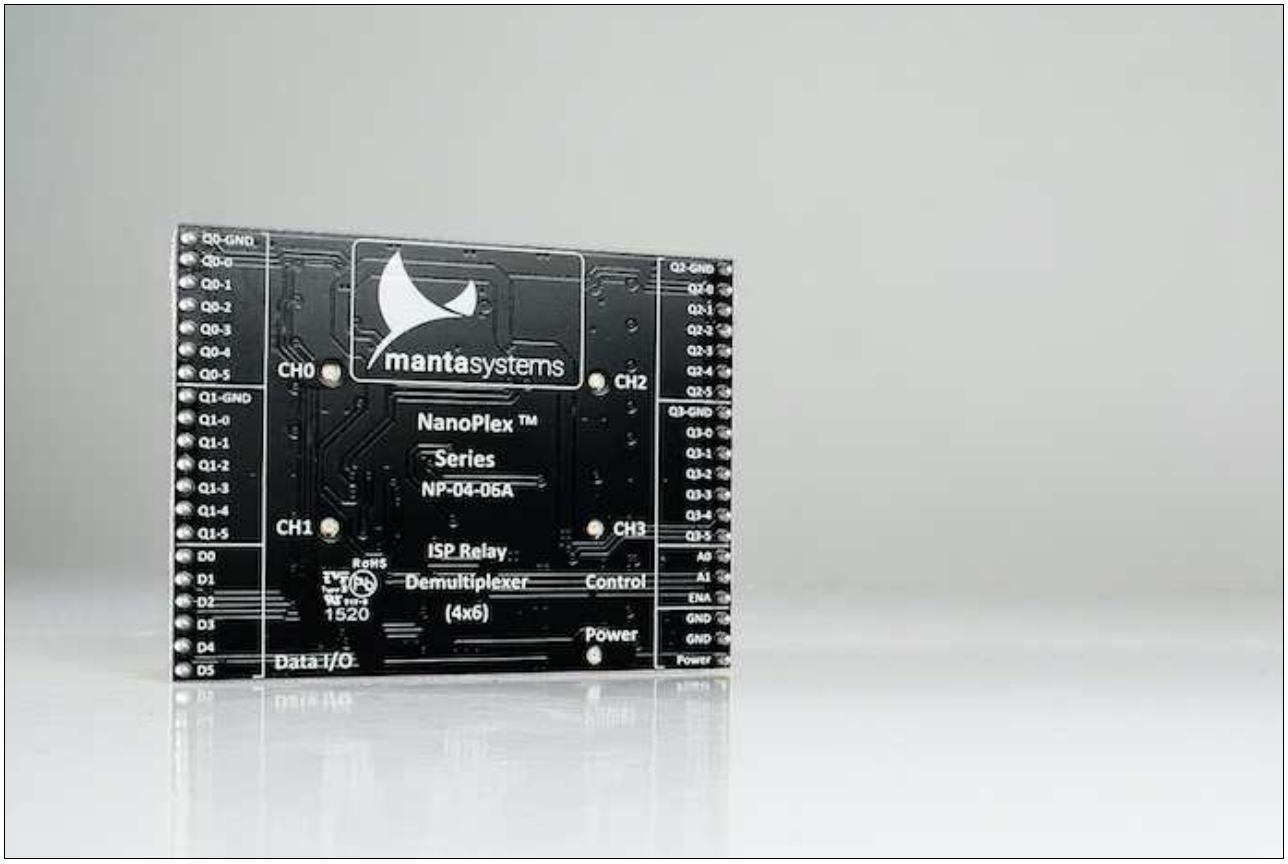
NanoPlex™ NPS-06-01-04A
Flexibility

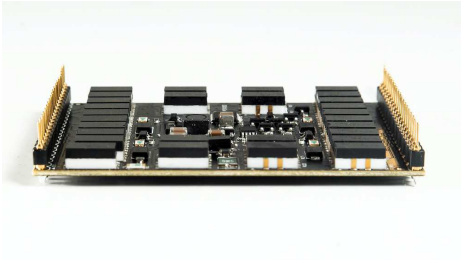
Application Note

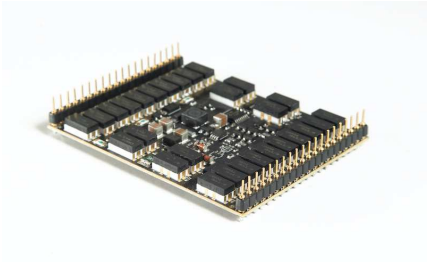
DC04016

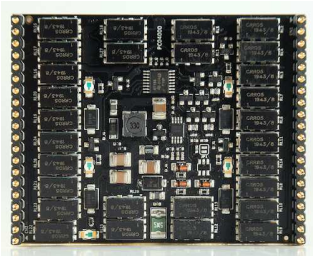


Product General Description

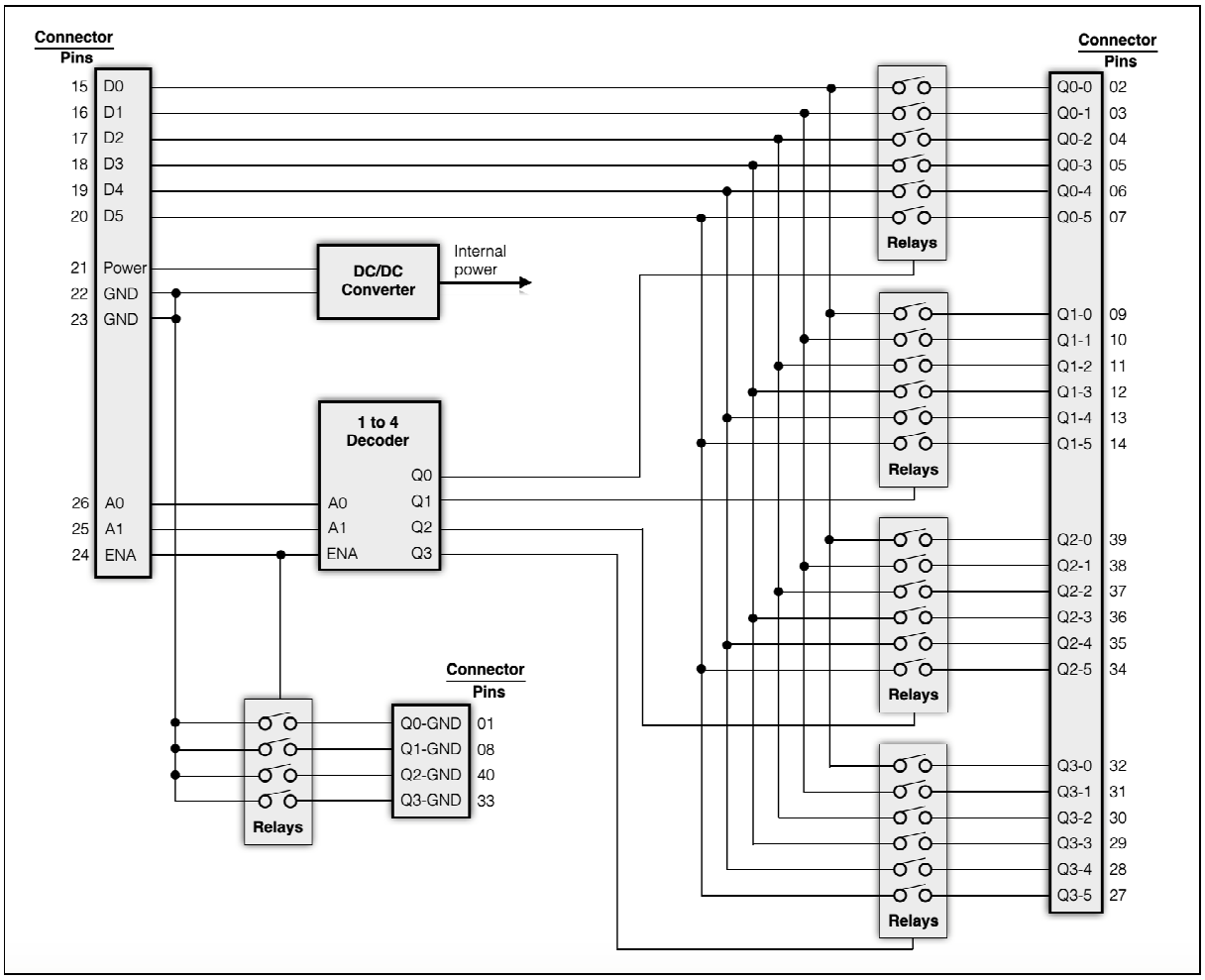
NanoPlex NPS-06-01-04A Universal Relay ISP-Channel Multiplier allows the expansion of the number of channels of ISP-Programming tools, while also offering galvanic isolation. The total number of switched signals is 24. NanoPlex is used on PCBAs production lines, in ATE-controlled ISP programming. Thanks to its ultra-small size (only 51.0x66.5 mm), NanoPlex takes easly place in Test Fixtures. Designed for piggyback mounting, NanoPlex is universal and compatible with all types of ISP Programming tools.



