TCNet

LINK SPECIFICATION V3.3.1 – 05/28/2019

INTRODUCTION

TCNet is originally designed by developers from the entertainment industry to create an open communication protocol between devices or software to share real-time Time Code and Meta Data.
The protocol is open and free to be used and everyone can contribute.

COMMUNICATION VIA NODES

TCNet is designed to have virtually unlimited amount of nodes that can participate. Each node is identified by its own unique MAC address and can have one of three roles: Auto, Master, Slave or Repeater. For example: A Master generates TCNet Time Code packets and sends these to all Slaves in network, A Slave only receives TCNet Metadata and Timing packets. A Repeater is capable of receiving AND sending TCNet Metadata and Timing Packets. No matter what role a node is, it is capable to send and receive TCNet Control Message packets.
TCNet Opt-IN packets are send by a node, every 1000 milliseconds to establish and keep participation in a TCNet network.
Each node finds and populates other nodes this way and holds a active population list of all nodes and its functions, listener port and timer.
When a node disconnects or disappears from a TCNet network, it should be automatically deleted from the population list.

NETWORK PORTS

TCNet communicates via the UDP protocol. The following ports are used:

Broadcast ports:
60000 - Used for Opt-IN and Opt-OUT messages
60000 - Used for Application Specific Data (Non public data shared between applications)
60001 – Used for broadcasting TCNet Time Packets

Unicast ports:
65023-65535 - Used for unicast messages. (Default is 65023)

NETWORK PARTICIPATION

To join a TCNet network the following steps need to be taken:

First step:
Create an internal timer that runs from 0-999999 Microseconds (This can also be done by using computers internal clock and take Microseconds of each second cycle)
Second step:
Open a listener on port 60000,60001,60002 to receive TCNet broadcast packets.
Third step:
Send a TCNet GW Opt-IN package every 1000 milliseconds, containing basic information and functionality of the node. (See: OPT-IN/OPT-OUT MESSAGES)
Fourth step:
Wait for incoming Opt-IN messages and keep track of all nodes in a list. Each Node tells what port to use to communicate.

Additional step:
Perform a time sync between all discovered nodes. (See: SYNC MESSAGES)

After joining a TCNet network, depending on your node's role, you can send and receive information.
The basic rule is that only a Master or Repeater can send data and that a Slave or Repeater only can request data.

OPT-IN/OPT-OUT MESSAGES

The following Opt-In/Opt-Out message types are defined in this document:

002 – TCNet OPT-IN Packet (Broadcast on port 60000)
003 – TCNet OPT-OUT Packet (Broadcast on port 60000)

STATUS MESSAGES

Broadcast of Realtime Status messages:

005 – TCNet Status Packet (Broadcast on port 60000)

SYNC MESSAGES

The following Sync message types are defined in this document:

010 – TCNet Time Sync Packet (Unicast on port Target-Node-Port)

NOTIFICATION MESSAGES

Control messages are special messages that allow remote control TCNet nodes. (Full documentation upon request)
The following control message types are defined in this document:

013 – TCNet Error Notification Packet (Unicast on port Target-Node-Port)
020 – TCNet Request Packet (Unicast on port Target-Node-Port)
030 – TCNet Application Specific Data Packet (Broadcast on port 60001, Unicast on Target-Node-Port)

CONTROL MESSAGES

Control messages are special messages that allow remote control TCNet nodes. (Full documentation upon request)
The following control message types are defined in this document:

101 – TCNet Control Messages (Unicast on port Target-Node-Port)
128 – TCNet Text Data (Broadcast on port 60000 or Unicast on port Target-Node-Port)
132– TCNet Keyboard Data (Broadcast on port 60000 or Unicast on port Target-Node-Port)

DATA PACKETS

Data message types are messages containing data such as metadata, timing data, waveform data, cues etc.
The following data message types are defined in this document:

200 - TCNet Data Packet - Metrics Data (Unicast on port Target-Node-Port) (Type 2)
200 - TCNet Data Packet - Metadata (Unicast on port Target-Node-Port) (Type 4)
200 - TCNet Data Packet - Beat Grid Info (Unicast on port Target-Node-Port) (Type 8)
200 - TCNet Data Packet - Cue Data Info (Unicast on port Target-Node-Port) (Type 12)
200 - TCNet Data Packet - Small Wave Form (Unicast on port Target-Node-Port) (Type 16)
200 - TCNet Data Packet - Big Wave Form (Unicast on port Target-Node-Port) (Type 32)

FILE PACKETS

File packet types are packets containing data such as images and audio files.
The following data message types are defined in this document:

204 - TCNet Data File Packet – Low Res Artwork Image (Unicast on port Target-Node-Port) (Type 128)

APPLICATION SPECIFIC DATA PACKETS

Application Specific Data packet types are packets containing data exchanged between applications.
The following data message types are defined in this document:

213 - TCNet Application Specific Data (Broadcast on port 60000, Unicast on Target-Node-Port)

TIMING PACKETS

Time Packets are time critical and updated at high rates.

254 - TCNet Time Packet (Broadcast on port 60001, Unicast on Target-Node-Port)

NODE OPTIONS

When a node opts in on a TCNet network, the communication flags can be set in this byte. If you need to set more flags than one, just sum the flags (Flag 1+ Flag 2+ Flag 8 = 11)
The following flags are available:

1 – NEED AUTHENTICATION (Authentication for extended communication needed)
2 – SUPPORTS TCNCM (Listens to TCNet Control Messages)
4 – SUPPORTS TCNASDP (Listens to TCNet Application Specific Data Packet)
8 – DND (Do not disturb/Sleeping. Node will request data itself if needed to avoid traffic)

FLAME VERSIONS

To make sure TCNet is backwards compatible, a flame number is used for each addition or change. To make your applications backwards compatible with older versions, always check for the protocol version of incoming packets.

