

StreamXpress Remote Control API

- Remote Control of StreamXpress
- SOAP based
- C++ Library

FEATURES

- Remote control of StreamXpress functions on same PC or from other PC on the network
- SOAP-based: Can be accessed using any SOAP toolkit
- Remote-Control (RC) license required

SpRcApi – Revision History

Version	Date	Change Description
V1.0.0.1	2009.02.16	<ul style="list-style-type: none">• First release to the field

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1. Using SpRcApi

1.1. Introduction

The StreamXpress Remote-Control API (**SpRcApi**) enables a client application that wishes to playout a stream to remotely control the StreamXpress. The client can be running on the same PC as the StreamXpress or on another PC in the network. Most functions available in the StreamXpress GUI are also available through the **SpRcApi**.

In this document, the remotely controlled StreamXpress will be interchangeably referred to as "playout server" or "StreamXpress".

1.2. Running StreamXpress

To run the StreamXpress as playout server it is required that:

1. The DekTec device used for playout contains a remote control (RC) license;
2. The StreamXpress is started with the `-rc` option, followed by the TCP port number that is used to connect, e.g. `-rc 9000`.

1.3. Including and linking SpRcApi

Each module that wants to use the **SpRcApi** function has to include header file "**SpRcApi.h**". This file automatically includes "**DTAPI.h**". Both "**SpRcApi.h**" and "**DTAPI.h**" must be located in a directory that is part of the include path. In Visual Studio this is the "Additional Include Directories" project property.

The implementation of the **SpRcApi** classes is available in "**SpRcApi.dll**". This DLL must be put in the same directory as your application's executable. The import library "**SpRcApi.lib**" has to be linked to your application.

1.4. Checking return codes

While using **SpRcApi**, it's important to check the return value after each call of an **SpRcApi** function. The connection to the StreamXpress playout server may get interrupted at any time, so each method call may fail, with the single exception of **GetVersion** which cannot fail.

For code clarity, the examples below do not check the return values of method calls. In production-quality code, however, it's essential to add such checks.

1.5. Connecting to StreamXpress

The following code establishes a connection to the StreamXpress.

```
// Create remote-control client
SpRcClient* SpRc;
SpRc = SpRcClient::CreateSpRcClient();

// Open a session
unsigned char Ip[] = {127,0,0,1};
SpRcApi->OpenSession(Ip, 9000);
```

Figure 1. Connecting to the StreamXpress.

The first step is to create an **SpRcClient** object, which represents the connection to the playout server.

The next step is to open a session with the playout server, using **OpenSession**. In this case, using local loopback address 127.0.0.1, a connection is established with the StreamXpress running on the same PC as the client application. Other PCs on the network can be reached by specifying their IP address.

1.6. Playing a file

The other methods in **SpRcApi** can be used to set parameters and play out a file. To a large extent they speak for themselves.

The code below disables looping, opens a file, starts playout and waits until playout is completed.

```
SpRc->SetLoopFlags(0);
SpRc->OpenFile(L"\\C:Stream.ts");
SpRc->SetPlayoutState(SPRC_STATE_PLAY);
SpRc->WaitForCondition(
    SPRC_COND_STOPPED, -1);
```

The file is opened in the context of the playout server, which means that C: is the C-disk on the playout server, not on the client.

SpRcClient – Session Interface**SpRcClient::CloseSession**

Close the session with the playout server.

```
SPRC_RESULT CloseSession();
```

Parameters**Result**

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_OK	The session with the playout server has been closed successfully

Remarks

SpRcClient::CreateSpRcClient

Create client object for issuing remote-control commands to a playout server.

```
static SpRcClient* CreateSpRcClient();
```

Parameters

Result

SPRC_RESULT	Meaning
NULL	Remote-control object cannot be created
<i>pointer</i>	Pointer to StreamXpress remote-control client

Remarks

The SpRcApi is initialised with code similar to the following:

```
SpRcClient* SpRcApi = SpRcClient::CreateSpRcClient();  
SPRC_RESULT Result = SpRcApi->OpenSession(IpAddr, PortNr);
```

After creating the client object and opening the session, all remote control commands are issued through the remote-control object **SpRcApi**.

