User's Guide

NHD-0440AZ-NLY-FBW-C6

LCM

(Liquid Crystal Display Character Module)

FEATURES

- Display format: 4 Lines x 40 Characters
- **(A)** – Display Series/Model
- **(Z)** – Factory line
- **(N) -** Polarizer = Transmissive (-) light method
- **(LY)** – Backlight = LED (Yellow-Green)
- **(F)** – LCD Type = FSTN
- **(B)** – View Direction = 6:00
- **(S/W)** – Operating Temp. = Standard (0 ~ +50c) , Wide (-20 ~ +70c)

LCD driver IC: SPLC780D

- **(C) -** 2x8 Pin FCI part#: 88874-016, shrouded header, 30u gold, right-angle, lead free, 5.84mm mating length. Header soldered onto component side of LCD PCB.
- **(6) -** R6 = 3.3K ohm Resistor

──────────────── For product support, contact

NHD0440AZ-NLY-FBW-C6   SPECIFICATIONS OF LCD MODULE

Features

1. 5x8 dots with cursor
2. Display format: 40characters * 4 lines
3. Built-in controller (SPLC780D)
4. +5V power supply
5. 1/16 duty, 1/5 bias cycle
6. FSTN, Transmissive negative display
7. Viewing direction: 6:00 o'clock

Outline dimension

Absolute maximum ratings

Item	Symbol	Standard			Unit
Power voltage	V_{DD}-V_{SS}	0	-	7.0	V
Input voltage	VIN	VSS	-	VDD	
Operating temperature range	VOP	-20	-	+70	
Storage temperature range	VST	-30	-	+80	C

*Wide temperature range is available

NHD-0440AZ
Interface pin description

Pin no.	Symbol	External connection	Function
1~4	DB7~DB4	MPU	Four high order bi-directional three-state data bus lines. Used for data transfer between the MPU
5~8	DB3~DB0	MPU	Four low order bi-directional three-state data bus lines. Used for data transfer between the MPU and the LCM. These four are not used during 4-bit operation.
9	E1	MPU	Operation (data read/write) enable signal
10	R/W	MPU	Read/write select signal
11	RS	MPU	Register select signal
12	V_0	Power supply	Contrast adjust
13	V_{SS}		Signal ground for LCM (GND)
14	V_{DD}		Power supply for logic (+5V) for LCM
15	E2	MPU	Enable signal (no pull-up resistor)
16	NC		
A	A	Power supply	Power supply for LED backlight (+4.2V)
K	K		Power supply for LED backlight (0V)

Contrast adjust

A）For Single Source
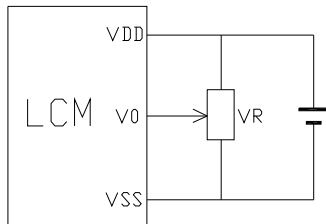
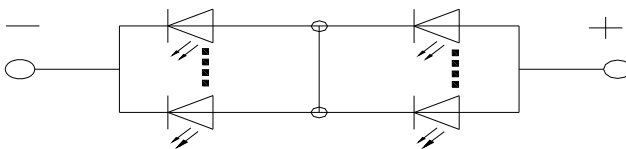
B) For Double Source
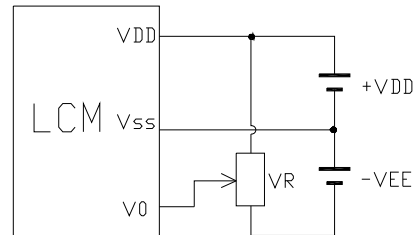
V_{DD}-V_0: LCD Driving voltage
VR: 1k~2k

Electrical characteristics
Backlight circuit diagram (light 48 x 2)

led ratings (Yellow/Green)   (UAK = 4.2V, Ta =25℃)

Item	Symbol	Min	Typ.	Max	Unit
Forward Voltage	VAK	3.6	4.2	4.3	V
Forward current	If	-	480	500	mA
Power	P			2016	mW
Peak wave length	λp		570		nm
Luminance	Lv		80		Cd/m2

NHD-0440AZ

FSTN type display module (Ta=25℃, VDD=5.0V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing angle	θ	$C_r{\geq}2$	-60	-	35	deg
	Φ		-40	-	40	
Contrast ratio	C_r		-	6	-	-
Response time (rise)	T_r	-	-	150	250	ms
Response time (fall)	T_r	-	-	150	250	

Electrical characteristics

DC characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage for LCD	V_{DD}-V_0	Ta =25℃	-	5.0	-	V
Input voltage	V_{DD}		2.7	-	5.5	
Supply current	I_{DD}	Ta=25℃, V_{DD}=5.0V	-	3.5	4.0	mA
Input leakage current	I_{LKG}		-	-	5.0	uA
"H" level input voltage	V_{IH}		2.2	-	V_{DD}	
"L" level input voltage	V_{IL}	Twice initial value or less	0	-	0.6	
"H" level output voltage	V_{OH}	LOH=-0.25mA	2.4	-	-	V
"L" level output voltage	V_{OL}	LOH=1.6mA	-	-	0.4	
Backlight supply voltage	V_F		-	-	5.0	
Backlight supply current	I_F	V_F=4.2V	-	480	-	mA

Read cycle (Ta=25℃, VDD=5.0V)

Parameter	Symbol	Test pin	Min.	Typ.	Max.	Unit
Enable cycle time	t_c		500	-	-	ns
Enable pulse width	t_w	E	300	-	-	
Enable rise/fall time	t_r, t_f		-	-	25	
RS; R/W setup time	t_{su}	RS; R/W	100	-	-	
RS; R/W address hold time	t_h	RS; R/W	10	-	-	
Read data output delay	t_d	DB0~DB7	60	-	90	
Read data hold time	t_{dh}		20	-	-	

Write cycle (Ta=25℃, VDD=5.0V)

