VVWAUDIO
        vvwiAudioBits,
        //! XML tag
#define VVWINFOTAG_woAudioBits                          "AudioBits"
#define VVWINFODESC_woAudioBits                         "AudioBits"
        //char  szName[_VVWXXX_NAME_SIZE];        // Stream identifier
        //RECT/*16*/  rcFrame;                           // Frame dimensions
        vvwiLastElementPlus1
        // DO NOT ADD ANYTHING BELOW vvwiLastElementPlus1
};
```

3.11Direct Link Header

dtmediaread.h

```
/*****************************************************************************
 *
 *
 * Copyright (c) 1998-2025 Drastic Technologies Ltd.  All Rights Reserved.
 * 523 The Queensway, Suite 201 Toronto ON M8Y 1J7
 * phone (416) 255 5636  fax (416) 255 8780
 * engineering@drastictech.com      http://www.drastic.tv
 *****************************************************************************/
// drmediaread.h : Declaration of the dtmediaread api

// Hacking class from activex control

#ifndef __DTMEDIAREAD_DRASTIC_API_9204jrewf348j4_H_
#define __DTMEDIAREAD_DRASTIC_API_9204jrewf348j4_H_

////////////////////////////////////////////////////////////////////////////

#define DTMRHANDLE void*

#ifdef _WIN32
#define DTMRCALLTYPE __stdcall
#include <windows.h>
#else
#define DTMRCALLTYPE
#include <stddef.h>
#endif

#ifdef __cplusplus
extern "C" {          // PREVENT C++ NAME-MANGLING
#endif

/** The read types
 */
//! Windows RGBA 8 bits per component, 32 total (like bitmap, tga, etc.)
const unsigned long DTMR_READTYPE_ARGB = 0;
//! RGB 8 bits per component, 24 total
const unsigned long DTMR_READTYPE_RGB = 0x10000000;
//! Alpha only 8 bits per component, repeated to 24
```

```
const unsigned long DTMR_READTYPE_AAA = 0x20000000;
//! 8 Bit YCbCr (yuv2, D1/HDSDI raw 4:2:2 video
const unsigned long DTMR_READTYPE_UYVY = 1;
//! 10 Bit v210 (quicktime packing) 4:2:2 video
const unsigned long DTMR_READTYPE_V210 = 2;
//! 10 Bit RGB 4:4;4 (dpx packing)
const unsigned long DTMR_READTYPE_RGB10Bit = 3;
//! 16 bit per component (64 bit) RGBA 4:4:4:4
const unsigned long DTMR_READTYPE_RGBA64 = 4;
//! RGB 16 bits per component, 48 total
const unsigned long DTMR_READTYPE_RGB48 = 0x10000004;
//! Alpha only 16 bits per component, repeated to 48
const unsigned long DTMR_READTYPE_AAA16 = 0x20000004;
//! 16 bit half float per component RGBA (GPU)
const unsigned long DTMR_READTYPE_RGBAHALFFLOAT = 5;
//! 16 bit half float per component RGB (GPU)
const unsigned long DTMR_READTYPE_RGBHALFFLOAT = 6;
//! Set to invert the picture vertically
const unsigned long DTMR_READFLAG_FLIP = 0x80000000;
//! Invalid file
const unsigned long DTMR_READTYPE_INVALID = -1;
//! Set readtype to video frame size AUDIO to 16 bits LE
const unsigned long DTMR_READTYPE_FRAME_AUDIO_16LE = (0x00010000 | 16);
//! Set readtype to video frame size AUDIO to 32 bits (note, 16, 20, 24 will be shifted to most
significant, LE)
const unsigned long DTMR_READTYPE_FRAME_AUDIO_32LE = (0x00010000 | 32);
//! Set readtype to arbitrary sample AUDIO to 16 bits LE
const unsigned long DTMR_READTYPE_SAMPLE_AUDIO_16LE = (0x00110000 | 16);
//! Set readtype to arbitrary sample AUDIO to 32 bits (note, 16, 20, 24 will be shifted to most
significant, LE)
const unsigned long DTMR_READTYPE_SAMPLE_AUDIO_32LE = (0x00110000 | 32);