SpRcClient::GetRemoteVersion

Get **SpRcApi** version number as used in the playout server.

```
virtual void SpRcClient::GetRemoteVersion(
[out] int& Major           // Major version number
[out] int& Minor           // Minor version number
[out] int& BugFix          // Bug fix number
[out] int& Build           // Build number
);
```

Parameters

Major, Minor, BugFix, Build

Version number of the **SpRcApi** library which was used in the StreamXpress. For an explanation of **SpRcApi** version numbering, see **SpRcClient::GetVersion**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_OK	The remote version number has been read successfully

Remarks

SpRcClient::GetVersion

Get version number of the **SpRcApi** client dll.

```
virtual void SpRcClient::GetVersion(  
    [out] int& Major           // Major version number  
    [out] int& Minor          // Minor version number  
    [out] int& BugFix         // Bug fix number  
    [out] int& Build          // Build number  
);
```

Parameters

Major

Major version number. This number is incremented when a non-backward compatible change is introduced in the StreamXpress remote-control API.

Minor

Minor version number. This number is incremented when a method is added to the StreamXpress remote-control API in a backward compatible way. For example, a client with version number 1.3.x.x will be able to interoperate with StreamXpress with API version 1.4.x.x.

BugFix

This number is incremented when a bug in the **SpRcApi** dll has been fixed, without functional enhancements.

Build

The build number is a redundant version number that is incremented with every new version of the **SpRcApi** dll.

Result

SPRC_RESULT	Meaning
	No return value

Remarks

SpRcClient::OpenSession

Establish a session with the playout server.

```
SPRC_RESULT SpRcClient::OpenSession(  
    [in] unsigned char  IpAddr[4],    // IP address  
    [in] unsigned short PortNr       // Port number  
);
```

Parameters

IpAddr

IP address of the playout server. If the StreamXpress is running on the same machine, 127.0.0.1

PortNr

Port number to access the playout server. The port number should match the port specified in the `-rc port` option when starting the StreamXpress.

Result

SPRC_RESULT	Meaning
SPRC_E_NO_LICK	The port is not properly licensed for playout and remote control
SPRC_OK	The session with the playout server has been opened successfully
SPRC_VERSION_CONFLICT	A session with the playout server has been opened, but a version conflict has been detected between the version of the client SpRcApi and that of the server SpRcApi

Remarks

The `SpRcClient` object supports a single session. If multiple sessions are required, multiple `SpRcClient` objects must be created.

SpRcClient – Application Common Interface

SpRcClient::GetAppInfo

Get information about the application.

```
virtual SPRC_RESULT SpRcClient::GetAppInfo(
    [out] std::wstring& AppName,      // Application name
    [out] Int& MajorVersion,         // Major version number
    [out] Int& MinorVersion,        // Minor version number
    [out] Int& BugFixVersion,       // Bug-fix version number
    [out] Int& BuildNumber);       // Build number
);
```

Parameters

AppName

Application name as Unicode string. For the moment, the only application supporting SpRcApi is StreamXpress.

MajorVersion

Major version number. This number is incremented when the application implements major new functions.

MinorVersion

Minor version number. This number is incremented when the application implements small updates in functionality, possibly together with bug fixes.

BugFixVersion

Bug-fix version number. This number is incremented when the only changes relative to the last version of the application are bug fixes.

BuildNumber

Build number. This number is incremented with new builds of the application. It's never reset to zero so that each version of the application has a different build number.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_OK	Application information is returned successfully

Remarks

SpRcClient – Port Selection Interface

Struct PortDesc

Structure describing a physical playout port.

```
struct PortDesc {
    __int64 m_Serial;           // Unique serial number of the device
    int m_TypeNumber;         // Device type number
    int m_Ip[4];              // IP address (for IP ports only)
    int m_Mac [6];           // MAC address (for IP ports only)
    int m_FirmwareVersion;    // Firmware version
    int m_FirmwareVariant;    // Firmware variant
    int m_Port;               // Physical port number
    int m_OutputType;         // Output type (OR-able flags)
    int m_Capabilities;       // Capability flags (OR-able flags)
    int m_InUse;              // Output port already in use?
};

typedef std::vector<SpRcPortDesc> SpRcPortDescs;
typedef SpRcPortDescs::iterator SpRcPortDescIt;
```

