ENTTEC Pty/Ltd
ACN 089 252 791
ABN 94 388 357 479
PO Box 282
Kew, Vic, 3101
Australia

Tel (03) 9819 2433
Fax (03) 9819 2733
Web: www.enttec.com

DMX on ETHERNET Protocol

Version	1.4
Last Revision:	06/08/01
Status:	Public Protocol

Operation:

Plug & Play: The IN node will broadcast using (IP:255.255.255.255) MAC(FF:FF:FF:FF:FF:FF) data packets on the ethernet. The universe is set to whatever the user has specified using the dip-switches. The OUT node will accept any incoming data frame that is set to the same universe as the dip-switches, the frame will be used to update it's internal DMX512 buffer.
All outgoing frames from the IN node will be sent with the following IP parameters:TTL = 4 and TOS=0;

Configured: The IN node will send packets to a specific IP using or broadcast, the universe is read from the internal EEPROM that can be configured using GateConfig. The OUT node will only accept data packets for which it has been configured.

All data and poll packets are sent to UDP port 3333 (0xD05)
Config packets are sent to TCP port 3333

RLE Compression

The DMXEtherGate can use Run Length Encoding to compress the DMX signal. As the DMX signal is very redundant, this form of compression is very effective although quite simple.
The DMX Engine inside the DMXEtherGate can compress the signal in 690uS, so using RLE has very little impact on performance or latency

Before each compressed data packet, a control byte (0xFE) is inserted, the next byte is the number of repetitions of the data byte and the byte after is the actual data byte. If a DMX value is 0xFE or 0xFD, the compressor will insert an escape byte before (0xFD) An RLE compressed DMX Data packet will look like this:

0x78 0x56 0x74 0xFE 0x5 0x10 0x41 0x78 0xFD 0xFE 0x36 0xFD 0xFD

Decompressed we would have:
0x78 0x56 0x74 0x10 0x10 0x10 0x10 0x10 0x41 0x78 0xFE 0x36 0xFD

ENTTEC Pty/Ltd
ACN 089 252 791
ABN 94 388 357 479
PO Box 282
Kew, Vic, 3101
Australia

Tel (03) 9819 2433
Fax (03) 9819 2733
Web: www.enttec.com

Packets:

1. Poll: Used to poll all nodes on a network
2. Poll Reply: Reply by a node from a poll packet
3. Config: Configuration packet sent from GateConfig to node
4. Data: DMX data packet sent from IN node.
5. Ack/nAck: Acknowledgement packets.
6. Reset Packet: Sending this packet will reset the node and update the configuration.

Poll Reply (UDP)

Field	*Name*	*Size*	*Description*
1	Head	4	Packet header: ESPR
2	MAC	6	Mac address of node (also serial number)
3	Node Type	2	0x0001: DMX Single Outpout Node 0x0002: DMX Single Input Node 0x0060:RS232 Node 0x0061:IO Node 0x0100:LonWorks Node
4	Version	1	Firmware Version of Node
5	Switch settings	1	Setting of DIP switches on front panel (2 top bits)
6	Name	10	ASCIIZ name of node
7	Option Field	1	Option field as in Config packet
8	TOS	1	Type of service
9	TTL	1	As in Config Packet
10	Data	N	Node Specific Configuration, this is the same as in the Config Packet

ENTTEC Pty/Ltd
ACN 089 252 791
ABN 94 388 357 479
PO Box 282
Kew, Vic, 3101
Australia

Tel (03) 9819 2433
Fax (03) 9819 2733
Web: www.enttec.com

Poll (UDP)

Poll packets can be sent on a specific IP or Broadcast address.

Field	Name	Size	Description
1	Head	4	Packet header: ESPP
2	Reply Type	1	0 = Just Reply by an Ack (heartbeat) 1 = Reply with full Information

Ack/nAck (UDP)

Field	Name	Size	Description
1	Head	4	Packet header: ESAP
2	Status	1	0x00=OK (Ack) else Error Code of nAck 0x01=CRC Failed 0xFF = CRC not supported
3	CRC	1	8 bit CRC of packet received (0 if nAck) or reply to a poll

DMX Data (UDP)

DMX data packets are only sent when the data changes on an input, if data is not changed the input node shall send 1 full (Type 0 or 2) packet every second.
DMX Data packet will use an UDP/IP transmission scheme

Field	Name	Size	Description
1	Head	4	Packet header: ESDD
2	Universe	1	Universe assigned with this data packet
3	Start Code	1	DMX Start code
3	Data Type	1	Bit field: 0: 512 bytes of DATA 1:Channel + Value (not implemented in V1.3) 2:RLE Compressed 512 bytes of data

ENTTEC Pty/Ltd
ACN 089 252 791
ABN 94 388 357 479
PO Box 282
Kew, Vic, 3101
Australia

Tel (03) 9819 2433
Fax (03) 9819 2733
Web: www.enttec.com

Field	*Name*	*Size*	*Description*
4	Data Size	2	Size of the data block
5	Data	n	

Config Packet (TCP)

This packet is used to configure a node
The Configuration Packet must be sent using a TCP/IP connection, this packet can only be sent to a specific node.
After a configuration oacket is sent, a RESET packet must be sent to restart the node and load the new configuration.

Field	*Name*	*Size*	*Description*
1	Head	4	Packet header: ESNC
2	IP	4	IP Address of node
3	Name	10	ASCIIZ string containing the name
4	Options	1	Bit field: 0:Configured, has the node been configured ? 1: Enable DHCP (not yet implemented) 2: Enable Data Error correction (Ack on BCST packets)
	TOS	1	Type of Service
5	TTL	1	Time to Live to use when transmitting packets
7	Data	N	

Node Type 0x0001 DMX Output node

ENTTEC Pty/Ltd
ACN 089 252 791
ABN 94 388 357 479
PO Box 282
Kew, Vic, 3101
Australia

Tel (03) 9819 2433
Fax (03) 9819 2733
Web: www.enttec.com

Field	*Name*	*Size*	*Description*
1	Listen ON	1	Bit field representing the reception type: 0:Full Broadcast or Class A Boradcast 1:Linked to node IP (Pier to Pier) 2:Class C Broadcast 3:Any Packet Received
2	IP	4	IP to listen to
3	Universe	1	Universe the output is assigned to

Node Type 0x0002: DMX Input node

Field	*Name*	*Size*	*Description*
1	Data Tx Type	1	Bit field representing the transmission type: 0:Broadcast 1:Linked to node IP (Pier to Pier) 2:Class C Broadcast 3:Data Type (0 = Raw DMX 1=RLE Data)
2	IP	4	When input node is linked, this section contains the IP of the output node
3	Universe	1	Universe this input is assigned to

Reset (TCP)

Sending this packet will reset the node and load the current configuration. This packet can only be sent in a TCP packet addresed to a single node. Once the packet is sent, the TCP connection will be dropped.

Field	*Name*	*Size*	*Description*
1	Head	4	Packet header: ESZZ