

DTAPI

| CORE DTAPI CLASSES

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Table of Contents

| | | | |
|---|----------|--|------------|
| Structures | 5 | struct DtlpPars | 98 |
| struct DtAtsc3DemodL1Data | 5 | struct DtlpPars2 | 104 |
| struct DtAtsc3DemodBootstrapData | 6 | struct DtlpProfile | 110 |
| struct DtAtsc3DemodL1BasicData | 8 | struct DtlpQosStat | 113 |
| struct DtAtsc3DemodL1DetailData | 13 | struct DtlpStat | 114 |
| struct DtAtsc3DemodL1SubframeData | 14 | struct DtlSdbsLayerPars | 115 |
| struct DtAtsc3DemodL1PlpData | 17 | struct DtlSdbtLayerData | 116 |
| struct DtAtsc3StreamSelPars | 21 | struct DtlSdbtLayerPars | 117 |
| struct DtBsProgress | 22 | struct DtlSdbtParamData | 119 |
| struct DtCmPars | 23 | struct DtlSdbtStreamSelPars | 121 |
| struct DtCmPath | 24 | struct DtPar | 122 |
| struct DtConstelPoint | 25 | struct DtRawlpHeader | 123 |
| struct DtDabEnsembleInfo | 26 | struct DtRfLevel | 124 |
| struct DtDabService | 27 | struct DtRsDecStats | 125 |
| struct DtDabServiceComp | 28 | struct DtSdilpFrameStat | 126 |
| struct DtDabEtiStreamSelPars | 30 | struct DtTransmitter | 127 |
| struct DtDabStreamSelPars | 31 | struct DtSpsProgress | 128 |
| struct DtDabSubChannel | 32 | struct DtT2MiStreamSelPars | 129 |
| struct DtDabTransmitterId | 34 | struct DtVitDecStats | 130 |
| struct DtDabTransmitterIdInfo | 35 | Callback functions | 131 |
| struct DtDemodDvbS2ModCodSettings | 36 | DtBsProgressFunc | 131 |
| struct DtDemodLdpcStats | 37 | DtSpsProgressFunc | 132 |
| struct DtDemodMaLayerData | 38 | pDtEventCallback | 133 |
| struct DtDemodMaLayerStat | 39 | DtCmmbPars | 134 |
| struct DtDemodParsAtsc | 40 | DtCmmbPars | 134 |
| struct DtDemodParsAtsc3 | 41 | DtCmmbPars::RetrieveTsRateFromTs | 135 |
| struct DtDemodParsDab | 42 | DtDemodPars | 136 |
| struct DtDemodParsDvbC2 | 43 | DtDemodPars | 136 |
| struct DtDemodParsDvbS | 44 | DtDemodPars::CheckValidity | 137 |
| struct DtDemodParsDvbS2 | 45 | DtDemodPars::GetModType | 138 |
| struct DtDemodParsDvbS2Adv | 47 | DtDemodPars::SetModType | 139 |
| struct DtDemodParsDvbT | 48 | IDtDemodEvent | 141 |
| struct DtDemodParsDvbT2 | 50 | IDtDemodEvent::TuningParsHaveChanged | 141 |
| struct DtDemodParsLq | 51 | IDtDemodEvent::TuningFreqHasChanged | 142 |
| struct DtDemodParsLsdbt | 52 | DtlqDirectPars | 143 |
| struct DtDemodParsQam | 53 | DtlqDirectPars | 143 |
| struct DtDemodPlpBlocks | 55 | DtlqDirectPars::CheckValidity | 145 |
| struct DtDetVidStd | 56 | DtlSdbtPars | 146 |
| struct DtDeviceDesc | 57 | DtlSdbtPars | 146 |
| struct DtDvbC2DemodPlpSigDataPlp | 60 | DtlSdbtPars::CheckValidity | 149 |
| struct DtDvbC2DemodPlpSigData | 62 | DtlSdbtPars::ComputeRates | 150 |
| struct DtDvbC2DemodL1Part2Plp | 63 | DtlSdbtPars::RetrieveParsFromTs | 151 |
| struct DtDvbC2DemodL1Part2DSlice | 65 | DtSdi | 152 |
| struct DtDvbC2DemodL1Part2 | 67 | DtSdi | 152 |
| struct DtDvbC2NotchPars | 69 | DtSdi::ConvertFrame | 153 |
| struct DtDvbC2StreamSelPars | 70 | DtStatistic | 155 |
| struct DtDvbCidPars | 71 | struct DtStatistic | 155 |
| struct DtDvbS2ModCod | 72 | DtStatistic::GetValue | 159 |
| struct DtDvbTStreamSelPars | 73 | Global Functions | 160 |
| struct DtDvbTTPsInfo | 74 | ::DtapiCheckDeviceDriverVersion | 160 |
| struct DtDvbT2AuxPars | 77 | ::DtapiDeviceScan | 161 |
| struct DtDvbT2DemodL1PostPlp | 78 | ::DtapiDtDeviceDesc2String | 163 |
| struct DtDvbT2RfPars | 81 | ::DtapiDtHwFuncDesc2String | 164 |
| struct DtDvbT2DemodL1Data | 82 | ::DtapiGetDeviceDriverVersion | 166 |
| struct DtDvbT2ParamInfo | 88 | ::DtapiGetDtapiServiceVersion | 167 |
| struct DtDvbT2PlpPars | 89 | ::DtapiGetVersion | 168 |
| struct DtDvbT2StreamSelPars | 93 | | |
| struct DtEventArgs | 94 | | |
| struct DtFractionInt | 95 | | |
| struct DtHwFuncDesc | 96 | | |

| | | | |
|---|------------|---|------------|
| ::DtapiHwFuncScan..... | 169 | DtInpChannel::GetIpPars..... | 251 |
| ::DtapiInitDtIpParsFromIpString..... | 171 | DtInpChannel::GetIpStat..... | 252 |
| ::DtapiIoStd2VidStd..... | 172 | DtInpChannel::GetMaxFifoSize..... | 253 |
| ::DtapiModPars2SymRate..... | 173 | DtInpChannel::GetPars..... | 254 |
| ::DtapiModPars2TsRate..... | 174 | DtInpChannel::GetRxClkFreq..... | 255 |
| ::DtapiPower2Voltage..... | 176 | DtInpChannel::GetRxControl..... | 256 |
| ::DtapiRegisterCallback..... | 177 | DtInpChannel::GetRxMode..... | 257 |
| ::DtapiResult2Str..... | 178 | DtInpChannel::GetStatistics..... | 258 |
| ::DtapiUnregisterCallback..... | 179 | DtInpChannel::GetStatus..... | 259 |
| ::DtapiVidStd2IoStd..... | 180 | DtInpChannel::GetStreamSelection..... | 262 |
| ::DtapiVidStd2Str..... | 181 | DtInpChannel::GetSupportedPars..... | 263 |
| ::DtapiVoltage2Power..... | 182 | DtInpChannel::GetSupportedStatistics..... | 264 |
| DtDevice..... | 183 | DtInpChannel::GetTargetId..... | 265 |
| DtDevice::AttachToIpAddr..... | 183 | DtInpChannel::GetTsRateBps..... | 266 |
| DtDevice::AttachToSerial..... | 184 | DtInpChannel::GetTunerFrequency..... | 267 |
| DtDevice::AttachToSlot..... | 185 | DtInpChannel::GetViolCount..... | 268 |
| DtDevice::AttachToType..... | 186 | DtInpChannel::I2CLock..... | 269 |
| DtDevice::Detach..... | 187 | DtInpChannel::I2CRead..... | 270 |
| DtDevice::DetectIoStd..... | 188 | DtInpChannel::I2CUnlock..... | 271 |
| DtDevice::DetectVidStd..... | 189 | DtInpChannel::I2CWrite..... | 272 |
| DtDevice::FlashDisplay..... | 190 | DtInpChannel::I2CWriteRead..... | 273 |
| DtDevice::GetAttribute..... | 191 | DtInpChannel::LedControl..... | 275 |
| DtDevice::GetDescriptor..... | 193 | DtInpChannel::LnbEnable..... | 276 |
| DtDevice::GetDeviceDriverVersion..... | 194 | DtInpChannel::LnbEnableTone..... | 277 |
| DtDevice::GetDisplayName..... | 195 | DtInpChannel::LnbSendBurst..... | 278 |
| DtDevice::GetFanSpeed..... | 196 | DtInpChannel::LnbSendDiseqcMessage..... | 279 |
| DtDevice::GetFirmwareVersion..... | 197 | DtInpChannel::LnbSetVoltage..... | 280 |
| DtDevice::GetGenlockState..... | 198 | DtInpChannel::PolarityControl..... | 281 |
| DtDevice::GetIoConfig..... | 199 | DtInpChannel::Read..... | 282 |
| DtDevice::GetNwSpeed..... | 201 | DtInpChannel::ReadFrame..... | 284 |
| DtDevice::GetPowerStatus..... | 202 | DtInpChannel::RegisterDemodCallback..... | 285 |
| DtDevice::GetRefClkCnt..... | 203 | DtInpChannel::Reset..... | 286 |
| DtDevice::GetRefClkFreq..... | 205 | DtInpChannel::SetAdcSampleRate..... | 287 |
| DtDevice::GetTemperature..... | 206 | DtInpChannel::SetAntPower..... | 288 |
| DtDevice::GetUsbSpeed..... | 207 | DtInpChannel::SetDemodControl..... | 289 |
| DtDevice::GetVcxoState..... | 208 | DtInpChannel::SetErrorStatsMode..... | 292 |
| DtDevice::HwFuncScan..... | 209 | DtInpChannel::SetFifoSize..... | 293 |
| DtDevice::LedControl..... | 210 | DtInpChannel::SetIoConfig..... | 294 |
| DtDevice::RebootFirmware..... | 211 | DtInpChannel::SetIpPars..... | 295 |
| DtDevice::SetDisplayName..... | 213 | DtInpChannel::SetPars..... | 298 |
| DtDevice::SetIoConfig..... | 214 | DtInpChannel::SetPower..... | 299 |
| DtDevice::SetLicenseFromFile..... | 217 | DtInpChannel::SetRxControl..... | 300 |
| DtDevice::SetLicenseFromString..... | 218 | DtInpChannel::SetRxMode..... | 301 |
| DtDevice::SetNwSpeed..... | 219 | DtInpChannel::SetStreamSelection..... | 304 |
| DtDevice::VpdDelete..... | 220 | DtInpChannel::SetTunerFrequency..... | 305 |
| DtDevice::VpdRead..... | 222 | DtInpChannel::SpectrumScan..... | 306 |
| DtDevice::VpdWrite..... | 224 | DtInpChannel::Tune..... | 307 |
| DtInpChannel..... | 225 | DtOutpChannel..... | 309 |
| DtInpChannel..... | 225 | DtOutpChannel..... | 309 |
| DtInpChannel::AttachToPort..... | 226 | DtOutpChannel::AttachToPort..... | 310 |
| DtInpChannel::BlindScan..... | 228 | DtOutpChannel::ClearFifo..... | 311 |
| DtInpChannel::CancelBlindScan..... | 230 | DtOutpChannel::ClearFlags..... | 312 |
| DtInpChannel::CancelSpectrumScan..... | 231 | DtOutpChannel::Detach..... | 313 |
| DtInpChannel::ClearFifo..... | 232 | DtOutpChannel::GetAttribute..... | 314 |
| DtInpChannel::ClearFlags..... | 233 | DtOutpChannel::GetDescriptor..... | 315 |
| DtInpChannel::Detach..... | 234 | DtOutpChannel::GetExtClkFreq..... | 316 |
| DtInpChannel::DetectIoStd..... | 235 | DtOutpChannel::GetFailsafeAlive..... | 317 |
| DtInpChannel::GetConstellationPoints..... | 236 | DtOutpChannel::GetFailsafeConfig..... | 318 |
| DtInpChannel::GetDemodControl..... | 237 | DtOutpChannel::GetFifoLoad..... | 319 |
| DtInpChannel::GetDescriptor..... | 247 | DtOutpChannel::GetFifoSize..... | 320 |
| DtInpChannel::GetFifoLoad..... | 248 | DtOutpChannel::GetFlags..... | 321 |
| DtInpChannel::GetFlags..... | 249 | DtOutpChannel::GetIoConfig..... | 322 |
| DtInpChannel::GetIoConfig..... | 250 | DtOutpChannel::GetIpPars..... | 323 |
| | | DtOutpChannel::GetModControl..... | 324 |

| | |
|--|-----|
| DtOutpChannel::GetOutputLevel | 325 |
| DtOutpChannel::GetRfControl | 326 |
| DtOutpChannel::GetSpiClk | 327 |
| DtOutpChannel::GetTargetId | 328 |
| DtOutpChannel::GetTsRateBps | 329 |
| DtOutpChannel::GetTxControl | 330 |
| DtOutpChannel::GetTxMode | 331 |
| DtOutpChannel::LedControl | 332 |
| DtOutpChannel::Reset | 333 |
| DtOutpChannel::SetChannelModelling | 334 |
| DtOutpChannel::SetCustomRollOff | 335 |
| DtOutpChannel::SetFailsafeAlive | 336 |
| DtOutpChannel::SetFailsafeConfig | 337 |
| DtOutpChannel::SetFifoSize | 338 |
| DtOutpChannel::SetIoConfig | 339 |
| DtOutpChannel::SetIpPars | 340 |

| | |
|--|-----|
| DtOutpChannel::SetModControl | 343 |
| DtOutpChannel::SetOutputLevel | 372 |
| DtOutpChannel::SetMultiModConfig | 373 |
| DtOutpChannel::SetPower | 374 |
| DtOutpChannel::SetRfControl | 375 |
| DtOutpChannel::SetRfMode | 376 |
| DtOutpChannel::SetSnr | 377 |
| DtOutpChannel::SetSpiClk | 378 |
| DtOutpChannel::SetTsRateBps | 379 |
| DtOutpChannel::SetTsRateRatio | 380 |
| DtOutpChannel::SetTxControl | 381 |
| DtOutpChannel::SetTxMode | 383 |
| DtOutpChannel::SetTxPolarity | 387 |
| DtOutpChannel::Write | 388 |

Structures

struct DtAtsc3DemodL1Data

This structure specifies the ATSC layer-1 signaling data.

```
struct DtAtsc3DemodL1Data
{
    DtAtsc3DemodBootstrapData  m_Bootstrap; // Bootstrap data
    DtAtsc3DemodL1BasicData    m_L1Basic;    // L1-Basic data
    DtAtsc3DemodL1DetailData   m_L1Detail;   // L1-Detail data
};
```

Members

m_Bootstrap

Structure specifying the ATSC 3.0 bootstrap data. See **DtAtsc3DemodBootstrapData** for details.

m_L1Basic

Structure specifying the ATSC 3.0 L1-Basic signaling data. See **DtAtsc3DemodL1BasicData** for details.

m_L1Detail

Structure specifying the ATSC 3.0 L1-Detail signaling data. See **DtAtsc3DemodL1DetailData** for details.

struct DtAtsc3DemodBootstrapData

This structure specifies the ATSC 3.0 bootstrap signaling data.

```
struct DtAtsc3DemodBootstrapData
{
    int  m_MinorVersion;           // Bootstrap minor version
    int  m_NumSymbols;             // Number of bootstrap symbols
    int  m_EasWakeup;              // Emergency alert signal wake-up
    int  m_MinTimeToNext;          // Minimum time interval to next frame
    int  m_SystemBandwidth;         // Bandwidth of the post bootstrap signal
    int  m_BsrCoefficient;         // Sample rate post-bootstrap
    int  m_PreambleStructure;      // The structure of post-bootstrap symbols
    // Parameters derived from m_PreambleStructure
    int  m_L1BasicFecMode;         // L1-Basic FEC type mode
    int  m_PreambleFftSize;        // Preamble FFT size
    int  m_PreambleGuardInterval;  // Preamble guard interval
    int  m_PreamblePilotDx;        // Preamble pilot pattern Dx
};
```

Members

m_MinorVersion

Minor version. Minor version number signaled in the bootstrap. The valid range is 0 ... 7.

m_NumSymbols

Number of bootstrap symbols.

m_EasWakeup

Emergency alert signal wake-up. The valid range is 0 ... 3.

m_MinTimeToNext

Minimum time interval to next frame. The valid range is 0 ... 31.

m_SystemBandwidth

System bandwidth used for the post-bootstrap portion of the current frame.

| Value | Meaning |
|--------------------|--------------------|
| DTAPI_ATSC3_6MHZ | 6 MHz |
| DTAPI_ATSC3_7MHZ | 7 MHz |
| DTAPI_ATSC3_8MHZ | 8 MHz |
| DTAPI_ATSC3_GT8MHZ | Greater than 8 MHz |

m_BsrCoefficient

Sample rate post-bootstrap of the current frame = $(N+16) * 0.384\text{MHz}$. The valid range is 0 ... 127.

m_PreambleStructure

Signaling the structure of post-bootstrap symbols. Its value specifies the preamble FFT-size, preamble guard interval, preamble pilot and L1-Basic FEC mode according Annex H of ATSC 3.0 Physical Layer Protocol.

m_L1BasicFecMode

The FEC-type mode used for L1-Basic, derived from *m_PreambleStructure*. The valid range is 1 ... 5.

m_PreambleFftSize

The FFT-size used for the preamble symbols, derived from *m_PreambleStructure*.

| Value | Meaning |
|---------------------|---------|
| DTAPI_ATSC3_FFT_8K | 8K FFT |
| DTAPI_ATSC3_FFT_16K | 16K FFT |
| DTAPI_ATSC3_FFT_32K | 32K FFT |

m_PreambleGuardInterval

The guard interval between the preamble symbols, derived from *m_PreambleStructure*.

| Value | Meaning |
|------------------------|-----------|
| DTAPI_ATSC3_GI_1_192 | GI1_192 |
| DTAPI_ATSC3_GI_2_384 | GI2_384 |
| DTAPI_ATSC3_GI_3_512 | GI3_512 |
| DTAPI_ATSC3_GI_4_768 | GI4_768 |
| DTAPI_ATSC3_GI_5_1024 | GI5_1024 |
| DTAPI_ATSC3_GI_6_1536 | GI6_1536 |
| DTAPI_ATSC3_GI_7_2048 | GI7_2048 |
| DTAPI_ATSC3_GI_8_2432 | GI8_2432 |
| DTAPI_ATSC3_GI_9_3072 | GI9_3072 |
| DTAPI_ATSC3_GI_10_3648 | GI10_3648 |
| DTAPI_ATSC3_GI_11_4096 | GI11_4096 |
| DTAPI_ATSC3_GI_12_4864 | GI12_4864 |

m_PreamblePilotDx

The DX value of the preamble pilot pattern, derived from *m_PreambleStructure*.

| Value | Meaning |
|----------------------|---------|
| DTAPI_ATSC3_PP_DX_3 | DX=3 |
| DTAPI_ATSC3_PP_DX_4 | DX=4 |
| DTAPI_ATSC3_PP_DX_6 | DX=6 |
| DTAPI_ATSC3_PP_DX_8 | DX=8 |
| DTAPI_ATSC3_PP_DX_12 | DX=12 |
| DTAPI_ATSC3_PP_DX_16 | DX=16 |
| DTAPI_ATSC3_PP_DX_24 | DX=24 |
| DTAPI_ATSC3_PP_DX_32 | DX=32 |

struct DtAtsc3DemodL1BasicData

This structure specifies the ATSC 3.0 L1-Basic signaling data.

```
struct DtAtsc3DemodL1BasicData
{
    int  m_Version;           // L1-Basic structure version
    int  m_MimoScatPilotEnc;  // MIMO pilot encoding scheme
    bool m_LlsFlag;          // Low level signaling present (yes/no)
    int  m_TimeInfoFlag;     // Time information
    bool m_ReturnChannelFlag; // Dedicated return channel present (yes/no)
    int  m_Papr;             // PAPR reduction mode
    int  m_FrameLengthMode;  // Frame length mode (time/symbol aligned)
    int  m_FrameLength;      // Frame length in units of 5 milliseconds
    int  m_ExcessSamples;     // Number of excess samples included
    int  m_TimeOffset;        // Time offset
    int  m_AdditionalSamples; // Number of additional samples
    int  m_NumSubframes;     // Number of subframes

    // L1-Basic parameters for L1-Detail
    int  m_PreambleNumSymbols; // Number of preamble OFDM symbols
    int  m_PreambleReducedCarriers; // Preamble carrier reduction coeff
    int  m_L1DetailSize;       // Size of L1-Detail in number of bytes
    int  m_L1DetailFecMode;    // L1-Detail FEC-type mode
    int  m_L1DetailAddParity;  // L1-Detail additional parity mode
    int  m_L1DetailNumCells;   // Size of L1-Detail in number of OFDM cells

    // L1-Basic parameters for first subframe
    bool m_FirstSubMimo;      // MIMO
    int  m_FirstSubMiso;      // MISO
    int  m_FirstSubFftSize;   // FFT-size
    int  m_FirstSubReducedCarriers; // Carrier reduction coefficient
    int  m_FirstSubGuardInterval; // Guard interval
    int  m_FirstSubNumOfdmSymbols; // Number of payload OFDM symbol
    int  m_FirstSubPilotPattern; // Pilot pattern
    int  m_FirstSubPilotBoost; // Pilot power boost
    bool m_FirstSubSbsFirst;  // First symbol is a boundary symbol (yes/no)
    bool m_FirstSubSbsLast;   // Last symbol is a boundary symbol (yes/no)
};
```

Members

m_Version

L1-Basic structure version, shall be 0.

m_MimoScatPilotEnc

MIMO pilot encoding scheme.

| Value | Meaning |
|-------|--|
| 0 | Walsh-Hadamard pilots or no MIMO subframes |
| 1 | Null pilots |

m_LlsFlag

If true, indicates one or more PLPs carry low level signaling information.

m_TimeInfoFlag

Specifies the presence or absence of the timing information in the current frame.

| Value | Meaning |
|------------------------------|---|
| DTAPI_ATSC3_TIME_NONE | No time information is included |
| DTAPI_ATSC3_TIME_MS | Time information in millisecond precision is included |
| DTAPI_ATSC3_TIME_US | Time information in microsecond precision is included |
| DTAPI_ATSC3_TIME_NS | Time information in nanosecond precision is included |

m_ReturnChannelFlag

If true, a dedicated return channel (DRC) is present.

m_Papr

The peak to average power reduction method.

| Value | Meaning |
|--------------------------------|---|
| DTAPI_ATSC3_PAPR_NONE | None |
| DTAPI_ATSC3_PAPR_ACE | ACE - Active Constellation Extension |
| DTAPI_ATSC3_PAPR_TR | TR - Power reduction with reserved carriers |
| DTAPI_ATSC3_PAPR_ACE_TR | ACE and TR |

m_FrameLengthMode

Specifies the frame length alignment mode.

| Value | Meaning |
|---------------------------------|-----------------------|
| DTAPI_ATSC3_ALIGN_TIME | Time-aligned frames |
| DTAPI_ATSC3_ALIGN_SYMBOL | Symbol-aligned frames |

m_FrameLength

If *m_FrameLengthMode*==**DTAPI_ATSC3_ALIGN_TIME**, it specifies the length of a frame in units of 5 milliseconds. The valid values are 0 and 10 ... 1000.

m_ExcessSamples

If *m_FrameLengthMode*==**DTAPI_ATSC3_ALIGN_TIME**, it specifies the additional number of excess samples included in the guard interval of each non-preamble OFDM symbol.

m_TimeOffset

If *m_FrameLengthMode*==**DTAPI_ATSC3_ALIGN_SYMBOL**, it specifies the number of sample periods between the nearest preceding or coincident millisecond boundary and the leading edge of the frame.

m_AdditionalSamples

If *m_FrameLengthMode*==**DTAPI_ATSC3_ALIGN_SYMBOL**, it specifies the number of additional samples added at the end of a frame.

m_NumSubframes

Number of subframes. The valid range is 1 ... 256.

m_PreambleNumSymbols

Number of preamble OFDM symbols. The valid range is 1 ... 8.

m_PreambleReducedCarriers

Specifies the preamble carrier reduction. The valid range is 0 ... 4.

m_L1DetailSize

Specifies the size (in bytes) of the L1-Detail information.

m_L1DetailFecMode

The FEC-type mode used for L1-Detail. The valid range is 1 ... 7.

m_L1DetailAddParity

L1-Detail additional parity mode, specifying the ratio (K) of the number of additional parity bits. The valid range is 0 ... 2.

m_L1DetailNumCells

Specifies the size (in OFDM cells) of the coded and modulated L1-Detail + additional parity bits of the next frame.

m_FirstSubMimo

If true, MIMO is used for the first subframe.

m_FirstSubMiso

The MISO option used for the first subframe.

| Value | Meaning |
|-----------------------|----------------------------|
| DTAPI_ATSC3_MISO_NONE | No MISO |
| DTAPI_ATSC3_MISO_64 | MISO with 64 coefficients |
| DTAPI_ATSC3_MISO_256 | MISO with 256 coefficients |

m_FirstSubFftSize

FFT-size for the first subframe.

| Value | Meaning |
|---------------------|---------|
| DTAPI_ATSC3_FFT_8K | 8K FFT |
| DTAPI_ATSC3_FFT_16K | 16K FFT |
| DTAPI_ATSC3_FFT_32K | 32K FFT |

m_FirstSubReducedCarriers

Specifies the carrier reduction for the first subframe. The valid range is 0 ... 4.

m_FirstSubGuardInterval

The guard interval between data symbols for the first subframe.

| Value | Meaning |
|------------------------|-----------|
| DTAPI_ATSC3_GI_1_192 | GI1_192 |
| DTAPI_ATSC3_GI_2_384 | GI2_384 |
| DTAPI_ATSC3_GI_3_512 | GI3_512 |
| DTAPI_ATSC3_GI_4_768 | GI4_768 |
| DTAPI_ATSC3_GI_5_1024 | GI5_1024 |
| DTAPI_ATSC3_GI_6_1536 | GI6_1536 |
| DTAPI_ATSC3_GI_7_2048 | GI7_2048 |
| DTAPI_ATSC3_GI_8_2432 | GI8_2432 |
| DTAPI_ATSC3_GI_9_3072 | GI9_3072 |
| DTAPI_ATSC3_GI_10_3648 | GI10_3648 |
| DTAPI_ATSC3_GI_11_4096 | GI11_4096 |
| DTAPI_ATSC3_GI_12_4864 | GI12_4864 |

m_FirstSubNumOfdmSymbols

Specifies the total number of data payload OFDM symbols, including any subframe-boundary symbol(s) within the first subframe. The valid range is 1 ... 2048.

m_FirstSubPilotPatern

The scattered pilot pattern for the first subframe.

| Value | Meaning |
|---------------------|-----------------|
| DTAPI_ATSC3_PP_3_2 | SP3_2 / MP3_2 |
| DTAPI_ATSC3_PP_3_4 | SP3_4 / MP3_4 |
| DTAPI_ATSC3_PP_4_2 | SP4_2 / MP4_2 |
| DTAPI_ATSC3_PP_4_4 | SP4_4 / MP4_4 |
| DTAPI_ATSC3_PP_6_2 | SP6_2 / MP6_2 |
| DTAPI_ATSC3_PP_6_4 | SP6_4 / MP6_4 |
| DTAPI_ATSC3_PP_8_2 | SP8_2 / MP8_2 |
| DTAPI_ATSC3_PP_8_4 | SP8_4 / MP8_4 |
| DTAPI_ATSC3_PP_12_2 | SP12_2 / MP12_2 |
| DTAPI_ATSC3_PP_12_4 | SP12_4 / MP12_4 |
| DTAPI_ATSC3_PP_16_2 | SP16_2 / MP16_2 |
| DTAPI_ATSC3_PP_16_4 | SP16_4 / MP16_4 |
| DTAPI_ATSC3_PP_24_2 | SP24_2 / MP24_2 |
| DTAPI_ATSC3_PP_24_4 | SP24_4 / MP24_4 |
| DTAPI_ATSC3_PP_32_2 | SP32_2 / MP32_2 |
| DTAPI_ATSC3_PP_32_4 | SP32_4 / MP32_4 |

m_FirstSubPilotBoost

Specifies the power of the scattered pilots for the first subframe. The valid range is 0... 4.

m_FirstSubSbsFirst

If true, the first symbol of the first subframe is a subframe boundary symbol.

m_FirstSubSbsLast

If true, the last symbol of the first subframe is a subframe boundary symbol.

struct DtAtsc3DemodL1DetailData

This structure specifies the ATSC 3.0 L1-Detail signaling data.

```
struct DtAtsc3DemodL1DetailData
{
    int    m_Version;           // L1-Detail structure version
    int    m_NumRf;             // Number of frequencies in channel bonding
    int    m_RfFrequency[7];    // Other RF-channels in units of 10kHz
    // Time elapsed since the PTP epoch on 1st January 1970
    int    m_TimeSec;           // Seconds component
    int    m_TimeMillisec;      // Milliseconds component
    int    m_TimeMicrosec;      // Microseconds component
    int    m_TimeNanosec;       // Nanoseconds component
    __int64 m_AgeOfTimeInfo;    // The age of the time info in nanoseconds
    // Subframe data
    std::vector<DtAtsc3DemodL1SubframeData> m_Subframes;
};
```

Members

m_Version

L1-Detail structure version, shall be 0.

m_NumRf

Specifies the number of frequencies involved in channel bonding, not including the frequency of the present channel.

m_RfFrequency

An array, specifying the center frequencies (in 10kHz) of the other RF channels involved in channel bonding.

m_TimeSec

If `DtAtsc3DemodL1DetailData::m_FrameLengthMode != DTAPI_ATSC3_TIME_NONE`, it specifies the seconds component of the time information.

m_TimeMillisec

If `DtAtsc3DemodL1DetailData::m_FrameLengthMode == DTAPI_ATSC3_TIME_MS`, it specifies the milliseconds component of the time information.

m_TimeMicrosec

If `DtAtsc3DemodL1DetailData::m_FrameLengthMode == DTAPI_ATSC3_TIME_US`, it specifies the microseconds component of the time information.

m_TimeNanosec

If `DtAtsc3DemodL1DetailData::m_FrameLengthMode == DTAPI_ATSC3_TIME_NS`, it specifies the nanoseconds component of the time information.

m_AgeOfTimeInfo

Specifies the age of the last time information in nanoseconds.

m_Subframes

A vector specifying the ATSC 3.0 modulation parameters for the subframes.

Note: The L1-Basic first-subframe parameters are copied in the first element of the vector.

struct DtAtsc3DemodL1SubframeData

This structure specifies the ATSC 3.0 L1-Detail subframe signaling data.

```
struct DtAtsc3DemodL1SubframeData
{
    bool    m_Mimo;                // MIMO
    int     m_Miso;                // MISO
    int     m_FftSize;            // FFT-size
    int     m_ReducedCarriers;     // Carrier reduction coefficient
    int     m_GuardInterval;      // Guard interval
    int     m_NumOfdmSymbols;     // Number of payload OFDM symbol
    int     m_PilotPattern;       // Pilot pattern
    int     m_PilotBoost;         // Pilot power boost
    bool    m_SbsFirst;           // First symbol is a boundary symbol (yes/no)
    bool    m_SbsLast;            // Last symbol is a boundary symbol (yes/no)
    int     m_Multiplex;          // Subframe multiplex mode
    bool    m_FreqInterleaver;    // Frequency interleaver enabled
    int     m_SbsNumNullCells;    // Number of null cells in SBS
    // PLP data
    std::vector<DtAtsc3DemodL1PlpData> m_Plps;
};
```

Members

m_Mimo

If true, MIMO is used.

m_Miso

The MISO option used.

| Value | Meaning |
|-----------------------|----------------------------|
| DTAPI_ATSC3_MISO_NONE | No MISO |
| DTAPI_ATSC3_MISO_64 | MISO with 64 coefficients |
| DTAPI_ATSC3_MISO_256 | MISO with 256 coefficients |

m_FftSize

FFT-size.

| Value | Meaning |
|---------------------|---------|
| DTAPI_ATSC3_FFT_8K | 8K FFT |
| DTAPI_ATSC3_FFT_16K | 16K FFT |
| DTAPI_ATSC3_FFT_32K | 32K FFT |

m_ReducedCarriers

Specifies the carrier reduction. The valid range is 0 ... 4.

m_GuardInterval

The guard interval between data symbols.

| Value | Meaning |
|------------------------|---------|
| DTAPI_ATSC3_GI_1_192 | 1/192 |
| DTAPI_ATSC3_GI_2_384 | 2/384 |
| DTAPI_ATSC3_GI_3_512 | 3/512 |
| DTAPI_ATSC3_GI_4_768 | 4/768 |
| DTAPI_ATSC3_GI_5_1024 | 5/1024 |
| DTAPI_ATSC3_GI_6_1536 | 6/1536 |
| DTAPI_ATSC3_GI_7_2048 | 7/2048 |
| DTAPI_ATSC3_GI_8_2432 | 8/2432 |
| DTAPI_ATSC3_GI_9_3072 | 9/3072 |
| DTAPI_ATSC3_GI_10_3648 | 10/3648 |
| DTAPI_ATSC3_GI_11_4096 | 11/4096 |
| DTAPI_ATSC3_GI_12_4864 | 12/4864 |

m_NumOfdmSymbols

Specifies the total number of data payload OFDM symbols, including any subframe-boundary symbol(s) within the subframe. The valid range is 1 ... 2048.

m_PilotPattern

The scattered pilot pattern.

| Value | Meaning |
|---------------------|-----------------|
| DTAPI_ATSC3_PP_3_2 | SP3_2 / MP3_2 |
| DTAPI_ATSC3_PP_3_4 | SP3_4 / MP3_4 |
| DTAPI_ATSC3_PP_4_2 | SP4_2 / MP4_2 |
| DTAPI_ATSC3_PP_4_4 | SP4_4 / MP4_4 |
| DTAPI_ATSC3_PP_6_2 | SP6_2 / MP6_2 |
| DTAPI_ATSC3_PP_6_4 | SP6_4 / MP6_4 |
| DTAPI_ATSC3_PP_8_2 | SP8_2 / MP8_2 |
| DTAPI_ATSC3_PP_8_4 | SP8_4 / MP8_4 |
| DTAPI_ATSC3_PP_12_2 | SP12_2 / MP12_2 |
| DTAPI_ATSC3_PP_12_4 | SP12_4 / MP12_4 |
| DTAPI_ATSC3_PP_16_2 | SP16_2 / MP16_2 |
| DTAPI_ATSC3_PP_16_4 | SP16_4 / MP16_4 |
| DTAPI_ATSC3_PP_24_2 | SP24_2 / MP24_2 |
| DTAPI_ATSC3_PP_24_4 | SP24_4 / MP24_4 |
| DTAPI_ATSC3_PP_32_2 | SP32_2 / MP32_2 |
| DTAPI_ATSC3_PP_32_4 | SP32_4 / MP32_4 |

m_PilotBoost

Specifies the power of the scattered pilots for the subframe. The valid range is 0... 4.

m_SbsFirst

If true, the first symbol of the subframe is a subframe boundary symbol.

m_SbsLast

If true, the last symbol of the subframe is a subframe boundary symbol.

m_Multiplex

Specifies the current subframe is time-division multiplexed/concatenated in time with adjacent subframes, shall be 0.

m_FreqInterleaver

If true, the frequency interleaver is enabled and used, otherwise the frequency interleaver is bypassed and not used.

m_SbsNumNullCells

Specifies the number of null cells in the subframe boundary symbol(s) of the current subframe.

m_Plps

A vector specifying the ATSC 3.0 modulation parameters for the PLPs within the subframe.

struct DtAtsc3DemodL1PlpData

This structure specifies the ATSC 3.0 L1-Detail PLP signaling data.

```
struct DtAtsc3DemodL1PlpData
{
    int    m_Id;                // PLP ID
    bool   m_LlsFlag;           // Low level signaling present (yes/no)
    int    m_Layer;             // Layer (core/enhanced)
    int    m_Start;             // PLP's first data cel
    int    m_Size;              // Number of data cells allocated
    int    m_ScramblerType;     // Scrambler type
    int    m_FecCodeLength;     // FEC code length
    int    m_FecOuterCode;     // FEC outer code type
    int    m_Modulation;        // Modulation type
    int    m_CodeRate;          // Code rate
    int    m_TiMode;            // Time interleaver mode
    int    m_FecFrameStart;     // FEC frame start position
    int    m_CtiFecFrameStart;  // CTI FEC frame start position
    int    m_PlpType;           // PLP type
    int    m_NumSubslices;      // Number of subslices
    int    m_SubsliceInterval;  // Subslice interval
    bool   m_TiExtInterleaving; // Extended interleaving enabled
    int    m_CtiDepth;          // Convolutional time interleaver depth
    int    m_CtiStartRow;       // Start position of the interleaver
    bool   m_HtiInterSubframe;  // HTI inter-subframe interleaving is used
    int    m_HtiNumTiBlocks;    // Number of TI blocks
    int    m_HtiNumFecBlocksMax; // Maximum number of FEC blocks per
                                // interleaving frame
    int    m_HtiNumFecBlocks[16]; // Number of FEC blocks per contained in
                                // interleaving frames for the current PLP
    int    m_HtiCellInterleaver; // The cell interleaver is used

    int    m_LdmInjectLevel;    // LDM injection level
};
```

Members

m_Id

Unique identification of the PLP within an ATSC-system. The valid range is 0 ... 63.

m_LlsFlag

If true, indicates the PLP carries low level signaling information.

m_Layer

Specifies whether the PLP belongs to the core or to the enhanced layer.

| Value | Meaning |
|----------------------------|----------------|
| DTAPI_ATSC3_LAYER_CORE | Core layer |
| DTAPI_ATSC3_LAYER_ENHANCED | Enhanced layer |

m_Start

Specifies the index of the data cell that holds the first data cell of the current PLP in the current subframe.

m_Size

Specifies the number of data cells allocated to the current PLP within the current subframe.

m_ScramblerType

Specifies the choice of scrambler type, shall be 0.

m_FecCodeLength

The LDPC FEC coding used by the PLP.

| Value | Meaning |
|----------------------|----------|
| DTAPI_ATSC3_LDPC_16K | 16K LDPC |
| DTAPI_ATSC3_LDPC_64K | 64K LDPC |

m_FecOuterCode

The outer code type used by the PLP.

| Value | Meaning |
|------------------------|----------------|
| DTAPI_ATSC3_OUTER_BCH | BCH outer code |
| DTAPI_ATSC3_OUTER_CRC | CRC outer code |
| DTAPI_ATSC3_OUTER_NONE | No outer code |

m_Modulation

Modulation used by the PLP.

| Value | Meaning |
|---------------------|----------|
| DTAPI_ATSC3_QPSK | QPSK |
| DTAPI_ATSC3_QAM16 | 16-QAM |
| DTAPI_ATSC3_QAM64 | 64-QAM |
| DTAPI_ATSC3_QAM256 | 256-QAM |
| DTAPI_ATSC3_QAM1024 | 1024-QAM |
| DTAPI_ATSC3_QAM4096 | 4096-QAM |

m_CodeRate

Convolutional coding rate used by the PLP.

| Value | Meaning |
|-----------------------|---------|
| DTAPI_ATSC3_COD_2_15 | 2/15 |
| DTAPI_ATSC3_COD_3_15 | 3/15 |
| DTAPI_ATSC3_COD_4_15 | 4/15 |
| DTAPI_ATSC3_COD_5_15 | 5/15 |
| DTAPI_ATSC3_COD_6_15 | 6/15 |
| DTAPI_ATSC3_COD_7_15 | 7/15 |
| DTAPI_ATSC3_COD_8_15 | 8/15 |
| DTAPI_ATSC3_COD_9_15 | 9/15 |
| DTAPI_ATSC3_COD_10_15 | 10/15 |
| DTAPI_ATSC3_COD_11_15 | 11/15 |
| DTAPI_ATSC3_COD_12_15 | 12/15 |
| DTAPI_ATSC3_COD_13_15 | 13/15 |

m_TiMode

Time interleaver mode.

| Value | Meaning |
|-------------------------|---|
| DTAPI_ATSC3_TIMODE_NONE | No time interleaving |
| DTAPI_ATSC3_TIMODE_CTI | Convolutional time interleaver (CTI) mode |
| DTAPI_ATSC3_TIMODE-HTI | Hybrid time interleaver (HTI) mode |

m_FecFrameStart

Specifies the start position of the first FEC frame that begins within the current PLP during the current subframe.

m_CtiFecFrameStart

Specifies the start position of the first complete FEC frame for the current PLP leaving the CTI in the current or subsequent subframes.

m_PlpType

PLP type.

| Value | Meaning |
|-----------------------------|---------------|
| DTAPI_ATSC3_PLPTYPE_NONDISP | Non-dispersed |
| DTAPI_ATSC3_PLPTYPE_DISP | Dispersed |

m_TiExtInterleaving

If true, extended interleaving is used for this PLP.

m_CtiDepth

If *m_TiMode*==DTAPI_ATSC3_TIMODE_CTI, it specifies the convolutional time interleaver (CTI) depth.

| Value | Meaning |
|--------------------------|--|
| DTAPI_ATSC3_CTIDEPH_512 | 512 rows |
| DTAPI_ATSC3_CTIDEPH_724 | 724 rows |
| DTAPI_ATSC3_CTIDEPH_887 | 887 rows (1254 rows if extended interleaving is used) |
| DTAPI_ATSC3_CTIDEPH_1024 | 1024 rows (1448 rows if extended interleaving is used) |

m_CtiStartRow

If *m_TiMode*==DTAPI_ATSC3_TIMODE_CTI, it specifies the position of the interleaver selector at the start of the subframe.

m_HtiInterSubframe

If true, enable the HTI inter-subframe interleaving is used.

m_HtiNumTiBlocks

If the HTI inter-subframe interleaving is disabled: the number of time interleaver blocks per interleaving frame. If HTI inter-subframe interleaving is enabled: the number of subframes over which cells from one time interleaver block are carried.

m_HtiNumFecBlocksMax

The maximum number of FEC blocks per interleaving frame for the current PLP.

m_HtiNumFecBlocks[16]

The number of FEC blocks contained in the interleaving frames for the current PLP.

m_HtiCellInterleaver

If true, the HTI cell interleaving is used.

m_LdmInjectLevel

If *m_Layer*!=DTAPI_ATSC3_LAYER_CORE, it specifies the enhanced layer injection level relative to the core PLP.

Values 0...9 give an injection level: *m_LdmInjectLevel* / 2.0 dB.

Values 10...30 give an injection level: *m_LdmInjectLevel* - 5.0 dB.

struct DtAtsc3StreamSelPars

This structure specifies the criteria to select a PLP from an ATSC 3.0 stream.

```
struct DtAtsc3StreamSelPars
{
    int    m_PlpId;                // Data PLP ID
};
```

Members

m_PlpId

Unique identification of the data PLP within the ATSC 3.0 stream. The valid range is 0 ... 63 and **DTAPI_ATSC3_PLP_ID_AUTO**. The latter value specifies automatic selection of the data PLP.

struct DtBsProgress

This structure describes the progress of an asynchronous blind scan. Used by **DtInpChannel::BlindScan** to return the current state and the transmitters found by scanning a frequency band using the **DtBsProgressFunc** callback.

```
struct DtBsProgress
{
    __int64  m_FreqHz;           // Center frequency found
    DtDemodPars  m_DemodPars;    // Demodulator parameters found
    BsEvent  m_ProgressEvent;    // Progress event
    bool  m_ChannelFound;        // Channel is found
    DTAPI_RESULT  m_Result;      // Result of the blindscan
};
```

Members

m_FreqHz

The center frequency that was found for this transmitter.

m_DemodPars

The demodulator parameters found for this transmitter.

m_ProgressEvent

Enumeration defining the type of progress event.

| Value | Meaning |
|--------------|--|
| BS_STEP | One frequency step is completed |
| BS_CANCELLED | Blind scan is cancelled due to execution of DtInpChannel::CancelBlindscan or due to execution of a tuning function. |
| BS_DONE | The blind scan is completed |

m_ChannelFound

If set, the channel is found on the transmitter frequency.

m_Result

The result code of the blind scan.

struct DtCmPars

This structure specifies channel-modelling parameters. It's used to simulate the transmission distortions that may occur in the channel between a transmitter and a receiver.

```
struct DtCmPars
{
    bool    m_EnableAwgn;           // Enable white Gaussian noise injection
    double  m_Snr;                  // Signal-to-noise ratio in dB
    bool    m_EnablePaths;         // Enable multi-path simulation
    std::vector<DtCmPath> m_Paths;
};
```

Members

m_EnableAwgn

Enable Additive White Gaussian Noise (AWGN) injection.

m_Snr

Signal-to-noise ratio. The noise power is defined relative to an imaginative 0dB output signal of the modulator. This means that *m_Snr* is the real signal-to-noise ratio only if the accumulated power of the paths in *m_Paths* is 0dB.

m_EnablePaths

Enable the simulation of multiple transmission fading paths ("multi-path"). The common usage is to define one main path and several auxiliary paths for simulating echoes. If no paths are defined, a single 0dB path is used.

m_Paths

Vector of path parameters.

struct DtCmPath

This structure specifies the fading parameters for a single path in a multi-path simulation.

```
struct DtCmPath
{
    Type    m_Type;           // Type of path fading
    double  m_Attenuation;    // Attenuation in dB
    double  m_Delay;         // Delay in us
    double  m_Phase;         // Phase shift in degrees
    double  m_Doppler;       // Doppler frequency in Hz
};
```

Members

m_Type

Enumeration defining the type of path fading.

| Value | Meaning |
|-------------------|---|
| CONSTANT_DELAY | Constant delay/phase |
| CONSTANT_DOPPLER | Constant frequency shift |
| RAYLEIGH_JAKES | Rayleigh fading with Jakes power spectral density (mobile path model) |
| RAYLEIGH_GAUSSIAN | Rayleigh fading with Gaussian power spectral density (ionospheric path model) |

m_Attenuation

Attenuation in dB. The total attenuation of all paths should not exceed 0dB to avoid overflow of the channel simulator.

m_Delay

Delay in μs . The maximum delay for an 8MHz channel is $896\mu\text{s}$.

m_Phase

Constant phase shift in degrees. Used for **CONSTANT_DELAY** and **CONSTANT_DOPPLER**; Don't care for other path types.

m_Doppler

Doppler frequency shift in Hz for all paths except **CONSTANT_DELAY**. The corresponding Speed in m/s is: $\text{Speed} = f_{\text{doppler}} * 3.10^8 / f_{\text{RF}}$.

struct DtConstelPoint

This structure describes a constellation point in a receiver constellation diagram.

```
struct DtConstelPoint
{
    int    m_X;                // X-coordinate of the constellation point
    int    m_Y;                // Y-coordinate of the constellation point
};
```

Members

m_X, m_Y

The X- and Y-coordinate of the described constellation point.

struct DtDabEnsembleInfo

This structure describes the DAB ensemble information used for the statistic DTAPI_STAT_DAB_ENSEM_INFO.

```
struct DtDabEnsembleInfo
{
    int    m_CountryId;           // Country identifier
    int    m_EnsembleReference;   // Identifier of the ensemble
    int    m_ExtCountryCode;      // Extended country code
    int    m_InterTableId;        // International table identifier
    std::wstring m_Label;         // Label identifying this ensemble
    int    m_LocalTimeOffset;     // Local time offset in half hours from UTC
    int    m_LtoUnique;           // Covers one(=0) or several(=1) time zones
    int    m_TransmissionMode;    // Transmission mode: 1..4
    std::vector< DtDabService> m_Services; // Services in this ensemble
    std::map<int, DtDabSubChannel> m_SubChannels; // Sub-channels
};
```

Members

m_CountryId

Country identification as defined in TS 101 756.

m_EnsembleReference

The number of the ensemble allocated for use within a national area.

m_ExtCountryCode

Extended country code as defined in TS 101 756.

m_InterTableId

International table identifier as defined in TS 101 756.

m_Label

Label associated with this ensemble.

m_LocalTimeOffset

The Local Time Offset (LTO) for the ensemble. It is expressed in multiples of half hours in the range -12 hours to +12 hours.

m_TransmissionMode

DAB transmission mode: 1...4.

m_Services

A vector specifying the services in this ensemble.

m_SubChannels

A map specifying the sub-channels in this ensemble. The key in the map is the sub-channel identifier.

struct DtDabService

This structure describes a single service in the DAB ensemble. It is used in struct **DtDabEnsembleInfo**.

```
struct DtDabService
{
    int    m_CondAccessId;        // Conditional access identifier
    int    m_CountryId;          // Country identifier
    int    m_ExtCountryCode;      // Extended country code
    bool   m_IsLocal;            // True if local
    std::wstring m_Label;        // Label identifying this service
    int    m_ServiceReference;    // Identifier of the service
    std::vector<DtDabServiceComp> m_Components; // Service components
};
```

Members

m_CondAccessId

Access Control System (ACS) identifier used for the service.

m_CountryId

Country identification as defined in TS 101 756.

m_ExtCountryCode

Extended country code as defined in TS 101 756.

m_IsLocal

Indicates whether the service is available over the whole, or only a partial area served by the ensemble, **false**: whole ensemble service area; **true**: partial ensemble service area.

m_Label

Label associated with this service.

m_ServiceReference

Indicates the number of the service.

m_Components

A vector specifying the service components in this service.

struct DtDabServiceComp

This structure describes a single DAB service component. It is used in struct **DtDabService**.

```
struct DtDabServiceComp
{
    int    m_AudioServiceCompType; // Audio service component type
    int    m_DataServiceCompType;  // Data service component type
    int    m_FidChannelId;         // Fast information data channel identifier
    bool   m_HasCondAccess;        // True if access control applies
    int    m_IsPrimary;            // True if this is the primary component
    std::wstring m_Label;          // Label identifying this service component
    int    m_Language;             // Service component language
    int    m_SubChannelId;         // Subchannel identifier
    int    m_ServiceCompId;        // Service component identifier
    int    m_TransportMechanismId; // Transport mechanism identifier
};
```

Members

m_AudioServiceCompType

Type of the audio component if the transport mechanism is "MSC stream audio" else -1.

| Value | Meaning |
|-------|--|
| 0 | Foreground sound (MPEG 1/2 layer 2) |
| 1 | Background sound (MPEG 1/2 layer 2) |
| 2 | Multi-channel audio extension (MPEG 2 layer 2) |
| 63 | AAC audio (DAB+) (MPEG 4 HE AAC v2) |
| Other | Reserved |

m_DataServiceCompType

Type of the data service component as defined in TS 101 756 if the transport mechanism is "MSC stream data" else -1.

| Value | Meaning |
|-------|-------------------------------|
| 24 | MPEG-2 Transport Stream (DMB) |
| Other | Specified in TS 101 756 |

m_FidChannelId

Identifies the service component carried in the Fast Information Data Channel (FIDC) if the transport mechanism is "FIDC" else -1.

m_HasCondAccess

Indicates whether access control applies to the service component. **false**: no access control or access control applies only to a part of the service component; **true**: access control applies to the whole of the service component.

m_IsPrimary

Indicates whether the service component is the primary one, **false**: not primary (secondary); **true**: primary.

m_Label

Label associated with this service component.

m_Language

Indicates the language of the audio or data service component as defined in TS 101 756 or -1 if not available.

m_SubChannelId

Identifies the sub-channel in which the service component is carried if the transport mechanism is "MSC stream audio" or "MSC stream data" else -1.

m_ServiceCompId

Uniquely identifies the service component within the ensemble if the transport mechanism is "MSC packet data" else -1.

m_TransportMechanismId

The transport mechanism used.

| Value | Meaning |
|-------|--|
| 0 | Main Service Channel (MSC) - Stream mode - audio |
| 1 | Main Service Channel (MSC) - Stream mode - data |
| 2 | Fast Information Data Channel (FIDC) |
| 3 | Main Service Channel (MSC) - Packet mode - data |

struct DtDabEtiStreamSelPars

This structure specifies the selection parameters for a DAB Ensemble Transport Interface (ETI) stream.

```
struct DtDabEtiStreamSelPars
{
    // No parameters required
};
```

Members

DtDabEtiStreamSelPars structure has no members

Remark

All DAB sub-channels are selected and output in a DAB Ensemble Transport Interface (ETI) stream.

struct DtDabStreamSelPars

This structure specifies the criteria to select a sub-channel from a DAB stream.

```
struct DtDabStreamSelPars
{
    int  m_BitrateKbps;           // Bitrate in kbps
    int  m_ErrProtLevel;         // Error protection level
    int  m_ErrProtMode;          // Error protection mode
    int  m_ErrProtOption;        // Error protection option
    int  m_StartAddress;         // Start address in capacity units
    DtDabExtractionMode m_ExtractionMode; // DAB data extraction mode
};
```

Members

m_BitrateKbps

Specifies the bitrate of the channel in kbps. For UEP profile the valid range is: 32 ... 384 kbps and the bitrate must be a multiple of 8 kbps. For EEP profile the valid range is: 8 ... 2048 kbps and the bitrate must be a multiple of 8 kbps.

m_ErrProtLevel

Error protection level, the valid range for the UEP profile is: 1 ... 4; the valid range for the EEP profile is: 1 ... 5.

m_ErrProtMode

Error protection mode.

| Value | Meaning |
|---------------|--------------------------------|
| DTAPI_DAB_UEP | Unequal Error Protection (UEP) |
| DTAPI_DAB_EEP | Equal Error Protection (EEP) |

m_ErrProtOption

Protection level option for EEP: 0 or 1. Only meaningful for EEP profile.

m_StartAddress

Specifies the address of the first capacity unit (CU) of the sub-channel. The valid range is: 0 ... 863.

m_ExtractionMode

| Value | Meaning |
|--------------------|----------------------------|
| DAB_RAW | Raw DAB stream |
| DAB_EXTRACTION_AAC | AAC/DAB+ stream extraction |
| DAB_EXTRACTION_DMB | DMB stream extraction |

struct DtDabSubChannel

This structure describes a single DAB sub-channel. A DAB sub-channel contains the data for a single audio or data stream. Multiple service components can refer to the same sub-channel. `DtDabSubChannel` is used in struct `DtDabEnsembleInfo`.

```
struct DtDabSubChannel
{
    int    m_BitrateKbps;           // Bitrate in kbps
    int    m_ErrProtLevel;         // Error protection level
    int    m_ErrProtMode;         // Error protection mode
    int    m_ErrProtOption;        // Error protection option
    int    m_FecScheme;           // FEC scheme
    int    m_StartAddress;         // Start address in capacity units
    int    m_SubChannelId;         // Subchannel identifier
    int    m_SubChannelSize;       // Size of subchannel in capacity units
    int    m_UepTableIndex;        // Index in UEP table
    int    m_UepTableSwitch;       // UEP table switch
};
```

Members

m_BitrateKbps

The bitrate of the channel in kbps.

m_ErrProtLevel

Error protection level, for UEP profile: 1 ... 4; for EEP profile: 1 ... 5.

m_ErrProtMode

Error protection mode.

| Value | Meaning |
|----------------------------|--------------------------------|
| <code>DTAPI_DAB_UEP</code> | Unequal Error Protection (UEP) |
| <code>DTAPI_DAB_EEP</code> | Equal Error Protection (EEP) |

m_ErrProtOption

Protection level option, for EEP: 0 or 1. For UEP: -1.

m_FecScheme

Indicates the forward error correction (FEC) scheme in use, 0: no FEC scheme applied; 1: FEC for MSC packet mode; other values are reserved for future use.

m_StartAddress

The address of the first capacity unit (CU) of the sub-channel, range: 0 ... 863.

m_SubChannelId

Identifies the sub-channel.

m_SubChannelSize

The number of capacity units occupied by the sub-channel.

m_UepTableIndex

Index which identifies one of the 64 options available for the sub-channel size and protection level as defined in EN 300 401 table 6.

m_UepTableSwitch

Indicates whether the table index refers to table 6 or some other use, 0: table 6 is used; 1: reserved.

struct DtDabTransmitterId

This structure describes the DAB transmitter identification for a single transmitter, it is used in struct `DtDabTransmitterIdInfo`.

```
struct DtDabTransmitterId
{
    int    m_TxMainId;           // Transmitter main identifier
    int    m_TxSubId;           // Transmitter sub-identifier
    double m_RelativePowerdB;    // Relative transmitter power
};
```

Members

m_TxMainId

Transmitter main identifier; 0...5 for DAB transmission mode 3, otherwise 0...69.

m_TxSubId

Transmitter sub-identifier; 0...23

m_RelativePowerdB

Transmitter power, relative to total power in dB.

struct DtDabTransmitterIdInfo

This structure describes the DAB transmitter identification information (DAB-TII), used for the statistic `DTAPI_STAT_DAB_TXID_INFO`.

```
struct DtDabTransmitterIdInfo
{
    std::vector<DtDabTransmitterId> m_Transmitters;
};
```

Members

m_Transmitters

A vector specifying the identification information of all received transmitter signals.

struct DtDemodDvbS2ModCodSettings

This structure can be applied for a certain MODCOD.

```
struct DtDvbS2ModCodSettings
{
    bool    m_Enable;           // Demodulation of this MODCOD
    int     m_SnrThreshold;     // SNR threshold for automute algorithm
};
```

Members

m_Enable

Control if this MODCOD should be demodulated at all.

m_SnrThreshold

The SNR threshold to be used by the AutoMute algorithm for this MODCOD, in units of 0.1dB.

struct DtDemodLdpcStats

This structure describes the LDPC information used for the statistic `DTAPI_STAT_LDPC_STATS`.

```
struct DtDemodLdpcStats
{
    __int64 m_FecBlocksCount; // Total number of FEC blocks
    __int64 m_UncorrFecBlocksCount; // Number of uncorrected FEC blocks
    __int64 m_FecBlocksCount1; // Number of FEC blocks since last read
    __int64 m_FecBlocksItCount; // Total number of LDPC iterations
    int m_FecBlocksItMin; // Maximum number of LDPC iteration
    int m_FecBlocksItMax; // Maximum number of LDPC iteration
    __int64 m_BchBitCount; // Total number of decoded data bits
    __int64 m_BchBitErrorCount; // Bit error count before LDPC
};
```

Members

m_FecBlocksCount

The total number of decoded FEC-blocks.

m_UncorrFecBlocksCount

The total number of uncorrected FEC-blocks (not exact).

m_FecBlocksCount1

The number of decoded FEC-blocks, reset when the statistic is read.

m_FecBlocksItCount

The number of LDPC iterations, the average number of LDPC-iterations = $m_FecBlocksItCount / m_FecBlocksCount1$.

m_FecBlockCountItMin

The minimum number of LDPC-iterations for a FEC-block, reset when the statistic is read.

m_FecBlockCountItMax

The maximum number of LDPC-iterations for a FEC-block, reset when the statistic is read.

m_BchBitCount

The total number of decoded data bits, including BCH bits.

m_BchBitErrorCount

The bit error count before LDPC.