Members

m_Serial

The serial number that uniquely identifies the DekTec device that hosts the playout port.

m_TypeNumber

This integer corresponds to the number in the device's type number, e.g. 245 for the DTU-245.

m_Ip

If the playout port is an IP-network port, this member identifies the IP address. Otherwise, the value of this member is undefined.

m_Mac

If the playout port is an IP-network port, this member identifies the MAC address. Otherwise, the value of this member is undefined.

m_FirmwareVersion

Version number of the firmware loaded on the device that hosts the playout port.

m_FirmwareVariant

Variant of the firmware loaded on the device that hosts the playout port. Some DekTec devices may support multiple variants of the firmware each with different functionality.

m_Port

This integer identifies the physical port number associated with this function. Please refer to DekTec's DTAPI documentation for an overview of physical port numbers per device.

m_OutputType

This field describes the type of stream that can be generated on this playout port. Output types are encoded in flags that may be OR-ed together to indicate that the port supports multiple types.

Value	Meaning
SPRC_ASI	DVB-ASI
SPRC_ATSC	ATSC (VSB) modulation
SPRC_DTMB	DTMB modulation
SPRC_DVBS	DVB-S modulation
SPRC_DVBS2	DVB-S.2 modulation
SPRC_DVBT	DVB-T modulation, includes DVB-H
SPRC_ISDBT	ISDB-T modulation
SPRC_QAM_A	QAM modulation, ITU-T J.83 Annex A (DVB-C)
SPRC_QAM_B	QAM modulation, ITU-T J.83 Annex B (US)
SPRC_QAM_C	QAM modulation, ITU-T J.83 Annex C (Japan)
SPRC_SDSDI	Standard-definition SDI
SPRC_SPI	DVB-SPI
SPRC_TSOIP	TS-over-IP

m_Capabilities

This field describes further capabilities of the playout port. Capabilities are encoded in flags that may be OR-ed together to indicate that the port supports multiple capabilities.

Value	Meaning
SPRC_ADJLVL	Modulator port has an adjustable output level
SPRC_CM	Modulator port supports channel modelling
SPRC_DIGIQ	Modulator port has a digital IQ output
SPRC_IF	Modulator port has an IF output
SPRC_LBAND	Modulator port can upconvert to L-Band 950 .. 2150MHz
SPRC_UHF	Modulator port can upconvert to UHF Band 400 .. 862MHz
SPRC_VHF	Modulator port can upconvert to VHF Band 47 .. 470MHz

m_InUse

This status flag indicates whether the playout port is currently being used.

The “in-use” status is a snapshot of the current situation. Attaching to a playout port that is unused may fail because of race conditions with other applications.

Value	Meaning
SPRC_PORT_CURR	Port is the currently selected playout port in this remote-control session
SPRC_PORT_UNUSED	Port is not used
SPRC_PORT_USED	Port is used by another application

SpRcClient::ScanPorts

Get information about the ports available for play out.

```
virtual SPRC_RESULT SpRcClient::ScanPorts (  
    [out] SpRcPortDesc& PortDescs // List of playout ports  
);
```

Parameters

PortDescs

List of playout ports. Refer to **Struct PortDesc** for a description of attributes per port.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_OK	Application information is returned successfully

Remarks

SpRcClient::SelectPort

Select a physical port for play out.

```
virtual SPRC_RESULT SpRcClient::SelectPort(
    [in] __int64 Serial,        // Serial number of device to be selected
    [in] int Port;            // Physical port number to be selected
    [in] int Modulation;      // Initial modulation standard
);
```

Parameters

Serial

The serial number that identifies the device to be selected.

Port

Physical port number of port to be selected.

