KiNET Protocol
Tier 1 Specification

Revision Date: December 22, 2009

Revision Control

Date	Revision	Description	Author
30Jul07	E00	Moving to new ESD template and restructuring	B. Chemel
1Aug07	E01	Adding product matrix	B. Chemel
13Aug08	E02	Update Matrix, data sheets, few fixes.	N. Karecki
06Jul09	E03	Adding sync packet	F. Matho
05Nov09	E04	Added PORTOUT flags	J. Warwick

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1 Introduction

KiNET is a lightweight UDP/IP based protocol used to communicate via Ethernet with Color Kinetics light fixtures and power supplies. This specification will serve to document the so-called “Tier 1” KiNET functionality; namely, the packet types which encapsulate DMX data, allowing one to send command data to light fixtures.

Two generations of the KiNET protocol have been implemented. These generations will be referred to as “KiNET v1” and “KiNET v2” throughout this document. The following table shows which CK power supplies and data enablers support each version.

Product	KiNET v1 (DMXOUT)	KiNET v2 (PORTOUT)
PDS-150e	Y	N
PDS-500e	Y	N
PDS-60 24V Ethernet	Y	N
PDS-60 24V DMX/Ethernet	Y	Y
PDS-60ca 12V Ethernet	Y	N
PDS-60ca 7.5V Ethernet	Y	N
PDS-60ca 7.5V DMX/Ethernet	Y	Y
PDS-70mr 24V Ethernet	Y	N
sPDS-60ca 24V DMX/Ethernet	Y	Y
sPDS-480ca (7.5V, 12V, 24V)	N	Y
Data Enabler Ethernet	Y	N
Data Enabler EO / iColor Accent Powercore	N	Y

1.1 Endianness and byte ordering

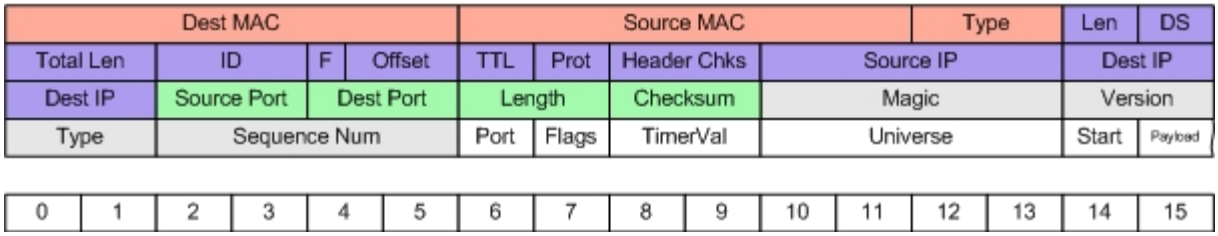
In contrast to the big-endian network byte ordering used by the MAC, UDP, and IP headers, KiNET packets use little-endian byte ordering, with the LSB coming first for all multi-byte fields. See the capture examples below for an illustration (the KiNET header magic number of 0x4ADC0104 is easy to spot).

2 KiNET v1

2.1 DMXOUT Packet

2.1.1 Packet Diagram

KTYPE_DMXOUT (0x0101)



2.1.2 Packet Capture

```
0000   00 0a c5 22 08 1b 00 12   3f 38 bb 9e 08 00 45 00
0010   02 31 07 c4 00 00 80 11   46 95 0a 01 d5 d6 0a 00
0020   00 8c 0a 8d 17 96 02 1d   0c e1 04 01 dc 4a 01 00
0030   01 01 00 00 00 00 00 00   00 00 ff ff ff ff 00 ff
0040   00 00 ff 00 00 00 00 00   00 00 00 00 00 00 00 00
0050   00 00 00 00 00 00 00 00   00 00 00 00 00 00 00 00
0060   00 00 00 00 00 00 00 00   00 00 00 00 00 00 00 00
0070   00 00 00 00 00 00 00 00   00 00 00 00 00 00 00 00
```

2.1.3 Field Definitions

Note: MAC, IP, and UDP header fields apply for all subsequent KiNET packet types in this document.