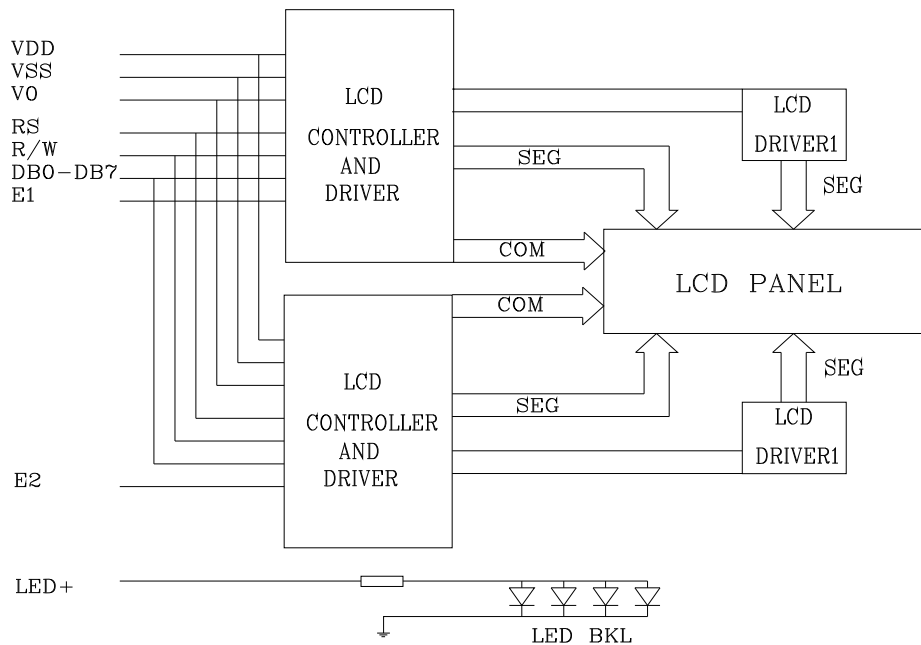| Parameter	Symbol	Test pin	Min.	Typ.	Max.	Unit
Enable cycle time	t_c		500	-	-	ns
Enable pulse width	t_w	E	300	-	-	
Enable rise/fall time	t_r, t_f		-	-	25	
RS; R/W setup time	t_{su1}	RS; R/W	100	-	-	
RS; R/W address hold time	t_{h1}	RS; R/W	10	-	-	
Read data output delay	t_{su2}	DB0~DB7	60	-	-	
Read data hold time	t_{h2}		10	-	-	

Write mode timing diagram
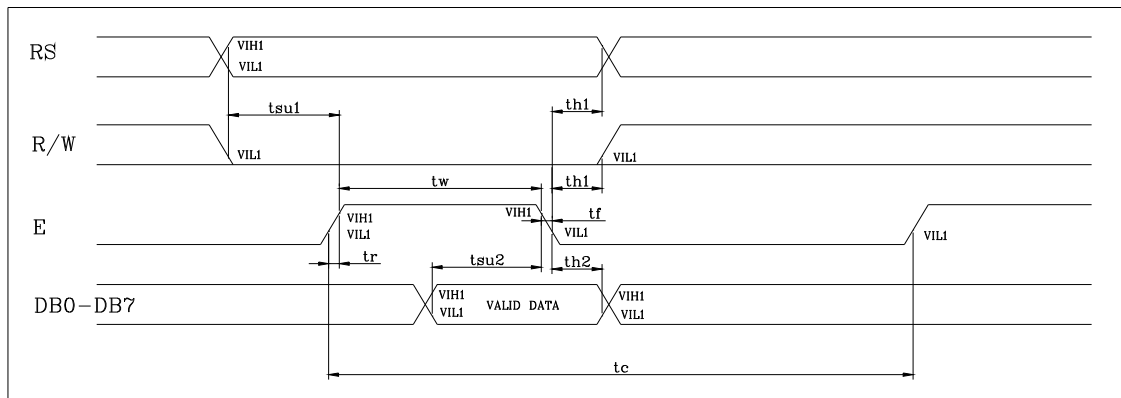
Read mode timing diagram
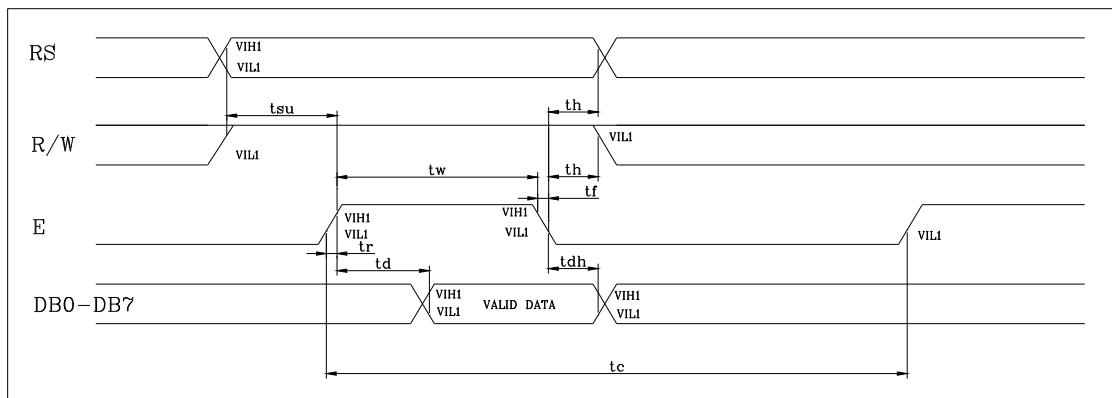
Block diagram

Instruction description
Outline
To overcome the speed difference between the internal clock of KS0066U and the MPU clock, KS0066U performs internal operations by storing control in formations to IR or DR. The internal operation is determined according to the signal from MPU, composed of read/write and data bus (Refer to Table7).
Instructions can be divided largely into four groups:

1) KS0066U function set instructions (set display methods, set data length, etc.)
2) Address set instructions to internal RAM
3) Data transfer instructions with internal RAM
4) Others

The address of the internal RAM is automatically increased or decreased by 1.

Note: during internal operation, busy flag (DB7) is read "High".
   Busy flag check must be preceded by the next instruction.
   When an MPU program with checking the busy flag (DB7) is made, it must be necessary 1/2 fuss for executing the next instruction by the falling edge of the "E" signal after the busy flag (DB7) goes to "LOW".