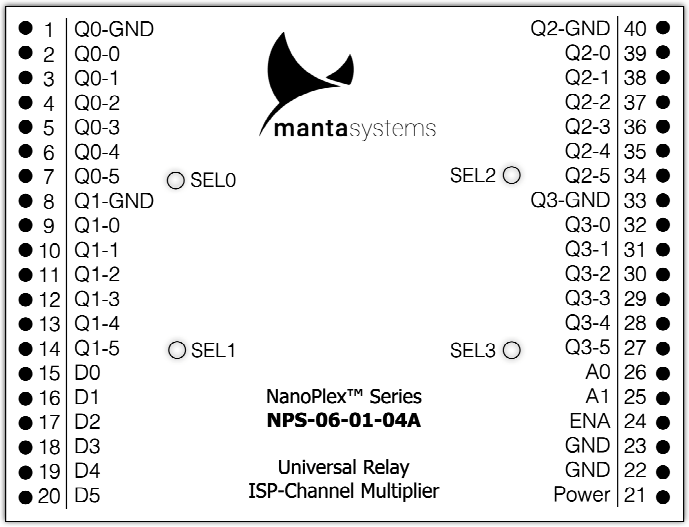




Block Diagram



Layout (top view)

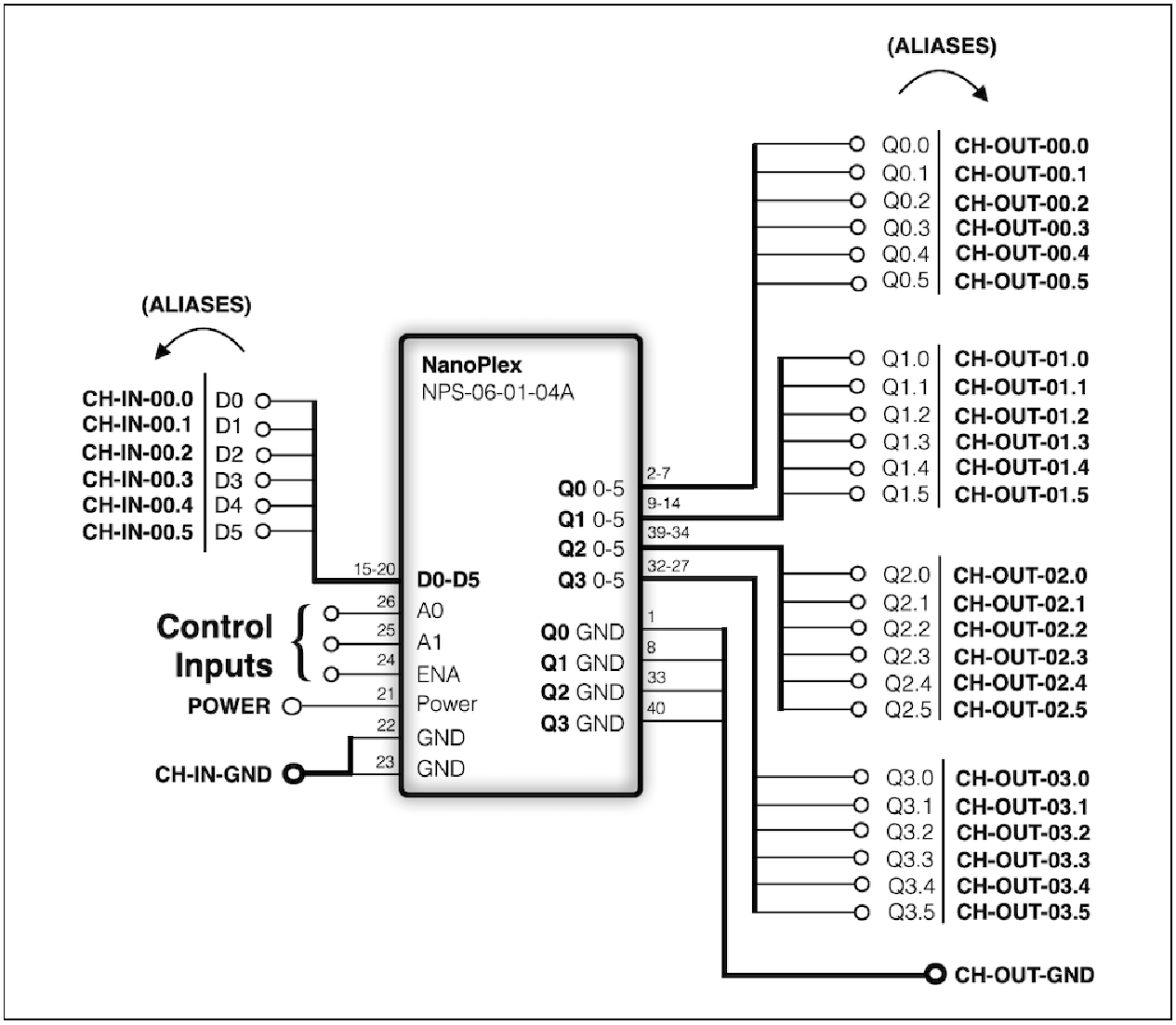


NPS-06-01-04A Operating Modes

Depending on the required number of signals per every channel, four operating modes are possible. On the following mode examples diagrams, for a better explanation of all the possible operating modes, signal names are assigned with aliases (texts are in **bold**).

Mode 1x4

6 Signals per channel
1 Input channel
4 Output channels



Truth table

(the symbol ► stands for "connected to")

ENA	A1	A0	CH-IN-	00.0 ►	00.1 ►	00.2 ►	00.3 ►	00.4 ►	00.5 ►
1	0	0	CH-OUT-	00.0	00.1	00.2	00.3	00.4	00.5
1	0	1	CH-OUT-	01.0	01.1	01.2	01.3	01.4	01.5
1	1	0	CH-OUT-	02.0	02.1	02.2	02.3	02.4	02.5
1	1	1	CH-OUT-	03.0	03.1	03.2	03.3	03.4	03.5
0	X	X	CH-OUT	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z

Operating sequence