Modulation

For modulators only: Initial modulation standard. Use one of the `SPRC_MOD_XXX` constants. Set to 0 otherwise.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_MOD_STANDARD	Initial modulation standard <i>Modulation</i> is not supported on the modulator port
SPRC_E_NO_LICK	The port is not properly licensed for playout and remote control
SPRC_E_NOT_FOUND	Cannot find the playout port identified by <i>Serial</i> and <i>Port</i>
SPRC_E_PORT_USED	The port could not be selected because it's in use by another instance of the StreamXpress or another application
SPRC_OK	The playout port has been selected successfully

Remarks

The playout server will start without file selected and with parameters set to the default for the port.

A list of physical ports available for playout can be obtained with `SpRcClient::ScanPorts`.

SpRcClient – Payout Interface

Struct SpRcAsiPars

Payout parameters for a DVB-ASI output port.

```

struct SpRcAsiPars {
    bool   m_Remux;           // Remultiplex yes/no
    int    m_PlayoutRate;    // Only used if Remux is on
    bool   m_BurstMode;     // DVB-ASI burst mode
    int    m_TxMode;        // Transmit mode
    int    m_Polarity;     // Physical polarity of the ASI signal
};

```

Members

m_Remux

Turn remultiplexing on (true) or off (false). If remultiplexing is on, the StreamXpress adds null packets and adjusts timing information so that the stream is played out at *m_PlayoutRate*. If remultiplexing is off, the stream is played out at the Transport-Stream rate, and *m_Playout* is not used.

m_PlayoutRate

DVB-ASI payout rate.

m_BurstMode

Turn DVB-ASI burst mode on (true) or off (false).

m_TxMode

Transmit mode.

Value	Meaning
DTAPI_TXMODE_188	Transport Packets are assumed to be 188 bytes, and are played out as 188-bytes packets.
DTAPI_TXMODE_204	Transport Packets are assumed to be 204 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_ADD16	Transport Packets are assumed to be 188 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_MIN16	Transport Packets are assumed to be 204 bytes, and are played out as 188-bytes packets.
DTAPI_TXMODE_RAW	No assumptions are made on packet structure. Bytes in the stream are transmitted unmodified. Null-packet stuffing cannot be applied.

m_Polarity

Polarity of the DVB-ASI signal.

Value	Meaning
DTAPI_TXPOL_NORMAL	Generate a 'normal' ASI signal
DTAPI_TXPOL_INVERTED	Generate an inverted ASI signal

Struct SpRcIsdbtLayerPars

Structure describing ISDB-T modulation parameters for one hierarchical layer. This structure is used in `SpRcIsdbtPars`, in an array of three structs for layer A, B and C.

```

struct SpRcIsdbtLayerPars {
    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. The sum of *m_NumSegment* must be 13.

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 I 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 SpRcIsdbtPars

Modulation parameters for ISDB-T.

```

struct SpRcIsdbtPars {
    bool m_DoMux;           // Hierarchical multiplexing yes/no
    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
    SpRcIsdbtLayerPars 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_ParXtra0;       // Extra parameters
    int  m_Virtual13Segm; // Virtual 13-segment mode
};

struct SpRcIsdbtLayerPars {
    int  m_NumSegment;     // Number of segments
    int  m_Modulation;     // Modulation type
    int  m_CodeRate;       // Code rate
    int  m_TimeInterleave; // Time interleaving
};

```

Members

m_DoMux

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

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_BType

Broadcast type.

Value	Meaning
DTAPI_ISDBT_BTYPE_TV	TV broadcast; Can be used with any number of segments
DTAPI_ISDBT_BTYPE_RAD1	1-segment radio broadcast; Total #segments must be 1
DTAPI_ISDBT_BTYPE_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
DTAPI_ISDBT_LAYER_A	Map elementary stream to layer A
DTAPI_ISDBT_LAYER_B	Map elementary stream to layer B
DTAPI_ISDBT_LAYER_C	Map elementary stream to layer C

m_LayerOther

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

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_Virtual13Segm

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

Struct SpRcModPars

Modulation parameters for all modulation standards except DVB-T2 and ISDB-T.