The BER before LDPC is approximately: $m_BchBitErrorCount / m_BchBitCount$, this is accurate if there are no uncorrected blocks ($m_UncorrFecBlocksCount = 0$).

struct DtDemodMaLayerData

This structure describes the DVB-C2/T2 mode adaptation layer information used for the statistic **DTAPI_STAT_MA_DATA**.

```
struct DtDemodMaLayerData
{
    bool    m_Hem;                // High Efficiency Mode: yes/no
    bool    m_Npd;                // Null Packet Deletion: yes/no
    int     m_Issy;               // ISSY mode. See DTAPI_DVBX2_ISSY_XXX
    int     m_IssyBufs;           // Current ISSY BUFS value
    int     m_IssyTto;            // Last ISSY TTO value (DVB-T2 only)
    int     m_IssyBufStat;        // Last ISSY BUFSTAT value (DVB-C2/S2 only)
};
```

Members

m_Hem

If true, the PLP uses High Efficiency Mode (HEM); Otherwise Normal Mode (NM) is used.

m_Npd

If true, Null Packet Deletion (NPD) is active, otherwise it is not active.

m_Issy

ISSY mode.

| Value | Meaning |
|---|---------------------------|
| DTAPI_DVBC2_ISSY_NONE / DTAPI_DVBT2_ISSY_NONE | No ISSY field is used |
| DTAPI_DVBC2_ISSY_SHORT/ DTAPI_DVBT2_ISSY_SHORT | 2-byte ISSY field is used |
| DTAPI_DVBC2_ISSY_LONG / DTAPI_DVBT2_ISSY_LONG | 3-byte ISSY field is used |

m_IssyBufs

Value of the ISSY BUFS parameter.

m_IssyTto

Last value of ISSY TTO, DVB-T2 only.

m_IssyBufStat

Last value of ISSY BUFSTAT, DVB-C2/S2 only.

struct DtDemodMaLayerStat

This structure describes the DVB-C2/T2 mode adaptation layer statistics used for the statistic `DTAPI_STAT_MA_STATS`.

```
struct DtDemodMaLayerStats
{
    __int64 m_HdrCrc8ErrorCount;    // Number BBframe header CRC8 errors
    __int64 m_PckCrc8ErrorCount;    // Number packet CRC8 errors (m_Hem=0)
    __int64 m_FramingErrorCount;    // SYNCED/DFL/UPD consistency errors
    __int64 m_CommonPlpResyncCount; // Number data-PLP common-PLP resyncs
};
```

Members

m_HdrCrc8ErrorCount

Number of CRC8 errors for BB-frame headers.

m_PckCrc8ErrorCount

Number of CRC8 errors for packets, only for HEM=0.

m_FramingErrorCount

Number of consistency errors found in SYNCED, DFL and UPD fields.

m_CommonPlpResyncCount

Number of times a resynchronization between data and common PLP was needed. It normally happens only in case of receive errors. This field is only updated in the corresponding data PLP.

struct DtDemodParsAtsc

This structure describes the demodulation parameters for ATSC.

```
struct DtDemodParsAtsc
{
    int    m_Constellation;    // VSB constellation
};
```

Members

m_Constellation
The VSB constellation.

| Value | Meaning | Symbol Rate (bd) | TS Rate (bps) |
|----------------------|---------|------------------|---------------|
| DTAPI_MOD_ATSC_VSB8 | 8-VSB | 10,762,238 | 19,392,658 |
| DTAPI_MOD_ATSC_VSB16 | 16-VSB | 10,762,238 | 38,785,317 |

struct DtDemodParsAtsc3

This structure describes the demodulation parameters for ATSC 3.0.

```
struct DtDemodParsDvbC2
{
    int    m_Bandwidth;           // Bandwidth
};
```

Members

m_Bandwidth
Bandwidth.

| Value | Meaning |
|------------------|---------|
| DTAPI_ATSC3_6MHZ | 6 MHz |
| DTAPI_ATSC3_7MHZ | 7 MHz |
| DTAPI_ATSC3_8MHZ | 8 MHz |

struct DtDemodParsDab

This structure describes the demodulation parameters for DAB.

```
struct DtDemodParsDab
{
    // Empty
};
```

Members

DtDemodParsDab structure has no members.

struct DtDemodParsDvbC2

This structure describes the demodulation parameters for DVB-C2.

```
struct DtDemodParsDvbC2
{
    int    m_Bandwidth;           // DVB-C2 Bandwidth (channel raster)
    bool   m_ScanL1Part2Data     // Scan for full L1Part2Data
};
```

Members

m_Bandwidth

Channel raster of the network.

| Value | Meaning |
|------------------|---------|
| DTAPI_DVBC2_6MHZ | 6 MHz |
| DTAPI_DVBC2_8MHZ | 8 MHz |

m_ScanL1Part2Data

Scan and cache the full L1Part2Data after each DVBC2 tune. If this flag is set, the statistic **DTAPI_STAT_DVBC2_L1P2DATA** returns all data slices including PLPs for the tuned channel instead of only the active. Setting this flag increases the time needed for tuning and locking.

struct DtDemodParsDvbS

This structure describes the demodulation parameters for DVB-S.

```
struct DtDemodParsDvbS
{
    int  m_CodeRate;           // DVB-S code rate
    int  m_SpecInv;            // Spectral inversion (yes/no)
    int  m_SymRate;            // Symbol rate in baud
};
```

Members

m_CodeRate
DVB-S code rate

| Value | Meaning |
|-------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_CR_AUTO | Autodetect code rate |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

m_SpecInv
Spectral inversion

| Value | Meaning |
|-----------------------------|--------------------------------------|
| DTAPI_MOD_S_S2_SPECNONINV | No spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV | Spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV_AUTO | Autodetect spectrum inversion |
| DTAPI_MOD_S_S2_SPECINV_UNK | Spectrum inversion status is unknown |

m_SymRate
The symbol rate (in bd). The value **DTAPI_MOD_SYMRATE_AUTO** specifies automatic detection of the symbol rate. The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

struct DtDemodParsDvbS2

This structure describes the demodulation parameters for DVB-S2.

```
struct DtDemodParsDvbs2
{
    int  m_CodeRate;           // DVB-S.2 code rate
    int  m_FecFrame;          // Long or short FEC-frames
    int  m_Pilots;             // Pilots (yes/no)
    int  m_SpecInv;            // Spectral inversion (yes/no)
    int  m_SymRate;            // Symbol rate in baud
};
```

Members

m_CodeRate

DVB-S.2 code rate

| Value | Meaning |
|-------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_1_3 | Code rate 1/3 |
| DTAPI_MOD_1_4 | Code rate 1/4 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_2_5 | Code rate 2/5 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_3_5 | Code rate 3/5 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_8_9 | Code rate 8/9 |
| DTAPI_MOD_9_10 | Code rate 9/10 |
| DTAPI_MOD_CR_AUTO | Autodetect code rate |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

m_FecFrame

FEC-frame length

| Value | Meaning |
|-----------------------|-----------------------------|
| DTAPI_MOD_S2_SHORTFRM | Short FEC-frame |
| DTAPI_MOD_S2_LONGFRM | Long FEC-frame |
| DTAPI_MOD_S2_FRM_AUTO | Autodetect FEC-frame length |
| DTAPI_MOD_S2_FRM_UNK | FEC-frame length is unknown |

m_Pilots

DVB-S.2 pilots

| Value | Meaning |
|--------------------------|--------------------------|
| DTAPI_MOD_S2_NOPILOTS | Pilots disabled |
| DTAPI_MOD_S2_PILOTS | Pilots enabled |
| DTAPI_MOD_S2_PILOTS_AUTO | Autodetect pilots status |
| DTAPI_MOD_S2_PILOTS_UNK | Pilots status is unknown |

m_SpecInv

Spectral inversion

| Value | Meaning |
|-----------------------------|--------------------------------------|
| DTAPI_MOD_S_S2_SPECNONINV | No spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV | Spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV_AUTO | Autodetect spectrum inversion |
| DTAPI_MOD_S_S2_SPECINV_UNK | Spectrum inversion status is unknown |

m_SymRate

The symbol rate (in bd). The value **DTAPI_MOD_SYMRATE_AUTO** specifies automatic detection of the symbol rate. The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

struct DtDemodParsDvbS2Adv

This structure describes the advanced demodulation parameters for DVB-S2. This structure is a derived class from `DtDemodParsDvbS2`. This structure should be used to control the demodulation of each individual MODCODs in case of VCM streams.

```
struct DtDemodParsDvbS2Adv : DtDemodParsDvbS2
{
    bool    m_AutoMuteModCods;    // Enable AutoMute algorithm. MODCODs with
                                // a SNR threshold above the current SNR
                                // will not be demodulated.
    int     m_HysteresisMargin;   // Margin to add on top of the SNR threshold
                                // before re-enabling a certain MODCOD,
                                // in units of 0.1 dB
    std::map<DtDvbS2ModCod, DtDemodDvbS2ModCodSettings> m_ModCods;
                                // List with supported MODCODs

    // Methods
    DTAPI_RESULT DeleteModCod(DtDvbS2ModCod ModCod);
    DTAPI_RESULT InitSnrThreshold(int TypeNumber);
    DTAPI_RESULT SetModCod(DtDvbS2ModCod ModCod,
                           DtDemodDvbS2ModCodSettings &Settings);
};
```

Members

m_AutoMuteModCods

Enable for the AutoMute algorithm. When enabled, MODCODs with a SNR below the configured threshold will not be demodulated, in order to robustly demodulate the other MODCODs in the stream.

m_HysteresisMargin

The margin which is added on top of the SNR threshold before re-enabling a certain MODCOD, in units of 0.1 dB.

m_ModCods

List of MODCODs which are supported by the device, which contains the settings for each MODCOD. `DtDemodParsDvbS2Adv::InitSnrThreshold` set the list with MODCODs.

Methods

DeleteModCod(DtDvbS2ModCod ModCod)

Delete a member from the MODCOD list, in order to exclude this MODCOD from the AutoMute algorithm.

InitSnrThreshold(int TypeNumber)

Init the list of MODCODs *m_ModCods* for a certain device type, e.g. 2137 from DTA-2137(C).

SetModCod(DtDvbS2ModCod ModCod, DtDemodDvbS2ModCodSettings &Settings)

Change the settings for a certain MODCOD, e.g. the SNR threshold to be used by the AutoMute algorithm or control if this MODCOD should be demodulated at all.

struct DtDemodParsDvbT

This structure describes the demodulation parameters for DVB-T.

```
struct DtDemodParsDvbT
{
    int  m_Bandwidth;           // Bandwidth
    int  m_CodeRate;           // Code rate
    int  m_Constellation;       // Constellation
    int  m_Guard;              // Guard interval
    int  m_Interleaving;       // Interleaving
    int  m_Mode;               // Transmission mode
};
```

Members

m_Bandwidth
Bandwidth.

| Value | Meaning |
|-----------------|---------|
| DTAPI_DVBT_6MHZ | 6 MHz |
| DTAPI_DVBT_7MHZ | 7 MHz |
| DTAPI_DVBT_8MHZ | 8 MHz |

m_CodeRate
DVB-T code rate

| Value | Meaning |
|-------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_CR_AUTO | Autodetect code rate |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

m_Constellation
Constellation

| Value | Meaning |
|------------------------|--------------------------|
| DTAPI_MOD_DVBT_QPSK | QPSK |
| DTAPI_MOD_DVBT_QAM16 | 16-QAM |
| DTAPI_MOD_DVBT_QAM64 | 64-QAM |
| DTAPI_MOD_DVBT_CO_AUTO | Autodetect constellation |
| DTAPI_MOD_DVBT_CO_UNK | Constellation is unknown |

m_Guard

Guard interval

| Value | Meaning |
|------------------------|---------------------------|
| DTAPI_MOD_DVBT_G_1_32 | 1/32 |
| DTAPI_MOD_DVBT_G_1_16 | 1/16 |
| DTAPI_MOD_DVBT_G_1_8 | 1/8 |
| DTAPI_MOD_DVBT_G_1_4 | 1/4 |
| DTAPI_MOD_DVBT_GU_AUTO | Autodetect guard interval |
| DTAPI_MOD_DVBT_G_UNK | Guard interval is unknown |

m_Interleaving

Interleaving

| Value | Meaning |
|------------------------|-------------------------------|
| DTAPI_MOD_DVBT_INDEPTH | In-depth interleaver (2k, 4k) |
| DTAPI_MOD_DVBT_NATIVE | Native interleaver |
| DTAPI_MOD_DVBT_IL_AUTO | Autodetect interleaving |
| DTAPI_MOD_DVBT_IL_UNK | Interleaving is unknown |

m_Mode

Transmission mode

| Value | Meaning |
|------------------------|------------------------------|
| DTAPI_MOD_DVBT_2K | 2k mode |
| DTAPI_MOD_DVBT_8K | 8k mode |
| DTAPI_MOD_DVBT_MD_AUTO | Autodetect transmission mode |
| DTAPI_MOD_DVBT_MD_UNK | Transmission mode is unknown |

struct DtDemodParsDvbT2

This structure describes the demodulation parameters for DVB-T2.

```
struct DtDemodParsDvbT2
{
    int    m_Bandwidth;           // Bandwidth
    int    m_T2Profile;          // DVB-T2 profile
};
```

Members

m_Bandwidth
Bandwidth.

| Value | Meaning |
|--------------------|---------|
| DTAPI_DVBT2_1_7MHZ | 1.7 MHz |
| DTAPI_DVBT2_5MHZ | 5 MHz |
| DTAPI_DVBT2_6MHZ | 6 MHz |
| DTAPI_DVBT2_7MHZ | 7 MHz |
| DTAPI_DVBT2_8MHZ | 8 MHz |
| DTAPI_DVBT2_10MHZ | 10 MHz |

m_T2Profile
DVB-T2 profile

| Value | Meaning |
|--------------------------|--------------|
| DTAPI_DVBT2_PROFILE_BASE | Base profile |
| DTAPI_DVBT2_PROFILE_LITE | Lite profile |

struct DtDemodParsIq

This structure describes the parameters for reception of I/Q samples.

```
Struct DtDemodParsDvbT2
{
    int    m_Bandwidth;           // Signal bandwidth in Hz
    int    m_IqDemodType;        // Modulation type
    int    m_SampleRate;         // Sample rate in Hz
};
```

Members

m_Bandwidth

Bandwidth in Hz. The valid bandwidth values are: 1700000, 5000000, 6000000, 7000000, 8000000 and 10000000 Hz.

m_IqDemodType

The input signal's modulation type.

| Value | Meaning |
|------------------|-----------------------|
| DTAPI_DEMOD_OFDM | OFDM modulated signal |
| DTAPI_DEMOD_QAM | QAM modulated signal |

m_SampleRate

Sample rate in Hz.

struct DtDemodParsIsdbt

This structure describes the demodulation parameters for ISDB-T.

```
struct DtDemodParsIsdbt
{
    int  m_Bandwidth;           // Bandwidth
    int  m_SubChannel;         // Sub-channel number
    int  m_NumberOfSegments;    // Initial total number of segments
};
```

Members

m_Bandwidth
Bandwidth.

| Value | Meaning |
|---------------------|---------|
| DTAPI_ISDBT_BW_5MHZ | 5 MHz |
| DTAPI_ISDBT_BW_6MHZ | 6 MHz |
| DTAPI_ISDBT_BW_7MHZ | 7 MHz |
| DTAPI_ISDBT_BW_8MHZ | 8 MHz |

m_SubChannel
Sub-channel number (0 ... 41) of the centre segment of the spectrum. The default is 22.

m_NumberOfSegments
Number of Segments

| Value | Meaning |
|---------------------|--------------------|
| DTAPI_ISDBT_SEGM_1 | 1 ISDB-T segment |
| DTAPI_ISDBT_SEGM_3 | 3 ISDB-T segments |
| DTAPI_ISDBT_SEGM_13 | 13 ISDB-T segments |

struct DtDemodParsQam

This structure describes the demodulation parameters for QAM-A, B and C.

```
struct DtDemodParsQam
{
    int  m_Annex;           // ITU-T J.83 annex
    int  m_Interleaving;    // Interleaving; ignored vor Annex A and C
    int  m_SymRate;         // Symbol rate in baud
};
```

Members

m_Annex

ITU-T J.83 Annex.

| Value | Meaning |
|-----------------|-------------------------------|
| DTAPI_MOD_J83_A | J.83 annex A (DVB-C) |
| DTAPI_MOD_J83_B | J.83 annex B ("American QAM") |
| DTAPI_MOD_J83_C | J.83 annex C ("Japanese QAM") |

m_Interleaving

For J.83 Annex B, this parameter specifies the interleaving mode detected as specified in the table below. For Annex A and C this parameter is not used.

| Value | CW | I | J | Burst protection 64-/256-QAM |
|-------------------------|------|-----|----|------------------------------|
| DTAPI_MOD_QAMB_I128_J1D | 0001 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I64_J2 | 0011 | 64 | 2 | 47 μ s / 33 μ s |
| DTAPI_MOD_QAMB_I32_J4 | 0101 | 32 | 4 | 24 μ s / 16 μ s |
| DTAPI_MOD_QAMB_I16_J8 | 0111 | 16 | 8 | 12 μ s / 8.2 μ s |
| DTAPI_MOD_QAMB_I8_J16 | 1001 | 8 | 16 | 5.9 μ s / 4.1 μ s |
| DTAPI_MOD_QAMB_I128_J1 | 0000 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I128_J2 | 0010 | 128 | 2 | 190 μ s / 132 μ s |
| DTAPI_MOD_QAMB_I128_J3 | 0100 | 128 | 3 | 285 μ s / 198 μ s |
| DTAPI_MOD_QAMB_I128_J4 | 0110 | 128 | 4 | 379 μ s / 264 μ s |
| DTAPI_MOD_QAMB_I128_J5 | 1000 | 128 | 5 | 474 μ s / 330 μ s |
| DTAPI_MOD_QAMB_I128_J6 | 1010 | 128 | 6 | 569 μ s / 396 μ s |
| DTAPI_MOD_QAMB_I128_J7 | 1100 | 128 | 7 | 664 μ s / 462 μ s |
| DTAPI_MOD_QAMB_I128_J8 | 1110 | 128 | 8 | 759 μ s / 528 μ s |
| DTAPI_MOD_QAMB_IL_AUTO | - | - | - | Autodetect interleaving mode |
| DTAPI_MOD_QAMB_IL_UNK | - | - | - | Interleaving mode is unknown |

m_SymRate

The symbol rate (in bd). The value **DTAPI_MOD_SYMRATE_AUTO** specifies automatic detection of the symbol rate. The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

Remarks

For DTA-2136 and DTA-2139 J.83 annex A (DVB-C) QAM-128 is not supported

struct DtDemodPlpBlocks

This structure describes the number of FEC-blocks for DVB-C2/T2 used for the statistic **DTAPI_STAT_PLP_BLOCKS**.

```
struct DtDemodMaLayerStats
{
    int  m_NumBlocks;           // Last plp_num_blocks value
    int  m_NumBlocksMin;       // Minimum plp_num_blocks value
    int  m_NumBlocksMax;       // Maximum plp_num_blocks value
};
```

Members

m_NumBlocks
Last plp_num_blocks value.

m_NumBlocksMin
Minimum plp_num_blocks value, set to -1 when the statistic is read.

m_NumBlocksMax
Maximum plp_num_blocks value, reset when the statistic is read.

struct DtDetVidStd

This structure describes the video standard as detected on an input port.

```
struct DtDetVidStd
{
    int    m_VidStd;           // Detected video standard
    int    m_LinkStd;          // Detected link standard
    int    m_LinkNr;           // Link nr for multi-link standards
    unsigned int m_Vpid;        // Raw VPID extracted from the SDI stream
    unsigned int m_Vpid2;       // Raw VPID from link 2, only for 3G lvl B
};
```

Members

m_VidStd

DTAPI_VIDSTD_XXX, the video standard detected at the input.

m_LinkStd

DTAPI_VIDLNK_* for video standards with multiple mappings, otherwise -1.

m_LinkNr

Link number for multi-link standards, otherwise -1.

m_Vpid

Raw VPID as extracted from the SDI stream.

m_Vpid2

For 3G level B signals, the raw VPID as extracted from stream 2.

struct DtDeviceDesc

This structure describes a DekTec device.

```
struct DtDeviceDesc
{
    int    m_Category;           // Device category (DTAPI_CAT_XXX)
    int64  m_Serial;            // Unique serial number of the device
    int    m_PciBusNumber;      // PCI-bus number
    int    m_SlotNumber;        // PCI-slot number
    int    m_UsbAddress;        // USB address
    int    m_TypeNumber;        // Device type number
    int    m_SubType;           // Device subtype (0=none, 1=A, ...)
    int    m_DeviceId;          // Device ID
    int    m_VendorId;          // Vendor ID
    int    m_SubsystemId;       // Subsystem ID
    int    m_SubVendorId;       // Subsystem Vendor ID
    int    m_NumHwFuncs;        // #Hardware functions hosted by device
    int    m_HardwareRevision;  // Hardware revision (e.g. 302 = 3.2)
    int    m_FirmwareVersion;   // Firmware version
    int    m_FirmwareVariant;   // Firmware variant
    int    m_NumDtInpChan;      // Number of input channels
    int    m_NumDtOutpChan;     // Number of output channels
    int    m_NumPorts;          // Number of physical ports
    unsigned char m_Ip[4];       // IPv4 address
    unsigned char m_IpV6[3][16]; // 3x IPv6 address
    unsigned char m_MacAddr[6]; // MAC address
};
```

Members

m_Category

Code indicating the device category.

| Value | Meaning |
|---------------|--|
| DTAPI_CAT_PCI | PCI or PCI-Express device |
| DTAPI_CAT_USB | USB-2 or USB-3 device |
| DTAPI_CAT_NW | Pseudo category that is used to refer to the network aspect of a device. This category value is used for getting the device driver version of the network driver and to refer to network related events. |
| DTAPI_CAT_IP | Network appliance: DTE-31xx |
| DTAPI_CAT_NIC | Non-DekTec network card (local NIC) |

m_Serial

The serial number that uniquely identifies the device.

m_PciBusNumber, m_SlotNumber

For devices in category **DTAPI_CAT_PCI**, these integers identify the PCI bus and slot number in which the PCI card is installed. For other categories, the values are undefined.

m_UsbAddress

For devices in category **DTAPI_CAT_USB**, this number identifies the USB address of the device. For other categories, the value is undefined.

m_TypeNumber

This integer corresponds to the integer in the DekTec type identifier for the device, e.g. 2144 for the DTA-2144.

m_SubType

This integer identifies the subtype of the device.

| Value | Meaning |
|-------|---|
| -1 | The driver could not establish a value for subtype ¹ . |
| 0 | Subtype is not applicable (no suffix to type number) |
| 1 | The type number is suffixed by 'A' |
| 2 | The type number is suffixed by 'B' |
| :: | etc. |

Example: If *m_TypeNumber* is 2137 and *m_SubType* is 3, the full type number is DTA-2137C.

m_DeviceId, m_VendorId, m_SubsystemId, m_SubVendorId

Device ID, Vendor ID, Subsystem ID and Subsystem Vendor ID. Identification information of the device, as read from its PCI configuration-space registers.

m_NumHwFuncs

Number of hardware functions hosted by the device.

m_HardwareRevision

Hardware revision of the device, encoded as major hardware revision times 100 plus minor hardware revision. For example, *m_HardwareRevision*=102 corresponds to hardware revision r1.2, while *m_HardwareRevision*=310 corresponds to r3.10.

m_FirmwareVersion

Version number of the firmware loaded in the device.

m_FirmwareVariant

Variant of the firmware loaded on the device. This is not used in the current set of DekTec devices, but future devices may support multiple variants of the firmware each with different functionality.

m_NumDtInpChan

Number of input channels available on the device. For devices that have ports that are software programmable as input or output, the maximum number of input channels is used. IP ports count as 1 input channel and 1 output channel.

m_NumDtOutpChan

Number of output channels available on the device. For devices that have ports that are software programmable as input or output, the maximum number of output channels is used. IP ports count as 1 input channel and 1 output channel.

¹ This is an error condition that cannot occur for a correctly working board.

m_NumPorts

Number of physical ports available on the device. Doubly-buffered outputs count as a single port.

m_Ip

For devices in category **DTAPI_CAT_IP** and **DTAPI_CAT_NIC**, this member identifies the IPv4 address of the device. Otherwise, the value of this member is undefined.

m_IpV6[3]

For devices in category **DTAPI_CAT_IP** and **DTAPI_CAT_NIC**, this member identifies the IPv6 addresses of the device (if the device supports IPv6 and IPv6 is enabled). Otherwise, the values of this member are undefined.

m_Mac

For devices in category **DTAPI_CAT_IP** and **DTAPI_CAT_NIC**, this member identifies the MAC address of the device. Otherwise, the value of this member is undefined.

struct DtDvbC2DemodPlpSigDataPlp

This structure specifies the DVB-C2 layer-1 signalling data for one physical layer pipe (PLP).

```
struct DtDvbC2DemodPlpSigDataPlp
{
    int    m_Id;                // PLP ID: 0...255
    int    m_FecType;           // FEC type
    int    m_CodeRate;          // Code rate
    int    m_Modulation;        // Modulation type
    int    m_HdrCntr;           // Header counter
};
```

Members

m_Id

Unique identification of the PLP within a C2 system. The valid range is 0 ... 255.

m_FecType

FEC type used by the PLP.

| Value | Meaning |
|----------------------|----------|
| DTAPI_DVBC2_LDPC_16K | 16K LDPC |
| DTAPI_DVBC2_LDPC_64K | 64K LDPC |

m_CodeRate

Convolutional coding rate used by the PLP.

| Value | Meaning |
|----------------------|--------------------|
| DTAPI_DVBC2_COD_2_3 | 2/3 |
| DTAPI_DVBC2_COD_3_4 | 3/4 |
| DTAPI_DVBC2_COD_4_5 | 4/5 |
| DTAPI_DVBC2_COD_5_6 | 5/6 |
| DTAPI_DVBC2_COD_8_9 | 8/9 (for 16K FEC) |
| DTAPI_DVBC2_COD_9_10 | 9/10 (for 64K FEC) |

m_Modulation

Modulation used by the PLP.

| Value | Meaning |
|----------------------|-----------|
| DTAPI_DVBC2_QAM16 | 16-QAM |
| DTAPI_DVBC2_QAM64 | 64-QAM |
| DTAPI_DVBC2_QAM256 | 256-QAM |
| DTAPI_DVBC2_QAM1024 | 1024-QAM |
| DTAPI_DVBC2_QAM4096 | 4096-QAM |
| DTAPI_DVBC2_QAM16384 | 16384-QAM |
| DTAPI_DVBC2_QAM65536 | 65536-QAM |

m_HdrCtr

Header counter field, number of FEC-frames following the FEC-frame header.

| Value | Meaning |
|-------|--------------|
| 0 | 1 FEC frame |
| 1 | 2 FEC frames |

Remarks

For type-1 data slices this structure contains the PLP signalling information from the layer-1 part-2 signalling data. For type-2 data slices this structure contains the PLP signalling information from the layer-1 part-1 signalling data (=FEC-frame header).

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbC2DemodPlpSigData

This structure specifies the DVB-C2 layer-1 signalling information for the physical layer pipes.

```
struct DtDvbC2DemodPlpSigData
{
    int    m_NumPlps;           // Number of PLPs
    std::vector<DtDvbC2DemodPlpSigDataPlp> m_Plps;
};
```

Members

m_NumPlps

Specifies the number of physical layer pipes signalled in the DVB-C2 layer-1 signalling data.

m_Plps

A vector specifying the DVB-C2 layer-1 signalling data for the physical layer pipes (not necessarily for each detected PLP).

struct DtDvbC2DemodL1Part2Plp

This structure specifies the DVB-C2 layer-1 part 2 signalling information for one physical layer pipe (PLP).

```
struct DtDvbC2DemodL1Part2Plp
{
    int    m_Id;                // PLP ID: 0...255
    int    m_Bundled;           // PLP bundled (yes/no)
    int    m_Type;              // PLP type
    int    m_PayloadType;       // PLP payload type
    int    m_GroupId;           // PLP group ID
    int    m_Start;             // Start of first complete XFEC-frame
    int    m_FecType;           // FEC type
    int    m_Modulation;        // Modulation type
    int    m_CodeRate;          // Code rate
    int    m_PsiSiReproc;       // PSI/SI reprocessing is performed (yes/no)
    int    m_TsId;              // Transport stream ID
    int    m_OnwId;             // Original network ID
};
```

Members

m_Id

Unique identification of the PLP within a C2 system. The valid range is 0 ... 255.

m_Bundled

If '1', the associated PLP is bundled with other PLP(s) within the current C2 system. All the bundled PLPs have the same PLP ID.

m_Type

PLP type.

| Value | Meaning |
|------------------------------|------------------|
| DTAPI_DVBC2_PLP_TYPE_COMMON | Common PLP |
| DTAPI_DVBC2_PLP_TYPE_GROUPED | Grouped data PLP |
| DTAPI_DVBC2_PLP_TYPE_NORMAL | Normal data PLP |

m_PayloadType

PLP payload type.

| Value | Meaning |
|--------------------------|--|
| DTAPI_DVBC2_PAYLOAD_GFPS | Generic Fixed-length Packetized Stream |
| DTAPI_DVBC2_PAYLOAD_GCS | Generic Continuous Stream |
| DTAPI_DVBC2_PAYLOAD_GSE | Generic Stream Encapsulation |
| DTAPI_DVBC2_PAYLOAD_TS | Transport Stream |

m_GroupId

Identifies the PLP group with which the PLP is associated.

m_Start

Start position of the first complete XFEC-frame of the PLP. Not set for type 2 data slices.

m_FecType

FEC type used by the PLP. Not set for type 2 data slices.

| Value | Meaning |
|----------------------|----------|
| DTAPI_DVBC2_LDPC_16K | 16K LDPC |
| DTAPI_DVBC2_LDPC_64K | 64K LDPC |

m_Modulation

Modulation used by the PLP. Not set for type 2 data slices.

| Value | Meaning |
|----------------------|-----------|
| DTAPI_DVBC2_QAM16 | 16-QAM |
| DTAPI_DVBC2_QAM64 | 64-QAM |
| DTAPI_DVBC2_QAM256 | 256-QAM |
| DTAPI_DVBC2_QAM1024 | 1024-QAM |
| DTAPI_DVBC2_QAM4096 | 4096-QAM |
| DTAPI_DVBC2_QAM16384 | 16384-QAM |
| DTAPI_DVBC2_QAM65536 | 65536-QAM |

m_CodeRate

Convolutional coding rate used by the PLP. Not set for type 2 data slices.

| Value | Meaning |
|----------------------|--------------------|
| DTAPI_DVBC2_COD_2_3 | 2/3 |
| DTAPI_DVBC2_COD_3_4 | 3/4 |
| DTAPI_DVBC2_COD_4_5 | 4/5 |
| DTAPI_DVBC2_COD_5_6 | 5/6 |
| DTAPI_DVBC2_COD_8_9 | 8/9 (for 16K FEC) |
| DTAPI_DVBC2_COD_9_10 | 9/10 (for 64K FEC) |

m_PsiSiReproc

If '1', indicates that PSI/SI has been reprocessed.

m_TsId, m_OnwId

If *m_PsiSiReproc* is set to '1', these members specify the transport stream ID and original network ID of the transport stream in the PLP. A receiver will use these fields if it can't rely on the PSI/SI.

Remarks

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbC2DemodL1Part2DSlice

This structure specifies the DVB-C2 layer-1 part-2 signalling information for one data slice.

```
struct DtDvbC2DemodL1Part2DSlice
{
    int    m_Id;                // Data slice ID
    int    m_TunePosition;      // Tune position
    int    m_OffsetLeft;       // Data slice left offset (start position)
    int    m_OffsetRight;      // Data slice right offset (end position)
    int    m_TiDepth;          // Time interleaving depth
    int    m_Type;             // Data slice type
    int    m_FecHdrType;       // FEC header type
    int    m_ConstConfig;      // Constant data slice configuration (yes/no)
    int    m_LeftNotch;        // Left notch present (yes/no)
    int    m_NumPlps;          // Number of PLPs
    std::vector<DtDvbC2DemodL1Part2Plp> m_Plps;
};
```

Members

m_Id

Unique identification of the data slice within a C2 system.

m_TunePosition

Tune position of the associated data slice relative to the start frequency of the C2 system, in multiples of pilot carrier spacing.

m_OffsetLeft

Start position of the associated data slice by means of the distance to the left from the tuning position, in multiples of the pilot carrier spacing.

m_OffsetRight

End position of the associated data slice by means of the distance to the right from the tuning position, in multiples of the pilot carrier spacing.

m_TiDepth

Time interleaving depth within the associated data slice.

| Value | Meaning |
|-------------------------|----------------------|
| DTAPI_DVBC2_TIDEPH_NONE | No time interleaving |
| DTAPI_DVBC2_TIDEPH_4 | 4 OFDM symbols |
| DTAPI_DVBC2_TIDEPH_8 | 8 OFDM symbols |
| DTAPI_DVBC2_TIDEPH_16 | 16 OFDM symbols |

m_Type

Data slice type.

| Value | Meaning |
|---------------------------|-------------------|
| DTAPI_DVBC2_DSLICE_TYPE_1 | Data slice type 1 |
| DTAPI_DVBC2_DSLICE_TYPE_2 | Data slice type 2 |

m_FecHdrType

FEC frame header type.

| Value | Meaning |
|--------------------------------|----------------------|
| DTAPI_DVBC2_FECHDR_TYPE_ROBUST | Robust mode |
| DTAPI_DVBC2_FECHDR_TYPE_HEM | High efficiency mode |

m_ConstConfig

If '1', indicates that the configuration of the associated data slice shall not change; otherwise, the configuration is assumed to be variable.

m_LeftNotch

If '1', indicates the presence of a left neighboured notch band.

m_NumPlps

Specifies the number of physical layer pipes signalled in the layer 1 signalling part 2 data.

m_Plps

A vector specifying the DVB-C2 layer 1 signalling part 2 data for the physical layer pipes (not necessarily for each detected PLP).

Remarks

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbC2DemodL1Part2

This structure specifies the DVB-C2 layer-1 part-2 signalling information.

```
struct DtDvbC2DemodL1Part2
{
    int  m_NetworkId;           // Network ID
    int  m_C2SystemId;          // C2 system ID
    int  m_StartFrequency;       // Start frequency
    int  m_C2Bandwidth;          // Bandwidth of the generated signal
    int  m_GuardInterval;        // Guard interval
    int  m_C2FrameLength;        // Number of symbols per C2 frame
    int  m_L1P2ChangeCtr;        // Value of L1_PART2_CHANGE_COUNTER field
    int  m_ReservedTone;         // Reserved tones present (yes/no)

    // Data-slice parameters
    int  m_NumDSlices;           // Number of data slices
    std::vector< DtDvbC2DemodL1Part2DSlice> m_DSlices;
    // Notches
    int  m_NumNotches;           // Number of notches
    std::vector< DtDvbC2NotchPars> m_Notches;
};
```

Members

m_NetworkId

Network ID. Unique identification of the DVB-C2 network.

m_C2SystemId

C2 system ID. Unique identification of a C2 system.

m_StartFrequency

Start frequency of the C2 system by means of the distance from 0Hz in multiples of the carrier spacing (D_x). ($D_x=24$ for guard interval 1/128 and $D_x=12$ for guard interval 1/64).

m_C2Bandwidth

Bandwidth of the generated signal in multiples of pilot carrier spacing.

m_GuardInterval

The guard interval between OFDM symbols.

| Value | Meaning |
|----------------------|---------|
| DTAPI_DVBC2_GI_1_128 | 1/128 |
| DTAPI_DVBC2_GI_1_64 | 1/64 |

m_C2FrameLength

The number of data symbols per C2 frame.

m_L1P2ChangeCtr

The value of the L1_PART2_CHANGE_COUNTER field, indicating the number of C2 frames ahead where the configuration will change.

m_ReservedTone

If '1', indicates one or more reserved tones (carriers) are used.

m_NumDSlices

Specifies the number of data slices signalled in the layer-1 signalling part-2 data.

m_DSlices

A vector specifying the layer-1 signalling part-2 data for the data slices (not necessarily for each detected data slice).

m_NumNotches

Specifies the number of notch bands signalled in the layer-1 signalling part-2 data.

m_Notches

A vector specifying the layer-1 signalling part-2 data for the notches (not necessarily for each detected notch).

Remarks

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbC2NotchPars

This structure specifies a DVB-C2 notch band. It is used in class **DtDvbC2Pars** and in structure **DtDvbC2DemodL1Part2Data**.

```
struct DtDvbC2NotchPars
{
    int    m_Start;           // Notch start
    int    m_Width;          // Notch width
};
```

Members

m_Start

Start position of the notch band relative to the start frequency of the C2 system. The start position is indicated in multiples of the pilot carrier spacing.

The valid range is 0 ... 8191 if the guard interval is 1/128.

The valid range is 0 ... 16383 if the guard interval is 1/64.

m_Width

Width of the notch band indicated in multiples of the pilot carrier spacing.

The valid range is 0 ... 255 if the guard interval is 1/128.

The valid range is 0 ... 511 if the guard interval is 1/64.

struct DtDvbC2StreamSelPars

This structure specifies the criteria to select a PLP from a DVB-C2 stream.

```
struct DtDvbC2StreamSelPars
{
    int    m_DSliceId;           // Data slice ID
    int    m_PlpId;             // Data PLP ID
    int    m_CommonPlpId;       // Common PLP ID
};
```

Members

m_DSliceId

Unique identification of the data slice within the DVB-C2 stream. Valid values are: 0 ... 255 and **DTAPI_DVBC2_DSLICE_ID_AUTO**. The latter value specifies automatic selection of the data slice. In this case the first PLP is selected.

m_PlpId

Unique identification of the data PLP within the DVB-C2 stream. The valid range is 0 ... 255 and **DTAPI_DVBC2_PLP_ID_AUTO**. The latter value specifies automatic selection of the data PLP.

m_CommonPlpId

Unique identification of the common PLP within the DVB-C2 stream. It will be combined with the selected data PLP. The valid values are: 0 ... 255, **DTAPI_DVBC2_PLP_ID_NONE** and **DTAPI_DVBC2_PLP_ID_AUTO**.

The value **DTAPI_DVBC2_PLP_ID_NONE** indicates that no common PLP is selected. The value **DTAPI_DVBC2_PLP_ID_AUTO** indicates automatic selection of the common PLP.

struct DtDvbCidPars

This structure specifies the DVB channel identification for satellite (DVB-S2) signals, ETSI TS 103 129.

```
struct DtDvbCidPars
{
    bool    m_Enable;           // Enable DVB-CID signalling
    unsigned int  m_GuidHigh;    // DVB-CID Global Unique Identifier MSBs
    unsigned int  m_GuidLow;    // DVB-CID Global Unique Identifier LSBs
    // CID content. Key: Content ID (0...31);
    //                      Value: Content information field(24-bit)
    std::map<int, int>  m_Content;
};
```

Members

m_Enable

Enable the insertion of DVB channel identification signaling information in the RF-signal.

m_GuidHigh

The 32 most significant bits of the DVB channel identification Global Unique Identifier

m_GuidLow

The 32 least significant bits of the DVB channel identification Global Unique Identifier

m_Content

Map that specifies the DVB channel identification content, according ETSI TS 103 129 table 1.
The key in the map is the Content ID. The value stored in the map is the information field.

Content ID 0 (carrier ID format) shall have the value 0x0001

struct DtDvbS2ModCod

This structure specifies a single DVB-S2 MODCOD.

```
struct DtDvbS2ModCod
{
    int    m_ModType;           // Modulation type, e.g. DTAPI_MOD_DVBS2_QPSK
    int    m_CodeRate;         // Code rate, e.g. DTAPI_MOD_1_2
};
```

Members

m_ModType

The modulation type, e.g. DTAPI_MOD_DVBS2_QPSK

m_CodeRate

The code rate, e.g. DTAPI_MOD_1_2

struct DtDvbTStreamSelPars

This structure specifies the selection parameters for a DVB-T transport stream.

```
struct DtDvbTStreamSelPars
{
    // No parameters required
};
```

Members

Remarks

No additional parameters are required to select a DVB-T transport stream. Hierarchical DVB-T demodulation is not supported.

struct DtDvbTTpsInfo

This structure describes the DVB-T Transmission Parameter Signalling (TPS) information used for the statistic `DTAPI_STAT_DVBT_TPS_INFO`.

```
struct DtDvbTTpsInfo
{
    int    m_LengthIndicator;    // TPS length indicator
    int    m_Constellation;      // Constellation
    int    m_HpCodeRate;        // High priority stream code rate
    int    m_LpCodeRate;        // Low priority stream code rate
    int    m_Guard;             // Guard interval
    int    m_Interleaving;      // Interleaving
    int    m_Mode;              // Transmission mode
    int    m_Hierarchy;         // Hierarchy information
    int    m_CellId;            // Cell identifier or -1 if not available
    int    m_HpS48S49;          // High priority S48 and S49
    int    m_LpS48S49;          // Low priority S48 and S49
    int    m_OddS50_S53;        // S50...S53 of the odd frames
    int    m_EvenS50_S53;       // S50...S53 of the even frames
};
```

Members

m_LengthIndicator

TPS length indicator field.

m_Constellation

DVB-T constellation pattern.

| Value | Meaning |
|-----------------------------------|---------|
| <code>DTAPI_MOD_DVBT_QPSK</code> | QPSK |
| <code>DTAPI_MOD_DVBT_QAM16</code> | 16-QAM |
| <code>DTAPI_MOD_DVBT_QAM64</code> | 64-QAM |

m_HpCodeRate, m_LpCodeRate

High priority stream and low priority stream code rate.

| | |
|----------------------------|---------------|
| <code>DTAPI_MOD_1_2</code> | Code rate 1/2 |
| <code>DTAPI_MOD_2_3</code> | Code rate 2/3 |
| <code>DTAPI_MOD_3_4</code> | Code rate 3/4 |
| <code>DTAPI_MOD_5_6</code> | Code rate 5/6 |
| <code>DTAPI_MOD_7_8</code> | Code rate 7/8 |

m_Guard

Guard interval.

| Value | Meaning |
|------------------------------------|---------|
| <code>DTAPI_MOD_DVBT_G_1_32</code> | 1/32 |
| <code>DTAPI_MOD_DVBT_G_1_16</code> | 1/16 |

| | |
|----------------------|-----|
| DTAPI_MOD_DVBT_G_1_8 | 1/8 |
| DTAPI_MOD_DVBT_G_1_4 | 1/4 |

m_Interleaving

Interleaving.

| Value | Meaning |
|------------------------|-------------------------------|
| DTAPI_MOD_DVBT_INDEPTH | In-depth interleaver (2k, 4k) |
| DTAPI_MOD_DVBT_NATIVE | Native interleaver |

m_Mode

Transmission mode.

| Value | Meaning |
|-------------------|-----------------|
| DTAPI_MOD_DVBT_2K | 2k mode |
| DTAPI_MOD_DVBT_4K | 4k mode (DVB-H) |
| DTAPI_MOD_DVBT_8K | 8k mode |

m_Hierarchy

Hierarchy information.

| Value | Meaning |
|--------------------------------|------------------|
| DTAPI_MOD_DVBT_HARCHY_N ONE | Non hierarchical |
| DTAPI_MOD_DVBT_HARCHY_A 1 | Alpha = 1 |
| DTAPI_MOD_DVBT_HARCHY_A 2 | Alpha = 2 |
| DTAPI_MOD_DVBT_HARCHY_A 4 | Alpha = 4 |

m_CellId

16-bit cell identifier (cell_id) or -1 if not available.

m_HpS48S49, m_LpS48S49

High priority stream and low priority stream S48 and S49 bits for DVB-H or -1 if not available.
The values may be OR-ed together.

| Value | Meaning |
|------------------------|--|
| DTAPI_MOD_DVBT_S48_OFF | Time slicing is not used |
| DTAPI_MOD_DVBT_S48 | At least one elementary stream uses Time Slicing |
| DTAPI_MOD_DVBT_S49_OFF | MPE-FEC is not used |
| DTAPI_MOD_DVBT_S49 | At least one elementary stream uses MPE-FEC |

m_OddS50_S53, m_EvenS50_53

Reserved bits of odd and even frames.

struct DtDvbT2AuxPars

This structure specifies the DVB-T2 auxiliary stream information from the layer-1 post signalling data.

```
struct DtDvbT2AuxPars
{
    int  m_AuxStreamType;      // Auxiliary stream type
    int  m_AuxPrivateConfig;   // Auxiliary stream info
};
```

Members

m_AuxStreamType

Type of the current auxiliary stream.

m_AuxPrivateConfig

Field for future use for signalling auxiliary streams.

struct DtDvbT2DemodL1PostPlp

This structure specifies the DVB-T2 layer-1 post signalling information for one physical layer pipe (PLP).

```
struct DtDvbT2DemodL1PostPlp
{
    int  m_Id;                // PLP ID: 0...255
    int  m_Type;              // PLP type
    int  m_PayloadType;       // PLP payload type
    int  m_FfFlag;            // FF flag
    int  m_FirstRfIdx;        // First TFS RF channel where PLP occurs
    int  m_FirstFrameIdx;     // First frame index
    int  m_GroupId;           // PLP group ID
    int  m_CodeRate;          // Code rate
    int  m_Modulation;        // Modulation type
    int  m_Rotation;          // Constellation rotation (yes/no)
    int  m_FecType;           // FEC type
    int  m_NumBlocks;         // Maximum number of FEC blocks per IL frame
    int  m_FrameInterval;     // T2-frame interval
    int  m_TimeIlLength;      // Time interleaving length
    int  m_TimeIlType;        // Time interleaving type
    int  m_InBandAFlag;       // In-band A signalling information (yes/no)
    int  m_InBandBFlag;       // In-band B signalling information (yes/no)
    int  m_Reserved1;         // Reserved field1
    int  m_PlpMode;           // PLP mode
    int  m_Static;            // Static configuration
    int  m_StaticPadding;     // Static padding
};
```

Members

m_Id
Unique identification of the PLP within a T2 system.

m_Type
PLP type.

| Value | Meaning |
|---------------------------|----------------|
| DTAPI_DVBT2_PLP_TYPE_COMM | Common PLP |
| DTAPI_DVBT2_PLP_TYPE_1 | Data PLP type1 |
| DTAPI_DVBT2_PLP_TYPE_2 | Data PLP type2 |

m_PayloadType
PLP payload type.

| Value | Meaning |
|--------------------------|--|
| DTAPI_DVBT2_PAYLOAD_GFPS | Generic Fixed-length Packetized Stream |
| DTAPI_DVBT2_PAYLOAD_GCS | Generic Continuous Stream |
| DTAPI_DVBT2_PAYLOAD_GSE | Generic Stream Encapsulation |
| DTAPI_DVBT2_PAYLOAD_TS | Transport Stream |

m_FfFlag

FF flag. This parameter is only meaningful for type-1 PLPs in a time-frequency-slicing (TFS) configuration.

m_FirstRfIdx

First TFS RF channel. This parameter is only meaningful for type-1 PLPs in a time-frequency-slicing (TFS) configuration.

m_FirstFrameIdx

First frame index.

m_GroupId

Identifies the PLP group with which the PLP is associated.

m_CodeRate

Convolutional coding rate used by the PLP.

| Value | Meaning |
|---------------------|-----------------------|
| DTAPI_DVBT2_COD_1_2 | 1/2 |
| DTAPI_DVBT2_COD_3_5 | 3/5 |
| DTAPI_DVBT2_COD_2_3 | 2/3 |
| DTAPI_DVBT2_COD_3_4 | 3/4 |
| DTAPI_DVBT2_COD_4_5 | 4/5, not for T2 lite |
| DTAPI_DVBT2_COD_5_6 | 4/5, not for T2 lite |
| DTAPI_DVBT2_COD_1_3 | 1/3, only for T2 lite |
| DTAPI_DVBT2_COD_2_5 | 2/5, only for T2 lite |

m_Modulation

Modulation used by the PLP.

| Value | Meaning |
|--------------------|---------|
| DTAPI_DVBT2_BPSK | BPSK |
| DTAPI_DVBT2_QPSK | QPSK |
| DTAPI_DVBT2_QAM16 | 16-QAM |
| DTAPI_DVBT2_QAM64 | 64-QAM |
| DTAPI_DVBT2_QAM256 | 256-QAM |

m_Rotation

If '1', constellation rotation is used, otherwise not.

m_FecType

FEC type used by the PLP.

| Value | Meaning |
|----------------------|----------------------------------|
| DTAPI_DVBT2_LDPC_16K | 16K LDPC |
| DTAPI_DVBT2_LDPC_64K | 64K LDPC; not allowed in T2 lite |

m_NumBlocks

Maximum number of FEC blocks for this PLP.

m_FrameInterval

T2 frame interval for this PLP.

m_TimeIlLength

Time-interleaving length.

If *m_TimeIlType* is set to '0', this parameter specifies the number of TI blocks per interleaving frame.

If *m_TimeIlType* is set to '1', this parameter specifies the number of T2 frames to which each interleaving frame is mapped.

m_TimeIlType

Type of time interleaving used by the PLP.

| Value | Meaning |
|--------------------------------|---|
| DTAPI_DVBT2_IL_ONETOONE | One interleaving frame corresponds to one T2 frame |
| DTAPI_DVBT2_IL_MULTI | One interleaving frame is carried in multiple T2 frames |

m_InBandAFlag

If '1', the in-band A flag is set and in-band signalling information is inserted in this PLP.

m_InBandBFlag

If '1', the in-band B flag is set and in-band signalling information is inserted in this PLP. This is only useful if DVB-T2 V1.2.1 is selected.

m_Reserved1

Field reserved for future use. It is sometimes used for bias balancing.

m_PlpMode

Mode used for the current PLP.

| Value | Meaning |
|------------------------------------|---|
| DTAPI_DVBT2_PLP_MODE_NONE | Not specified, used if DVB-T2 V1.1.1 is selected. |
| DTAPI_DVBT2_PLP_MODE_NORMAL | Normal Mode |
| DTAPI_DVBT2_PLP_MODE_HEM | High Efficiency Mode |

m_Static

If '1', the layer 1 post signalling fields only changes at a superframe boundaries otherwise the fields may change at any time.

m_StaticPadding

If '1', BB-frame padding is not used, otherwise BB-frame padding may be used.

Remarks

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbT2RfPars

This structure specifies the DVB-T2 time-frequency-slicing (TFS) RF-channel information from the layer-1 post signalling data.

```
struct DtDvbT2RfPars
{
    int    m_RfIdx;           // Index of the RF-frequency
    int    m_Frequency;       // Centre frequency in Hz
};
```

Members

m_RfIdx

The index of this RF-frequency within the loop.

m_Frequency

The centre frequency in Hz of the RF channel.

struct DtDvbT2DemodL1Data

This structure specifies the DVB-T2 layer-1 post signalling data.

```

struct DtDvbT2DemodL1Data
{
    // P1 information
    struct DtDvbT2DemodL1P1
    {
        bool    m_Valid;           // P1 found
        int     m_FftMode;        // FFT mode (or size)
        int     m_Miso;           // MISO used
        int     m_Fef;           // FEF used
        int     m_T2Profile;      // DVB-T2 profile
    } m_P1;
    // L1-Pre information
    struct DtDvbT2DemodL1Pre
    {
        bool    m_Valid;           // L1-pre found
        int     m_Type;            // Stream type within the super frame
        int     m_BwtExt;          // Bandwidth extension
        int     m_S1;              // S1 field value
        int     m_S2;              // S2 field value
        int     m_L1Repetition;    // L1 repetition (yes/no)
        int     m_GuardInterval;   // Guard interval
        int     m_Papr;            // PAPR reduction mode
        int     m_L1Modulation;    // L1 modulation type
        int     m_L1CodeRate;      // L1 code rate
        int     m_L1FecType;       // L1 FEC type
        int     m_L1PostSize;      // Size of the L1-post in OFDM cells
        int     m_L1PostInfoSize; // Size of the L1-post information
        int     m_Rotation;        // Constellation rotation (yes/no)
        int     m_PilotPatern;     // Pilot pattern
        int     m_TxIdAvailability; // The TX-id
        int     m_CellId;         // Cell ID
        int     m_NetworkId;       // Network ID
        int     m_T2SystemId;      // T2 system ID
        int     m_NumT2Frames;      // Number of T2 frames in a super frame
        int     m_NumDataSyms;     // Number of data OFDM symbols per T2-frame
        int     m_RegenFlag;       // Regeneration count indicator
        int     m_L1PostExt;       // L1-post extensions (yes/no)
        int     m_NumRfChans;      // Number of RF channels
        int     m_CurrentRfIdx;     // Current RF channel index
        int     m_T2Version;       // DVB-T2 specification version
        int     m_L1PostScrambling; // L1-post scrambling
        int     m_T2BaseLite;      // T2-Lite is used in a base profile
    } m_L1Pre;
    // L1-Post information
    struct DtDvbT2DemodL1Post
    {
        bool    m_Valid;           // L1-post found
        int     m_NumPlps;         // Number of PLPs
        int     m_NumAux;          // Number of auxiliary streams
        // TFS RF-channel frequencies
        std::vector< DtDvbT2DemodRfPars> m_RfChanFreqs;
        int     m_FefType;          // FEF type (if FEF is used)
        int     m_FefLength;        // FEF length (if FEF is used)
    }
}

```

```

    int m_FefInterval; // FEF interval (if FEF is used)

    // PLPs
    std::vector< DtDvbT2DemodL1PostPlp> m_Plps;
    // Auxiliary stream signalling information
    std::vector< DtDvbT2DemodAuxPars> m_AuxPars;
} m_L1Pre;
};

```

Public members

m_Pl.m_Valid

If true, P1 signalling data has been successfully decoded and is valid.

m_Pl.m_FftMode

The FFT size used for computing OFDM symbols.

| Value | Meaning |
|---------------------|---------|
| DTAPI_DVBT2_FFT_1K | 1K FFT |
| DTAPI_DVBT2_FFT_2K | 2K FFT |
| DTAPI_DVBT2_FFT_4K | 4K FFT |
| DTAPI_DVBT2_FFT_8K | 8K FFT |
| DTAPI_DVBT2_FFT_16K | 16K FFT |
| DTAPI_DVBT2_FFT_32K | 32K FFT |

m_Pl.m_Miso

If '1', MISO is used otherwise SISO.

m_Pl.m_Fef

If '1', FEF-parts are used.

m_Pl.m_T2Profile

DVB-T2 profile.

| Value | Meaning |
|--------------------------|--|
| DTAPI_DVBT2_PROFILE_BASE | Base profile |
| DTAPI_DVBT2_PROFILE_LITE | Lite profile (Requires DVB-T2 version 1.3.1) |

m_L1Pre.m_Valid

If true, L1-pre signalling data has been successfully decoded and is valid.

m_L1Pre.m_Type

Stream types carried within the current T2 superframe.

| Value | Meaning |
|------------------------|---|
| DTAPI_DVBT2_TYPE_TS | Transport Stream only |
| DTAPI_DVBT2_TYPE_GS | Generic Stream only |
| DTAPI_DVBT2_TYPE_TS_GS | Mixed Transport Stream and Generic Stream |

m_L1Pre.m_BwtExt

If '1', the extended carrier mode is used.

m_L1Pre.m_S1

S1 field.

m_L1Pre.m_S2

S2 field.

m_L1Pre.m_L1Repetition

If '1', L1 signalling is provided for the next frame.

m_L1Pre.m_GuardInterval

The guard interval between OFDM symbols.

| Value | Meaning |
|-----------------------|---------|
| DTAPI_DVBT2_GI_1_128 | 1/128 |
| DTAPI_DVBT2_GI_1_32 | 1/32 |
| DTAPI_DVBT2_GI_1_16 | 1/16 |
| DTAPI_DVBT2_GI_19_256 | 19/256 |
| DTAPI_DVBT2_GI_1_8 | 1/8 |
| DTAPI_DVBT2_GI_19_128 | 19/128 |
| DTAPI_DVBT2_GI_1_4 | 1/4 |

m_L1Pre.m_Papr

The peak to average power reduction method.

For DVB-T2 version 1.1.1:

| Value | Meaning |
|-------------------------|---|
| DTAPI_DVBT2_PAPR_NONE | None |
| DTAPI_DVBT2_PAPR_ACE | ACE - Active Constellation Extension |
| DTAPI_DVBT2_PAPR_TR | TR - Power reduction with reserved carriers |
| DTAPI_DVBT2_PAPR_ACE_TR | ACE and TR |

For DVB-T2 version 1.2.1 and higher:

| Value | Meaning |
|-------------------------|--|
| DTAPI_DVBT2_PAPR_NONE | L1-ACE is used and TR is used on P2 symbols only |
| DTAPI_DVBT2_PAPR_ACE | L1-ACE and ACE only are used |
| DTAPI_DVBT2_PAPR_TR | L1-ACE and TR only are used |
| DTAPI_DVBT2_PAPR_ACE_TR | L1-ACE, ACE and TR are used |

m_L1Pre.m_L1Modulation

The modulation type used for the L1-post signalling block.

| Value | Meaning |
|-------------------|---------|
| DTAPI_DVBT2_BPSK | BPSK |
| DTAPI_DVBT2_QPSK | QPSK |
| DTAPI_DVBT2_QAM16 | 16-QAM |
| DTAPI_DVBT2_QAM64 | 64-QAM |

m_L1Pre.m_L1CodeRate

Convolutional coding rate used for the L1-post signalling block.

| Value | Meaning |
|---------------------|---------|
| DTAPI_DVBT2_COD_1_2 | 1/2 |

m_L1Pre.m_L1FecType

FEC type used for the L1-post signalling block.

| Value | Meaning |
|----------------------|----------|
| DTAPI_DVBT2_LDPC_16K | 16K LDPC |

m_L1Pre.m_L1PostSize

Size of the coded and modulated L1-post signalling data block, in OFDM cells.

m_L1Pre.m_L1PostInfoSize

Size of the information part of the L1-post signalling data block, in bits, including the extension field, if present, but excluding the CRC.

m_L1Pre.m_PilotPattern

The Pilot Pattern used.

| Value | Meaning |
|------------------|---------|
| DTAPI_DVBT2_PP_1 | PP1 |
| DTAPI_DVBT2_PP_2 | PP2 |
| DTAPI_DVBT2_PP_3 | PP3 |
| DTAPI_DVBT2_PP_4 | PP4 |
| DTAPI_DVBT2_PP_5 | PP5 |
| DTAPI_DVBT2_PP_6 | PP6 |
| DTAPI_DVBT2_PP_7 | PP7 |
| DTAPI_DVBT2_PP_8 | PP8 |

m_L1Pre.m_TxIdAvailability

Field for signalling the availability of transmitter identification signals within the current geographic cell.

m_L1Pre.m_CellId

Cell ID. Unique identification of a geographic cell in a DVB-T2 network.

m_L1Pre.m_NetworkId

Network ID. Unique identification of the DVB-T2 network.

m_L1Pre.m_T2SystemId

T2 system ID. Unique identification of the T2 system.

m_L1Pre.m_NumT2Frames

The number of T2 frames in a super frame. The valid range is 1 ... 255.

m_L1Pre.m_NumDataSyms

The number of data OFDM symbols per T2 frame, excluding P1 and P2.

m_L1Pre.m_RegenFlag

Indicates the number of times the DVB-T2 signal has been regenerated.

m_L1Pre.m_L1PostExt

If '1', the L1-post extension field is present.

m_L1Pre.m_NumRfChans

The number of frequencies in the T2 system.

m_L1Pre.m_CurrentRfIdx

The index of the current RF channel within its TFS structure.

m_L1Pre.m_T2Version

Version of the DVB-T2 specification.

| Value | Meaning |
|---------------------------|---------------|
| DTAPI_DVBT2_VERSION_1_1_1 | Version 1.1.1 |
| DTAPI_DVBT2_VERSION_1_2_1 | Version 1.2.1 |
| DTAPI_DVBT2_VERSION_1_3_1 | Version 1.3.1 |

m_L1Pre.m_L1PostScrambling

If '1', L1-post signalling is scrambled.

m_L1Pre.m_T2BaseLite

If '1', T2 lite is used in a base profile component.

m_L1Post.m_Valid

If '1', L1-post signalling data has been successfully decoded and is valid.

m_L1Post.m_NumSubslices

The number of subslices per T2 frame for type-2 PLPs.

m_L1Post.m_NumPlps

Indicates the number of physical layer pipes in the T2 system.

m_L1Post.m_NumAux

Indicates the number of auxiliary streams.

m_L1Post.m_RfChanFreqs

A vector specifying the TFS RF-channel frequencies.

m_L1Post.m_FefType

Specifies the FEF type, only if FEF is used (i.e. *m_L1P.m_Fef*='1').

m_L1Post.m_FefLength

The length of a FEF-part in number of T-units (= samples), only if FEF is used (i.e. *m_L1P.m_Fef='1'*).

m_L1Post.m_FefInterval

The number of T2 frames between two FEF parts, only if FEF is used (i.e. *m_L1P.m_Fef='1'*).

m_L1Post.m_Plps

A vector specifying the DVB-T2 L1-post signalling data for the physical layer pipes (not necessarily for each detected PLP).

m_L1Post.m_AuxPars

A vector specifying the auxiliary signalling information.