/** Open a new file, stream, or network source for preview
 */
DTMRHANDLE DTMRCALLTYPE dtmrOpen(char * szFileName, unsigned long dwFlags);
typedef DTMRHANDLE (DTMRCALLTYPE * p_dtmrOpen)(char * szFileName, unsigned long
dwFlags);

/** Special case:  Open a video and array of audio files
*  szFileNameVAA[0] = video file name
*  szFileNameVAA[1] = first audio file
```

```
*  szFileNameVAA[n] = last audio file
*  szFileNameVAA[n+1] = NULL for rest of audio entries
*/
DTMRHANDLE DTMRCALLTYPE dtmrOpenMulti(char * szFileNameVAA[17], unsigned long
dwFlags);

/** Close the currently open stream or file
 */
long DTMRCALLTYPE dtmrClose(DTMRHANDLE dtmr);
typedef long (DTMRCALLTYPE * p_dtmrClose)(DTMRHANDLE dtmr);

/** Returns recommended and supported read types
 */
long DTMRCALLTYPE dtmrGetReadTypes(DTMRHANDLE dtmr, unsigned long dwIndex, unsigned
long * pdwTypes);
typedef long (DTMRCALLTYPE * p_dtmrGetReadTypes)(DTMRHANDLE dtmr, unsigned long
dwIndex, unsigned long * pdwTypes);

/** The final file name used for the source file
 */
long DTMRCALLTYPE dtmrSourceFileName(DTMRHANDLE dtmr, char * tszMAX_PATHString);
typedef long (DTMRCALLTYPE * p_dtmrSourceFileName)(DTMRHANDLE dtmr, char *
tszMAX_PATHString);

/** Source video media's height
 */
long DTMRCALLTYPE dtmrSourceHeight(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceHeight)(DTMRHANDLE dtmr, long *pVal);

/** Source video media's width
 */
long DTMRCALLTYPE dtmrSourceWidth(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceWidth)(DTMRHANDLE dtmr, long *pVal);

/* Source video media's bit depth
 */
long DTMRCALLTYPE dtmrSourceBitDepth(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceBitDepth)(DTMRHANDLE dtmr, long *pVal);

/* Source video media's fourcc compression code
 */
long DTMRCALLTYPE dtmrSourceFourCC(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceFourCC)(DTMRHANDLE dtmr, long *pVal);
```

```
/* Source video media's bit rate
 */
long DTMRCALLTYPE dtmrSourceBitRate(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceBitRate)(DTMRHANDLE dtmr, long *pVal);

/* Source video media's frame size for the requested or current frame
 */
long DTMRCALLTYPE dtmrSourceFrameSize(DTMRHANDLE dtmr, long dwFrame, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceFrameSize)(DTMRHANDLE dtmr, long dwFrame, long
*pVal);

/* Source video total channels
 */
long DTMRCALLTYPE dtmrSourceVideoChannels(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceVideoChannels)(DTMRHANDLE dtmr, long *pVal);

/* Source audio total channels
 */
long DTMRCALLTYPE dtmrSourceAudioChannels(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceAudioChannels)(DTMRHANDLE dtmr, long *pVal);

/** Source audio media frequency
 */
long DTMRCALLTYPE dtmrSourceAudioFrequency(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceAudioFrequency)(DTMRHANDLE dtmr, long *pVal);

/** Source audio media bits per sample
 */
long DTMRCALLTYPE dtmrSourceAudioBitsPerSample(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceAudioBitsPerSample)(DTMRHANDLE dtmr, long
*pVal);