```
struct SpRcModPars {  
    int m_ModType;           // Modulation type  
    int m_ParXtra0;         // Extra modulation parameter 0  
    int m_ParXtra1;         // Extra modulation parameter 1  
    int m_ParXtra2;         // Extra modulation parameter 2  
    int m_SymRate;          // Symbol rate in bd  
};
```

Members

m_ModType

Modulation type, see DTAPI_MOD_XXX constants.

m_ParXtra0, *m_ParXtra1*, *m_ParXtra2*

Modulation parameters, see DTAPI documentation (`SetModControl`).

m_SymRate

Symbol rate in baud. Required for modulation standards that require a symbol rate, like DVB-S. This member should be set to -1 if no symbol rate is required.

Struct SpRcPlayoutInfo

Structure describing static playout information.

```
struct SpRcPlayoutInfo {
    bool m_BurstMode;           // DVB-ASI burst mode
    bool m_ExtClock;           // Use external clock
    bool m_FileCanBeRead;      // A file has been selected that can be read
    std::wstring m_Filename;    // Currently selected filename
    long m_FileOffsetEnd;      // Number of unused bytes at end of file
    long m_FileOffsetStart;    // Number of unused bytes at start of file
    long m_FilePlayedBytes;    // File length minus bytes at start and end
    int m_FileRateEst;         // TS: Estimated file rate
    long m_FileSize;           // Size of the file
    int m_FileType;            // Type of data in file: RAW/TS/SDI
    double m_LoopBeginRel;     // Subloop, begin position (relative 0..1)
    double m_LoopEndRel;       // Subloop, end position (relative 0..1)
    int m_LoopFlags;           // Adapt CC/PCR/TDT and wrap-around flags
    int m_PlayoutState;        // HOLD/PLAYING
    int m_PlayoutRate;         // Playout rate @188
    boolean m_Remux;           // Remultiplex mode
    int m_SymRate;             // Modulators: Symbol rate
    double m_TimeLoopBegin;    // Time corresponding to beginning of loop
    double m_TimeLoopEnd;      // Time corresponding to end of loop
    int m_TimeOffset;          // Offset added to playout time
    int m_TsRate;              // TS: TS rate @188
    int m_TpSize;              // TS: packet size
    int m_TxPolarity;          // Transmit polarity for ASI channels
};
```

Members

m_BurstMode
DVB-ASI burst mode.

Struct SpRcPlayoutStatus

Structure describing the dynamic playout status.

```
struct SpRcPlayoutInfo {
    int    m_FifoLoad;           // Current FIFO load
    int    m_NumErrors;         // Number of errors (underflows)
    int    m_NumWraps;          // #wraps
    double m_PosRel;            // Relative position in subloop (0..1)
    int    m_TotalMemLoad;      // #words in DiskBuffer+MemBuffer (snapshot)
};
```

Members

m_FifoLoad

Current load of the output FIFO.

Struct SpRcRfPars

Structure describing RF parameters for modulators.

```
struct SpRcRfPars {  
    __int64  m_Frequency;    // RF frequency (Hz)  
    double   m_Level;       // RF output level (dBm)  
};
```

Members

m_Frequency

Center frequency in Hz of the upconverted signal.

m_Level

Level of the main output signal in dBm.

Struct SpRcSpiPars

Playout parameters for a DVB-SPI output port.