Remarks

Unsupported fields are set to **DTAPI_STAT_UNSUP_INTITEM**.

struct DtDvbT2ParamInfo

This structure contains the DVB-T2 “derived” parameters which can be computed from the main DVB-T2 parameters. `DtDvbT2Pars::GetParamInfo` and `DtDvbT2Pars::OptimisePlpNumBlocks` set the members in this structure.

```
struct DtDvbT2ParamInfo
{
    int    m_TotalCellsPerFrame; // Total number of cells per frame
    int    m_L1CellsPerFrame;    // Total #L1 signalling cells per frame
    int    m_AuxCellsPerFrame;    // Total #auxiliary stream cells per frame
    int    m_BiasBalCellsPerFrame;
                                // Total number of L1 bias balancing cells
    int    m_BiasBalCellsMax;     // Maximum #L1 bias balancing cells per P2
    int    m_DummyCellsPerFrame; // Total number of cells lost per frame
    int    m_SamplesPerFrame;     // Total number of samples per frame
};
```

Members

m_TotalCellsPerFrame

Total number of cells per frame.

m_L1CellsPerFrame

Total number of cells per frame used for L1 signaling.

The overhead is $m_L1CellsPerFrame / m_TotalCellsPerFrame$.

m_AuxCellsPerFrame

Total number of auxiliary stream cells per frame. This member is currently only used for Tx signalling if it is enabled.

m_BiasBalCellsPerFrame

Total number of L1 bias balancing cells per frame.

m_BiasBalCellsMax

Maximum number of L1 bias balancing cells per P2.

m_DummyCellsPerFrame

Total number of cells lost per frame. It is computed for the first frame in case no NDP is used.

The dummy cells overhead = $m_DummyCellsPerFrame / m_TotalCellsPerFrame$.

m_SamplesPerFrame

Total number of samples per frame.

struct DtDvbT2PlpPars

This structure specifies the DVB-T2 modulation parameters for one physical layer pipe (PLP). It is used in class `DtDvbT2Pars`, in an array of structures that specify the parameters for each PLP.

```
struct DtDvbT2PlpPars
{
    bool    m_Hem;                // High Efficiency Mode: yes/no
    bool    m_Npd;                // Null Packet Deletion: yes/no
    int     m_Issy;               // ISSY mode. See DTAPI_DVBT2_ISSY_XXX
    int     m_IssyBufs;          // ISSY BUFS
    int     m_IssyTDesign;       // T-design value for TTO generation
    int     m_CompensatingDelay;  // Additional delay before TS data is sent
    int     m_TsRate;            // If 0 compute rate from PLP parameters
    int     m_Id;                // PLP ID: 0...255
    int     m_GroupId;           // PLP group ID: 0...255
    int     m_Type;              // PLP type: DTAPI_DVBT2_PLP_TYPE_XXX
    int     m_CodeRate;          // PLP code rate: DTAPI_DVBT2_COD_XXX
    int     m_Modulation;        // PLP modulation: DTAPI_DVBT2_BPSK/...
    bool    m_Rotation;          // Constellation rotation: yes/no
    int     m_FecType;           // FEC type: 0=16K, 1=64K
    int     m_FrameInterval;     // T2-frame interval for this PLP: 1...255
    int     m_FirstFrameIdx;     // First frame index: 0...m_FrameInterval-1
    int     m_TimeIlLength;      // Time interleaving length: 0...255
    int     m_TimeIlType;        // Interleaving type: DTAPI_DVBT2_IL_XXX
    bool    m_InBandAFlag;       // In band A signaling information: yes/no
    bool    m_InBandBFlag;       // In band B signaling information: yes/no
    bool    m_NumBlocks;         // Number of FEC blocks per IL frame

    // IDs of the other PLPs in In Band Signaling
    int     m_NumOtherPlpInBand; // Number of other PLPs in m_OtherPlpInBand
    int     m_OtherPlpInBand[DTAPI_DVBT2_NUM_PLP_MAX-1];

    // The parameters below are only meaningful for type 1 PLPs in TFS case
    bool    m_FfFlag;            // FF-flag
    int     m_FirstRfIdx;         // First TFS RF channel: 0...NumRf-1
};
```

Members

`m_Hem`

If true, the PLP uses High Efficiency Mode (HEM); Otherwise Normal Mode (NM) is used.

`m_Npd`

If true, Null Packet Deletion (NPD) is active, otherwise it is not active.

`m_Issy`

ISSY mode.

| Value | Meaning |
|-------------------------------------|---------------------------|
| <code>DTAPI_DVBT2_ISSY_NONE</code> | No ISSY field is used |
| <code>DTAPI_DVBT2_ISSY_SHORT</code> | 2-byte ISSY field is used |
| <code>DTAPI_DVBT2_ISSY_LONG</code> | 3-byte ISSY field is used |

`m_IssyBufs`

Value of the ISSY BUFS parameter.

m_IssyTDesign

T-design value for TTO generation. Use 0 to have the modulator choose the value. T-design is defined as the delay (in samples) between the start of the first T2 frame in which the PLP is mapped (*m_FirstFrameIdx*) and the first output bit of the transport stream.

m_CompensatingDelay

Additional delay (in samples) before the TS data is sent. Use -1 to let the modulator choose the value.

m_TsRate

Transport stream rate. If 0, the rate is computed from the PLP parameters. This is only possible if no NPD is used.

m_Id

Unique identification of the PLP within a T2 system. The valid range is 0 ... 255.

m_GroupId

Identifies the PLP group with which the PLP is associated. The valid range is 0 ... 255.

m_Type

PLP type.

| Value | Meaning |
|---------------------------|----------------|
| DTAPI_DVBT2_PLP_TYPE_COMM | Common PLP |
| DTAPI_DVBT2_PLP_TYPE_1 | Data PLP type1 |
| DTAPI_DVBT2_PLP_TYPE_2 | Data PLP type2 |

m_CodeRate

Convolutional coding rate used by the PLP.

| Value | Meaning |
|---------------------|-----------------------|
| DTAPI_DVBT2_COD_1_2 | 1/2 |
| DTAPI_DVBT2_COD_3_5 | 3/5 |
| DTAPI_DVBT2_COD_2_3 | 2/3 |
| DTAPI_DVBT2_COD_3_4 | 3/4 |
| DTAPI_DVBT2_COD_4_5 | 4/5, not for T2 lite |
| DTAPI_DVBT2_COD_5_6 | 4/5, not for T2 lite |
| DTAPI_DVBT2_COD_1_3 | 1/3, only for T2 lite |
| DTAPI_DVBT2_COD_2_5 | 2/5, only for T2 lite |

m_Modulation

Modulation used by the PLP.

| Value | Meaning |
|--------------------|---------|
| DTAPI_DVBT2_BPSK | BPSK |
| DTAPI_DVBT2_QPSK | QPSK |
| DTAPI_DVBT2_QAM16 | 16-QAM |
| DTAPI_DVBT2_QAM64 | 64-QAM |
| DTAPI_DVBT2_QAM256 | 256-QAM |

m_Rotation

If true, constellation rotation is used, otherwise not.

m_FecType

FEC type used by the PLP.

| Value | Meaning |
|----------------------|----------------------------------|
| DTAPI_DVBT2_LDPC_16K | 16K LDPC |
| DTAPI_DVBT2_LDPC_64K | 64K LDPC; not allowed in T2 lite |

m_FrameInterval

T2-frame interval for this PLP. The valid range is 1 ... 255.

m_FirstFrameIdx

First frame index. The valid range is 0 ... *m_FrameInterval*-1.

m_TimeIILength

Time interleaving length.

If *m_TimeIILength* is set to '0', this parameter specifies the number of TI-blocks per interleaving frame.

If *m_TimeIILength* is set to '1', this parameter specifies the number of T2 frames to which each interleaving frame is mapped.

The valid range is 0 ... 255.

m_TimeIILType

Type of time interleaving used by the PLP.

| Value | Meaning |
|-------------------------|---|
| DTAPI_DVBT2_IL_ONETOONE | One interleaving frame corresponds to one T2 frame |
| DTAPI_DVBT2_IL_MULTI | One interleaving frame is carried in multiple T2 frames |

m_InBandAFlag

If true, the in-band A flag is set and in-band signalling information is inserted in this PLP.

m_InBandBFlag

If true, the in-band B flag is set and in-band signalling information is inserted in this PLP. This is only useful if DVB-T2 V1.2.1 is selected.

m_NumBlocks

The maximum number of FEC blocks contained in one interleaving frame for this PLP. The valid range is 0 ... 2047.

m_NumOtherPlpInBand

Number of other PLPs in the in-band signalling.

m_OtherPlpInBand[DTAPI_DVBT2_NUM_PLP_MAX-1]

IDs of the other PLPs in the in-band signalling.

m_FfFlag

FF flag.

This parameters is only meaningful for type-1 PLPs in the TFS case.

m_FirstRfIdx

First TFS RF channel. The valid range is 0 ... Number of RF channels - 1.

This parameters is only meaningful for type-1 PLPs in the TFS case.

struct DtDvbT2StreamSelPars

This structure specifies the criteria to select a PLP from a DVB-T2 stream.

```
struct DtDvbC2StreamSelPars
{
    int    m_PlpId;                // Data PLP ID
    int    m_CommonPlpId;          // Common PLP ID
};
```

Members

m_PlpId

Unique identification of the data PLP within the DVB-T2 stream. The valid range is 0 ... 255 and **DTAPI_DVBT2_PLP_ID_AUTO**. The value **DTAPI_DVBT2_PLP_ID_AUTO** specifies automatic selection of the PLP. In this case the first PLP is selected.

m_CommonPlpId

Unique identification of the common PLP within the DVB-T2 stream. It will be combined with the selected data physical layer pipe. The valid values for *m_CommonPlpId* are: 0 ... 255, **DTAPI_DVBT2_PLP_ID_NONE** and **DTAPI_DVBT2_PLP_ID_AUTO**.

The value **DTAPI_DVBT2_PLP_ID_NONE** specifies that no common PLP is used. The value **DTAPI_DVBT2_PLP_ID_AUTO** specifies automatic selection of the common PLP.

struct DtEventArgs

This structure contains all information about the occurred event.

```
struct DtEventArgs
{
    int    m_HwCat;           // Hardware category: DTAPI_CAT_XXX
    __int64 m_Serial;         // Serial number of device causing the event
    int    m_Value1;          // Event value #1
    int    m_Value2;          // Event value #2
    void*  m_pContext;        // Opaque pointer passed when registered
};
```

Members

m_HwCat

Identifies the hardware category:

| Parameter | Meaning |
|---------------|-----------------------------|
| DTAPI_CAT_PCI | PCI or PCI-Express device |
| DTAPI_CAT_USB | USB-2 or USB-3 device |
| DTAPI_CAT_NW | Network device |
| DTAPI_CAT_IP | Network appliance: DTE-31xx |
| DTAPI_CAT_NIC | Non-DekTec network card |

m_Serial

Serial number of the device causing the event.

m_Value1

Event specific value #1:

| Parameter | Meaning |
|----------------------------|---|
| DT_EVENT_VALUE1_POWER_UP | A device power up has been occurred. |
| DT_EVENT_VALUE1_POWER_DOWN | A device power down has been occurred. |
| DT_EVENT_VALUE1_NO_LOCK | Internal PLLs have not achieved or lost lock. |
| DT_EVENT_VALUE1_LOCKED | Full clock-lock has been achieved. |

m_Value2

Event specific value #2. This member variable is not used and reserved for future use.

m_pContext

Opaque pointer that is passed to **DtapiRegisterCallback** when subscribing to the event.

struct DtFractionInt

This structure specifies a precise rational number, expressed as the quotient of two integers.

```
struct DtFractionInt
{
    int  m_Num;           // Numerator
    int  m_Den;           // Denominator
};
```

Members

m_Num
Numerator

m_Den
Denominator

struct DtHwFuncDesc

Structure describing a hardware function.

```
struct DtHwFuncDesc
{
    DtDeviceDesc  m_DvcDesc;           // Device descriptor
    int  m_ChanType;                   // Channel type (OR-able)
    DtCaps  m_Flags;                   // Capability flags (OR-able)
    int  m_IndexOnDvc;                 // Relative index of hardware function
    int  m_Port;                       // Physical port number (1...#ports)
    unsigned char  m_Ip[4];            // IPv4 address (TS-over-IP only)
    unsigned char  m_IpV6[3][16];     // IPv6 address (TS-over-IP only)
    unsigned char  m_MacAddr[6];      // MAC address (TS-over-IP only)
};
```

Members

m_DvcDesc

Device descriptor of the device that hosts this hardware function.

m_ChanType

This member variable identifies the channel type of the hardware function. Channel types **DTAPI_CHAN_INPUT** and **DTAPI_CHAN_OUTPUT** may be OR-ed together. The channel-object column identifies the channel object that can be attached to this hardware function for interaction with the hardware.

Channel types **DTAPI_CHAN_DBLBUF**, **DTAPI_CHAN_DISABLED** and **DTAPI_CHAN_LOOPTHR** do not have an associated channel object because no direct interaction is possible.

| Value | Channel Object | Meaning |
|----------------------------|----------------------|--|
| DTAPI_CHAN_DISABLED | n.a. | Channel is disabled |
| DTAPI_CHAN_INPUT | DtInpChannel | Input channel |
| DTAPI_CHAN_OUTPUT | DtOutpChannel | Output channel |
| DTAPI_CHAN_DBLBUF | n.a. | The hardware function is a double-buffered copy of another hardware function |
| DTAPI_CHAN_LOOPTHR | n.a. | The hardware function is a loop-through copy of another hardware function |

For TS-over-IP channels both **DTAPI_CHAN_INPUT** and **DTAPI_CHAN_OUTPUT** are set.

On the DTA-2137 the hardware function for physical port #2 must be disabled before port #1 is configured for APSK operation. Only physical port #1 can be configured for APSK operation.

m_Flags

Capability flags that provide further information about the hardware function.
The available capabilities are listed in DTAPI.h as **DTAPI_CAP_XXX**.

m_IndexOnDvc

This integer identifies a specific hardware function when the device hosts multiple hardware functions with the same channel type and stream type.

If the function occurs only once, *m_IndexOnDvc* = 0. If the device supports the function twice, indices are 0 and 1; etc.

m_Port

This integer identifies the physical port number associated with this function.

The general rule on PCI cards is that the top-most port is #1, the one below that #2, etc., with the following exceptions:

- The Ethernet port on the DTA-160 and the DTA-2160 is port #4;
- Double-buffered outputs like on the DTA-140 count as a single port.

m_Ip

IPv4 address of the hardware function. This field is only valid for functions with capability **DTAPI_CAP_IP**.

m_IpV6[3]

Array of IPv6 addresses of the hardware function. This field is only valid for functions with capability **DTAPI_CAP_IP**. The array contains the link-local, site-local and global IPv6 addresses associated to the hardware function. If an IPv6 address type is not available, an entry with all 0's is added to the end.

m_MacAddr

MAC address of the hardware function. This field is only valid for functions with capability **DTAPI_CAP_IP**.

Remarks

This structure is used by `::DtapiHwFuncScan` to return a description of a hardware function.

The channel type of bi-directional ASI/SDI ports is *either* **DTAPI_CHAN_INPUT** or **DTAPI_CHAN_OUTPUT**. Method `DtDevice::SetIoConfig` can be used to change the direction. The next time `::DtapiHwFuncScan` is called, the channel type in the hardware-function descriptor will be updated to reflect the last-programmed direction.

struct DtIpPars

DtIpPars struct is deprecated. The **DtIpPars2** struct is the successor.

The parameters in this structure are used when starting transmission or reception of a TS-over-IP stream to or from a unicast or multicast destination.

The parameters in this structure are used when starting transmission or reception of a TS-over-IP stream to or from a unicast or multicast destination. **DtIpPars** is also used to read back TS-over-IP parameters using **DtIpChannel::GetIpPars**.

Both IPv4 and IPv6 are supported, as selected by the **DTAPI_IP_V4/DTAPI_IP_V6** flag in *m_Flags*.

DtIpPars supports network redundancy (SMPTE 2022-7 “Seamless Protection Switching of SMPTE ST 2022 IP Datagrams”) by setting *m_Mode* to **DTAPI_IP_TX_2022_7** (transmission on two links) or **DTAPI_IP_RX_2022_7** (reception from two links). If one of these modes is used, the redundant link parameters have to be specified in the six struct members starting at *m_Ip2*. Network redundancy is currently supported only by DekTec’s DTA-2162 (Dual GigE port card for PCIe).

SD-SDI is also supported (SMPTE 2022 5/6) by setting the video standard in the *m_IpProfile* member.

See the description of the members for more information.

```
struct DtIpPars
{
    // Main link
    unsigned char  m_Ip[16];           // IP address (IPv4/IPv6)
    unsigned short m_Port;             // Port number
    unsigned char  m_SrcFltIp[16];     // Source filter: IP address (IPv4/IPv6)
    unsigned short m_SrcFltPort;       // Source filter: port number
    int m_VlanId;                      // VLAN ID
    int m_VlanPriority;                // VLAN priority

    // Redundant link (mode DTAPI_IP_TX_2022_7, DTAPI_IP_RX_2022_7 only)
    u_char m_Ip2[16];                 // IP address (IPv4/IPv6)
    u_short m_Port2;                  // Port number
    u_char m_SrcFltIp2[16];           // Source filter: IP address (IPv4/IPv6)
    u_short m_SrcFltPort2;            // Source filter: port number
    int m_VlanId2;                    // VLAN ID
    int m_VlanPriority2;               // VLAN priority

    int m_TimeToLive;                 // Time-to-live (TTL) for IP Tx
    int m_NumTpPerIp;                 // #TPs per IP packet
    int m_Protocol;                   // Protocol: DTAPI_PROTO_UDP/RTP
    int m_DiffServ;                   // Differentiated services
    int m_FecMode;                    // Error correction mode
    int m_FecNumRows;                 // 'D' = #rows in FEC matrix
    int m_FecNumCols;                 // 'L' = #columns in FEC matrix
    int m_Flags;                      // Control flags
    int m_Mode;                       // Redundancy mode
    DtIpProfile m_IpProfile;           // IP stream profile
};
```

Members when used for IP reception (**Rx**)

m_Ip (main link), *m_Ip2* (redundant link)

IP address from which to receive IP packets, specified as 4 bytes for IPv4 and 16 bytes for IPv6. For unicast receive, all bytes can be set to 0. If the IP address is in the multicast range, **DTAPI** automatically joins and drops membership of the multicast group when required. The **DTAPI_IP_V4/DTAPI_IP_V6** flag in *m_Flags* member selects between using the IPv4 and IPv6 protocol.

m_Port, *m_Port2*

Port number on which to receive IP packets. Destination port number 0 is not allowed. When the protocol is RTP, the port number shall be even.

m_SrcFltIp, *m_SrcFltIp2*

Source IP address for source-specific multicast.

Relevant only if the IP address is a multicast address. In this case *m_SrcFltIp(2)* can be set to a specific IP address for listening to a single multicast source.

If *m_SrcFltIp(2)* is set to 0.0.0.0 (or 16x 0 for IPv6), any-source multicast is used and the multicast sender may be any IP address.

m_SrcFltPort, *m_SrcFltPort2*

Source-specific multicast: source port number associated with *m_SrcFltIp(2)*.

m_SrcFltPort(2) may be set to a specific source port number, or to 0 for accepting IP packets from any source port.

m_VlanId, *m_VlanId2*

VLAN identifier (VID) as specified in IEEE 802.1Q. If set to 0, VLAN is not used. If set to a positive integer, only packets with the specified VLAN identifier are received.

m_VlanPriority, *m_VlanPriority2*

Not used for Rx.

m_TimeToLive

Not used for Rx.

m_NumTpPerTp

Write: Expected number of transport packets stored in one IP packet. This value is used to estimate the receive buffer size. If omitted, a value of 7 is used for the estimation.

Read back: Number of transport packets stored in one IP packet in the incoming stream.

m_Protocol

Expected protocol.

Write: Only automatic detection (value **DTAPI_PROTO_AUTO**) is allowed.

Read back: Set to the protocol that has been detected.

| Value | Meaning |
|-------------------------|---------------------------------|
| DTAPI_PROTO_UDP | UDP |
| DTAPI_PROTO_RTP | RTP |
| DTAPI_PROTO_AUTO | Automatically detect UDP or RTP |

m_DiffServ

Not used.

m_FecMode

Error-correction mode.

| Value | Meaning |
|--------------------------|--|
| DTAPI_FEC_DISABLE | Do not apply error correction |
| DTAPI_FEC_2D | Apply error correction with the FEC streams received on port numbers <i>m_Port</i> +2 and <i>m_Port</i> +4 |

m_FecNumRows, m_FecNumCols

Write: Expected number of FEC rows and columns in the FEC matrix. These values are used to estimate the receive buffer size. If omitted, a maximal matrix size of 10x10 is used for the estimation when using MPEG-2 packets and 375x4 when using SDI. These values are only used if *m_FecMode* is not **DTAPI_FEC_DISABLE**.

Read back: Number of rows and columns in the FEC matrix that has been detected. In SMPTE-2022 these parameters are called *D* and *L* respectively.

m_Flags

Control/status flags. In the current version of DTAPI a single flag is supported, selecting between IPv4 and IPv6 addressing.

| Value | Meaning |
|--------------------|--|
| DTAPI_IP_V4 | Use the IPv4 protocol. All IP addresses are 4 bytes long. This is the default when neither DTAPI_IP_V4 nor DTAPI_IP_V6 is specified. |
| DTAPI_IP_V6 | Use the IPv6 protocol. All IP addresses are 16 bytes long. |

m_Mode

IP redundancy mode.

| Value | Meaning |
|---------------------------|--|
| DTAPI_IP_NORMAL | Normal mode: non-redundant IP reception. The constructor of DtIpPars initializes <i>m_Mode</i> to this mode, so this is the default. |
| DTAPI_IP_RX_2022_7 | Receive packets from two IP ports and merge the packets into a single logical stream. This mode is defined by the SMPTE 2022-7 standard. This mode can only be used when the port supports capability CAP_IP_PAIR and has an <u>odd</u> physical port number N. The port will be paired with IP port N+1. The redundant link parameters must have to be valid. The incoming streams on ports N and N+1 must be equal to each other, with the exception of the IP-address fields. Such streams can be generated by e.g. a DTA-2162 in DTAPI_IP_TX_2022_7 mode. This mode is not supported for IPv6 with the UDP protocol. If using the 2022_7 mode with IPv6 and UDP, unpredictable output is returned to the application. When using IPv6, only the RTP protocol is supported for receive. |

m_IpProfile

The *m_IpProfile* defines the maximal bitrate and the maximal path skew of the expected receiving stream(s). These values are used for receive buffer calculations and for the SMPTE 2022-7 mode. Also the SDI standard (for SMPTE 2022 5/6) can be selected. See the **DtIpProfile** struct for details.

Members when used for IP transmission (Tx)

m_Ip (main link), *m_Ip2* (redundant link)

IP destination address that will be used for transmission. *m_Ip* is specified as 4 bytes for IPv4 and 16 bytes for IPv6. The **DTAPI_IP_V4/DTAPI_IP_V6** flag in *m_Flags* member selects between using the IPv4 and IPv6 protocol.

m_Port, *m_Port2*

Destination port number. When the protocol is RTP, the port number shall be even.

m_SrcFltIp, *m_SrcFltIp2*

Not used for specifying Tx parameters.
Read back: The host's IP address.

m_SrcFltPort, *m_SrcFltPort2*

Source port number used for transmission. This member is used only if the **DTAPI_IP_TX_MANSRCPORT** flag in *m_Flags* is set. If the **DTAPI_IP_TX_MANSRCPORT** flag is not set, a free source port is assigned automatically.
Read back: The selected source port number.

m_VlanId, *m_VlanId2*

VLAN identifier (VID) as specified in IEEE 802.1Q. If set to 0, VLAN is not used. If set to a positive integer, the IP packets will be tagged with the specified VLAN identifier.

m_VlanPriority, m_VlanPriority2

Priority value which refers to the IEEE 802.1p Priority Code Point (PCP). It is used in the VLAN header as specified in IEEE 802.1Q.

m_TimeToLive

Time-To-Live (TTL) value to be used for transmission. When *m_TimeToLive* is 0, a default value is used.

m_NumTpPerIp

Number of Transport Packets (TPs) stored in one IP packet. The valid range is 1...7. This member is not used when the video standard is SDI.

m_Protocol

Protocol used for encapsulation of transport packets. When using the SDI video standard, only DTAPI_PROTO_RTP is allowed.

| Value | Meaning |
|-----------------|---------|
| DTAPI_PROTO_UDP | UDP |
| DTAPI_PROTO_RTP | RTP |

m_DiffServ

Value to be put in the *Differentiated Services* field (formerly *Type Of Service*) in the IPv4 header or *Traffic Class* field in the IPv6 header. The valid range is 0...255. The default value is 0.

| Bits | Field | Meaning |
|------|-------|------------------------------------|
| 7..2 | DSCP | Differentiated Services Code Point |
| 1..0 | ECN | Explicit Congestion Notification |

m_FecMode

Error-correction mode.

| Value | Meaning |
|-------------------|--|
| DTAPI_FEC_DISABLE | Do not add FEC packets |
| DTAPI_FEC_2D_M1 | Generate FEC packets as specified in SMPTE-2022. The FEC-packet is inserted exact in the middle of the next 2 TS packets. The FEC packets are NOT BLOCK aligned generated. |
| DTAPI_FEC_2D_M1_B | See DTAPI_FEC_2D_M1. The FEC packets are BLOCK aligned generated. |
| DTAPI_FEC_2D_M2 | Generate FEC packets as specified in SMPTE-2022. The FEC-packet is inserted exact after the following IP TS packet. The FEC packets are NOT BLOCK aligned generated. |
| DTAPI_FEC_2D_M2_B | See DTAPI_FEC_2D_M2. The FEC packets are BLOCK aligned generated. |

m_FecNumRows, m_FecNumCols

Number of rows and columns in the FEC matrix. In SMPTE-2022 these parameters are called *D* and *L* respectively. The DTAPI supports all matrix sizes with the following restriction:
L > 0 and D >= 0

m_Flags

Control/status flags.

| Value | Meaning |
|-------------------------------|--|
| DTAPI_IP_V4 | Use the IPv4 protocol. All IP addresses are 4 bytes long. This is the default when neither DTAPI_IP_V4 nor DTAPI_IP_V6 is specified (this is if <i>m_Flags</i> is 0) |
| DTAPI_IP_V6 | Use the IPv6 protocol. All IP addresses are 16 bytes long. |
| DTAPI_IP_TX_MANSRCPORT | Use <i>m_SrcFltPort</i> and <i>m_SrcFltPort2</i> as the source port for transmitting packets. If this flag is not specified, a free source port is assigned automatically. |

m_Mode

IP redundancy mode.

| Value | Meaning |
|---------------------------|--|
| DTAPI_IP_NORMAL | Normal mode: non-redundant IP transmission. The constructor of DtIpPars initializes <i>m_Mode</i> to this mode, so this is the default. |
| DTAPI_IP_TX_2022_7 | Transmit TS-over-IP packets to two physical IP ports at once. This mode is defined by the SMPTE 2022-7 standard. Both streams will be equal to each other, with the exception of the IP-addressing fields. This mode can only be used when the port supports capability CAP_IP_PAIR and has an <u>odd</u> physical port number N. The redundant link is port N+1. The redundant link parameters must have to be valid. |

m_IpProfile

If SDI is used for transmitting (SMPTE 2022 5/6) the video standard must be set. See the **DtIpProfile** struct for details.

struct DtIpPars2

The parameters in this structure are used when starting transmission or reception of a TS-over-IP stream to or from a unicast or multicast destination. **DtIpPars2** is also used to read back TS-over-IP parameters using **DtIpChannel::GetIpPars**.

Both IPv4 and IPv6 are supported, as selected by the **DTAPI_IP_V4/DTAPI_IP_V6** flag in *m_Flags*.

DtIpPars2 supports network redundancy (SMPTE 2022-7 “Seamless Protection Switching of SMPTE ST 2022 IP Datagrams”) by setting *m_Mode* to **DTAPI_IP_TX_2022_7** (transmission on two links) or **DTAPI_IP_RX_2022_7** (reception from two links). If one of these modes is used, the redundant link parameters have to be specified in the six struct members starting at *m_Ip2*. Network redundancy is currently supported only by DekTec’s DTA-2162 (Dual GigE port card for PCIe).

SD-SDI is also supported (SMPTE 2022 5/6) by setting the video standard in the *m_IpProfile* member.

See the description of the members for more information.

```
struct DtIpPars2
{
    // Main link
    unsigned char  m_Ip[16];           // IP address (IPv4/IPv6)
    unsigned short m_Port;             // Port number
    unsigned char  m_Gateway[16];      // New gateway (IPv4/IPv6)

    std::vector<DtIpSrcFlt> m_SrcFlt;  // Source IP/port filter
    int m_VlanId;                   // VLAN ID
    int m_VlanPriority;              // VLAN priority

    // Redundant link (mode DTAPI_IP_TX_2022_7, DTAPI_IP_RX_2022_7 only)
    u_char m_Ip2[16];               // IP address (IPv4/IPv6)
    u_short m_Port2;                 // Port number
    std::vector<DtIpSrcFlt> m_SrcFlt2; // Source IP/port filter
    int m_VlanId2;                   // VLAN ID
    int m_VlanPriority2;              // VLAN priority

    int m_TimeToLive;                // Time-to-live (TTL) for IP Tx
    int m_NumTpPerIp;                 // #TPs per IP packet
    int m_Protocol;                   // Protocol: DTAPI_PROTO_UDP/RTP
    int m_DiffServ;                   // Differentiated services
    int m_FecMode;                    // Error correction mode
    int m_FecNumRows;                 // 'D' = #rows in FEC matrix
    int m_FecNumCols;                 // 'L' = #columns in FEC matrix
    int m_Flags;                      // Control flags
    int m_Mode;                       // Redundancy mode
    DtIpProfile m_IpProfile;          // IP stream profile
};
```

Members when used for IP reception (**Rx**)

m_Ip (main link), *m_Ip2* (redundant link)

IP address from which to receive IP packets, specified as 4 bytes for IPv4 and 16 bytes for IPv6. For unicast receive, all bytes can be set to 0. If the IP address is in the multicast range, **DTAPI** automatically joins and drops membership of the multicast group when required. The **DTAPI_IP_V4/DTAPI_IP_V6** flag in *m_Flags* member selects between using the IPv4 and IPv6 protocol.

m_Port, m_Port2

Port number on which to receive IP packets. Destination port number 0 is not allowed.
When the protocol is RTP, the port number shall be even.

m_Gateway, m_Gateway2

Not used for Rx.

m_SrcFlt, m_SrcFlt2

A list of source IP addresses and ports for source-specific multicast.

The source IP-address is only relevant if the IP address is a multicast address. In this case *m_SrcFlt(2)* can be set to a specific IP address/port for listening to a single or multiple multicast sources.

If *m_SrcFlt.m_SrcFltIp(2)* is set to 0.0.0.0 (or 16x 0 for IPv6), or the list is empty, any-source multicast is used and the multicast sender may be any IP address.

If *m_SrcFlt.m_SrcFltPort(2)* may be set to a specific source port number, or to 0 for accepting IP packets from any source port.

m_VlanId, m_VlanId2

VLAN identifier (VID) as specified in IEEE 802.1Q. If set to 0, VLAN is not used. If set to a positive integer, only packets with the specified VLAN identifier are received.

m_VlanPriority, m_VlanPriority2

Not used for Rx.

m_TimeToLive

Not used for Rx.

m_NumTpPerTp

Write: Expected number of transport packets stored in one IP packet. This value is used to estimate the receive buffer size. If omitted, a value of 7 is used for the estimation.

Read back: Number of transport packets stored in one IP packet in the incoming stream.

m_Protocol

Expected protocol.

Write: Only automatic detection (value `DTAPI_PROTO_AUTO`) is allowed.

Read back: Set to the protocol that has been detected.

| Value | Meaning |
|-------------------------------|---------------------------------|
| <code>DTAPI_PROTO_UDP</code> | UDP |
| <code>DTAPI_PROTO_RTP</code> | RTP |
| <code>DTAPI_PROTO_AUTO</code> | Automatically detect UDP or RTP |

m_DiffServ

Not used.

m_FecMode

Error-correction mode.

| Value | Meaning |
|--------------------------------|--|
| <code>DTAPI_FEC_DISABLE</code> | Do not apply error correction |
| <code>DTAPI_FEC_2D</code> | Apply error correction with the FEC streams received on port numbers <i>m_Port+2</i> and <i>m_Port+4</i> |

m_FecNumRows, m_FecNumCols

Write: Expected number of FEC rows and columns in the FEC matrix. These values are used to estimate the receive buffer size. If omitted, a maximal matrix size of 10x10 is used for the estimation when using MPEG-2 packets and 375x4 when using SDI. These values are only used if `m_FecMode` is not `DTAPI_FEC_DISABLE`.

Read back: Number of rows and columns in the FEC matrix that has been detected. In SMPTE-2022 these parameters are called *D* and *L* respectively.

m_Flags

Control/status flags. In the current version of DTAPI a single flag is supported, selecting between IPv4 and IPv6 addressing.

| Value | Meaning |
|--------------------------|--|
| <code>DTAPI_IP_V4</code> | Use the IPv4 protocol. All IP addresses are 4 bytes long. This is the default when neither <code>DTAPI_IP_V4</code> nor <code>DTAPI_IP_V6</code> is specified. |
| <code>DTAPI_IP_V6</code> | Use the IPv6 protocol. All IP addresses are 16 bytes long. |

m_Mode

IP redundancy mode.

| Value | Meaning |
|---------------------------------|---|
| <code>DTAPI_IP_NORMAL</code> | Normal mode: non-redundant IP reception. The constructor of <code>DtIpPars</code> initializes <code>m_Mode</code> to this mode, so this is the default. |
| <code>DTAPI_IP_RX_2022_7</code> | Receive packets from two IP ports and merge the packets into a single logical stream. This mode is defined by the SMPTE 2022-7 standard. This mode can only be used when the port supports capability <code>CAP_IP_PAIR</code> and has an <u>odd</u> physical port number <i>N</i> . The port will be paired with IP port <i>N</i> +1. The redundant link parameters must have to be valid. The incoming streams on ports <i>N</i> and <i>N</i> +1 must be equal to each other, with the exception of the IP-address fields. Such streams can be generated by e.g. a DTA-2162 in <code>DTAPI_IP_TX_2022_7</code> mode. This mode is not supported for IPv6 with the UDP protocol. If using the 2022_7 mode with IPv6 and UDP, unpredictable output is returned to the application. When using IPv6, only the RTP protocol is supported for receive. |

m_IpProfile

The `m_IpProfile` defines the maximal bitrate and the maximal path skew of the expected receiving stream(s). These values are used for receive buffer calculations and for the SMPTE 2022-7

mode. Also the SDI standard (for SMPTE 2022 5/6) can be selected. See the `DtlpProfile` struct for details.

Members when used for IP transmission (**Tx**)

m_Ip (main link), m_Ip2 (redundant link)

IP destination address that will be used for transmission. *m_Ip* is specified as 4 bytes for IPv4 and 16 bytes for IPv6. The `DTAPI_IP_V4/DTAPI_IP_V6` flag in *m_Flags* member selects between using the IPv4 and IPv6 protocol.

m_Port, m_Port2

Destination port number. When the protocol is RTP, the port number shall be even.

m_Gateway, m_Gateway2

This member can be used to override the default gateway. If not used, the standard default gateway is used as defined at the network interface.

m_SrcFlt, m_SrcFlt2

This member is only used when specifying the `DTAPI_IP_TX_MANSRCPORT` flag in *m_Flags*. if the `DTAPI_IP_TX_MANSRCPORT` flag in *m_Flags* is set, the port number of the first element is used for the source port for transmission. If the `DTAPI_IP_TX_MANSRCPORT` flag is not set, a free source port is assigned automatically.
Read back: The host's IP address and used source port.

VlanId, m_VlanId2

VLAN identifier (VID) as specified in IEEE 802.1Q. If set to 0, VLAN is not used. If set to a positive integer, the IP packets will be tagged with the specified VLAN identifier.

m_VlanPriority, m_VlanPriority2

Priority value which refers to the IEEE 802.1p Priority Code Point (PCP). It is used in the VLAN header as specified in IEEE 802.1Q.

m_TimeToLive

Time-To-Live (TTL) value to be used for transmission. When *m_TimeToLive* is 0, a default value is used.

m_NumTpPerIp

Number of Transport Packets (TPs) stored in one IP packet. The valid range is 1...7. This member is not used when the video standard is SDI.

m_Protocol

Protocol used for encapsulation of transport packets. When using the SDI video standard, only `DTAPI_PROTO_RTP` is allowed.

| Value | Meaning |
|------------------------------|---------|
| <code>DTAPI_PROTO_UDP</code> | UDP |
| <code>DTAPI_PROTO_RTP</code> | RTP |

m_DiffServ

Value to be put in the *Differentiated Services* field (formerly *Type Of Service*) in the IPv4 header or *Traffic Class* field in the IPv6 header. The valid range is 0...255. The default value is 0.

| Bits | Field | Meaning |
|------|-------|------------------------------------|
| 7..2 | DSCP | Differentiated Services Code Point |
| 1..0 | ECN | Explicit Congestion Notification |

m_FecMode

Error-correction mode.

| Value | Meaning |
|-------------------|--|
| DTAPI_FEC_DISABLE | Do not add FEC packets |
| DTAPI_FEC_2D_M1 | Generate FEC packets as specified in SMPTE-2022. The FEC-packet is inserted exact in the middle of the next 2 TS packets. The FEC packets are NOT BLOCK aligned generated. |
| DTAPI_FEC_2D_M1_B | See DTAPI_FEC_2D_M1. The FEC packets are BLOCK aligned generated. |
| DTAPI_FEC_2D_M2 | Generate FEC packets as specified in SMPTE-2022. The FEC-packet is inserted exact after the following IP TS packet. The FEC packets are NOT BLOCK aligned generated. |
| DTAPI_FEC_2D_M2_B | See DTAPI_FEC_2D_M2. The FEC packets are BLOCK aligned generated. |

m_FecNumRows, *m_FecNumCols*

Number of rows and columns in the FEC matrix. In SMPTE-2022 these parameters are called *D* and *L* respectively. The DTAPI supports all matrix sizes with the following restriction:
 $L > 0$ and $D \geq 0$

m_Flags

Control/status flags.

| Value | Meaning |
|------------------------|--|
| DTAPI_IP_V4 | Use the IPv4 protocol. All IP addresses are 4 bytes long. This is the default when neither DTAPI_IP_V4 nor DTAPI_IP_V6 is specified (this is if <i>m_Flags</i> is 0) |
| DTAPI_IP_V6 | Use the IPv6 protocol. All IP addresses are 16 bytes long. |
| DTAPI_IP_TX_MANSRCPORT | Use <i>m_SrcFltPort</i> and <i>m_SrcFltPort2</i> as the source port for transmitting packets. If this flag is not specified, a free source port is assigned automatically. |

m_Mode

IP redundancy mode.

| Value | Meaning |
|---------------------------|---|
| DTAPI_IP_NORMAL | Normal mode: non-redundant IP transmission. The constructor of DtIpPars initializes <i>m_Mode</i> to this mode, so this is the default. |
| DTAPI_IP_TX_2022_7 | Transmit TS-over-IP packets to two physical IP ports at once. This mode is defined by the SMPTE 2022-7 standard. Both streams will be equal to each other, with the exception of the IP-addressing fields. This mode can only be used when the port supports capability CAP_IP_PAIR and has an <u>odd</u> physical port number N. The redundant link is port N+1. The redundant link parameters must have to be valid. |

m_IpProfile

If SDI is used for transmitting (SMPTE 2022 5/6) the video standard must be set. See the **DtIpProfile** struct for details.

struct DtIpProfile

This structure describes the IP transmission “profile”. It defines the maximum bitrate and (in SMPTE 2022-7 mode) the maximal skew between path 1 (main link) and path 2(redundant link). These values are only used for IP receive.

The `m_VideoStandard` member must be set for IP transmit and IP receive or use the default value.

This structure is contained in the `DtIpPars` structure.

```
struct DtIpProfile
{
    int    m_Profile;                // IP transmission profile
    unsigned int  m_MaxBitrate;      // Maximal bitrate in bps
    int    m_MaxSkew;               // Maximal skew in ms
    int    m_VideoStandard;         // DTAPI_VIDSTD_
};
```

Members

m_Profile

Defines the IP transmission profile. It sets the maximal bitrate and maximal skew using a predefined or user defined profile.

| Value | Meaning | |
|-----------------------------------|--|----------------------|
| DTAPI_IP_PROF_NOT_DEFINED | No profile defined. This is the default. The DTAPI default values are used as follows: m_MaxSkew=50ms m_MaxBitrate = 270Mbps | |
| DTAPI_IP_USER_DEFINED | The profile is defined by the m_MaxSkew and m_MaxBitrate members of the DtlpProfile struct. | |
| DTAPI_IP_LBR_LOW_SKEW | m_MaxSkew=10ms, m_MaxBitrate = 10Mbps | Low bitrate profile |
| DTAPI_IP_LBR_MODERATE_SKEW | m_MaxSkew=50ms, m_MaxBitrate = 10Mbps | |
| DTAPI_IP_LBR_HIGH_SKEW | m_MaxSkew=450ms, m_MaxBitrate = 10Mbps | |
| DTAPI_IP_SBR_LOW_SKEW | m_MaxSkew=10ms, m_MaxBitrate = 270Mbps | Slow bitrate profile |
| DTAPI_IP_SBR_MODERATE_SKEW | m_MaxSkew=50ms, m_MaxBitrate = 270Mbps | |
| DTAPI_IP_SBR_HIGH_SKEW | m_MaxSkew=450ms, m_MaxBitrate = 270Mbps | |
| DTAPI_IP_HBR_LOW_SKEW | m_MaxSkew=10ms, m_MaxBitrate = 3Gbps | High bitrate profile |
| DTAPI_IP_HBR_MODERATE_SKEW | m_MaxSkew=50ms, m_MaxBitrate = 3Gbps | |
| DTAPI_IP_HBR_HIGH_SKEW | m_MaxSkew=450ms, m_MaxBitrate = 3Gbps | |

Note:

- 1) The m_MaxBitrate will be truncated to the maximal physical link speed a card can handle. For the DTA-160, DTA-2160 and DTA-2162 this value will be truncated to maximal 1Gbps.
- 2) The DtlpChannel::SetFifoSize function overrules the m_MaxBitrate in the above table for the buffer size calculation of the SDI/TS packet buffer.

m_MaxBitrate

This value indicates the maximal expected bitrate of the receiving stream in bps. It's used to calculate the receive buffer size.

m_MaxSkew

The m_MaxSkew is the maximal expected difference over time in arrival time between IP packets of path 1 (main link) compared to the IP packets of path 2 (redundant link). In SMPTE 2022-7 this is defined as PD. The skew is in milliseconds.

m_VideoStandard

Set/get the video standard for transmit and receive. The default value is DTAPI_VIDSTD_TS. The IP-port supports the following video standards:

| Value | Meaning | Supported SMPTE standard |
|-----------------------------|--|---|
| DTAPI_VIDSTD_TS | Transmitting MPEG-2 transport stream data over IP | SMPTE-2022-1 SMPTE-2022-2 SMPTE-2022-7 |
| DTAPI_VIDSTD_525 | Transmitting 10-bit, 525 lines, full SDI frames over IP | SMPTE-2022- 5 SMPTE-2022- 6 SMPTE-2022- 7 |
| DTAPI_VIDSTD_625 | Transmitting 10-bit, 625 lines, full SDI frames over IP | |
| DTAPI_VIDSTD_UNKNOWN | Video standard is unknown. No IP packets received or unknown video format. | |

struct DtIpQosStat

This structure contains additional IP statistic counters that are calculated by the driver. This structure is contained in the DtIpStat structure. All counters are measured over a time period of one second and one minute. The counters can be retrieved by the m_QosStatsLastSec and m_QosStatsLastMin members of the DtIpStat structure.

If the “Seamless Protection Switching” mode is active (SMPTE 2022-7) counters are maintained for path 1(main link), path 2(redundant link) and the resulting stream. If the SMPTE 2022-7 mode is inactive, only the main link counters are valid.

```
struct DtIpQosStat
{
    double m_PerAfterFec;      // Packet Error Rate of reconstructed stream
    double m_MinSkew;         // Min. skew between path 1 and path 2
    double m_MaxSkew;         // Max. skew between path 1 and path 2

    // Main link
    double m_Per1;            // Packet Error Rate path 1
    double m_DelayFactor1;    // Delay factor path 1
    double m_MinIpat1;        // Min. Inter Packet Arrival Time path 1
    double m_MaxIpat1;        // Max. Inter Packet Arrival Time path 1

    // Redundant link
    double m_Per2;            // Packet Error Rate path 2
    double m_DelayFactor2;    // Delay factor path 2
    double m_MinIpat2;        // Min. Inter Packet Arrival Time path 2
    double m_MaxIpat2;        // Max. Inter Packet Arrival Time path 2
};
```

Members

m_Per1, m_Per2, m_PerAfterFec

Packet Error Rate for the main link (m_Per1), redundant link (m_Per2) and the resulting stream (m_PerAfterFec).

m_MinSkew, m_MaxSkew

The skew is the minimal (m_MinSkew) and maximal (m_MaxSkew) difference over time in arrival time between IP packets of the main link compared to the IP packets of the redundant link. If the skew is positive, the main link has a longer delay than the redundant link. If the skew is negative the redundant link has a longer delay. Note: PD as defined in SMPTE 2022-7 is the absolute value of the skew. The skew is measured in milliseconds.

m_DelayFactor1(main link), m_DelayFactor2(redundant link)

Delay Factor in microseconds. The delay factor is an indication of the jitter of the IP stream. It is defined as the maximum difference between the actual arrival time of a UDP/RTP packet and the ideal (jitterless) arrival time of that packet.

m_MinIpat1(main link), m_MinIpat2(redundant link)

Minimal “Inter Packet Arrival Time” of two consecutive IP packets in milliseconds.

m_MaxIpat1(main link), m_MaxIpat2(redundant link)

Maximal “Inter Packet Arrival Time” of two consecutive IP packets in milliseconds.

struct DtIpStat

Structure with IP statistics calculated by the driver. If the “Seamless Protection Switching” mode is active (SMPTE 2022-7) counters are maintained for path 1(main link), path 2(redundant link) and the resulting stream. If this mode is inactive, only path 1 values are valid.

Note: The packet counters are not reset after read and a counter wrap must be handled by the application.

```
struct DtIpStat
{
    unsigned int  m_TotNumIpPackets;           // #IP packets stream
    unsigned int  m_LostIpPacketsBeforeFec;    // #lost IP packets before FEC
    unsigned int  m_LostIpPacketsAfterFec;     // #lost IP packets after FEC

    // Main link
    unsigned int  m_NumIpPacketsReceived1;    // #IP packets received path 1
    unsigned int  m_NumIpPacketsLost1;        // #IP packets lost path 1

    // Redundant link
    unsigned int  m_NumIpPacketsReceived2;    // #IP packets received path 2
    unsigned int  m_NumIpPacketsLost2;        // #IP packets lost path 2

    DtIpQosStats m_QosStatsLastSec;           // QOS statistics per second
    DtIpQosStats m_QosStatsLastMin;          // QOS statistics per minute
};
```

Members

m_TotNumIpPackets

Total number of IP packets that the stream should contain. Lost packets are included in this counter.

m_LostIpPacketsBeforeFec

Number of IP packets lost before FEC reconstruction.

m_LostIpPacketsAfterFec

Number of IP packets lost after FEC reconstruction.

m_NumIpPacketsReceived1(main link), m_NumIpPacketsReceived2(redundant link)

Number of IP packets received. Lost IP packets are not included in this counter.

m_NumIpPacketsLost1(main link), m_NumIpPacketsLost2(redundant link)

Number of IP packets lost.

m_QosStatsLastSec, m_QosStatsLastMin

Quality Of Service statistics calculated by the driver. These statistics are calculated over the last second(*m_QosStatsLastSec*) and over the last minute(*m_QosStatsLastMin*). See the *DtIpQosStats* structure for details.

struct DtIsdbsLayerPars

This structure specifies the ISDB-S modulation for one hierarchical layer. This structure is used in class **DtIsdbsPars**, in an array of four structures for layer 1...4.

```
struct DtIsdbsLayerPars
{
    int    m_NumSlots;           // Number of slots
    int    m_ModCod;            // Modulation method and code rate
};
```

Members

m_NumSlots

The number of slots per frame used for this hierarchical layer.

m_ModCod

Modulation type used for this hierarchical layer.

| Value | Meaning |
|------------------------------|------------------------|
| DTAPI_ISDBS_MODCOD_BPSK_1_2 | BPSK 1/2 |
| DTAPI_ISDBS_MODCOD_QPSK_1_2 | QPSK 1/2 |
| DTAPI_ISDBS_MODCOD_QPSK_2_3 | QPSK 2/3 |
| DTAPI_ISDBS_MODCOD_QPSK_3_4 | QPSK 3/4 |
| DTAPI_ISDBS_MODCOD_QPSK_5_6 | QPSK 5/6 |
| DTAPI_ISDBS_MODCOD_QPSK_7_8 | QPSK 7/8 |
| DTAPI_ISDBS_MODCOD_8PSK_2_3 | 8PSK 2/3 |
| DTAPI_ISDBS_MODCOD_NOT_ALLOC | This layer is not used |

struct DtIsdbtLayerData

This structure specifies the ISDB-T modulation parameters for one hierarchical layer. It is used in class `DtIsdbtParamData` used for the statistic `DTAPI_STAT_ISDBT_PARSDATA`.

```
struct DtIsdbtLayerData
{
    int  m_NumSegments;           // Number of segments
    int  m_Modulation;            // Modulation type
    int  m_CodeRate;              // Code rate
    int  m_TimeInterleave;        // Time interleaving
};
```

Members

m_NumSegments

Number of segments used in this layer.

m_Modulation

Modulation type applied to the segments in this layer.

| Value | Meaning |
|-----------------------|---------|
| DTAPI_ISDBT_MOD_DQPSK | DQPSK |
| DTAPI_ISDBT_MOD_QPSK | QPSK |
| DTAPI_ISDBT_MOD_QAM16 | 16-QAM |
| DTAPI_ISDBT_MOD_QAM64 | 64-QAM |

m_CodeRate

Convolutional coding rate applied to the segments in this layer.

| Value | Meaning |
|----------------------|---------|
| DTAPI_ISDBT_RATE_1_2 | 1/2 |
| DTAPI_ISDBT_RATE_2_3 | 2/3 |
| DTAPI_ISDBT_RATE_3_4 | 3/4 |
| DTAPI_ISDBT_RATE_5_6 | 5/6 |
| DTAPI_ISDBT_RATE_7_8 | 7/8 |

m_TimeInterleave

Encoded length of time interleaving.

The table below defines the mapping of *m_TimeInterleave* to parameter *l* in the time-interleaving process.

| Value | Mode 1 | Mode 2 | Mode 3 |
|-------|--------|--------|--------|
| 0 | 0 | 0 | 0 |
| 1 | 4 | 2 | 1 |
| 2 | 8 | 4 | 2 |
| 3 | 16 | 8 | 4 |

struct DtIsdbtLayerPars

This structure specifies the ISDB-T modulation parameters for one hierarchical layer. It is used in class **DtIsdbtPars**, in an array of three structures for layer A, B and C.

```
struct DtIsdbtLayerPars
{
    int  m_NumSegments;           // Number of segments
    int  m_Modulation;            // Modulation type
    int  m_CodeRate;              // Code rate
    int  m_TimeInterleave;        // Time interleaving
    // Derived:
    int  m_BitRate;               // Bit rate in bps
};
```

Members

m_NumSegments

Number of segments used in this layer.

m_Modulation

Modulation type applied to the segments in this layer.

| Value | Meaning |
|-----------------------|---------|
| DTAPI_ISDBT_MOD_DQPSK | DQPSK |
| DTAPI_ISDBT_MOD_QPSK | QPSK |
| DTAPI_ISDBT_MOD_QAM16 | 16-QAM |
| DTAPI_ISDBT_MOD_QAM64 | 64-QAM |

m_CodeRate

Convolutional coding rate applied to the segments in this layer.

| Value | Meaning |
|----------------------|---------|
| DTAPI_ISDBT_RATE_1_2 | 1/2 |
| DTAPI_ISDBT_RATE_2_3 | 2/3 |
| DTAPI_ISDBT_RATE_3_4 | 3/4 |
| DTAPI_ISDBT_RATE_5_6 | 5/6 |
| DTAPI_ISDBT_RATE_7_8 | 7/8 |

m_TimeInterleave

Encoded length of time interleaving.

The table below defines the mapping of *m_TimeInterleave* to parameter *l* in the time-interleaving process.

| Value | Mode 1 | Mode 2 | Mode 3 |
|-------|--------|--------|--------|
| 0 | 0 | 0 | 0 |
| 1 | 4 | 2 | 1 |
| 2 | 8 | 4 | 2 |
| 3 | 16 | 8 | 4 |

m_BitRate

Bit rate in bits-per-second, assuming this is a 6-MHz channel. This is a “derived” parameter, which is set to a value by calling **DtIsdbtPars::ComputeRates**.

Remarks

The ISDB-T modulator uses the sum of *m_NumSegments* over layer A/B/C to set the total number of segments. This enables the usage of broadcast type **BTYPE_TV** for 1-segment modulation.

struct DtIsdbtParamData

This structure specifies the ISDB-T modulation parameters. It is used in class `DtIsdbtParamData` used for the statistic `DTAPI_STAT_ISDBT_PARSDATA`.

```
struct DtIsdbtPars
{
    int    m_BType;           // Broadcast type
    int    m_Mode;            // Transmission mode
    int    m_Guard;           // Guard interval
    int    m_PartialRx;       // Partial reception
    int    m_Emergency;       // Switch-on control for emergency broadcast
    int    m_IipPid;          // PID used for multiplexing IIP packet
    DtIsdbtLayerData m_LayerPars[3]; // Layer-A/B/C parameters
};
```

Public Members

m_BType

Broadcast type.

| Value | Meaning |
|-------------------------|---|
| DTAPI_ISDBT_BTTYPE_TV | TV broadcast; Can be used with any number of segments |
| DTAPI_ISDBT_BTTYPE_RAD1 | 1-segment radio broadcast; Total #segments must be 1 |
| DTAPI_ISDBT_BTTYPE_RAD3 | 3-segment radio broadcast; Total #segments must be 3 |

m_Mode

Transmission mode.

| Value | Meaning |
|-------|------------|
| 1 | Mode 1: 2k |
| 2 | Mode 2: 4k |
| 3 | Mode 3: 8k |

m_Guard

Guard-interval length.

| Value | Meaning |
|------------------------|---------|
| DTAPI_ISDBT_GUARD_1_32 | 1/32 |
| DTAPI_ISDBT_GUARD_1_16 | 1/16 |
| DTAPI_ISDBT_GUARD_1_8 | 1/8 |
| DTAPI_ISDBT_GUARD_1_4 | 1/4 |

m_PartialRx

Flag that indicates whether layer A is used for partial reception: 0 = no partial reception, 1 = partial reception on.

m_LayerPars

Modulation parameters for hierarchical layers A (element 0), B (1) and C (2).

Remarks

struct DtIsdbtStreamSelPars

This structure specifies the selection parameters for an ISDB-T stream.

```
struct DtIsdbtStreamSelPars
{
    // Empty
};
```

Members

DtIsdbtStreamSelPars structure has no members

Remark

All layers are selected and output the same stream

struct DtPar

This is a generic structure to represent a single parameter setting. It is used for setting and retrieving parameter settings.

```
struct DtPar
{
    DTAPI_RESULT m_Result;    // Result of retrieving the parameters
    int m_ParId;              // DTAPI_PAR_XXX
    int m_IdXtra[4];          // Extra identification parameters
    ParValueType m_ValueType; // Value types of the parameter
    union {
        bool m_ValueBool;    // Value if value type is PAR_VT_BOOL
        double m_ValueDouble; // Value if value type is PAR_VT_DOUBLE
        int m_ValueInt;       // Value if value type is PAR_VT_INT
        void* m_pValue;       // Pointer for complex types
    };
};
```

Members

m_Result

If the user queries one or more parameters with **GetPar**, this member is used to return the result code for retrieving the parameter.

m_ParId

Identifies the parameter:

| Parameter | Type | Meaning |
|--------------------------|------|---|
| DTAPI_PAR_DEMOD_THREADS | int | Number of threads used for the software demodulation; The default value is 4. |
| DTAPI_PAR_DEMOD_LDPC_MAX | int | Maximum number of iterations for ATSC 3.0/DVB-C2/T2 LDPC-error correction; The default value is 50. |
| DTAPI_PAR_DEMOD_LDPC_AVG | int | Limit for the average number of iterations for ATSC 3.0/DVB-C2/T2 LDPC-error correction; The default value is 16. |
| DTAPI_PAR_DEMOD_MER_ENA | bool | Enable (true) or disable MER calculation; The default value is 'true'. |

m_IdXtra[4]

Extra identification parameters. Not yet used.

m_ValueType

Identifies the type of the value according to the following table:

| Value | Meaning |
|------------------|----------------------------|
| PAR_VT_BOOL | The value type is bool |
| PAR_VT_DOUBLE | The value type is double |
| PAR_VT_INT | The value type is int |
| PAR_VT_UNDEFINED | The value is not valid yet |

struct DtRawIpHeader

Structure placed in front of all IP Packets in receive mode **DTAPI_RXMODE_IPRAW**.

```
struct DtRawIpHeader
{
    unsigned short  m_Tag;           // 0x44A0h = 'D'160
    unsigned short  m_Length;       // IP packet length
    unsigned int    m_TimeStamp;    // IP packet arrival/transmit timestamp
};
```

Members

m_Tag

16-bit tag that marks the beginning of a **DtRawIpHeader** structure. The value of this field is fixed to: 0x44A0.

m_Length

16-bit integer that indicates the number of bytes (i.e. size of the IP packet) following directly after the **DtRawIpHeader** structure.

m_TimeStamp

A 32-bit timestamp, taken from the internal 54-MHz system clock on the device, indicating the arrival time of the IP packet following this structure.

struct DtRfLevel

Structure describing a RF-level for a specific frequency. Used by `DtInpChannel::SpectrumScan` to return the RF levels found by scanning a frequency band.

```
struct DtRfLevel
{
    __int64 m_FreqHz;           // Center frequency of the Rf level
    int m_RfLevel;             // RF level found in units of 0.1 dBmV
};
```

Members

`m_FreqHz`

The center frequency of the found RF level.