```
ENA = 1
A1-A0 = "00"
      CH-IN-00.0 ► CH-OUT-00.0
      CH-IN-00.1 ► CH-OUT-00.1
      CH-IN-00.2 ► CH-OUT-00.2
      CH-IN-00.3 ► CH-OUT-00.3
      CH-IN-00.4 ► CH-OUT-00.4
      CH-IN-00.5 ► CH-OUT-00.5
A1-A0 = "01"
      CH-IN-00.0 ► CH-OUT-01.0
      CH-IN-00.1 ► CH-OUT-01.1
      CH-IN-00.2 ► CH-OUT-01.2
      CH-IN-00.3 ► CH-OUT-01.3
      CH-IN-00.4 ► CH-OUT-01.4
      CH-IN-00.5 ► CH-OUT-01.5
A1-A0 = "10"
      CH-IN-00.0 ► CH-OUT-02.0
      CH-IN-00.1 ► CH-OUT-02.1
      CH-IN-00.2 ► CH-OUT-02.2
      CH-IN-00.3 ► CH-OUT-02.3
      CH-IN-00.4 ► CH-OUT-02.4
      CH-IN-00.5 ► CH-OUT-02.5
A1-A0 = "11"
      CH-IN-00.0 ► CH-OUT-03.0
      CH-IN-00.1 ► CH-OUT-03.1
      CH-IN-00.2 ► CH-OUT-03.2
      CH-IN-00.3 ► CH-OUT-03.3
      CH-IN-00.4 ► CH-OUT-03.4
      CH-IN-00.5 ► CH-OUT-03.5
```

Connector pinout (aliases signals, top view)