```

struct SpRcSpiPars {
    bool   m_Remux;           // Remultiplex yes/no
    int    m_PlayoutRate;    // Only used if Remux is on
    int    m_TxMode;         // Transmit mode
    bool   m_Power;         // Turn power on/off for external adapter
};

```

Members

m_Remux

Turn remultiplexing on (true) or off (false). If remultiplexing is on, the StreamXpress adds null packets and adjusts timing information so that the stream is played out at *m_PlayoutRate*. If remultiplexing is off, the stream is played out at the Transport-Stream rate, and *m_Playout* is not used.

m_PlayoutRate

DVB-SPI playout rate.

m_TxMode

Transmit mode.

Value	Meaning
DTAPI_TXMODE_188	Transport Packets are assumed to be 188 bytes, and are played out as 188-bytes packets.
DTAPI_TXMODE_192	192-byte mode (DTA-102 only) Transport Packets are assumed to be 192 bytes, and are played out as 192-bytes packets.
DTAPI_TXMODE_204	Transport Packets are assumed to be 204 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_ADD16	Transport Packets are assumed to be 188 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_MIN16	Transport Packets are assumed to be 204 bytes, and are played out as 188-bytes packets.
DTAPI_TXMODE_RAW	No assumptions are made on packet structure. Bytes in the stream are transmitted unmodified. Null-packet stuffing cannot be applied.

m_PlayoutRate

Power for external adapter is switched on or off.

Struct SpRcTsoipPars

Parameters for a Transport-Stream-over-IP port.

```

struct SpRcTsoipPars {
    int m_TxMode; // Transmission mode (188, 204, Add16, ...)
    unsigned char m_Ip[4]; // IP address
    int m_Port; // Port number
    int m_TimeToLive; // TTL
    int m_NumTpPerIp; // #TPs per IP packet
    int m_Protocol; // Protocol: 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
};

```

Members

m_TxMode

Transmit mode.

Value	Meaning
DTAPI_TXMODE_188	Transport Packets are assumed to be 188 bytes, and are played out as 188-bytes packets.
DTAPI_TXMODE_204	Transport Packets are assumed to be 204 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_ADD16	Transport Packets are assumed to be 188 bytes, and are played out as 204-bytes packets.
DTAPI_TXMODE_MIN16	Transport Packets are assumed to be 204 bytes, and are played out as 188-bytes packets.

m_Ip[4]

Destination IP address. If the IP address is in the multicast range, the playout server automatically joins and drops membership of the multicast group.

m_Port

Destination port number.

m_TimeToLive

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

m_NumTpPerIp

Number of Transport Packets (TPs) stored in one IP packet. The range is 1..7.

m_Protocol

Protocol expected for encapsulation of Transport Packets.

Value	Meaning
DTAPI_PROTO_UDP	UDP
DTAPI_PROTO_RTP	RTP

m_DiffServ

Value to be put in the *Differentiated Services* field (formerly *Service Type*) in the IP header.

m_FecMode

Error-correction mode.

Value	Meaning
DTAPI_FEC_DISABLE	No FEC
DTAPI_FEC_2D	RFC2733 parity FEC with 2D extensions as described in Code of Practice #3

m_FecNumRows, m_FecNumCols

Number of rows and columns in the FEC matrix. In the *COP #3* these parameters are called *D* and *L* respectively. The following restrictions apply to *L* and *D*:

$$4 \leq D \leq 20, \quad 1 \leq L \leq 20 \quad \text{and} \quad L * D \leq 100$$

SpRcClient::ClearErrors

Clear number-of-errors counter.

```
virtual SPRC_RESULT SpRcClient::ClearErrors(  
);
```

Parameters

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_OK	The DVB-ASI transmission parameters have been read successfully

Remarks

SpRcClient::GetAsiPars

Get DVB-ASI transmission parameters.

```
virtual SPRC_RESULT SpRcClient::GetAsiPars (
    [in] SpRcAsiPars& AsiPars // ASI parameters
);
```

Parameters

AsiPars

DVB-ASI transmission parameters, see **Struct SpRcAsiPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_ASI	Invalid operation because the port is not an ASI port
SPRC_OK	The DVB-ASI transmission parameters have been read successfully

Remarks

SpRcClient::GetIsdbtPars

Get ISDB-T modulation parameters.

```
virtual SPRC_RESULT SpRcClient::GetIsdbtPars(
    [in] SpRcIsdbtPars& IsdbtPars // ISDB-T parameters
);
```

Parameters

IsdbtPars

ISDB-T modulation parameters, see **Struct SpRcIsdbtPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_ISDBT	Invalid operation because the port is operating in ISDB-T modulation mode
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The modulation parameters have been read successfully

Remarks

SpRcClient::GetModPars

Get modulation parameters.