/* Source audio media's fourcc compression code
 */
long DTMRCALLTYPE dtmrSourceAudioFourCC(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceAudioFourCC)(DTMRHANDLE dtmr, long *pVal);

/** Return the duration (total number of frames) of the media
 */
long DTMRCALLTYPE dtmrDuration(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrDuration)(DTMRHANDLE dtmr, long *pVal);
```

```
/** Return the audio duration (total number of audio samples) of the media
 */
long DTMRCALLTYPE dtmrAudioDuration(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrAudioDuration)(DTMRHANDLE dtmr, long *pVal);

/** Source video rate value (FPS = SourceRate / SourceScale)
 */
long DTMRCALLTYPE dtmrSourceRate(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceRate)(DTMRHANDLE dtmr, long *pVal);

/** Source video scale value (FPS = SourceRate / SourceScale)
 */
long DTMRCALLTYPE dtmrSourceScale(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceScale)(DTMRHANDLE dtmr, long *pVal);

/** Return source metadata information that are numeric (DWORDs or longs)
 */
long DTMRCALLTYPE dtmrSourceMetaDataDWORD(DTMRHANDLE dtmr, long
dwMetaDataElement, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrSourceMetaDataDWORD)(DTMRHANDLE dtmr, long
dwMetaDataElement, long *pVal);

/** Return source metadata information that are string data
 */
long DTMRCALLTYPE dtmrSourceMetaDataSTR(DTMRHANDLE dtmr, long dwMetaDataElement,
char * szMAX_PATHString);
typedef long (DTMRCALLTYPE * p_dtmrSourceMetaDataSTR)(DTMRHANDLE dtmr, long
dwMetaDataElement, char * szMAX_PATHString);

/** Set the read type for the video frames
 */
long DTMRCALLTYPE dtmrSetReadType(DTMRHANDLE dtmr, long lReadType);
typedef long (DTMRCALLTYPE * p_dtmrSetReadType)(DTMRHANDLE dtmr, long lReadType);

/** Get the current absolute (zero based) Frame
 */
long DTMRCALLTYPE dtmrGetFrame(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrGetFrame)(DTMRHANDLE dtmr, long *pVal);

/** Set the current absolute (zero based) Frame
 */
long DTMRCALLTYPE dtmrSetFrame(DTMRHANDLE dtmr, long newVal);
typedef long (DTMRCALLTYPE * p_dtmrSetFrame)(DTMRHANDLE dtmr, long newVal);
```

```
/** Set the channel for the video frames (0, 1, 2, 3, 4 etc.) (0 = 0x03, 1 = 0x0C, 2 = 0x30, 3 = 0xC0 etc.)
 */
long DTMRCALLTYPE dtmrSetVideoChannel(DTMRHANDLE dtmr, long lVideoChannel);
typedef long (DTMRCALLTYPE * p_dtmrSetVideoChannel)(DTMRHANDLE dtmr, long lVideoChannel);

/** Set the audio channel pair to monitor (0  = 1+2, 1 = 3+4, 2 = 5+6, 3 = 7+8 etc.)
 */
long DTMRCALLTYPE dtmrSetAudioChannelPair(DTMRHANDLE dtmr, long lAudioChannelPair);
typedef long (DTMRCALLTYPE * p_dtmrSetAudioChannelPair)(DTMRHANDLE dtmr, long lAudioChannelPair);

/** Return the last GetVideoFrame VITC (vertical blank) time code
 */
long DTMRCALLTYPE dtmrLastVitcFrame(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrLastVitcFrame)(DTMRHANDLE dtmr, long *pVal);

/** Return the last GetVideoFrame VITC (vertical blank time code) user bits
 */
long DTMRCALLTYPE dtmrLastVitcUb(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrLastVitcUb)(DTMRHANDLE dtmr, long *pVal);

/** Return the last GetVideoFrame LTC (SMPTE) time code
 */
long DTMRCALLTYPE dtmrLastLtcFrame(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrLastLtcFrame)(DTMRHANDLE dtmr, long *pVal);

