 <p>TRIDENT AN ITW COMPANY</p>	<p>Title: Product Specification 256-D™ 2bank 30pl Print Head with Trident Test Fluid</p>
<p>Spec. No.: CS01-0407 Rev. E</p>	
<p>Date: 11 April 2011</p>	

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PRODUCT SPECIFICATION: **For Trident OEM Customer Distribution Only**

Information that has been updated or revised since the last revision
is shown in **Red Text** to make it easier to review this document.

For questions on this, or related, specifications please contact your Trident representative
or Dave Wheeler, Marketing Manager, at 203 –740-9333 x 3076.

Document Revision Control

REVISION	DESCRIPTION	APPROVAL	DATE
A	Production Release	DW/JC	08-24-06
B	Corrected pinouts to match delivered boards, p.6 and 7	DW/ES/DG	9-29-06
C	Added drop volume (30pl) and “2bank” to title of this specification. Separate specifications are provided for other printhead configurations	DW/ES/TC	10-2-06 SM
D	Updated to reflect current configuration (with heater) and added reference part number to define configuration. Corrected section numbering.	DW/TC	5-29-08 MT
E	Corrected Filters	ES	04/11/11

TABLE OF CONTENTS

SCOPE 3

PRINT HEAD DESCRIPTION..... 3

FILTERS AND LARGE INK SUPPLY SYSTEM (LISS)..... 3

JET CHARACTERIZATION 4

TRIDENT TEST FLUID PARAMETERS..... 5

MAINTENANCE 5

SHIPPING AND CAPPING 5

POWER REQUIREMENTS..... 5

PRINT HEAD PHYSICAL DIMENSIONS 5

ELECTRONICS 6

Connector 6

Pin outs 6

Heater 8

Temperature Sensor 8

1 Scope

This specification covers the physical configuration, functional performance for the Trident 256-D Fluid Jetting printhead with 2bank 40um single hole orifices and long shelf while jetting Trident 256Jet-D test fluid (MSDS#63). The performance parameters listed in this specification are based on Trident reference part number N256-3033-05. This part number may not be available to all customers. Please contact your Trident representative for the appropriate part number for ordering.

2 Print Head Description

2.1	Number of Channels	256	Address ability
2.2	Number of Orifices	256	Number of dots
2.2.1	Orifice Pattern	2 rows	128 orifices per row
2.2.2	Orifice row spacing	0.310	Inch (7.874 mm)
2.3	Vertical Address ability	64	Pixels per inch
2.4	Printing Orientation		Horizontal and Downward
2.5	Print gap	0.10	Inches (2.54mm) Maximum recommended
2.6	Ability to seal CP/OP with no increase in print gap requirements	Yes	Chamber Plate is designed with ability to seal
2.7	Ink Wetted Material	Print head: primarily Stainless Steel and proprietary adhesives; LISS: Polypropylene, Stainless Steel and proprietary compounds.	
2.8	No leakage from any sealed fluid path areas	Visual inspection	
2.9	Temperature Control	Ambient to 30°C (temperatures up to 70 °C are permissible with a Trident-approved heat up procedure.)	

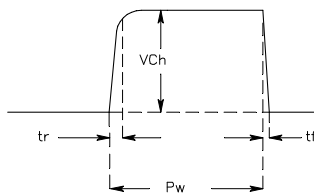
3 Filters and Large Ink Supply System (LISS)

3.1	Relative height between lowest orifice and top plane of ink reservoir	-0.25 to -0.75	Inches (-6.35 to -19.05mm)
3.2	Inlet tubing Inside Diameter	0.250	Inches (6.35mm) nominal
3.3	Vent tubing Inside Diameter	0.188	Inches (4.78mm) nominal
3.5	LISS Filter material: woven mesh stainless steel	20 30	micron nominal micron absolute
3.6	Manifold Filter	30	micron nominal