Pin	Signal
01	CH-OUT-GND
02	CH-OUT-00.0
03	CH-OUT-00.1
04	CH-OUT-00.2
05	CH-OUT-00.3
06	CH-OUT-00.4
07	CH-OUT-00.5
08	CH-OUT-GND
09	CH-OUT-01.0
10	CH-OUT-01.1
11	CH-OUT-01.2
12	CH-OUT-01.3
13	CH-OUT-01.4
14	CH-OUT-01.5
15	CH-IN-00.0
16	CH-IN-00.1
17	CH-IN-00.2
18	CH-IN-00.3
19	CH-IN-00.4
20	CH-IN-00.5

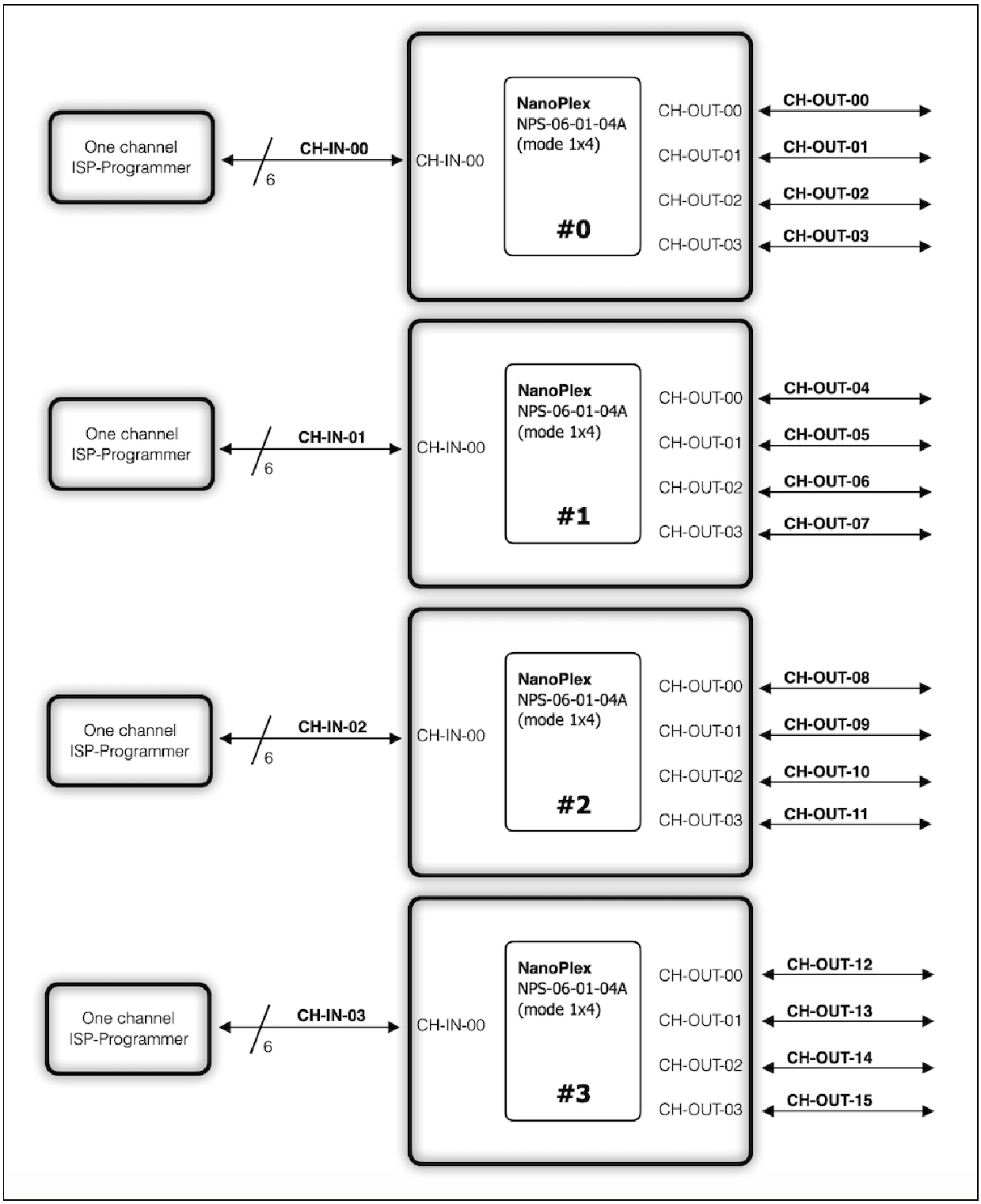
Signal	Pin
CH-OUT-GND	40
CH-OUT-02.0	39
CH-OUT-02.1	38
CH-OUT-02.2	37
CH-OUT-02.3	36
CH-OUT-02.4	35
CH-OUT-02.5	34
CH-OUT-GND	33
CH-OUT-03.0	32
CH-OUT-03.1	31
CH-OUT-03.2	30
CH-OUT-03.3	29
CH-OUT-03.4	28
CH-OUT-03.5	27
A0	26
A1	25
ENA	24
GND (*)	23
GND (*)	22
Power	21