/** Return the last GetVideoFrame LTC (SMPTE time code) user bits
 */
long DTMRCALLTYPE dtmrLastLtcUb(DTMRHANDLE dtmr, long *pVal);
typedef long (DTMRCALLTYPE * p_dtmrLastLtcUb)(DTMRHANDLE dtmr, long *pVal);

/** GetVideoFrame returns a safe array containing one video frame
 */
long DTMRCALLTYPE dtmrGetVideoFrame(DTMRHANDLE dtmr, unsigned char * psvFrame, long * plSize);
typedef long (DTMRCALLTYPE * p_dtmrGetVideoFrame)(DTMRHANDLE dtmr, unsigned char * psvFrame, long * plSize);

/** GetAudioFrame returns a safe array containing one video frame worth of audio data
 */
```

```
long DTMRCALLTYPE dtmrGetAudioFrame(DTMRHANDLE dtmr, unsigned char * psaFrame, long *
plSize);
typedef long (DTMRCALLTYPE * p_dtmrGetAudioFrame)(DTMRHANDLE dtmr, unsigned char *
psaFrame, long * plSize);

/** Get current extended data
 */
long DTMRCALLTYPE dtmrGetCurExtendedData(DTMRHANDLE dtmr, unsigned char *pvData,
unsigned long * plFlags, long *plSize);
typedef long (DTMRCALLTYPE * p_dtmrGetCurExtendedData)(DTMRHANDLE dtmr, unsigned char
*pvData, unsigned long * plFlags, long *plSize);

//! Data is EIA-608B SD closed caption data field one (uses 2 bytes)
#define FRAMEINFO_DATA_F1_EIA608              0x00000001
//! Data is EIA-608B SD closed caption data field two (uses 2 bytes)
#define FRAMEINFO_DATA_F2_EIA608              0x00000002
//! Data is EIA-708 HD closed caption data (uses remaining bytes = minus the above)
#define FRAMEINFO_DATA_EIA708                 0x00000100

/** Get current closed captions (from last video frame loaded) including size and flags
 */
long DTMRCALLTYPE dtmrGetCurClosedCaptions(DTMRHANDLE dtmr, unsigned char *pvCC, long
*plCCSize, long * plCCFlags);
typedef long (DTMRCALLTYPE * p_dtmrGetCurClosedCaptions)(DTMRHANDLE dtmr, unsigned char
*pvCC, long *plCCSize, long * plCCFlags);

/** Advanced - send/return a mediacmd structure
*/
long DTMRCALLTYPE dtmrSetMode(DTMRHANDLE dtmr, void * pMediCmd);
typedef long (DTMRCALLTYPE * p_dtmrSetMode)(DTMRHANDLE dtmr, void * pMediCmd);

// dwFlags
        //! Send this in if you just need the filename (faster than getting all the info)
#define DPOSSIZENAME_FILENAME_ONLY            0x40000000        // Same as
DFRAME_SKIP_FRAME
        //! Flag for mediafile/avhal to get audio dframe
#define GetAudio      0x00000000
        //! Flag for mediafile/avhal to get video dframe
#define GetVideo      0x00000001

// dwFrameFlags
#define DPOSSIZENAME_VIDEO_FRAME      0x00000001
        //! Is this file type currently recording
```