```
virtual SPRC_RESULT SpRcClient::GetModPars (  
    [in] SpRcModPars& ModPars    // Modulation parameters  
);
```

Parameters

ModPars

Modulation parameters, see **Struct SpRcModPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The modulation parameters have been read successfully

Remarks

SpRcClient::GetPayoutInfo

Get static payout information.

```
virtual SPRC_RESULT SpRcClient::GetPayoutInfo(  
    [in] SpRcPayoutInfo& PoInfo    // Static payout info  
);
```

Parameters

PoInfo

Payout information, see **Struct SpRcPayoutInfo**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the payout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_OK	The payout information has been read successfully

Remarks

SpRcClient::GetPlayoutStatus

Get dynamic playout status.

```
virtual SPRC_RESULT SpRcClient::GetPlayoutStatus(  
    [in] SpRcPlayoutStatus& PoStatus    // Dynamic playout status  
);
```

Parameters

PoInfo

Playout information, see Struct **SpRcPlayoutInfo**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_OK	The playout status has been read successfully

Remarks

SpRcClient::GetRfPars

Get RF parameters.

```
virtual SPRC_RESULT SpRcClient::GetRfPars(  
    [in] SpRcRfPars& RfPars           // RF parameters  
);
```

Parameters

RfPars

RF parameters, see Struct `SpRcRfPars`.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The RF parameters have been read successfully

Remarks

SpRcClient::GetSpiPars

Get DVB-SPI transmission parameters.

```
virtual SPRC_RESULT SpRcClient::GetSpiPars (  
    [in] SpRcAsiPars& SpiPars // DVB-SPI parameters  
);
```

Parameters

AsiPars

DVB-SPI transmission parameters, see **Struct SpRcSpiPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_SPI	Invalid operation because the port is not a DVB-SPI port
SPRC_OK	The DVB-SPI transmission parameters have been read successfully

Remarks

SpRcClient::GetTsoipPars

Get TSolP transmission parameters.

```
virtual SPRC_RESULT SpRcClient::GetTsoipPars(  
    [in] SpRcTsoipPars& TsoipPars // TSOIP parameters  
);
```

Parameters

TsoipPars

TSolP transmission parameters, see Struct **SpRcTsoipPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_TSOIP	Invalid operation because the port is not a TSolP port
SPRC_OK	The TSolP transmission parameters have been read successfully

Remarks

SpRcClient::OpenFile

Open file for playout.

```
virtual SPRC_RESULT SpRcClient::OpenFile(  
    [in] std::wstring& Filename    // Filename  
);
```

Parameters

Filename

Filename to be opened.

Result

SPRC_RESULT	Meaning
SPRC_E_FILE_CANT_FIND	Can't find a file with the specified filename
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_OK	The playout file has been opened successfully

Remarks

SpRcClient::SetAsiPars

Set DVB-ASI transmission parameters.

```
virtual SPRC_RESULT SpRcClient::SetAsiPars(
    [in] SpRcAsiPars AsiPars // ASI parameters
);
```

Parameters

AsiPars

DVB-ASI transmission parameters, see **Struct SpRcAsiPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_ASI	Invalid operation because the port is not an ASI port
SPRC_E_POLARITY	The polarity specified in <i>AsiPars</i> is not supported by the device
SPRC_E_TXMODE	The transmit mode specified in <i>AsiPars</i> is not compatible with the Transport-Stream file
SPRC_OK	The DVB-ASI transmission parameters have been set successfully

Remarks

SpRcClient::SetLoopFlags

Set loop-adaptation flags.

```
virtual SPRC_RESULT SpRcClient::SetLoopFlags(
    [in] int LoopFlags // Loop-adaptation flags
);
```

Parameters

LoopFlags

Loop-adaptation flags encoded in flags that may be OR-ed together.

Value	Meaning
SPRC_LOOP_CC	Adapt continuity counters
SPRC_LOOP_PCR	Adapt PCR
SPRC_LOOP_TDT	Adapt TDT
SPRC_LOOP_WRAP	Auto wrap-around

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_OK	The loop-adaptation flags have been set successfully

Remarks

SpRcClient::SetIsdbtPars

Set ISDB-T modulation parameters.