`m_RfLevel`

RF level found in units of 0.1 dBmV.

struct DtRsDecStats

This structure specifies the Reed-Solomon decoder statistics used for the statistic `DTAPI_STAT_RSDEC_STATS`.

```
struct DtRsDecStats
{
    bool    m_Locked;           // Decoder is locked
    __int64 m_ByteSkipCount;    // Bytes skipped while looking for sync
    __int64 m_PacketCount;      // Decoded packets count
    __int64 m_UncorrPacketCount; // Uncorrected packets count
    __int64 m_ByteErrorCount;   // Byte error count
    __int64 m_BitErrorCount;    // Bit error count
};
```

Members

m_Locked

Indication whether the Reed-Solomon decoder is locked.

m_ByteSkipCount

The total number of bytes skipped while looking for synchronisation.

m_PacketCount

The total number of decoded transport stream packets.

m_UncorrPacketCount

The total number of uncorrected transport stream packets.

m_ByteErrorCount

The byte error count before Reed-Solomon.

m_BitErrorCount

The bit error count before Reed-Solomon.

struct DtSdiIpFrameStat

Structure placed in front of all SDI frames in receive mode when using the option `DTAPI_RXMODE_SDI_STAT` and SDI over IP

```
struct DtSdiIpFrameStat
{
    unsigned int    m_FrameCount; // SDI frame counter
    unsigned int    m_Timestamp;  // RTP timestamp first IP packet this frame
    unsigned int    m_MinIpat;    // Min. IPAT of all IP packets this frame
    unsigned int    m_MaxIpat;    // Max. IPAT of all IP packets this frame
    __int64         m_Reserved1;
    __int64         m_Reserved2;
};
```

Members

m_FrameCount

SDI framecounter as defined in the SMPTE-2022-6 specification. Only the lower 8 bits are used.

m_Timestamp

This is the RTP timestamp of the first IP packets contained in the SDI frame.

m_MinIpat

Minimal Inter Packet Arrival time of all IP packets contained in the SDI frame. This value is in 54MHz units.

m_MaxIpat

Maximal Inter Packet Arrival time of all IP packets contained in the SDI frame. This value is in 54MHz units.

m_Reserved1, m_Reserved2

Reserved for future use.

struct DtTransmitter

This structure describes a transmitter. Used by `DtInpChannel::BlindScan` to return the transmitters found by scanning a frequency band.

```
struct DtTransmitter
{
    __int64  m_FreqHz;           // Center frequency of the transmitter
    int      m_ModType;          // Modulation type
    int      m_SymbolRate;       // Symbol rate
};
```

Members

FreqHz

Centre frequency of the transmitter in Hertz.

ModType

Type of modulation used in the transmitted signal. See `DtInpChannel::GetDemodControl`, section Modulation Types, for a list of applicable values.

SymbolRate

The symbol rate of the transmitted signal.

struct DtSpsProgress

This structure describes the progress of an asynchronous spectrum scan. Used by `DtInpChannel::SpectrumScan` to return the current state and RF levels found by scanning a frequency band using the `DtSpsProgressFunc` callback.

```
struct DtSpsProgress
{
    DtRfLevel  m_DtRfLevel;    // A single level
    SpsEvent   m_ProgressEvent; // Progress event
    DTAPI_RESULT m_Result;     // Result of the spectrum scan
};
```

Members

m_DtRfLevel

The RF level found on a frequency.

m_ProgressEvent

Enumeration defining the type of progress event.

| Value | Meaning |
|----------------------|--|
| SPS_STEP | One frequency step is completed |
| SPS_CANCELLED | The spectrum scan is cancelled due to execution of <code>DtInpChannel::CancelSpectrumscan</code> or due to execution of a tuning function. |
| SPS_DONE | The spectrum scan is completed |

m_Result

The result code of the spectrum scan.

struct DtT2MiStreamSelPars

This structure specifies the selection parameters for a T2-MI transport stream containing a complete DVB-T2 stream.

```
struct DtT2MiStreamSelPars
{
    int    m_T2MiOutPid;           // T2-MI output PID
    int    m_T2MiTsRate;          // T2-MI transport stream rate
};
```

Members

m_T2MiOutPid

Specifies the PID carrying the T2-MI packet data. The valid range is 0 ... 8190.

m_T2MiTsRate

Specifies the T2-MI transport-stream rate in bits per second. If set to '-1' a variable bitrate transport stream is created, else null packets are added to reach the specified rate. The maximum rate is 72 Mbps.

In case the specified transport-stream rate is too low, T2-MI overflows occur. The number of overflows can be retrieved using the **DTAPI_STAT_T2MI_OVFS** statistic.

Remarks

T2-MI transport stream selection cannot be combined with DVB-T2 stream (PLP) selection.

struct DtVitDecStats

This structure specifies the Viterbi decoder statistics used for the statistic `DTAPI_STAT_VITDEC_STATS`.

```
struct DtVitDecStats
{
    __int64  m_BitCount;           // Input bit count
    __int64  m_BitErrorCount;     // Bit error count
};
```

Members

m_BitCount

The total number of decoded bits.

m_BitErrorCount

The bit error count before Viterbi.

Callback functions

DtBsProgressFunc

Prototype of a callback function to be supplied by the user with the asynchronous `DtInpChannel::BlindScan` method. This callback function is invoked when a blind scan specific event has occurred.

```
typedef void DtBsProgressFunc(  
    [out] DtBsProgress& Progress    // Progress information  
    [out] void* pOpaque             // Pointer to event arguments structure  
);
```

Parameters

Progress

See `DtBsProgress` for a list of applicable values.

pOpaque

Opaque pointer that was passed in the `DtInpChannel::BlindscanScan` method.

Remarks

The callback function may not block and the amount of processing should be kept as low as possible to avoid stalling the **DTAPI** or driver. In case significant processing time is required the data should be written to a temporary buffer and be processed in another thread.

DtSpsProgressFunc

Prototype of a callback function to be supplied by the user with `DtInpChannel::SpectrumScan`. This callback function is invoked when a spectrum scan specific event has occurred.

```
typedef void DtSpsProgressFunc(  
    [out] DtSpsProgress&   Progress    // Progress information  
    [out] void*            pOpaque      // Pointer to event arguments structure  
);
```

Parameters

Progress

See `DtSpsProgress` for a list of applicable values.

pOpaque

Opaque pointer that was passed in the `DtInpChannel::SpectrumScan` method.

Remarks

The callback function may not block and the amount of processing should be kept as low as possible to avoid stalling the `DTAPI` or driver. In case significant processing time is required the data should be written to a temporary buffer and be processed in another thread.

pDtEventCallback

Prototype of a callback function to be supplied by the user with `::DtapiRegisterCallback` and/or `DtDevice::RegisterCallback`. This callback function is invoked when an event has occurred.

```
typedef void (*pDtEventCallback) (  
    [out] int    Event           // Occurred event  
    [out] const DtEventArgs*    pArgs // Pointer to event arguments structure  
);
```

Parameters

Event

Identifies the event that has been occurred. See `::DtapiRegisterCallback` and `DtDevice::RegisterCallback` for a list of applicable values.

pArgs

Pointer to the `DtEventArgs` event argument structure with additional information about the event that has been occurred.

Remarks

The callback function may not block and the amount of processing should be kept as low as possible to avoid stalling the **DTAPI** or driver. In case significant processing time is required the data should be written to a temporary buffer and be processed in another thread.

DtCmmbPars

DtCmmbPars

Structure describing parameters for CMMB modulation.

```
struct DtCmmbPars
{
    int  m_Bandwidth;           // CMMB channel bandwidth
    int  m_TsRate;              // CMMB TS rate in bps
    int  m_TsPid;               // PID of the CMMB stream.
    int  m_AreaId;              // Area ID
    int  m_Txid;                // Transmitter ID
};
```

Public members

m_Bandwidth

The bandwidth of the channel.

| Value | Meaning |
|--------------------|---------|
| DTAPI_CMMB_BW_2MHZ | 2 MHz |
| DTAPI_CMMB_BW_8MHZ | 8 MHz |

m_TsRate

The rate in bits per second of the input transport stream.

m_TsPid

The PID of the CMMB stream in the transport stream.

m_AreaId

The area ID. The valid range is 0 ... 127.

m_Txid

The transmitter ID. The valid range is 0 ... 127.

Remarks

If the CMMB modulation is selected, the data written to the Transmit FIFO shall be in the format of CMMB PMS data packets.

DtCmmbPars::RetrieveTsRateFromTs

Retrieve the TS rate from a 188-byte transport stream with CMMB PMS data packets and store the results in the **DtCmmbPars** object calling this function.

```
DTAPI_RESULT DtCmmbPars::RetrieveTsRateFromTs (
    [in] char*   pBuffer,           // Buffer with transport stream
    [in] int     NumBytes,         // Number of bytes in buffer
);
```

Function Arguments

pBuffer

Buffer containing CMMB PMS data packets from which to retrieve the TS rate.

NumBytes

Number of transport-stream bytes in the buffer (at least 3MB).

Result

| DTAPI_RESULT | Meaning |
|------------------------|---|
| DTAPI_OK | TS rate has be retrieved successfully |
| DTAPI_E_INSUF_LOAD | The buffer contains insufficient data to determine the TS rate. |
| DTAPI_E_INVALID_TSTYPE | The buffer does not contain a transport stream consisting of CMMB PMS data packets. |

Remarks

DtDemodPars

DtDemodPars

The **DtDemodPars** class encapsulates demodulation parameters.

```
class DtDemodPars;
```


DtDemodPars::CheckValidity

Check demodulation parameters for validity.

```
DTAPI_RESULT DtDemodPars::CheckValidity(
);
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|---------------------------|--|
| DTAPI_OK | The demodulation parameters have been set successfully |
| DTAPI_E_INVALID_BANDWIDTH | Invalid value for bandwidth field |
| DTAPI_E_INVALID_CONSTEL | Invalid value for constellation field |
| DTAPI_E_INVALID_GUARD | Invalid value for guard-interval field |
| DTAPI_E_INVALID_INTERLVNG | Invalid value for interleaving field |
| DTAPI_E_INVALID_J83ANNEX | Invalid value for J.83 annex |
| DTAPI_E_INVALID_MODPARS | Invalid demodulation parameters |
| DTAPI_E_INVALID_PILOTS | Invalid value for pilots |
| DTAPI_E_INVALID_RATE | Invalid value for convolutional rate or FEC code rate |
| DTAPI_E_INVALID_SYMRATE | Invalid value for symbol rate |
| DTAPI_E_INVALID_T2PROFILE | Invalid value for DVB-T2 profile |
| DTAPI_E_INVALID_TRANSMODE | Invalid value for transmission-mode field |

Remarks

DtDemodPars::GetModType

Returns the modulation type. The value `DTAPI_MOD_TYPE_UNK` indicates that no valid modulation type has been set.

```
int DtDemodPars::GetModType(  
);
```

Function Arguments

Result

Remarks

DtDemodPars::SetModType

Initializes the **DtDemodPars** object for the specified modulation type.

```
DTAPI_RESULT DtDemodPars::SetModType (
    [in] int    ModType,           // Modulation type
);
```

Function Arguments

ModType

Modulation type for which the **DtDemodPars** object is initialized.

| Value | Meaning | Encapsulated demodulation parameters | Access method in DtDemodPars |
|------------------------|-----------------|--------------------------------------|------------------------------|
| DTAPI_MOD_ATSC | ATSC VSB | DtDemodParsAtsc | Atsc () |
| DTAPI_MOD_ATSC3 | ATSC 3.0 | DtDemodParsAtsc3 | Atsc3 () |
| DTAPI_MOD_DAB | DAB | DtDemodParsDab | Dab () |
| DTAPI_MOD_DVBC2 | DVB-C2 | DtDemodParsDvbC2 | DvbC2 () |
| DTAPI_MOD_DVBS_QPSK | DVB-S, QPSK | DtDemodParsDvbS | DvbS () |
| DTAPI_MOD_DVBS2_8PSK | DVB-S.2, 8PSK | DtDemodParsDvbS2 | DvbS2 () |
| DTAPI_MOD_DVBS2_16APSK | DVB-S.2, 16APSK | | |
| DTAPI_MOD_DVBS2_32APSK | DVB-S.2, 32APSK | | |
| DTAPI_MOD_DVBS2_QPSK | DVB-S.2, QPSK | | |
| DTAPI_MOD_DVBT | DVB-T | DtDemodParsDvbT | DvbT () |
| DTAPI_MOD_DVBT2 | DVB-T2 | DtDemodParsDvbT2 | DvbT2 () |
| DTAPI_MOD_IQDIRECT | I/Q samples | DtDemodParsIq | Iq () |
| DTAPI_MOD_ISDBT | ISDB-T | DtDemodParsIsdbt | Isdbt () |
| DTAPI_MOD_QAM16 | 16-QAM | DtDemodParsQam | Qam () |
| DTAPI_MOD_QAM32 | 32-QAM | | |
| DTAPI_MOD_QAM64 | 64-QAM | | |
| DTAPI_MOD_QAM128 | 128-QAM | | |
| DTAPI_MOD_QAM256 | 256-QAM | | |
| DTAPI_MOD_QAM_AUTO | Autodetect QAM | | |

Result

| DTAPI_RESULT | Meaning |
|--------------|---|
| DTAPI_OK | The modulation type has been set successfully |

| | |
|-------------------------|-------------------------|
| DTAPI_E_INVALID_MODTYPE | Invalid modulation type |
|-------------------------|-------------------------|

Remarks

IDtDemodEvent

Call back interface for demodulation controller events (e.g. tuning frequency has changed).

IDtDemodEvent::TuningParsHaveChanged

This event method is called when the tuning frequency has been changed.

```
void IDtDemodEvent::TuningParsHaveChanged(  
    [in] __int64 OldFreqHz      // Old tuning frequency in hertz  
    [in] int OldModType        // Old modulation type  
    [in] int OldParXtra[3]     // Old extra modulation parameters  
    [in] __int64 NewFreqHz     // New tuning frequency in hertz  
    [in] int NewModType        // New modulation type  
    [in] int NewParXtra[3]     // New extra modulation parameters  
);
```

Function Arguments

OldFreqHz

The old tuning frequency (in Hz). A value of -1 indicates no valid frequency was previously set.

OldModType, OldParXtra[3]

Old modulation parameters. A value of -1 indicates no previous modulation parameters have been set. Refer to **DtInpChannel::SetDemodControl** for the possible values of these parameters

NewFreqHz

The new tuning frequency (in Hz).

NewModType, NewParXtra[3]

New modulation parameters. Refer to **DtInpChannel::SetDemodControl** for the possible values of these parameters

IDtDemodEvent::TuningFreqHasChanged

This event method is called when the tuning frequency has been changed.

```
void IDtDemodEvent::TuningFreqHasChanged(  
    [in] __int64 OldFreqHz    // Old tuning frequency in hertz  
    [in] __int64 NewFreqHz    // New tuning frequency in hertz  
);
```

Function Arguments

OldFreqHz

The old tuning frequency (in Hz). A value of -1 indicates no valid frequency was previously set.

NewFreqHz

The new tuning frequency (in Hz).

DtIqDirectPars

DtIqDirectPars

Structure describing parameters for IQ-direct modulation.

```
struct DtIqDirectPars
{
    DtFractionInt m_SampleRate; // Sample rate
    int m_IqPacking;           // Packing of IQ-samples
    int m_ChannelFilter        // Channel filter
    int m_Interpolation;       // Interpolation method
};
```

Members

m_SampleRate

Specifies the sample rate used by hardware to clock out I and Q samples

m_IqPacking

Specifies the size of the IQ-sample fields which are transferred over the PCI-Express bus, to reduce the PCI-Express bandwidth usage.

| Value | Meaning |
|---------------------|-------------------------------|
| DTAPI_MOD_IQCK_AUTO | Best IQ-sample-packing |
| DTAPI_MOD_IQCK_NONE | No IQ-sample-packing |
| DTAPI_MOD_IQCK_10B | IQ-samples packed into 10 bit |
| DTAPI_MOD_IQCK_12B | IQ-samples packed into 12 bit |

m_ChannelFilter

Specifies the roll-off of the channel filter or the cut-off frequency of the low-pass filter, only supported for the DTA-2115.

| Value | Meaning |
|------------------------|--|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_5 | 5% roll-off |
| DTAPI_MOD_ROLLOFF_10 | 10% roll-off |
| DTAPI_MOD_ROLLOFF_15 | 15% roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_LPF_0_614 | Passband up to sample rate*0.614; used for 2MHz CMMB |
| DTAPI_MOD_LPF_0_686 | Passband up to sample rate*0.686; used for ISDB-T/Tmm/Tsb |
| DTAPI_MOD_LPF_0_754 | Passband up to sample rate*0.754; used for 8MHz CMMB, DAB |
| DTAPI_MOD_LPF_0_833 | Passband up to sample rate*0.833; used for DVB-C2/T/T2 |
| DTAPI_MOD_LPF_0_850 | Passband up to sample rate*0.850; used for DVB-T2 extended bandwidth |

m_Interpolation

Specifies which interpolation method is used.

| Value | Meaning |
|-------------------------|--------------------------|
| DTAPI_MOD_INTERPOL_OFDM | Use OFDM interpolation |
| DTAPI_MOD_INTERPOL_QAM | Use QAM interpolation |
| DTAPI_MOD_INTERPOL_RAW | Raw mode (e.g. DTA-2115) |

Remarks

If the modulation mode IQ-DIRECT is selected, the data written to the Transmit FIFO shall be an array of I/Q sample pairs. The samples are signed 16-bit integer in I, Q order (not dependent on IQ-sample packing).

DtIqDirectPars::CheckValidity

Check the IQ-direct parameters for validity.

```
DTAPI_RESULT DtIqDirectPars::CheckValidity(  
);
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|-------------------------|---|
| DTAPI_OK | IQ-direct modulation parameters are valid |
| DTAPI_E_INVALID_ROLLOFF | Invalid roll-off or low-pass filter |
| DTAPI_E_INVALID_FORMAT | Invalid IQ-packing |
| DTAPI_E_INVALID_MODE | Invalid interpolation type |

Remarks

DtIsdbtPars

DtIsdbtPars

Structure describing parameters for ISDB-T modulation.

```

struct DtIsdbtPars
{
    bool    m_DoMux;                // Hierarchical multiplexing yes/no
    bool    m_FilledOut;           // Members have been given a value
    int     m_ParXtra0;            // #Segments, bw, sample rate, sub-channel
    int     m_BType;               // Broadcast type
    int     m_Mode;                // Transmission mode
    int     m_Guard;               // Guard interval
    int     m_PartialRx;           // Partial reception
    int     m_Emergency;           // Switch-on control for emergency broadcast
    int     m_IipPid;              // PID used for multiplexing IIP packet
    DtIsdbtLayerPars m_LayerPars[3]; // Layer-A/B/C parameters
    std::map<int, int> m_Pid2Layer; // PID-to-layer map
    int     m_LayerOther;          // Other PIDs are mapped to this layer
    int     m_Virtual13Segm;       // Virtual 13-segment mode
    // Derived:
    bool    m_Valid;               // The parameter set is valid
    int     m_TotalBitrate;        // Bitrate of entire stream
};

```

Public Members

m_DoMux

If true, perform hierarchical multiplexing in accordance with the ISDB-T parameters as defined explicitly in this class.

If false, the ISDB-T modulation parameters are specified indirectly by the TMCC information in the 16 extra bytes of the 204-byte packets.

m_FilledOut

This member has significance only if hierarchical multiplexing is on. In that case it indicates whether member variables *m_BType*, *m_Mode*, ... up to and including *m_LayerOther* have been given a value.

Method **RetrieveParsFromTs** will set *m_FilledOut* to true if it has succeeded in finding a valid set of parameters in the transport stream. Alternatively, an application can set *m_FilledOut* to true itself if it has filled out the ISDB-T parameters in the **DtIsdbtPars** object.

m_ParXtra0

Extra parameter encoding bandwidth, sample rate and number of segments. This parameter is encoded like *ParXtra0* in **SetModControl** with *ModType* **DTAPI_MOD_ISDBT**.

m_BType

Broadcast type.

| Value | Meaning |
|-------------------------|---|
| DTAPI_ISDBT_BTTYPE_TV | TV broadcast; Can be used with any number of segments |
| DTAPI_ISDBT_BTTYPE_RAD1 | 1-segment radio broadcast; Total #segments must be 1 |
| DTAPI_ISDBT_BTTYPE_RAD3 | 3-segment radio broadcast; Total #segments must be 3 |

m_Mode

Transmission mode.

| Value | Meaning |
|-------|------------|
| 1 | Mode 1: 2k |
| 2 | Mode 2: 4k |
| 3 | Mode 3: 8k |

m_Guard

Guard-interval length.

| Value | Meaning |
|------------------------|---------|
| DTAPI_ISDBT_GUARD_1_32 | 1/32 |
| DTAPI_ISDBT_GUARD_1_16 | 1/16 |
| DTAPI_ISDBT_GUARD_1_8 | 1/8 |
| DTAPI_ISDBT_GUARD_1_4 | 1/4 |

m_PartialRx

Flag that indicates whether layer A is used for partial reception: 0 = no partial reception, 1 = partial reception on.

m_Emergency

Flag that indicates whether the switch-on control flag for emergency broadcast should be turned on: 0 = off, 1 = on.

m_IipPid

PID value used for multiplexing the IIP packet.

m_LayerPars

Modulation parameters for hierarchical layers A (element 0), B (1) and C (2).

m_Pid2Layer

Map that specifies the hierarchical layer, or layers, to which an elementary stream is to be mapped. The key in the map is the PID of the elementary stream. The value stored in the map is an OR of one or more flags listed in the table below. A value of 0 indicates that the elementary stream is to be dropped.

| Value | Meaning |
|----------------------------------|----------------------------------|
| <code>DTAPI_ISDBT_LAYER_A</code> | Map elementary stream to layer A |
| <code>DTAPI_ISDBT_LAYER_B</code> | Map elementary stream to layer B |
| <code>DTAPI_ISDBT_LAYER_C</code> | Map elementary stream to layer C |

m_LayerOther

Map streams with PIDs not in *m_Pid2Layer* to this layer.

m_Valid

The ISDB-T parameter set is valid. This is a “derived” parameter, which is set to a value by `DtIsdbtPars::CheckValidity`.

m_Virtual13Segm

Use virtual 13 segment mode. The number of segments in layer B is “faked” to be 12.

m_TotalBitrate

Bitrate in bps of the entire stream. The bitrate includes the 16 dummy bytes per packet that contain the ISDB-T information.

Remarks

DtIsdbtPars::CheckValidity

Check ISDB-T parameters for validity. A boolean result (valid/not valid) is stored in the invoking object, in flag *m_Valid*.

```
DTAPI_RESULT DtIsdbtPars::CheckValidity(
    [out] int& ResultCode           // Result of validity check
);
```

Function Arguments

ResultCode

| Value | Meaning |
|--------------------------|--|
| DTAPI_ISDBT_OK | ISDB-T parameters are valid |
| DTAPI_ISDBT_E_BANDWIDTH | Illegal value for bandwidth field in <i>m_ParXtra0</i> |
| DTAPI_ISDBT_E_BTYPE | Illegal value for broadcast type (<i>m_BType</i>) |
| DTAPI_ISDBT_E_GUARD | Illegal value for guard-interval length (<i>m_Guard</i>) |
| DTAPI_ISDBT_E_MODE | Illegal value for transmission mode (<i>m_Mode</i>) |
| DTAPI_ISDBT_E_NSEGM | Number of segments is not equal to 1, 3 or 13, or number of segments is invalid for the current broadcast type, or number of segments encoded in <i>m_ParXtra0</i> does not match number of segments specified in <i>m_LayerPars</i> |
| DTAPI_ISDBT_E_NOTFILLED | Member <i>m_FilledOut</i> is false, indicating that not all ISDB-T parameters have been initialized |
| DTAPI_ISDBT_E_PARTIAL | 'Partial Reception' is selected but number of segments in layer A is not 1 |
| DTAPI_ISDBT_E_SRATE | Illegal value for sample rate field in <i>m_ParXtra0</i> |
| DTAPI_ISDBT_E_SUBCHANNEL | Invalid sub-channel number. For 1-segment radio: $1 \leq \text{sub channel} \leq 40$ For 1-segment radio: $4 \leq \text{sub channel} \leq 37$ |

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | ISDB-T modulation parameters have been found valid |
| DTAPI_E_INVALID_PARS | ISDB-T parameters are invalid. <i>ResultCode</i> is set to a value indicating the reason why the ISDB-T parameters are not valid |

Remarks

This routine assumes that **DtIsdbtPars::ComputeRates** has been called so that the rate variables in the **DtIsdbtPars** object have been set to the correct value.

DtIsdbtPars::ComputeRates

Compute the bit rate per hierarchical layer and store the results in the object calling this function.

```
DTAPI_RESULT DtIsdbtPars::ComputeRates();
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|---------------------|--|
| DTAPI_OK | ISDB-T rates have been computed successfully |
| DTAPI_E_INVALID_ARG | One of the ISDB-T parameters, or the combination of parameters is invalid. |

Remarks

DtIsdbtPars::RetrieveParsFromTs

Retrieve modulation parameters from a 204-byte transport stream with TMCC information and store the results in the **DtIsdbtPars** object calling this function.

```
DTAPI_RESULT DtIsdbtPars::RetrieveParsFromTs (
    [in] char*   pBuffer,           // Buffer with transport stream
    [in] int     NumBytes,         // Number of bytes in buffer
);
```

Function Arguments

pBuffer

Buffer containing transport-stream packets from which to retrieve the ISDB-T parameters.

NumBytes

Number of transport-stream bytes in the buffer.

Result

| DTAPI_RESULT | Meaning |
|------------------------|---|
| DTAPI_OK | ISDB-T modulation parameters have been recovered successfully |
| DTAPI_E_INVALID_TSTYPE | The buffer does not contain a transport stream consisting of 204-byte packets with TMCC information |
| DTAPI_E_INSUF_LOAD | The buffer contains insufficient data to recover all ISB-T modulation parameters |

Remarks

DtSdi

DtSdi

The **DtSdi** class contains helper methods for processing SDI data.

```
class DtSdi;
```


DtSdi::ConvertFrame

This method can be used to convert an SDI frame from one data format to another, e.g. from 10-bit uncompressed to Huffman compressed.

```
DTAPI_RESULT DtSdi::ConvertFrame(
    [in] unsigned int* pInFrame,      // Buffer with input frame
    [in/out] int& InFrameSize,       // [in] Size of input frame
                                      // [out] Number of bytes used
    [in] int InFrameFormat,          // Format of input frame
    [in] unsigned int* pOutFrame,    // Buffer for output frame
    [in/out] int& OutFrameSize,      // [in] Size of output frame
                                      // [out] Number of bytes returned
    [in] int OutFrameFormat          // Format of output frame
);
```

Function Arguments

pInFrame

Buffer containing the frame to be converted. The buffer address shall be 32-bit aligned.

InFrameSize

As an input argument *InFrameSize* indicates the number of bytes in the input frame buffer. The input buffer should comprise at least one complete frame, including any stuff-bytes required to achieve 32-bit alignment. Furthermore, *InFrameSize* must be a multiple of 4.

As an output argument *InFrameSize* indicates how many bytes of the input frame buffer have been used.

InFrameFormat

Specifies the format of the frame-data in the input frame buffer.

| Value | Meaning |
|------------------|--|
| DTAPI_SDI_FULL | Complete SDI frame, including SAV/ EAV, horizontal and vertical blanking periods |
| DTAPI_SDI_ACTVID | Only the active video part of the SDI frame |

The format can optionally be combined (OR-ed) with the following flags:

| Value | Meaning |
|-------------------|--|
| DTAPI_SDI_HUFFMAN | The frame is compressed with lossless Huffman compression |
| DTAPI_SDI_625 | The frame contains 625 lines |
| DTAPI_SDI_525 | The frame contains 525 lines |
| DTAPI_SDI_8B | 8-bit data samples: every 32-bit word contains four 8-bit samples |
| DTAPI_SDI_10B | Packed 10-bit samples: eight 10-bit samples are encoded in ten bytes |
| DTAPI_SDI_16B | One 10-bit sample per 16-bit word. Every 32-bit word in the frame buffer contains two 10-bit samples |

pOutFrame

Buffer to receive the converted frame. The buffer address shall be 32-bit aligned

OutFrameSize

As an input argument *OutFrameSize* indicates the size of the output frame buffer. The output buffer should be large enough to receive one complete frame and should be 32-bit aligned.

As an output argument *OutFrameSize* indicates the size of the converted output frame (i.e. number of bytes returned). The returned size includes any stuffing bytes added to the end of the frame to achieve 32-bit alignment.

OutFrameFormat

Specifies the desired format of the data format for the output frame (please refer to the *InFrameFormat* parameter for a description of the available formats).

NOTE: not every input format can be converted to every output format (e.g. it is not possible to convert between 525-line and 625-line frames)

Result

| DTAPI_RESULT | Meaning |
|--------------------------|---|
| DTAPI_OK | Frame has successfully been converted |
| DTAPI_E_INVALID_BUF | The frame input or output buffer pointer is invalid (e.g. NULL pointer or not 32-bit aligned) |
| DTAPI_E_INCOMP_FRAME | The input buffer does not contain a complete frame |
| DTAPI_E_OUTBUF_TOO_SMALL | The output buffer is too small for receiving the converted frame |
| DTAPI_E_UNSUP_CONV | The requested conversion is not supported |

Remarks

DtStatistic

struct DtStatistic

This structure represents a single measurement or statistic value, mostly for RF receiver cards. It is used in `DtInpChannel::GetStatistics` to pass measurements and statistics information. Please use `DtInpChannel::GetSupportedStatistics` to obtain a list of statistics supported for a given input channel.

```
struct DtStatistic
{
    DTAPI_RESULT m_Result;           // Result of retrieving the statistic
    int m_StatisticId;              // DTAPI_STAT_XXX
    int m_IdXtra[4];                // Extra identification parameters
    int m_ValueType;                // Identifies the type of the value
    union {
        bool m_ValueBool;           // Value if value type is STAT_VT_BOOL
        double m_ValueDouble;       // Value if value type is STAT_VT_DOUBLE
        int m_ValueInt;              // Value if value type is STAT_VT_INT
        void* m_pValue;              // Pointer if value type is not boolean,
                                     // int or double
    };
};
```

Members

`m_Result`

If the user queries one or more measurements with `DtInpChannel::GetStatistics`, this member is used to return the result code for retrieving the statistic from the receiver hardware.

`m_StatisticId`

Identifies the statistic:

| Statistic | Type | Meaning |
|-------------------------|--------|---|
| DTAPI_STAT_AGC1 | int | Returns the AGC1 value |
| DTAPI_STAT_AGC2 | int | Returns the AGC2 value |
| DTAPI_STAT_ATSC3_L1DATA | struct | ATSC 3.0 layer-1 signaling data |
| DTAPI_STAT_BADPCKCNT | int | Count of uncorrected packets. Returns 0 if the receiver is not locked. Remark: for DTA-2136 <u>only</u> this value is reset on each call. |
| DTAPI_STAT_BER_POSTBCH | double | Post-BCH bit error rate |
| DTAPI_STAT_BER_POSTLDPC | double | Post-LDPC bit error rate. <code>m_IdXtra[0]</code> identifies: ATSC 3.0/DVB-C2/T2 PLP. |
| DTAPI_STAT_BER_POSTVIT | double | Post-Viterbi bit error rate. <code>m_IdXtra[0]</code> identifies: DAB sub-channel's start-address or ISDB-T layer. |
| DTAPI_STAT_BER_PREBCH | double | Pre-BCH bit error rate. <code>m_IdXtra[0]</code> identifies: ATSC 3.0/DVB-C2/T2 PLP. |
| DTAPI_STAT_BER_PRELDPC | double | Pre-LDPC bit error rate. <code>m_IdXtra[0]</code> identifies: ATSC 3.0/DVB-C2/T2 PLP. |

| | | |
|-----------------------------|--------|--|
| DTAPI_STAT_BER_PRERS | double | Pre-Reed-Solomon bit error rate. m_IdXtra[0] identifies: DAB sub-channel's start-address or ISDB-T layer. |
| DTAPI_STAT_BER_PREVIT | double | Pre-Viterbi bit error rate. m_IdXtra[0] identifies: DAB sub-channel's start-address or ISDB-T layer. |
| DTAPI_STAT_CARRIER_LOCK | bool | Carrier lock status |
| DTAPI_STAT_CNR | int | Carrier-over-noise ratio in units of 0.1 dB |
| DTAPI_STAT_DAB_ENSEM_INFO | struct | DAB ensemble information from the Fast Information Channel (FIC) |
| DTAPI_STAT_DAB_TXID_INFO | struct | DAB transmitter identification information (TII) |
| DTAPI_STAT_DVBC2_DSLICEDISC | int | DVB-C2 data slice discontinuity count |
| DTAPI_STAT_DVBC2_L1HDR_ERR | int | DVB-C2 L1-Preamble header error count |
| DTAPI_STAT_DVBC2_L1P2_ERR | int | DVB-C2 L1-Part 2 error count |
| DTAPI_STAT_DVBC2_L1P2DATA | struct | DVB-C2 layer-1 part 2 signalling data |
| DTAPI_STAT_DVBC2_PLPSIGDATA | struct | DVB-C2 layer-1 PLP signalling data |
| DTAPI_STAT_DVBT_TPS_INFO | struct | DVB-T transmission parameter signalling information |
| DTAPI_STAT_DVBT2_L1DATA | struct | DVB-T2 layer-1 signalling data |
| DTAPI_STAT_DVBT2_L1POST_ERR | int | DVB-T2 L1-Post error count |
| DTAPI_STAT_DVBT2_L1PRE_ERR | int | DVB-T2 L1-Post error count |
| DTAPI_STAT_ESN0 | int | Energy per symbol to noise power spectral density in units of 0.1 dB |
| DTAPI_STAT_EBN0 | int | Energy per bit to noise power spectral density ratio in units of 0.1 dB |
| DTAPI_STAT_FEC_LOCK | bool | FEC decoding lock status |
| DTAPI_STAT_FER_POSTBCH | double | Post-BCH frame error rate. m_IdXtra[0] identifies: ATSC 3.0/DVB-C2/T2 PLP. |
| DTAPI_STAT_FREQ_SHIFT | double | Input frequency shift (Hz) |
| DTAPI_STAT_ISDBT_PARSDATA | struct | ISDB-T signalling data |
| DTAPI_STAT_LDPC_STATS | struct | LDPC error correction counters. m_IdXtra[0] identifies: DVB-C2/T2 PLP. |
| DTAPI_STAT_LINKMARGIN | int | Difference in dB between C/N of the received signal and the C/N at which the receiver cannot demodulate the signal any more in units of 0.1 dB |
| DTAPI_STAT_LOCK | bool | Overall lock status |
| DTAPI_STAT_MA_DATA | struct | DVB-C2/T2 mode adaptation data. m_IdXtra[0] identifies: DVB-C2/T2 PLP. |
| DTAPI_STAT_MA_STATS | struct | DVB-C2/T2 mode adaptation statistics. m_IdXtra[0] identifies: DVB-C2/T2 PLP. |
| DTAPI_STAT_MER | int | MER in units of 0.1 dB. m_IdXtra[0] identifies: ATSC 3.0/DVB-C2/T2 PLP. |

| | | |
|----------------------------|--------|--|
| DTAPI_STAT_OCCUPIEDBW | double | Occupied bandwidth in MHz |
| DTAPI_STAT_PACKET_LOCK | bool | Packet-level lock status |
| DTAPI_STAT_PER | double | Packet-error rate. m_IdXtra[0] identifies: DAB sub-channel's start-address or ISDB-T layer. |
| DTAPI_STAT_PLP_BLOCKS | struct | DVB-T2 number of FEC blocks. m_IdXtra[0] identifies: DVB-T2 PLP. |
| DTAPI_STAT_RELOCKCNT | int | Receiver relock count |
| DTAPI_STAT_RFLVL_CHAN | int | RF level for channel bandwidth in units of 0.1dBmV |
| DTAPI_STAT_RFLVL_CHAN_QS | int | Quick-scan RF level for channel bandwidth in units of 0.1dBmV |
| DTAPI_STAT_RFLVL_NARROW | int | RF level for a narrow bandwidth in units of 0.1dBmV |
| DTAPI_STAT_RFLVL_NARROW_QS | int | Quick-scan RF level for a narrow bandwidth in units of 0.1dBmV |
| DTAPI_STAT_RFLVL_UNCALIB | int | Uncorrected RF level reported by the tuner in units of 0.1dBmV |
| DTAPI_STAT_ROLLOFF | double | Roll-off factor (percentage) |
| DTAPI_STAT_RS | int | Reed-Solomon error count. Set to -1 if receiver is not locked Note: See remarks section for usage instructions |
| DTAPI_STAT_RSDEC_STATS | struct | Reed-Solomon decoder statistics. m_IdXtra[0] identifies: DAB sub-channel's start-address or ISDB-T layer. |
| DTAPI_STAT_SAMPRATE_OFFSET | double | Sample rate offset (ppm) |
| DTAPI_STAT_SNR | int | Signal-to-noise ratio in units of 0.1dB |
| DTAPI_STAT_SPECTRUMINV | bool | Spectrum inversion |
| DTAPI_STAT_T2MI_OVFS | int | DVB-T2 T2-MI overflow count |
| DTAPI_STAT_TEMP_TUNER | int | Tuner temperature |
| DTAPI_STAT_VIT_LOCK | bool | Viterbi lock status |
| DTAPI_STAT_VITDEC_STATS | struct | Viterbi decoder statistics. m_IdXtra[0] identifies: DAB sub-channel's start-address or ISDB-T layer. |

m_IdXtra[4]

Extra identification attributes. See the statistics for possible values or can be set to -1 if not applicable (default value).

m_ValueType

Identifies the type of the value according to the following table:

| Value | Meaning |
|------------------|--|
| STAT_VT_ATSC3_L1 | The value type is pointer to DtAtsc3DemodL1Data |

| | |
|------------------------------|--|
| STAT_VT_BOOL | The value type is bool |
| STAT_VT_DOUBLE | The value type is double |
| STAT_VT_DAB_ENSEM | The value type is pointer to DtDabEnsembleInfo |
| STAT_VT_DVBC2_L1P2 | The value type is pointer to DtDvbC2DemodL1Part2Data |
| STAT_VT_DVBC2_PLPSIG | The value type is pointer to DtDvbC2DemodL1PlpSigData |
| STAT_VT_DVBT_TPS_INFO | The value type is pointer to DtDvbTTpsInfo |
| STAT_VT_DVBT2_L1 | The value type is pointer to DtDvbT2DemodL1Data |
| STAT_VT_INT | The value type is int |
| STAT_VT_ISDBT_PARS | The value type is pointer to DtIsdbtParamsData |
| STAT_VT_LDPC_STATS | The value type is pointer to DtDemodLdpcStats |
| STAT_VT_MA_DATA | The value type is pointer to DtDemodMaLayerData |
| STAT_VT_MA_STATS | The value type is pointer to DtDemodMaLayerStats |
| STAT_VT_PLP_BLOCKS | The value type is pointer to DtDemodPlpBlocks |
| STAT_VT_RS_STATS | The value type is pointer to DtRsDecStats |
| STAT_VT_VIT_STATS | The value type is pointer to DtVitDecStats |
| STAT_VT_UNDEFINED | The value is not valid yet |

m_ValueBool, *m_ValueDouble*, *m_ValueInt*, *m_pValue*

The value of the statistic. *m_ValueType* determines which variable is used.

Remarks

The **DTAPI_STAT_RS** statistic is available only if the hardware has been put in a special mode using the **SetErrorStats** method. Refer to **DtInpChannel::SetErrorStats** for a full description.

In DVB-S2, the **DTAPI_STAT_BER_PRELDPC** statistic is the bit error rate before the receiver has applied any error correction. For the DTA-2137 it is computed from the MER. This computation has been validated using DekTec's advanced demodulator simulation software (this software has been used amongst others in the DVB working groups for the definition of DVB-T2 and DVB-C2). The correspondence between theoretical and measured values is very good.

For the DTA-2137, the **DTAPI_STAT_BER_ESNO** statistic is computed from the MER under the assumption that the noise distribution is Gaussian (AWGN channel), as under these circumstances E_s/N_0 and MER are identical.

For the DTA-2137, the **DTAPI_STAT_BER_EBNO** statistic is computed from the E_s/N_0 and is valid for constant modulated (CCM) streams only.

DtStatistic::GetValue

Get the value of the statistic.

```
DTAPI_RESULT DtStatistic::GetValue(int& Value);
DTAPI_RESULT DtStatistic::GetValue(double& Value);
DTAPI_RESULT DtStatistic::GetValue(bool& Value);

DTAPI_RESULT DtStatistic::GetValue(DtAtsc3DemodL1Data*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDabEnsembleInfo*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDvbC2DemodL1Part2Data*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDvbC2DemodL1PlpSigData*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDvbT2TpsInfo*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDvbT2DemodL1Data*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDemodLdpcStats*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDemodMaLayerData*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDemodMaLayerStats*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtDemodPlpBlocks*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtIsdbtParamsData*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtRsDecStats*& pValue);
DTAPI_RESULT DtStatistic::GetValue(DtVitDecStats*& pValue);
```

Function Arguments

Value

Receives the value of the statistic. The type of Value must match the type of the statistic. Integers are not automatically converted to doubles or vice versa.

pValue

Receives a pointer to the value of the statistic.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Frame has successfully been converted |
| DTAPI_E_INVALID_TYPE | The value type of the overload does not match the type of the statistic |

Remarks

Global Functions

::DtapiCheckDeviceDriverVersion

Check whether the versions of the device drivers are compatible with the current version of the DTAPI library.

```
DTAPI_RESULT  ::DtapiCheckDeviceDriverVersion(void);  
DTAPI_RESULT  ::DtapiCheckDeviceDriverVersion(int DeviceCategory);
```

Function Arguments

DeviceCategory

Device category (DTAPI_CAT_PCI or DTAPI_CAT_USB) of device driver for which to check the version.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The device drivers are compatible with the current version of the DTAPI library. |
| DTAPI_E_DRIVER_INCOMP | Version of at least one of the device drivers is incompatible with the DTAPI library. The device drivers need to be upgraded. |
| DTAPI_E_NO_DEVICE | Device-driver version cannot be queried because no DekTec device of the given category is available in the system, or the DekTec devices are disabled in the Windows device manager, or the DekTec device driver for the category is not installed. |

Remarks

These functions can only check the driver version if a PCI or USB device is installed. DTE devices use the standard network drivers and no specific DekTec driver that could be incompatible.

::DtapiDeviceScan

Scan DekTec devices in the system.

```
DTAPI_RESULT ::DtapiDeviceScan(  
    [in] int    NumEntries,           // #Device entries in DvcDescArr  
    [out] int&  NumEntriesResult,     // #Devices found or #entries required  
    [out] DtDeviceDesc* DvcDescArr,  // Device descriptor array  
    [in] bool   InclDteDvcs=false,   // Include DTE-31xx devices  
    [in] int    ScanOrder=DTAPI_SCANORDER_ORIG // Sort order for results  
);
```

Function Arguments

NumEntries

Specifies the size, in number of **DtDeviceDesc** entries, of the caller-supplied *pDvcDesc* array.

NumEntriesResult

Output argument that receives the number of devices found and described in *DvcDescArr*. The value of this argument can be greater than *NumEntries*; in this case **DtapiDeviceScan** returns **DTAPI_E_BUF_TOO_SMALL**.

DvcDescArr

Pointer to a caller-supplied array of **DtDeviceDesc** entries to receive the device descriptions.

InclDteDvcs

Include DekTec DTE-31xx devices in the scan. This requires scanning the network.

ScanOrder

The order in which the devices in the system are returned. By default the first results are PCI devices (DTA-1xx, DTA-2xxx), then USB devices (DTU-xxx), then networked devices (DTE-31xx). The order of devices within one device category is OS-dependent. If you use **DTAPI_SCANORDER_SN** the devices in the *DvcDescArr* array will be sorted by serial number.

| Value | Meaning |
|-----------------------------|--------------------------------|
| DTAPI_SCANORDER_ORIG | Sort devices by type (default) |
| DTAPI_SCANORDER_SN | Sort devices by serial number |

Result

| DTAPI_RESULT | Meaning |
|------------------------------|---|
| DTAPI_OK | Scan has completed successfully and the <i>DvcDescArr</i> array was large enough to contain all device descriptions. |
| DTAPI_E_BUF_TOO_SMALL | The number of device-description entries in <i>DvcDescArr</i> is too small. The number of entries required is returned in <i>NumEntriesResult</i> . |

Remarks

DtapiDeviceScan scans the PCI and USB bus(es) in the current system and returns all DekTec devices found.

If *InclDteDvcs* is set to **true**, **DtapiDeviceScan** also scans the network for DekTec DTE-31xx devices. This will take extra time.

This function may have to be called twice. The first time, *NumEntries* should be set to a best-guess maximum value. If the result status is **DTAPI_E_BUF_TOO_SMALL**, the application should free the current array of **DtDeviceDesc** entries, allocate a new array with the number of entries returned in *NumEntriesResult*, and call **DtapiDeviceScan** again.

::DtapiDtDeviceDesc2String

Create a descriptive string from a device descriptor, e.g. "DTA-2145 in Slot 0".

```
DTAPI_RESULT ::DtapiDtDeviceDesc2String(  
    [in] DtDeviceDesc* pDvcDesc,    // Device descriptor  
    [in] int StringType,           // Type of string to create  
    [out] char* pString             // String buffer  
    [in] int StringLength          // Size of the string buffer  
);  
  
DTAPI_RESULT ::DtapiDtDeviceDesc2String(  
    [in] DtDeviceDesc* pDvcDesc,    // Device descriptor  
    [in] int StringType,           // Type of string to create  
    [out] wchar_t* pString          // String buffer  
    [in] int StringLength          // Size of the string buffer  
);
```

Function Arguments

pDvcDesc

Pointer to the hardware function descriptor used as input to create our string description.

StringType

Defines the type of string to create. Can be any of the values defined in the table below. The values should be prefixed by **DTAPI_DVC2STR_**.

| Value | Example | Meaning |
|---------------------|----------------------|---------------------------------|
| TYPE_NMB | "DTA-2145" | Device type number |
| TYPE_AND_LOC | "DTA-2145 in slot 5" | Device type number and location |

pString

Pointer to the buffer that receives the descriptive string.

StringLength

Size of the provided buffer (including space for '\0' termination). If the size specified here is too short, the generated string will be clipped and no error is returned. A size of 64 characters should suffice for all strings created with this function.

Results

| DTAPI_RESULT | Meaning |
|----------------------------|---|
| DTAPI_OK | Successfully created a string |
| DTAPI_E_INVALID_BUF | An invalid buffer pointer is supplied for <i>pDvcDesc</i> or <i>pString</i> |

::DtapiDtHwFuncDesc2String

Create a descriptive string for a hardware function from a **DtHwFuncDesc** structure, e.g. "DTA-2145 in slot 5" or "DVB-ASI".

```
DTAPI_RESULT ::DtapiDtHwFuncDesc2String(
    [in] DtHwFuncDesc* pHwFunc,      // Hardware function descriptor
    [in] int StringType,             // Type of string to create
    [out] char* pString              // String buffer
    [in] int StringLength            // Size of the string buffer
);
DTAPI_RESULT ::DtapiDtHwFuncDesc2String(
    [in] DtHwFuncDesc* pHwFunc,      // Hardware function descriptor
    [in] int StringType,             // Type of string to create
    [out] wchar_t* pString           // String buffer
    [in] int StringLength            // Size of the string buffer
);
```

Function Arguments

pHwFunc

Pointer to the hardware function descriptor used as input to create our string description.

StringType

Defines the type of string to create. Can be any of the values defined in the table below. The values should be prefixed by **DTAPI_HWF2STR_**.

| Value | Example | Meaning |
|-----------------------|----------------------|--|
| TYPE_NMB | "DTA-2111" | Device type number |
| TYPE_AND_PORT | "DTA-145 port 1" | Device type number and port number if necessary to uniquely identify the hardware function. If both ports of a DTA-145 are configured as output this function will return "DTA-145 port 1", if port 1 is configured as input and port 2 as output this function will return "DTA-145". |
| TYPE_AND_LOC | "DTA-2144 in slot 5" | Device type number and location |
| ITF_TYPE | "DVB-ASI" | Physical interface type |
| ITF_TYPE_SHORT | "ASI" | Physical interface type – short descriptive string |

pString

Pointer to the buffer that receives the descriptive string

StringLength

Size of the provided buffer (including space for '\0' termination). If the size specified here is too short, the generated string will be clipped and no error is returned. A size of 64 characters should suffice for all strings created with this function.

Results

| DTAPI_RESULT | Meaning |
|---------------------|--|
| DTAPI_OK | Successfully created a string |
| DTAPI_E_INVALID_BUF | An invalid buffer pointer is supplied for <i>pHwFunc</i> or <i>pString</i> |

::DtapiGetDeviceDriverVersion

Get device driver version information.

```
DTAPI_RESULT  ::DtapiGetDeviceDriverVersion(
    [in] int    DeviceCategory,      // Device-driver category
    [out] int&  Major,              // Major version number
    [out] int&  Minor,              // Minor version number
    [out] int&  BugFix,             // Bug fix version number
    [out] int&  Build               // Build number
);
```

Function Arguments

DeviceCategory

Argument specifying the device category:

| Value | Meaning |
|----------------|--|
| DTAPI_CAT_PCI | PCI-bus device; Query version of <i>Dta32</i> or <i>Dta64</i> device driver. |
| DTAPI_CAT_USB | USB device; Query version of <i>Dtu32</i> or <i>Dtu64</i> device driver. |
| DTAPI_CAT_NW | Network device; Query version of <i>DtaNw32</i> or <i>DtaNw64</i> device driver |
| DTAPI_CAT_NWAP | VLAN device; Query version of <i>DtaNwAp32</i> or <i>DtaNwAp64</i> device driver |

DriverVersionMajor

Major version number of the device driver. This number is incremented for major functional upgrades of the device driver.

DriverVersionMinor

The minor version number is incremented for small functional increments of the device driver.

DriverVersionBugFix

The bug-fix version number is incremented when a bug in the device driver has been fixed, without further functional enhancements to the driver.

DriverVersionBuild

Build number.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Device-driver version has been retrieved successfully. |
| DTAPI_E_NO_DEVICE | Device-driver version cannot be queried because no DekTec device with the specified device category is installed. |
| DTAPI_E_NOT_SUPPORTED | The specified device category does not use a device driver with a version that can be queried. |

Remarks

::DtapiGetDtapiServiceVersion

Get version of the **DTAPI** service.

```
DTAPI_RESULT :: DtapiGetDtapiServiceVersion(
[out] int& SvcMajor,           // Major version number
[out] int& SvcMinor,           // Minor version number
[out] int& SvcBugFix,          // Bug fix version number
[out] int& SvcBuild            // Build number
);
```

Function Arguments

SvcMajor

Major version number of the **DTAPI** service.

SvcMinor

The minor version number is incremented for small functional increments of the **DTAPI** service.

SvcBugFix

This number is incremented when a bug in the **DTAPI** service has been fixed, without functional enhancements.

SvcBuild

Build number.

Result

| DTAPI_RESULT | Meaning |
|----------------------------|---|
| DTAPI_E_CONNECT_TO_SERVICE | Failed to connect to the DTAPI service. |
| DTAPI_OK | Version numbers have been retrieved successfully. |

Remarks

The main version of **DTAPI** is the one retrieved with **::DtapiGetVersion**. The version of the **DTAPI** service is required in specific circumstances only.

::DtapiGetVersion

Get version of the **DTAPI** library.

```
DTAPI_RESULT ::DtapiGetVersion(
[out] int& Major,           // Major version number
[out] int& Minor,          // Minor version number
[out] int& BugFix,         // Bug fix version number
[out] int& Build           // Build number
);
```

Function Arguments

Major

Major version number of the **DTAPI** library. This number is incremented for major functional upgrades of the **DTAPI**.

Minor

The minor version number is incremented for small functional increments of the **DTAPI**.

BugFix

This number is incremented when a bug in the **DTAPI** library has been fixed, without functional enhancements.

Build

Build number.

Result

| DTAPI_RESULT | Meaning |
|--------------|---|
| DTAPI_OK | Version numbers have been retrieved successfully. |

Remarks

This function always succeeds.

The PCI and USB device driver have their own version number, which is independent from the **DTAPI** library version.

::DtapiHwFuncScan

Scan hardware functions hosted by DekTec devices.

```
DTAPI_RESULT ::DtapiHwFuncScan(  
    [in] int    NumEntries,           // #Function entries in pHwFuncs  
    [out] int&   NumEntriesResult,    // #Functions found or #entries required  
    [out] DtHwFuncDesc* pHwFuncs,    // Hardware-function descriptions  
    [in] bool    InclDteDvcs=false   // Include DTE-31xx devices  
    [in] int     ScanOrder=DTAPI_SCANORDER_ORIG // Sort order for results  
);
```

Function Arguments

NumEntries

Specifies the size, in number of **DtHwFuncDesc** entries, of the caller-supplied *pHwFuncs* array.

NumEntriesResult

Output argument that receives the number of hardware functions found and described in *pHwFuncs*. The value of this argument can be greater than *NumEntries*; in this case **DtapiHwFuncScan** returns **DTAPI_E_BUFFER_TOO_SMALL**.

pHwFuncs

Pointer to a caller-supplied array of **DtHwFuncDesc** entries to receive the hardware-function descriptors. A NULL pointer may be supplied, but only if *NumEntries* is 0.

InclDteDvcs

Include DekTec DTE-31xx devices in the scan. This requires scanning the network.

ScanOrder

The order in which the devices in the system are scanned. By default the first results are functions of DTA devices, then DTU devices, then DTE devices. The order of devices within one device category is OS-defined. If you use **DTAPI_SCANORDER_SN** the devices will be sorted by serial number before enumerating the hardware functions.

The order in which the devices in the system are returned. By default the first results are functions of PCI devices (DTA-1xx, DTA-2xxx), then USB devices (DTU-xxx), then networked devices (DTE-31xx). The order of devices within one device category is OS-dependent. If you use **DTAPI_SCANORDER_SN** the devices will be sorted by serial number before enumerating the hardware functions.

| Value | Meaning |
|-----------------------------|--------------------------------|
| DTAPI_SCANORDER_ORIG | Sort devices by type (default) |
| DTAPI_SCANORDER_SN | Sort devices by serial number |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Scan has completed successfully and the <i>pHwFuncs</i> array was large enough to contain all function descriptions. |
| DTAPI_E_BUF_TOO_SMALL | The number of function-description entries in <i>pHwFuncs</i> is too small. The number of entries required is returned in <i>NumEntriesResult</i> . |
| DTAPI_E_INVALID_BUF | A NULL pointer was supplied to <i>pHwFuncs</i> while <i>NumEntries</i> is greater than 0. |

Remarks

DtapiHwFuncScan scans the PCI and USB bus(es) in the current system and returns all hardware functions hosted by DekTec devices. Each device may implement multiple hardware functions.

If *InclDteDvcs* is set to **true**, the **DtapiHwFuncScan** also scans the network for DekTec DTE-31xx devices. This will take extra time.

This function may have to be called twice. The first time, *NumEntries* should be set to a best-guess maximum value. If the result status is **DTAPI_E_BUF_TOO_SMALL**, the application should free the current array of **DtHwFuncDesc** entries, allocate a new array with the number of entries returned in *NumEntriesResult*, and call **DtapiHwFuncScan** again.

Another method is to start with setting *pHwFuncs* to NULL and *NumEntries* to 0. The number of required hardware-function entries will be returned, after which *pHwFuncs* can be allocated with the right size and **DtapiHwFuncScan** called again.

The hardware-function descriptors are always retrieved in the same order. Hardware functions hosted by the same device are grouped together. Within a group of hardware functions hosted by a particular device, functions of the same type are grouped together. These sequencing rules enable application programs to easily create function lists in a 'logical' order.

::DtapiInitDtIpParsFromIpString

Initializes the IP and source-IP address members of a TS-over-IP parameters structure.

```
DTAPI_RESULT ::DtapiInitIpParsFromIpString(  
    [out] DtIpPars&  IpPars,           // TS-over-IP parameters to initialize  
    [in] const char*  pIp,             // String with destination IP address  
    [in] const char*  pSrcIp          // String with source IP address  
);  
  
DTAPI_RESULT ::DtapiInitIpParsFromIpString(  
    [out] DtIpPars&  IpPars,           // TS-over-IP parameters to initialize  
    [in] const wchar_t* pIp,           // String with destination IP address  
    [in] const wchar_t* pSrcIp        // String with source IP address  
);
```

Function Arguments

IpPars

TS-over-IP parameters structure to initialize.

pIp

Pointer to a string that holds the IP address (e.g. "127.0.0.1") to be used as destination IP address. If this pointer is NULL the IP address "0.0.0.0" will be used.

pSrcIp

Pointer to a string that holds the IP address (e.g. "192.168.0.1") to be used as source IP address. If this pointer is NULL the IP address "0.0.0.0" will be used.

Results

| DTAPI_RESULT | Meaning |
|--------------|-------------------------|
| DTAPI_OK | This method cannot fail |

Remarks

This method only initializes the `m_Ip` and `m_SrcIp` members in the TS-over-IP parameters structure, it will leave the other members untouched.

::DtapiIoStd2VidStd

Convert *Value* and *SubValue* parameter values (as used in **DtDevice::SetIoConfig** calls) to a **DTAPI_VIDSTD_XXX** constant (as used in the Matrix API to identify video standards).

```
DTAPI_RESULT ::DtapiIoStd2VidStd(  
    [in] int& Value,           // I/O configuration value:  
                                // DTAPI_IOCONFIG SDI/HDSDI/3GSDI  
    [in] int& SubValue,       // I/O configuration subvalue:  
                                // DTAPI_IOCONFIG_1080I50, ...  
    [out] int VidStd,         // DTAPI_VIDSTD_XXX: video standard  
);
```

Function Arguments

Value, *SubValue*

I/O configuration value and sub value to be converted to a **DTAPI_VIDSTD_XXX** standard.

VidStd

Corresponding video standards. For example, value **DTAPI_IOCONFIG_HDSDI** and sub value **DTAPI_IOCONFIG_1080I50** are converted to **DTAPI_VIDSTD_1080I50**.

Result

| DTAPI_RESULT | Meaning |
|------------------------|--|
| DTAPI_E_INVALID_VIDSTD | <i>Value</i> and <i>SubValue</i> do not correspond to a video standard |
| DTAPI_OK | Successfully converted I/O configuration value and sub value to the corresponding video standard |

Remarks

::DtapiModPars2SymRate

Compute symbol rate from transport-stream rate and modulation parameters.