Contents
1) Clear display

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	0	1

Clear all the display data by writing "20H" (space code) to all DDRAM address, and set DDRAM address to "00H" into AC (address counter).
Return cursor to the original status, namely, brings the cursor to the left edge on the fist line of the display.
Make the entry mode increment (I/D="High").

2) Return home

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	1	-

Return home is cursor return home instruction.
Set DDRAM address to "00H" into the address counter.
Return cursor to its original site and return display to its original status, if shifted.
Contents of DDRAM does not change.

3) Entry mode set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	I/D	SH

Set the moving direction of cursor and display.

I/D: increment / decrement of DDRAM address (cursor or blink)
When I/D="high", cursor/blink moves to right and DDRAM address is increased by 1.
When I/D="Low", cursor/blink moves to left and DDRAM address is increased by 1.
*CGRAM operates the same way as DDRAM, when reading from or writing to CGRAM.
(I/D="high". shift left, I/D="Low". Shift right).

4) Display ON/OFF control

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	1	D	C	B

Control display/cursor/blink ON/OFF 1 bit register.

D: Display ON/OFF control bit
When D="High", entire display is turned on.
When D="Low", display is turned off, but display data remains in DDRAM.

C: cursor ON/OFF control bit
When D="High", cursor is turned on.
When D="Low", cursor is disappeared in current display, but I/D register preserves its data.

B: Cursor blink ON/OFF control bit
When B="High", cursor blink is on, which performs alternately between all the "High" data and display characters at the cursor position.
When B="Low", blink is off.

5) Cursor or display shift

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	1	S/C	R/L	-	-

Shifting of right/left cursor position or display without writing or reading of display data.
This instruction is used to correct or search display data. (Refer to Table 6)
During 2-line mode display, cursor moves to the 2nd line after the 40th digit of the 1st line.
When display data is shifted repeatedly, each line is shifted individually.
When display shift is performed, the contents of the address counter are not changed.

Shift patterns according to S/C and R/L bits

S/C	R/L	Operation
0	0	Shift cursor to the left, AC is decreased by 1
0	1	Shift cursor to the right, AC is increased by 1
1	0	Shift all the display to the left, cursor moves according to the display
1	1	Shift all the display to the right, cursor moves according to the display

6) Function set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	DL	N	F	-	-

DL: Interface data length control bit
When DL="High", it mans 8-bit bus mode with MPU.
When DL="Low", it mans 4-bit bus mode with MPU. Hence, DL is a signal to select 8-bit or 4-bit bus mode.
When 4-but bus mode, it needs to transfer 4-bit data twice.

N: Display line number control bit
When N="Low", 1-line display mode is set.
When N="High", 2-line display mode is set.

F: Display line number control bit
When F="Low", 5x8 dots format display mode is set.
When F="High", 5x11 dots format display mode.

7) Set CGRAM address

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0

Set CGRAM address to AC.
The instruction makes CGRAM data available from MPU.

8) Set DDRAM address

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0

Set DDRAM address to AC.
This instruction makes DDRAM data available form MPU.
When 1-line display mode (N=LOW), DDRAM address is form "00H" to "4FH".
In 2-line display mode (N=High), DDRAM address in the 1st line form "00H" to "27H", and DDRAM address
In the 2nd line is from "40H" to "67H".

9) Read busy flag & address

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0

This instruction shows whether KS0066U is in internal operation or not.
If the resultant BF is "High", internal operation is in progress and should wait BF is to be LOW, which by then if the nest
instruction can be performed. In this instruction you can also read the value of the address counter.

10) Write data to RAM

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	0	D7	D6	D5	D4	D3	D2	D1	D0

Write binary 8-bit data to DDRAM/CGRAM.
The selection of RAM from DDRAM, and CGRAM, is set by the previous address set instruction (DDRAM address set,
CGRAM address set).
RAM set instruction can also determine the AC direction to RAM.
After write operation. The address is automatically increased/decreased by 1, according to the entry mode.

11) Read data from RAM

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	1	D7	D6	D5	D4	D3	D2	D1	D0

Read binary 8-bit data from DDRAM/CGRAM.
The selection of RAM is set by the previous address set instruction. If the address set instruction of RAM is not
performed before this instruction, the data that has been read first is invalid, as the direction of AC is not yet determined.
If RAM data is read several times without RAM address instructions set before, read operation, the correct RAM data
can be obtained from the second. But the first data would be incorrect, as there is no time margin to transfer RAM data.
In case of DDRAM read operation, cursor shift instruction plays the same role as DDRAM address set instruction,
It also transfers RAM data to output data register.
After read operation, address counter is automatically increased/decreased by 1 according to the entry mode.

After CGRAM read operation, display shift may not be executed correctly.

NOTE: In case of RAM write operation, AC is increased/decreased by 1 as in read operation.
At this time, AC indicates next address position, but only the previous data can be read by the read instruction.

Instruction table

Instruction	Instruction code										Description	Execution Time (fosc= 270 KHZ
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRA and set DDRAM address to "00H" from AC	1.53ms
Return Home	0	0	0	0	0	0	0	0	1	-	Set DDRAM address to "00H" From AC and return cursor to Its original position if shifted. The contents of DDRAM are not changed.	1.53ms
Entry mode Set	0	0	0	0	0	0	0	1	I/D	SH	Assign cursor moving direction And blinking of entire display	39us
Display ON/ OFF control	0	0	0	0	0	0	1	D	C	B	Set display (D), cursor (C), and Blinking of cursor (B) on/off Control bit.	
Cursor or Display shift	0	0	0	0	0	1	S/C	R/L	-	-	Set cursor moving and display Shift control bit, and the Direction, without changing of DDRAM data.	39us
Function set	0	0	0	0	1	DL	N	F	-	-	Set interface data length (DL: 8-Bit/4-bit), numbers of display Line (N: =2-line/1-line) and, Display font type (F: 5x11/5x8)	39us
Set CGRAM Address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address Counter.	39us
Set DDRAM Address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address Counter.	39us
Read busy Flag and Address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal Operation or not can be known By reading BF. The contents of Address counter can also be read.	0us
Write data to Address	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM).	43us
Read data From RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM).	43us