INFORMATION

For more background information or documentation, please don't hesitate to make inquiries to dev@eiglive.com.

TCNet Opt-IN Packet

Functionality Present and keep alive a node into a TCNet network.
Type Broadcast
Port UDP(60000)
Size 68
Behavior Broadcast every 1000ms

PARAMETERS	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	6	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	2	Type 2: TCNet OPT-IN	V1-0
Node Name	8	8	ASCII TEXT*	Node Name	V3-1
SEQ	16	1	0-255	Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data					
Node Count	24	2	0-65535 (LITTLE ENDIAN)	Amount of Registered Nodes	V3-1
Node Listener Port	26	2	65023-65535 (LITTLE ENDIAN)	Listener Port for Unicast Messages	V3-1
Uptime	28	2	0-43199 (LITTLE ENDIAN)	Uptime of Node in SEC	V3-2
RESERVED	30	2		RESERVED	V3-2
Vendor Name	32	16	ASCII TEXT	Vendor	V3-2
Application/Device Name	48	16	ASCII TEXT	Application / Device Name	V3-2
Application/Device Major Version	64	1	0-255	Application/Device Major Version	V3-2
Application/Device Minor Version	65	1	0-255	Application/Device Minor Version	V3-2
Application/Device Bug Version	66	1	0-255	Application/Device Minor Version	V3-2
RESERVED	67	1		RESERVED	V3-2

* See details below:

TCNet Opt-IN Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=2
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Node Count Number of nodes registered by system
Node Listener Port Listener port of node (Used to receive unicast messages)
Uptime Up time of Node in seconds. (!) **Must Roll over / Reset every 12 hours.**
Vendor Name Name of Vendor of Node
Application/Device Name Name of Application/Device (Node)
Major Version Major Version of Node
Minor Version Minor Version of Node
Bug Version Bug Version of Node

TCNet Opt-OUT Packet

Functionality Notifies other nodes that node leaves network.
Type Broadcast
Port UDP(60000)
Size 28
Behavior Broadcast once when leaving network

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	3	Type 3: TCNet OPT-OUT	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data						
	Node Count	24	2	0-65535 (LITTLE ENDIAN)	Amount of Registered Nodes	V3-1
	Node Listener Port	26	2	65023-65535 (LITTLE ENDIAN)	Listener Port for Unicast Messages	V3-1

* See details below:

TCNet Opt-OUT Packet - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. Value=3
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Timestamp in microseconds that is used to calculate network latency.
Node Count Number of nodes registered by system
Node Listener Port Listener port of node (Used to receive unicast messages)

TIP:
In case of a disconnect of a Master Node in the network, the next master is chosen by looking at all Nodes running as Node Type 1 (Auto Master).
The node that has the highest Uptime including Timestamp becomes the new master. This node changes its type to 2 (Master) and starts its services as such.

TCNet Status Packet

Functionality Status PACKET of current settings on node.
Type Broadcast
Port UDP(60000)
Size 100 (+ App Specific Data)
Behavior Broadcast every 1000ms

PARAMETERS	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	6	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	5	Type 5: TCNet STATUS	V3-3
Node Name	8	8	ASCII TEXT*	Node Name	V3-1
SEQ	16	1	0-255	Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data					
Node Count	24	2	0-65535 (LITTLE ENDIAN)	Amount of Registered Nodes	V3-3
Node Listener Port	26	2	65023-65535 (LITTLE ENDIAN)	Listener Port for Unicast Messages	V3-3
RESERVED	28	6		RESERVED	V3-3
Layer 1 Source	34	1	0-255	Layer 1 Source	V3-3
Layer 2 Source	35	1	0-255	Layer 2 Source	V3-3
Layer 3 Source	36	1	0-255	Layer 3 Source	V3-3
Layer 4 Source	37	1	0-255	Layer 4 Source	V3-3
Layer A Source	38	1	0-255	Layer A Source	V3-3
Layer B Source	39	1	0-255	Layer B Source	V3-3
Layer M Source	40	1	0-255	Layer M Source	V3-3
Layer C Source	41	1	0-255	Layer C Source	V3-3
Layer 1 Status	42	1	0-255	Layer 1 Status	V3-3
Layer 2 Status	43	1	0-255	Layer 2 Status	V3-3
Layer 3 Status	44	1	0-255	Layer 3 Status	V3-3
Layer 4 Status	45	1	0-255	Layer 4 Status	V3-3
Layer A Status	46	1	0-255	Layer A Status	V3-3
Layer B Status	47	1	0-255	Layer B Status	V3-3
Layer M Status	48	1	0-255	Layer M Status	V3-3
Layer C Status	49	1	0-255	Layer C Status	V3-3
Layer 1 Track ID	50	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer 1	V3-3
Layer 2 Track ID	54	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer 2	V3-3
Layer 3 Track ID	58	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer 3	V3-3
Layer 4 Track ID	62	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer 4	V3-3
Layer A Track ID	66	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer A	V3-3
Layer B Track ID	70	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer B	V3-3
Layer M Track ID	74	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer M	V3-3
Layer C Track ID	78	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID for Layer C	V3-3
RESERVED	82	1		RESERVED	V3-3
SMPTE Mode	83	1	0-255	SMPTE Mode	V3-3
Auto Master Mode	84	1	0-255	RESERVED	V3-3

	RESERVED	85	15		RESERVED	V3-3
	APP SPECIFIC	100	>		APP SPECIFIC	V3-3

* See details below:

TCNet Status Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet: STATUS - Value=5
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Node Count Number of nodes registered by system
Node Listener Port Listener port of node (Used to receive unicast messages)