```
DTAPI_RESULT ::DtapiModPars2SymRate (  
[out] int& SymRate           // Computed symbol rate  
[in] int ModType,           // Modulation type  
[in] int ParXtra0,          // Extra parameter #0  
[in] int ParXtra1,          // Extra parameter #1  
[in] int ParXtra2,          // Extra parameter #2  
[in] int TsRate              // transport-stream rate  
);  
  
DTAPI_RESULT ::DtapiModPars2SymRate (  
[out] int& SymRate           // Computed symbol rate  
[in] int ModType,           // Modulation type  
[in] int ParXtra0,          // Extra parameter #0  
[in] int ParXtra1,          // Extra parameter #1  
[in] int ParXtra2,          // Extra parameter #2  
[in] DtFractionInt TsRate // transport-stream rate  
);
```

Function Arguments

SymRate

The symbol rate in baud computed from transport-stream rate and modulation parameters.

ModType, ParXtra0, ParXtra1, ParXtra2

Set of modulation parameters from which the symbol rate is computed. Refer to **DtOutpChannel::SetModControl** on page 343 for more details about these parameters.

TsRate

transport-stream rate in bps.

Result

| DTAPI_RESULT | Meaning |
|---------------------|---|
| DTAPI_OK | Symbol rate has been computed successfully |
| Other result values | Error in modulation parameters, please refer to DtOutpChannel::SetModControl |

Remarks

::DtapiModPars2TsRate

Compute transport-stream rate from modulation parameters. There are overloads for different modulation types, please refer to `DtOutpChannel::SetModControl`.

```
DTAPI_RESULT ::DtapiModPars2TsRate (
[out] int& TsRate // Computed transport-stream rate
[in] int ModType, // Modulation type
[in] int ParXtra0, // Extra parameter #0
[in] int ParXtra1, // Extra parameter #1
[in] int ParXtra2, // Extra parameter #2
[in] int SymRate=-1 // Optional symbol rate
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] DtFractionInt& TsRate // Computed transport-stream rate
[in] int ModType, // Modulation type
[in] int ParXtra0, // Extra parameter #0
[in] int ParXtra1, // Extra parameter #1
[in] int ParXtra2, // Extra parameter #2
[in] int SymRate=-1 // Optional symbol rate
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] int& TsRate // Computed transport-stream rate
[in] DtDvbC2Pars& C2Pars // DVB-C2 modulation parameters
[in] int PlpIdx=-1 // Optional PLP-index
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] DtFractionInt & TsRate // Computed transport-stream rate
[in] DtDvbC2Pars& C2Pars // DVB-C2 modulation parameters
[in] int PlpIdx=-1 // Optional PLP-index
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] int& TsRate // Computed transport-stream rate
[in] DtDvbT2Pars& T2Pars // DVB-T2 modulation parameters
[in] int PlpIdx=-1 // Optional PLP-index
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] DtFractionInt & TsRate // Computed transport-stream rate
[in] DtDvbT2Pars& T2Pars // DVB-T2 modulation parameters
[in] int PlpIdx=-1 // Optional PLP-index
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] int& TsRate // Computed transport-stream rate
[in] DtIsdbTmmPars& TmmPars // DVB-S2 modulation parameters
[in] int TsIdx=-1 // Optional stream-index
);

DTAPI_RESULT ::DtapiModPars2TsRate (
[out] DtFractionInt & TsRate // Computed transport-stream rate
[in] DtIsdbTmmPars& TmmPars // DVB-S2 modulation parameters
[in] int TsIdx=-1 // Optional stream-index
);
```

Function Arguments

TsRate

The transport-stream rate in bps computed from modulation parameters.

ModType, ParXtra0, ParXtra1, ParXtra2

Set of modulation parameters from which the transport-stream rate is computed. Refer to **DtOutpChannel::SetModControl** on page 343 for more details about these parameters.

C2Pars

DVB-C2 modulation parameters from which the transport-stream rate of a PLP (default PLP0) is computed; see description of **class DtDvbC2Pars**.

T2Pars

DVB-T2 modulation parameters from which the transport-stream rate of a PLP (default PLP0) is computed; see description of **class DtDvbT2Pars**.

TmmPars

ISDB-Tmm modulation parameters from which the transport-stream rate of a stream (default stream 0) is computed; see description of **class DtIsdbTmmPars**.

SymRate

Symbol rate in baud. This argument is only required for modulation modes that are dependent on a symbol rate: DVB-C, DVB-S and DVB-S.2.

For other modulation modes the transport-stream rate is uniquely determined by *ModType*, *ParXtra0*, *ParXtra1* and *ParXtra2*.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Successfully derived a TS-rate from the modulation parameters |
| DTAPI_E_SYMRATE_REQD | Conversion requires a symbol rate but none is specified |
| Other result values | Error in modulation parameters, please refer to DtOutpChannel::SetModControl |

Remarks

::DtapiPower2Voltage

Convert from dBm to dBmV.

```
DTAPI_RESULT ::DtapiPower2Voltage(
    [in] int    dBm,           // Level in dBm
    [out] int&   dBmV,        // Converted level in dBmV
    [in] bool   Is50Ohm=false // 50 Ohm (true) or 75 Ohm (false)
);
```

Function Arguments

dBm

Input level in dBm that is to be converted.

dBmV

Converted level expressed in dBmV.

Is50Ohm

Indicates whether conversion has to be applied for a 50-Ω impedance (true) or a 75-Ω impedance (false).

Result

| DTAPI_RESULT | Meaning |
|--------------|--|
| DTAPI_OK | Successfully converted the level in dBm to a level in dBmV |

Remarks

::DtapiRegisterCallback

Register to one or multiple events and define the callback function.

```
DTAPI_RESULT ::DtapiRegisterCallback (
    [in] pDtEventCallback Callback // Callback for occurred events
    [in] void* pContext           // Opaque pointer passed to callback
    [in] int EventTypes          // Events to subscribe to (OR-able)
    [out] void** pId             // Subscription identifier
);
```

Function Arguments

Callback

Pointer to the user-provided callback function that will be called when an event occurred.

pContext

Opaque pointer that is passed to the callback function.

EventTypes

Specifies the events to subscribe to. The events may be OR-ed together.

Global events:

| Event | Meaning |
|----------------------|--|
| DT_EVENT_TYPE_ADD | A DekTec device has been inserted and is now available. |
| DT_EVENT_TYPE_REMOVE | A DekTec device has been removed and is no longer available. |

pId

Pointer to the event subscription identifier.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Callback function has been attached successfully to the event(s) |
| DTAPI_E_INVALID_TYPE | The EventTypes argument contains invalid event types. |
| DTAPI_E_INVALID_ARG | The value of one of the arguments is invalid, and no specific other error code applies |
| DTAPI_E_OUT_OF_MEM | Event watcher cannot be allocated |

::DtapiResult2Str

Convert **DTAPI_RESULT** value to a string.

```
const char* ::DtapiResult2Str(  
    [in] DTAPI_RESULT  DtapiResult  // DTAPI_RESULT value to be converted  
);
```

Function Arguments

DtapiResult

DTAPI_RESULT value to be converted to a string.

Result

Remarks

For ease of use, this function doesn't return a **DTAPI_RESULT** but returns the string directly.

::DtapiUnregisterCallback

Unregister to the one or multiple events.

```
DTAPI_RESULT ::DtapiUnregisterCallback(  
    [in] void*  pId          // Subscription identifier to unregister  
);
```

Function Arguments

pId

Pointer to the event subscription identifier given by **DtapiRegisterCallback**.

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | Callback function has been successfully unregistered. |
| DTAPI_E_INVALID_ARG | The value of one of the arguments is invalid, and no specific other error code applies |
| DTAPI_E_NOT_INITIALIZED | No callback functions for events have been registered |

::DtapiVidStd2IoStd

Convert a **DTAPI_VIDSTD_XXX** constant, used in the Matrix API to identify video standards, to *Value* and *SubValue* parameter values used in **DtDevice::SetIoConfig** calls.

```
DTAPI_RESULT ::DtapiVidStd2IoStd(  
    [in] int VidStd,           // DTAPI_VIDSTD_XXX: video standard  
    [out] int& Value,          // I/O configuration value:  
                                // DTAPI_IOCONFIG SDI/HDSDI/3GSDI  
    [out] int& SubValue,       // I/O configuration subvalue:  
                                // DTAPI_IOCONFIG_1080I50, ...  
);
```

Function Arguments

VidStd

Video standard to be converted: **DTAPI_VIDSTD_1080I50**, ...

Value, *SubValue*

Converted I/O configuration value and sub value. For example, **DTAPI_VIDSTD_1080I50** is converted to value **DTAPI_IOCONFIG_HDSDI** and sub value **DTAPI_IOCONFIG_1080I50**.

Result

| DTAPI_RESULT | Meaning |
|-------------------------------|--|
| DTAPI_E_INVALID_VIDSTD | An invalid value for video standard was specified |
| DTAPI_OK | Successfully converted the video standard to I/O configuration <i>Value</i> and <i>SubValue</i> values |

Remarks

The return value is only valid for SDI ports. For SPISDI ports there is no corresponding function.

::DtapiVidStd2Str

Convert a **DTAPI_VIDSTD_XXX** constant to a human-readable string.

```
const char*  ::DtapiVidStd2Str(  
    [in] int   VidStd,           // DTAPI_VIDSTD_XXX: video standard  
);
```

Function Arguments

VidStd

Video standard to be converted. For example, **DTAPI_VIDSTD_1080I50**, is converted to "DTAPI_VIDSTD_1080I50".

Result

Remarks

For ease of use, this function doesn't return a **DTAPI_RESULT** but returns the string directly.

::DtapiVoltage2Power

Convert from dBmV to dBm.

```
DTAPI_RESULT ::DtapiVoltage2Power(
    [in] int    dBmV,           // Level in dBmV
    [out] int&   dBm,           // Converted level in dBm
    [in] bool   Is50Ohm=false  // 50 Ohm (true) or 75 Ohm (false)
);
```

Function Arguments

dBmV

Input level in dBmV that is to be converted.

dBm

Converted level expressed in dBm.

Is50Ohm

Indicates whether conversion has to be applied for a 50-Ω impedance (true) or a 75-Ω impedance (false).

Result

| DTAPI_RESULT | Meaning |
|--------------|--|
| DTAPI_OK | Successfully converted the level in dBmV to a level in dBm |

Remarks

DtDevice

DtDevice::AttachToIpAddr

Attach device object to the device hardware, based on the IP address of a DTE-31xx device.

```
DTAPI_RESULT DtDevice::AttachToIpAddr(  
    [in] unsigned char Ip[4] // IP address  
);
```

Function Arguments

Ip

IP address of the DTE-31xx to attach to.

Result

| DTAPI_RESULT | Meaning |
|------------------------|--|
| DTAPI_OK | Device object has been attached successfully to the hardware |
| DTAPI_E_ATTACHED | Device object is already attached to device hardware |
| DTAPI_E_NO_DEVICE | No DekTec devices found (at all) |
| DTAPI_E_NO_SUCH_DEVICE | A DTE-31xx with the IP address cannot be found |

Remarks

AttachToIpAddr is non-intrusive. No initialization actions are performed.

This method can only be applied to DTE-31xx devices.

DtDevice::AttachToSerial

Attach device object to the device hardware, based on the serial number of the device.

```
DTAPI_RESULT DtDevice::AttachToSerial (
    [in] __int64 Serial    // Serial number
);
```

Function Arguments

Serial

Serial number of the DekTec device to attach to.

Result

| DTAPI_RESULT | Meaning |
|------------------------|---|
| DTAPI_OK | Device object has been attached successfully to the hardware |
| DTAPI_E_ATTACHED | Device object is already attached to device hardware |
| DTAPI_E_DRIVER_INCOMP | Version of device driver is incompatible with the DTAPI version, device driver needs to be upgraded |
| DTAPI_E_NO_DEVICE | No DekTec devices found (at all) |
| DTAPI_E_NO_SUCH_DEVICE | The device with the specified serial number could not be found |

Remarks

AttachToSerial is non-intrusive. No initialization actions are performed.

DtDevice::AttachToSlot

Attach device object to a PCI Bus device, based on PCI-bus number and slot number.

```
DTAPI_RESULT DtDevice::AttachToSlot(
    [in] int   PciBusNumber,    // PCI-bus number
    [in] int   SlotNumber      // PCI-slot number
);
```

Function Arguments

PciBusNumber, SlotNumber

PCI-bus number and slot number of the DekTec device to attach to.

Result

| DTAPI_RESULT | Meaning |
|------------------------|---|
| DTAPI_OK | Device object has been attached successfully to the hardware |
| DTAPI_E_ATTACHED | Device object is already attached to a PCI card |
| DTAPI_E_NO_DTA_CARD | No DekTec PCI cards found (at all) |
| DTAPI_E_NO_SUCH_DEVICE | No DekTec DTA-1xx PCI card found in the specified slot, or the slot is empty |
| DTAPI_E_DRIVER_INCOMP | Version of device driver is incompatible with the DTAPI version, device driver needs to be upgraded |

Remarks

AttachToSlot is non-intrusive. No initialization actions are performed.

This method cannot be applied to USB devices. Use **AttachToSerial** or **AttachToType** instead.

DtDevice::AttachToType

Attach device object to the device hardware, based on the type number of the device.

```
DTAPI_RESULT DtDevice::AttachToType(
    [in] int    TypeNumber,        // Type number of the device to look for
    [in] int    DeviceNo=0        // Relative device number
);
```

Function Arguments

TypeNumber

Integer value representing the type number of the device to attach to. The integer corresponds to the number in the hardware's type string, e.g. 2160 for the DTA-2160 or 245 for DTU-245.

DeviceNo

If the system contains multiple devices of the same type, this index number distinguishes between the various devices. *DeviceNo* of the first device is 0, the next device 1, and so on.

Result

| DTAPI_RESULT | Meaning |
|------------------------|--|
| DTAPI_OK | Device object has been attached successfully to the hardware |
| DTAPI_E_ATTACHED | Device object is already attached to device hardware |
| DTAPI_E_NO_DEVICE | No DekTec devices found (at all) |
| DTAPI_E_NO_SUCH_DEVICE | No device with type <i>Typenumber</i> is found in this system, or the number of devices of this type is less-or-equal than <i>DeviceNo</i> |
| DTAPI_E_DRIVER_INCOMP | Version of device driver is incompatible with the DTAPI version, device driver needs to be upgraded |

Remarks

AttachToType is non-intrusive. No initialization actions are performed.

DtDevice::Detach

Detach device object from device hardware.

```
DTAPI_RESULT DtDevice::Detach(  
    void  
);
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Device object has been detached successfully from the device hardware |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware, so it cannot be detached |

Remarks

Event subscribers will be automatically unsubscribed.

DtDevice::DetectIoStd

Detect the video standard of the signal currently applied to an input port.

```
DTAPI_RESULT DtDevice::DetectIoStd (
    [in] int    Port,           // Physical port number (1...#ports)
    [out] int&   Value          // Detected video standard
    [out] int&   SubValue       // Detected video standard
);
```

Parameters

Port

Physical port number of the port to detect the video standard for.

Value/SubValue

Returns the detected video standard. The values can be used via Refer to **SetIoConfig(Port, DTAPI_IOCONFIG_IOSTD, Value, SubValue)** to set the input video standard for a specific port. See **SetIoConfig()** for more information.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Call succeeded |
| DTAPI_E_NOT_SUPPORTED | Detection of video standard is not supported for current device |
| DTAPI_E_DEV_DRIVER | Unexpected driver error |

Remarks

This function is only supported by cards having the Matrix capability.

DtDevice::DetectVidStd

Detect the video standard and link nr of the signal currently applied to an input port.

```
DTAPI_RESULT DtDevice::DetectIoStd (  
    [in] int    Port,           // Physical port number (1...#ports)  
    [out] DtDetVidStd& Info    // Detected video standard info  
);
```

Parameters

Port

Physical port number of the port to detect the video standard for.

Info

Returns information about the detected video standard.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Call succeeded |
| DTAPI_E_NOT_SUPPORTED | Detection of video standard is not supported for current device |
| DTAPI_E_DEV_DRIVER | Unexpected driver error |

Remarks

This function is only supported by cards having the Matrix2 capability.

DtDevice::FlashDisplay

Flash the LCD display of a DTE-31xx a number of times. With this function, a configuration tool can alert a user to a particular DTE-31xx unit.

```
DTAPI_RESULT DtDevice::FlashDisplay(
    [in] int    NumFlashes=5,      // Number of flashes
    [in] int    OnTime=100,        // Time (ms) display is on
    [in] int    OffTime=100       // Time (ms) display is off
);
```

Function Arguments

NumFlashes

Number of times to flash the display.

OnTime, OffTime

Time in ms the LCD display has to be on/off for one flash.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | A 'flash display' command has been sent to the DTE-31xx |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to a DTE-31xx |
| DTAPI_E_NOT_SUPPORTED | The device is not a DTE-31xx, or a DTE-31xx without a display |

Remarks

DtDevice::GetAttribute

Get the value of an attribute for a port of this device.

```
DTAPI_RESULT DtDevice::GetAttribute(
    [in] int& Port,           // Physical port number (1...#ports)
    [in] int& AttrId,        // Attribute identifier
    [out] int& AttrValue     // Returned attribute value
);
// Overload to get device-level attributes
DTAPI_RESULT DtDevice::GetAttribute(
    [in] int& AttrId,        // Attribute identifier
    [out] int& AttrValue     // Returned attribute value
);
```

Function Arguments

Port

Physical port number of the port for which to retrieve the attribute.

AttrId

Identifies the attribute that is to be retrieved.

| Value | Applicable to | Meaning |
|----------------------------|-----------------------------------|---|
| DTAPI_ATTR_LEVEL_MAX | Modulator port | Maximum output level in tenth of a dBm. For OFDM modes, the maximum output level is 3dB less. |
| DTAPI_ATTR_LEVEL_RANGE | Modulator port | Output-level range in tenth of a dB. |
| DTAPI_ATTR_RFFREQ_ABSMAX | Modulator port / Demodulator port | Absolute maximum output frequency in MHz supported by the hardware. Frequencies between RFFREQ_MAX and RFFREQ_ABSMAX may work, but are not guaranteed to work. |
| DTAPI_ATTR_RFFREQ_ABSMIN | Modulator port / Demodulator port | Absolute minimum output frequency in MHz supported by the hardware. Frequencies between RFFREQ_ABSMIN and RFFREQ_MIN may work, but are not guaranteed to work. |
| DTAPI_ATTR_RFFREQ_MAX | Modulator port / Demodulator port | Maximum supported output frequency in MHz. |
| DTAPI_ATTR_RFFREQ_MIN | Modulator port / Demodulator port | Minimum supported output frequency in MHz. |
| DTAPI_ATTR_SAMP_RHW_ABSMAX | Modulator port | Absolute maximum sample rate supported by the hardware. The device hardware may work for sample rates between SAMP_RHW_MAX and SAMP_RHW_ABSMAX , but performance specifications are not guaranteed. If SAMP_RHW_MAX equals SAMP_RHW_ABSMAX , sample rate conversion is used for sample rates above SAMP_RHW_MAX . |
| DTAPI_ATTR_SAMP_RHW_ABSMIN | Modulator port | Absolute minimum sample rate supported by the hardware. The device hardware may work for sample rates between SAMP_RHW_ABSMIN and SAMP_RHW_MIN , but performance specifications are not guaranteed. If SAMP_RHW_MIN equals SAMP_RHW_ABSMIN , sample rate conversion is used for sample rates below SAMP_RHW_MIN . |

| | | |
|----------------------------|----------------|---|
| DTAPI_ATTR_SAMPRHW_HARDLIM | Modulator port | |
| DTAPI_ATTR_SAMPRHW_MAX | Modulator port | Maximum sample rate for which performance specifications are guaranteed. |
| DTAPI_ATTR_SAMPRHW_MIN | Modulator port | Minimum sample rate for which performance specifications are guaranteed. |
| DTAPI_ATTR_SAMPRATE_ABSMAX | Modulator port | Absolute maximum sample rate that is supported. The signal must be band-limited, otherwise signal frequencies between SAMPRHW_MAX/2 and SAMPRATE_MAX/2 are muted and may even fold back (alias) into the main band. |
| DTAPI_ATTR_SAMPRATE_ABSMIN | Modulator port | Absolute minimum sample rate that is supported. |
| DTAPI_ATTR_SAMPRATE_MAX | Modulator port | Maximum sample rate for which performance specifications are guaranteed. |
| DTAPI_ATTR_SAMPRATE_MIN | Modulator port | Minimum sample rate for which performance specifications are guaranteed. |
| DTAPI_ATTR_NUM_FANS | Device-level | The number of fans on the device. |
| DTAPI_ATTR_NUM_TEMP_SENS | Device-level | The number of temperature sensors on the device. |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The attribute value has been retrieved successfully |
| DTAPI_E_NO_SUCH_PORT | Invalid port number for this device |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The attribute is not supported for this device |

Remarks

DtDevice::GetDescriptor

Get device descriptor.

```
DTAPI_RESULT DtDevice::GetDescriptor(  
    [out] DtDeviceDesc& DvcDesc    // Device descriptor  
);
```

Function Arguments

DvcDesc

Output argument that receives the device descriptor.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | The device descriptor has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |

Remarks

DtDevice::GetDeviceDriverVersion

Get device-driver version information.

```
DTAPI_RESULT DtDevice::GetDeviceDriverVersion(
[out] int& Major,           // Major version number
[out] int& Minor,           // Minor version number
[out] int& BugFix,          // Buf-fix version number
[out] int& Build            // Build number
);
```

Function Arguments

Major

Major version number of the device driver used to access the device hardware. This number is incremented for major functional upgrades of the device driver.

Minor

The minor version number is incremented for small functional increments of the device driver.

BugFix

The bug-fix version number is incremented when a bug in the device driver is fixed, without functional enhancements.

Build

Build number.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Version numbers have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |

Remarks

This function cannot be used to obtain hardware versioning information. Use **VpdRead** instead.

DtDevice::GetDisplayName

Get the name displayed on the LCD status display of a DTE-31xx.

```
DTAPI_RESULT DtDevice::GetDisplayName(
    [out] char*   pName           // Displayed name
);
DTAPI_RESULT DtDevice::GetDisplayName(
    [out] wchar_t* pName          // Displayed name
);
```

Function Arguments

pName

Pointer to the character array that receives the displayed name. The character array must be allocated before calling **GetDisplayName**. The **DTAPI** limits the maximum length of a name including the null-terminator to 16 characters, so a 16-char array suffices.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Version numbers have been retrieved successfully |
| DTAPI_E_NOT_SUPPORTED | The device does not have a status display |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |

Remarks

DtDevice::GetFanSpeed

Get the current fan speed in rpm.

```
DTAPI_RESULT DtDevice::GetFanSpeed(  
    [in] int    Fan  
    [out] int&   Rpm  
);
```

Function Arguments

Fan

1-based index of the fan to get the speed of.

Rpm

The speed of the fan.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Fan speed has been retrieved successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware. |

Remarks

DtDevice::GetFirmwareVersion

Get version number of the firmware loaded on the device.

```
DTAPI_RESULT DtDevice::GetFirmwareVersion(  
    [out] int& FirmwareVersion  
);
```

Function Arguments

FirmwareVersion

Single number that identifies the version of the FPGA- and/or embedded software on the device.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Firmware version has been retrieved successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware. |

Remarks

DtDevice::GetGenlockState

Get the state and the detected video standard currently applied to the specified reference source ("genlock") input port.

```
DTAPI_RESULT DtDevice::GetGenlockState(
    [out] int& State,           // Current genlock state
    [out] int& RefVidStd       // Reference video standard
);
// OVERLOAD: Just the genlock state
DTAPI_RESULT DtDevice::GetGenlockState(
    [out] int& State,           // Current genlock state
);
```

Function Arguments

State

Returns the genlock state of the on-board video clock generator.

| Value | Meaning |
|--------------------|---|
| DTAPI_GENL_NO_REF | No reference input signal is detected on the reference source input port, or the configured reference video standard (with IoConfig) is inconsistent with the applied video standard. |
| DTAPI_GENL_LOCKING | A valid reference input signal is detected on the reference source input and internal PLLs are locking to it. |
| DTAPI_GENL_LOCKED | Full clock-lock has been achieved. |

RefVidStd

Returns the video standard configured for the reference source (with **SetIoConfig**). Refer to spreadsheet [CapList.xlsx](#), sheet **IO Capabilities**, group **IOSTD**, for a list of all supported values.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Genlock state has been returned. |
| DTAPI_E_DEV_DRIVER | Unexpected driver error. |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware. |
| DTAPI_E_NOT_SUPPORTED | This function is not supported by the current hardware. |

Remarks

The genlock port is configured with **SetIoConfig**.

DtDevice::GetIoConfig

Get the I/O configuration of the specified port.

```
DTAPI_RESULT DtInpChannel::GetIoConfig(
    [in] int Port,           // Physical port number (1...#ports)
    [in] int Group,         // I/O configuration group
    [out] int& Value        // I/O configuration value
);

DTAPI_RESULT DtInpChannel::GetIoConfig(
    [in] int Port,           // Physical port number (1...#ports)
    [in] int Group,         // I/O configuration group
    [out] int& Value,        // I/O configuration value
    [out] int& SubValue     // I/O configuration subvalue
);

DTAPI_RESULT DtInpChannel::GetIoConfig(
    [in] int Port,           // Physical port number (1...#ports)
    [in] int Group,         // I/O configuration group
    [out] int& Value,        // I/O configuration value
    [out] int& SubValue,     // I/O configuration subvalue
    [out] __int64& ParXtra0  // Extra parameter #0
);

DTAPI_RESULT DtInpChannel::GetIoConfig(
    [in] int Port,           // Physical port number (1...#ports)
    [in] int Group,         // I/O configuration group
    [out] int& Value,        // I/O configuration value
    [out] int& SubValue,     // I/O configuration subvalue
    [out] __int64& ParXtra0, // Extra parameter #0
    [out] __int64& ParXtra1  // Extra parameter #1
);
```

Function Arguments

Port

Physical port number.

Group, Value, SubValue, ParXtra0, ParXtra1

I/O configuration parameters, see **SetIoConfig**.

Result

| DTAPI_RESULT | Meaning |
|------------------------|--|
| DTAPI_OK | I/O configuration has been read successfully |
| DTAPI_E_NO_SUCH_PORT | Invalid port number for this device |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The method is applied to either another device rather than a DTA-2137 or an invalid port number is given |
| DTAPI_E_FIRMW_INCOMP | The firmware is incompatible, please upgrade the firmware |
| DTAPI_E_SERVICE_INCOMP | The DTAPI service needs to be updated |
| DTAPI_E_INVALID_MODE | For <i>IoConfig</i> DTAPI_IOCONFIG_S2LOOPMODE : The configuration of the corresponding ASI port is not in loop-through mode |

Remarks

DtDevice::GetNwSpeed

Get the speed of the network link.

```
DTAPI_RESULT DtDevice::GetNwSpeed(
    [in] int    Port,           // Physical port number (1...#ports)
    [out] bool& Enable,        // Manual speed selection enabled/disabled
    [out] int&  Speed          // Current link speed
);
```

Function Arguments

Port

Physical port number.

Enable

Output argument that is set to *true* if the network port is forced to the specified Speed with the DtDevice::SetNwSpeed function.

Speed

Current link speed.

| Value | Meaning |
|--------------------------|----------------------|
| DTAPI_NWSPEED_NOLIN | Link not connected |
| DTAPI_NWSPEED_10MB_HALF | 10Mbps, half duplex |
| DTAPI_NWSPEED_10MB_FULL | 10Mbps, full duplex |
| DTAPI_NWSPEED_100MB_HALF | 100Mbps, half duplex |
| DTAPI_NWSPEED_100MB_FULL | 100Mbps, full duplex |
| DTAPI_NWSPEED_100MB_FULL | 100Mbps, full duplex |
| DTAPI_NWSPEED_1GB_MASTER | 1Gbps in master mode |
| DTAPI_NWSPEED_1GB_SLAVE | 1Gbps in slave mode |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Network speed has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device is not a network port |

Remarks

DtDevice::GetPowerStatus

Get the power status of a device.

```
DTAPI_RESULT DtDevice::GetPowerStatus (
    [out] int& Status,           // Current power status
);
```

Function Arguments

Status

Current power status.

| Value | Meaning |
|----------------------------|-----------------------------|
| DTAPI_POWER_STATUS_OK | Device is powered correctly |
| DTAPI_POWER_EXT_12V_ABSENT | External 12V is absent |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Device power status has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device is not supported by this method |

Remarks

Currently only the DTA-2180 is supported by this method.

DtDevice::GetRefClkCnt

Get a sample of the reference-clock counter on the device.

```
DTAPI_RESULT DtDevice::GetRefClkCnt (
    [out] int& RefClkCnt          // Sample of reference-clock counter
);
DTAPI_RESULT DtDevice::GetRefClkCnt (
    [out] int& RefClkCnt,         // Sample of reference-clock counter
    [out] int& RefClkFreqHz      // Clock frequency of the reference clock
);
```

Function Arguments

RefClkCnt

Sample of the 32-bit reference clock counter.

RefClkFreqHz

Clock frequency of the reference clock in Hz.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Sample has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device does not support retrieval of a sample of the reference-clock counter |

Remarks

This method is supported on the following devices:

| Device Type Number | Clock Frequency |
|--------------------|--|
| DTA-105 | 54.0MHz |
| DTA-107(S2) | 25.0MHz |
| DTA-110(T) | 25.0MHz |
| DTA-115 | 54.0MHz |
| DTA-120 | 40.5MHz (FW Version \geq 4) |
| DTA-122 | 27.0MHz (FW Version \geq 4) |
| DTA-124 | 40.5Mhz (FW Version 0) / 54MHz (FW Version \geq 1) |
| DTA-140 | 40.5MHz (FW Version \geq 1) |
| DTA-145 | 54.0MHz |

| | |
|----------|---------|
| DTA-160 | 54.0MHz |
| DTA-2135 | 54.0MHz |
| DTA-2144 | 54.0MHz |
| DTA-2145 | 54.0MHz |
| DTE-3100 | 54.0MHz |
| DTE-3120 | 54.0MHz |

Some devices (e.g. DTU-225 and DTU-245) that have a reference-clock counter, do not allow access to their reference-clock counter (i.e. this method will return **DTAPI_E_NOT_SUPPORTED**). For these devices it is possible to determine the running frequency of their on-board reference-clock counter via the **DtDevice::GetRefClkFreq** method.

DtDevice::GetRefClkFreq

Get the frequency of the on-board reference clock.

```
DTAPI_RESULT DtDevice::GetRefClkFreq(
    [out] int& RefClkFreqHz    // Clock frequency of the reference clock
);
```

Function Arguments

RefClkFreqHz

Clock frequency of the reference clock in Hz.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Sample has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device does not support getting of the reference-clock frequency |

Remarks

Amongst other purposes the on-board reference-clock counter is used for assigning arrival timestamps to the incoming data (see **DtInpChannel::SetRxMode**). By calling this method one can determine the running frequency of the reference-clock counter used for assigning the arrival timestamps.

Next to the devices mentioned in the description of the **DtDevice::GetRefClkCnt** method, this method supports the following devices:

| Device Type Number | Clock Frequency |
|--------------------|---|
| DTU-225 | 48Mhz (FW Version < 5) / 54MHz (FW Version ≥ 5) |
| DTU-245 | 48Mhz (FW Version < 5) / 54MHz (FW Version ≥ 5) |

DtDevice::GetTemperature

Get the current temperature of a sensor in degrees Celsius.

```
DTAPI_RESULT DtDevice::GetTemperature(  
    [in] int    TempSens  
    [out] int&   Temp  
);
```

Function Arguments

TempSens

1-based index of the temperature sensor to get the temperature of.

Temp

The current temperature of the device near the given sensor.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Temperature has been read successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware. |

Remarks

DtDevice::GetUsbSpeed

Get the speed (e.g. full or high speed) of the USB bus.

```
DTAPI_RESULT DtDevice::GetUsbSpeed(
    [out] int&    UsbSpeed
);
```

Function Arguments

UsbSpeed

Current speed of the USB bus the device is connected to.

| Value | Meaning |
|----------------------|---|
| DTAPI_USB_FULL_SPEED | USB bus operates at full speed (max. 12Mbps) |
| DTAPI_USB_HIGH_SPEED | USB bus operates at high speed (max. 480Mbps) |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | USB speed has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device does not support the getting of the USB speed |

Remarks

Use this method to determine if the USB device is connected to a USB bus operating in full or high speed mode. A USB bus operating at full speed usually indicates that the DTU-2XX device is connected to a USB-1 bus². High speed is only supported by USB-2 buses.

USB “full speed” limits the maximum input/output bit-rate supported by the DTU-2XX devices to 8Mbps. To be able to use the DTU-2XX for bit-rates higher than 8Mbps a USB-2 bus operating at high speed should be used.

This method is only supported by the DTU-2XX devices.

² USB-2 buses can operate in full-speed mode for backward compatibility reasons (support for USB-1 devices)

DtDevice::GetVcxoState

Get the state of the on-board VCXO.

```
DTAPI_RESULT DtDevice::GetVcxoState (
    [out] bool&  Enable,          // VCXO is enabled or disabled?
    [out] int&   Lock,           // Current genlock state
    [out] int&   VcxoClkFreqHz  // Measured VCXO frequency in Hz
);
```

Function Arguments

Enable

Indicates whether the VCXO is enabled or disabled.

Lock

Current genlock state.

| Value | Meaning |
|----------------------|---|
| DTAPI_GENLOCK_INLOCK | The VCXO is genlocked to a SDI reference signal |
| DTAPI_GENLOCK_NOLOCK | The VCXO is not genlocked to a SDI signal |

VcxoClkFreqHz

Measured VCXO frequency in Hz.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | State has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_SUPPORTED | The device does not support this function |

Remarks

DtDevice::HwFuncScan

Scan hardware functions hosted by this device.

```
DTAPI_RESULT DtDevice::HwFuncScan (
    [in] int    NumEntries,           // #Function entries in pHwFuncs
    [out] int&  NumEntriesResult,     // #Functions found or #entries required
    [out] DtHwFuncDesc* pHwFuncs     // Hardware-function descriptions
);
```

Function Arguments

NumEntries

Specifies the size, in number of **DtHwFuncDesc** entries, of the caller-supplied *pHwFuncs* array.

NumEntriesResult

Output argument that receives the number of hardware functions found and described in *pHwFuncs*. The value of this argument can be greater than *NumEntries* (when **DtapiHwFuncScan** returns **DTAPI_E_BUFFER_TOO_SMALL**).

pHwFuncs

Pointer to a caller-supplied array of **DtHwFuncDesc** entries to receive the hardware-function descriptors. A NULL pointer may be supplied, but only if *NumEntries* is 0.

Result

| DTAPI_RESULT | Meaning |
|------------------------------|---|
| DTAPI_OK | Scan has completed successfully and the <i>pHwFuncs</i> array was large enough to contain all function descriptions. |
| DTAPI_E_BUF_TOO_SMALL | The number of function-description entries in <i>pHwFuncs</i> is too small. The number of entries required is returned in <i>NumEntriesResult</i> . |
| DTAPI_E_INVALID_BUF | A NULL pointer was supplied to <i>pHwFuncs</i> while <i>NumEntries</i> is greater than 0. |

Remarks

This function is the equivalent of **::DtapiHwFuncScan** for a single device.

DtDevice::HwFuncScan function may have to be called twice. The first time, *NumEntries* should be set to a best-guess maximum value. If the result status is **DTAPI_E_BUF_TOO_SMALL**, the application should free the current array of **DtHwFuncDesc** entries, allocate a new array with the number of entries returned in *NumEntriesResult*, and call **DtapiHwFuncScan** again.

Another method is to start with setting *pHwFuncs* to NULL and *NumEntries* to 0. The number of required hardware-function entries will be returned, after which *pHwFuncs* can be allocated with the right size and **DtapiHwFuncScan** called again.

DtDevice::LedControl

Take direct control of the device's general-status LED, or let the hardware drive the LED.

```
DTAPI_RESULT DtDevice::LedControl(  
    [in] int    LedControl        // DTAPI_LED_XXX  
);
```

Function Arguments

LedControl

Controls status of the LED.

| Value | Meaning |
|--------------------|--|
| DTAPI_LED_HARDWARE | Hardware drives the LED (default after power up) |
| DTAPI_LED_OFF | LED is forced to off-state |
| DTAPI_LED_GREEN | LED is forced to green-state |
| DTAPI_LED_RED | LED is forced to red-state |
| DTAPI_LED_YELLOW | LED is forced to yellow-state |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | LED setting has been accepted |
| DTAPI_E_INVALID_MODE | The specified LED-control value is invalid |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device does not have a general-status LED |

Remarks

When a device object is detached from the device hardware, all direct-control settings are released (LED control is reset to **DTAPI_LED_HARDWARE**).

The DTA-120, DTA-122 and DTA-140 each have a single LED, which can be controlled by either this method (**DtDevice::LedControl**) or by **DtInpChannel::LedControl**. If both methods are applied in parallel, **DtDevice::LedControl** has precedence over **DtInpChannel::LedControl**.

DtDevice::RebootFirmware

Reboots the firmware of a DekTec device, identified by the serial number of the device. This method is intended to be used after a firmware upgrade. The new firmware is activated without power cycling the system.

```
static DTAPI_RESULT DtDevice::RebootFirmware(
    [in] __int64 Serial    // Serial number
);
```

Function Arguments

Serial

Serial number of the DekTec device

Result

| DTAPI_RESULT | Meaning |
|------------------------|--|
| DTAPI_OK | Reboot of device firmware is performed successfully |
| DTAPI_E_IN_USE | The device with the specified serial number is in use |
| DTAPI_E_NO_SUCH_DEVICE | The device with the specified serial number could not be found |
| DTAPI_E_NOT_SUPPORTED | The device doesn't support firmware reboot, you need to power cycle the system |
| DTAPI_E_RESTART_REQD | The reboot of the firmware is not completed, you need to restart the system or restart the driver of this device. A power cycle is not required. |

Remarks

The **RebootFirmware** method requires no application is attached to this device or its ports. For this reason it is a static method.

For Linux an extra (manual) driver stop, wait 1 sec and driver start action is required when **DTAPI_E_RESTART_REQD** is returned (for Windows this action is done by the DtapiService).

DtDevice::RegisterCallback

Register to one or multiple events and define the callback function.

```
DTAPI_RESULT DtDevice::RegisterCallback(  
    [in] pDtEventCallback  Callback // Callback for occurred events  
    [in] void*  pContext      // Opaque pointer passed to callback  
    [in] int    EventTypes    // Events to subscribe to (OR-able)  
    [out] void** pId          // Subscription identifier  
);
```

Function Arguments

Callback

Pointer to the user-provided callback function that will be called when an event occurred.

pContext

Opaque pointer that is passed to the callback function.

EventTypes

Specifies the events to subscribe to. The events may be OR-ed together.

Device events:

| Event | Meaning |
|------------------------|--|
| DT_EVENT_TYPE_POWER | A device power up or power down has been occurred. |
| DT_EVENT_TYPE_GENLOCK | The genlock state of the device has changed. |
| DT_EVENT_TYPE_IOCONFIG | One or more IoConfigs have been changed. |

pId

Pointer to the event subscription identifier.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Callback function has been attached successfully to the event(s) |
| DTAPI_E_INVALID_TYPE | The EventTypes argument contains invalid event types. |
| DTAPI_E_INVALID_ARG | The value of one of the arguments is invalid, and no specific other error code applies |
| DTAPI_E_OUT_OF_MEM | Event watcher cannot be allocated |

DtDevice::SetDisplayName

Set the name on the LCD status display of a DTE-31xx device.

```
DTAPI_RESULT DtDevice::SetDisplayName(  
    [in] char*   pName           // Displayed name  
);  
DTAPI_RESULT DtDevice::SetDisplayName(  
    [in] wchar_t* pName          // Displayed name  
);
```

Function Arguments

pName

Null-terminated character string specifying the name to be displayed on the LCD status display of the device.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Version numbers have been retrieved successfully |
| DTAPI_E_NOT_SUPPORTED | The device does not have a status display |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |

Remarks

DtDevice::SetIoConfig

Configure a physical port that supports certain configurable “I/O capabilities”. An overview of the I/O capabilities and the DekTec devices supporting them can be found in spreadsheet [CapList.xlsx](#), sheet [IO Capabilities](#), which is part of the DTAPI user documentation.

On Windows, the I/O configuration settings are persisted in the registry, and automatically reloaded after a reboot. On Linux, applications have to implement their own persistency.

Two overloads are defined, one to configure a single port and another to configure a number of ports in one operation. It is mandatory to use the latter overload if there are dependencies between the ports, so that the ports must be configured at the same time.

```
DTAPI_RESULT DtDevice::SetIoConfig(
    [in,out] DtIoConfig* pIoConfigs,    // I/O configuration parameters
    [in] int Count,                    // Number of elements In pIoConfigs
);

DTAPI_RESULT DtDevice::SetIoConfig(
    [in] int Port,                    // Physical port number (1...#ports)
    [in] int Group,                  // I/O configuration group
    [in] int Value,                  // I/O configuration value
    [in] int SubValue=-1,            // I/O configuration subvalue
    [in] __int64 ParXtra0=-1,        // Extra parameter #0
    [in] __int64 ParXtra1=-1        // Extra parameter #1
);
```

Function Arguments

pIoConfigs, Count

Array of I/O configuration parameters per port. *Count* is the number of array elements.

Port

Physical port number.

Group, Value, SubValue, ParXtra0, ParXtra1

Specifies the I/O configuration parameters. Refer to spreadsheet [CapList.xlsx](#), sheet [IO Capabilities](#) for details. In this sheet, *Cap* corresponds to *Value*, while *SubCap* corresponds to *SubValue*. Some additional explanation on a subset of the I/O configuration settings is provided below.

Group BOOLIO

I/O capabilities in group **BOOLIO** have a Boolean *Value* argument.

| Value | Meaning |
|----------------------|----------------------------|
| DTAPI_IOCONFIG_TRUE | Enable the I/O capability |
| DTAPI_IOCONFIG_FALSE | Disable the I/O capability |

Boolean I/O Capability FAILSAFE

If **DTAPI_IOCONFIG_FAILSAFE** for an output port is set to **TRUE**, that port is put in “failsafe” mode, protected by a “watchdog”. This means that the user application has to call **DtOutpChannel::SetFailsafeAlive** repeatedly within the watchdog timeout period. If the user application is too late (e.g. due to a crash), the watchdog times out and the failsafe relay is released so that the output is connected directly to the input. Failsafe mode is implemented

on the DTA-145 and the DTA-2145. On these cards, if the watchdog triggers, the input signal on port #1 will be physically connected to port #2 through a relay.
I/O configuration parameter *ParXtra0* specifies the watchdog time out in milliseconds.

Boolean I/O Capability GENLOCKED

If set, the output port will lock the SDI output timing to the genlock input. If the application fails to write data to the channel in time, black frames are inserted to maintain synchronization.

Boolean I/O Capability GENREF

If set, the input port will act as an SDI genlock reference input. I/O configuration parameter *ParXtra0* specifies the expected video standard, e.g. **DTAPI_IOCONFIG_1080I50**.

Boolean I/O Capability SWS2APSK

DTA-2137 only: Enable DVB-S2 reception in 16-APSK or 32-APSK mode.

This I/O capability can only be enabled on port 1; port 2 must be disabled. The board can only receive a single channel when this I/O capability is enabled. Without **SWS2APSK**, two channels are available.

I/O Capability IODIR, OUTPUT for the DTA-2137

The DTA-2137 supports two specific I/O capabilities for looping through the received DVB-S2 stream on one of the ASI ports:

DTAPI_IOCONFIG_LOOPS2L3 encapsulates DVB-S2 baseband frames (BBFRAMEs) in L3 frames and outputs them on the ASI port.

DTAPI_IOCONFIG_LOOPS2TS selects a sub stream from a DVB-S2 Multiple Input Stream, based on ISI (specified in *ParXtra1*). The selected stream can be an MPEG2 transport stream or any other input stream type. It is output on the ASI port.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Channel type has been set successfully |
| DTAPI_E_ATTACHED | Cannot change I/O configuration because a channel object is attached to this port |
| DTAPI_E_DEV_DRIVER | Driver was not able to set the I/O configuration |
| DTAPI_E_FIRMW_INCOMP | The firmware is incompatible |
| DTAPI_E_INVALID_ARG | The value of one of the arguments is invalid, and no specific other error code applies |
| DTAPI_E_INVALID_ISI | For DTAPI_IOCONFIG_LOOPS2TS only: An invalid value for ISI is specified. The valid range is 0...255 |
| DTAPI_E_INVALID_MODE | Invalid setting for I/O configuration |
| DTAPI_E_NO_SUCH_PORT | Invalid port number for this device |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The I/O configuration option is not supported |

| | |
|------------------------|---------------------------------------|
| DTAPI_E_SERVICE_INCOMP | The DTAPI service needs to be updated |
|------------------------|---------------------------------------|

Remarks

The I/O configuration of a port can only be changed when the underlying device is attached to a **DtDevice** object.

DtDevice::SetLicenseFromFile

Programs licenses from a file on a DekTec device.

```
DTAPI_RESULT DtDevice::SetLicenseFromFile (
    [in] const std::wstring&  LicFilename, // The license file
    [in] bool  Force=false     // Allow existing licenses to be removed
);
```

Function Arguments

LicFilename

String containing the name of the license file to be programmed on the device.

Force

If *false*, the licenses from the file will only be programmed on the DekTec device if no existing licenses will be removed. It will return an error (**DTAPI_E_LICENSE**) in case existing licenses would be removed during programming.

If *true*, the licenses from the file will be programmed on the DekTec device regardless of the existing licenses.

Result

| DTAPI_RESULT | Meaning |
|-------------------------------|--|
| DTAPI_OK | The licenses have been programmed successfully |
| DTAPI_E_FILE_OPEN | Couldn't not open the specified license file |
| DTAPI_E_NO_SUCH_DEVICE | License is not intended for the attached device |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_LICENSE | License string contains invalid licenses or would remove existing licenses on the device |
| DTAPI_E_XML_ELEM | A required element in the XML license string is missing at the expected location |
| DTAPI_E_XML_SYNTAX | The XML license string is not well-formed XML |

Remarks

DtDevice::SetLicenseFromString

Programs licenses from a string on a DekTec device.

```
DTAPI_RESULT DtDevice::SetLicenseFromString (
    [in] const std::wstring&  LicString, // The license string
    [in] bool  Force=false      // Allow existing licenses to be removed
);
```

Function Arguments

LicString

String containing licenses to be programmed on the device.

Force

If *false*, the licenses will only be programmed on the DekTec device if no existing licenses will be removed. It will return an error (**DTAPI_E_LICENSE**) in case existing licenses would be removed during programming.

If *true*, the licenses will be programmed on the DekTec device regardless of the existing licenses.

Result

| DTAPI_RESULT | Meaning |
|-------------------------------|--|
| DTAPI_OK | The licenses have been programmed successfully |
| DTAPI_E_NO_SUCH_DEVICE | License is not intended for the attached device |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_LICENSE | License string contains invalid licenses or would remove existing licenses on the device |
| DTAPI_E_XML_ELEM | A required element in the XML license string is missing at the expected location |
| DTAPI_E_XML_SYNTAX | The XML license string is not well-formed XML |

Remarks

DtDevice::SetNwSpeed

Set the speed of a network link.

```
DTAPI_RESULT DtDevice::SetNwSpeed(
    [in] int    Port,           // Physical port number (1...#ports)
    [in] bool   Enable,        // Enable manual speed setting
    [in] int    Speed          // Link speed selection
);
```

Function Arguments

Port

Physical port number.

Enable

Enable (*true*) or disable (*false*) forcing the speed of the network port.
If set to disable, the Speed argument is not used.

Speed

Link speed.

| Value | Meaning |
|--------------------------|--------------------------------------|
| DTAPI_NWSPEED_AUTO | Automatically set network link speed |
| DTAPI_NWSPEED_10MB_HALF | 10Mbps, half duplex |
| DTAPI_NWSPEED_10MB_FULL | 10Mbps, full duplex |
| DTAPI_NWSPEED_100MB_HALF | 100Mbps, half duplex |
| DTAPI_NWSPEED_100MB_FULL | 100Mbps, full duplex |
| DTAPI_NWSPEED_100MB_FULL | 100Mbps, full duplex |
| DTAPI_NWSPEED_1GB_MASTER | 1Gbps in master mode |
| DTAPI_NWSPEED_1GB_SLAVE | 1Gbps in slave mode |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Network speed has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_ARG | Device object is not attached to device hardware |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | The device is not a network port |

Remarks

DtDevice::UnregisterCallback

Unregister to the one or multiple events.

```
DTAPI_RESULT DtDevice::UnregisterCallback(  
    [in] void*  pId          // Subscription identifier to unregister  
);
```

Function Arguments

pId

Pointer to the event subscription identifier given by **DtDevice::RegisterCallback**.

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | Callback function has been successfully unregistered. |
| DTAPI_E_INVALID_ARG | The value of one of the arguments is invalid, and no specific other error code applies |
| DTAPI_E_NOT_INITIALIZED | No callback functions for events have been registered |

DtDevice::VpdDelete

Delete a Vital-Product Data (VPD) item from the VPD read/write section in the serial EEPROM on the device.

```
DTAPI_RESULT DtDevice::VpdDelete(  
    [in] const char*  pTag    // Identifies VPD item, e.g. "Y0"  
);  
DTAPI_RESULT DtDevice::VpdDelete(  
    [in] const wchar_t* pTag  // Identifies VPD item, e.g. L"Y0"  
);
```

Function Arguments

pTag

Null-terminated character string identifying the VPD item to be deleted.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | VPD item has been deleted successfully |
| DTAPI_E_EEPROM_READ | A read operation from the serial EEPROM did not succeed |
| DTAPI_E_EEPROM_WRITE | The write operation to the serial EEPROM did not succeed |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_FOUND | The VPD item could not be found |
| DTAPI_E_READ_ONLY | An attempt was made to delete a read-only VPD item |

Remarks

If a VPD item with the specified keyword already exists, that item is overwritten, unless it is a read-only item. In the latter case, **DTAPI_E_READ_ONLY** is returned.

The size of the VPD read/write segment is 256 bytes. Writing to the serial EEPROM is a relatively slow operation.

DtDevice::VpdRead

Read a Vital-Product Data (VPD) item from the EEPROM on the device.

```
DTAPI_RESULT DtOutpChannel::VpdTag(  
    [in] const char* pTag,          // Identifies the VPD item, e.g. "SN"  
    [out] char* pVpdItem           // String read from EEPROM  
);  
  
DTAPI_RESULT DtOutpChannel::VpdTag(  
    [in] const wchar_t* pTag,      // Identifies the VPD item, e.g. L"SN"  
    [out] wchar_t* pVpdItem       // String read from EEPROM  
);
```

Function Arguments

pTag

Null-terminated character string identifying the VPD item to be read. The keyword must consist of either two characters, or it should be the special string "VPDID".

The table below lists standard keywords supported by DekTec devices. Next to these standard keywords, custom VPD keywords can be created with **VpdWrite**.

| Value | Meaning |
|---------|---|
| "VPDID" | Pseudo value to retrieve the VPD ID String, e.g. "DTA-100 DVB-ASI-C Output 0...150 Mbps". |
| "CL" | Customer ID |
| "EC" | Engineering Change level. Identifies the hardware revision level of the device, e.g. "Rev 1". |
| "MN" | Manufacture ID DekTec-internal code identifying the manufacturer of the hardware. |
| "PD" | Production Date, e.g. "2003.07" |
| "PN" | Part Number, e.g. "DTU-225" |
| "SN" | Serial Number E.g. "4225266001". |
| "XT" | Crystal stability E.g. "5ppm@25C;15ppm", which means a frequency stability of ± 5 ppm at room temperature and a stability of ± 15 ppm over the full temperature range and including aging. |

pVpdItem

String retrieved from the EEPROM. The character array must be allocated before calling **VpdRead**. The **DTAPI** limits the maximum length of a VPD item to 63 characters, so a 64-char array suffices.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | VPD item has been read successfully |
| DTAPI_E_EEPROM_FORMAT | The data format in the serial EEPROM is not VPD compliant |
| DTAPI_E_EEPROM_READ | A read operation from the serial EEPROM did not succeed |
| DTAPI_E_KEYWORD | The keyword is neither two characters, nor "VPDID" |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_NOT_FOUND | The VPD item could not be found |

Remarks

If one of the standard keywords ("CL", "EC", ...) has been specified and the method returns **DTAPI_E_NOT_FOUND**, the serial EEPROM has been tampered.

DtDevice::VpdWrite

Write a Vital-Product Data (VPD) item to the VPD read/write section in the serial EEPROM on the device.

```
DTAPI_RESULT DtDevice::VpdWrite(  
    [in] const char*  pTag,        // Identifies VPD item, e.g. "Y1"  
    [in] char*       pVpdItem     // String to be written to the EEPROM  
);  
DTAPI_RESULT DtDevice::VpdWrite(  
    [in] const char*  pTag,        // Identifies VPD item, e.g. L"Y1"  
    [in] wchar_t*    pVpdItem     // String to be written to the EEPROM  
);
```

Function Arguments

pTag

Null-terminated character string identifying the VPD item to be written. The keyword must consist of two characters (the "VPDID" item cannot be written).

pVpdItem

String to be written to the EEPROM. The maximum size of a VPD item is 63 characters.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | VPD item has been written successfully |
| DTAPI_E_EEPROM_FULL | The serial EEPROM has not enough free space available for writing the new VPD item |
| DTAPI_E_EEPROM_READ | A read operation from the serial EEPROM did not succeed |
| DTAPI_E_EEPROM_WRITE | The write operation to the serial EEPROM did not succeed for another reason |
| DTAPI_E_KEYWORD | The keyword does not consist of two characters |
| DTAPI_E_NOT_ATTACHED | Device object is not attached to device hardware |
| DTAPI_E_READ_ONLY | An attempt was made to overwrite a read-only VPD item |
| DTAPI_E_TOO_LONG | The length of the VPD item is too long (>63 characters) |

Remarks

If a VPD item with the specified keyword already exists, that item is overwritten, unless it is a read-only item. In the latter case, **DTAPI_E_READ_ONLY** is returned.

For system-specific use, the VPD specification in the *PCI Local Bus Specification Rev 2.2* recommends keywords of the form "Yx", with the second character one of '0' ... '9', 'B' ... 'Z'. Keyword "YA" is defined as the *system-asset identifier* provided by the system owner. Keywords of the form "Vx" are reserved for use by DekTec.

The size of the VPD read/write segment is 256 bytes. Write operations to the serial EEPROM are relatively slow.

DtInpChannel

DtInpChannel

Class representing an input channel for receiving the following formats:

- MPEG-2 transport stream over ASI, SPI or IP;
- Serial Digital Interface (SDI);
- Demodulators (receivers).

```
class DtInpChannel;
```

Operations on input channels require *exclusive access* to the hardware. Just a single input channel object can attach to the hardware and that object gets exclusive access.

Demodulators are a special case, because some operations on demodulators do not require exclusive access. Therefore, for demodulators only, an input channel can attach to receiver hardware non-exclusively. In this mode, operations that require exclusive access like reading transport-stream data return an error. However, operations like tuning and getting measurements can be executed, possibly in parallel from multiple processes. This enables application scenarios in which one application tunes the receiver and receives transport stream data, while another application reads MER, constellation points and other measurement data.

DtInpChannel::AttachToPort

Attach the input-channel object to a specific physical port. Attachment can be exclusive (default) or shared. Demodulators are the only type of input channels that support shared access for a subset of functions (tuning and measurement functions).

```
DTAPI_RESULT DtInpChannel::AttachToPort(
    [in] DtDevice* pDtDvc,           // Device object
    [in] int Port,                  // Physical port number (1...#ports)
    [in] bool Exclusive=true,       // Request exclusive access yes/no
    [in] bool ProbeOnly=false       // Just check whether channel is in use
);
```

Function Arguments

pDtDvc

Pointer to the device object that represents a DekTec device. The device object must have been attached to the device hardware.

Port

Physical port number. The channel object is attached to this port. The port number of the top-most port is 1, except on the DTA-160 or DTA-2160, on which the top-most Ethernet port is port #4.

Exclusive

If *false*, request shared access. If *true*, request exclusive access. This is the default. For demodulators, and for demodulators only, this argument may be set to *false*. This way, multiple input channel objects in multiple processes can access the receiver and demodulator-specific functions that access the receiver using I2C calls can be called simultaneously, e.g. **GetConstellationPoints** and **Tune**. Most generic input-channel functions still require exclusive access to access device registers and will return an error (**DTAPI_E_EXCL_ACCESS_REQD**) if the channel was attached non-exclusively.

ProbeOnly

Probe whether the channel is in use, but do not actually attach.

Result

| DTAPI_RESULT | Meaning |
|-----------------------------------|--|
| DTAPI_OK | Channel object has been attached successfully to the port |
| DTAPI_OK_FAILSAFE | For devices with a failsafe relay only. Attachment in failsafe mode was successfully completed. The application shall call SetFailsafeAlive on a regular basis to prevent the release of the failsafe relay. Failure to do so will physically connect this input port to the buddy output port. This is not an error code; It is intended to make the application aware of failsafe mode. |
| DTAPI_E_ATTACHED | Channel object is already attached |
| DTAPI_E_CONNECT_TO_SERVICE | The DTAPI service is not running |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |

| | |
|-------------------------------|--|
| DTAPI_E_DEVICE | Pointer <i>pDtDvc</i> is not valid or the device object is not attached to a hardware device |
| DTAPI_E_EXCL_MANDATORY | Shared access (<i>Exclusive=false</i>) was requested, but this is not supported by the input channel. Only demodulators support shared access. |
| DTAPI_E_IN_USE | Another channel object is already attached to this port |
| DTAPI_E_NO_DT_INPUT | <i>Port</i> is not an input |
| DTAPI_E_NO_SUCH_PORT | Invalid port number for this device |
| DTAPI_E_OUT_OF_MEM | TS-over-IP: Receive FIFO cannot be allocated |

Remarks

DtInpChannel::BlindScan

DtInputChannel supports synchronous and asynchronous **BlindScan**.

The synchronous version scans the spectrum for valid transponders.

The asynchronous version scans the spectrum and returns the transponder information using a callback mechanism.

```
DTAPI_RESULT DtInpChannel::BlindScan(
    [in] int NumEntries,           // #Transponder entries in pResults
    [out] int& NumEntriesResult,   // #Transponders found or #entries req.
    [out] DtTransmitter* pResults, // Transmitter descriptions
    [in] __int64 FreqHzSteps,      // Optional parameter to select stepsize
    [in] __int64 StartFreqHz,     // Optional parameter to select starting
                                   // frequency
    [in] __int64 EndFreqHz        // Optional parameter to select ending
                                   // frequency
);

DTAPI_RESULT DtInpChannel::BlindScan(
    [in] DtBsProgressFunc pCallback, // Progress callback function
    [in] void* pOpaque,              // Opaque pointer
    [in] const DtDemodPars& DemodPars, // Demod pars to use for scanning
    [in] __int64 FreqHzSteps,        // Optional parameter to select stepsize
    [in] __int64 StartFreqHz,        // Optional parameter to select starting
                                   // frequency
    [in] __int64 EndFreqHz           // Optional parameter to select ending
                                   // frequency
);
```

Function Arguments

NumEntries

Specifies the size of the caller-supplied array *pResults* in number of **DtTransmitter** entries.