NOTE: When an MPU program with checking the busy flag (DB7) is made, it must be necessary 1/2fosc is necessary for executing the next instruction by the falling edge of the "E" signal after the busy flag (DB7) goes to "Low".
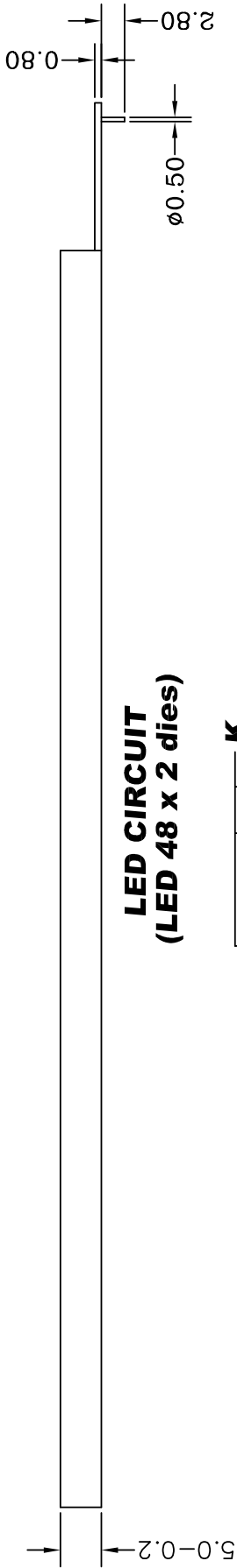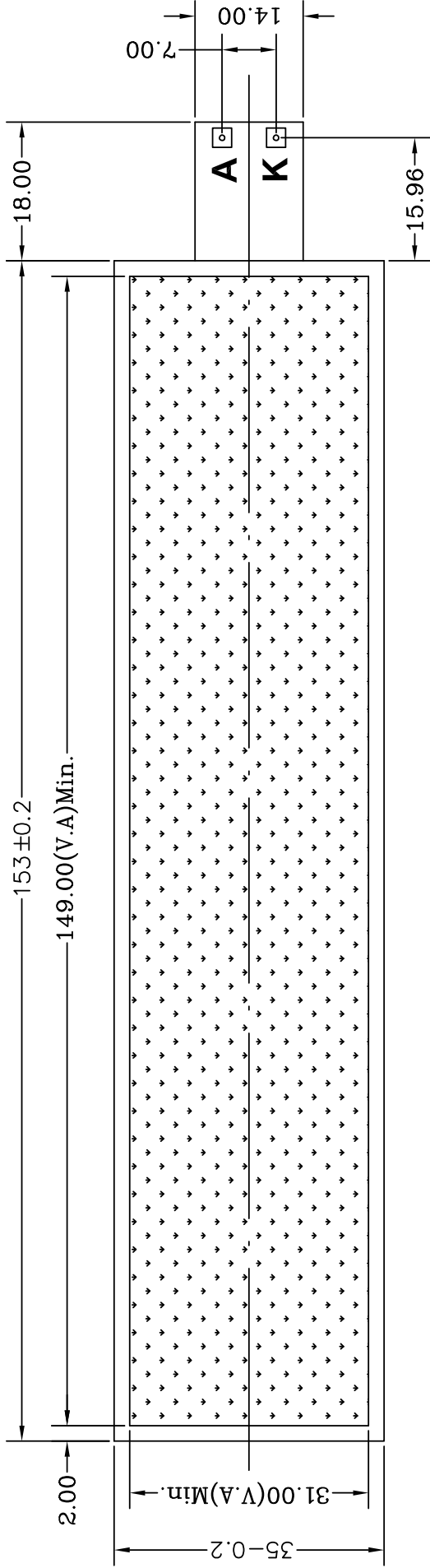
DDRAM address:

Display position

1	2	3	4	5	-	-	-	-	-	-	-	-	-	-	36	37	38	39	40
00	01	02	03	04	-	-	-	-	-	-	-	-	-	-	23	24	25	26	27
40	40	41	42	43	-	-	-	-	-	-	-	-	-	-	63	64	65	66	67
00	01	02	03	04	-	-	-	-	-	-	-	-	-	-	23	24	25	26	27
40	40	41	42	43	-	-	-	-	-	-	-	-	-	-	63	64	65	66	67

DDRAM address

Standard character pattern

UNIT:mm

14.00

7.00

A   K

18.00

15.96

2.80

0.80

Ø0.50

153 ±0.2

149.00(V.A)Min.

2.00

31.00(V.A)Min.

35-0.2

5.0-0.2

LED CIRCUIT
(LED 48 x 2 dies)

K

A

E.L.A(Effective Light Area)
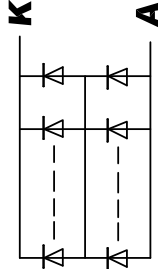
85cd/m² (MIN)

NOTES:
1.LED TYPE: (96 LEDS, MATRIX)
2.CIUCUIT TYPE: SERIES-PARALLEL
3.COLOUR: YELLOW-GREEN
4.PEAK WAVE LENGTH: 565nm~570nm
5.SUPPLY VOLTAGE: 3.8 V - 4.4V
6.CURRENT: 480mA~720mA
7.LUMINOUS INTENSITY: 110 cd/m²
8.OPERATION TEMP: -20°C TO 70°C
9.STORAGE TEMP: -25°C TO 75°C
10.UNIFORMLY: 75%(MIN)
11.UNMARKED TOLERANCES:±0.2mm

Newhaven Display International, LLC

REVISION RECORD					Drawn:	Model Name:
VER	Date	Modify Contents	Name	Confirm		ZJDA-2404G-4
2					Checker:	Date:
3						2004-01-07
4					Approved:	
5						
6						Page: 1-1
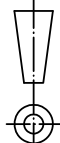
ENGINEERING REQUEST FORM

