



Texas Instrument TMS320 (JTAG) Mass ISP Programming

Application Note

DC04029

NanoPlex™ general description

NanoPlex NPS-06-01-04A Universal Relay ISP-Channel Multiplier allows the expansion of the number of channels of ISP-Programming tools, while also offering galvanic isolation. The total number of switched signals is 28. NanoPlex is used on PCBAs production lines, in ATE-controlled ISP programming. Thanks to its ultra-small size (only 51.0- x 66.5-mm), this NanoPlex model takes easily place in Test Fixtures. Designed for piggyback mounting, NanoPlex is universal and compatible with all types of ISP Programming tools.

Recommended Readings - Further Documentation

Before starting, please study the following essential papers:

- *NanoPlex NPS-06-01-04A Data Sheet*
- *NanoPlex NPS-06-01-04A Flexibility Application Note*

'*NanoPlex NPS-06-01-04A Flexibility Application Note*' clearly describes NanoPlex **modularity** and how to deploy **multiple units** in order to create high-density ISP Programming Multipliers with an **unlimited number of channels**.

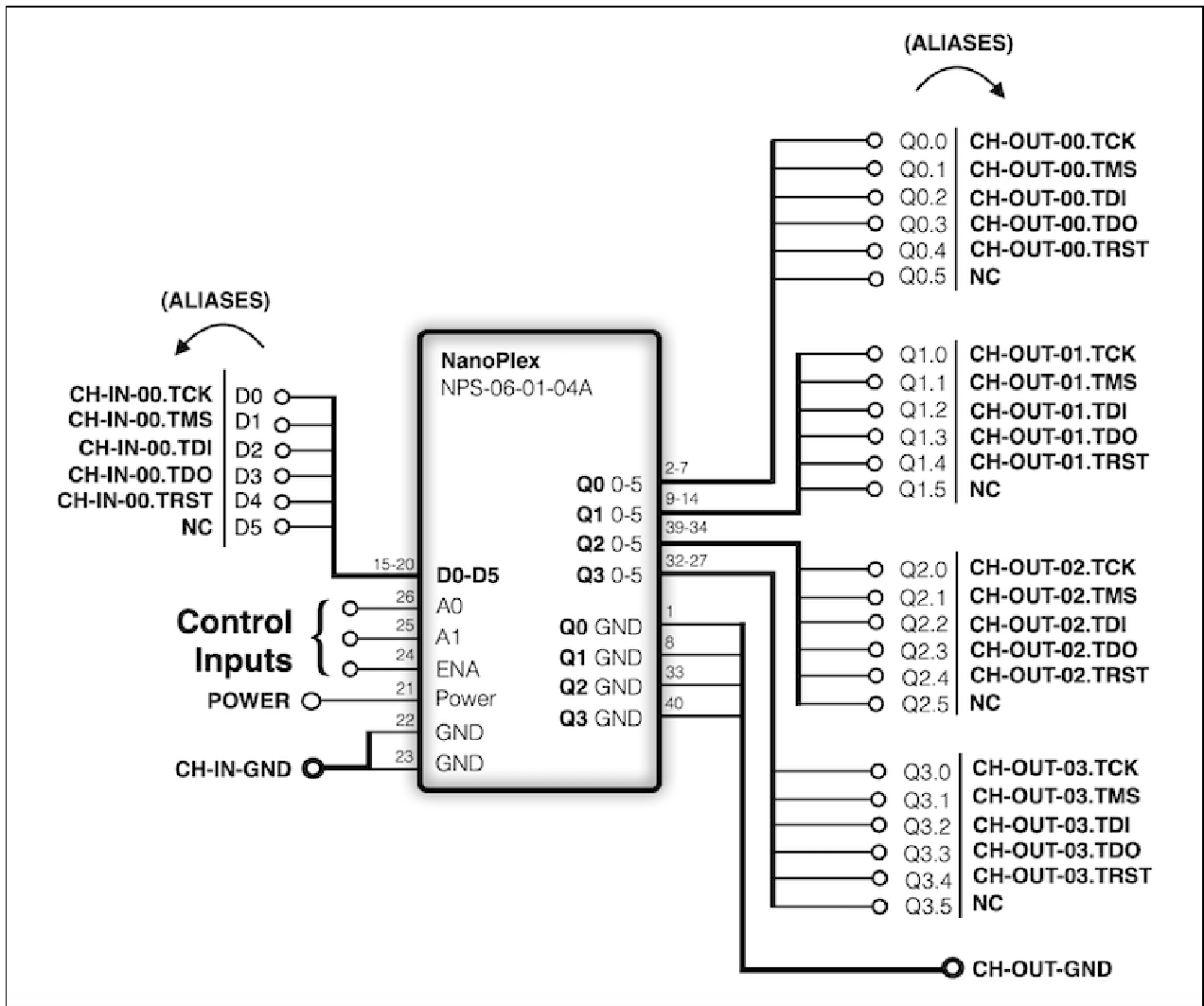
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Signals required for ISP Programming are:

- TCK
- TMS
- TDI
- TDO
- TRST

The most convenient way to ISP program multiple instances of this device through NanoPlex is using this model in **1x4 operating mode**. 1 NanoPlex input channel is multiplied to 4 separated, galvanic isolated output channels.