NumEntriesResult

Output argument that receives the number of transponders found. The value can be greater than *NumEntries* (when **BlindScan** returns **DTAPI_E_BUF_TOO_SMALL**).

pResults

Pointer to a caller-supplied array of **DtTransmitter** entries to receive the transmitter descriptors.

FreqHzSteps

This optional argument specifies the step size of the blind scan in Hertz.

StartFreqHz

This optional argument specifies the starting frequency of the blind scan in Hertz.

EndFreqHz

This optional argument specifies the ending frequency of the blind scan in Hertz.

pCallback

A callback function with callback prototype **DtBsProgressFunc** that will be executed by the asynchronous blind scan.

pOpaque

An optional pointer to a user object that is returned in the callback function.

DemodPars

The demodulator parameters to use for the asynchronous blind scan.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The blind scan succeeded successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The blind scan is not supported by the attached hardware |
| DTAPI_E_BUF_TOO_SMALL | The number of transponder-description entries in <i>pResults</i> is too small. The number of entries required is returned in <i>NumEntriesResult</i> . |
| DTAPI_E_INVALID_FREQ | The range of frequencies specified with <i>FreqHzSteps</i> , <i>StartFreqHz</i> and <i>EndFreqHz</i> is incompatible (too low or too high) with the tuner on the attached hardware |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The synchronous **BlindScan** method is currently only supported by the DTA-2137.

The **BlindScan** method operates with the current LNB settings. In order to scan the frequency band for multiple local oscillator frequency's and/or polarization modes, the desired LNB setting needs to be applied prior to calling **BlindScan**.

Depending on the starting frequency, the ending frequency and the step size, the synchronous **BlindScan** will take a few minutes to complete. To reduce the amount of time that **BlindScan** needs to complete the scan, the step size can be increased or the frequency band could be narrowed. Alternative the asynchronous method can be used.

DtInpChannel::CancelBlindScan

Cancels a running asynchronous blind scan.

```
DTAPI_RESULT DtInpChannel::CancelBlindScan();
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | An active blind scan is cancelled |
| DTAPI_E_IDLE | No blind scan is currently active |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::CancelSpectrumScan

Cancels a running asynchronous spectrum scan.

```
DTAPI_RESULT DtInpChannel::CancelSpectrumScan();
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | An active spectrum scan is cancelled |
| DTAPI_E_IDLE | No spectrum scan is currently active |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::ClearFifo

Clear contents of the receive FIFO and set receive control to **DTAPI_RXCTRL_IDLE**. Clear the overflow flag (**DTAPI_RX_FIFO_OVF**).

```
DTAPI_RESULT DtInpChannel::ClearFifo();
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Receive FIFO has been cleared |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The effects of **ClearFifo** are equivalent to **Reset** (**DTAPI_FIFO_RESET**).

Calling **clearFifo()** will clear the receive-FIFO-overflow flag (**DTAPI_FIFO_OVF**) and set the receive-control state to **DTAPI_RXCTRL_IDLE**.

DtInpChannel::ClearFlags

Clear *latched* status flag(s).

```
DTAPI_RESULT DtInpChannel::ClearFlags(  
    [in] int    Latched           // Latched status flags to be cleared  
);
```

Function Arguments

Latched

Latched status flag(s) to be cleared. Multiple flags can be cleared with one method call by OR-ing the bit positions to be cleared. The following flags are latched and can be cleared:

| Value | Meaning |
|---------------------|---------------------------|
| DTAPI_RX_FIFO_OVF | See <code>GetFlags</code> |
| DTAPI_RX_SYNC_ERR | " " |
| DTAPI_RX_RATE_OVF | " " |
| DTAPI_RX_TARGET_ERR | " " |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Flag(s) have been cleared successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (`AttachToPort` was called with *Exclusive=true*).

Some status flags that are queried with `GetFlags` are not latched and therefore cannot be cleared.

The latched status flags are also automatically reset after attaching and after `Reset`.

DtInpChannel::Detach

Detach input-channel object from hardware function and free associated resources.

```
DTAPI_RESULT DtInpChannel::Detach(  
    [in] int DetachMode        // How to detach  
);
```

Function Arguments

DetachMode

Specifies how the channel object is detached from the hardware function.

If *DetachMode* is 0, the object is detached without further action. Other modes are defined below.

| Value | Meaning |
|----------------------|---|
| DTAPI_INSTANT_DETACH | Clear the contents of the receive FIFO and set receive control to DTAPI_RXCTRL_IDLE |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Channel object has been detached successfully from the hardware function |
| DTAPI_E_INVALID_FLAGS | An invalid detach flag was specified |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function, so it cannot be detached |

Remarks

DtInpChannel::DetectIoStd

For ASI/SDI or SPI input channels: Detect whether the input signal is ASI, SDI, SPI or SPISDI.

```
DTAPI_RESULT DtInpChannel::DetectIoStd(  
    [out] int& Value           // DTAPI_IOCONFIG_ASI, DTAPI_IOCONFIG_SDI,  
                               // DTAPI_IOCONFIG_SPI or DTAPI_IOCONFIG_SPISDI  
    [out] int& SubValue        // For (SPI)SDI: specific (SPI)SDI standard  
);
```

Function Arguments

Value

Indicates whether a DVB-ASI, an SDI, a SPI or a SPISDI signal was received.

| Value | Meaning |
|-----------------------|--|
| DTAPI_IOCONFIG_ASI | A valid DVB-ASI signal is being received |
| DTAPI_IOCONFIG_SDI | A valid SDI signal is being received |
| DTAPI_IOCONFIG_SPI | A valid SPI signal is being received |
| DTAPI_IOCONFIG_SPISDI | A valid SPISDI signal is being received |

SubValue

If an SDI signal was received, *SubValue* receives the specific SDI standard, for example **DTAPI_IOCONFIG_525I59_94**.

If an SPISDI signal was received, *SubValue* receives the specific SPISDI standard, for example **DTAPI_IOCONFIG_SPI525I59_94**.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | The I/O standard was detected successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

This routine may take considerable time to complete the detection process.

DtInpChannel::GetConstellationPoints

Get an array of constellation points.

```
DTAPI_RESULT DtInpChannel::GetConstellationPoints(  
    [in] int NumPoints,           // Number of points to get  
    [out] DtConstelPoint* pPoints // Array with constellation points  
);
```

Function Arguments

NumPoints

Specifies the number of constellation points to be read. The caller-supplied *pPoints* array must be able to accommodate at least *NumPoints* entries. A typical number of constellation points to read are 32.

pPoints

Pointer to a caller-supplied array of **DtConstelPoint** entries to receive the constellation points. The table below indicates the valid ranges for the constellation point x- and y-axis per device.

| Device | Valid Range for X, Y | #Bits |
|----------|----------------------|-------|
| DTU-234 | 0 ... 255 | 8 |
| DTU-235 | -512 ... 512 | 10 |
| DTU-236 | -1024 ... 1024 | 11 |
| DTA-2135 | -512 ... 512 | 10 |
| DTA-2136 | -16384 ... 16384 | 15 |
| DTA-2137 | -16384 ... 16384 | 15 |
| DTA-2139 | -16384 ... 16384 | 15 |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | A valid set of constellation points has been returned |
| DTAPI_E_INVALID_BUF | The <i>pPoints</i> pointer is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This functionality is not supported by the hardware or DTAPI |

Remarks

DtInpChannel::GetDemodControl

Get modulation parameters as detected by the demodulator.

```
DTAPI_RESULT DtInpChannel::GetDemodControl (
    [out] DtDemodPars* pDemodPars    // Receives the demodulation parameters
);

DTAPI_RESULT DtInpChannel::GetDemodControl (
    [out] int& ModType,                // Modulation type
    [out] int& ParXtra0,               // Extra parameter #0
    [out] int& ParXtra1,               // Extra parameter #1
    [out] int& ParXtra2               // Extra parameter #2
);
```

Function Arguments

pDemodPars

Receives the demodulation parameters. The user must have allocated the **DtDemodPars** structure. See class **DtDemodPars** for possible demodulation parameters.

ModType, ParXtra0, ParXtra1, ParXtra2

Modulation parameters as detected by the demodulator. See the tables on the following pages for a detailed specification of each parameter, per DekTec board type and firmware version.

Detailed Parameter Descriptions

| Page | Modulation Type |
|------|-----------------|
| 238 | Overview |
| 239 | ATSC |
| 240 | DVB-S |
| 241 | DVB-S.2 |
| 243 | DVB-T |
| 245 | QAM |
| | |

| Page | Modulation Type |
|------|-----------------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Modulation Types

ModType

Detected modulation type. The value `DTAPI_MOD_TYPE_UNK` indicates that the modulation type could not be detected.

L-Band

| ModType | Meaning | Required Capability |
|-------------------------------------|------------------|---|
| <code>DTAPI_MOD_DVBS_QPSK</code> | DVB-S, QPSK | <code>DTAPI_CAP_RX_DVBS</code> |
| <code>DTAPI_MOD_DVBS2_8PSK</code> | DVB-S.2, 8-PSK | <code>DTAPI_CAP_RX_DVBS</code> |
| <code>DTAPI_MOD_DVBS2_16APSK</code> | DVB-S.2, 16-APSK | <code>DTAPI_CAP_RX_DVBS</code> + <code>DTAPI_CAP_S2APSK</code> |
| <code>DTAPI_MOD_DVBS2_32APSK</code> | DVB-S.2, 32-APSK | <code>DTAPI_CAP_RX_DVBS</code> + <code>DTAPI_CAP_S2APSK</code> |
| <code>DTAPI_MOD_DVBS2_QPSK</code> | DVB-S.2, QPSK | <code>DTAPI_CAP_RX_DVBS</code> |

VHF / UHF

| ModType | Meaning | Required Capability |
|-------------------------------|----------|---|
| <code>DTAPI_MOD_ATSC</code> | ATSC VSB | <code>DTAPI_CAP_RX_ATSC</code> |
| <code>DTAPI_MOD_DVBT</code> | DVB-T | <code>DTAPI_CAP_RX_DVBT</code> |
| <code>DTAPI_MOD_QAM16</code> | 16-QAM | <code>DTAPI_CAP_RX_QAM_A</code> for QAM-A <code>DTAPI_CAP_RX_QAM_B</code> for QAM-B <code>DTAPI_CAP_RX_QAM_C</code> for QAM-C |
| <code>DTAPI_MOD_QAM32</code> | 32-QAM | |
| <code>DTAPI_MOD_QAM64</code> | 64-QAM | |
| <code>DTAPI_MOD_QAM128</code> | 128-QAM | |
| <code>DTAPI_MOD_QAM256</code> | 256-QAM | |

Modulation Mode: ATSC

ModType

| ModType | Meaning | Required Capability |
|----------------|---------|---------------------|
| DTAPI_MOD_ATSC | ATSC | DTAPI_CAP_RX_ATSC |

ParXtra0

Extra modulation parameter #0 specifies the VSB constellation.

| ParXtra0 | Meaning | Symbol Rate (bd) | TS Rate (bps) |
|------------------------|---------------------------------------|------------------|---------------|
| DTAPI_MOD_ATSC_VSB8 | 8-VSB | 10,762,238 | 19,392,658 |
| DTAPI_MOD_ATSC_VSB16 | 16-VSB | 10,762,238 | 38,785,317 |
| DTAPI_MOD_ATSC_VSB_UNK | Constellation is unknown | | |
| DTAPI_MOD_ATSC_VSB_MSK | AND-mask for ATSC constellation field | | |

ParXtra1, ParXtra2

Not used in ATSC modulation.

Modulation Mode: DVB-S

ParXtra0

Extra modulation parameter #0

| ParXtra0 | Meaning |
|------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

ParXtra1

Extra modulation parameter #1 encodes spectral inversion yes/no

Spectral Inversion

| ParXtra1 | Meaning |
|----------------------------|--------------------------------------|
| DTAPI_MOD_S_S2_SPECNONINV | No spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV | Spectrum inversion detected |
| DTAPI_MOD_S_S2_SPECINV_UNK | Spectrum inversion status is unknown |
| DTAPI_MOD_S_S2_SPECINV_MSK | AND-mask for this field |

ParXtra2

The detected symbol rate (in bd). The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

Modulation Mode: DVB-S.2

ParXtra0

Extra modulation parameter #0 encodes the code rate.

| ParXtra0 | Meaning |
|------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_1_3 | Code rate 1/3 |
| DTAPI_MOD_1_4 | Code rate 1/4 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_2_5 | Code rate 2/5 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_3_5 | Code rate 3/5 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_8_9 | Code rate 8/9 |
| DTAPI_MOD_9_10 | Code rate 9/10 |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

ParXtra1

Extra modulation parameter #1 encodes spectral inversion yes/no, pilots yes/no and long/short FEC frame.

Spectral Inversion

See Spectral Inversion section for DVB-S

Pilots

| Value | Meaning |
|-------------------------|--------------------------|
| DTAPI_MOD_S2_NOPILOTS | Pilots disabled |
| DTAPI_MOD_S2_PILOTS | Pilots enabled |
| DTAPI_MOD_S2_PILOTS_UNK | Pilots status is unknown |
| DTAPI_MOD_S2_PILOTS_MSK | AND-mask for this field |

Long or Short FECFRAME

| Value | Meaning |
|-----------------------|------------------------------|
| DTAPI_MOD_S2_SHORTFRM | Short FECFRAME (16.200 bits) |
| DTAPI_MOD_S2_LONGFRM | Long FECFRAME (64.800 bits) |

| | |
|-----------------------------|-------------------------|
| DTAPI_MOD_S2_FRM_UNK | Frame size is unknown |
| DTAPI_MOD_S2_FRM_MSK | AND-mask for this field |

ParXtra2

The detected symbol rate in baud. The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

Modulation Mode: DVB-T

ParXtra0

Extra modulation parameter #0 is the code rate.

| Value | Meaning |
|------------------|----------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_CR_UNK | Code rate is unknown |

ParXtra1

Extra modulation parameter #1 is the OR of values for the following fields: Bandwidth, Constellation, Guard Interval, Interleaving and Transmission Mode.

Bandwidth

| Value | Meaning |
|-----------------------|----------------------|
| DTAPI_MOD_DVBT_6MHZ | 6 MHz |
| DTAPI_MOD_DVBT_7MHZ | 7 MHz |
| DTAPI_MOD_DVBT_8MHZ | 8 MHz |
| DTAPI_MOD_DVBT_BW_UNK | Bandwidth is unknown |
| DTAPI_MOD_DVBT_BW_MSK | AND mask |

Constellation

| Value | Meaning |
|-----------------------|--------------------------|
| DTAPI_MOD_DVBT_QPSK | QPSK |
| DTAPI_MOD_DVBT_QAM16 | 16-QAM |
| DTAPI_MOD_DVBT_QAM64 | 64-QAM |
| DTAPI_MOD_DVBT_CO_UNK | Constellation is unknown |
| DTAPI_MOD_DVBT_CO_MSK | AND mask |

Guard Interval

| Value | Meaning |
|-----------------------|---------|
| DTAPI_MOD_DVBT_G_1_32 | 1/32 |
| DTAPI_MOD_DVBT_G_1_16 | 1/16 |
| DTAPI_MOD_DVBT_G_1_8 | 1/8 |
| DTAPI_MOD_DVBT_G_1_4 | 1/4 |

| | |
|-----------------------|---------------------------|
| DTAPI_MOD_DVBT_CO_UNK | Guard interval is unknown |
| DTAPI_MOD_DVBT_GU_MSK | AND mask |

Interleaving

| Value | Meaning |
|------------------------|-------------------------------|
| DTAPI_MOD_DVBT_INDEPTH | In-depth interleaver (2k, 4k) |
| DTAPI_MOD_DVBT_NATIVE | Native interleaver |
| DTAPI_MOD_DVBT_IL_UNK | Interleaving is unknown |
| DTAPI_MOD_DVBT_IL_MSK | AND mask |

Transmission Mode

| Value | Meaning |
|-----------------------|------------------------------|
| DTAPI_MOD_DVBT_2K | 2k mode |
| DTAPI_MOD_DVBT_8K | 8k mode |
| DTAPI_MOD_DVBT_MD_UNK | Transmission mode is unknown |
| DTAPI_MOD_DVBT_MD_MSK | AND mask |

ParXtra2

Not used for DVB-T

Modulation Mode: QAM

ModType

The QAM constellation is encoded in *ModType* according to the following table.

| ModType | Meaning | Required Capability |
|------------------|---------|--|
| DTAPI_MOD_QAM16 | 16-QAM | DTAPI_CAP_RX_QAM_A (QAM-A) DTAPI_CAP_RX_QAM_B (QAM-B) DTAPI_CAP_RX_QAM_C (QAM-C) |
| DTAPI_MOD_QAM32 | 32-QAM | |
| DTAPI_MOD_QAM64 | 64-QAM | |
| DTAPI_MOD_QAM128 | 128-QAM | |
| DTAPI_MOD_QAM256 | 256-QAM | |

ParXtra0

Extra modulation parameter #0 is the ITU-T J.83 Annex.

| ITU-T J.83 Annex | Meaning | Required Capability |
|-------------------|----------------------------------|---------------------|
| DTAPI_MOD_J83_A | J.83 annex A (DVB-C) | DTAPI_CAP_RX_QAM_A |
| DTAPI_MOD_J83_B | J.83 annex B ("American QAM") | DTAPI_CAP_RX_QAM_B |
| DTAPI_MOD_J83_C | J.83 annex C ("Japanese QAM") | DTAPI_CAP_RX_QAM_C |
| DTAPI_MOD_J83_UNK | Annex is unknown | |

ParXtra1

For J.83 Annex B, this parameter specifies the interleaving mode detected as specified in the table below. For Annex A and C this parameter is not used.

| Value | CW | I | J | Burst protection 64-/256-QAM |
|-------------------------|------|-----|----|------------------------------|
| DTAPI_MOD_QAMB_I128_J1D | 0001 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I64_J2 | 0011 | 64 | 2 | 47 μ s / 33 μ s |
| DTAPI_MOD_QAMB_I32_J4 | 0101 | 32 | 4 | 24 μ s / 16 μ s |
| DTAPI_MOD_QAMB_I16_J8 | 0111 | 16 | 8 | 12 μ s / 8.2 μ s |
| DTAPI_MOD_QAMB_I8_J16 | 1001 | 8 | 16 | 5.9 μ s / 4.1 μ s |
| DTAPI_MOD_QAMB_I128_J1 | 0000 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I128_J2 | 0010 | 128 | 2 | 190 μ s / 132 μ s |
| DTAPI_MOD_QAMB_I128_J3 | 0100 | 128 | 3 | 285 μ s / 198 μ s |
| DTAPI_MOD_QAMB_I128_J4 | 0110 | 128 | 4 | 379 μ s / 264 μ s |
| DTAPI_MOD_QAMB_I128_J5 | 1000 | 128 | 5 | 474 μ s / 330 μ s |
| DTAPI_MOD_QAMB_I128_J6 | 1010 | 128 | 6 | 569 μ s / 396 μ s |
| DTAPI_MOD_QAMB_I128_J7 | 1100 | 128 | 7 | 664 μ s / 462 μ s |
| DTAPI_MOD_QAMB_I128_J8 | 1110 | 128 | 8 | 759 μ s / 528 μ s |
| DTAPI_MOD_QAMB_IL_UNK | - | - | - | Interleaving mode is unknown |

ParXtra2

The detected symbol rate (in bd). The value **DTAPI_MOD_SYMRATE_UNK** indicates the symbol rate could not be detected.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The modulation parameters have been returned successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This function is not supported for the underlying hardware |

Remarks

The detected modulation parameters returned by this method should only be considered to be valid if the **DtInpChannel** indicates that receiver- and FEC-lock has been achieved.

DtInpChannel::GetDescriptor

Get hardware function descriptor for this input channel.

```
DTAPI_RESULT DtInpChannel::GetDescriptor(  
    [out] DtHwFuncDesc&  HwFuncDesc  // Hardware function descriptor  
);
```

Function Arguments

HwFuncDesc

Output argument that receives the hardware function descriptor.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | The hardware function descriptor been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtInpChannel::GetFifoLoad

Get the current load of the channel's receive FIFO.

```
DTAPI_RESULT DtInpChannel::GetFifoLoad(  
    [out] int&  FifoLoad          // Load of receive FIFO  
);
```

Function Arguments

FifoLoad

This output argument is set to the number of bytes in the receive FIFO.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | FIFO load has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The value retrieved with this method call approximates the load of the Receive FIFO. Some additional data bytes may be buffered on the device.

If a transfer is in progress and/or the device receives data, then every call to **GetFifoLoad** may return a different value.

DtInpChannel::GetFlags

Get current and latched value of the input channel's status flags.

```
DTAPI_RESULT DtInpChannel::GetFlags(  
    [out] int&  Flags,           // Status flags  
    [out] int&  Latched         // Latched status flags  
);
```

Function Arguments

Flags

Output argument that is set to the current value of the input-channel status flags. Each status flag is represented by one bit. Multiple status flags can be true simultaneously. If none of the status flags is true, *Flags* is set to zero.

| Value | Meaning |
|---------------------|--|
| DTAPI_RX_FIFO_OVF | A receive FIFO overflow condition has occurred. The data in the receive FIFO was not read fast enough to a system buffer. |
| DTAPI_RX_SYNC_ERR | A synchronisation error has occurred in the synchronisation stage of the input channel. This error cannot occur in packet mode DTAPI_RXMODE_RAW . |
| DTAPI_RX_RATE_OVF | Data is entering the receive FIFO faster than 150Mbps (DTA-122 only) |
| DTAPI_RX_TARGET_ERR | The target adapter signals a fault (DTA-122 only) |
| DTAPI_RX_LINK_ERR | The communication link with the device is broken (DTE-31xx devices only) |
| DTAPI_RX_DATA_ERR | Data is lost during transfer to a system buffer (DTE-31xx devices only) |

Latched

Output argument that is set to the latched value of the status flags: On a '0' to '1' transition of a status flag, the corresponding bit in *Latched* is set to '1'. The bit remains set until cleared explicitly by one of the following DTAPI-calls: **ClearFlags**, **AttachToPort** or **Reset**.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Status flags have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::GetIoConfig

Get the I/O configuration of the physical port attached to the input channel. This is the same function as `DtDevice::GetIoConfig` applied to the physical port corresponding to this channel.

```
DTAPI_RESULT DtInpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value          // I/O configuration value  
);  
  
DTAPI_RESULT DtInpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue       // I/O configuration subvalue  
);  
  
DTAPI_RESULT DtInpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue,       // I/O configuration subvalue  
    [out] __int64& ParXtra0    // Extra parameter #0  
);  
  
DTAPI_RESULT DtInpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue,       // I/O configuration subvalue  
    [out] __int64& ParXtra0,   // Extra parameter #0  
    [out] __int64& ParXtra1    // Extra parameter #1  
);
```

Function Arguments

Group, Value, SubValue, ParXtra0, ParXtra1

I/O configuration parameters, see `DtDevice::GetIoConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | I/O configuration has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| Other result codes | See <code>DtDevice::GetIoConfig</code> |

Remarks

This function requires exclusive access (`AttachToPort` was called with `Exclusive=true`).

DtInpChannel::GetIpPars

Get TS-over-IP parameters of the received stream as detected by the driver.

```
DTAPI_RESULT DtInpChannel::GetIpPars(  
    [in] DtIpPars* pIpPars    // Receives the TS-over-IP parameters  
);
```

Function Arguments

pIpPars

Receives the TS-over-IP parameters. The user must have allocated the **DtIpPars** structure.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The TS-over-IP parameters have been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Channel is not a TS-over-IP channel |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::GetIpStat

Get IP statistics from the network driver.

```
DTAPI_RESULT DtInpChannel::GetIpStat(  
    [in] DtIpStat* pIpStat    // Receives the IP parameters  
);
```

Function Arguments

pIpStat

Receives the IP statistics. The user must have allocated the **DtIpStat** structure.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The TS-over-IP statistics have been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Channel is not a TS-over-IP channel |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::GetMaxFifoSize

Get the maximum size of the channel's receive FIFO.

```
DTAPI_RESULT DtInpChannel::GetMaxFifoSize(  
    [out] int& MaxFifoSize    // Maximum size of FIFO in bytes  
);
```

Function Arguments

MaxFifoSize

Maximum size of the receive FIFO in number of bytes.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Maximum size of FIFO has been read successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtInpChannel::GetPars

Get parameter settings from the demodulator. This function accepts and returns an array of **DtPar** structures so that multiple parameters can be retrieved in one call.

```
DTAPI_RESULT DtInpChannel::GetPars(
    [in] int    NumPars,           // Number of parameters
    [in,out] DtPar* pPars        // Array with parameters
);
```

Function Arguments

NumPars

Specifies the size, in number of **DtPar** entries, of the caller-supplied *pPars* array.

pPar

Pointer to a caller-supplied array of **DtPar** structures specifying the requested parameters. The current values of the requested parameters are returned through this same array.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Parameter values have been read successfully |
| DTAPI_E_INVALID_BUF | Invalid buffer pointer is passed |
| DTAPI_E_INVALID_TYPE | Parameter type is incorrect |
| DTAPI_E_NOT_ATTACHED | demodulator is not attached |

Remarks

DtInpChannel::GetRxClkFreq

DTA-2142 only. Get the frequency of the DVB-SPI clock.

```
DTAPI_RESULT DtInpChannel::GetRxClkFreq(  
    [out] int& RxClkFreq    // Frequency of the DVB-SPI clock in Hertz  
);
```

Function Arguments

MaxFifoSize

Output argument that is set to a measurement of the DVB-SPI clock frequency.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Maximum size of FIFO has been read successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::GetRxControl

Get the current value of receive control.

```
DTAPI_RESULT DtInpChannel::GetRxControl (
    [out] int& RxControl    // Receive control
);
```

Function Arguments

RxControl

This argument is set to the current value of receive control: **DTAPI_RXCTRL_IDLE** or **DTAPI_RXCTRL_RCV**.

Refer to **SetRxControl** for a description of the receive control values.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Receive control has been successfully retrieved |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

Transport Streams – In receive modes **DTAPI_RXMODE_ST188**, **DTAPI_RXMODE_STMP2** and **DTAPI_RXMODE_ST204**, receive control is synchronised to packet boundaries. For example, if **SetRxControl** is used to change the control state from **DTAPI_RXCTRL_RCV** to **DTAPI_RXCTRL_IDLE**, and **GetRxControl** is called immediately thereafter, then **DTAPI_RXCTRL_RCV** may be returned. Only when a new packet enters the Receive FIFO, the value returned by **GetRxControl** becomes **DTAPI_RXCTRL_IDLE**.

SDI – Receive-control state is synchronised to the vertical sync.

In receive mode **DTAPI_RXMODE_STRAW**, method **GetRxControl** always returns the receive-control state set by **SetRxControl**.

DtInpChannel::GetRxMode

Get the current value of receive mode.

```
DTAPI_RESULT DtInpChannel::GetRxMode(  
    [out] int& RxMode          // Receive mode  
);
```

Function Arguments

RxControl

This argument is set to the current value of receive mode.
Refer to **SetRxMode** for a description of the receive modes.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Receive mode has been successfully retrieved |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

DtInpChannel::GetStatistics

Get statistics information from demodulator. This function gets an array of **DtStatistic** structures so that multiple statistics can be retrieved in one call.

```
DTAPI_RESULT DtInpChannel::GetStatistics(  
    [in] int    Count,                // Number of statistics  
    [in out] DtStatistic* pStatistics // Array with statistics  
);
```

Function Arguments

Count

The number of requested statistics.

pStatistic

An array specifying the statistics to be retrieved in one call. After the call it holds the values of the requested statistics.

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | The statistics have been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The statistic is not compatible with ErrorStatsMode |
| DTAPI_E_INVALID_FOR_ACM | The requested statistic is not available for Adaptive Coding Modulation (ACM) in DVB-S2 |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_LOCKED | The requested statistic cannot be retrieved because the receiver is not locked to the input signal |
| DTAPI_E_NOT_SUPPORTED | The requested statistic is not supported by the hardware or the requested return type is not supported |
| DTAPI_E_TUNING | The statistic cannot be retrieved because the receiver is busy with tuning. |

Remarks

DtInpChannel::GetStatus

Get status information from the input channel. If a device does not support a certain feature, the corresponding status variable is set to **DTAPI_NOT_SUPPORTED** (-1).

```
DTAPI_RESULT DtInpChannel::GetStatus(  
[out] int& PacketSize,      // Packet size  
[out] int& NumInv,          // #Invalid bytes per packet (DTA-122)  
[out] int& ClkDet,          // Clock- or carrier detected  
[out] int& AsiLock,         // DVB-ASI PLL locked (ASI inputs)  
                                // SDI genlocked (SDI genlock inputs)  
[out] int& RateOk,          // Input rate above minimum  
[out] int& AsiInv           // Input-invert status (ASI inputs)  
);
```

Function Arguments

PacketSize

MPEG mode: Size of incoming MPEG-2 transport packets.

| Value | Meaning |
|-------------------|---|
| DTAPI_PCKSIZE_188 | 188-byte packets at the transport-stream input |
| DTAPI_PCKSIZE_204 | 204-byte packets at the transport-stream input |
| DTAPI_PCKSIZE_INV | No MPEG-2 compliant packets found at the transport-stream input |

SDI mode: SDI video standard of incoming stream. For cards with **DTAPI_CAP_MATRIX** one of **DTAPI_VIDSTD_XXX**. For cards without that capability one of the following values:

| Value | Meaning |
|-------------------|---|
| DTAPI_SDIMODE_525 | 525-line video mode input |
| DTAPI_SDIMODE_625 | 625-line video mode input |
| DTAPI_SDIMODE_INV | No valid SDI signal detected on the input |

NumInv

Defined for DVB-SPI input channels (DTA-122) only: Number of “invalid” bytes (DVALID input signal is '0') per packet.

| Value | Meaning |
|---------------------|--|
| DTAPI_NUMINV_NONE | No invalid bytes |
| DTAPI_NUMINV_16 | 16 invalid bytes per packet |
| DTAPI_NUMINV_OTHER | Other number of invalid bytes per packet |
| DTAPI_NOT_SUPPORTED | Device does not support this parameter (not DTA-122) |

ClkDet

For DVB-SPI input channels, this output argument indicates whether a receive clock of sufficient frequency is detected at the SPI input.

For DVB-ASI and SDI input channels, this output argument acts as a *Carrier Detect* signal.

| Value | Meaning |
|--------------------------|--|
| DTAPI_CLKDET_OK | DVB-SPI : Receive clock detected DVB-ASI, SDI : Carrier detected TS-over-IP : IP traffic detected in the last second |
| DTAPI_CLKDET_FAIL | DVB-SPI : No receive clock detected, or receive-clock rate is too low DVB-ASI, SDI : No carrier detected TS-over-IP : No IP traffic in the last second |

AsiLock

For DVB-ASI input channels, this output argument indicates whether the DVB-ASI clock signal can be recovered reliably.

| Value | Meaning |
|----------------------------|--|
| DTAPI_ASI_INLOCK | PLL is locked to the incoming DVB-ASI input signal |
| DTAPI_ASI_NOLOCK | Clock signal cannot be recovered from the input signal |
| DTAPI_NOT_SUPPORTED | Hardware function does not support this parameter |

For ports configured as SDI genlock input port, this output argument indicates whether the genlock circuitry is locked to the provided SDI genlock signal.

| Value | Meaning |
|-----------------------------|--|
| DTAPI_GENLOCK_INLOCK | The SDI genlock circuitry is locked to the incoming SDI input signal |
| DTAPI_GENLOCK_NOLOCK | The SDI genlock circuitry is NOT locked to the incoming SDI input signal |
| DTAPI_NOT_SUPPORTED | Hardware function does not support this parameter |

RateOk

Defined for DVB-ASI input channels only: Output argument that indicates whether the transport rate at the DVB-ASI input is sufficiently high for further processing. When this parameter is set to **DTAPI_INPRATE_LOW**, the most likely cause is an “empty” DVB-ASI signal (stuffing symbols only).

| Value | Meaning |
|----------------------------|---|
| DTAPI_INPRATE_OK | The DVB-ASI input rate is sufficient |
| DTAPI_INPRATE_LOW | The DVB-ASI input rate is too low (<900 bps) |
| DTAPI_NOT_SUPPORTED | Hardware function does not support this parameter |

AsiInv

Defined for DVB-ASI input channels only: This argument indicates whether the input circuitry is currently inverting the DVB-ASI input signal. This is most useful when polarity control has been

set to **DTAPI_POLARITY_AUTO**; In the other polarity-control settings, *AsiInv* just echoes the value of argument *PolarityControl* in the call to **PolarityControl**.

| Value | Meaning |
|----------------------------|---|
| DTAPI_ASIINV_NORMAL | Polarity of DVB-ASI input signal is normal (not inverted) |
| DTAPI_ASIINV_INVERT | Polarity of DVB-ASI signal is inverted |
| DTAPI_NOT_SUPPORTED | Device does not support this parameter |

Result

| DTAPI_RESULT | Meaning |
|-----------------------------|---|
| DTAPI_OK | Status information has been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtInpChannel::GetStreamSelection

Get the selection parameters for the currently selected DAB-stream, PLP, Layer or T2-MI stream.

```
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtDabEtiStreamSelPars& StreamSel // DAB-ETI selection parameters
);
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtDabStreamSelPars& StreamSel // DAB stream selection parameters
);
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtDvbC2StreamSelPars& StreamSel // PLP selection parameters
);
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtDvbT2StreamSelPars& StreamSel // PLP selection parameters
);
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtT2MiStreamSelPars& StreamSel // T2-MI parameters
);
DTAPI_RESULT DtInpChannel::GetStreamSelection(
    [out] DtIsdbtStreamSelPars& StreamSel // ISDB-T selection parameters
);
```

Function Arguments

StreamSel

Output argument that receives the selection parameters.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The selection parameters have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The current demodulation type does not correspond to the type of the selection parameters |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not support DAB, DVB-C2, DVB-T2, T2-MI or ISDB-T |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive*=true).

DtInpChannel::GetSupportedPars

Get the parameters supported by the demodulator.

```
DTAPI_RESULT DtInpChannel::GetSupportedPars (  
[in,out] int&  NumPars,      // Number of parameters  
[out] DtPar*  pPars         // Array with supported parameters  
);
```

Function Arguments

NumPars

As an input argument it specifies the size, in number of **DtPar** entries, of the caller-supplied *pPars* array. As an output argument it receives the number of supported parameters.

pPar

Pointer to a caller-supplied array of **DtPar** to receive the requested parameters.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Parameter information has been read successfully |
| DTAPI_E_BUF_TOO_SMALL | The number of DtPar entries in <i>pPars</i> is too small |
| DTAPI_E_NOT_ATTACHED | Advanced demodulator object is not attached |

DtInpChannel::GetSupportedStatistics

Get the supported statistics from demodulator. This function gets an array of **DtStatistic** structures.

```
DTAPI_RESULT DtInpChannel::GetSupportedStatistics(  
[in out] int& Count,           // Number of statistics  
[out] DtStatistic* pStatistics // Array with statistics  
);
```

Function Arguments

Count

As input it specifies the size, in number of **DtStatistic** entries, of the caller-supplied *pStatistics* array. As output it receives the number of supported statistics and described in *pStatistics*.

pStatistic

Pointer to a caller-supplied array of **DtStatistic** entries identifying the supported statistics.

Result

| DTAPI_RESULT | Meaning |
|--------------------------|---|
| DTAPI_OK | Statistics information has been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_BUFFER_TOO_SMALL | The number of statistic entries in <i>pStatistics</i> is too small. |

Remarks

DtInpChannel::GetTargetId

Get the target-adapter identifier (DTA-122 only).

```
DTAPI_RESULT DtInpChannel::GetTargetId(  
    [out] int& Present,          // Target adapter present?  
    [out] int& TargetId         // Target-adapter identifier  
);
```

Function Arguments

Present

Output argument that indicates whether a target adapter has been detected.

| Value | Meaning |
|----------------------|--|
| DTAPI_NO_CONNECTION | Nothing is connected to the input connector of the DTA-122. |
| DTAPI_DVB_SPI_SOURCE | A standard DVB-SPI source is connected to the DTA-122. |
| DTAPI_TARGET_PRESENT | A target adapter is present. |
| DTAPI_TARGET_UNKNOWN | The device is busy assessing the situation on the input connector. |

TargetId

Output argument that is set to an integer value that uniquely identifies the target adapter. Please refer to the DTA-122 documentation for a list of available target adapters.

TargetId is assigned a value only if *Present* is **DTAPI_TARGET_PRESENT**.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Target ID has been retrieved successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function. |
| DTAPI_E_NOT_SUPPORTED | The input channel does not support target adapters (DVB-ASI input channels: DTA-120/140, DTU-225). |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The DTA-122 does not recognize the DTA-102 as a standard DVB-SPI source (*Present* is set to **DTAPI_NO_CONNECTION**), unless the ground pins on the DVB-SPI cable are connected together. This is due to the target-adaptor detection circuitry.

DtInpChannel::GetTsRateBps

Get a measurement of the input's transport stream rate.

```
DTAPI_RESULT DtInpChannel::GetTsRateBps (
    [out] int& TsRate           // transport-stream rate in bps
);
```

Function Arguments

TsRate

Measurement of the current transport stream rate, expressed in bits per second. This rate does not take into account 'extra' bytes beyond the 188 MPEG-2 defined bytes.

If the channel's receive mode is **DTAPI_RXMODE_STRAW**, the value returned by this method is equal to the raw input bit rate, this is the rate at which valid data enters the device.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | transport-stream rate has been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

In all receive modes except **DTAPI_RXMODE_STRAW** this method strictly applies the definition of transport-stream rate in the MPEG-2 Systems specification. This rate is based on 188-byte packets. If the packet size is not 188 bytes, a conversion factor is used.

Example: When 204-byte packets enter the system, the raw input rate is divided by 204/188.

DtInpChannel::GetTunerFrequency

Get current tuner frequency.

```
DTAPI_RESULT DtInpChannel::GetTunerFrequency(  
    [out] __int64& FreqHz    // Frequency in hertz  
);
```

Function Arguments

FreqHz

Current tuning frequency (in Hz)

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The tuner frequency has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not include a tuner |

Remarks

DtInpChannel::GetViolCount

Get number of code violations on a DVB-ASI input channel.

```
DTAPI_RESULT DtInpChannel::GetViolCount(
    [out] int& ViolCount    // Code-violation counter
);
```

Function Arguments

ViolCount

Total number of DVB-ASI code violations since power-up of a DVB-ASI input channel.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Code violation count has been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

A code violation is a bit error that leads to an illegal 8B/10B code (the line code used by DVB-ASI). Bit errors may be caused by poor cable quality, or by an input cable that is too long.

The value of this counter is updated about 20 times per second. The counter is only incremented and never reset. When the largest positive 32-bit integer value ($2^{31}-1$) has been reached, the counter wraps around to the largest 32-bit negative integer value (-2^{31}).

Connecting or disconnecting the cable to/from a DVB-ASI input channel may cause a massive amount of code violations. This is “normal” behaviour, caused by the locking process of the DVB-ASI input circuitry.

DtInpChannel::I2CLock

Lock the I2C bus for exclusive access.

```
DTAPI_RESULT DtInpChannel::I2CLock(  
    [in] int    Timeout           // Maximum time to wait for lock  
);
```

Function Arguments

Timeout

Maximum time (in ms) to wait for the I2C lock. The value -1 indicates an infinite wait time.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | I2C lock has successfully been obtained |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | Locking of the I2C bus is not supported on this device |
| DTAPI_E_TIMEOUT | Lock could not be obtained within the specified timeout |

Remarks

It is recommended to never hold the lock for longer than 2 seconds as locking the I2C bus for prolonged periods of time can result in serious degradation of the performance of the device and can even result in loss of functionality.

Internal use only: this function is exported for DekTec application usage.

DtInpChannel::I2CRead

Read data from the I2C bus.

```
DTAPI_RESULT DtInpChannel::I2CRead(
    [in] int    DvcAddr,           // I2C device address
    [out] char* pBuffer,          // Buffer for receiving the data
    [in] int    NumBytesToRead    // #Bytes to read
);
```

Function Arguments

DvcAddr

Device address of the targeted I2C device.

The I2C device address consists out of 1 transfer direction bit + 7 address bits. This method ignores the transfer bit (LSB) and only used the 7 address bits. Valid values for the device address are: 0x00h-0xFF

pBuffer

Pointer to a buffer for receiving the I2C bytes.

The buffer must be caller-allocated and have a size of at least NumBytesToRead.

NumBytesToRead

Number of bytes to read.

Maximum allowed number of bytes to read is 512.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Sample has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to device hardware |
| DTAPI_E_INVALID_BUF | Invalid buffer pointer provided |
| DTAPI_E_INVALID_SIZE | Invalid number of bytes to read specified (i.e. >512 bytes) |
| DTAPI_E_NOT_SUPPORTED | The device does not support reading of the on board I2C bus |

Remarks

The **I2CRead** method is intended for direct low-level access to the on board I2C resources.

Internal use only: this function is exported for DekTec application usage.

DtInpChannel::I2CUnlock

Release the lock (i.e. exclusive access) on the I2C bus.

```
DTAPI_RESULT DtInpChannel::I2CUnlock(void);
```

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | I2C lock has successfully been released |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to device hardware |
| DTAPI_E_NOT_SUPPORTED | Unlocking of the I2C bus is not supported on this device |

Remarks

Internal use only: this function is exported for DekTec application usage.

DtInpChannel::I2CWrite

Write data to the I2C bus.

```
DTAPI_RESULT DtInpChannel::I2CWrite(
    [in] int    DvcAddr,          // I2C device address
    [in] char*  pBuffer,         // Buffer with bytes to write
    [in] int    NumBytesToWrite // #Bytes to write
);
```

Function Arguments

DvcAddr

Device address of the targeted I2C device

The I2C device address consists out of 1 transfer direction bit + 7 address bits. This method ignores the transfer bit (LSB) and only used the 7 address bits. Valid values for the device address are: 0x00h-0xFF

pBuffer

Pointer to a buffer with the bytes to write.

The buffer must have a size of at least *NumBytesToWrite*.

NumBytesToWrite

Number of bytes to write.

Maximum allowed number of bytes to write is 512.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Sample has been retrieved successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to device hardware. |
| DTAPI_E_INVALID_BUF | Invalid buffer pointer provided |
| DTAPI_E_INVALID_SIZE | Invalid number of bytes to write specified (i.e. >512 bytes) |
| DTAPI_E_NOT_SUPPORTED | The device does not support writing to the on board I2C bus. |

Remarks

The **I2CWrite** method is intended for direct low-level access to the on board I2C resources.

Internal use only: this function is exported for DekTec application usage.

DtInpChannel::I2CWriteRead

Lock the I2C bus followed by a write and/or read action on the I2C bus and finally release the lock.

```
DTAPI_RESULT DtInpChannel::I2CWrite(  
    [in] int    DvcAddrWrite,    // I2C device address to write to  
    [in] char*   pBufferWrite,   // Buffer with bytes to write  
    [in] int    NumBytesToWrite, // #Bytes to write  
    [in] int    DvcAddrRead,    // I2C device address to read from  
    [out] char*  pBufferRead,   // Buffer for receiving the data  
    [in] int    NumBytesToRead  // #Bytes to read  
);
```

Function Arguments

DvcAddrWrite

Device address of the targeted I2C device to write to.

The I2C device address consists out of 1 transfer direction bit + 7 address bits. This method ignores the transfer bit (LSB) and only used the 7 address bits. Valid values for the device address are: 0x00h-0xFF

pBufferWrite

Pointer to a buffer with the bytes to write.

The buffer must have a size of at least *NumBytesToWrite*.

NumBytesToWrite

Number of bytes to write.

Maximum allowed number of bytes to write is 512.

DvcAddrRead

Device address of the targeted I2C device to read from.

The I2C device address consists out of 1 transfer direction bit + 7 address bits. This method ignores the transfer bit (LSB) and only used the 7 address bits. Valid values for the device address are: 0x00h-0xFF

pBufferRead

Pointer to a buffer for receiving the I2C bytes.

The buffer must be caller-allocated and have a size of at least *NumBytesToRead*.

NumBytesToRead

Number of bytes to read.

Maximum allowed number of bytes to read is 512.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Sample has been retrieved successfully. |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver. |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to device hardware. |
| DTAPI_E_INVALID_BUF | Invalid buffer pointer provided |
| DTAPI_E_INVALID_SIZE | Invalid number of bytes to write specified (i.e. >512 bytes) |
| DTAPI_E_NOT_SUPPORTED | The device does not support writing to the on board I2C bus. |

Remarks

The **I2CWriteRead** method is intended for direct low-level access to the on board I2C resources.
Internal use only: this function is exported for DekTec application usage.

DtInpChannel::LedControl

Take direct control of input-status LED, or let hardware drive the LED.

```
DTAPI_RESULT DtInpChannel::LedControl (
    [in] int    LedControl          // DTAPI_LED_XXX
);
```

Function Arguments

LedControl

Controls the LED.

| Value | Meaning |
|--------------------|--|
| DTAPI_LED_HARDWARE | Hardware drives the LED (default after power-up) |
| DTAPI_LED_OFF | LED is forced to off-state |
| DTAPI_LED_GREEN | LED is forced to green-state |
| DTAPI_LED_RED | LED is forced to red-state |
| DTAPI_LED_YELLOW | LED is forced to yellow-state |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | LED setting has been accepted |
| DTAPI_E_INVALID_MODE | The specified LED-control value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

Detaching the input channel releases any direct-control setting that might have been applied to the LEDs (LED control is reset to **DTAPI_LED_HARDWARE**).

Some devices have a single LED, which can be controlled by either **DtDevice::LedControl** or by **DtInpChannel::LedControl**. If both methods are used at the same time, then **DtDevice::LedControl** takes precedence over **DtInpChannel::LedControl**.

DtInpChannel::LnbEnable

For satellite receivers (DTA-2137, DTE-3137): Enable or disable the LNB controller.

```
DTAPI_RESULT DtInpChannel::LnbEnable(  
    [in] bool Enable           // Enable/disable controller  
);
```

Function Arguments

Enable

If set true, the LNB controller will be enabled. If false the LNB controller is disabled.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | LNB controller has successfully been enabled or disabled |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INTERNAL | Unexpected internal DTAPI error encountered |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This method is not supported by the underlying hardware |

Remarks

DtInpChannel::LnbEnableTone

For satellite receivers (DTA-2137, DTE-3137): Enable or disable the 22kHz tone on the LNB.

```
DTAPI_RESULT DtInpChannel::LnbEnableTone (
    [in] bool  Enable           // Enable/disable 22kHz tone
);
```

Function Arguments

Enable

Enable (=true) or disable (=false) generation of 22 kHz tone.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The 22kHz tone has successfully been enabled or disabled |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INTERNAL | Unexpected internal DTAPI error encountered |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This method is not supported by the underlying hardware |

Remarks

Before calling this method the on-board LNB controller must have been enabled using `DtInpChannel::LnbEnable` method. If the LNB controller is disabled this method will fail.

DtInpChannel::LnbSendBurst

For satellite receivers (DTA-2137, DTE-3137): Transmit a tone burst of type A or B.

```
DTAPI_RESULT DtInpChannel::LnbSendBurst(
    [in] int BurstType          // Burst type
);
```

Function Arguments

BurstType

Controls the burst type.

| Value | Meaning |
|-------------------|--------------|
| DTAPI_LNB_BURST_A | Burst type A |
| DTAPI_LNB_BURST_B | Burst type B |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | LNB burst has successfully been sent |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INTERNAL | Unexpected internal DTAPI error encountered |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This method is not supported by the underlying hardware |

Remarks

Before calling this method the on-board LNB controller must have been enabled using `DtInpChannel::LnbEnable` method. If the LNB controller is disabled this method will fail.

DtInpChannel::LnbSendDiseqcMessage

For satellite receivers (DTA-2137, DTE-3137): Send a DiSEqC message. There are two overloads: one with and one without capture of the DiSEqC reply.

```
DTAPI_RESULT DtInpChannel::LnbSendDiseqcMessage (
    [in] const unsigned char*  pMsgOut      // The message
    [in] int  NumBytesOut      // Size of output message
);
DTAPI_RESULT DtInpChannel::LnbSendDiseqcMessage (
    [in] const unsigned char*  pMsgOut      // Buffer with message
    [in] int  NumBytesOut      // Size of output buffer
    [in] unsigned char* pMsgIn  // Buffer for reply
    [in/out] int& NumBytesIn    // Size of reply buffer / reply message
);
```

Function Arguments

pMsgOut

Pointer to buffer with the message to send. The maximum allowed message size is 8.

NumBytesOut

Number of bytes in the message buffer.

pMsgIn

Pointer to buffer in which the reply message is stored. The maximum reply size is 8 bytes.

NumBytesIn

As input argument this argument specifies the size of the reply buffer. As output argument this argument returns the number of bytes in the reply message.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | LNB message was successfully sent |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INTERNAL | Unexpected internal DTAPI error encountered |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This method is not supported by the underlying hardware |

Remarks

Before calling this method the on-board LNB controller must have been enabled using the **LnbEnable** method. If the LNB controller is disabled this method will fail.

DtInpChannel::LnbSetVoltage

For satellite receivers (DTA-2137, DTE-3137): Set the LNB voltage.

```
DTAPI_RESULT DtInpChannel::LnbSetVoltage(  
    [in] int    Level           // Voltage level  
);
```

Function Arguments

Level

Controls the LNB voltage.

| Value | Meaning |
|---------------|--------------------|
| DTAPI_LNB_13V | LNB voltage is 13V |
| DTAPI_LNB_14V | LNB voltage is 14V |
| DTAPI_LNB_18V | LNB voltage is 18V |
| DTAPI_LNB_19V | LNB voltage is 19V |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | LNB voltage has successfully been set |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INTERNAL | Unexpected internal DTAPI error encountered |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This method is not supported by the underlying hardware |

Remarks

The LNB voltage settings will only have effect if the LNB controller has been enabled using the `LnbEnable` method.

DtInpChannel::PolarityControl

Control the automatic polarity-detection circuitry of a DVB-ASI input channel.

```
DTAPI_RESULT DtInpChannel::PolarityControl(  
    [in] int    PolarityControl // Polarity-control setting  
);
```

Function Arguments

PolarityControl

This argument controls inversion of the DVB-ASI signal.

| Value | Meaning |
|-----------------------|--|
| DTAPI_POLARITY_AUTO | Automatically detect and correct the polarity |
| DTAPI_POLARITY_NORMAL | 'Normal' operation: do not invert the DVB-ASI signal |
| DTAPI_POLARITY_INVERT | Invert DVB-ASI signal |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Polarity setting has been accepted |
| DTAPI_E_INVALID_MODE | The specified polarity-control value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Device is not a DVB-ASI device, or hardware does not support control of the polarity-detection process |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The DVB-ASI signal is sensitive to polarity. Without corrective measures, an inverted DVB-ASI signal – which may be caused by inverting distribution amplifiers – may be decoded incorrectly by a standard DVB-ASI receiver.

Automatic detection of DVB-ASI signal polarity (setting **DTAPI_POLARITY_AUTO**) can be successfully applied only when it is known a priori that the input signal is DVB/MPEG-2 compliant. For non MPEG-2 applications, *PolarityControl* should be set to **DTAPI_POLARITY_NORMAL**, or the input signal may be distorted badly due to periodic inversion.

Old revisions of the DTU-225 do not support these functions: These devices always operate as if *PolarityControl* is set to **DTAPI_POLARITY_NORMAL**.

DtInpChannel::Read

Read data bytes from the input channel.

```
DTAPI_RESULT DtInpChannel::Read(  
    [in] char*   pBuffer,           // Buffer to store data  
    [in] int     NumBytesToRead    // #Bytes to be read  
);  
  
DTAPI_RESULT DtInpChannel::Read(  
    [in] char*   pBuffer,           // Buffer to store data  
    [in] int     NumBytesToRead    // #Bytes to be read  
    [in] int     TimeOut           // Maximum time to wait for data  
);
```

Function Arguments

pBuffer

Pointer to the buffer into which the data bytes from the input channel will be written. The pointer must be aligned to a 32-bit word boundary, except for IP input channels for which there are no alignment restrictions.

NumBytesToRead

Transfer size: Number of bytes to be read from the input channel. The value of *NumBytesToWrite* must be a multiple of four, except for IP input channels, which can accept any positive value.

TimeOut

Transfer timeout: specifies the maximum time (in ms) to wait for the requested amount of data. This method will fail if the data cannot be read within the specified period. A value of 0 indicates that no time out applies and -1 specifies an infinite timeout.

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | Read operation has been completed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_BUF | The buffer is not aligned to a 32-bit word boundary |
| DTAPI_E_INVALID_SIZE | The specified transfer size is negative or not a multiple of 4 |
| DTAPI_E_INVALID_TIMEOUT | Invalid timeout period specified |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_TIMEOUT | Read operation failed. Requested number of bytes could not be returned within the specified timeout period |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

Read returns when *NumBytesToRead* bytes have been transferred into the buffer. The thread executing **Read** will sleep until sufficient data has entered the receive FIFO to complete the transfer. If either the input signal disappears or receive control is **DTAPI_RXCTRL_IDLE**, the **Read** call may sleep for an indefinite period of time (the thread 'hangs').

There are two ways to avoid such a ‘hanging’ thread:

- Before calling **Read**, check the FIFO load. Read an amount of data that is less than or equal to the FIFO load;
- Use **Read** with a time out.

The first method should be used if maximum performance is required. The second method is easier to use at the expense of some extra CPU cycles.

DtInpChannel::ReadFrame

Read a single SDI frame from the input channel.

```
DTAPI_RESULT DtInpChannel::ReadFrame(  
    [in] unsigned int*  pFrame,      // Buffer to receive the frame  
    [in/out] int&  FrameSize,        // [in] Size of frame buffer  
                                       // [out] Number of bytes returned  
    [in] int  Timeout                // Maximum time to wait for a frame  
);
```

Function Arguments

pFrame

Buffer to receive the SDI frame. Must be 32-bit aligned. NOTE: the format (e.g. 8-bit/10-bit, compressed/uncompressed, etc.) of the data returned in the frame buffer depends on the active receive-mode

FrameSize

As an input argument this argument indicates the size of the frame buffer. The frame buffer should be large enough to receive a complete frame and must be 32-bit aligned.

As an output argument this argument indicates the number of bytes returned in the frame buffer. The returned number of bytes includes any stuff bytes added to the end of the frame to achieve 32-bit alignment.

Timeout

Maximum amount of time in ms to wait for a complete frame. This method will fail if a frame cannot be returned within the specified period.

The value of this argument must larger than 0 or -1 to specify an infinite timeout. The default value is -1 (infinite).

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | Read operation has been completed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_BUF | The buffer is not aligned to a 32-bit word boundary |
| DTAPI_E_BUF_TOO_SMALL | The frame buffer is too small for receiving a complete frame |
| DTAPI_E_INVALID_TIMEOUT | Invalid timeout period specified |
| DTAPI_E_NOT_SDI_MODE | The channel is not in SDI mode (see SetRxMode page 301) |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_TIMEOUT | Read operation failed. Could not return a complete frame within the specified timeout period |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

If an infinite timeout has been specified, this method will block until a complete frame has been received from the hardware.

DtInpChannel::RegisterDemodCallback

Register a callback function for handling demodulator events.

```
DTAPI_RESULT DtInpChannel::RegisterDemodCallback (
    [in] IDtDemodEvent* pEvent,        // Event handler
    [in] __int64 Events=-1,           // Events to register for
);
```

Function Arguments

pIEvent

Pointer to a callback function for handling demodulator events. Use NULL to stop handling events.

Events

Events to register for. The table below contains the supported events. Multiple event constants can be OR-ed together to register for multiple events. To register for all demodulator events use the value -1.

| Event | Description |
|---------------------------------|---|
| DTAPI_EV_TUNE_PARS_HAVE_CHANGED | Tuning parameters have changed (SetDemodControl , SetTunerFrequency or Tune was called) |
| DTAPI_EV_TUNE_FREQ_HAS_CHANGED | Tuning frequency has changed (SetTunerFrequency or Tune was called) |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Callback has been registered or deregistered successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Registering an event interface is not supported |

Remarks

DtInpChannel::Reset

Reset input channel.

```
DTAPI_RESULT DtInpChannel::Reset (
    [in] int ResetMode
);
```

Function Arguments

ResetMode

Specifies which part of the hardware and software stack is reset. The following values are defined (values cannot be OR-ed together):

| Value | Meaning |
|------------------|---|
| DTAPI_FIFO_RESET | Reset (clear) the Receive FIFO: <ul style="list-style-type: none"> • Data transfers are halted instantaneously • All data pending in the Receive FIFO is discarded • Receive-control state is reset to DTAPI_RXCTRL_IDLE • Receive-FIFO overflow flag is cleared |
| DTAPI_FULL_RESET | Full input-channel reset: <ul style="list-style-type: none"> • All actions for DTAPI_FIFO_RESET, plus: • Synchronisation-error flag (DTAPI_RX_SYNC_ERR) is cleared • State machines in the device hardware are reset |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Input channel has been reset |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_MODE | The value specified for <i>ResetMode</i> is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

An input-channel reset operation does not affect the following settings:

- Receive mode and insert-time-stamp flag (refer to **DtInpChannel::SetRxMode**)
- Polarity control of DVB-ASI inputs (refer to **DtInpChannel::PolarityControl**)

DtInpChannel::SetAdcSampleRate

DTA-2135 only. Set sample rate for ADC input channels. The ADC sample-rate determines the rate at which samples are taken from the down-converted RF signal.

```
DTAPI_RESULT DtInpChannel::SetAdcSampleRate(  
    [in] int SampleRate    // ADC sample rate in Hz  
);
```

Function Arguments

SampleRate

ADC sample-rate according to the table below.

| Value | Meaning |
|---------------------|------------------------------|
| DTAPI_ADCCLK_OFF | Clock is off |
| DTAPI_ADCCLK_27M | 27Mhz Clock |
| DTAPI_ADCCLK_20M647 | 20.647059 Clock ³ |
| DTAPI_ADCCLK_13M5 | 13.5Mhz Clock |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | ADC sample-rate has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified receive mode is invalid or incompatible with the input channel |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Current device is not supported by this function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

Only the first channel of the DTA-2135 provides access the down-converted RF signal.

The IF frequency of the DTA-2135 is 36.167Mhz. Since the available sample-rates are all well below the Nyquist rate the signal is under sampled. Please refer to sampling theory on details how to recover the signal.

³ The exact frequency is $27 * 13 / 17 = 20.647059\text{Mhz}$

DtInpChannel::SetAntPower

For receivers: Turn antenna power on or off.

```
DTAPI_RESULT DtInpChannel::SetAntPower (
    [in] int  AntPower          // Antenna power on/off
);
```

Function Arguments

AntPower

Power state according to the table below.

| Value | Meaning |
|-----------------|--|
| DTAPI_POWER_OFF | No power is applied. The antenna needs to be self-powered |
| DTAPI_POWER_ON | Power (+5V, 30mA) is applied to the external antenna through the antenna connector(s) of the channel |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Power state has been changed successfully |
| DTAPI_E_INVALID_MODE | The specified antenna power mode value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not have a provision for antenna power |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

After **Attach** and after **Reset**, antenna power is turned off.

DtInpChannel::SetDemodControl

Set the demodulation parameters.