DATE: 1/3/05

SHEET 1 OF 1

# of Cd's/Disks attached: _____
Drawing #: _____

REVISED

[ ] PART NUMBER ACTION NOTICE

[✓] ENGINEERING CHANGE NOTICE

ECN NO: 89333

ORIG: HARRY

ENG / REQ: FREDDY

NPI PART: 01909181

DESC: CONNECTOR-HEADER-16 PIN-RA-VW

END WINDOWS

PROJECT: Commercial

CREATE/UPDATE BOM (Only for BOM)
- [ ] YES [✓] NO
NEW RELEASE — [ ] YES [✓] NO
UPDATE — [✓] YES [ ] NO

CURRENT REVISION: A   NEW REVISION: _____

DPT. RESPONSIBLE FOR DRAWING: [ ] ME [ ] EE [ ] SE

VENDOR NAME: _____

VENDOR PART #: _____

MANUFACTURER: FCI ELECTRONICS

MFG PART #: 88874-016

APPROX COST: _____

PART TYPE:
- [ ] SHEET METAL
- [ ] MACHINED
- [ ] WELDMENT
- [ ] PLASTIC
- [✓] PURCHASED
- [ ] MODIFIED
- [ ] ASSY
- [ ] KIT
- [ ] OTHER

WHERE USED:
- [ ] FRONTEND, LDU, READER TRANSPORT
- [ ] STACKER / TURNAROUND
- [ ] MAGAZINE
- [ ] CONVEYORS & RACKS
- [ ] R & D PARTS
- [ ] PRINTER PARTS
- [ ] BAR CODE READER

PART CATEGORY: [ ] MAKE [✓] BUY

SERIAL TRACKING METHOD: [✓] NONE [ ] MANUAL [ ] BATCH

UNIT OF MEASURE: [ ] INCHES [✓] EACH [ ] FEET [ ] REF

CAF#: _____   DRAFTER: _____   DATE: _____

DESCRIPTION OF CHANGE & WHY
(IF NEEDED FOR CLARITY, ATTACH A MARKED-UP COPY OF DRAWING)

UPDATE SPEC

PLEASE ADD MANUFACTURE 3M AND P.N. 2516-5002UB AS ALTERNATE TO THIS NUMBER

[ ] VENDOR HAS BEEN NOTIFIED   [ ] FIX REPORTED PROBLEM   CE EFFECTIVITY: [ ] NO EFFECT   [ ] SAFETY   [ ] EMC

* EFFECTIVITY *

ON HAND	OPEN P/O	OPEN S/O & B/O	FINISHED GOODS	OPEN W/O - WIP	FIELD	SPARES
REWORK	UPDATE	UPDATE	REWORK	REWORK	REWORK	REWORK
SCRAP	CANCEL	CANCEL	SCRAP	SCRAP	SCRAP	SCRAP
NO EFFECT ✓	NO EFFECT ✓	NO EFFECT ✓	NO EFFECT ✓	NO EFFECT ✓	NO EFFECT ✓	NO EFFECT ✓

** ECN APPROVALS *

DEPARTMENT	APP DATE	SIGNATURE	REJ DATE	SIGNATURE
ENGINEER	1/3/05			
ENGINEERING DPT MANAGER	1-3-05			
VP OF ENGINEERING				
PROJECT MANAGER				
DOCUMENT CTRL MANAGER	1-4-05			
CUSTOMER SERVICE MANAGER				

COMMENTS

FOR DOC CONTROL USE ONLY:
RECEIVED JAN 0 3 2005
ENTERED 1/4/05

31000069 Rev I

EQUILATERAL TRIANGLE

R .020 TYP
.51

45°
4X

.10 +.0 -.02
2.5 +.0 -.3

X — X

SECTION X—X

.055±.010
1.65±.25

.365±.010
9.27±.25

±.010
±.25

DIM 5

.230±.008
5.84±.02

MAX .050
FLASH 1.27

.040
1.02

MAX .030
FLASH .76

.100
2.54

AT BASE
AT TIPS

⊕ .010/.25 Ⓢ F Ⓖ Ⓜ Ⓢ
⊕ .016/.41 Ⓢ F Ⓖ Ⓜ Ⓢ

.320
8.13

.010
.25

.022±.005 STANDOFF TYP
.56±.13

NOTE 1

⊕ .008/.15 Ⓢ F Ⓜ

.200
5.08

SEE SHT 2 AND TABLE FOR
POL FEATURE ARRANGEMENT
AND STYLE

.100
2.54

.120
3.05

.055±.010
1.40±.25

.016 SPHER. R TYP
.38

DIM A ±.015
±.38

DIM B ±.010
±.25

—F—

⊕ .008/.15 Ⓢ F Ⓜ

.015 MAX 2X
0.38

R .015
0.38

.025
0.63

ROUND OR SQUARE
SEE TABLE

SECTION Y—Y

.200
8.00

R .020
4X .51

PRODUCT NUMBER
SEE TABLE

mat'l code			
SEE NOTE 2			

	ltr	ecn no	dr	date
A		V11921	JM	8/13/91
B		V12776	JM	10/14/91
C		V40786	MSC	5/31/94
D		V20288	RGD	2/7/02

tolerances unless otherwise specified

linear	.XX ±.01/.3		
	.XXX ±.005/0.13		
	.XXXX ±.0020/0.05		
angle	σ ±2°		
dr	J.MUSTARD	8/13/91	
engr	W.FUNK	8/13/91	
chr	MSMYK	8/13/91	
appd	MSMYK	8/13/91	

	revision	
sheet	D	D	D	D
Index		1	2	3

ACAD

Electronics
FCI
www.fciconnect.com

CUSTOMER
COPY

projection

INCH/MM

HEADER QUICKIE SLIM LINE
RIGHT ANGLE 4-WALLED

product family   QKE
size   dwg no
A   88874

code

scale   5:1

cage code
22526

sheet
1 of 3

PDM: Rev:D   STATUS: Released   Printed: May 02, 2003

RECOMMENDED HOLE PATTERN
SCALE 10/1

.100±.003
2.54±.08

ø.035±.003
0.89±0.08
NOTE 6B

ø.040±.003
1.02±0.08
TYP
NOTE 6C

.100±.003
2.54±.08
TYP (NON-ACCUM)

NOTES:

1. SAME PIN POSITION TOLERANCE APPLIES TO BOTH ENDS OF EACH TERMINAL.

2. MOLDING MAT'L: 30% GLASS-FILLED POLYESTER, FLAME RETARDANT PER UL-94V-0, COLOR: BLUE.

3. .1° MAX DRAFT PERMISSIBLE ON ALL SURFACES.