On the following mode examples diagram, NanoPlex signal names are assigned with aliases (texts are in **bold**).



Truth table

(the symbol ► stands for “connected to”)

ENA	A1	A0	CH-IN-	00.TCK	00.TMS	00.TDI	00.TDO	00.TRST
				►	►	►	►	►
1	0	0	CH-OUT-	00.TCK	00.TMS	00.TDI	00.TDO	00.TRST
1	0	1	CH-OUT-	01.TCK	01.TMS	01.TDI	01.TDO	01.TRST
1	1	0	CH-OUT-	02.TCK	02.TMS	02.TDI	02.TDO	02.TRST
1	1	1	CH-OUT-	03.TCK	03.TMS	03.TDI	03.TDO	03.TRST
0	X	X	CH-OUT-	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z

Operating sequence

ENA = 1

A1-A0 = "00"

```
CH-IN-00.TCK ▶ CH-OUT-00.TCK
CH-IN-00.TMS ▶ CH-OUT-00.TMS
CH-IN-00.TDI ▶ CH-OUT-00.TDI
CH-IN-00.TDO ▶ CH-OUT-00.TDO
CH-IN-00.TRST ▶ CH-OUT-00.TRST
```

A1-A0 = "01"

```
CH-IN-00.TCK ▶ CH-OUT-01.TCK
CH-IN-00.TMS ▶ CH-OUT-01.TMS
CH-IN-00.TDI ▶ CH-OUT-01.TDI
CH-IN-00.TDO ▶ CH-OUT-01.TDO
CH-IN-00.TRST ▶ CH-OUT-01.TRST
```

A1-A0 = "10"

```
CH-IN-00.TCK ▶ CH-OUT-02.TCK
CH-IN-00.TMS ▶ CH-OUT-02.TMS
CH-IN-00.TDI ▶ CH-OUT-02.TDI
CH-IN-00.TDO ▶ CH-OUT-02.TDO
CH-IN-00.TRST ▶ CH-OUT-02.TRST
```

A1-A0 = "11"

```
CH-IN-00.TCK ▶ CH-OUT-03.TCK
CH-IN-00.TMS ▶ CH-OUT-03.TMS
CH-IN-00.TDI ▶ CH-OUT-03.TDI
CH-IN-00.TDO ▶ CH-OUT-03.TDO
CH-IN-00.TRST ▶ CH-OUT-03.TRST
```

Connector pinout (aliases signals, top view)

Pin	Signal
01	CH-OUT-GND
02	CH-OUT-00.TCK
03	CH-OUT-00.TMS
04	CH-OUT-00.TDI
05	CH-OUT-00.TDO
06	CH-OUT-00.TRST
07	NC
08	CH-OUT-GND
09	CH-OUT-01.TCK
10	CH-OUT-01.TMS
11	CH-OUT-01.TDI
12	CH-OUT-01.TDO
13	CH-OUT-01.TRST
14	NC
15	CH-IN-00.TCK
16	CH-IN-00.TMS
17	CH-IN-00.TDI
18	CH-IN-00.TDO
19	CH-IN-00.TRST
20	NC

Signal	Pin
CH-OUT-GND	40
CH-OUT-02.TCK	39
CH-OUT-02.TMS	38
CH-OUT-02.TDI	37
CH-OUT-02.TDO	36
CH-OUT-02.TRST	35
NC	34
CH-OUT-GND	33
CH-OUT-03.TCK	32
CH-OUT-03.TMS	31
CH-OUT-03.TDI	30
CH-OUT-03.TDO	29
CH-OUT-03.TRST	28
NC	27
A0	26
A1	25
ENA	24
GND (*)	23
GND (*)	22
Power	21

(*) GND at pins 22/23 is used for both Power GND and CH-IN-GND.

Using multiple NanoPlex NPS-06-01-04A units

NanoPlex NPS-06-01-04A product is modular by design. Several units can be deployed in order to set-up a very large, limitless channel-multiplier. The advantage of using more units is a faster and less expensive substitution.

Please read '[NanoPlex NPS-06-01-04A Flexibility Application Note](#)' to discover how to set-up a switching system with the **number of channels as high as your application requires**.

About Manta Systems

Manta Systems is a high-tech company, global leader in high-density signal switching for In-System Programming (ISP) and Testing Systems. The company targets the electronic boards assembly market, where a high number of connections is required. Manta Systems flagship product is NanoPlex™, a series of Channels Multipliers for In-System Programming (ISP) and Testing instruments. NanoPlex is the **world's first universal tool** providing end-user with the possibility of having compact, easy-to-use, professional, reliable In-System Programming (ISP) and Testing Channel Multiplication functionality.

Warranty

All Manta Systems products are covered by a **three-year warranty** against defects and workmanship from the purchase date. The warranty only covers products when properly installed and used.

Orders

All NanoPlex™ Series products are generally **off-the-shelf**.

Shipping is within **24 hours** from order reception.

Free shipping & 30-day money back guarantee.

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