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

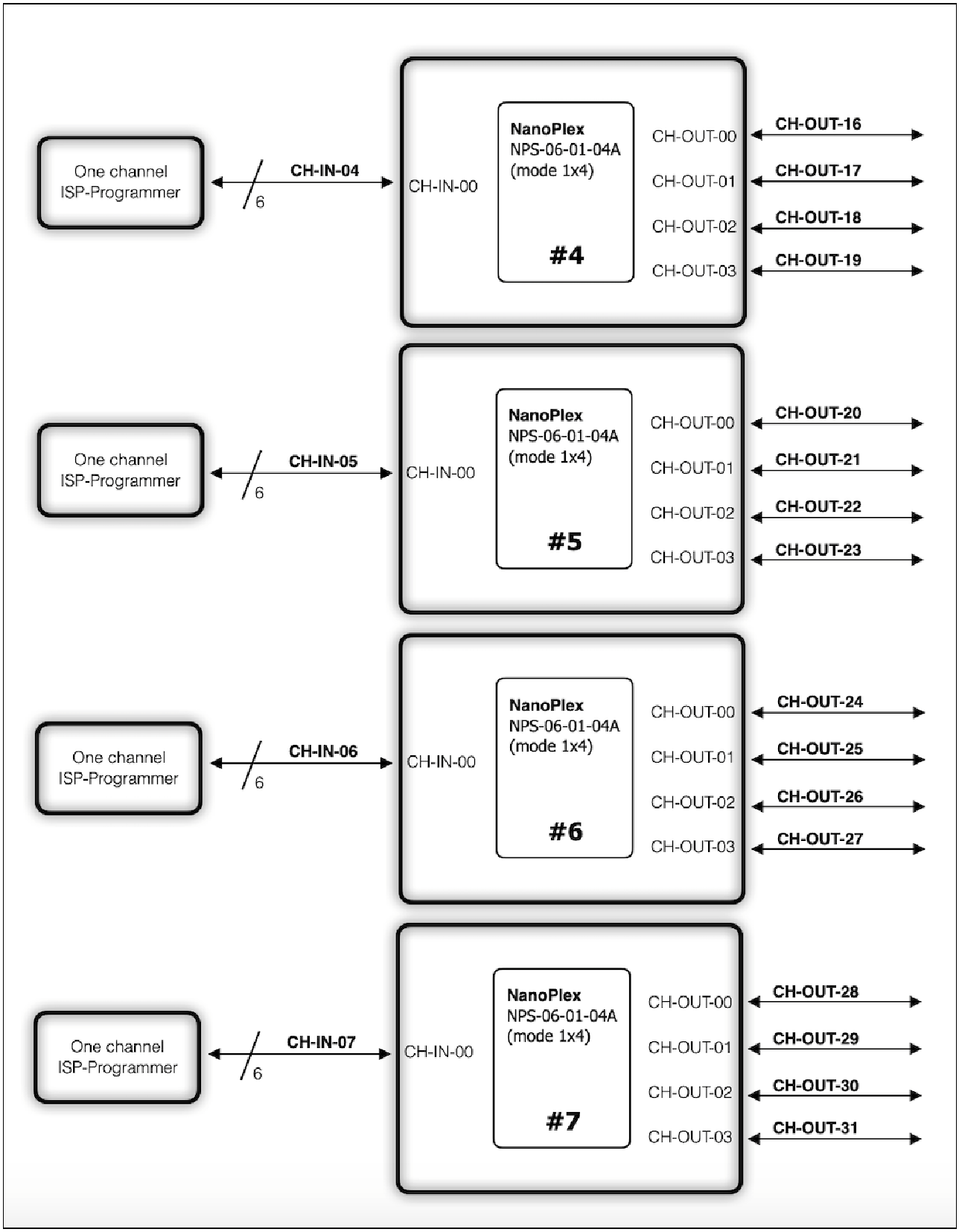
Using 8 NanoPlex NPS-06-01-04A units for a 32-channel system

The following diagram shows how 8 NanoPlex NPS-06-01-04A units can be used to create a massive, 32-channel ISP Programming multiplier. In this example, 8 input channels are from the output of any brand or type of ISP-Programming tool.