4. 4 POUNDS/1.8 KILOGRAMS MIN. TERM. PULL-OUT FORCE.

5. TERMINAL MAT'L: PHOSPHOR BRONZE.

6. A. PART NUMBERS HAVING AN "R" FOLLOWING THE 8 DIGIT PART NUMBER (EXAMPLE 88235-010R) HAVE TWO PAIRS OF PINS AT EACH END TO PROVIDE RETENTION, LOCATION IS MANUFACTURER'S OPTION. SEE DETAIL "R" SHEET 1.

B. CONNECTORS WITH RETENTION AND ROUND PINS HAVE 15LB./6.8KG. MAX INSERTION AND .75LB./.11KG. MIN RETENTION FORCE WHEN USED IN A .035/0.89±.003/0.08 DIA HOLE AND .062/1.58 THICK P.C.BOARD.

C. CONNECTORS WITH RETENTION AND SQUARE PINS HAVE A 15LB./6.8KG. MAX INSERTION AND A .5LB./.23KG. MIN RETENTION WHEN USED IN A .040/1.02±.003/0.08 DIA HOLE AND A .062/1.58 THICK P.C.BOARD.

PRODUCT NUMBER
SEE TABLE

2 X 5
STYLE A

STYLE B

2 X 7
STYLE C

2 X 8 THRU 2 X 30
STYLE D

KEY FOR PLATING AND TAIL LENGTH AND TYPE			
X	TERMINAL PLATING	DIM S ±.01 ±.3	TERMINAL TYPE
-0XX	30u"/.76u Au OVER 50u"/1.27u Ni	.105/2.67	RD
-1XX	30u"/.76u GXT/GOLD FLASH	.105/2.67	RD
-2XX	30u"/.76u Au OVER 50u"/1.27u Ni	.150/3.81	RD
-3XX	30u"/.76u GXT/GOLD FLASH	.150/3.81	RD
-4XX	30u"/.76u Au OVER 50u"/1.27u Ni	.105/2.67	SQ
-5XX	15u"/.38u GXT/GOLD FLASH	.105/2.67	SQ
-6XX	30u"/.76u Au OVER 50u"/1.27u Ni	.150/3.81	SQ
-7XX	30u"/.76u GXT/GOLD FLASH	.150/3.81	SQ
-8XX	15u"/.38u Au OVER 50u"/1.27u Ni	.150/3.81	SQ
-9XX	30u"/.76u GXT/GOLD FLASH	.105/2.67	SQ

FCI

Electronics
FCI

CUSTOMER COPY

title
HEADER QUICKIE SLIM LINE
RIGHT ANGLE 4-WALLED

product family OKE
size dwg no
A 88874

cage code
22526

projection

INCH/MM

scale 5:1

www.fciconnect.com

code

sheet 2 of 4

mat'l. code SEE NOTE 2				
ltr	ecn no	dr	date	
D				

tolerances unless otherwise specified			
linear	.XX ±.01/.3		
	.XXX ±.005/0.13		
	.XXXX ±.0020/0.051		
angles	0° ±2°		
dr	J.MUSTARD	8/13/01	
engq	W.FUNK	8/13/91	
chr	M.SMYK	8/13/91	
appd	M.SMYK	8/13/01	

sheet index	revision sheet	ACAD

PDM: Rev:D   STATUS: Released   Printed: May 02, 2003

PRODUCT NUMBER NOTE 6	POS	DIM A	DIM B	DIM C	STYLE
88874--X02	2X5	.78/19.8	.72/18.3	.400/10.16	B
--X06	2X4	.68/17.3	.62/15.8	.300/7.62	A
--X10	2X5	.78/19.8	.72/18.3	.400/10.16	A
--X14	2X7	.98/24.9	.92/23.4	.600/15.24	C
--X16	2X8	1.08/27.9	1.02/25.9	.700/17.78	D
--X20	2X10	1.28/32.5	1.22/31.0	.800/22.86	
--X24	2X12	1.48/37.6	1.42/36.1	1.100/27.94	
--X26	2X13	1.58/40.1	1.52/38.6	1.200/30.48	
--X30	2X15	1.78/45.2	1.72/43.7	1.400/35.56	
--X34	2X17	1.98/50.3	1.92/48.8	1.600/40.64	
--X40	2X20	2.28/57.9	2.22/56.4	1.900/48.26	
--X44	2X22	2.48/63.0	2.42/61.5	2.100/53.34	
--X50	2X25	2.78/70.6	2.72/69.1	2.400/60.96	
88874--X60	2X30	3.28/83.3	3.22/81.8	2.800/73.66	D

Electronics FCI

www.fciconnect.com

CUSTOMER COPY

title: HEADER QUICKIE SLIM LINE RIGHT ANGLE 4-WALLED

product family: QKE

size: A dwg no: 88874 code: –

scale: 5:1

INCH/MM

sheet 3 of 4

cage code 22526

Printed: May 02, 2003

tolerances unless otherwise specified						
linear	XX ±.01/.3					
	XXX ±.005/0.13					
	XXXX ±.0020/0.051					
angles	0' ±2°					
dr	J.MUSTARD	8/13/91				
engr	W.FUNK	8/13/91				
chr	M.SMYK	8/13/91				
appl	M.SMYK	8/13/91				

projection

mat'l. code SEE NOTE 2
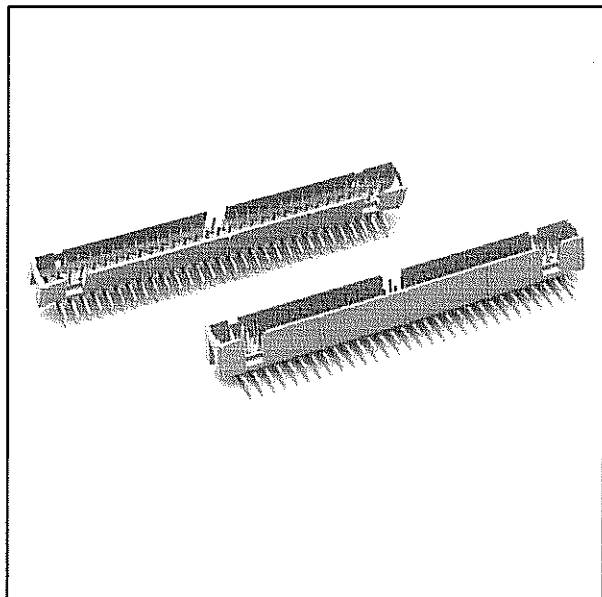
ltr	ecn no	dr	date
D			

