

NL023		Datasheet
Rev 1.00	Date: 24.11.2019	

Product History		
Version	Rev.Date	Description
1.0	November 2019	First version

Introduction

The tiny NL023 is part of a new generation of powerful ARM based 58mm thermal printer controllers designed and supplied by Norden Logic. The controllers shine with their size, huge RAM and Flash memory, support for a wide range of input voltage, real-time head temperature control, real-time paper-out monitor, custom fonts, user definable flash storage and a big selection of built-in language fonts. The NL023 is a replacement part for the older ZYTP58-FT6B printer chip.

The NL023 uses the industry standard ESC/POS control commands. The initial release of the NL023 supports directly 8-bit, UTF8 and UTF16 characters as well as Chinese and Japanese. 170 languages and more.

User Interface

- UART interface
- Stepper motor drive interface
- 2 individual STB lines
- TH thermal monitor line
- PHE paper-out monitor line
- Flash storage



Features

Thermal heads: 58mm

- Supply voltage: 3.5V~9V;
- Print speed: 80mm/second
- Languages: 170 and more
- Grayscale: 8 levels
- Font Attributes: Double width, Double height, Bold, Italic, Reverse, Underline, Normal
- 1D Barcode: UPC-A, UPC-E, EAN-13, EAN-8, CODE39, CODE93, ITF25, CODABAR, CODE128-A
- 2D Barcode: QR etc via POS GS v command
- Software API: ESC/POS (C libraries provided)
- UART interface: Flow Control: RTS, XON/XOFF
- Built-in: Overheat monitor, Paper-out monitor,
- Operating temperature: -40°C~+85°C
- Storage temperature: -50°C~+125°C

Application

- Medical device
- Taxi meter
- Calculator
- Handheld pos
- Tank meter
- Mobile pos
- Industrial meters
- Cash register

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1. Description

The Norden Logic NL023 is a thermal printer head controller designed to control 58mm thermal print heads from manufacturers such as Seiko, Fujitsu, Samsung, ALPS, PRT and others.

The controller is designed to interface with a host controller via the UART interface. The NL023 exposes many settable properties via the industry standard ESC/POS programming interface. A comprehensive ESC/POS command interface document is available as well as C library source files with all supported commands and a command test software application - to make integration fast and easy.

Also available are our Printer EVK boards ready to print evaluation boards.

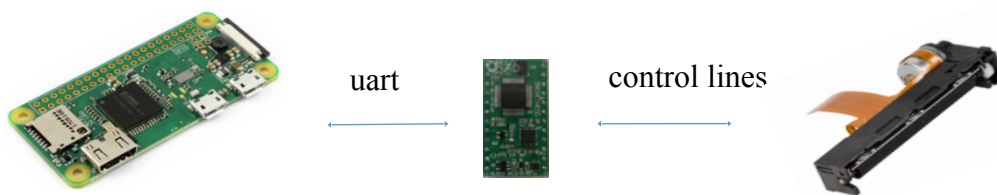


Figure1 application diagram

- A host is always in command sending ESC/POS commands to the NL023 via the UART control lines RX/TX
- The NL023 in turn controls the thermal head via dedicated control lines
- The NL023 can be delivered in consumer grade or industrial grade

2. Overview

The NL023 supports a variety of print heads available on the market. Many heads are compatible designs and feature the exact same characteristics. As we can not list all heads on the market we have put a table together with the type we currently support. More are added and if your head is not listed, please contact us.

Supported 58mm heads:

- Fujitsu FTP628MCL101
- Fujitsu FTP628MCL103
- Seiko LPTZ245B/D/...
- Seiko LTP01-245
- Samsung SMP685
- Samsung SMP695
- PRT PT486F
- ALPS PTMBL1B
- WinsPu TP2ZX

and compatible

NL023 parameters is as table below:

Table1 function overview

Print method	Thermal print dot lines
Print density	8dots/mm
Print points	384dots/line for 58mm heads
Print width	58mm heads
Print speed	80mm/sec(max)
Print character (fonts)	Latin: 8x16, 12x24 dots DoubleByte: 16x16, 24x24 dots Over 170 combined possible languages
BMP print	Vertical print
	NV bitmap print (4MB storage) or custom fonts
1D barcode	UPCA, UPCE, EAN13, EAN8, CODE39 ITF25, CODABAR, CODE93, CODE128A
2D barcode	High speed printing e.g. QR via GS v print command
UART buffer	8K Bytes
Paper-out detection	Yes
Over-heat monitor	Yes
Platen detection	Yes
Dimensions	31.8 x 17.78 mm

3. Pin descriptions

NL023 pinout see figure2:

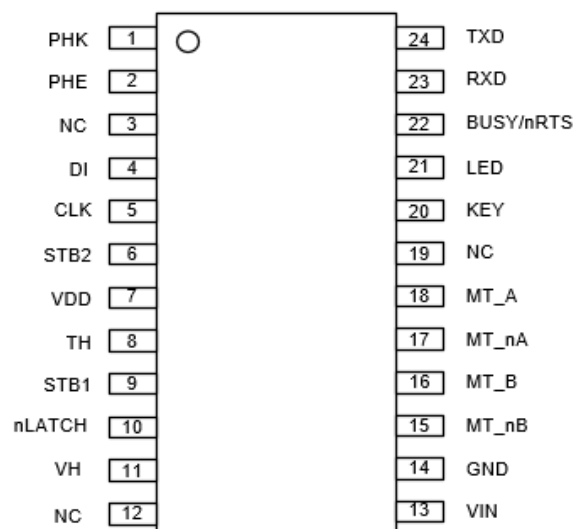


Figure2 NL023 pinout

The table 2 below describes the NL023 pinout in detail:

Table2 NL023 pinout

name	sort	direction	type	Descriptions
PHK	1	Out	For heads	Connect the head's Cathode for photo interruptor
PHE	2	IN	For heads	Paper out detect pin , connects to PHE pin of head
NC	3	NC	NC	
DI	4	Out	For heads	Data output to head
CLK	5	Out	For heads	Clock output to head
STB2	6	Out	For heads	Thermal head energizing control signal
VDD	7	Out	Power	3.3V power supply for head
TH	8	Out	For Host	Temperature monitor pin
STB1	9	IN	For heads	Thermal head energizing control signal
nLATCH	10	IN	For heads	Latch signal
VH	11	Out	Power	Power line connect to external head
NC	12	NC	NC	
VIN	13	IN	Power	Power Supply
GND	14	IN	Power	Power GND
MT_nB	15	Out	For Mortor	Stepmotor nB
MT_B	16	Out	For Mortor	Stepmotor B
MT_nA	17	Out	For Mortor	Stepmotor nA
MT_A	18	Out	For Mortor	Stepmotor A
NC	19	NC	NC	
KEY	20	Input	reserve	
LED	21	Out	Indicator	When NL023 run ,it light external LED.
BUSY/nRTS	22	Out	For heads	nRTS=0, NL023 is ready nRTS=1, NL023 is busy, don't send data
RXD	23	Out	For heads	NL023 UART receiving (connect to host TX pin)
TXD	24	Out	For heads	NL023 UART sending (connect to host RX pin)

4. Electrical characteristics

NL023 electrical parameter as in table 3:

Table 3 electrical characteristics

symbol	parameter	conditions	min	typical	max	unit
V _{in}	supply voltage	T _o =25°C	3.8	7.2	9	V
I _s	static current	V _{in} =7.2V		32mA		
V _H	print voltage		-	=V _{in}	-	V
I _H	print current				6 ⁽¹⁾	A
V _{dd}	V _{dd} inside chip		3.2	3.3	3.4	V
V _{IH}	Logic Supply	V _{dd} =3.3V	0.7V _{dd}	-	-	V
V _{IL}		V _{dd} =3.3V			0.3V _{dd}	V
V _{OH}		V _{dd} =3.3V	V _{dd} -0.4			V
V _{OL}		V _{dd} =3.3V			0.4	V
I _{OH}		V _{dd} =3.3V	8			mA
F _{clk}				2		Mhz
I _m	step motor current	V _{in} =7.2V	-	0.5	-	A
T _o	operation temperature		-40		+85	°C
T _s	storage temperature		-50		+125	°C
T _j	joint temperature				250	°C
t _j	soldering time				3	s