Layer Source Source number of layer
Layer Status Status of layer (Can be combined)
Example:
Bit 0: OFF= Stopped, ON=Running
Bit 1: OFF= Offline, ON=Online
Bit 2: RESERVED
Bit 3: RESERVED
Bit 4: RESERVED
Bit 5: RESERVED
Bit 6: RESERVED
Bit 7: RESERVED

Layer Track ID Track ID of track loaded on layer
SMPTE Mode SMPTE Mode set on node
Values: 24=24FPS, 25=25FPS,29=29.7FPS,30=30FPS
Auto Master Mode Auto Master mode on node (0=Disabled, 1=HTP Master, 2=Link Master)
App Specific Application Specific Data

TCNet Time Sync Packet

Functionality Send and Receive Time Sync Data.
Type Unicast
Port UDP(Target-Node-Port)
Size 32
Behavior Response Required

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	10	Type 10: TCNet Time Sync Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data						
	STEP	24	1	0-3	Step No	V3-1
	RESERVED	25	1		RESERVED	
	Node Listener Port	26	2	65023-65535 (LITTLE ENDIAN)	Listener Port for Unicast Messages	V3-2
	Remote Timestamp	28	4	0-999999 (LITTLE ENDIAN)	Timestamp of Remote Node	V3-2

* See details below:

TCNet Time Sync Packet - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=10
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Step Current step in process (0=Initialize, 1=Response)
Node Listener Port Listener port of node (Used to receive unicast messages)
Remote Timestamp Time stamp send by remote node in Sync Message

TCNet Time Sync Packet – Usage

Step 1:
Initializer send a TCNet Time Sync Message to remote node with Timestamp=Current timer in microseconds and STEP number=0
Step 2:
Remote node receives message and sends message back with Timestamp=Remote node's current timer in microseconds, STEP number=1 and Remote Timestamp= Initializer's original timestamp
Step 3:
Initializer received message back and calculates remote node's current time by:
Delay = (Current timer – Remote timestamp) /2)
Time of remote node = Timestamp + Delay
Optional:
In order to get a more accurate timing, you can initialize the routine again and calculate more accurate by:
Delay 1 = (Current timer – Remote timestamp) /2)
Delay 2 = (Current timer – Remote timestamp) /2)
Time of remote node = Timestamp + ((Delay1+Delay2) /2)

Note:
To keep track of this time, for each remote node, an internal timer should be created to keep track of current time of node.

TCNet Error / Notification

Functionality Notifies that a request is not handled
Type Unicast
Port UDP(Target-Node-Port)
Size 30
Behavior Send when a request is not handled or caused an error or for notifications, this message is sent back to notify requesting node.

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	13	Type 13: TCNet Error Notification	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data						
	Datatype	24	1	0-FF	Data type of Request	V3-1
	Layer ID	25	1	0-FF	Layer ID of original request	V3-1
	Code	26	2	(LITTLE ENDIAN)	Returned Code	V3-1
	Message Type	28	2	(LITTLE ENDIAN)	Message type of Request	V3-1

* See details below:

TCNet Error / Notification - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet: - Value=13
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data type Data type of failed request
Layer ID Layer ID of original request. If request was not targeted for specific layer, this value = 0
Code Error / Notification Code. The following protocol codes are defined

001 – Request Unknown (An unknown request is made)
013 – Request Not Possible/Featured (A request is recognized but can't be handled by node)
014 – Request Data = EMPTY (When a request is made for data and data is empty, this could be used to notify requesting node that there is nothing to send.
255 – Request Response: OK

Message Type Request ID (Message Type)

TCNet Request Packet

Functionality Request Data from other Node
Type Unicast
Port UDP(Target-Node-Port)
Size 26
Behavior Request is sent to a master or repeater node. As result the node will send back a packet containing small wave data or a request error message.

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	20	Type 20: TCNet Request Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data						
	Data Type	24	1	0-255	Data Type	V3-1
	Layer	25	1	0-255	Layer where data belongs to	V3-1

* See details below:

TCNet Request Packet - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet: - Value=20
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data Type Data Type to request
Layer Layer where Data is requested for

TCNet Control Packet

Functionality Send and Receive Control Packets to control nodes remotely.
Type Unicast
Port UDP(Target-Node-Port)
Size 42 + Datasize
Behavior Response Required

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	101	Type 101: TCNet Control	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	STEP	24	1	0-1	Step No	V3-1
	RESERVED	25	1		RESERVED	
	Data Size	26	4	(LITTLE ENDIAN)	Total Data Size	V3-2
	RESERVED	30	12		RESERVED	
Data						
	Control Path	42	Data Size	ASCII TEXT	String with Control Path	V3-2

* See details below:

TCNet Control Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=101
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Timestamp in microseconds that is used to calculate network latency.
Step Current step in process (0=Initialize, 1=Response)
Control Path String with Control Path, examples:

To stop a layer remotely: **layer/1/state=6;** (6=stop)
To set layer A source layer 1: **layer/5/source=1;**
To set layer M source layer A: **layer/7/source=5;**
To set state to "play" on layer 2 and force a resync on layer 2: **layer/2/state=3; layer/2/resync;**

As control paths differ per application, contact your software vendor to obtain correct control path's.