PDM: Rev:D STATUS: Released

ACAD

3M™ Pak 100 4-Wall Header

.100″ × .100″ Low Profile, Straight and Right Angle, High Temp Option   2500 Series

- Low profile, space saving design
- Socket compatibility for current design validation
- Center slot polarization prevents mis-insertions and reduces insertion time
- Dual slot polarization means broader compatibility with competitive polarization designs
- Optional retainer clamp for locking sockets in place and increasing connection reliability in vibration-prone environments
- Optional snap-in latches available
- Optional polarizing post available
- Exposed solder tails (on right angle version) provide ease of cleaning and reduced repair costs

Date Modified:May 30, 2003

TS-0770-11
Sheet 1 of 3

Physical

Insulation
Material: Glass Filled Polyester (PBT)
Glass Filled Polyester (PCT)(High Temp Option)
Flammability: UL 94V-0
Color: Gray
Beige (High Temp Option)

Contact
Material: Copper Alloy
Plating
Underplate: 100 μ″ [2.54 μm] Nickel — QQ-N-290, Class 2
Wiping Area: Gold — MIL-G-45204, Type II, Grade C
Solder Tails: 200 μ″ [5.08 μm] 60/40 Tin Lead — MIL-P-81728
Wrap Tails: Gold Flash (Normal Temp Only)
Marking: 3M Logo, and Orientation Triangle

Electrical

Current Rating: 2 A
Insulation Resistance: $>1 \times 10^9$ Ω at 500 Vdc
Withstanding Voltage: 1000 Vrms at Sea Level

Environmental

Temperature Rating: –55°C to +105°C
Processing: Maximum 235°C, with 90 seconds over 215°C (High Temp Option)

UL File No.: E68080

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Interconnect Solutions
http://www.3M.com/interconnects/

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For technical, sales or ordering information call
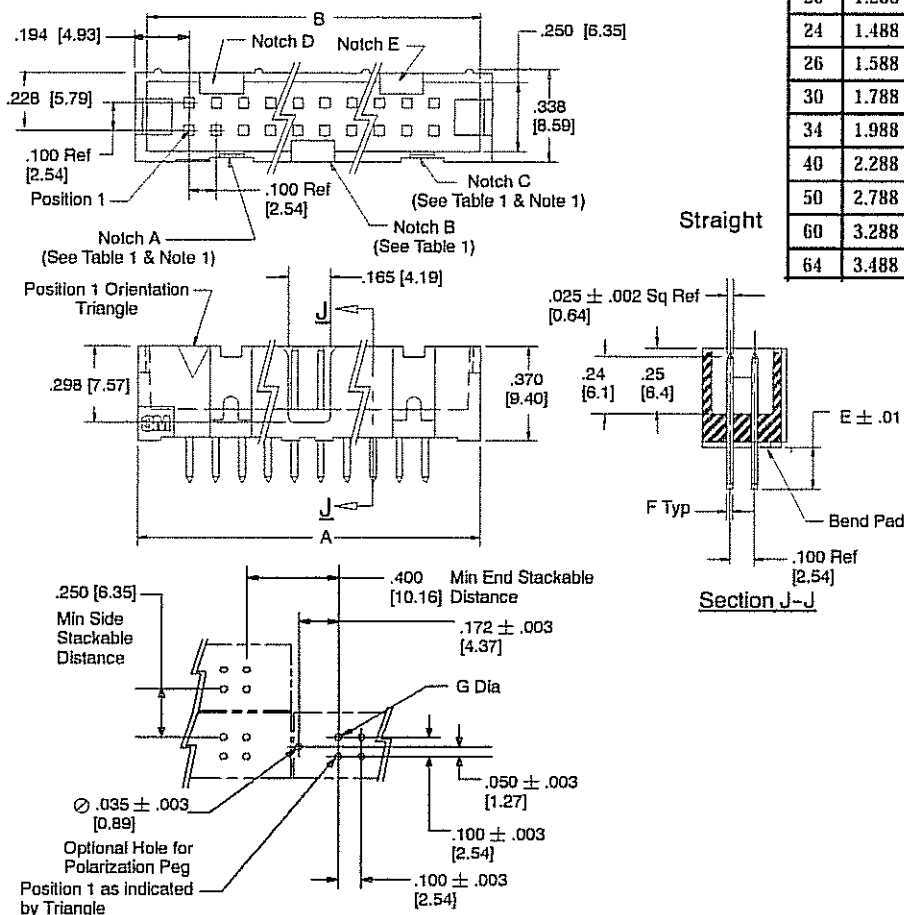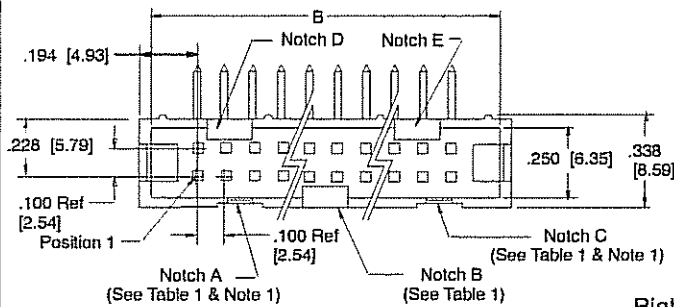800-225-5373

3M™ Pak 100 4-Wall Header
.100″ × .100″ Low Profile, Straight and Right Angle, High Temp Option   2500 Series

Table 2

| Tail | Dim E | Pin Cross Section | | | Dim G ± .003 |
		Dimension F	Diagonals	Corner Radii	
X2	.112 [2.84]	.0245 ± .0005 [0.622]	.028 ± .001 [0.71]	.0075 Ref [0.191]	.035 [0.89] (See Note 2)
03	.155 [3.94]	.0245 ± .0005 [0.622]	.028 ± .001 [0.71]	.0075 Ref [0.191]	.035 [0.89]
05	.61 Ref [15.5]	.0250 ± .002 [0.635]	.035 ± .003 [0.90]	.003 Max [0.08]	.045 [1.14]