Example diagram 1/2



Example diagram 2/2

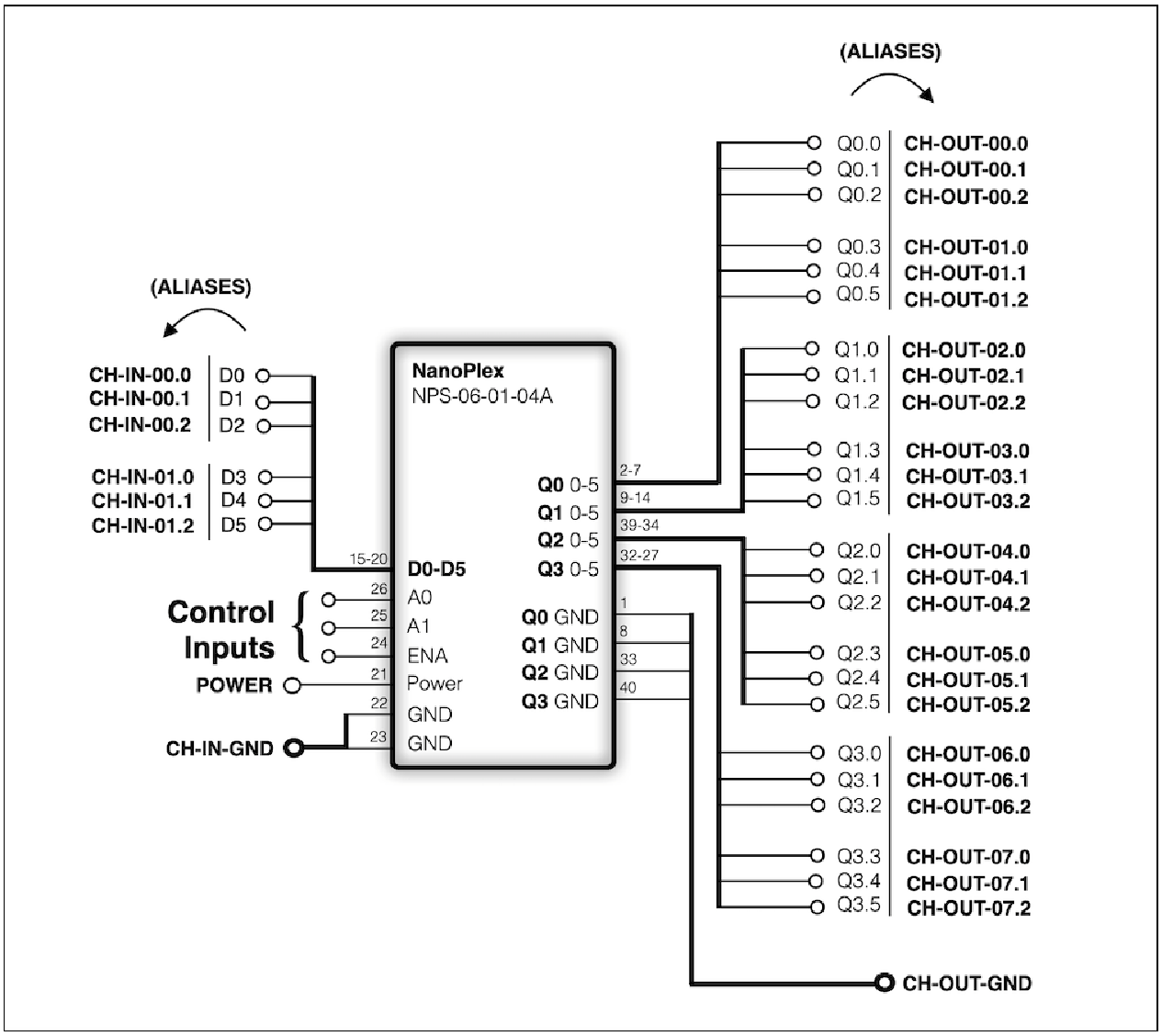


Channels and aliases

NanoPlex Unit	Input Cannels		Input Aliases	Output Cannels		Output Aliases
#0	CH-IN-00	►	**CH-IN-00**	CH-OUT-00	►	**CH-OUT-00**
#0				CH-OUT-01	►	**CH-OUT-01**
#0				CH-OUT-02	►	**CH-OUT-02**
#0				CH-OUT-03	►	**CH-OUT-03**
#1	CH-IN-00	►	**CH-IN-01**	CH-OUT-00	►	**CH-OUT-04**
#1				CH-OUT-01	►	**CH-OUT-05**
#1				CH-OUT-02	►	**CH-OUT-06**
#1				CH-OUT-03	►	**CH-OUT-07**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
#7	CH-IN-00	►	**CH-IN-07**	CH-OUT-00	►	**CH-OUT-28**
#7				CH-OUT-01	►	**CH-OUT-29**
#7				CH-OUT-02	►	**CH-OUT-30**
#7				CH-OUT-03	►	**CH-OUT-31**

Mode 2x8

3 Signals per channel
2 Input channels
8 Output channels



Truth table

(the symbol ► stands for "connected to")

ENA	A1	A0	CH-IN-	00.0 ►	00.1 ►	00.2 ►	01.0 ►	01.1 ►	01.2 ►
1	0	0	CH-OUT-	00.0	00.1	00.2	01.0	01.1	01.2
1	0	1	CH-OUT-	02.0	02.1	02.2	03.0	03.1	03.2
1	1	0	CH-OUT-	04.0	04.1	04.2	05.0	05.1	05.2
1	1	1	CH-OUT-	06.0	06.1	06.2	07.0	07.1	07.2
0	X	X	CH-OUT	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z

Operating sequence

```
ENA = 1