2.1.3.1 MAC Header

Field Name	Bytes	Offset	Value	Notes
Dest MAC	6	0		Set to the MAC address of the target power/data supply. Each power/data supply has a unique MAC address that is assigned during manufacture and also marked on the supply via a sticker. The MAC address of a power/data supply can also be determined using the discovery process. For broadcast DMXOUT packet destination MAC should be set to 0xFFFFFFFFFFFF.
Source MAC	6	6		Set to MAC address of the sender.
Type	2	12	0x0800	Set to 0x0800 for IP.
Total Size	**14**			

2.1.3.2 IP Header

Field Name	Bytes	Offset	Value	Notes
Version	4bits	14	0x4	Set to IP version. For KiNET this will always be V4.
Length	4bits	14.5		Set to IP header length, in number of 32-bit words.
DS	1	15	0x00	Set for differentiated services. Not used for KiNET, typically set to 0.
Total Length	2	16		Set to packet total length in bytes, including header and data.
ID	2	18		Set to id for fragmentation. Not used for KiNET.
Flags	4bits	20		Set for fragmentation. KiNET packets will not be fragmented.
Offset	12bits	20.5		Set for fragment offset. Not used for KiNET.
TTL	1	22		Set for time to live. Not used for KiNET.
Protocol	1	23	0x11	Set to UDP (0x11) for KiNET.
Header Checksum	2	24		Set to IP header checksum.
Source IP	4	26		Set to the IP Address of the sender.
Dest IP	4	30		Set to the IP Address of the target power/data supply. Each power/data supply has a unique IP address that is assigned during manufacture and also marked on the supply via a sticker. The IP address of a power/data supply can also be determined using the discovery process. For broadcast DMXOUT packets destination IP should be set to 255.255.255.255.
Total Size	**20**			

2.1.3.3 UDP Header

Field Name	Bytes	Offset	Value	Notes
Source Port	2	34		Set to source port. User can select an available port (other than 6038) for this use.
Destination Port	2	36	0x1796	Set to 6038 (0x1796). All KiNET packets will use this as dest port.
Length	2	38		Length of UDP header and payload.
Checksum	2	40		Set to checksum of header and data.
Total Size	**8**			

2.1.3.4 KiNET Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Magic Number	4	42	0	0x4ADC0104	
Version	2	46	4	0x0002	Latest version of KiNET protocol is V2.0. Older supplies may support KiNET V1.0 only.
Type	2	48	6	0x0101	Set to KiNET packet type. For DMXOUT, packet type is 0x0101.
Sequence Number	4	50	8		Can be used for ordering/numbering of packets. Not implemented on most supplies. Should be set to 0.
Total Size	**12**				

2.1.3.5 KiNET DMXOUT Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Port	1	54	12	0x00	Not used, set to 0x00.
Flags	1	55	13	0x00	Not used, set to 0x00.
TimerVal	2	56	14	0x0000	Not used, set to 0x0000.
Universe	4	58	16	0xFFFFFFFF	Each power/data supply has a universe setting to facilitate multicast data distribution. The "don't care" value for universe is -1 (0xFFFFFFFF). If a packet is sent with a universe value (other than -1) that does not match that of the supply, the supply will drop the packet.
Total Size	**8**				

2.1.3.6 KiNET DMX Data

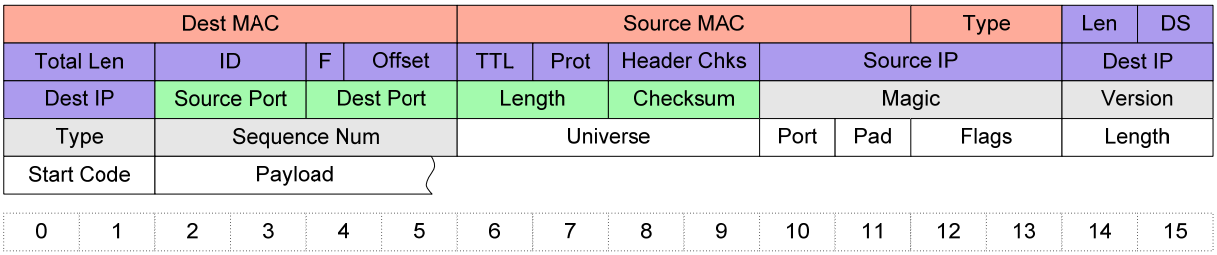
Field Name	Bytes	Offset	UDP Offset	Value	Notes
Payload	1- 512	62	20	0x00 then RGB Triples.	Data is sent in RGB triples with one byte per color. Some lights/power supplies also support 16-bit and 12-bit data mode where data will be sent two bytes per color**. First byte is DMX start code : 0x00**
Total Size	**1-512**				

3 KiNET v2

3.1 PORTOUT Packet

3.1.1 Packet Diagram

KTYPE_PORTOUT (0x0108)



3.1.2 Packet Capture

```
0000  00 0a c5 44 15 f2 00 12  3f 38 bb 9e 08 00 45 00
0010  02 34 0f e7 00 00 80 11  3d da 0a 01 d5 d6 0a 00
0020  01 21 0a 8d 17 96 02 20  13 44 04 01 dc 4a 01 00
0030  08 01 00 00 00 00 00 00  00 00 01 00 00 00 00 02
0040  f0 ff ff 00 00 ff 00 00  ff 00 00 ff 00 00 ff 00
0050  00 ff 00 00 ff 00 00 ff  00 00 ff 00 00 ff 00 00
0060  ff 00 00 ff 00 00 ff 00  00 ff 00 00 ff 00 00 ff
0070  00 00 ff 00 00 ff 00 00  ff 00 00 ff 00 00 ff 00
```