TCNet Text Data Packet

Functionality Send and Receive Text Data Packets to control nodes remotely.
Type Broadcast/Unicast
Port UDP(6000 or Target-Node-Port)
Size 42 + Data size
Behavior Response Required

PARAMETERS	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	128	Type 128: TCNet Text Data	V1-0
Node Name	8	8	ASCII TEXT*	Node Name	V3-1
SEQ	16	1	0-255	Sequence Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
STEP	24	1	0-1	Step No	V3-1
RESERVED	25	1		RESERVED	
Data Size	26	4	(LITTLE ENDIAN)	Total Data Size	V3-2
RESERVED	30	12		RESERVED	
Data					
Text Data	42	Data Size	ASCII TEXT	String Text Data	V3-2

* See details below:

TCNet Text Data Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=128
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Step Current step in process (0=Initialize, 1=Response)
Text Data Raw text data string

TCNet Keyboard Data Packet

Functionality Send and Receive Realtime Keyboard Data Packets to control nodes remotely.
Type Broadcast/Unicast
Port UDP(6000 or Target-Node-Port)
Size 44
Behavior Response Required

PARAMETERS	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	132	Type 132: TCNet Keyboard Data	V3-2
Node Name	8	8	ASCII TEXT*	Node Name	V3-1
SEQ	16	1	0-255	Sequence Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
RESERVED	24	1		RESERVED	V3-2
RESERVED	25	1		RESERVED	V3-2
Data Size	26	4	(LITTLE ENDIAN)	Total Data Size	V3-2
RESERVED	30	12		RESERVED	V3-2
Data					
Keyboard Data	42	2	HEX ASCII Code	Keyboard Data	V3-2

* See details below:

TCNet Keyboard Data Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=132
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Timestamp in microseconds that is used to calculate network latency.
Step Current step in process (0=Initialize, 1=Response)
Keyboard Data Raw text data string

TCNet Data Packet – Metrics Data

Functionality Updates Data for Layer
Type Unicast
Port UDP(Target-Node-Port)
Size 122
Behavior Unicast when cache changes.

PARAMETER	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
SEQ	16	1	0-255	Sequence Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data					
Data Type	24	1	2	Datatype 2 = Metrics	V2-0
Layer ID	25	1	0-FF*	Layer Number	V2-0
RESERVED	26	1		RESERVED	V2-0
Layer State	27	1	0-FF*	Layer State	V2-0
RESERVED	28	1		RESERVED	V2-0
Sync Master	29	1	0-FF*	Sync Master	V2-0
RESERVED	30	1		RESERVED	V2-0
Beat Marker	31	1	0-4*	Beat Marker	V2-0
Track Length	32	4	0-0x5265C00 (LITTLE ENDIAN)	Track Length in Milliseconds	V2-0
Current Position	36	4	0-0x5265C00 (LITTLE ENDIAN)	Playhead Position in Milliseconds	V2-0
Speed	40	4	0-20000 (LITTLE ENDIAN)	Playhead Speed	V3-2
RESERVED	44	1		RESERVED	V3-0
Beat Number	57	4	(LITTLE ENDIAN)	Beat Number	V3-0
RESERVED	61-111	51			V3-0
BPM	112	4	0-0x1869F* (LITTLE ENDIAN)	BPM	V3-0
Pitch Bend	116	2	(16-BIT) 0-FFFF* (LITTLE ENDIAN)	Pitch Bend	V3-0
Track ID	118	4	0-FFFFFFFF* (LITTLE ENDIAN)	Assigned Track ID	V3-0

* See details next page

TCNet Data Packet - Metrics Data - Details

Node ID	Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version	Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header	TCNet Protocol Header (Must be "TCN")
Message Type	Message type of packet. - Value=200
Node Name	GW Code of software/machine/source that sends packet. (8 Characters) Example: ABCDEFGH
SEQ	Sequence number of packet. (See Sequence number)
Node Type	Node Type Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options	Node options: See Node Options
Timestamp	Time stamp in microseconds that is used to calculate network latency.
Data Type	Datatype of TCNet Data Packet. (Metrics Data = 2)
Layer ID	Layer number of layer sending data. Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Layer State	Play head status of layer Example: 0=IDLE, 3,=PLAYING, 4=LOOPING, 5=PAUSED, 6=STOPPED, 7=CUE BUTTON DOWN, 8=PLATTER DOWN, 9=FFWD, 10=FFRV, 11=HOLD
Sync Master	Sync master status of layer. Example use of this status is to follow the current active layer and allows auto cue to this layer. Example: 0=Slave / 1=Master
Beat Marker	Beat marker status of layer - Range: 1~4
Track Length	Total track length of layer in milliseconds Example: 0~9999.9999 sec
Location Marker	Play head position of layer Example: 0~9999.9999 sec
Speed Value	Play head speed on layer Example: -0~65536 (Where 32768 = 100% speed, 0 = 0% Speed, 65536=200% speed)
Beat Number	Current Beat Number
BPM Value	Play head BPM speed of layer Example: 0.01~999.99
Speed Bend Value	Play head speed bend value of layer. (Used for live adjust.) Example: 0~65536 (Where 32768 = 100% speed, 0 = 0% Speed, 65536=200% speed)
Track ID	Track ID number of the track that is loaded on layer. This is usually the database ID number. (Used to reflect track selection changes)

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=2, Parameter 1=LAYER, Parameter 2=0

TCNet Data Packet - Meta Data

Functionality Contains metadata of a layer
Type Unicast
Port UDP(Target-Node-Port)
Size 544 (May change in future FLAMES)
Behavior Unicast on update event or upon request

PARAMETER	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
SEQ	16	1	0-255	Sequence Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data					
Data Type	24	1	4	Datatype 4 = Metadata	V1-0
Layer ID	25	1	0-FF*	Layer ID	V1-0
RESERVED	26	1		RESERVED	V1-0
RESERVED	27	2		RESERVED	V1-0
Track Artist	29	256	ASCII TEXT	Track Artist Name	V1-0
Track Title	285	256	ASCII TEXT	Track Title Name	V1-0
Track Key	541	2	(LITTLE ENDIAN)	Track KEY	V3-2

* See details below:

