WHITE PAPER

Fraunhofer DCPServer Professional

INTRODUCTION

The Fraunhofer DCPServer Professional allows the universal processing and management of data streams based on the DCP protocol. DCP stands for '**Distribution & Communication Protocol**'. This protocol is standardized as ETSI TS 102 821 (www.etsi.org). DCP based protocols specified for Digital Radio include MDI (Multiplex Distribution Interface), RSCI (Receiver Status & Control Interface) and EDI (Encapsulation of DAB Interfaces).

DCP BASED PROTOCOLS

A number of widely used application protocols are based on the DCP Distribution & Communication Protocol. The transport of all these application protocols can be managed using the DCPServer Professional.

- One of the protocols based on DCP is **MDI** – the 'Multiplex Distribution Interface' (ETSI TS 102 820) for DRM – Digital Radio Mondiale (www.drm.org). MDI is the standard transmission format for the digital DRM Multiplex from the DRM Multiplex Generator (e.g. the Fraunhofer DRM ContentServer) to any DRM conforming Modulator. Alternatively the MDI data stream can also directly be fed into a DRM software receiver for monitoring, e.g. the Fraunhofer DRM SoftwareRadio, or archiving.
- Another DRM specific protocol is **RSCI** – the 'Receiver Status & Control Interface' (ETSI TS 102 349). It provides a standardized way for interfacing with DRM receivers.
- **EDI** – the 'Encapsulation of DAB Interfaces' protocol (ETSI TS 102 693) – is the equivalent of MDI for the DAB Digital Radio standard (www.worlddab.org). It carries a DAB sub-multiplex (STI-D content) or the full DAB Ensemble Multiplex (ETI content) via DCP.

FUNCTIONALITY OF THE FRAUNHOFER DCPSERVER PROFESSIONAL

- Console application, runs on
  - **Windows** XP, Vista, 7
  - **Linux**

- Versatile functionality:
  - DCP data stream **monitoring**
  - DCP data stream **forwarding/redirecting**
  - DCP data stream **multiplication** (unlimited number of target devices!)
  - DCP data stream **writing to/reading from file** (in real time or with individual delays in between DCP packet)
  - DCP data stream **transformation** (DCP protocol parameters) and **conversion** (e.g. UDP/IP to serial etc.)

- o **Processing statistics** when program finishes
- o 'Endless' **loop-playback** when reading from file,
  optionally with **correction** of DCP internal counters and time stamps
- o **Correction and refreshing** of forward error correction information
  (e.g. in multi-segment connections)

- Full support of all features of the DCP protocol:
  - o Contains a PFT en- and decoder incl. FEC (forward error correction),
    target-/source-addressing and fragmentation/de-fragmentation
  - o Output of fragments can be spread over time (including interleaving)
  - o Contains FILE-Layer support (writing/reading of DCP data to/from file)
  - o Supports as basic transmission layers (besides file):
    - UDP/IP reception/sending (uni- or multicast)
    - Output to serial ports (e.g. COMx, dev/ttySx)

- Full support for DCP's TAG Packet functionality:
  - o Display of all TAG Items carried within a TAG Packet
  - o Supports individual bit length of TAG Items (not just full byte length)
  - o Supports multiple TAG Items with identical name/ID within one TAG Packet

- Support for the EDI specific 'resend request feature' – both for the EDI encoder and decoder side.

- The Fraunhofer DCPServer Professional allows the definition of
  - o one Input-Device (source of a DCP stream):
    - Reception of DCP data via UDP/IP or from file
    - Reception from UDP/IP unicast- or multicast addresses
    - Optional filtering of incoming UDP/IP packets according to source address
    - Display of the time of reception of each DCP data packet relative to the start of the program
    - Reading from file in can be performed in real time, as quick as possible or with fixed delays in between the processing of DCP Packets

- o as well as optionally any number of Output-Devices
  (targets of the DCP stream):
  - All received information is automatically forwarded to all defined DCP output devices
  - For every single output device an individual basic transmission layer (UDP/IP unicast, UDP/IP multicast, file, serial) as well as individual DCP format parameters (AF, PFT, fragmentation, forward error correction, addressing,...) can be specified

- If required, the DCPServer Professional can automatically stop after a predefined amount of time or received data.
  If required, every output device can optionally be deactivated after a predefined amount of time or a certain amount of written data.

- When quitting the tool, the Fraunhofer DCPServer Professional provides a detailed statistics for the input device as well as every defined output device:
  number of received DCP Packets, number of detected invalid DCP Packets in the input stream, number of not successfully sent DCP Packets per output device, etc.

- The Fraunhofer DCPServer Professional provides the conversion of MDI/DCP data streams into the IPIO or SUDP_BM format respectively, as well as the output of these formats via serial line. This format is required to connect to first generation Transradio (Telefunken) DRM Modulators.

ABOUT FRAUNHOFER IIS

The Audio and Media Technologies division of Fraunhofer IIS has been an authority in its field for more than 25 years, starting with the creation of mp3 and co-development of AAC formats. Today, there are more than 10 billion licensed products worldwide with Fraunhofer's media technologies, and over one billion new products added every year. Besides the global successes mp3 and AAC, the Fraunhofer technologies that improve consumers' audio experiences include Cingo® (spatial VR audio), Symphoria® (automotive 3D audio), xHE-AAC (adaptive streaming and digital radio), the 3GPP EVS VoLTE codec (crystal clear telephone calls), and the interactive and immersive MPEG-H TV Audio System.

With the test plan for the Digital Cinema Initiative and the recognized software suite easyDCP, Fraunhofer IIS significantly pushed the digitization of cinema. The most recent technological achievement for moving pictures is Realception®, a tool for light-field data processing.

Fraunhofer IIS, based in Erlangen, Germany, is one of 69 divisions of Fraunhofer-Gesellschaft, Europe's largest application-oriented research organization.

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