3.1.3 Field Definitions

3.1.3.1 KiNET Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Magic Number	4	42	0	0x4ADC0104	
Version	2	46	4	0x0002	Latest version of KiNET protocol is V2.0. Older supplies may support KiNET V1.0 only.
Type	2	48	6	0x0108	Set to KiNET packet type. For PORTOUT, packet type is 0x0108.
Sequence Number	4	50	8		Can be used for ordering/numbering of packets. Not implemented on most supplies. Should be set to 0.
Total Size	**12**				

3.1.3.2 KiNET PORTOUT Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Universe	4	54	12	0xFFFFFFFF	Each power/data supply has a universe setting to facilitate multicast data distribution. The "don't care" value for universe is -1 (0xFFFFFFFF). If a packet is sent with a universe value (other than -1) that does not match that of the supply, the supply will drop the packet.
Port	1	58	16	0x01 – 0x10	Specifies the port on the supply which the data is going to. Supplies may have anywhere from 1 to 16 ports. It is necessary to send data to each port individually before a sync is sent. Port numbers are indexed starting at 1.
Pad	1	59	17	0x00	Not used, set to 0x00.
Flags	2	60	18	0x00	Bitwise-OR of the following fields: • 0x01 – undefined • 0x02 – payload format: 0=8 bit data, 1=16 bit data • 0x04 – data sending: 0=send immediately, 1=hold for SYNC packet
Length	2	62	20		Set to number of bytes in KiNET payload.
Start Code	2	64	22	0x0fff **OR** 0x0000	Set to 0x0FFF for ChromASIC-based lights. Set to 0x0000 for non-CA lights.
Total Size	**12**				

3.1.3.3 KiNET PORTOUT Data

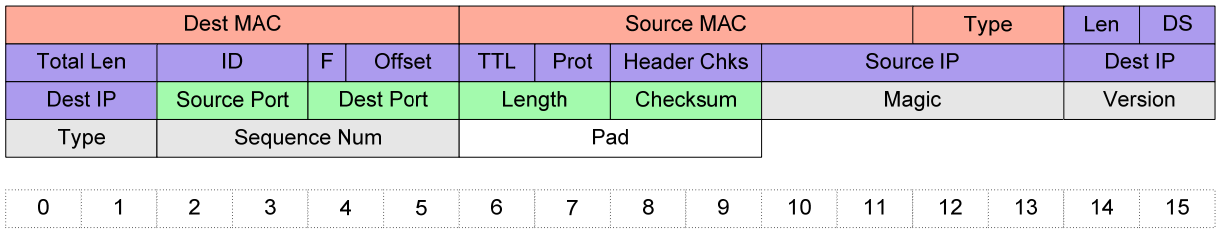
Field Name	Bytes	Offset	UDP Offset	Value	Notes
Payload	0-512	62	24		Data is sent in RGB triples with one byte per color.
Total Size	**0-512**				

3.2 SYNC Packet

PORTOUT packets are used to send data to Color Kinetics ChromASIC based products. PORTOUT packets are sent to individual power/data supplies to queue up data for the lights. Typically, supplies will have multiple output ports and the user will send a PORTOUT packet for each port on the supply. Once all of the PORTOUT packets are sent a SYNC packet is sent as a broadcast to tell all supplies to send the queued data to the lights.

3.2.1 Packet Diagram

KTYPE_PORTOUT_SYNC (0x0109)



3.2.2 Packet Capture

```
0000   ff ff ff ff ff ff 00 30  48 92 a1 73 08 00 45 00
0010   00 2c 00 00 40 00 40 11  23 ac 0a 07 0d 0f ff ff
0020   ff ff 80 06 17 96 00 18  66 bf 04 01 dc 4a 01 00
0030   09 01 00 00 00 00 00 00  00 00 00 00
```

3.2.3 Field Definitions

3.2.3.1 KiNET Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Magic Number	4	42	0	0x4ADC0104	
Version	2	46	4	0x0002	Latest version of KiNET protocol is V2.0. Older supplies may support KiNET V1.0 only.
Type	2	48	6	0x0109	Set to KiNET packet type. For SYNC, packet type is 0x0109.
Sequence Number	4	50	8		Can be used for ordering/numbering of packets. Not implemented on most supplies. Should be set to 0.
Total Size	**12**				

3.2.3.2 KiNET SYNC Header

Field Name	Bytes	Offset	UDP Offset	Value	Notes
Pad	4	54	12	0x00000000	
Total Size	**4**				