TCNet Data Packet - Meta Data – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=200
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Timestamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Meta Data Packet.
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Track ID Track ID number of the track that is loaded on layer. This is usually the source's database ID number.
Track Artist Artist name of content loaded to layer -
Example: My Artist Name (Max 256 characters)
Track Name Track name of content loaded to layer -
Example: My Track Title (Max 256 characters
Track KEY Audio Key of track

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=4, Parameter 1=LAYER, Parameter 2=0

TCNet Data Packet - Beat Grid Data

Functionality Contains Beat Grid Data of layer
Type Unicast
Port UDP(Target-Node-Port)
Size 2442 (May change in future FLAMES)
Behavior Unicast upon request

PARAMETER		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Type	24	1	8	Datatype 8 = Beat Grid Data	V3-2
	Layer ID	25	1	1-8	Layer Number	V3-2
	Data Size	26	4	(LITTLE ENDIAN)	Total Data Size	V3-2
	Total Packet	30	4	0-FF*	Total Packets used for data	V3-2
	Packet No	34 **	4	(LITTLE ENDIAN)	Packet Number	V3-2
	Data Cluster Size	38	4	2400 (LITTLE ENDIAN)	Data Cluster Size	V3-2
Data **						
	Beat Number	42 + OFFSET***	2	(LITTLE ENDIAN)	Beat Number	V3-2
	Beat Type	44 + OFFSET***	1	(LITTLE ENDIAN)	20 = Downbeat, 10 = Up Beat	V3-2
	RESERVED	45 + OFFSET***	1		RESERVED	V3-2
	Beat Time Stamp	46 + OFFSET***	4	(LITTLE ENDIAN)	Timestamp in MS	V3-2

* See details below:
** Data should be split in multiple packets where each packet has a maximum of 2400 bytes of Data (Max Packet Size = 2442)
*** OFFSET = (Beat Nunber * 8) – (Packet No * 2400)

TCNet Data Packet - Beat Grid Data - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=200
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Data Packet. (Beat Grid Data=8)
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Total Packets Total amount of packets for data (LITTLE ENDIAN)
Packet No Packet number of data (LITTLE ENDIAN)
Data Size Total data size. Is total of all data send, including in extra packets (LITTLE ENDIAN)
Data Cluster Size Cluster Size of data (Amount of bytes used per cluster to split up total data. – Standard value = 32000
Beat Number Beat Number (LITTLE ENDIAN)
Beat Type Beat Type (20=Down Beat, 10=Upbeat)
Beat Type Beat Timestamp in MS

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=8, Layer=The layer you request data from

TCNet Data Packet - CUE Data

Functionality Contains Cue Data of Layer
Type Unicast
Port UDP(Target-Node-Port)
Size 50 (May change in future FLAMES)
Behavior Unicast upon request

PARAMETER		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Type	24	1	12	Datatype 12 = Cue Data	V3-2
	Layer ID	25	1	1-8	Layer Number	V3-2
	RESERVED	26	16		RESERVED	V3-2
Data						
	Loop IN	42	4	(LITTLE ENDIAN)	Loop IN Time	V3-2
	Loop OUT	46	4	(LITTLE ENDIAN)	Loop OUT Time	V3-2

* See details below:

TCNet Data Packet - CUE Data - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=200
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Data Packet. (Cue Data=12)
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Loop IN Time of Loop IN
Loop OUT Time of Loop OUT

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=12, Layer=The layer you request data from

TCNet Data Packet - Small Wave Form Data

Functionality Contains Small Wave Form Data of layer
Type Unicast
Port UDP(Target-Node-Port)
Size 2442 (May change in future FLAMES)
Behavior Unicast upon request

PARAMETER		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Type	24	1	16	Datatype 16 = Small Waveform	V3-2
	Layer ID	25	1	1-8	Layer Number	V3-2
	Data Size	26	4	Size=2400 (LITTLE ENDIAN)	Total Datasize	V3-2
	Total Packet	30	4	0-FF*	Total Packets used for data	V3-2
	Packet No	34	4	(LITTLE ENDIAN)	Packet Number	V3-2
	RESERVED	38	4		RESERVED	V3-2
Data						
	Waveform Data	42-2441	2400	BLevel (Odd Bytes) / BColor (Even Bytes) -0-FF	Wave Form Data as Bar Levels/Bar Colors	V3-2

* See details below:

TCNet Data Packet – Small Wave Form Data - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=200
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Data Packet. (Small Waveform=16)
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Total Packets Total number of packets for data (LITTLE ENDIAN)
Packet No Packet number of data
Data Size Total data size
Waveform Data Wave form data: Odd bytes are Bar Levels, Even bytes are Bar Colors (Total = 1200x2 = 2400 bytes)

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=16, Layer=The layer you request data from

TCNet Data Packet – Big Wave Form Data

Functionality Contains Small Wave Form Data of layer
Type Unicast
Port UDP(Target-Node-Port)
Size Depending on track length
Behavior Unicast upon request

PARAMETER		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	200	Type 200: TCNet Data Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Type	24	1	32	Datatype 32 = Big Waveform	V3-2
	Layer ID	25	1	1-8	Layer Number	V3-2
	Data Size	26	4	TOTAL DATA SIZE	Total Data size	V3-2
	Total Packet	30	4	0-FF*	Total Packets used for data	V3-2
	Packet No	34	4	(LITTLE ENDIAN)	Packet Number	V3-2
	Data Cluster Size	38	4	Standard: 4800 (LITTLE ENDIAN)	Data Cluster Size	V3-2
Data						
	Waveform Data	42 – Max 4842	Max 4842	BLevel (Odd Bytes) / BColor (Even Bytes) -0-FF	Wave Form Data as Bar Levels/Bar Colors	V3-2

