TC | APPLIED TECHNOLOGIES

TCAT Connection Management System Specification

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Document History

Version	Date	Name	Comment
0.0.0.1	August 16, 2007	M Lave	Document started

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1 Introduction

This simple Connection Management System is an example of a CMS implemented on the DICE platform. It is primarily based on features provided by ‘avs’, ‘dal’ and the IEEE1394 stack.
A controller is required to set the system up. The controller uses a register space to do that. The device will store the setup in persistent storage using ‘sps’. The connections are based on fixed Isoc channels and when the device boots it will try to reserve those channels and start streaming. If the channel or bandwidth is not available it will fail and not commence streaming on the channel.
This model does not involve asynchronous device to device communication, it assumes that the controller has configured the nodes correctly.
This means that if a new device is added or a device is removed the controller will be required to reconfigure the system.

2 Features

- A number of fixed transmitter definitions (conduits).
- Configuration of receivers (source conduits)
- Internal routing of conduits to physical outputs
- Receiver reconfiguration without dropouts.
- Auto detect rates within one rate mode.
- Support for audio and UART in one conduit.
- XML description for controller.
- Lock, slip, status information for controller.
- Single master device and support for daisy-chain slaving.

3 Device communication model

The communication model is based on a private memory space. This memory space contains locations to configure the system, transmitters and receivers.

The private space used for tcatCMS is split into sections. The offset to those sections are defined in the beginning of the space. This would allow for future extensions without jeopardizing backward compatibility. The following sections are defined in the TCAT_CMS_SPACE:

CAPABILITY_SPACE
GLOBAL_PAR_SPACE
TX_PAR_SPACE
RX_PAR_SPACE
RX_ROUTE_SPACE
RC_COMM_SPACE
GENERAL_STAT_SPACE
TX_STAT_SPACE
RX_STAT_SPACE
XML_SPACE

APP_SPACE

3.1 TCAT_CMS_SPACE

Address	Parameter name	Size	Attribute
FFFF E800 0000_{16}	CAPABILITY_ OFF	32bit	RO
FFFF E800 0004_{16}	CAPABILITY_ SZ	32bit	RO
FFFF E800 0008_{16}	GLOBAL_PAR_OFF	32bit	RO
FFFF E800 $000C_{16}$	GLOBAL_PAR_SZ	32bit	RO
FFFF E800 0010_{16}	TX_PAR_OFF	32bit	RO
FFFF E800 0014_{16}	TX_PAR_SZ	32bit	RO
FFFF E800 0018_{16}	RX_PAR_OFF	32bit	RO
FFFF E800 $001C_{16}$	RX_PAR_SZ	32bit	RO
FFFF E800 0020_{16}	RX_ROUTE_OFF	32bit	RO
FFFF E800 0024_{16}	RX_ROUTE_SZ	32bit	RO
FFFF E800 0028_{16}	RX_COMM_OFF	32bit	RO
FFFF E800 $002C_{16}$	RX_COMM_SZ	32bit	RO
FFFF E800 0030_{16}	GENERAL_STAT_OFF	32bit	RO
FFFF E800 0034_{16}	GENERAL_STAT_SZ	32bit	RO
FFFF E800 0038_{16}	TX_STAT_OFF	32bit	RO
FFFF E800 $003C_{16}$	TX_STAT_SZ	32bit	RO
FFFF E800 0040_{16}	RX_STAT_OFF	32bit	RO
FFFF E800 0044_{16}	RX_STAT_SZ	32bit	RO
FFFF E800 0048_{16}	XML_OFF	32bit	RO
FFFF E800 $004C_{16}$	XML_SZ	32bit	RO
FFFF E800 0050_{16}	APP_SPACE_OFF	32bit	RO
FFFF E800 0054_{16}	APP_SPACE_SZ	32bit	RO
FFFF E800 0058_{16}	UNUSED_SPACE_OFF	32bit	RO
FFFF E800 $005C_{16}$	UNUSED_SPACE_SZ	32bit	RO

This structure is read only and is used to specify the offset of the various configuration blocks. All values are 32 bit unsigned. The offsets are in quadlets from the start of this structure and the sizes are in number of quadlets.

3.2 CAPABILITY_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	SPEC_VERSION	32bit	RO	The revision of this specification
04_{16}	CAP_FLAGS	32bit	RO	Various capability flags. See below
08_{16}	NB_TX	32bit	RO	Number of Isoc transmitters.
$0C_{16}$	NB_RX	32bit	RO	Number of Isoc. Receivers
10_{16}	NB_OUTPUTS	32bit	RO	Number of physical outputs (might change

				with rate_mode)
14_{16}	NB_COMMS	32bit	RO	Number of physical comm. Outputs.

3.3 GLOBAL_PAR_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	NICK_NAME	16*32bit	RW	Zero terminated string, implicitly terminated if strlen()=64
04_{16}	SYNC_SOURCE	32bit	RW	See definitions below
08_{16}	RATE_MODE	32bit	RW	See definitions below
$0C_{16}$	INDICATE	32bit	RW	Blink indicate light
10_{16}	COM0_SETUP	32bit	RW	See definitions below
14_{16}	COM1_SETUP	32bit	RW	See definitions below

COMn_SETUP bit definitions

Bit	Name	Meaning
0..3	BAUD	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600, 7=115200, 8-14, reserved 15=31250 (MIDI)
4..5	PARITY	00 = No Parity 01 = Even parity 10 = Odd parity 11 = Reserved
6..7	BITS	00 = 5 bits per char 01 = 6 bits per char 10 = 7 bits per char 11 = 8 bits per char
8	STOP	0 = 1 stop bit 1 = 2 stop bits
9	ENABLE	0 = port disabled 1 = port enabled

SYNC_SOURCE

This field selects the sync source. The source selection is split into 3 groups. The first group is internal rates. The second group is external sync sources and the last group is SYT sync.The group is indicated by bit 4 and 5.