```
virtual SPRC_RESULT SpRcClient::SetIsdbtPars(  
    [in] SpRcIsdbtPars IsdbtPars    // ISDB-T parameters  
);
```

Parameters

IsdbtPars

ISDB-T modulation parameters, see **Struct SpRcIsdbtPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_ISDBT	Invalid operation because the port is operating in ISDB-T modulation mode
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The modulation parameters have been set successfully

Remarks

SpRcClient::SetModPars

Set modulation parameters for all modulation standards except ISDB-T and DVB-T2.

```
virtual SPRC_RESULT SpRcClient::SetModPars(  
    [in] SpRcModPars ModPars // Modulation parameters  
);
```

Parameters

ModPars

Modulation parameters, see **Struct SpRcModPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The modulation parameters have been set successfully

Remarks

SpRcClient::SetPlayoutState

Set playout state (play/pause/stop).

```
virtual SPRC_RESULT SpRcClient::SetPlayoutState(
    [in] int PlayoutState // Playout state
);
```

Parameters

PlayoutState

New playout state.

Value	Meaning
SPRC_STATE_PAUSE	Pause
SPRC_STATE_PLAY	Play
SPRC_STATE_STOP	Stop

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_INV_STATE	Invalid playout state
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_OK	The playout state has been set successfully

Remarks

SpRcClient::SetRfPars

Set RF parameters.

```
virtual SPRC_RESULT SpRcClient::SetRfPars(
    [in] SpRcRfPars RfPars           // RF parameters
);
```

Parameters

RfPars

RF parameters, see Struct **SpRcPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_INV_FREQ	The centre frequency in <i>RfPars</i> is not supported by the upconverter on this modulator
SPRC_E_INV_LEVEL	The level in <i>RfPars</i> is not supported by this modulator
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_MOD	Invalid operation because the port is not a modulation port
SPRC_OK	The RF parameters have been set successfully

Remarks

SpRcClient::SetSpiPars

Set DVB-ASI transmission parameters.

```
virtual SPRC_RESULT SpRcClient::SetAsiPars(  
    [in] SpRcSpiPars SpiPars // DVB-SPI parameters  
);
```

Parameters

AsiPars

DVB-SPI transmission parameters, see **Struct SpRcSpiPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_SPI	Invalid operation because the port is not a DVB-SPI port
SPRC_E_TXMODE	The transmit mode specified in <i>SpiPars</i> is not compatible with the Transport-Stream file
SPRC_OK	The DVB-SPI transmission parameters have been set successfully

Remarks

SpRcClient::SetTsoipPars

Set TSolP transmission parameters.

```
virtual SPRC_RESULT SpRcClient::SetTsoipPars (  
    [in] SpRcTsoipPars  TsoipPars    // TSoIP parameters  
);
```

Parameters

TsoipPars

TSolP transmission parameters, see Struct **SpRcTsoipPars**.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_NO_PORT	Invalid operation because no port is selected
SPRC_E_NOT_TSOIP	Invalid operation because the port is not a TSolP port
SPRC_OK	The TSolP transmission parameters have been set successfully

Remarks

SpRcClient::WaitForCondition

Wait for a certain condition.

```
virtual SPRC_RESULT SpRcClient::WaitForCondition(
    [in] int Condition,          // Playout state to wait for
    [in] int TimeOut           // Maximum time to wait in ms
);
```

Parameters

Condition

Condition to wait for.

Value	Meaning
SPRC_COND_STOPPED	Playout server is in a stopped state; In this context, pause is not considered a stopped state

TimeOut

Time-out period in ms. If this parameter is -1 no time out is applied.

Result

SPRC_RESULT	Meaning
SPRC_E_COMMUNICATION	An error has occurred in the communication with the playout server
SPRC_E_INV_CONDITION	An invalid condition has been specified
SPRC_OK	The condition has occurred
SPRC_TIME_OUT	The time out has triggered

Remarks