* See details below:

TCNet Data Packet - Big Wave Form Data - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=200
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Data Packet. (Big Waveform=32)
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Total Packets Total amount of packets for data (LITTLE ENDIAN)
Packet No Packet number of data
Data Size Total data size. Is total of all data send, including in extra packets (LITTLE ENDIAN)
Data Cluster Size Cluster Size of data (Amount of bytes used per cluster to split up total data. – Standard value = 32000
Waveform Data Wave form data: Odd bytes are Bar Levels, Even bytes are Bar Colors

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=32, Layer=The layer you request data from

TCNet Data File Packet - Low Res Artwork File

Functionality Contains Low Res Artwork file (JPEG Format)
Type Unicast
Port UDP(Target-Node-Port)
Size Depending on file size
Behavior Unicast upon request

PARAMETER		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	204	Type 204: TCNet File Data File Packet	V3-2
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Type	24	1	128	Datatype 128 = Low Res Artwork File	V3-2
	Layer ID	25	1	1-8	Layer Number	V3-2
	Data Size	26	4	TOTAL DATA SIZE	Total Data size	V3-2
	Total Packet	30	4	0-FF*	Total Packets used for data	V3-2
	Packet No	34	4	(LITTLE ENDIAN)	Packet Number	V3-2
	Data Cluster Size	38	4	Standard: 4800 (LITTLE ENDIAN)	Data Cluster Size	V3-2
Data						
	File Data	42 – Max 4842	Max 4842	RAW FILE DATA	RAW FILE DATA	V3-2

* See details below:

TCNet Data File Packet – Low Res Artwork File - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=204
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Timestamp in microseconds that is used to calculate network latency.
Data Type Datatype of TCNet Data Packet. (Low Res Artwork File=128)
Layer ID Layer number if layer sending data.
Example: LAYER1, 2=LAYER2, 3=LAYER3, 4=LAYER4, 5=LAYER A, 6=LAYER B, 7=MASTER OUT, 8=RESERVED
Total Packets Total number of packets for data (LITTLE ENDIAN)
Packet No Packet number of data
Data Size Total data size. Is total of all data send, including in extra packets (LITTLE ENDIAN)
Data Cluster Size Cluster Size of data (Amount of bytes used per cluster to split up total data. – Standard value = 32000
File Data Raw file data of JPEG file

Note:
This info can be requested from a node by sending a TCNet Request Data packet, with Datatype=12, Layer=The layer you request data from

TCNet Application Specific Data Packet

Functionality Application Specific Broadcasted Data
Type Broadcast / Unicast
Port UDP(60001) for Broadcast or Target-Node-Port for Unicast
Size Data Size
Behavior Broadcast or Unicast depending on application

PARAMETERS		BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header						
	Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
	Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
	Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
	Header	4	3	TCN	TCNet Protocol Header	V3-1
	Message Type	7	1	30	Type 30: TCNet Application Specific Data Packet	V1-0
	Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
	SEQ	16	1	0-255	Sequence Number	V3-1
	Node Type	17	1	0-255	Node Type	V3-1
	Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
	Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
	Data Identifier 1	24	1	0-255	Application Identifier Signature 1/2 (Defaults to 0)	V3-0
	Data Identifier 2	25	1	0-255	Application Identifier Signature 2/2 (Defaults to 0)	V3-0
	Data Size	26	4	(LITTLE ENDIAN)	Data Size of all packets	V3-0
	Total Packets	30	4	(LITTLE ENDIAN)	Total of all packets	V3-0
	Packet No	34	4	(LITTLE ENDIAN)	Packet No	V3-0
	Packet Signature	38	4	178260640 (LITTLE ENDIAN)	Signature of Packet	V3-0
Data						
	Data	42	Data Size		Data	V3-0

* See details below:

TCNet Application Specific Data Packet - Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=30
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.
Application Identifier 4 Byte Application Code. This code is used to identify application.
Data Size Data Size in Little Endian
Total Packets Total number of packets for data (LITTLE ENDIAN)
Packet No Packet number of data
Packet Signature Packet Signature (LITTLE ENDIAN)
Data Data

TCNet Time Packet

Functionality Constant stream of timing data of layers
Type Broadcast
Port UDP(60001)
Size 162 (May change in future FLAMES)
Behavior Unicast every 1ms - 40ms or at time critical event.