```
#define DPOSSIZENAME_RECORDING                  0x00000004
        //! This frame needs to be made black (default frame) in MediaFile
#define DPOSSIZENAME_PLEASE_BLACK               _PDFRAMEFLAGS_PLEASE_BLACK
        //      0x00000080
        //! This is a mono audio chunk
#define DPOSSIZENAME_MONO_AUDIO_FRAME       0x00000100
        //! This is a stereo audio chunk
#define DPOSSIZENAME_STEREO_AUDIO_FRAME     0x00000200
#define DPOSSIZENAME_QUAD_AUDIO_FRAME       0x00000400
#define DPOSSIZENAME_4_1_AUDIO_FRAME    0x00000800
#define DPOSSIZENAME_5_1_AUDIO_FRAME    0x00001000
#define DPOSSIZENAME_7_1_AUDIO_FRAME    0x00002000
#define DPOSSIZENAME_9_1_AUDIO_FRAME    0x00004000
#define DPOSSIZENAME_AUDIO_MASK
        (DPOSSIZENAME_MONO_AUDIO_FRAME|DPOSSIZENAME_STEREO_AUDIO_FRAME|
DPOSSIZENAME_STEREO_AUDIO_FRAME|DPOSSIZENAME_QUAD_AUDIO_FRAME|
DPOSSIZENAME_4_1_AUDIO_FRAME|DPOSSIZENAME_5_1_AUDIO_FRAME|
DPOSSIZENAME_7_1_AUDIO_FRAME|DPOSSIZENAME_9_1_AUDIO_FRAME)
#define DPOSSIZENAME_FRAME_MASK                 0x0000FFFF
        //! This frame contains audio data see DFRAME::dwType
#define DFRAME_TYPE_AUDIO           0x00010000
        //! 16 bit audio
#define DPOSSIZENAME_AUD_16_16_BIT              0x00100000
        //! 20 bit audio in 24
#define DPOSSIZENAME_AUD_20_24_BIT              0x00200000
        //! 24 bit audio in 24
#define DPOSSIZENAME_AUD_24_24_BIT              0x00400000
        //! 24/32 bit audio in 32
#define DPOSSIZENAME_AUD_24_32_BIT              0x00800000
        //! 32/32 bit audio in 32
#define DPOSSIZENAME_AUD_32_32_BIT              0x01000000
        //! Audio is compressed
#define DPOSSIZENAME_AUD_COMPRESSED         0x02000000
        //! Audio is big endian, else little endian
#define DPOSSIZENAME_AUD_BIGENDIAN_BIT 0x00080000
        //! Just for completeness
#define DPOSSIZENAME_AUD_LITTLEENDIAN_BIT   0x00000000
        //! This frame is independent of other frames for decode see DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME        0x10000000
        //! This frame is independent of other frames for decode (an MPEG I Frame) see
DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME_I      0x10000000
        //! This frame requires previous keyframe(s) (for MPEG a P Frame) see DFRAME::dwType
```

```
#define DFRAME_TYPE_KEYFRAME_P    0x80000000
        //! This frame requires more than one frame to decode (for MPEG a B Frame) see
DFRAME::dwType
#define DFRAME_TYPE_KEYFRAME_B    0x20000000
        //! This frame should be skipped (decoded, but not displayed) - Used to reach seek frame on a
non key frame from key frame see DFRAME::dwType
#define DFRAME_SKIP_FRAME              0x40000000

/** Get info on a frame of audio or video
*/
long DTMRCALLTYPE dtmrGetFileFrameInfo(DTMRHANDLE dtmr, unsigned long dwFrame,
unsigned long dwChannels, unsigned long dwFlags,
                                                                    size_t * pnPosition, size_t *
pnSize, unsigned long * pdwFrameFlags,
                                                                    char * szFilePathAndName);
typedef long (DTMRCALLTYPE * p_dtmrGetFileFrameInfo)(DTMRHANDLE dtmr, unsigned long
dwFrame, unsigned long dwChannels, unsigned long dwFlags,
                                                                    size_t * pnPosition, size_t *
pnSize, unsigned long * pdwFrameFlags,
                                                                    char * szFilePathAndName);

#ifdef __cplusplus
}                       // PREVENT C++ NAME-MANGLING
#endif

////////////////////////////////////////////////////////////////////////////

#endif //__DTMEDIAREAD_DRASTIC_API_9204jrewf348j4_H_
```

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