Table 1

| Pin Qty | Dimensions | | Polarizing Notches |
	A	B	
10	.788 [20.02]	.708 [17.98]	B C
14	.988 [25.10]	.908 [22.06]	B C D E
16	1.088 [27.64]	1.008 [25.60]	A B C D E
20	1.288 [32.72]	1.208 [30.68]	A B C D E
24	1.488 [37.80]	1.408 [35.76]	A B C D E
26	1.588 [40.34]	1.508 [38.30]	A B C D E
30	1.788 [45.42]	1.708 [43.38]	A B C D E
34	1.988 [50.50]	1.908 [48.46]	A B C D E
40	2.288 [58.12]	2.208 [56.08]	A B C D E
50	2.788 [70.82]	2.708 [68.78]	A B C D E
60	3.288 [83.52]	3.208 [81.48]	A B C D E
64	3.488 [88.60]	3.408 [86.56]	A B C D E

Straight

Section J-J

Recommended P.C. Board Hole Pattern
(Shown for mounting side of board.)

Notes:
1. Notches "A" and "C" will accommodate 3M Polarizing Keys 3518.
2. The recommended PCB hole size for the kinked tail positions on the .112″ solder tail connector is .035″ ± .002.
   Refer to TS-0972 for the positions kinked.

Inch [mm]

| Tolerance Unless Noted | | | |
	.0	.00	.000
Inch	± .1	± .01	± .005

[ ] Dimensions for Reference Only

Ordering Information

X25XX-X0XXXXX

Blank = Standard
N = High Temperature

Pin Quantity: (See Table 1)

Bend Pad Option:
6= Straight pin product with bend pad in High temp or normal plastics
7= Straight pin product w/o bend pad in High temp only

Tail
02 = Solder Tails for .062 [1.57] Thick Board.
K2 = Kinked Solder Tails for .082 [1.57] Thick Board.
03 = Solder Tails for .094 to .125 [2.39 to 3.18] Thick Board.
05 = Wrap Tails for up to 3 Levels of Wire Wrap.
    (Normal temp only)

Mating Plating Thickness:
Solder Tail Versions
UG = 15 μ″ [0.38 μm]
UB = 30 μ″ [0.76 μm]
Wrap Tail Versions
EB = 30 μ″ [0.76 μm]
    (Normal temp Only)

TS-0770-11
Sheet 2 of 3

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3M™ Pak 100 4-Wall Header
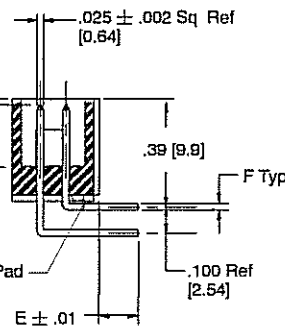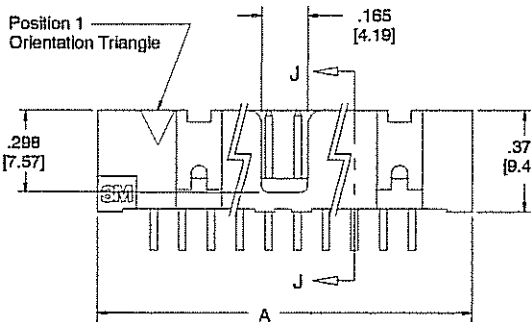## .100″ × .100″ Low Profile, Straight and Right Angle, High Temp Option   2500 Series

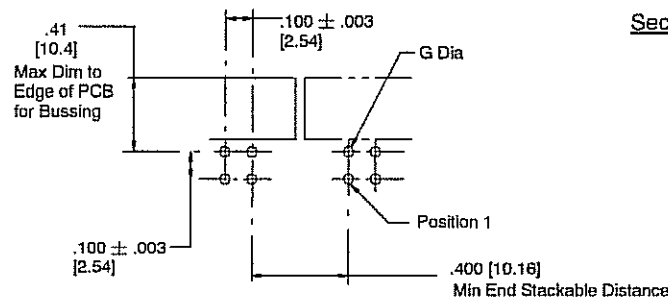| Table 2					
Tail	Dim E	Pin Cross Section			Dim G ± .003
		Dimension F	Diagonals	Corner Radii	
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03	.155 [3.94]	.0245 ± .0005 [0.622]	.028 ± .001 [0.71]	.0075 Ref [0.191]	.035 [0.89]
05	.61 Ref [15.5]	.0250 ± .002 [0.635]	.035 ± .003 [0.90]	.003 Max [0.08]	.045 [1.14]

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Pin Qty	Dimensions		Polarizing Notches
	A	B	
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64	3.488 [88.60]	3.408 [86.56]	A B C D E

.194 [4.93]
B
Notch D   Notch E
.228 [5.79]
.250 [6.35]   .338 [8.59]
.100 Ref [2.54]
Position 1
.100 Ref [2.54]
Notch A (See Table 1 & Note 1)
Notch B (See Table 1)
Notch C (See Table 1 & Note 1)

Right Angle

Position 1 Orientation Triangle
.165 [4.19]
J
.298 [7.57]
.370 [9.40]
3M
J
A

.025 ± .002 Sq Ref [0.64]
.24 [6.1]   .25 [6.4]
.39 [9.9]
F Typ
Bend Pad
.100 Ref [2.54]
E ± .01

Section J-J

.41 [10.4] Max Dim to Edge of PCB for Bussing
.100 ± .003 [2.54]
G Dia
.100 ± .003 [2.54]
Position 1
.400 [10.16] Min End Stackable Distance

Recommended Mounting Hole Pattern

Inch [mm]

Tolerance Unless Noted			
	.0	.00	.000
Inch	± .1	± .01	± .005

[ ] Dimensions for Reference Only

Notes:
1. Notches "A" and "C" will accommodate 3M Polarizing Keys 3518.
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TS-0770-11
Sheet 3 of 3

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