

**NAME**

IsdbMux - create a multiplexed ISDB-S file

**SYNOPSIS**

IsdbMux **-p** params [**-v**] **-o** outfile infile1 infile2...

**DESCRIPTION**

IsdbMux is a tool to convert one or more transport-stream files into a valid ISDB-S stream including TMCC data. The resulting stream can be used for ISDB-S modulation using the DekTec StreamXpress player.

**OPTIONS**

The following options are supported:

**-p** param1=val1,param2=val2...

Specifies the modulation parameters in a comma-separated parameter-value list. See the PARAMETERS section for a list of supported parameters and their values.

**-v** Sets verbose mode.

**-o** outfile Sets the output filename. The bitrate of the output file will be 52,170,000 bps.

infilek Name of the *k*-th MPEG-2 transport-stream input file to be multiplexed. The input files shall contain 188-byte packets. The bitrate of the input files is constrained by the modulation type and number of slots used, see section CONSTRAINTS.

**PARAMETERS**

The following modulation parameters are recognized for the **-p** option:

output\_format raw (default) | b15

The overall multiplexing format of the output file.

raw SYNC bytes are used for TMCC data storage

b15 According to ARIB TR B15. The TMCC data is stored in the 16 extra bytes of 204-byte packets.

tmode[i] bpsk1/2 | qpsk1/2 | qpsk2/3 | qpsk3/4 | qpsk5/6 | qpsk7/8 | 8psk2/3 (default)

Modulation type for hierarchy layer *i* (*i*<5). A maximum of 5 layers with different modulation types can be defined.

slot\_count[i] 0..48 (default: slot\_count[0]=48), *i*<5

The number of slots per frame used for hierarchical layer *i*. The total number of slots per frame is 48, so the sum of slot\_count[i] must be 48.

relts [*k,k,...,k*], 48 positions, *k*<8 (default: *k*=0 for 48 positions)  
*k* specifies for each of the 48 TMCC slots the index of the corresponding transport-stream file, e.g. *k*=5 refers to infile5.

tsid[k] 0..65535, *k*<8 (default: 0)

Transport-stream identifier (TSID) for transport stream *k*.

**CONSTRAINTS**

The output bitrate is fixed to 52.17 Mbps. This bit rate is available in its entirety to the input file(s) if all slots use 8PSK2/3 modulation. However, the TS rate capacity is reduced if some slots are set to use another modulation type than 8PSK2/3. In that case IsdbsMux stuffs the output stream with null packets, so that the output bitrate remains fixed at 52.17 Mbps.

The table below summarizes the constraints on slot-count allocation and input-file bitrate, to enable IsdbsMux to generate a valid ISDB-S stream.

Modulation	Slot count multiple of	Null packet stuffing	TS rate (bd) / $n$ slots	Maximum TS rate (bd)
BPSK1/2	4	3 of 4 slots	1,086,875 / 4 slots	13,042,500
QPSK1/2	2	1 of 2 slots	1,086,875 / 2 slots	26,085,000
QPSK2/3	3	1 of 3 slots	2,173,750 / 3 slots	34,780,000
QPSK3/4	4	1 of 4 slots	3,260,625 / 4 slots	39,127,500
QPSK5/6	6	1 of 6 slots	5,434,375 / 6 slots	43,475,000
QPSK7/8	8	1 of 8 slots	7,608,125 / 8 slots	45,648,750
8PSK2/3	1	none	1,086,875 / slot	52,170,000

**EXAMPLE**

```
IsdbsMux -p
  tmode[0]=8psk2/3,slot_count[0]=46,tmode[1]=qpsk1/2,slot_count[1]=2,
  relts=[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,1,
  1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,0,0],
  tsid[0]=0x40f1,tsid[1]=0x40f2 -o muxed.ts fileA.ts fileB.ts
```

Create an ISDB-S multiplex with 2 hierarchical layers:

```
Layer 0:      8PSK, code rate 2/3, uses 46 slots
Layer 1:      QPSK, code rate 1/2, uses 2 slots
```

The packets transmitted in layer 1 using QPSK 1/2 are more robust and are typically used to transmit the SI data and the audio.

Two transport-stream files are used:

```
fileA.ts      ID=0x40F1; Uses slot 1-22 (8PSK 2/3) and slot 47,48 (QPSK 1/2)
fileB.ts      ID=0x40F2; Uses slot 23-46 (8PSK 2/3)
```

Layer 1 uses 2 slots. IsdbsMux will use one of these slots to stuff null packets and the other slot to transmit transport packets.

**LICENSE**

A valid ISDB-S license installed on a DekTec modulator card is required to run IsdbsMux.