```
DTAPI_RESULT DtInpChannel::SetDemodControl (
    [in] DtDemodPars* pDemodPars    // Demodulation parameters
);

DTAPI_RESULT DtInpChannel::SetDemodControl (
    [in] int ModType,                // Modulation type
    [in] int ParXtra0,               // Extra parameter #0
    [in] int ParXtra1,               // Extra parameter #1
    [in] int ParXtra2               // Extra parameter #2
);
```

Function Arguments

pDemodPars

Pointer to a structure containing the demodulation parameters. See class **DtDemodPars** for possible demodulation parameters.

ModType

Expected type of modulation of the input signal. See **GetDemodControl** for a list of applicable values, with the exception of the **DTAPI_MOD_TYPE_UNK** value, which cannot be used in the **SetDemodControl** method.

ParXtra0, ParXtra1, ParXtra2

Additional parameters further defining the demodulation process. See **GetDemodControl** for a list of applicable values, with the exception of the **DTAPI_MOD_XXX_UNK** values, which cannot be used in the **SetDemodControl** method.

Many of the additional parameters can be automatically detected by the demodulator hardware and therefore it is not always required to fully define the demodulation parameters. However, providing more detail will help the demodulator to achieve signal lock faster, as it will not have to autodetect them.

The tables below show the limitations with respect to automatic detection:

Automatic detection

ModType

The modulation type must always be set explicitly and using automatic detection is not allowed.

ParXtra0, ParXtra1, ParXtra2

The table below lists which parameters can be automatically detected for each of the modulation standards:

| Modulation Mode: ATSC | | |
|-----------------------|---------------|--|
| ParXtra0 | Constellation | No automatic detection supported (constellation must be specified) |
| ParXtra2 | Symbol rate | Automatically detected by definition |

| Modulation Mode: DVB-S | | |
|------------------------|--------------------|-----------------------------|
| ParXtra0 | Code rate | DTAPI_MOD_CR_AUTO |
| ParXtra1 | Spectral inversion | DTAPI_MOD_S_S2_SPECINV_AUTO |
| ParXtra2 | Symbol rate | DTAPI_MOD_SYMRATE_AUTO |

| Modulation Mode: DVB-S.2 | | |
|--------------------------|--------------------|--------------------------------------|
| ParXtra0 | Code rate | DTAPI_MOD_CR_AUTO |
| ParXtra1 | Spectral inversion | Automatically detected by definition |
| | Pilots | DTAPI_MOD_S2_PILOTS_AUTO |
| | FEC frame size | DTAPI_MOD_S2_FRM_AUTO |
| ParXtra2 | Symbol rate | DTAPI_MOD_SYMRATE_AUTO |

| Modulation Mode: DVB-T | | |
|------------------------|----------------|--|
| ParXtra0 | Code rate | DTAPI_MOD_CR_AUTO |
| ParXtra1 | Bandwidth | No automatic detection supported (bandwidth must be specified) |
| | Constellation | DTAPI_MOD_DVBT_CO_AUTO |
| | Guard interval | DTAPI_MOD_DVBT_GU_AUTO |
| | Interleaving | DTAPI_MOD_DVBT_IL_AUTO |
| | Tx mode | DTAPI_MOD_DVBT_MD_AUTO |

| Modulation Mode: QAM | | |
|----------------------|--------------|---|
| ParXtra0 | J.83 Annex | No automatic detection supported (Annex must be specified) |
| ParXtra1 (QAM-B) | Interleaving | Automatically detected by definition |
| ParXtra2 | Symbol rate | <p>DTAPI_MOD_SYMRATE_AUTO</p> <p>Automatic detection of symbol rate is supported by the DTA-2136, DTA-2138, DTA-2139 and the DTU-234. The DTU-236 supports automatic detection of the symbol rate for QAM-B only.</p> <p>You can directly set the symbol rate the tuner should lock to for the DTA-2136, DTA-2139 and DTU-236. For QAM-A and QAM-C on the DTU-236 this is the only possibility since automatic detection isn't supported.</p> |

Result

| DTAPI_RESULT | Meaning |
|---|--|
| DTAPI_OK | The modulation parameters have been set successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_BANDWIDTH | Invalid value for bandwidth field |
| DTAPI_E_INVALID_CONSTEL | Invalid value for constellation field |
| DTAPI_E_INVALID_FHMODE | Invalid value for frame-header mode field |
| DTAPI_E_INVALID_GUARD | Invalid value for guard-interval field |
| DTAPI_E_INVALID_INTERLVNG | Invalid value for interleaving field |
| DTAPI_E_INVALID_J83ANNEX DTAPI_E_INVALID_ROLLOFF | Invalid value for J.83 annex |
| DTAPI_E_INVALID_MODE | Modulation type is incompatible with demodulator |
| DTAPI_E_INVALID_MODPARS | Invalid demodulation parameters |
| DTAPI_E_INVALID_PILOTS | Pilots cannot be specified in C=1 mode |
| DTAPI_E_INVALID_RATE | Invalid value for convolutional rate or FEC code rate |
| DTAPI_E_INVALID_SYMRATE | Invalid value for symbol rate |
| DTAPI_E_INVALID_T2PROFILE | Invalid value for DVB-T2 profile |
| DTAPI_E_INVALID_TRANSMODE | Invalid value for transmission-mode field |
| DTAPI_E_INVALID_USEFRAMENO | Invalid value for use-frame-numbering field |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | This function is not supported for the underlying hardware |

Remarks

For DTA-2136 and DTA-2139 J.83 annex A (DVB-C) QAM-128 is not supported

For DTA-2131 a low C/N and MER could be measured when using a DVB-T2 configuration including Pilot Pattern 8 (PP8).

DtInpChannel::SetErrorStatsMode

Set the way error statistics are gathered for the specified type of modulation. This method is currently only supported by the DTA-2137.

```
DTAPI_RESULT DtInpChannel::SetErrorStatsMode(  
    [in] int  ModType,          // Type of modulation  
    [in] int  Mode              // The desired error statistics mode  
);
```

Function Arguments

ModType

Type of modulation for which the given error statistics mode is set.

| Value | Meaning |
|------------------------|------------------|
| DTAPI_MOD_DVBS_QPSK | DVB-S, QPSK |
| DTAPI_MOD_DVBS2_8PSK | DVB-S.2, 8-PSK |
| DTAPI_MOD_DVBS2_16APSK | DVB-S.2, 16-APSK |
| DTAPI_MOD_DVBS2_32APSK | DVB-S.2, 32-APSK |
| DTAPI_MOD_DVBS2_QPSK | DVB-S.2, QPSK |

Mode

Desired error-statistics mode.

| Value | Meaning |
|----------------------|--|
| DTAPI_ERRORSTATS_BER | (Default for each type of modulation) Bit error rate |
| DTAPI_ERRORSTATS_RS | Reed-Solomon error count |

Result

| DTAPI_RESULT | Meaning |
|-------------------------|--|
| DTAPI_OK | The error-statistics mode has been changed successfully |
| DTAPI_E_INVALID_MODTYPE | The specified type of modulation is not valid |
| DTAPI_E_INVALID_PARS | The combination of <i>ModType</i> and <i>Mode</i> is not valid |

Remarks

Reed-Solomon error counts (error-statistics mode **DTAPI_ERRORSTATS_RS**) can only be used for DVB-S.

DtInpChannel::SetFifoSize

Set the size the receive FIFO to a specified value. This function is only supported for IP-streams.
The FIFO size can only be changed if receive control is **IDLE**.

```
DTAPI_RESULT DtInpChannel::SetFifoSize(  
    [in] int  FifoSize           // Size of transmit FIFO in bytes  
);
```

Function Arguments

FifoSize

Requested size of the receive FIFO in number of bytes.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | The size of the receive FIFO has been set successfully |
| DTAPI_E_IN_USE | The FIFO size cannot be changed because receive control state is not IDLE. |
| DTAPI_E_INVALID_SIZE | The specified FIFO size is negative or zero |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_OUT_OF_MEM | Receive FIFO cannot be allocated |

Remarks

The size of the receive FIFO determines the amount of packet data that can be buffered in the driver. It does not increase the receive delay.

DtInpChannel::SetIoConfig

Set the I/O configuration of the physical port attached to the input channel. This is the same function as `DtDevice::SetIoConfig` applied to the physical port corresponding to this channel.

```
DTAPI_RESULT DtInpChannel::SetIoConfig(  
    [in] int    Group,                // I/O configuration group  
    [in] int    Value,                // I/O configuration value  
    [in] int    SubValue=-1,          // I/O configuration subvalue  
    [in] __int64 ParXtra0=-1,         // Extra parameter #0  
    [in] __int64 ParXtra1=-1         // Extra parameter #1  
);
```

Function Arguments

Group, *Value*, *SubValue*, *ParXtra0*, *ParXtra1*

I/O configuration parameters, see `DtDevice::SetIoConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | I/O configuration has been set successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| Other result codes | See <code>DtDevice::SetIoConfig</code> |

Remarks

This function requires exclusive access (`AttachToPort` was called with *Exclusive=true*).

DtInpChannel::SetIpPars

Set parameters for the reception of TS-over-IP streams.

```
DTAPI_RESULT DtInpChannel::SetIpPars(  
    [in] DtIpPars*  pIpPars          // TS-over-IP parameters  
);
```

Function Arguments

SetIpPars

New parameter set to be applied. Please refer to the **DtIpPars** page for a description of the parameters.

Result

| DTAPI_RESULT | Meaning |
|----------------------------|---|
| DTAPI_OK | TS-over-IP parameters have been applied successfully |
| DTAPI_E_BIND | Error binding port to IP address |
| DTAPI_E_IN_USE | Function Arguments cannot be changed because the channel is busy. The receive-control state should be switched back to idle first |
| DTAPI_E_INVALID_DIFFSERV | The m_Diffserv parameter is invalid |
| DTAPI_E_INVALID_FECMODE | The m_FecMode parameter is invalid |
| DTAPI_E_INVALID_FEC_MATRIX | The m_FecNumCols/m_FecNumRows is invalid |
| DTAPI_E_INVALID_FLAGS | The m_Flags parameter is invalid |
| DTAPI_E_INVALID_MODE | The m_Mode parameter is invalid |
| DTAPI_E_INVALID_IP_ADDR | The m_Ip or m_Ip2 parameter is invalid |
| DTAPI_E_INVALID_PORT | The m_Port parameter is invalid. |
| DTAPI_E_INVALID_PROTOCOL | The m_Protocol parameter is invalid |
| DTAPI_E_INVALID_SRCIP_ADDR | The m_SrcFltIp or m_SrcFltIp2 parameter is invalid |
| DTAPI_E_INVALID_VIDEOSTD | The m_Videostandard in member m_IpProfile is invalid |
| DTAPI_E_IPV6_NOT_SUPPORTED | IPv6 is not supported on this operating system |
| DTAPI_E_MULTICASTOIN | Error joining multicast address |
| DTAPI_E_NO_ADAPTER_IP_ADDR | The network IP address could not be retrieved. Check the network driver IP protocol settings |
| DTAPI_E_NO_LINK | The IP parameters cannot be applied because the link is down. Check network cable and speed settings |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NW_DRIVER | The IP address could not be retrieved from the network driver |
| DTAPI_E_NWAP_DRIVER | An error occurred using the Advanced Protocol Driver. |
| DTAPI_E_VLAN_NOT_FOUND | The VLAN with the given ID is not found |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

SetIpPars should be called at least once after attaching to the hardware but before setting the receive-control state to **DTAPI_RXCTRL_RCV**.

After the initial call to **SetIpPars**, parameters can be changed again, but only when the receive-control state is **DTAPI_RXCTRL_IDLE**.

When the destination IP address is a multicast IP address, DTAPI automatically joins the multicast group upon the first invocation of **SetIpPars**. When this method is called again, membership of the old multicast group is dropped and, if required, the new multicast group is joined.

DtInpChannel::SetPars

Set parameter settings for the demodulator. This function accepts an array of **DtPar** structures so that multiple parameters can be set in one call.

```
DTAPI_RESULT DtInpChannel::SetPars (
    [in] int    Count,           // Number of parameters
    [in] DtPar* pPars           // Array with parameters
);
```

Function Arguments

NumPars

Specifies the size, in number of **DtPar** entries, of the caller-supplied *pPars* array.

pPar

Pointer to a caller-supplied array of **DtPar** structures.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Parameter values have been set successfully |
| DTAPI_E_INVALID_BUF | Invalid buffer pointer is passed |
| DTAPI_E_INVALID_TYPE | Parameter type is incorrect |
| DTAPI_E_NOT_ATTACHED | Demodulator is not attached |
| DTAPI_E_NOT_IDLE | Demodulator is already started |

Remarks

Demodulation should not yet been started when this function is called.

DtInpChannel::SetPower

DTA-122 only. Turn on/off power for a target adapter attached to the DTA-122.

```
DTAPI_RESULT DtInpChannel::SetPower (
    [in] int    Power          // Power state
);
```

Function Arguments

Power

Power state according to the table below.

| Value | Meaning |
|-----------------|--|
| DTAPI_POWER_OFF | No power is applied. The 25-pin sub-D connector is compatible with DVB-SPI |
| DTAPI_POWER_ON | Apply power (+5V) to pin 12 and 25 of the 25-pin sub-D connector |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Power state has been changed successfully |
| DTAPI_E_INVALID_MODE | The specified power-mode value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not support a power connection for target adapters |

Remarks

After **Attach** and after **Reset**, power is turned off.

DtInpChannel::SetRxControl

Set receive control.

```
DTAPI_RESULT DtInpChannel::SetRxControl(  
    [in] int RxControl    // Receive control  
);
```

Function Arguments

RxControl

New receive control value according to the table below.

| Value | Meaning |
|-------------------|--|
| DTAPI_RXCTRL_IDLE | The input stream input is “disconnected” from the receive FIFO: Incoming transport packets are not stored in the receive FIFO. |
| DTAPI_RXCTRL_RCV | Normal operation. Incoming transport packets are stored in the receive FIFO. |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Receive-control state has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified receive-control state is invalid or incompatible with the attached hardware function |
| DTAPI_E_NO_IP_PARS | For TS-over-IP channels: receive-control state cannot be set to DTAPI_RXCTRL_RCV because TS-over-IP parameters have not been specified |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

If receive control is set to **DTAPI_RXCTRL_RCV**, but the application does not read data from the receive FIFO, then the receive FIFO will quickly overflow.

Calling **AttachToPort**, **Reset** or **ClearFifo** will initialize receive control to **DTAPI_RXCTRL_IDLE**.

DtInpChannel::SetRxMode

Set the receive mode for the input channel. It determines the conversions that will be applied to the input signal. Receive mode has to be set before setting receive control to **DTAPI_RXCTRL_RCV**.

Note: For ASI/SDI input channels, first configure the input port for ASI or SDI with **SetIoConfig**, group **IOSTD**. If an ASI-specific receive mode is applied to a channel that is configured for SDI (or vice versa), an error will be returned.

```
DTAPI_RESULT DtInpChannel::SetRxMode(
    [in] int    RxMode           // Receive mode
);
```

Function Arguments

RxMode

Receive mode according to the table below.

| Value | Meaning |
|---------------------------|---|
| DTAPI_RXMODE_ST188 | <i>Transport Stream - 188-byte mode</i> Always store 188-byte packets in the receive FIFO. When the input contains 204-byte packets, the 16 trailing bytes are dropped. Input data without 188- or 204-byte packet structure is dropped. |
| DTAPI_RXMODE_ST204 | <i>Transport Stream - 204-byte mode</i> Always store 204-byte packets in the receive FIFO. When the input contains 188-byte packets, 16 zero bytes are appended. Input data without 188- or 204-byte packet structure is dropped. |
| DTAPI_RXMODE_STMP2 | <i>Transport Stream - MPEG-2 mode</i> Store 188- or 204-byte packets in the receive FIFO without modification. Input data without 188- or 204-byte packet structure is dropped. |
| DTAPI_RXMODE_STRAW | <i>Transport Stream - Raw mode</i> No notion of packets. All incoming valid data bytes are stored in the Receive FIFO. For DVB-ASI input channels, this mode is incompatible with DTAPI_POLARITY_AUTO ! Please refer to the Remarks section. |
| DTAPI_RXMODE_STTRP | <i>Transport Stream - Transparent mode</i> All incoming data bytes are stored in the receive FIFO. The data is aligned to packet boundaries if valid packets are detected. This format includes a trailer that contains information about the detected packet size, sync status and valid data bytes within the packet. |
| DTAPI_RXMODE_STL3 | <i>L.3 Baseband frame mode</i> (DTA-2137/DTA-2137C only). No notion of transport stream packets. The entire DVB-S2 baseband frame is passed with the addition of an L.3 Header. Dummy frames are skipped. See DTAPI Manual – Overview and Data Formats.pdf for more details. |

| | |
|------------------------------|--|
| DTAPI_RXMODE_STL3FULL | <i>Full L.3 Baseband frame mode</i> Similar to DTAPI_RXMODE_STL3 . Dummy frames are encoded with ModCod is '0'. |
| DTAPI_RXMODE_RAWASI | <i>Raw ASI symbols</i> (Ports needs CAP_RAWASI) The complete incoming data stream can be read as packed 10-bit symbols. |

The following modes are valid for SDI capable channels only.

| Value | Meaning |
|--------------------------------|--|
| DTAPI_RXMODE_SDI_FULL | <i>Full frame mode</i> Store all SDI data (i.e. complete frames). |
| DTAPI_RXMODE_SDI_ACTVID | <i>Active video mode</i> Store only the active video part of each SDI frame. This mode should only be used in combination with Huffman compression (i.e. with DTAPI_RXMODE_SDI_HUFFMAN flag)! |

The following mode is valid for TS-over-IP reception only.

| Value | Meaning |
|---------------------------|---|
| DTAPI_RXMODE_IPRAW | <i>Raw IP mode</i> Store unprocessed IP packets in the buffer. If error correction is requested, store FEC streams too. Each IP packet returned by a call the DtInpChannel::Read will be preceded by a DtRawIpHeader structure. |

The receive mode can be optionally combined (OR-ed) with the following flag:

| Value | Meaning |
|---------------------------------|---|
| DTAPI_RXMODE_TIMESTAMP32 | <i>Time-stamped mode (32-bit timestamps)</i> Insert a 32-bit timestamp before each packet. The timestamp is a sample of the system clock counter on the device. This flag may not be specified in raw mode (DTAPI_RXMODE_STRAW) or any of the SDI modes. |
| DTAPI_RXMODE_TIMESTAMP64 | <i>Time-stamped mode (64-bit timestamps)</i> (hardware shall support DTAPI_CAP_TIMESTAMP64). Insert a 64-bit timestamp before each packet. The timestamp is a sample of the system clock counter on the device. This flag may not be specified in raw mode (DTAPI_RXMODE_STRAW) or any of the SDI modes. |
| DTAPI_RXMODE_SDI | <i>SDI mode</i> Operate in SDI mode; Otherwise ASI mode will be used. This flag is already OR-ed into DTAPI_RXMODE_SDI_FULL and DTAPI_RXMODE_SDI_ACTVID . |
| DTAPI_RXMODE_SDI_10B | <i>10-bit SDI samples</i> Provide 10-bit SDI samples. If both this flag and the 16B flag are omitted, 8-bit samples is assumed. |

| | |
|---------------------------------|---|
| DTAPI_RXMODE_SDI_16B | <i>16-bit SDI samples</i> Provide 10-bit SDI samples packed in 16-bits. Only the 10 least significant bits of each 16-bit sample will be used. If both this flag and the 10B flag are omitted, 8-bit samples is assumed. 16B mode is only supported by cards having the CAP_MATRIX capability. |
| DTAPI_RXMODE_SDI_HUFFMAN | <i>Huffman compression</i> Compress the SDI using Huffman compression. |
| DTAPI_RXMODE_SDI_STAT | <i>SDI statistics</i> Inserts statistical information before each SDI frame (a total of 32 bytes). If the DTAPI_RXMODE_TIMESTAMP32 is also enabled, the SDI statistics will be inserted after the timestamp. This mode is only supported for IP channels. See the DtSdiIpFrameStat struct for details. |

Result

| DTAPI_RESULT | Meaning |
|------------------------------|--|
| DTAPI_OK | Receive mode has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified receive mode is invalid or incompatible with the input channel |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Current device is not supported by this function |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

In receive mode **DTAPI_RXMODE_STRAW** ("raw" mode), the input channel does not care about the packet structure of the incoming transport stream: All data bytes are stored in the input buffer. For DVB-ASI input channels, raw mode can only work reliably if *polarity control* is set to **DTAPI_POLARITY_NORMAL** or **DTAPI_POLARITY_INVERT**. If polarity control is set to **DTAPI_POLARITY_AUTO**, disaster may be the result: Automatic polarity detection assumes that the input has a valid packet structure. If such a structure cannot be found, the device tries again with the input signal inverted. In raw mode, such inversion may occur periodically and severely corrupt the input data!

For the DTA-122 and DTA-2142 DVB-SPI ports, packet synchronisation in modes **DTAPI_RXMODE_ST188** and **DTAPI_RXMODE_ST204** is based on the PSYNC signal, not on the value of the first byte of the packet: The value of DATA at a PSYNC pulse is stored in the input buffer, even if the value is not 0x47.

Timestamps are stored in little-endian format: the first byte contains the least-significant 8 bits, the fourth byte the most-significant 8 bits. 32-bit timestamps can be read by code like this:

```
unsigned int TimeStamp = *(unsigned int*) PtrInCharBuffer;
```

DtInpChannel::SetStreamSelection

Select a DAB-stream, PLP in a DVB-C2 or DVB-T2 stream, T2-MI stream or ISDB-T layer

```
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtDabEtiStreamSelPars& StreamSel // DAB-ETI selection parameters
);
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtDabStreamSelPars& StreamSel // DAB-stream selection parameters
);
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtDvbC2StreamSelPars& StreamSel // PLP selection parameters
);
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtDvbT2StreamSelPars& StreamSel // PLP selection parameters
);
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtDvbT2MiStreamSelPars& StreamSel // T2-MI selection parameters
);
DTAPI_RESULT DtInpChannel::SetStreamSelection(
    [in] DtIsdbtStreamSelPars& StreamSel // ISDB-T selection parameters
);
```

Function Arguments

StreamSel

Specification of the PLP selection criteria.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The PLP has been selected successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_DSLICE_ID | Invalid data slice identifier |
| DTAPI_E_INVALID_MODE | The current demodulation type does not correspond to the type of the selection parameters |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not support DAB, DVB-C2, DVB-T2, ISDB-T or T2-MI |
| DTAPI_E_PLP_ID | Invalid physical layer pipe identifier |
| DTAPI_E_LAYER_ID | Invalid ISDB-T layer identifier |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

If the specified PLP/Layer is not available another PLP/Layer may be selected.

DtInpChannel::SetTunerFrequency

Set tuner frequency.

```
DTAPI_RESULT DtInpChannel::SetTunerFrequency(  
    [in] __int64& FreqHz    // Frequency in hertz  
);
```

Function Arguments

FreqHz

Desired tuning frequency (in Hz). The table below specifies the valid range and the step size with which the RF rate can be specified. *FreqHz* is rounded to the nearest RF frequency compatible with the frequency resolution.

| Device | Valid Range | Step Size |
|----------|-------------------------------|-----------|
| DTU-234 | 53,000,000 - 865,000,000 Hz | - |
| DTU-235 | 50,000,000 - 860,000,000 Hz | - |
| DTU-236 | 44,000,000 - 865,000,000 Hz | - |
| DTA-2135 | 50,000,000 - 860,000,000 Hz | - |
| DTA-2136 | 54,000,000 - 1002,000,000 Hz | - |
| DTA-2137 | 950,000,000 - 2150,000,000 Hz | - |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The tuner frequency has been set successfully |
| DTAPI_E_INVALID_FREQ | The specified frequency is incompatible (too low or too high) with the tuner |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not include a tuner |

Remarks

DtInpChannel::SpectrumScan

Scans the spectrum and returns RF levels using a callback mechanism.

```
DTAPI_RESULT DtInpChannel::SpectrumScan(  
    [in] DtSpsProgressFunc pCallback, // Progress callback function  
    [in] void* pOpaque,               // Opaque pointer  
    [in] int ScanType,                // RF level statistics type to use  
    [in] __int64 FreqHzSteps,         // Optional parameter to select stepsize  
    [in] __int64 StartFreqHz,         // Optional parameter to select starting  
                                       // frequency  
    [in] __int64 EndFreqHz            // Optional parameter to select ending  
                                       // frequency  
);
```

Function Arguments

pCallback

A callback function with callback prototype **DtSpsProgressFunc** that will be executed by the asynchronous spectrum scan.

pOpaque

An optional pointer to a user object that is returned in the callback function.

ScanType

The statistic RF level type to use for the scan. This can be any of the following values:

DTAPI_STAT_RFLVL_NARROW, **DTAPI_STAT_RFLVL_NARROW_QS**, **DTAPI_STAT_RFLVL_CHAN**
or **DTAPI_STAT_RFLVL_CHAN**.

FreqHzSteps

This optional argument specifies the step size of the spectrum scan in Hertz.

StartFreqHz

This optional argument specifies the starting frequency of the spectrum scan in Hertz.

EndFreqHz

This optional argument specifies the ending frequency of the spectrum scan in Hertz.

Result

| DTAPI_RESULT | Meaning |
|------------------------------|--|
| DTAPI_OK | The spectrum scan succeeded successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The spectrum scan is not supported by the attached hardware |
| DTAPI_E_INVALID_FREQ | The range of frequencies specified with <i>FreqHzSteps</i> , <i>StartFreqHz</i> and <i>EndFreqHz</i> is incompatible (too low or too high) with the tuner on the attached hardware |

Remarks

This function requires exclusive access (**AttachToPort** was called with *Exclusive=true*).

The **SpectrumScan** method is currently only supported by the DTU-236A and the DTU-238.

DtInpChannel::Tune

Tunes the demodulator to a frequency using the specified demodulation parameters. This function basically combines the functionality of the **SetDemodControl** and **SetTunerFrequency** methods.

```
DTAPI_RESULT DtInpChannel::Tune (
    [in] __int64& FreqHz           // Frequency in hertz
    [in] int ModType,              // Modulation type
    [in] int ParXtra0,             // Extra parameter #0
    [in] int ParXtra1,             // Extra parameter #1
    [in] int ParXtra2             // Extra parameter #2
);

DTAPI_RESULT DtInpChannel::Tune (
    [in] __int64& FreqHz           // Frequency in hertz
    [in] DtDemodPars* pDemodPars   // Demodulation parameters
);
```

Function Arguments

FreqHz

Desired tuning frequency (in Hz). See **SetTunerFrequency** for the allowed values.

ModType, ParXtra0, ParXtra1, ParXtra2

'Old style' demodulation parameters to use while tuning. Refer to **SetDemodControl** for more details about these parameters.

pDemodPars

'New style' demodulation parameters to use while tuning. Refer to **SetDemodControl** for more details about these parameters.

Result

| DTAPI_RESULT | Meaning |
|---|--|
| DTAPI_OK | The tuner frequency has been set successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_BANDWIDTH | Invalid value for bandwidth field |
| DTAPI_E_INVALID_CONSTEL | Invalid value for constellation field |
| DTAPI_E_INVALID_FHMODE | Invalid value for frame-header mode field |
| DTAPI_E_INVALID_FREQ | The specified frequency is incompatible (too low or too high) with the tuner |
| DTAPI_E_INVALID_GUARD | Invalid value for guard-interval field |
| DTAPI_E_INVALID_INTERLVNG | Invalid value for interleaving field |
| DTAPI_E_INVALID_J83ANNEX DTAPI_E_INVALID_ROLLOFF | Invalid value for J.83 annex |
| DTAPI_E_INVALID_MODE | Modulation type is incompatible with demodulator |
| DTAPI_E_INVALID_MODPARS | Invalid demodulation parameters |
| DTAPI_E_INVALID_PILOTS | Pilots cannot be specified in C=1 mode |

| | |
|-----------------------------------|---|
| DTAPI_E_INVALID_RATE | Invalid value for convolutional rate or FEC code rate |
| DTAPI_E_INVALID_SYMRATE | Invalid value for symbol rate |
| DTAPI_E_INVALID_T2PROFILE | Invalid value for DVB-T2 profile |
| DTAPI_E_INVALID_TRANSMODE | Invalid value for transmission-mode field |
| DTAPI_E_INVALID_USEFRAMENO | Invalid value for use-frame-numbering field |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not include a tuner |

DtOutpChannel

DtOutpChannel

Class representing an output channel for transmitting the following formats:

- MPEG-2 transport stream over ASI, SPI or IP
- Serial Digital Interface (SDI)

```
class DtOutpChannel;
```

DtOutpChannel::AttachToPort

Attach the output-channel object to a specific physical port.

```
DTAPI_RESULT DtOutpChannel::AttachToPort (
    [in] DtDevice*  pDtDvc,           // Device object
    [in] int  Port,           // Physical port number (1...#ports)
    [in] bool  ProbeOnly=false      // Just check whether channel is in use
);
```

Function Arguments

pDtDvc

Pointer to the device object that represents a DekTec device. The device object must have been attached to the device hardware.

Port

Physical port number. The channel object is attached to this port. The port number of the top-most port is 1, except on the DTA-160 and DTA-2160, on which the top-most Ethernet port is port #4.

ProbeOnly

Probe whether the channel is in use, but do not actually attach.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Channel object has been attached successfully to the port |
| DTAPI_OK_FAILSAFE | Channel object has been attached successfully to the hardware function. The application shall call the SetFailsafeAlive method on a regular basis to prevent the release of the failsafe relay, which will physically connect the input port to the output port. This is not an error code; It is intended to make the application aware of failsafe mode. |
| DTAPI_E_ATTACHED | Channel object is already attached |
| DTAPI_E_DEVICE | Pointer <i>pDtDvc</i> is not valid or the device object is not attached to a hardware device |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_IN_USE | Another channel object is already attached to this port |
| DTAPI_E_NO_DT_OUTPUT | <i>Port</i> is not an output |
| DTAPI_E_NO_SUCH_PORT | Invalid port number for this device |
| DTAPI_E_OUT_OF_MEM | TS-over-IP: Receive FIFO cannot be allocated |

Remarks

DtOutpChannel::ClearFifo

Clear contents of the transmit FIFO and set transmit control to **IDLE**. Clears the output channel's status flags: transmit-FIFO-underflow flag (**DTAPI_TX_FIFO_UFL**) and transmit-synchronisation-error flag (**DTAPI_TX_SYNC_ERR**).

```
DTAPI_RESULT DtOutpChannel::ClearFifo(  
    void  
);
```

Function Arguments

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Transmit FIFO has been cleared |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

The effects of **ClearFifo** are equivalent to **Reset (DTAPI_FIFO_RESET)**.

DtOutpChannel::ClearFlags

Clear *latched* status flag(s).

```
DTAPI_RESULT DtOutpChannel::ClearFlags(
    [int] int    Latched           // Latched status flags to be cleared
);
```

Function Arguments

Latched

Latched status flag(s) to be cleared. Multiple flags can be cleared with one function call by OR-ing the bit positions to be cleared. The following flags are latched and can be cleared:

| Value | Meaning |
|-----------------------|---------------------|
| DTAPI_TX_CPU_UFL | See GetFlags |
| DTAPI_TX_DMA_UFL | " " |
| DTAPI_TX_FIFO_UFL | " " |
| DTAPI_TX_READBACK_ERR | " " |
| DTAPI_TX_SYNC_ERR | " " |
| DTAPI_TX_TARGET_ERR | " " |
| DTAPI_TX_LINK_ERR | " " |
| DTAPI_TX_DATA_ERR | " " |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Flag(s) have been successfully cleared |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

Some status flags that are queried with **GetFlags** are not latched and therefore cannot be cleared.

The latched status flags are also automatically reset after attaching and after **Reset**. A call to **ClearFifo** clears **DTAPI_TX_FIFO_UFL** and **DTAPI_TX_SYNC_ERR**.

DtOutpChannel::Detach

Detach output channel object from a hardware function. Frees resources allocated for the output channel.

```
DTAPI_RESULT DtOutpChannel::Detach(  
    [in] int DetachMode        // How to detach  
);
```

Function Arguments

DetachMode

Specifies how the channel object should detach from the hardware function. If *DetachMode* is 0, the object is detached without further action. A number of flags listed below are defined to detach from the hardware function in a specific way. The flags can be OR-ed together to their combine behaviour, with some exceptions as listed in the table.

| Value | Meaning |
|-----------------------|---|
| DTAPI_INSTANT_DETACH | Clear the contents of the transmit FIFO and detach without waiting until pending data in the FIFO has been transmitted. This flag may not be combined with DTAPI_WAIT_UNTIL_SENT . |
| DTAPI_WAIT_UNTIL_SENT | Sleep until all pending data in the transmit FIFO has been transmitted. If this flag is combined with other flags, the wait is executed before the action associated with the other flags. This flag may not be combined with DTAPI_INSTANT_DETACH . |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Channel object has been detached successfully from the hardware function |
| DTAPI_E_INVALID_FLAGS | An invalid combination of detach flags was specified |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function, so it cannot be detached |

Remarks

For ASI channels, if packet stuffing is turned on, the output channel keeps transmitting null packets after detaching.

Detach may take a long time if **DTAPI_WAIT_UNTIL_SENT** is specified while the FIFO still contains data and transmit control is **IDLE**.

DtOutpChannel::GetAttribute

Get the value of an attribute for the port to which this channel is attached.

```
DTAPI_RESULT DtOutpChannel::GetAttribute(  
    [in] int&  AttrId,           // Attribute identifier  
    [out] int& AttrValue        // Returned attribute value  
);
```

Function Arguments

AttrId

Identifies the attribute that is to be retrieved. Please refer to `DtDevice::GetAttribute` for a list of attributes that can be retrieved.

AttrValue

Output argument that receives the attribute value.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The attribute value has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The attribute is not supported for this port |

Remarks

DtOutpChannel::GetDescriptor

Get hardware function descriptor for this output channel.

```
DTAPI_RESULT DtOutpChannel::GetDescriptor(  
    [out] DtHwFuncDesc&  HwFuncDesc  // Hardware function descriptor  
);
```

Function Arguments

HwFuncDesc

Output argument that receives the hardware function descriptor.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | The hardware function descriptor been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::GetExtClkFreq

Get an estimate of the frequency of the external clock (DTA-102 and DTA-2142 only).

```
DTAPI_RESULT DtOutpChannel::GetExtClkFreq(  
    [out] int& ExtClkFreq    // Measurement of external-clock frequency  
);
```

Function Arguments

ExtClkFreq

Output argument that is set to a measurement of the frequency of the signal applied to the external-clock input. For an accurate estimate, the external clock signal must be present and stable for at least one second.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | External-clock frequency has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

The frequency returned is a *byte* rate that must be multiplied by 8 or $8 \cdot 204/188$ to obtain the corresponding transport-stream bitrate.

DtOutpChannel::GetFailsafeAlive

Get current status of the watchdog that controls the failsafe relay.

```
DTAPI_RESULT DtOutpChannel::GetFailsafeAlive(
[out] bool&  Alive           // Are we alive and kicking?
);
```

Function Arguments

Alive

Indicates the current status of the watchdog.

If *Alive* is true, all is fine and the board is operating as normal. The failsafe timeout has not expired and the relay is in normal operational mode: the input port is connected to the input channel and the output channel is connected to the output port.

If *Alive* is false, the watchdog timer has expired before **SetFailsafeAlive** was called. The input-to-output relay is switched to failsafe mode: the input port is connected directly to the output port.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The watchdog status has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_CONFIG | The channel is not configured to operate in failsafe mode |
| DTAPI_E_NOT_SUPPORTED | The channel is not capable of operating in failsafe mode |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::GetFailsafeConfig

Get configuration info about failsafe mode.

```
DTAPI_RESULT DtOutpChannel::GetFailsafeConfig(
    [out] bool& Enable,           // Failsafe enabled yes/no
    [out] int& Timeout           // Watchdog timeout (in ms)
);
```

Function Arguments

Enable

Operation in failsafe mode has been enabled or disabled (see also **SetFailsafeConfig**).

Timeout

Current watchdog timeout period (in ms).

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Failsafe configuration has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_CONFIG | The channel is not configured to operate in failsafe mode |
| DTAPI_E_NOT_SUPPORTED | The channel is not capable of operating in failsafe mode |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::GetFifoLoad

Get the current load of the channel's transmit FIFO.

```
DTAPI_RESULT DtOutpChannel::GetFifoLoad(
    [out] int& FifoLoad        // Load of transmit FIFO in number of bytes
    [in] int  SubChan=0        // Sub-channel
);
```

Function Arguments

FifoLoad

This output argument is set to the number of bytes in the transmit FIFO.

SubChan

Sub-channel selection, used for multi-channel modulation see
`DtOutpChannel::SetMultiModConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | The FIFO load has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

If transmit control is **SEND**, then the value retrieved with `GetFifoLoad` may not be exact: it approximates the load of the transmit FIFO.

If a DMA transfer is in progress and/or the transmit control is **SEND**, then every call to `GetFifoLoad` may return a different value.

DtOutpChannel::GetFifoSize

Get the current size of the channel's transmit FIFO (**GetFifoSize**), or the maximum size supported by the channel (**GetFifoSizeMax**), or a typical size of the transmit FIFO that generally should work well (**GetFifoSizeTyp**).

```
DTAPI_RESULT DtOutpChannel::GetFifoSize(  
    [out] int& FifoSize          // Size of transmit FIFO in bytes  
);  
DTAPI_RESULT DtOutpChannel::GetFifoSizeMax(  
    [out] int& FifoSize          // Maximum size of transmit FIFO in bytes  
);  
DTAPI_RESULT DtOutpChannel::GetFifoSizeTyp(  
    [out] int& FifoSize          // Typical size of transmit FIFO in bytes  
);  
DTAPI_RESULT DtOutpChannel::GetMaxFifoSize(  
    [out] int& FifoSize          // Maximum size of transmit FIFO in bytes  
);
```

Function Arguments

FifoSize

Current, maximum or typical size of the transmit FIFO in number of bytes.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | The requested FIFO size has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

The actual size of the transmit FIFO is adjustable with **SetFifoSize**.

DekTec hardware devices have a transmit FIFO that has a size of at least 8Mbytes.

For modulators **GetFifoSizeMax** returns the size of the hardware FIFO.

DtOutpChannel::GetFlags

Get current and latched value of the output channel's status flags.

```
DTAPI_RESULT DtOutpChannel::GetFlags (
    [out] int& Status,           // Status flags
    [out] int& Latched          // Latched status flags
);
```

Function Arguments

Status

Output argument that receives the current status of the output channel. Each status flag is represented by one bit. Multiple status flags can be set at the same time. If none of the status flags is asserted, *Status* is set to zero.

| Value | Meaning |
|-----------------------|---|
| DTAPI_TX_CPU_UFL | Modulation error caused by low CPU performance |
| DTAPI_TX_DMA_UFL | Modulation error caused by low DMA performance |
| DTAPI_TX_FIFO_UFL | A transmit-FIFO underflow condition has occurred. Underflow detection is available in all transmit modes, including modes with null-packet stuffing switched on. |
| DTAPI_TX_MUX_OVF | Overflow in hierarchical multiplexing for ISDB-T |
| DTAPI_TX_READBACK_ERR | An output pin is forced to an erroneous signal level, e.g. because of a short-circuit (DTA-102 only) |
| DTAPI_TX_SYNC_ERR | Transmit-FIFO synchronisation error. The size of one or more packets mode does not match the transmit mode. This status flag is not used in transmit mode DTAPI_TXMODE_RAW . |
| DTAPI_TX_TARGET_ERR | The target adapter signals a fault (DTA-102 only) |
| DTAPI_RX_LINK_ERR | Communication link with the device is broken (DTE-31xx only) |
| DTAPI_RX_DATA_ERR | Data is lost during transfer to the device (DTE-31xx only) |

Latched

Output argument that *latches* the value of the status flags: If a status flag has become '1', even for a very short moment, the corresponding bit in *Latched* is set to '1'. The bit remains set until it is cleared explicitly by **ClearFlag**, or cleared implicitly by one of the following DTAPI-calls: **ClearFifo**, **AttachToPort** or **Reset**.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Status flags have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::GetIoConfig

Get the I/O configuration of the physical port attached to the output channel. This is the same function as `DtDevice::GetIoConfig` applied to the physical port corresponding to this channel.

```
DTAPI_RESULT DtOutpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value          // I/O configuration value  
);  
  
DTAPI_RESULT DtOutpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue       // I/O configuration subvalue  
);  
  
DTAPI_RESULT DtOutpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue,      // I/O configuration subvalue  
    [out] __int64& ParXtra0   // Extra parameter #0  
);  
  
DTAPI_RESULT DtOutpChannel::GetIoConfig(  
    [in] int Group,           // I/O configuration group  
    [out] int& Value,         // I/O configuration value  
    [out] int& SubValue,      // I/O configuration subvalue  
    [out] __int64& ParXtra0,  // Extra parameter #0  
    [out] __int64& ParXtra1   // Extra parameter #1  
);
```

Function Arguments

Group, Value, SubValue, ParXtra0, ParXtra1

I/O configuration parameters, see `DtDevice::GetIoConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | I/O configuration has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| Other result codes | See <code>DtDevice::GetIoConfig</code> |

DtOutpChannel::GetIpPars

Get IP-related parameters for this channel, as programmed with **SetIpPars**.

```
DTAPI_RESULT DtOutpChannel::GetIpPars (  
    [in] DtIpPars*  pIpPars          // Receives the TS-over-IP parameters  
);
```

Function Arguments

pIpPars

Receives the TS-over-IP parameters. The user must have allocated the **DtIpPars** structure.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The TS-over-IP parameters have been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Channel is not a TS-over-IP channel |

Remarks

DtOutpChannel::GetModControl

For modulators: get current modulation-control parameters.

```
DTAPI_RESULT DtOutpChannel::GetModControl (
    [out] int&  ModType,           // Modulation type
    [out] int&  ParXtra0,         // Extra parameter #0
    [out] int&  ParXtra1,         // Extra parameter #1
    [out] int&  ParXtra2,         // Extra parameter #2
    [out] void*& pXtraPars       // More extra parameters
);
```

Function Arguments

ModType

Output argument that receives the modulation type. See **SetModControl1** for a list of applicable values.

ParXtra0, ParXtra1, ParXtra2

Extra modulation parameters. See **SetModControl1** for a list of applicable values.

pXtraPars

Extra parameters that are stored in a struct (they do not fit in *ParXtra0 ... ParXtra2*). Extra parameters are used for the following modulation types CMMB, ISDB-S, ISDB-T, DVB-C2 and DVB-T2.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The modulation parameters have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The output channel is not a modulator |

Remarks

DtOutpChannel::GetOutputLevel

Get current level (in dBm) for outputs with an adjustable output level.

```
DTAPI_RESULT DtOutpChannel::GetOutputLevel(  
    [out] int& LeveldBm)    // Current level in units of 0.1dBm  
);
```

Function Arguments

LeveldBm

Output level expressed in units of 0.1 dBm (e.g. -30 → -30×0.1 = -3dBm).

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The output level has been retrieved successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not support a adjustable output level |

Remarks

DtOutpChannel::GetRfControl

Get upconverter parameters for devices with on-board RF upconverter.

```
DTAPI_RESULT DtOutpChannel::GetRfControl (
    [in] __int64& RfRate,      // RF frequency in Hz
    [out] int& LockStatus      // Lock status of RF PLL
);
```

Function Arguments

RfRate

Output arguments that is set to the current carrier frequency as programmed into the RF upconverter, expressed in Hertz.

The RF frequency returned in *RfRate* may be different from the frequency programmed with **SetRfControl** because of rounding to the RF step size.

LockStatus

Output argument that is an OR of the following flags. In the normal operational state all RF PLLs are in lock. The DTA-111, DTA-112 and DTA-115 have three PLLs, the other cards have a single PLL. If *LockStatus* is zero, none of the PLLs is in lock.

| Value | Meaning |
|-------------------|--|
| DTAPI_RFPLL_LOCK1 | The first RF PLL is in lock. |
| DTAPI_RFPLL_LOCK2 | The second RF PLL is in lock (DTA-111/112/115) |
| DTAPI_RFPLL_LOCK3 | The third RF PLL is in lock (DTA-111/112/115) |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The upconverter parameters have been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not have an RF upconverter |

Remarks

DtOutpChannel::GetSpiClk

DTA-2142 only. Get the DVB-SPI clock frequency in case the SPI channel is operating with a fixed clock (I/O configurations **SPIFIXEDCLK**, **SPISER8B**, **SPISER10B**).

```
DTAPI_RESULT DtOutpChannel::GetSpiClk(
    [in] Int& SpiClk           // Fixed SPI clock
);
```

Function Arguments

SpiClk

Receives the frequency of the fixed DVB-SPI clock in Hertz.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The TS-over-IP parameters have been applied successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_INVALID_MODE | The SPI clock is not fixed (SPI mode is SPIDVBMODE) |
| DTAPI_E_NOT_SUPPORTED | Not a DVB-SPI channel |

Remarks

DtOutpChannel::GetTargetId

Get the target-adapter identifier (DTA-102 only).

```
DTAPI_RESULT DtOutpChannel::GetTargetId(
    [out] int& Present,          // Target adapter present?
    [out] int& TargetId         // Target-adapter identifier
);
```

Function Arguments

Present

Output argument that indicates whether a target adapter has been detected.

| Value | Meaning |
|----------------------|--|
| DTAPI_NO_CONNECTION | Nothing is connected to the output connector of the DTA-102 |
| DTAPI_DVB_SPI_SINK | A standard DVB-SPI sink is connected to the DTA-102 |
| DTAPI_TARGET_PRESENT | A target adapter is present |
| DTAPI_TARGET_UNKNOWN | The system is busy assessing the situation on the output connector |

TargetId

Output argument that is set to an integer value that uniquely identifies the target adapter. Please refer to the DTA-102 data sheet for a list of available target adapters.

A value is assigned to *TargetId* only if *Present* is **DTAPI_TARGET_PRESENT**.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Target-adapter identifier has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The output channel does not support target adapters |

Remarks

DtOutpChannel::GetTsRateBps

Get the current transport-stream rate.

```
DTAPI_RESULT DtOutpChannel::GetTsRateBps (
    [out] int&   TsRate           // transport-stream rate in bps
);

DTAPI_RESULT DtOutpChannel::GetTsRateBps (
    [out] DtFractionInt&   TsRate // transport-stream rate in bps
);
```

Function Arguments

TsRate

Output argument that is set to the current transport-stream rate expressed in bits per second. If an external clock is used, or the bitrate is locked to an input, then result code **DTAPI_E_INVALID_TSRATESEL** is returned.

Result

| DTAPI_RESULT | Meaning |
|---------------------------|---|
| DTAPI_OK | transport-stream rate has been read successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_TSRATESEL | The current TS-rate selection I/O configuration does not allow retrieval of the transport-stream rate |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

For a discussion of transport-stream rate vs. transmit-clock rate, refer to **SetTsRateBps**.

DtOutpChannel::GetTxControl

Get the current value of transmit control.

```
DTAPI_RESULT DtOutpChannel::GetTxControl(  
    [out] int& TxControl    // Transmit control  
);
```

Function Arguments

TxControl

Refer to **SetTxControl** for a description of the different values for transmit control.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Transmit-control state has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::GetTxMode

Get the current transmit mode and null-packet stuffing mode.

```
DTAPI_RESULT DtOutpChannel::GetTxMode(  
    [out] int& TxMode,           // Transmit mode  
    [out] int& StuffMode        // Null-packet stuffing on/off  
);
```

Function Arguments

TxMode, StuffMode

Refer to **SetTxMode** for a description of transmit-control modes.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Transmit mode has been retrieved successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::LedControl

Take direct control of the channel's status LED, or let the hardware drive the LED.

```
DTAPI_RESULT DtOutpChannel::LedControl (
    [in] int    LedControl          // DTAPI_LED_XXX
);
```

Function Arguments

LedControl

Value that controls the status of the LED.

| Value | Meaning |
|--------------------|--|
| DTAPI_LED_HARDWARE | Hardware drives the LED (default after power up) |
| DTAPI_LED_OFF | LED is forced to off-state |
| DTAPI_LED_GREEN | LED is forced to green-state |
| DTAPI_LED_RED | LED is forced to red-state |
| DTAPI_LED_YELLOW | LED is forced to yellow-state |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | LED setting has been accepted |
| DTAPI_E_INVALID_MODE | The specified LED-control value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not have a general-status LED |

Remarks

DtOutpChannel::Reset

Reset the output channel.

```
DTAPI_RESULT DtOutpChannel::Reset(
    [in] int ResetMode          // DTAPI_FIFO_RESET or DTAPI_FULL_RESET
);
```

Function Arguments

ResetMode

Specifies which part of the hardware and software should be reset. The following values are defined (values cannot be OR-ed together):

| Value | Meaning |
|------------------|--|
| DTAPI_FIFO_RESET | Reset the transmit FIFO: <ul style="list-style-type: none"> • Data transfers and packet transmission are halted instantaneously. • All data pending in the transmit FIFO is discarded. • Transmit-control state is reset to DTAPI_TXCTRL_IDLE. • Transmit-FIFO underflow flag is cleared. |
| DTAPI_FULL_RESET | Full reset: <ul style="list-style-type: none"> • All actions for DTAPI_FIFO_RESET, plus: • transport-stream rate is reset to zero (except for ISDB-T and OFDM modulation on DTA-110T) |

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | Output channel has been reset |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_MODE | The specified value for <i>ResetMode</i> is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

A potential side-effect of calling **Reset** is that the packet currently being transmitted is truncated. For one packet, the number of bytes between two consecutive SYNC bytes is less than the packet size. To avoid such a truncation, **ClearFifo** may be used.

DtOutpChannel::SetChannelModelling

Set channel-modelling parameters. This function may only be called while transmit control is **IDLE**.

```
DTAPI_RESULT DtOutpChannel::SetChannelModelling(
    [in] Bool    CmEnable,           // Enable/disable channel modelling
    [in] DtCmPars& CmPars          // Channel modelling parameters
);
```

Function Arguments

CmEnable

Enable channel modelling. This parameter provides an easy way to turn off channel modelling entirely.

CmPars

Channel-modelling parameters. See description of struct **DtCmPars**.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Channel-modelling parameters have been applied successfully |
| DTAPI_E_CM_NUMPATHS | The number of paths specified in CmPars exceeds the maximum number of supported paths |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel has no license for channel-modelling, or channel modelling is not supported for this type of channel |

Remarks

DtOutpChannel::SetCustomRollOff

DTA-2107 only. Set the FIR-filter coefficients of the root-raised-cosine (RRC) channel filter to construct a custom roll-off factor. The user has to compute the filter coefficients himself.

```
DTAPI_RESULT DtOutpChannel::SetCustomRollOff(
    [in] Bool Enable,           // Enable/disable custom roll-off filter
    [in] DtFilterPars& Filter  // Custom roll-off filter parameters
);
```

Function Arguments

Enable

Enable or disable the channel filter with custom roll-off factor.

Filter

Filter coefficients to be programmed in the hardware.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Channel-modelling parameters have been applied successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The output channel does not support a custom roll-off filter |

Remarks

The filter does not necessarily need to be an RRC filter. Any set of filter coefficients can be programmed.

DtOutpChannel::SetFailsafeAlive

Reset the watchdog timer for operation in failsafe mode. Failing to call this method within the time-out set with **SetFailsafeConfig()** will result in the release of the on-board relay so that the output port is connected directly with the input port.

```
DTAPI_RESULT DtOutpChannel::SetFailsafeAlive();
```

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Watchdog has been triggered successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_CONFIG | The channel is not configured to operate in failsafe mode |
| DTAPI_E_NOT_SUPPORTED | The channel is not capable of operating in failsafe mode |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::SetFailsafeConfig

Configure failsafe mode.

```
DTAPI_RESULT DtOutpChannel::SetFailsafeConfig(
    [in] bool Enable,           // Enable/disable failsafe mode
    [in] int Timeout=0         // Watchdog timeout (in ms)
);
```

Function Arguments

Enable

Enable/disable the failsafe mode and switch to input or failsafe output.

If *Enable* is false, the output channel is connected directly to the input channel.

If *Enable* is true, the output channel will start operating in failsafe mode. The output becomes a failsafe output and the watchdog timer is started. The user application shall call **SetFailsafeAlive** repeatedly within the watchdog timeout period. If the user application is too late (e.g. because it has crashed), the watchdog times out and the failsafe relay is released so that the output is connected directly to the input.

Timeout

Specifies the watchdog timeout period in ms.

The timeout value can only be a multiple of 20ms. If the value is not a multiple of 20ms, it will be rounded downwards to the closest multiple of 20ms. Setting *Timeout* to zero indicates the parameter should be ignored (i.e. only the *Enable* parameter has a meaning)

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Output channel has been reset |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_CONFIG | The channel is not configured to operate in failsafe mode |
| DTAPI_E_NOT_SUPPORTED | The channel is not capable of operating in failsafe mode |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

DtOutpChannel::SetFifoSize

Set the size the transmit FIFO to a specified value (**SetFifoSize**), or to the maximum value supported by the channel (**SetFifoSizeMax**), or to a typical value (**SetFifoSizeTyp**).

The FIFO size can only be changed if transmit control is **IDLE**.

```
DTAPI_RESULT DtOutpChannel::SetFifoSize(
    [in] int    FifoSize          // Size of transmit FIFO in bytes
);
DTAPI_RESULT DtOutpChannel::SetFifoSizeMax(void);
DTAPI_RESULT DtOutpChannel::SetFifoSizeTyp(void);
```

Function Arguments

FifoSize

Requested size of the transmit FIFO in number of bytes.

FifoSize must be a multiple of 16 and may not exceed the maximum physical size of the transmit FIFO.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | The size of the transmit FIFO has been set successfully |
| DTAPI_E_IN_USE | The FIFO size cannot be changed because transmission-control state is DTAPI_TXCTRL_HOLD or DTAPI_TXCTRL_SEND |
| DTAPI_E_INVALID_SIZE | The specified FIFO size is negative, zero, not a multiple of 16 or greater than the maximum size |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

The size of the Transmit FIFO determines the amount of packet data that is buffered on the device. It also determines the delay between transferring data to the device (with **Write**) and transmission of that data.

DtOutpChannel::SetIoConfig

Set the I/O configuration of the physical port attached to the output channel. This is the same function as `DtDevice::SetIoConfig` applied to the physical port corresponding to this channel.

```
DTAPI_RESULT DtOutpChannel::SetIoConfig(
    [in] int    Group,           // I/O configuration group
    [in] int    Value,          // I/O configuration value
    [in] int    SubValue=-1,    // I/O configuration subvalue
    [in] __int64 ParXtra0=-1,    // Extra parameter #0
    [in] __int64 ParXtra1=-1    // Extra parameter #1
);
```

Function Arguments

Group, Value, SubValue, ParXtra0, ParXtra1

I/O configuration parameters, see `DtDevice::SetIoConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|---|
| DTAPI_OK | I/O configuration has been set successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| Other result codes | See <code>DtDevice::SetIoConfig</code> |

DtOutpChannel::SetIpPars

Set IP-related parameters for the transmission of a TS-over-IP stream. The IP parameters can only be set if transmit control is **IDLE**.

```
DTAPI_RESULT DtOutpChannel::SetIpPars(  
    [in] DtIpPars*  pIpPars          // TS-over-IP parameters  
);
```

Function Arguments

pIpPars

New parameter set to be applied. Please refer to the **DtIpPars** page for a description of the parameters.

Result

| DTAPI_RESULT | Meaning |
|----------------------------|---|
| DTAPI_OK | The TS-over-IP parameters have been applied successfully |
| DTAPI_E_DST_MAC_ADDR | The IP parameters cannot be applied because MAC address of destination cannot be determined. Most likely the destination address currently is invalid. Check if you can reach the destination IP address using the ping command on the console. |
| DTAPI_E_IN_USE | The parameters cannot be changed because the channel is busy. Transmit control shall be switched back to IDLE first |
| DTAPI_E_INVALID_ARG | The value of one of the TS-over-IP parameters is invalid |
| DTAPI_E_INVALID_FECMODE | The m_FecMode parameter is invalid. |
| DTAPI_E_INVALID_FEC_MATRIX | The m_FecNumCols / m_FecNumRows are invalid |
| DTAPI_E_INVALID_FLAGS | The m_Flags parameter is invalid |
| DTAPI_E_INVALID_MODE | The m_Mode parameter is invalid |
| DTAPI_E_INVALID_PROFILE | The m_Profile in the m_IpProfile member is invalid. |
| DTAPI_E_INVALID_PROTOCOL | The m_Protocol parameter is invalid or not valid for the current m_FecMode or m_VideoStandard |
| DTAPI_E_INVALID_VIDEOSTD | The m_VideoStandard in the m_IpProfile member is invalid. |
| DTAPI_E_IPV6_NOT_SUPPORTED | IPv6 is not supported on this operating system |
| DTAPI_E_NO_ADAPTER_IP_ADDR | The network IP address could not be retrieved. Check the network driver IP protocol settings |
| DTAPI_E_NO_LINK | The IP parameters cannot be applied because the link is down. Check network cable and speed settings |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Channel is not a TS-over-IP channel |
| DTAPI_E_NW_DRIVER | The IP address could not be retrieved from the network driver. Check network driver / network connection. |
| DTAPI_E_NWAP_DRIVER | An error occurred using the Advanced Protocol Driver. |
| DTAPI_E_VLAN_NOT_FOUND | The VLAN with the given ID is not found |

Remarks

SetIpPars should be called before transmit control is set to **HOLD** or **SEND**.

After the initial call to **SetIpPars**, parameters can be changed again, but only when transmit control is **IDLE**.

DtOutpChannel::SetModControl

Set modulation-control parameters for modulator channels. There are eight overloads, six for specific modulation types (CMMB, DVB-C2, DVB-T2, ISDB-S, ISDB-T and IQ-direct), one for the other modulation types and one for setting the DVB channel identification for satellite signals.

The ISDB-T overload can be used to let DTAPI perform hierarchical multiplexing. For ISDB-T without hierarchical multiplexing the first overload of **SetModControl** can be used. In that case the input of the modulator shall already be multiplexed and consist of 204-byte TMCC encoded packets.

If **SetFifoSizeType** has been called, **SetModControl** may change the size of the transmit FIFO to an appropriate value for the selected modulation type.