Source	Name	Meaning
0	INT_32K	Internal 32k sample rate
1	INT_44K1	
2	INT_48K	
3	INT88K2	
4	INT96K	
5	INT176K4	
6	INT192K	
7-15	Reserved	
16..31	EXT_SYNCn	External sync source. Sources are described in XML file.
32..47	SYT_SYNCn	Sync to the SYT from receiver n

3.4 TX_PAR_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	TX0_ISOC_CH	32bit	RW	Isoc channel
04_{16}	TX0_AUDIO_CFG	32bit	RW	Audio configuration mode.
08_{16}	TX0_COM_CFG	32bit	RW	Com port configuration mode
$0C_{16}$	TX0_RESERVED	32bit	RW	Reserved, should be 0
10_{16}	TX1_ISOC_CH	32bit	RW	Isoc channel
14_{16}	TX1_AUDIO_CFG	32bit	RW	Audio configuration mode.
18_{16}	TX1_COM_CFG	32bit	RW	Com port configuration mode
$1C_{16}$	TX1_RESERVED	32bit	RW	Reserved, should be 0
..				
$n*10_{16} + 00_{16}$	TXn_ISOC_CH	32bit	RW	Isoc channel
$n*10_{16} + 04_{16}$	TXn_AUDIO_CFG	32bit	RW	Audio configuration mode.
$n*10_{16} + 08_{16}$	TXn_COM_CFG	32bit	RW	Com port configuration mode
$n*10_{16} + 0C_{16}$	TXn_RESERVED	32bit	RW	Reserved, should be 0

The configuration of the Isoc transmitters are controlled by this space.
TXn_ISOC_CH: This field contains the Isoc channel used for this transmitter. If the field is $000000FF_{16}$ The transmitter is turned off. Writing to this field will result in the system freeing the previous Isoc channel and bandwidth and then it will try to allocate the channel number assigned and the required bandwidth. If the value $00000000EE_{16}$ is written the system will look for a free Isoc channel and allocate if possible.
The Audio and Com port configuration modes determines the layout of sequences on the stream. Changing those might result in the system having to reallocate the bandwidth.

3.5 RX_PAR_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	RX0_ISOC_CH	32bit	RW	Isoc channel
04_{16}	RX0_AUDIO_CHS	32bit	RW	Audio channels expected.
08_{16}	RX0_COM_CHS	32bit	RW	Com channels expected.
$0C_{16}$	RX0_RESERVED	32bit	RW	Reserved, should be 0
10_{16}	RX1_ISOC_CH	32bit	RW	Isoc channel
14_{16}	RX1_AUDIO_CHS	32bit	RW	Audio channels expected.
18_{16}	RX1_COM_CHS	32bit	RW	Com channels expected.
$1C_{16}$	RX1_RESERVED	32bit	RW	Reserved, should be 0
..				
$n*10_{16} + 00_{16}$	RXn_ISOC_CH	32bit	RW	Isoc channel
$n*10_{16} + 04_{16}$	RXn_AUDIO_CHS	32bit	RW	Audio channels expected.
$n*10_{16} + 08_{16}$	RXn_COM_CHS	32bit	RW	Com channels expected.
$n*10_{16} + 0C_{16}$	RXn_RESERVED	32bit	RW	Reserved, should be 0

3.6 RX_ROUTE_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	CH0_SOURCE	32bit	RW	Source for physical output ch 0
04_{16}	CH1_SOURCE	32bit	RW	Source for physical output ch 1
..				
$n*04_{16}$	CHn_SOURCE	32bit	RW	Source for physical output ch n

3.7 RX_COMM_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	COM0_SOURCE	32bit	RW	Source for physical comm. ch 0
..				
$n*04_{16}$	COMn_SOURCE	32bit	RW	Source for physical comm. ch n

3.8 GENERAL_STAT_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	LOCK_INFO	32bit	RO	See definition below
04_{16}	AES_LOCK_INFO	32bit	RO	See definition below
08_{16}	ADAT_LOCK_INFO	32bit	RO	See definition below
$0C_{16}$	RESERVED	32bit	RO	Reserved, zero

3.9 TX_STAT_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	TX0_AUDIO_CHS	32bit	RO	Number of audio channels in stream
04_{16}	TX0_COM_CHS	32bit	RO	Number of comm. Channels in stream
08_{16}	TX0_STATE	32bit	RO	See definition below
$0C_{16}$	TX0_RESERVED	32bit	RO	Zero
..				
$n*10_{16} + 00_{16}$	TXn_AUDIO_CHS	32bit	RO	Number of audio channels in stream
$n*10_{16} + 04_{16}$	TXn_COM_CHS	32bit	RO	Number of comm. Channels in stream
$n*10_{16} + 08_{16}$	TXn_STATE	32bit	RO	See definition below
$n*10_{16} + 0C_{16}$	TXn_RESERVED	32bit	RO	Zero

3.10 RX_STAT_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	RX0_STATE	32bit	RO	See definition below
$n*04_{16}$	RXn_STATE	32bit	RO	See definition below

3.11 XML_SPACE

Offset	Parameter	Size	Attribute	Function
00_{16}	XML_INFO	32bit	RO	See definition below
04_{16}	XML_FILE_URL	V*32bit	RO	Actual XML file or URL to XML file.

3.12 UNUSEDn_SPACE

This space can be used for application specific functionality.