PARAMETER	BYTE #	SIZE	VALUE	DESCRIPTION	FLAME
Management Header					
Node ID	0	2	(LITTLE ENDIAN)	Node ID of sending device	V1-0
Protocol Version (Major)	2	1	3	Protocol Version (Major) of sending device	V1-0
Protocol Version (Minor)	3	1	1	Protocol Version (Minor) of sending device	V1-0
Header	4	3	TCN	TCNet Protocol Header	V3-1
Message Type	7	1	254	Type 254: TCNet Time Packet	V1-0
Node Name	8	8	ASCII TEXT*	Node Name / Signature	V3-1
SEQ	16	1	0-255	Sequence Number	V3-1
Node Type	17	1	0-255	Node Type	V3-1
Node Options	18	2	(LITTLE ENDIAN)	Node Options	V3-1
Timestamp in Microseconds	20	4	0-999999 (LITTLE ENDIAN)	Timestamp in Microseconds	V3-1
Data					
L1 Time	24	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER 1 Current Time in Milliseconds	V3-0
L2 Time	28	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER 2 Current Time in Milliseconds	V3-0
L3 Time	32	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER 3 Current Time in Milliseconds	V3-0
L4 Time	36	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER 4 Current Time in Milliseconds	V3-0
LA Time	40	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER A Current Time in Milliseconds	V3-0
LB Time	44	4	0-0x55D4A80 (LITTLE ENDIAN)	LAYER B Current Time in Milliseconds	V3-0
LM Time	48	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER M Current Time in Milliseconds	V3-0
LC Time	48	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER C Current Time in Milliseconds	V3-0
L1 Total Time	56	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER 1 Total Time in Milliseconds	V3-0
L2 Total Time	60	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER 2 Total Time in Milliseconds	V3-0
L3 Total Time	64	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER 3 Total Time in Milliseconds	V3-0
L4 Total Time	68	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER 4 Total Time in Milliseconds	V3-0
LA Total Time	72	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER A Total Time in Milliseconds	V3-0
LB Total Time	76	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER B Total Time in Milliseconds	V3-0
LM Total Time	80	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER M Total Time in Milliseconds	V3-0
LC Total Time	84	4	0- 0x55D4A80 (LITTLE ENDIAN)	LAYER C Total Time in Milliseconds	V3-
L1 Beat Marker	88	1	0-4	Layer 1 Beatmarker	V3-0
L2 Beat Marker	89	1	0-4	Layer 2 Beatmarker	V3-0
L3 Beat Marker	90	1	0-4	Layer 3 Beatmarker	V3-0
L4 Beat Marker	91	1	0-4	Layer 4 Beatmarker	V3-0
LA Beat Marker	92	1	0-4	Layer A Beatmarker	V3-0
LB Beat Marker	93	1	0-4	Layer B Beatmarker	V3-0
LM Beat Marker	94	1	0-4	Layer M Beatmarker	V3-0
LC Beat Marker	94	1	0-4	Layer C Beatmarker	V3-0
L1 Layer State	96	1	0-FF	Layer 1 Layer State	V3-0
L2 Layer State	97	1	0-FF	Layer 2 Layer State	V3-0
L3 Layer State	98	1	0-FF	Layer 3 Layer State	V3-0
L4 Layer State	99	1	0-FF	Layer 4 Layer State	V3-0
LA Layer State	100	1	0-FF	Layer A State	V3-0
LB Layer State	101	1	0-FF	Layer B State	V3-0
LM Layer State	102	1	0-FF	Layer M State	V3-0

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TCNet Time Packet

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Data (Resume)						
	LC Layer State	103	1	0-FF	Layer C State	V3-0
	RESERVED	104	1			V2-0
	SMPTE Mode	105	1	= 24 or 25 or 29 or 30	General SMPTE Mode	V2-0
	L1 SMPTE Mode	106	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	L1 Time Code State	107	1	0-2	Time Code State	V2-0
	L1 Time Code Hours	108	1	0-17	Time Code Hours	V2-0
	L1 Time Code Minutes	109	1	0-3B	Time Code Minutes	V2-0
	L1 Time Code Seconds	110	1	0-3B	Time Code Seconds	V2-0
	L1 Time Code Frames	111	1	0-1D	Time Code Frames	V2-0
	L2 SMPTE Mode	112	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	L2 Time Code State	113	1	0-2	Time Code State	V2-0
	L2 Time Code Hours	114	1	0-17	Time Code Hours	V2-0
	L2 Time Code Minutes	115	1	0-3B	Time Code Minutes	V2-0
	L2 Time Code Seconds	116	1	0-3B	Time Code Seconds	V2-0
	L2 Time Code Frames	117	1	0-1D	Time Code Frames	V2-0
	L3 SMPTE Mode	118	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	L3 Time Code State	119	1	0-2	Time Code State	V2-0
	L3 Time Code Hours	120	1	0-17	Time Code Hours	V2-0
	L3 Time Code Minutes	121	1	0-3B	Time Code Minutes	V2-0
	L3 Time Code Seconds	122	1	0-3B	Time Code Seconds	V2-0
	L3 Time Code Frames	123	1	0-1D	Time Code Frames	V2-0
	L4 SMPTE Mode	124	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	L4 Time Code State	125	1	0-2	Time Code State	V2-0
	L4 Time Code Hours	126	1	0-17	Time Code Hours	V2-0
	L4 Time Code Minutes	127	1	0-3B	Time Code Minutes	V2-0
	L4 Time Code Seconds	128	1	0-3B	Time Code Seconds	V2-0
	L4 Time Code Frames	129	1	0-1D	Time Code Frames	V2-0

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TCNet Time Packet

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Data (Resume)						
	LA SMPTE Mode	130	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	LA Time Code State	131	1	0-2	Time Code State	V2-0
	LA Time Code Hours	132	1	0-17	Time Code Hours	V2-0
	LA Time Code Minutes	133	1	0-3B	Time Code Minutes	V2-0
	LA Time Code Seconds	134	1	0-3B	Time Code Seconds	V2-0
	LA Time Code Frames	135	1	0-1D	Time Code Frames	V2-0
	LB SMPTE Mode	136	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	LB Time Code State	137	1	0-2	Time Code State	V2-0
	LB Time Code Hours	138	1	0-17	Time Code Hours	V2-0
	LB Time Code Minutes	139	1	0-3B	Time Code Minutes	V2-0
	LB Time Code Seconds	140	1	0-3B	Time Code Seconds	V2-0
	LB Time Code Frames	141	1	0-1D	Time Code Frames	V2-0
	LM SMPTE Mode	142	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	LM Time Code State	143	1	0-2	Time Code State	V2-0
	LM Time Code Hours	144	1	0-17	Time Code Hours	V2-0
	LM Time Code Minutes	145	1	0-3B	Time Code Minutes	V2-0
	LM Time Code Seconds	146	1	0-3B	Time Code Seconds	V2-0
	LM Time Code Frames	147	1	0-1D	Time Code Frames	V2-0
	LC SMPTE Mode	148	1	= 24 or 25 or 29 or 30	Layer SMPTE Mode	V2-0
	LC Time Code State	149	1	0-2	Time Code State	V2-0
	LC Time Code Hours	150	1	0-17	Time Code Hours	V2-0
	LC Time Code Minutes	151	1	0-3B	Time Code Minutes	V2-0
	LC Time Code Seconds	152	1	0-3B	Time Code Seconds	V2-0
	LC Time Code Frames	153	1	0-1D	Time Code Frames	V2-0