```
// Overload #1 - To be used for all modulation modes except CMMB, DVB-CID,
//               DVB-C2, DVB-T2, ISDB-S and ISDB-T with hierarchical
//               multiplexing
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] int    ModType,                // Modulation type: DTAPI_MOD_XXX
    [in] int    ParXtra0,               // Extra parameter #0
    [in] int    ParXtra1,               // Extra parameter #1
    [in] int    ParXtra2               // Extra parameter #2
);
// Overload #2 - To be used for CMMB
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtCmmBParams& CmmBParams      // CMMB modulation parameters
);
// Overload #3 - To be used for DVB-C2
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtDvbC2Params& DvbC2Params    // DVB-C2 modulation parameters
);
// Overload #4 - To be used for DVB-CID
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtDvbCidParams& DvbCidParams  // DVB channel identification parameters
);
// Overload #5 - To be used for DVB-T2
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtDvbT2Params& DvbT2Params    // DVB-T2 modulation parameters
);
// Overload #6 - To be used for ISDB-S with hierarchical multiplexing
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtIsdbsParams& IsdbsParams    // ISDB-S modulation parameters
);
// Overload #7 - To be used for ISDB-T with hierarchical multiplexing
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtIsdbtParams& IsdbtParams    // ISDB-T modulation parameters
                                        // for hierarchical multiplexing
);
// Overload #8 - To be used for IQ-direct
DTAPI_RESULT DtOutpChannel::SetModControl (
    [in] DtIqDirectParams& IqDirectParams // IQ-direct modulation parameters
);
```

Function Arguments

ModType, ParXtra0, ParXtra1, ParXtra2

Modulation parameters. See the tables on the following pages for a detailed specification of each parameter, per DekTec board type and firmware version.

CmmbPars

CMMB modulation parameters; see description of `class DtCmmbPars`.

DvbC2Pars

DVB-C2 modulation parameters; see description of `class DtDvbC2Pars` in document: *DTAPI Reference – DVB-C2+T2 Multi-PLP Extensions*.

DvbCidPars

DVB channel identification for satellite (DVB-S2) signals parameters; see description of `class DtDvbCidPars`.

DvbT2Pars

DVB-T2 modulation parameters; see description of `class DtDvbT2Pars` in document: *DTAPI Reference – DVB-C2+T2 Multi-PLP Extensions*.

IsdbsPars

ISDB-S modulation parameters for hierarchical multiplexing; see description of `class DtIsdbsPars`.

Note: For ISDB-S, the current version of DTAPI supports multiplexing of a single TS only.

IsdbtPars

ISDB-T modulation parameters for hierarchical multiplexing; see description of `class DtIsdbtPars`.

IqDirectPars

IQ-direct modulation parameters; see description of `class DtIqDirectPars`.

Detailed Parameter Descriptions

| Page | Modulation Type |
|------|------------------------------|
| 345 | Overview |
| 348 | ADTB-T |
| 350 | ATSC |
| 134 | CMMB |
| 351 | DAB |
| 352 | DTMB |
| 354 | DVB-S |
| 355 | DVB-S.2 |
| 357 | DVB-S.2 L.3 base-band frames |

| Page | Modulation Type |
|----------|------------------------------|
| 358 | DVB-S.2X |
| 361 | DVB-S.2X L.3 baseband frames |
| 362 | DVB-T / DVB-H |
| 364 | IQ-DIRECT |
| 143, 366 | ISDB-S |
| 146, 367 | ISDB-T |
| 369 | QAM |
| 370 | DVB-T2 T2-MI |
| | |

The DVB-C2 and DVB-T2 parameters are described in a separate document: *DTAPI Reference – DVB-C2+T2 Multi-PLP Extensions*.

Modulation Types

ModType

Modulation type:

L-Band

| ModType | Meaning | Required Capability |
|-------------------------------|--|---------------------|
| DTAPI_MOD_DVBS_QPSK | DVB-S, QPSK | DTAPI_CAP_TX_DVBS |
| DTAPI_MOD_DVBS2_16APSK | DVB-S.2, 16-APSK | DTAPI_CAP_TX_S2APSK |
| DTAPI_MOD_DVBS2_32APSK | DVB-S.2, 32-APSK | |
| DTAPI_MOD_DVBS2_8PSK | DVB-S.2, 8-PSK | DTAPI_CAP_TX_DVBS2 |
| DTAPI_MOD_DVBS2_L3 | DVB-S.2 L.3 baseband frame modulation | |
| DTAPI_MOD_DVBS2_QPSK | DVB-S.2, QPSK | |
| DTAPI_MOD_DVBS2X_128APSK | DVB-S.2X, 128-APSK | DTAPI_CAP_TX_DVBS2X |
| DTAPI_MOD_DVBS2X_16APSK_L | DVB-S.2X, 16-APSK-L | |
| DTAPI_MOD_DVBS2X_256APSK | DVB-S.2X, 256-APSK | |
| DTAPI_MOD_DVBS2X_256APSK_L | DVB-S.2X, 256-APSK-L | |
| DTAPI_MOD_DVBS2X_32APSK_L | DVB-S.2X, 32-APSK-L | |
| DTAPI_MOD_DVBS2X_32APSK_L | DVB-S.2X, 32-APSK-L | |
| DTAPI_MOD_DVBS2X_64APSK | DVB-S.2X, 64-APSK | |
| DTAPI_MOD_DVBS2X_8APSK_L | DVB-S.2X, 8-APSK-L | |
| DTAPI_MOD_DVBS2X_BPSK_S_VLSNR | DVB-S.2X, BPSK-S very low SNR | |
| DTAPI_MOD_DVBS2X_BPSK_S_VLSNR | DVB-S.2X, BPSK-S very low SNR | |
| DTAPI_MOD_DVBS2X_BPSK_VLSNR | DVB-S.2X, BPSK very low SNR | |
| DTAPI_MOD_DVBS2X_QPSK_VLSNR | DVB-S.2X, QPSK very low SNR | |
| DTAPI_MOD_DVBS2X_32APSK_L | DVB-S.2X, 32-APSK-L | |
| DTAPI_MOD_DVBS2X_L3 | DVB-S.2X L.3 baseband frame modulation | |
| DTAPI_MOD_ISDBS | ISDB-S | DTAPI_CAP_TX_ISDBS |

VHF* / UHF

| ModType | Meaning | Required Capability |
|--------------------|--------------------------------|--|
| DTAPI_MOD_ADTBT | ADTB-T | DTAPI_CAP_TX_DTMB |
| DTAPI_MOD_ATSC | ATSC VSB | DTAPI_CAP_TX_ATSC |
| DTAPI_MOD_DAB | DAB+/DMB | DTAPI_CAP_TX_DAB |
| DTAPI_MOD_DMBTH | DMB-T/H | DTAPI_CAP_TX_DTMB |
| DTAPI_MOD_DVBT | DVB-T / DVB-H | DTAPI_CAP_TX_DVBT |
| DTAPI_MOD_IQDIRECT | Direct I/Q sample transmission | DTAPI_CAP_TX_IQ |
| DTAPI_MOD_QAM16 | 16-QAM | DTAPI_CAP_TX_QAM_A or DTAPI_CAP_TX_QAM_B or DTAPI_CAP_TX_QAM_C |
| DTAPI_MOD_QAM32 | 32-QAM | |
| DTAPI_MOD_QAM64 | 64-QAM | |
| DTAPI_MOD_QAM128 | 128-QAM | |
| DTAPI_MOD_QAM256 | 256-QAM | |
| DTAPI_MOD_T2MI | T2-MI modulation | DTAPI_CAP_TX_DVBT2 |

Modulation Mode : ADTB-T

ParXtra0

Extra modulation parameter #1 is the OR of values for the following fields: Bandwidth, Constellation, FEC Code Rate, Frame Header Mode, Interleaver Mode, Pilots and Use Frame Numbering.

Bandwidth

| Value | Meaning |
|-----------------------|----------|
| DTAPI_MOD_DTMB_5MHZ | 5 MHz |
| DTAPI_MOD_DTMB_6MHZ | 6 MHz |
| DTAPI_MOD_DTMB_7MHZ | 7 MHz |
| DTAPI_MOD_DTMB_8MHZ | 8 MHz |
| DTAPI_MOD_DTMB_BW_MSK | AND mask |

Constellation

| Value | Meaning |
|-----------------------|---|
| DTAPI_MOD_DTMB_QAM4NR | 4-QAM-NR; can only be used with FEC code rate 0.8 |
| DTAPI_MOD_DTMB_QAM4 | 4-QAM |
| DTAPI_MOD_DTMB_QAM16 | 16-QAM |
| DTAPI_MOD_DTMB_QAM32 | 32-QAM; can only be used with FEC code rate 0.8 |
| DTAPI_MOD_DTMB_QAM64 | 64-QAM |
| DTAPI_MOD_DTMB_CO_MSK | AND mask |

FEC Code Rate

| Value | Meaning |
|-------------------------|------------------------------------|
| DTAPI_MOD_DTMB_0_4 | FEC code rate 0.4: FEC(7488, 3008) |
| DTAPI_MOD_DTMB_0_6 | FEC code rate 0.6: FEC(7488, 4512) |
| DTAPI_MOD_DTMB_0_8 | FEC code rate 0.8: FEC(7488, 6016) |
| DTAPI_MOD_DTMB_RATE_MSK | AND mask |

Frame Header Mode

| Value | Meaning |
|-----------------------|--|
| DTAPI_MOD_DTMB_PN420 | PN420: Frame header 1 (420 symbols 55.6 μ s) |
| DTAPI_MOD_DTMB_PN595 | PN595: Frame header 2 (595 symbols 78.7 μ s) |
| DTAPI_MOD_DTMB_PN945 | PN945: Frame header 3 (945 symbols 125 μ s) |
| DTAPI_MOD_DTMB_PN_MSK | AND mask |

Interleaver Mode

| Value | Meaning |
|-----------------------|---------------------------------|
| DTAPI_MOD_DTMB_IL_1 | Interleaver mode 1: B=54, M=240 |
| DTAPI_MOD_DTMB_IL_2 | Interleaver mode 2: B=54, M=720 |
| DTAPI_MOD_DTMB_IL_MSK | AND mask |

Pilots

| Value | Meaning |
|--------------------------|---|
| DTAPI_MOD_DTMB_NO_PILOTS | No pilots |
| DTAPI_MOD_DTMB_PILOTS | Add pilots; Can be used in single-carrier mode only |
| DTAPI_MOD_DTMB_PIL_MSK | AND mask |

Use Frame Numbering

| Value | Meaning |
|---------------------------|---------------------|
| DTAPI_MOD_DTMB_NO_FRM_NO | No frame numbering |
| DTAPI_MOD_DTMB_USE_FRM_NO | Use frame numbering |
| DTAPI_MOD_DTMB_UFRM_MSK | AND mask |

Modulation Mode : ATSC

ModType

| ModType | Meaning | Required Capability |
|----------------|---------|---------------------|
| DTAPI_MOD_ATSC | ATSC | DTAPI_CAP_TX_ATSC |

ParXtra0

Extra modulation parameter #0 specifies the VSB constellation.

| ParXtra0 | Meaning | Symbol Rate (bd) | TS Rate (bps) |
|------------------------|---------------------------------------|------------------|---------------|
| DTAPI_MOD_ATSC_VSB8 | 8-VSB | 10,762,238 | 19,392,658 |
| DTAPI_MOD_ATSC_VSB16 | 16-VSB | 10,762,238 | 38,785,317 |
| DTAPI_MOD_ATSC_VSB_MSK | AND-mask for ATSC constellation field | | |

ParXtra1

This parameter specifies the number of taps of each phase of the root-raised cosine filter that is used to shape the spectrum of the output signal. The number of taps can have any value between 2 and 256 (the implementation is optimized for powers of 2). Specifying more taps improves the spectrum, but increases processor overhead.

The recommend number of taps is 64 taps; If insufficient CPU power is available, 32 taps produces acceptable results, too.

ParXtra2

Not used in ATSC modulation.

Modulation Mode : DAB

The DAB modulator doesn't work with transport streams but instead expects ETI(NI, G.703) streams with a constant bitrate of 2.048Mbps.

ParXtra0, ParXtra1, ParXtra2

Not used in DAB modulation.

Modulation Mode : DTMB

ParXtra0

Extra modulation parameter #1 is the OR of values for the following fields: Bandwidth, Constellation, FEC Code Rate, Frame Header Mode, Interleaver Mode and Use Frame Numbering.

Bandwidth

| Value | Meaning |
|-----------------------|----------|
| DTAPI_MOD_DTMB_5MHZ | 5 MHz |
| DTAPI_MOD_DTMB_6MHZ | 6 MHz |
| DTAPI_MOD_DTMB_7MHZ | 7 MHz |
| DTAPI_MOD_DTMB_8MHZ | 8 MHz |
| DTAPI_MOD_DTMB_BW_MSK | AND mask |

Constellation

| Value | Meaning |
|-----------------------|---|
| DTAPI_MOD_DTMB_QAM4NR | 4-QAM-NR; can only be used with FEC code rate 0.8 |
| DTAPI_MOD_DTMB_QAM4 | 4-QAM |
| DTAPI_MOD_DTMB_QAM16 | 16-QAM |
| DTAPI_MOD_DTMB_QAM32 | 32-QAM; can only be used with FEC code rate 0.8 |
| DTAPI_MOD_DTMB_QAM64 | 64-QAM |
| DTAPI_MOD_DTMB_CO_MSK | AND mask |

FEC Code Rate

| Value | Meaning |
|-------------------------|------------------------------------|
| DTAPI_MOD_DTMB_0_4 | FEC code rate 0.4: FEC(7488, 3008) |
| DTAPI_MOD_DTMB_0_6 | FEC code rate 0.6: FEC(7488, 4512) |
| DTAPI_MOD_DTMB_0_8 | FEC code rate 0.8: FEC(7488, 6016) |
| DTAPI_MOD_DTMB_RATE_MSK | AND mask |

Frame Header Mode

| Value | Meaning |
|-----------------------|--|
| DTAPI_MOD_DTMB_PN420 | PN420: Frame header 1 (420 symbols 55.6 μ s) |
| DTAPI_MOD_DTMB_PN945 | PN945: Frame header 3 (945 symbols 125 μ s) |
| DTAPI_MOD_DTMB_PN_MSK | AND mask |

Interleaver Mode

| Value | Meaning |
|-----------------------|---------------------------------|
| DTAPI_MOD_DTMB_IL_1 | Interleaver mode 1: B=54, M=240 |
| DTAPI_MOD_DTMB_IL_2 | Interleaver mode 2: B=54, M=720 |
| DTAPI_MOD_DTMB_IL_MSK | AND mask |

Use Frame Numbering

| Value | Meaning |
|---------------------------|---------------------|
| DTAPI_MOD_DTMB_NO_FRM_NO | No frame numbering |
| DTAPI_MOD_DTMB_USE_FRM_NO | Use frame numbering |
| DTAPI_MOD_DTMB_UFRM_MSK | AND mask |

Modulation Mode : DVB-S

ParXtra0

Extra modulation parameter #0

| ParXtra0 | Meaning |
|---------------|---------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |

Modulation Mode : DVB-S.2

ParXtra0

Extra modulation parameter #0 encodes the code rate.

| ParXtra0 | Meaning |
|----------------|----------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_1_3 | Code rate 1/3 |
| DTAPI_MOD_1_4 | Code rate 1/4 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_2_5 | Code rate 2/5 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_3_5 | Code rate 3/5 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_8_9 | Code rate 8/9 |
| DTAPI_MOD_9_10 | Code rate 9/10 |

ParXtra1

Extra modulation parameter #1 encodes pilots yes/no, FEC frame size, roll-off and constellation shape.

Pilots

| Value | Meaning |
|-------------------------|-------------------------|
| DTAPI_MOD_S2_NOPILOTS | Pilots disabled |
| DTAPI_MOD_S2_PILOTS | Pilots enabled |
| DTAPI_MOD_S2_PILOTS_MSK | AND-mask for this field |

Long or Short FECFRAME

| Value | Meaning |
|-----------------------|------------------------------|
| DTAPI_MOD_S2_SHORTFRM | Short FECFRAME (16.200 bits) |
| DTAPI_MOD_S2_LONGFRM | Long FECFRAME (64.800 bits) |
| DTAPI_MOD_S2_FRM_MSK | AND-mask for this field |

Roll-off

| Value | Meaning |
|------------------------|-------------------------|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_ROLLOFF_MSK | AND-mask for this field |

Constellation amplitude

| Value | Meaning |
|-------------------------|--|
| DTAPI_MOD_S2_CONST_AUTO | Default constellation amplitude |
| DTAPI_MOD_S2_CONST_E_1 | E=1; Average symbol energy is constant (only allowed for DVB-S2 16- and 32-APSK; default) |
| DTAPI_MOD_S2_CONST_R_1 | R=1; Radius of outer ring is constant (only allowed for DVB-S2 16- and 32-APSK) |
| DTAPI_MOD_S2_CONST_MSK | AND-mask for this field |

ParXtra2

Physical layer scrambling initialization sequence “n”, aka “Gold code”.

Modulation Mode : DVB-S.2 L.3 Baseband Frame

When DVB-S.2 L.3 baseband frame modulation is used **DTAPI** expects DVB-S2 baseband frames with an addition L.3 Header. See DTAPI Manual – Overview and Data Formats.pdf for more details. **DTAPI** decodes this information and performs the DVB-S2 modulation.

ParXtra0

Extra modulation parameter #0 specifies the symbol rate (in bd).

ParXtra1

Extra modulation parameter #1 encodes the roll-off.

Roll-off

| Value | Meaning |
|------------------------|-------------------------|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_ROLLOFF_MSK | AND-mask for this field |

ParXtra2

Not used.

Modulation Mode : DVB-S.2X

ParXtra0

Extra modulation parameter #0 encodes the code rate.

| ParXtra0 | Meaning |
|-----------------|------------------------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_1_3 | Code rate 1/3 |
| DTAPI_MOD_1_4 | Code rate 1/4 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_2_5 | Code rate 2/5 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_3_5 | Code rate 3/5 |
| DTAPI_MOD_4_5 | Code rate 4/5 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_6_7 | Code rate 6/7 |
| DTAPI_MOD_7_8 | Code rate 7/8 |
| DTAPI_MOD_8_9 | Code rate 8/9 |
| DTAPI_MOD_9_10 | Code rate 9/10 |
| DTAPI_MOD_9_10 | Code rate 9/10 |
| | DVB-S.2X specific code rates |
| DTAPI_MOD_1_5 | Code rate 1/5 |
| DTAPI_MOD_2_9 | Code rate 2/9 |
| DTAPI_MOD_11_45 | Code rate 11/45 |
| DTAPI_MOD_4_15 | Code rate 4/15 |
| DTAPI_MOD_13_45 | Code rate 13/45 |
| DTAPI_MOD_14_45 | Code rate 14/45 |
| DTAPI_MOD_9_20 | Code rate 9/20 |
| DTAPI_MOD_7_15 | Code rate 7/15 |
| DTAPI_MOD_8_15 | Code rate 8/15 |
| DTAPI_MOD_11_20 | Code rate 11/20 |
| DTAPI_MOD_5_9 | Code rate 5/9 |
| DTAPI_MOD_26_45 | Code rate 26/45 |
| DTAPI_MOD_28_45 | Code rate 28/45 |
| DTAPI_MOD_23_36 | Code rate 23/36 |
| DTAPI_MOD_29_45 | Code rate 29/45 |

| | |
|-----------------|-----------------|
| DTAPI_MOD_31_45 | Code rate 31/45 |
| DTAPI_MOD_25_36 | Code rate 25/36 |
| DTAPI_MOD_32_45 | Code rate 32/45 |
| DTAPI_MOD_13_18 | Code rate 13/18 |
| DTAPI_MOD_11_15 | Code rate 11/15 |
| DTAPI_MOD_7_9 | Code rate 7/9 |
| DTAPI_MOD_77_90 | Code rate 77/99 |

ParXtral

Extra modulation parameter #1 encodes pilots yes/no, FEC frame size, roll-off and constellation shape.

Pilots

| Value | Meaning |
|-------------------------|-------------------------|
| DTAPI_MOD_S2_NOPILOTS | Pilots disabled |
| DTAPI_MOD_S2_PILOTS | Pilots enabled |
| DTAPI_MOD_S2_PILOTS_MSK | AND-mask for this field |

Long, Medium or Short FECFRAME

| Value | Meaning |
|------------------------|-------------------------------|
| DTAPI_MOD_S2_SHORTFRM | Short FECFRAME (16.200 bits) |
| DTAPI_MOD_S2_MEDIUMFRM | Medium FECFRAME (32.400 bits) |
| DTAPI_MOD_S2_LONGFRM | Long FECFRAME (64.800 bits) |
| DTAPI_MOD_S2_FRM_MSK | AND-mask for this field |

Roll-off

| Value | Meaning |
|------------------------|-------------------------|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_5 | 5% roll-off |
| DTAPI_MOD_ROLLOFF_10 | 10% roll-off |
| DTAPI_MOD_ROLLOFF_15 | 15% roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_ROLLOFF_MSK | AND-mask for this field |

Constellation shape

| Value | Meaning |
|-------------------------|---|
| DTAPI_MOD_S2_CONST_AUTO | Default constellation shape |
| DTAPI_MOD_S2_CONST_E_1 | $E=1$; Average symbol energy is constant |
| DTAPI_MOD_S2_CONST_MSK | AND-mask for this field |

ParXtra2

Physical layer scrambling initialization sequence “n”, aka “Gold code”.

Modulation Mode : DVB-S.2X L.3 Baseband Frame

When DVB-S.2X L.3 baseband frame modulation is used **DTAPI** expects DVB-S2X baseband frames with an addition L.3 Header. See DTAPI Manual – Overview and Data Formats.pdf for more details. **DTAPI** decodes this information and performs the DVB-S2X modulation.

ParXtra0

Extra modulation parameter #0 specifies the symbol rate (in bd).

ParXtra1

Extra modulation parameter #1 encodes the roll-off.

Roll-off

| Value | Meaning |
|------------------------|-------------------------|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_5 | 5% roll-off |
| DTAPI_MOD_ROLLOFF_10 | 10% roll-off |
| DTAPI_MOD_ROLLOFF_15 | 15% roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_ROLLOFF_MSK | AND-mask for this field |

ParXtra2

Not used.

Modulation Mode : DVB-T/DVB-H

ParXtra0

Extra modulation parameter #0 is the code rate.

| | |
|---------------|---------------|
| DTAPI_MOD_1_2 | Code rate 1/2 |
| DTAPI_MOD_2_3 | Code rate 2/3 |
| DTAPI_MOD_3_4 | Code rate 3/4 |
| DTAPI_MOD_5_6 | Code rate 5/6 |
| DTAPI_MOD_7_8 | Code rate 7/8 |

ParXtra1

Extra modulation parameter #1 is the OR of values for the following fields: Bandwidth, Constellation, Guard Interval, Interleaving, Transmission Mode and DVB-H-Signalling.

Bandwidth

| Value | Meaning |
|-----------------------|----------|
| DTAPI_MOD_DVBT_5MHZ | 5 MHz |
| DTAPI_MOD_DVBT_6MHZ | 6 MHz |
| DTAPI_MOD_DVBT_7MHZ | 7 MHz |
| DTAPI_MOD_DVBT_8MHZ | 8 MHz |
| DTAPI_MOD_DVBT_BW_MSK | AND mask |

Constellation

| Value | Meaning |
|-----------------------|----------|
| DTAPI_MOD_DVBT_QPSK | QPSK |
| DTAPI_MOD_DVBT_QAM16 | 16-QAM |
| DTAPI_MOD_DVBT_QAM64 | 64-QAM |
| DTAPI_MOD_DVBT_CO_MSK | AND mask |

Guard Interval

| Value | Meaning |
|-----------------------|----------|
| DTAPI_MOD_DVBT_G_1_32 | 1/32 |
| DTAPI_MOD_DVBT_G_1_16 | 1/16 |
| DTAPI_MOD_DVBT_G_1_8 | 1/8 |
| DTAPI_MOD_DVBT_G_1_4 | 1/4 |
| DTAPI_MOD_DVBT_GU_MSK | AND mask |

Interleaving

| Value | Meaning |
|------------------------|-------------------------------|
| DTAPI_MOD_DVBT_INDEPTH | In-depth interleaver (2k, 4k) |
| DTAPI_MOD_DVBT_NATIVE | Native interleaver |
| DTAPI_MOD_DVBT_IL_MSK | AND mask |

Transmission Mode

| Value | Meaning |
|-----------------------|-----------------|
| DTAPI_MOD_DVBT_2K | 2k mode |
| DTAPI_MOD_DVBT_4K | 4k mode (DVB-H) |
| DTAPI_MOD_DVBT_8K | 8k mode |
| DTAPI_MOD_DVBT_MD_MSK | AND mask |

Disable DVB-H Signalling Service Indication

| Value | Meaning |
|-------------------------|--|
| DTAPI_MOD_DVBT_ENA4849 | Enable DVB-H signalling indication bits s48 and s49. <i>Note:</i> If <i>ParXtra2</i> is set to -1, s48 and s49 are disabled, too |
| DTAPI_MOD_DVBT_DIS4849 | Disable DVB-H signalling bits by setting TPS length field to 31, or 23 when <i>ParXtra2</i> is set to -1 |
| DTAPI_MOD_DVBT_4849_MSK | AND mask |

DVB-H Signalling – Service Indication s48

| Value | Meaning |
|------------------------|--|
| DTAPI_MOD_DVBT_S48_OFF | Time slicing is not used |
| DTAPI_MOD_DVBT_S48 | At least one elementary stream uses Time Slicing |
| DTAPI_MOD_DVBT_S48_MSK | AND mask |

DVB-H Signalling – Service Indication s49

| Value | Meaning |
|------------------------|---|
| DTAPI_MOD_DVBT_S49_OFF | MPE-FEC is not used |
| DTAPI_MOD_DVBT_S49 | At least one elementary stream uses MPE-FEC |
| DTAPI_MOD_DVBT_S49_MSK | AND mask |

ParXtra2

16-bit cell identifier (*cell_id*). If *ParXtra2* is set to -1, the cell identifier is disabled by setting the TPS length field to 23 (this disables the DVB-H Service Indication bits s48 and s49, too).

Modulation Mode : IQ-DIRECT

Sdfasdf

ParXtra0

Extra modulation parameter #0 specifies which interpolation method is used.

Interpolation Method

| Value | Meaning |
|-------------------------|--------------------------|
| DTAPI_MOD_INTERPOL_OFDM | Use OFDM interpolation |
| DTAPI_MOD_INTERPOL_QAM | Use QAM interpolation |
| DTAPI_MOD_INTERPOL_RAW | Raw mode (e.g. DTA-2115) |

ParXtra1

Extra modulation parameter #1 specifies the sample rate used by hardware to clock out I and Q samples.

ParXtra2

Extra modulation parameter #2 is the OR of values for the following fields: Roll-off and IQ-sample packing.

Roll-off

| Value | Meaning |
|------------------------|-------------------------|
| DTAPI_MOD_ROLLOFF_AUTO | Default roll-off |
| DTAPI_MOD_ROLLOFF_NONE | No roll-off |
| DTAPI_MOD_ROLLOFF_5 | 5% roll-off |
| DTAPI_MOD_ROLLOFF_10 | 10% roll-off |
| DTAPI_MOD_ROLLOFF_15 | 15% roll-off |
| DTAPI_MOD_ROLLOFF_20 | 20% roll-off |
| DTAPI_MOD_ROLLOFF_25 | 25% roll-off |
| DTAPI_MOD_ROLLOFF_35 | 35% roll-off |
| DTAPI_MOD_ROLLOFF_MSK | AND-mask for this field |

IQ-sample packing

Specifies the size of the IQ-sample fields which are transferred over the PCI-Express bus.

| Value | Meaning |
|-----------------------|-------------------------------|
| DTAPI_MOD_IQPKCK_AUTO | Best IQ-sample-packing |
| DTAPI_MOD_IQPKCK_NONE | No IQ-sample-packing |
| DTAPI_MOD_IQPKCK_10B | IQ-samples packed into 10 bit |
| DTAPI_MOD_IQPKCK_12B | IQ-samples packed into 12 bit |
| DTAPI_MOD_IQPKCK_MSK | AND-mask for this field |

Remarks

IQ-direct modulation parameters can also be set through `class DtIqDirectPars`.

If the modulation mode IQ-DIRECT is selected, the data written to the Transmit FIFO shall be an array of I/Q sample pairs. The samples are signed 16-bit integer in I, Q order (not dependent on IQ-sample packing).

Modulation Mode : ISDB-S

If ISDB-S modulation is selected using `SetModControl(DTAPI_MOD_ISDBS, -1, -1, -1)`, no further parameters are required and **DTAPI** expects an 188-byte transport stream with TMCC information encoded in the SYNC bytes. **DTAPI** will decode the TMCC information for obtaining the required modulation type and code rates.

Modulation Mode : ISDB-T

ParXtra0

Extra modulation parameter #0 is the OR of values for the following fields: Initial Total Number of Segments, Bandwidth, Sample Rate and Sub Channel.

Initial Total Number of Segments

| Value | Meaning |
|---------------------|-------------|
| DTAPI_ISDBT_SEGM_1 | 1 segment |
| DTAPI_ISDBT_SEGM_3 | 3 segments |
| DTAPI_ISDBT_SEGM_13 | 13 segments |

The DTAPI needs the number of segments to initialise the modulator and to compute bit rates. When in operation, the ISDB-T modulator dynamically follows the number of segments encoded in the TMCC information.

Bandwidth

| Value | Meaning |
|---------------------|----------|
| DTAPI_ISDBT_BW_5MHZ | 5 MHz |
| DTAPI_ISDBT_BW_6MHZ | 6 MHz |
| DTAPI_ISDBT_BW_7MHZ | 7 MHz |
| DTAPI_ISDBT_BW_8MHZ | 8 MHz |
| DTAPI_ISDBT_BW_MSK | AND mask |

Sample Rate

| Value | Meaning |
|-----------------------|---|
| DTAPI_ISDBT_SRATE_1_1 | Use nominal sample rate (512/63 MHz for 6MHz) |
| DTAPI_ISDBT_SRATE_1_2 | Use nominal sample rate divided by 2 (at most 6 segments) |
| DTAPI_ISDBT_SRATE_1_4 | Use nominal sample rate divided by 4 (at most 3 segments) |
| DTAPI_ISDBT_SRATE_1_8 | Use nominal sample rate divided by 8 (at most 1 segment) |
| DTAPI_ISDBT_SRATE_MSK | AND mask |

This is the sample rate used by the hardware.

Sub Channel

Sub-channel number (0 ... 41) of the centre segment of the spectrum.

WARNING: This parameter is only used for PRBS generation, not for actual frequency translation.

| Value | Meaning |
|-------------------------|---|
| DTAPI_ISDBT_SUBCH_SHIFT | Bit position of bit 0 of sub-channel number |
| DTAPI_ISDBT_SUBCH_MSK | AND mask for encoded sub-channel field |

ParXtra1, ParXtra2

Not used.

Remarks

SetModControl(DTAPI_MOD_ISDBT, int, int, int) can be used only for modulation of “TMCC-encoded” streams with 204-byte packets (last 16 bytes containing the TMCC information). The DTAPI is capable of hierarchical multiplexing too, but for using that the overload **SetModControl**(DtIsdbtPars&) has to be used.

The ISDB-T modulator does not use the Broadcast Type parameter to set the number of segments. This enables the usage of broadcast type **BTYPE_TV** for 1-segment modulation.

Modulation Mode : QAM

ModType

The QAM constellation is encoded in *ModType* according to the following table.

| ModType | Meaning | Required Capability |
|------------------|---------|--|
| DTAPI_MOD_QAM16 | 16-QAM | DTAPI_CAP_TX_QAM_A or DTAPI_CAP_TX_QAM_B or DTAPI_CAP_TX_QAM_C |
| DTAPI_MOD_QAM32 | 32-QAM | |
| DTAPI_MOD_QAM64 | 64-QAM | |
| DTAPI_MOD_QAM128 | 128-QAM | |
| DTAPI_MOD_QAM256 | 256-QAM | |

ParXtra0

Extra modulation parameter #0 is the ITU-T J.83 Annex.

| ITU-T J.83 Annex | Meaning | Required Capability |
|------------------|----------------------------------|---------------------|
| DTAPI_MOD_J83_A | J.83 annex A (DVB-C) | DTAPI_CAP_TX_QAM_A |
| DTAPI_MOD_J83_B | J.83 annex B ("American QAM") | DTAPI_CAP_TX_QAM_B |
| DTAPI_MOD_J83_C | J.83 annex C ("Japanese QAM") | DTAPI_CAP_TX_QAM_C |

ParXtra1

For J.83 Annex B, this parameter specifies the interleaving mode used as specified in the table below. For Annex A and C this parameter is not used.

| Value | CW | I | J | Burst protection 64-/256-QAM |
|-------------------------|------|-----|----|------------------------------|
| DTAPI_MOD_QAMB_I128_J1D | 0001 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I64_J2 | 0011 | 64 | 2 | 47 μ s / 33 μ s |
| DTAPI_MOD_QAMB_I32_J4 | 0101 | 32 | 4 | 24 μ s / 16 μ s |
| DTAPI_MOD_QAMB_I16_J8 | 0111 | 16 | 8 | 12 μ s / 8.2 μ s |
| DTAPI_MOD_QAMB_I8_J16 | 1001 | 8 | 16 | 5.9 μ s / 4.1 μ s |
| DTAPI_MOD_QAMB_I128_J1 | 0000 | 128 | 1 | 95 μ s / 66 μ s |
| DTAPI_MOD_QAMB_I128_J2 | 0010 | 128 | 2 | 190 μ s / 132 μ s |
| DTAPI_MOD_QAMB_I128_J3 | 0100 | 128 | 3 | 285 μ s / 198 μ s |
| DTAPI_MOD_QAMB_I128_J4 | 0110 | 128 | 4 | 379 μ s / 264 μ s |
| DTAPI_MOD_QAMB_I128_J5 | 1000 | 128 | 5 | 474 μ s / 330 μ s |
| DTAPI_MOD_QAMB_I128_J6 | 1010 | 128 | 6 | 569 μ s / 396 μ s |
| DTAPI_MOD_QAMB_I128_J7 | 1100 | 128 | 7 | 664 μ s / 462 μ s |
| DTAPI_MOD_QAMB_I128_J8 | 1110 | 128 | 8 | 759 μ s / 528 μ s |

ParXtra2

Not used.

Modulation Mode : T2MI

When T2-MI modulation is used **DTAPI** expects a 188-byte transport stream carrying T2-MI packets. **DTAPI** will decode the T2-MI packets and perform the DVB-T2 modulation.

ParXtra0

Extra modulation parameter #0 specifies the T2-MI transport-stream bitrate.

ParXtra1

Extra modulation parameter #1 is the OR of values for the following fields: First T2-MI Component PID value, Second T2-MI Component PID value and Multi-Profile.

First T2-MI Component PID

PID-value of the first T2-MI component (0 ... 8190).

| Value | Meaning |
|---------------------------|---|
| DTAPI_MOD_T2MI_PID1_SHIFT | Bit position of bit 0 of PID-value of the first T2-MI component |
| DTAPI__MOD_T2MI_PID1_MSK | AND mask for encoded PID field |

Second T2-MI Component PID

PID-value of the second T2-MI component (0 ... 8190). This field is only valid if multi-profile is enabled.

| Value | Meaning |
|---------------------------|--|
| DTAPI_MOD_T2MI_PID2_SHIFT | Bit position of bit 0 of PID-value of the second T2-MI component |
| DTAPI__MOD_T2MI_PID2_MSK | AND mask for encoded PID field |

Multi-Profile

| Value | Meaning |
|-------------------------|--|
| DTAPI_MOD_T2MI_MULT_DIS | Single profile, only first T2-MI component PID is used |
| DTAPI_MOD_T2MI_MULT_ENA | Multi-profile, both T2-MI components PIDs are used |
| DTAPI_MOD_T2MI_MULT_MSK | AND mask for encoded Multi-Profile field |

ParXtra2

Extra modulation parameter #2 specifies the DVB-T2 bandwidth.

| Value | Meaning |
|--------------------|---------|
| DTAPI_DVBT2_1_7MHZ | 1.7 MHz |
| DTAPI_DVBT2_5MHZ | 5 MHz |
| DTAPI_DVBT2_6MHZ | 6 MHz |
| DTAPI_DVBT2_7MHZ | 7 MHz |
| DTAPI_DVBT2_8MHZ | 8 MHz |
| DTAPI_DVBT2_10MHZ | 10 MHz |

Result

| DTAPI_RESULT | Meaning |
|---|---|
| DTAPI_OK | The modulation parameters have been set successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_IDLE | Transmit-control state is not DTAPI_TXCTRL_IDLE ; The requested modulation parameters can only be set in idle state |
| DTAPI_E_INVALID_BANDWIDTH | Invalid value for bandwidth field |
| DTAPI_E_INVALID_CONSTEL | Invalid value for constellation field |
| DTAPI_E_INVALID_FHMODE | Invalid value for frame-header mode field |
| DTAPI_E_INVALID_GUARD | Invalid value for guard-interval field |
| DTAPI_E_INVALID_INTERLVNG | Invalid value for interleaving field |
| DTAPI_E_INVALID_J83ANNEX DTAPI_E_INVALID_ROLLOFF | Invalid value for J.83 annex |
| DTAPI_E_INVALID_MODE | Modulation type is incompatible with modulator |
| DTAPI_E_INVALID_PILOTS | Pilots cannot be specified in C=1 mode |
| DTAPI_E_INVALID_RATE | Invalid value for convolutional rate or FEC code rate |
| DTAPI_E_INVALID_TRANSMODE | Invalid value for transmission-mode field |
| DTAPI_E_INVALID_USEFRAMENO | Invalid value for use-frame-numbering field |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not include a modulator |

Remarks

Changing the modulation parameters may change the symbol rate!

This is because DTAPI automatically computes the symbol rate from the transport-stream rate (as set with **SetTsRateBps**) and the modulation parameters.

DtOutpChannel::SetOutputLevel

Set level for modulators with an adjustable output level.

```
DTAPI_RESULT DtOutpChannel::SetOutputLevel (
    [in] int    LeveldBm           // Output level in units of 0.1dBm
);
```

Function Arguments

LeveldBm

Output level expressed in units of 0.1dBm. For example, -30 maps to $-30 \times 0.1 = -3\text{dBm}$.

Most modulators do not support a granularity of 0.1dBm. In that case, the output level is rounded to the nearest value supported by the modulator.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The output level has been set successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not support a controllable output level |

Remarks

DtOutpChannel::SetMultiModConfig

Configures a modulator for generation of multiple adjacent channels through one output channel.

```
DTAPI_RESULT DtOutpChannel::SetMultiModConfig(  
    [in] int    NumSubChan,        // Number of sub-channels  
    [in] int    FreqSpacing       // Frequency spacing  
);
```

Function Arguments

NumSubChan

Number of adjacent channels: 1...4 (*NumSubChan*=1 switches-off multi-channel modulation).

FreqSpacing

Frequency-distance between the center frequencies of the sub-channels.

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Power state has been changed successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not support the requested operation |
| DTAPI_E_NUM_CHAN | Invalid number of sub-channels |

Remarks

This method allows users to generate multiple adjacent channels (sub-channels) through one output channel. For example: generating two DVB-C or two DVB-T channels through a single DTA-2111.

The sub-channels share the same modulation settings, set through **SetModControl** and **SetTsRateBps**. When the transmit mode is set to **HOLD**, the multi-modulation channel settings are validated and checked against the limits of the card.

The center frequencies of the sub-channels are located around the carrier frequency of the RF upconverter, in formula: $\text{FreqUpConverter} - (\text{NumSubChan}-1) * \text{FreqSpacing} / 2 + \text{SubChan} * \text{FreqSpacing}$, where **SubChan** is the sub-channel (0...*NumSubChan*-1)

Each sub-channel has its own Transmit FIFO. The **Write** and **GetFifoLoad** methods have an optional *SubChan* parameter to control the contents of each channel individually.

Notes:

- 1) Underflow of one of the Transmit FIFOs stalls the transmission of all sub-channels.
- 2) Multi-channel performance is CPU bound, use the **GetFlags** to check for errors.

DtOutpChannel::SetPower

DTA-102 only. Turn on/off power for a target adapter attached to the DTA-102.

```
DTAPI_RESULT DtOutpChannel::SetPower(
    [in] int    Power           // New power state
);
```

Function Arguments

Power

New power state according to the table below.

| Value | Meaning |
|-----------------|--|
| DTAPI_POWER_OFF | No power is applied. The 25-pin sub-D connector is compatible with DVB-SPI |
| DTAPI_POWER_ON | Apply power (+5V) to pin 12 and 25 of the 25-pin sub-D connector |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | Power state has been changed successfully |
| DTAPI_E_INVALID_MODE | The specified power-mode value is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The hardware function does not support target adapters |

Remarks

After **Attach** and after **Reset**, power is turned off.

DtOutpChannel::SetRfControl

Set upconverter parameters for devices with on-board RF upconverter.

```
DTAPI_RESULT DtOutpChannel::SetRfControl (
    [in] __int64  RfRate          // RF frequency in Hz
);
DTAPI_RESULT DtOutpChannel::SetRfControl (
    [in] int      RfRate          // RF frequency in Hz
);
DTAPI_RESULT DtOutpChannel::SetRfControl (
    [in] double   RfRate          // RF frequency in Hz
);
```

Function Arguments

RfRate

New carrier frequency for RF upconverter, specified in Hertz. *RfRate* is rounded to the nearest RF frequency compatible with the frequency resolution.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|--|
| DTAPI_OK | The carrier frequency has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_RATE | The specified carrier frequency is incompatible (too low or too high) with the upconverter |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The device does not have an RF upconverter |

Remarks

Changing the RF frequency takes some time to let the PLL settle at the new frequency.

DtOutputChannel::SetRfMode

Set special modes for devices with on-board RF upconverter.

```
DTAPI_RESULT DtOutputChannel::SetRfMode(
    [in] int    RfMode           // Special upconverter mode
);
```

Function Arguments

RfMode

New RF upconverter mode according to the table below.

| Value | Meaning |
|---------------------|-----------------------|
| DTAPI_UPCONV_CW | Generate carrier only |
| DTAPI_UPCONV_MUTE | Mute RF output signal |
| DTAPI_UPCONV_NORMAL | Normal mode |

The RF-modes mentioned above can be OR-ed with the values specified in the table below:

| Value | Meaning |
|----------------------|--------------------------|
| DTAPI_UPCONV_SPECINV | Apply spectral inversion |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The new upconverter mode has been set successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified upconverter mode is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | The channel does not support the requested operation |

Remarks

DtOutpChannel::SetSnr

Sets noise generation mode and signal-to-noise ratio for modulators with a hardware-based white-noise generator.

```
DTAPI_RESULT DtOutpChannel::SetSnr(  
    [in] int  Mode,           // Noise generation mode  
    [in] int  SNR             // Desired signal to noise-ratio  
);
```

Function Arguments

Mode

Noise generation mode to be used.

| Value | Meaning |
|----------------------|---|
| DTAPI_NOISE_DISABLED | No noise generation |
| DTAPI_NOISE_WNG_HW | Use build-in hardware white noise generator |

SNR

Desired signal-to-noise ratio, expressed in units of 0.1dB. For example, 250 = 250×0.1 = 25dB. The table below specifies the valid range for SNR, based on the used hardware and noise generation mode.

| Device | Noise mode | Valid SNR range |
|---------|--------------------|-----------------|
| DTA-107 | DTAPI_NOISE_WNG_HW | 0.0 ... 35.9 dB |

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | Noise mode and SNR have been set successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_ARG | SNR value is invalid |
| DTAPI_E_INVALID_MODE | The specified noise generation mode is not valid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Setting the SNR not supported |

Remarks

DtOutpChannel::SetSpiClk

DTA-2142 only. Set the DVB-SPI clock frequency in case the SPI channel is operating with a fixed clock (I/O configurations **SPIFIXEDCLK**, **SPISER8B**, **SPISER10B**).

```
DTAPI_RESULT DtOutpChannel::SetSpiClk(
    [in] Int    SpiClk           // Fixed SPI clock
);
```

Function Arguments

SpiClk

Specifies the frequency of the fixed DVB-SPI clock in Hertz.

Result

| DTAPI_RESULT | Meaning |
|-----------------------|---|
| DTAPI_OK | The TS-over-IP parameters have been applied successfully |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_INVALID_MODE | The SPI clock is not fixed (SPI mode is SPIDVBMODE) |
| DTAPI_E_NOT_SUPPORTED | Not a DVB-SPI channel |

Remarks

DtOutputChannel::SetTsRateBps

Set the channel's transport-stream rate, based on 188-byte transport packets.

```
DTAPI_RESULT DtOutputChannel::SetTsRateBps (
    [in] int    TsRate          // transport-stream rate in bps
);

DTAPI_RESULT DtOutputChannel::SetTsRateBps (
    [in] DtFractionInt    TsRate // transport-stream rate in bps
);
```

Function Arguments

TsRate

New transport-stream rate (@188) specified in bits per second.

Result

| DTAPI_RESULT | Meaning |
|-------------------------|---|
| DTAPI_OK | The transport-stream rate has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_RATE | The specified transport-rate is invalid (negative) or incompatible (too high) with the attached hardware function |
| DTAPI_E_MODPARS_NOT_SET | For modulators: cannot set transport-rate because modulation parameters have not been set |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORTED | Setting the TS rate is not allowed |

Remarks

For transmit modes that are not based on 188-byte packets, the transport-stream rate will be different from the line clock. For example, in modes **DTAPI_TXMODE_204** and **DTAPI_TXMODE_ADD16** the line clock rate is set to 204/188 times the specified transport-stream clock.

The transport-stream rate is usually set in the initialisation phase after **AttachToPort**. It is recommended to first set the transmit mode with **SetTxMode** before setting the TS rate with **SetTsRateBps**.

For modulators the modulation parameters have to be set with **SetModControl** first before setting the TS rate with **SetTsRateBps**.

SetTsRateBps may also be used while packets are being transmitted. The DTA and DTU series of devices impose no constraints on the bit-rate step size or on the number of changes per second. Note however that bit-rate changes may lead to a (temporary) violation of the MPEG-2 Systems requirements on transport-streams.

The transport-stream rate may be set to zero. This effectively disables packet transmission and may stall the output channel.

DtOutpChannel::SetTsRateRatio

Set the ratio between transport-stream rate and external clock frequency. If the external clock frequency differs from the specified frequency, the transport stream rate will differ from the desired value by the same percentage.

```
DTAPI_RESULT DtOutpChannel::SetTsRateRatio(
    [in] int  TsRate,           // Desired transport stream rate
    [in] int  RefClk           // Frequency of external clock
);
```

Function Arguments

TsRate

Transport stream rate in bits per second.

RefClk

Frequency (in Hz) of the external reference clock applied to the device.

Result

| DTAPI_RESULT | Meaning |
|---------------------------|---|
| DTAPI_OK | The transport-stream ratio has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_TSRATESEL | The channel is not configured in DTAPI_TSRATESEL_EXTRATIO mode |
| DTAPI_E_NOT_SUPPORTED | The hardware does not have an external clock input |

Remarks

A ratio can only be set if the transport-stream rate selection (**DTAPI_IOCONFIG_TSRATESEL**) I/O configuration is **DTAPI_TSRATESEL_EXTRATIO**.

DtOutpChannel::SetTxControl

Set transmit control.

```
DTAPI_RESULT DtOutpChannel::SetTxControl (
    [in] int    TxControl          // Transmit-control state
);
```

Function Arguments

TxControl

New value for transmit control according to the table below.

| Value | Meaning |
|-------------------|---|
| DTAPI_TXCTRL_IDLE | Packet transmission and DMA writes to the transmit FIFO are disabled. |
| DTAPI_TXCTRL_HOLD | Packet transmission is disabled, but DMA writes to the transmit FIFO are enabled. |
| DTAPI_TXCTRL_SEND | Normal operation. Both packet transmission and DMA writes are enabled. |

Result

| DTAPI_RESULT | Meaning |
|-------------------------|---|
| DTAPI_OK | Transmit control has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INSUF_LOAD | For modulators: FIFO load is insufficient to start modulation |
| DTAPI_E_INVALID_LEVEL | The output level specified in SetOutputLevel is invalid for the attached hardware function |
| DTAPI_E_INVALID_MODE | The specified value for transmit control is invalid or incompatible with the attached hardware function |
| DTAPI_E_MODE_VIDEOSTD | For TS-over-IP channels: The specified <i>m_VideoStandard</i> in the <i>IpPars</i> structure and the <i>TxMode</i> are not consistent |
| DTAPI_E_MODPARS_NOT_SET | For modulators: cannot start transmission because modulation parameters have not been set |
| DTAPI_E_MODTYPE_UNSUP | For modulators: modulation type is not supported |
| DTAPI_E_NO_IPPARS | For TS-over-IP channels: cannot start transmission because IP parameters have not been specified yet |
| DTAPI_E_NO_TSRATE | Cannot start transmission because TS rate has not been set |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

Setting transmit control can be used for controlled start-up and shutdown of the streaming process. If transmit control is **DTAPI_TXCTRL_HOLD**, the transmit FIFO can be pre-loaded with packets (using **Write**), while no packets are transmitted yet. Then, if enough *credit* has been built up in the transmit

FIFO, transmit control is set to **DTAPI_TXCTRL_SEND**. This procedure prevents accidental Transmit-FIFO underflow in the start-up phase.

For TS-over-IP channels, transmit control values **HOLD** or **SEND** can only be entered if the IP transmission parameters have been specified using **SetIpPars**.

After **AttachToPort** and after **Reset**, transmit control is initialised to **IDLE**.

DtOutpChannel::SetTxMode

Set the transmit mode for the output channel. It determines the conversions that will be applied to the data written to the output channel. Transmit mode has to be set while transmit mode is still idle, this is before setting transmit control to `DTAPI_TXCTRL_HOLD` or `DTAPI_TXCTRL_SEND`.

Note: For ASI/SDI input channels, first configure the output port for ASI or SDI with `SetIoConfig`, group `IOSTD`. If an ASI-specific transmit mode is applied to a channel that is configured for SDI (or vice versa), an error will be returned.

```
DTAPI_RESULT DtOutpChannel::SetTxMode(
    [in] int TxMode,           // Transmit mode
    [in] int StuffMode        // TS: Null-packet stuffing on/off
                                // SDI: Black-frame stuffing on/off
);
```

Function Arguments

TxMode

New transmit mode according to the table below.

| Value | Meaning |
|----------------------------------|---|
| <code>DTAPI_TXMODE_188</code> | <i>188-byte mode</i> Packets in the Transmit FIFO are assumed to be 188 bytes long. Packets are transmitted without modification. |
| <code>DTAPI_TXMODE_192</code> | <i>192-byte mode (DTA-102 only)</i> Packets in the Transmit FIFO are assumed to be 192 bytes long. The SYNC byte of every second packet may be modified (not 0x47). PSYNC is pulsed at the start of every 192 byte packet. |
| <code>DTAPI_TXMODE_204</code> | <i>204-byte mode</i> Packets in the Transmit FIFO are assumed to be 204 bytes long. Packets are transmitted without modification. |
| <code>DTAPI_TXMODE_ADD16</code> | <i>Add 16 bytes mode</i> Packets in the Transmit FIFO are assumed to be 188 bytes long. The device adds 16 placeholder bytes (0) to every packet. |
| <code>DTAPI_TXMODE_MIN16</code> | <i>Minus 16 bytes mode</i> Packets in the Transmit FIFO are assumed to be 204 bytes long. The device removes the last 16 bytes of each packet. |
| <code>DTAPI_TXMODE_RAW</code> | <i>Raw mode</i> No assumptions are made on packet structure. Bytes in the buffer are transmitted unmodified. Null-packet stuffing cannot be applied. This mode is not allowed for TS-over-IP channels. |
| <code>DTAPI_TXMODE_RAWASI</code> | <i>Raw ASI symbols</i> (Ports needs <code>CAP_RAWASI</code>) The bytes in the buffer are assumed to be 10-bit packed raw ASI symbols which are transmitted at 270Mb/s. |

The following modes are valid for channels configured as SDI.

| Value | Meaning |
|--------------------------------|---|
| DTAPI_TXMODE_SDI_FULL | <i>Full SDI mode</i> The data in the Transmit FIFO is assumed to consist of complete SDI frames, including all synchronization information. |
| DTAPI_TXMODE_SDI_ACTVID | <i>Active Video SDI mode</i> The data in the Transmit FIFO is assumed to be the active video part of SDI frames. The hardware adds blanking information to create a complete frame. This mode can only be used in combination with Huffman compression (i.e. with DTAPI_TXMODE_SDI_HUFFMAN flag). When using this mode with Huffman compression disabled, the behavior of the output channel is undefined. |

The following mode is valid for TS-over-IP transmission only.

| Value | Meaning |
|---------------------------|--|
| DTAPI_TXMODE_IPRAW | <i>Raw IP mode</i> The Transmit FIFO is assumed to contain time-stamped IP packets that are transmitted unmodified. Each IP packet shall be preceded by a DtRawIpHeader structure. |

For DVB-ASI output channels, *TxMode* can be OR-ed with following flags:

| | |
|------------------------------|--|
| DTAPI_TXMODE_BURST | <i>Burst mode</i> The bytes making up a transport packet are sent in one burst, without K28.5 stuffing characters. If this flag is not specified, transmission of packet data is "continuous" (linear over time). |
| DTAPI_TXMODE_TXONTIME | <i>Transmit on timestamp</i> The MPEG-2 packets in the Transmit FIFO are assumed to be prefixed with a 32-bit timestamp (54MHz resolution) and will be transmitted at the times indicated by the timestamps. See DTAPI Manual – Overview and Data Formats.pdf for more details. |

For output channels configured as SDI, *TxMode* can be OR-ed with the values specified in the table below:

| Value | Meaning |
|-----------------------------|---|
| DTAPI_TXMODE_SDI_10B | <i>10-bit SDI samples</i> Indicates that SDI data in the Transmit FIFO is assumed to consist of 10-bit SDI samples. If both this flag and the 16B flag are omitted, 8-bit samples is assumed. |
| DTAPI_TXMODE_SDI_16B | <i>16-bit SDI samples</i> Indicates that SDI data in the Transmit FIFO is assumed to consist of 10-bit SDI samples packed in 16-bits. Only the 10 least significant bits of each 16-bit sample are used. If both this flag and the 10B flag are omitted, 8-bit samples is assumed. 16B mode is only supported by cards having the CAP_MATRIX capability. |

| | |
|---------------------------------|--|
| DTAPI_TXMODE_SDI_HUFFMAN | <i>Huffman compression</i> Indicates that the SDI frame in the Transmit FIFO is assumed to be Huffman compressed. Huffman compression is not supported by cards that support HD-SDI such as the DTA-2152. |
|---------------------------------|--|

For genlock-capable cards the output channel can be configured to operate in genlock mode (see `SetIOConfig`). When the genlock mode and the requested transmit mode conflict, **DTAPI_E_INVALID_MODE** error will be returned.

StuffMode

This parameter controls the behaviour of the output when there is no packet data available for transmission from the Transmit FIFO.

For channels configured as ASI:

If *StuffMode* is '1' (On), the output is stuffed with null packets. The size of inserted null packets is matched to *TxMode*. Packet Stuffing is not supported if *TxMode* is **DTAPI_TXMODE_RAW**, because both packet size and packet boundaries are unknown (**DTAPI_E_MODE** error is returned.)

If *StuffMode* is '0' (Off), null-packet stuffing is not applied. If the Transmit FIFO underflows:

- For DVB-ASI outputs (DTA-100, DTA-140), the output is stuffed with K28.5 characters;
- For DVB-SPI outputs (DTA-102), DVALID is de-asserted.

For channels configured as SDI:

This parameter is ignored if genlock is not supported.

If genlock is supported, but the output channel is not configured to operate in genlock mode, this parameter enables *black-frame stuffing*: The SDI output is stuffed with black frames when there is no packet data available in the Transmit FIFO.

Note that this parameter is ignored when the transmit channel is in SDI genlock mode, since the driver will automatically enable black-frame stuffing in this case.

Black-frame stuffing is not supported by cards supporting the matrix model such as the DTA-2152.

Result

| DTAPI_RESULT | Meaning |
|-----------------------------|--|
| DTAPI_OK | Transmit mode has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified transmit mode is invalid or incompatible with the output channel |
| DTAPI_E_NO_GENREF | No genlock reference port has been configured |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_IDLE | For DTA-110T and DTA-160 only: transmit mode can only be changed when transmit-control state is DTAPI_TXCTRL_IDLE |

Remarks

Changing the transmit mode may change the transmit-clock rate! For example, if transmit mode is changed from **DTAPI_TXMODE_ADD16** to **DTAPI_TXMODE_188** the transmit-clock is multiplied by 188/204. The **DTAPI** keeps the transport-stream rate constant.

The transmit mode is usually set in the initialisation phase just after **AttachToSerial**, **AttachToSlot**, **AttachToType** or **Reset**. It is recommended to set the transmit mode before setting the transport-stream rate.

It is recommended to stop transmission and clear the Transmit FIFO with **ClearFifo** before changing transmit mode.

DtOutpChannel::SetTxPolarity

Set the polarity of the DVB-ASI output signal.

```
DTAPI_RESULT DtOutpChannel::SetTxPolarity(  
    [in] int TxPolarity        // Polarity (normal or inverted)  
);
```

Function Arguments

TxPolarity

New polarity according to the table below.

| Value | Meaning |
|----------------------|---------------------------------|
| DTAPI_TXPOL_NORMAL | Generate a 'normal' ASI signal |
| DTAPI_TXPOL_INVERTED | Generate an inverted ASI signal |

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | The polarity of the ASI signal has been changed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_INVALID_MODE | The specified polarity is invalid |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |
| DTAPI_E_NOT_SUPPORT | Setting the polarity is not support by this output channel |

Remarks

This function can be used to test if an ASI receiver is capable of receiving both normal and inverted ASI signals.

DtOutputChannel::Write

Write data to the output channel. To avoid deadlock, the user shall meet certain preconditions as described in the Remarks section below.

```
DTAPI_RESULT DtOutputChannel::Write(  
    [in] char*   pBuffer,           // Buffer with data to be written  
    [in] int     NumBytesToWrite, // Number of bytes to be written  
    [in] int     SubChan=0         // Sub-channel  
);
```

Function Arguments

pBuffer

Pointer to the buffer containing the data to be written to the output channel. The pointer must be aligned to a 32-bit word boundary, except for IP output channels for which there are no alignment restrictions.

NumBytesToWrite

Number of bytes to be written to the output channel. The value of *NumBytesToWrite* must be a multiple of 4, except for IP output channels, which can accept any positive value.

SubChan

Sub-channel selection, used for multi-channel modulation see `DtOutputChannel::SetMultiModConfig`.

Result

| DTAPI_RESULT | Meaning |
|----------------------|--|
| DTAPI_OK | Write operation has been completed successfully |
| DTAPI_E_DEV_DRIVER | Unclassified failure in device driver |
| DTAPI_E_IDLE | Cannot write data because transmit control is IDLE |
| DTAPI_E_INVALID_BUF | The buffer is not aligned to a 32-bit word boundary |
| DTAPI_E_INVALID_SIZE | The specified transfer size is negative or not a multiple of four |
| DTAPI_E_NO_TSRATE | For TS-over-IP channels: cannot write data because transport-stream rate has not been specified, or TS rate is too low |
| DTAPI_E_NOT_ATTACHED | Channel object is not attached to a hardware function |

Remarks

Preconditions:

- Transmit mode must be **HOLD** or **SEND**, otherwise **DTAPI_E_IDLE** is returned;
- If transmit mode is **HOLD**, the amount of data written may not overflow the transmit FIFO, or deadlock will be the result.

If transmit mode is **SEND**, it is *strongly recommended* that the amount of data written does not overflow the transmit FIFO. Under certain conditions, overflowing the transmit FIFO will work reliably without deadlock, but these conditions are hard to specify. Generally speaking it is safer for a user application to monitor the FIFO load and never write more data than can be contained in the FIFO.

Write returns when all data has been transferred to the transmit FIFO.