4 Jet Characterization (based on use of Trident Test Fluid, see section 5)

4.1	Pixel to pixel registration	+/- 1/2 pixel at 200 dpi		
4.1.1	Jet Straightness	< 0.5 degrees		
4.1.2	Orifice position accuracy	+/- 2.0 μm		
4.2	Operating Temperature (ambient temperature of Trident test facility)	21°	Centigrade	
4.3	Drop Velocity	Average 8.0	Units Meters / second	Tolerance
4.4	Droplet Volume per orifice with PDC (precise individual voltage controller)	30	Picoliters (x10 ⁻¹² liters)	±2 % per jet
4.4.1	Orifice Size	40	Micron	± 1.5 μm
4.5	Operating frequency			
4.5.1	Single jet firing (up to)	18	kHz	
4.6	Channel Drive Voltage within each bank	30	Volts	
4.7	Channel Drive Voltage Range	25-40	Volts	nominal
4.8	Channel to Channel Spread within each bank	5	Volts	Maximum
4.9	Total Channel spread within each bank	10	Volts	Maximum
4.10	Drive Pulse	10	microseconds	±.5
4.10.1	Rise Time	0.75	microseconds	±.25
4.10.2	Fall Time	< 0.75	microseconds	
4.11	Channel Capacitance	600	pF	± 100pF

CHANNEL FIRING WAVEFORM



V_{Ch} - Channel Voltage
 t_r - Rise Time
 P_w - Firing Pulse Width
 t_f - Fall Time

5 Trident Test Fluid Parameters

5.1	Surface Tension	35	dynes
5.2	Viscosity (Measured at room temp of 23°C)	6.9	cps

6 Maintenance

6.1	Priming	Gravity Prime recommended, priming pressure not to exceed 15 psi
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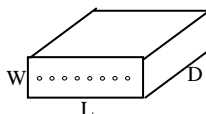
7 Shipping and Capping

7.1	Capping	The cap seals the ink in the channels allowing no ink leakage from any channels.
7.2	Shipping	Unit can be shipped dry or with ink, capped and ready to operate after shipment without ink leakage from any part of the printhead.

8 Power Requirements

		Average	Unit
8.1	Piezo Drive Supply – per channel		
8.1.1	Voltage	100	Volts DC maximum
8.1.2	Current	60	mA per channel
8.2	Heater Power		
8.2.1	Voltage	48V	Volts DC maximum
8.2.2	Power	40	watts

9 Print Head Physical Dimensions



9.1	Width	1.14 Inches	28.9 mm
9.2	Length	5.34 Inches	135.6 mm
9.3	Depth	2.17 Inches	55.1 mm
9.4	Mounting	4 mounting holes; M3 thread	Two Located on each side
9.5	Vertical Channel Spacing	0.015625 Inches (64 dpi) (using both banks)	0.397mm
9.6	Horizontal Channel Spacing	0.29 Inches	7.37 mm

Refer to outline drawing 256-9015-01

10 Electronics

Connectors:

Print head PCB: Tyco 104069-3

Mating connector: Tyco 1-111196-5 plug or equivalent

Pin outs:

Pin	J1 (even)	J1 (odd)	J2 (even)	J2 (odd)
1	CH126	Heater+	NC	CH127
2	CH124	Heater+	NC	CH129
3	CH122	NC	NC	CH131
4	CH120	Temp1	COM_B	CH133
5	CH118	Temp2	COM_B	CH135
6	CH116	COM_A	COM_B	CH137
7	CH114	COM_A	COM_B	CH139
8	CH112	COM_A	COM_B	CH141
9	CH110	COM_A	COM_B	CH143
10	CH108	COM_A	COM_B	CH145
11	CH106	COM_A	COM_B	CH147
12	CH104	COM_A	COM_B	CH149
13	CH102	COM_A	COM_B	CH151
14	CH100	COM_A	COM_B	CH153
15	CH98	COM_A	NC	CH155
16	CH96	COM_A	CH256	CH157
17	CH94	NC	CH254	CH159
18	CH92	CH1	CH252	CH161
19	CH90	CH3	CH250	CH163
20	CH88	CH5	CH248	CH165
21	CH86	CH7	CH246	CH167
22	CH84	CH9	CH244	CH169
23	CH82	CH11	CH242	CH171
24	CH80	CH13	CH240	CH173
25	CH78	CH15	CH238	CH175
26	CH76	CH17	CH236	CH177
27	CH74	CH19	CH234	CH179
28	CH72	CH21	CH232	CH181
29	CH70	CH23	CH230	CH183
30	CH68	CH25	CH228	CH185
31	CH66	CH27	CH226	CH187
32	CH64	CH29	CH224	CH189
33	CH62	CH31	CH222	CH191
34	CH60	CH33	CH220	CH193
35	CH58	CH35	CH218	CH195
36	CH56	CH37	CH216	CH197
37	CH54	CH39	CH214	CH199
38	CH52	CH41	CH212	CH201
39	CH50	CH43	CH210	CH203
40	CH48	CH45	CH208	CH205