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TCNet Time Packet

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Data (Resume)						
	L1 Layer OnAir	154	1	0-1	Layer OnAir State	V3-3
	L2 Layer OnAir	155	1	0-1	Layer OnAir State	V3-3
	L3 Layer OnAir	156	1	0-1	Layer OnAir State	V3-3
	L4 Layer OnAir	156	1	0-1	Layer OnAir State	V3-3
	LA Layer OnAir	157	1	0-1	Layer OnAir State	V3-3
	LB Layer OnAir	158	1	0-1	Layer OnAir State	V3-3
	LM Layer OnAir	159	1	0-1	Layer OnAir State	V3-3
	LC Layer OnAir	160	1	0-1	Layer OnAir State	V3-3
	RESERVED	161	1		RESERVED	V3-3

* Resumes next page

TCNet Time Packet – Details

Node ID Unique Node ID. When multiple applications/services are running on same IP, this number must be unique.
Protocol Version Protocol version of source that sends the packet. - Example: 1.00 would be: 01 00
Header TCNet Protocol Header (Must be "TCN")
Message Type Message type of packet. - Value=254
Node Name GW Code of software/machine/source that sends packet. (8 Characters)
Example: ABCDEFGH
SEQ Sequence number of packet. (See Sequence number)
Node Type Node Type
Example: 1=Auto, 2=Master,4=Slave,8=Repeater
Node Options Node options: See Node Options
Timestamp Time stamp in microseconds that is used to calculate network latency.

LX Time Layer X Time in MS
LX Total Time Layer X Total time in MS
LX Beatmarker Layer X Beatmarker position (0=unknown, 1-4=Beatmarker pos)
LX Layer State Layer X Layer State (Example: 0=IDLE, 3,=PLAYING, 4=LOOPING, 5=PAUSED, 6=STOPPED, 7=CUE BUTTON DOWN, 8=PLATTER DOWN, 9=FFWD, 10=FFRV, 11=HOLD)
SMPTE Mode SMPTE Mode set on node
Values: 24=24FPS, 25=25FPS,29=29.7FPS,30=30FPS
LX Layer OnAir Layer X Layer OnAir State (Example: 0=Not on Air, 1=On Air)

LX SMPTE Mode SMPTE Mode. If value =0, Use SMPTE general SMPTE mode defined in byte 105
LX TC State Status of timecode embedded in packet (Values: 0=Stopped, 1=Running, 2=Force Re sync)
LX TC Hours Hours value of the timecode (Values: 0–23)
LX TC Minutes Minutes value of the timecode (Values: 0–59)
LX TC Seconds Seconds value of the timecode (Values: 0–23)
LX TC Frames Frames value of the timecode (Values: 0 – Depending on frame rate)

Contribute

Contribution can be done by submitting your changes/idea's to info@eiglive.com.

Registered Application Codes

If you require an Application code, please contact dev@eiglive.com

0000	Reserved for Public	
0AA0	Pioneer DJ	http://www.pioneerdj.com
0AAA	TC Supply / ShowKontrol	http://www.showkontrol.com
0AAB	TC Supply Pyrotechnic Systems	http://www.tc-supply.com
0AAC	TC Supply Ride Control Systems	http://www.tc-supply.com
0AB0	Avolites Lighting	http://www.avolites.com
0AB1	MA Lighting	http://www.malighting.com
0AB3	Chamsys Lighting	http://www.chamsys.co.uk
0AB4	Obsidian Control	http://www.obsidiancontrol.com
0ABA	Arkaos Software	http://www.arkaos.net
0ABB	BLCKBOOK / Time Code Sync	http://www.timecodesync.com
0ABC	Resolume Software	http://www.resolume.com
0ABD	Green Hippo	http://www.green-hippo.com
0ABE	RD/ShowCockpit	http://www.showcockpit.com
0ABF	Disguise	http://disguise.one
0ACA	OrangePI	http://orangepi.dmx.org
FFFF	Reserved for Public	

TCNet Change Log

05/28/19	Revision 3.3.1 Added back SMPTE values in timing packets, Updated list of Registered Application Codes
04/29/19	Revision 3.3.0 Added Status Packets, Updated list of Registered Application Codes
03/28/19	Revision 3.2.8 Removed SMPTE format from timing packets
02/18/19	Revision 3.2.8 Added Node Options
02/15/19	Revision 3.2.7 Clean UP
01/10/19	Revision 3.2.6 Clean Up
12/24/18	Revision 3.2.5 Added Artwork File, Cue Data, Removed Timecode format from timing packet (deprecated)
12/20/18	Revision 3.2.4 Clean Up
12/17/18	Revision 3.2.4 Clean Up
11/27/18	Revision 3.2.2 Clean Up
11/19/18	Revision 3.2.1 Added Beat Grid Info Packet
11/10/18	Revision 3.2.0 Replaced Small Wave Form Packets to 3.2.0
10/31/18	Revision 3.1.6 (PRE FINAL)
10/26/18	Revision 3.1.5 (PRE FINAL)
09/28/18	Revision 3.1.3
02/02/18	Revision 3.0.0
12/21/17	Revision 2.1.0
10/01/17	Added Flame V2-0
05/10/16	Added Flame V1.0 (REV D)
01/17/16	Document Creation