5. Package characteristics

5.1 mechanical dimension

Figure 4 shows the package outline:

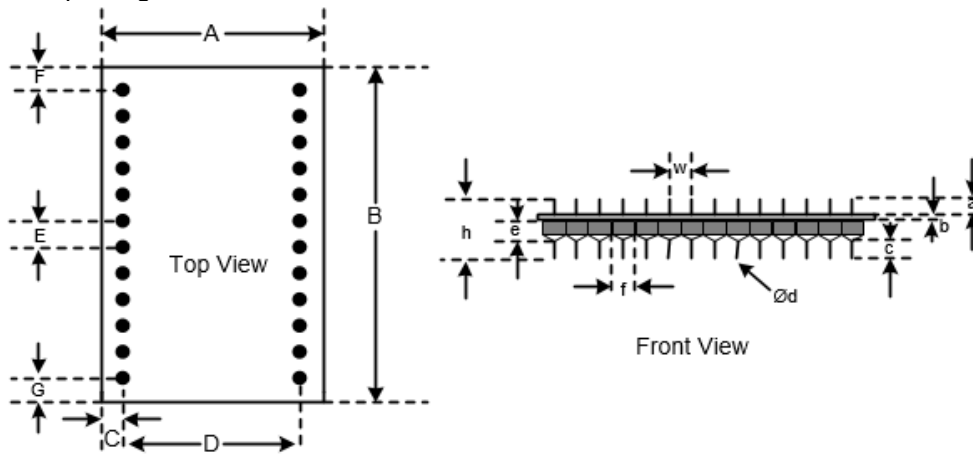


Figure4 package outline

Table 4 lists the mechanical dimensions of top view in mm:

Table4 mechanical dimensions of top view

symbol	A	B	C	D	E	F	G
typical	17.78	31.8	1.27	15.24	2.54	1.93	1.93

Table 5 lists the mechanical dimensions of front view in mm:

Table5 mechanical dimensions of front view

symbol	a	b	c	d	e	f	h	w
typical	2.00	1.00	4.00	0.46±0.05	4.96	2.54	11.96	2.54

6. Application circuit

NL023 is designed to connect to 58mm print heads compatible with FTP628MCL101. Vin is around 7.2V

See figure 6 below:

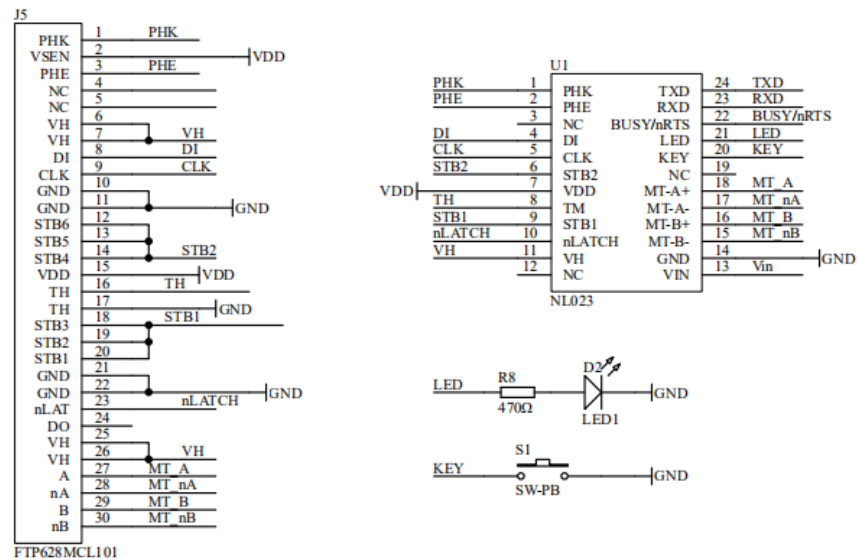


Figure6 NL023 connect with ftp628mcl101