CS01-0407 Rev E - Product Specification, 256-D 2bank 30pl Print Head with Trident Test Fluid

41	CH46	CH47	CH206	CH207
42	CH44	CH49	CH204	CH209
43	CH42	CH51	CH202	CH211
44	CH40	CH53	CH200	CH213
45	CH38	CH55	CH198	CH215
46	CH36	CH57	CH196	CH217
47	CH34	CH59	CH194	CH219
48	CH32	CH61	CH192	CH221
49	CH30	CH63	CH190	CH223
50	CH28	CH65	CH188	CH225
51	CH26	CH67	CH186	CH227
52	CH24	CH69	CH184	CH229
53	CH22	CH71	CH182	CH231
54	CH20	CH73	CH180	CH233
55	CH18	CH75	CH178	CH235
56	CH16	CH77	CH176	CH237
57	CH14	CH79	CH174	CH239
58	CH12	CH81	CH172	CH241
59	CH10	CH83	CH170	CH243
60	CH8	CH85	CH168	CH245
61	CH6	CH87	CH166	CH247
62	CH4	CH89	CH164	CH249
63	CH2	CH91	CH162	CH251
64	NC	CH93	CH160	CH253
65	COM_A	CH95	CH158	CH255
66	COM_A	CH97	CH156	NC
67	COM_A	CH99	CH154	COM_B
68	COM_A	CH101	CH152	COM_B
69	COM_A	CH103	CH150	COM_B
70	COM_A	CH105	CH148	COM_B
71	COM_A	CH107	CH146	COM_B
72	COM_A	CH109	CH144	COM_B
73	COM_A	CH111	CH142	COM_B
74	COM_A	CH113	CH140	COM_B
75	COM_A	CH115	CH138	COM_B
76	NC	CH117	CH136	COM_B
77	NC	CH119	CH134	COM_B
78	NC	CH121	CH132	NC
79	NC	CH123	CH130	Heater-
80	NC	CH125	CH128	Heater-

Heater

For power requirements, see section 8.2.
Both sets of pins are used for the one heater on the print head.

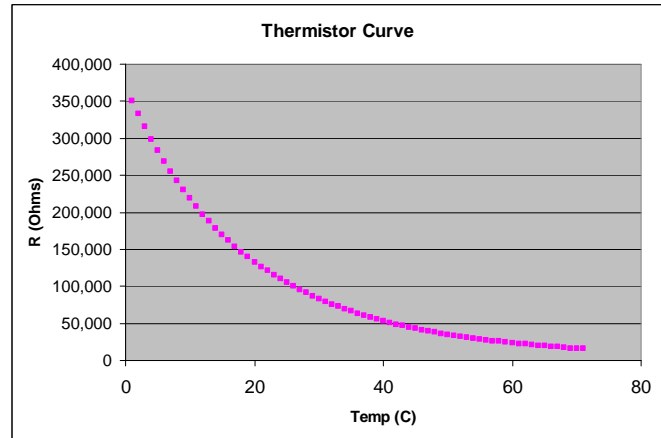
Temperature sensor:

Negative coefficient thermistor.

Thermistor curve is:

100,000 Ohms @ 25°C

Tol. = ±5% @ 25°C



Temperature [°C]	Resistance [Ohm]
-40	3921252.41
-35	2774564.66
-30	1988706.07
-25	1442860.78
-20	1058901.24
-15	785573.277
-10	588792.992
- 5	445601.87
0	340346.257
5	262229.446
10	203722.794
15	159521.653
20	125851.241
25	100000.00
30	80002.5468
35	64422.071
40	52199.5404
45	42548.2335
50	34879.3226

Temp. [°C]	Resistance [Ohm]
55	28748.9194
60	23820.0865
65	19835.3748
70	16596.8198
75	13951.2679
80	11779.5372
85	9988.35826
90	8504.34377
95	7269.4478
100	6237.52723
105	5371.7226
110	4642.45213
115	4025.86733
120	3502.65769
125	3057.12117
130	2676.43769
135	2350.09889
140	2069.45833
145	1827.37528
150	1617.93137