A1-A0 = "00"
      CH-IN-00.0 ► CH-OUT-00.0
      CH-IN-00.1 ► CH-OUT-00.1
      CH-IN-00.2 ► CH-OUT-00.2
      CH-IN-01.0 ► CH-OUT-01.0
      CH-IN-01.1 ► CH-OUT-01.1
      CH-IN-01.2 ► CH-OUT-01.2
A1-A0 = "01"
      CH-IN-00.0 ► CH-OUT-02.0
      CH-IN-00.1 ► CH-OUT-02.1
      CH-IN-00.2 ► CH-OUT-02.2
      CH-IN-01.0 ► CH-OUT-03.0
      CH-IN-01.1 ► CH-OUT-03.1
      CH-IN-01.2 ► CH-OUT-03.2
A1-A0 = "10"
      CH-IN-00.0 ► CH-OUT-04.0
      CH-IN-00.1 ► CH-OUT-04.1
      CH-IN-00.2 ► CH-OUT-04.2
      CH-IN-01.0 ► CH-OUT-05.0
      CH-IN-01.1 ► CH-OUT-05.1
      CH-IN-01.2 ► CH-OUT-05.2
A1-A0 = "11"
      CH-IN-00.0 ► CH-OUT-06.0
      CH-IN-00.1 ► CH-OUT-06.1
      CH-IN-00.2 ► CH-OUT-06.2
      CH-IN-01.0 ► CH-OUT-07.0
      CH-IN-01.1 ► CH-OUT-07.1
      CH-IN-01.2 ► CH-OUT-07.2
```

Connector pinout (aliases signals, top view)

Pin	Signal
01	CH-OUT-GND
02	CH-OUT-00.0
03	CH-OUT-00.1
04	CH-OUT-00.2
05	CH-OUT-01.0
06	CH-OUT-01.1
07	CH-OUT-01.2
08	CH-OUT-GND
09	CH-OUT-02.0
10	CH-OUT-02.1
11	CH-OUT-02.2
12	CH-OUT-03.0
13	CH-OUT-03.1
14	CH-OUT-03.2
15	CH-IN-00.0
16	CH-IN-00.1
17	CH-IN-00.2
18	CH-IN-01.0
19	CH-IN-01.1
20	CH-IN-01.2

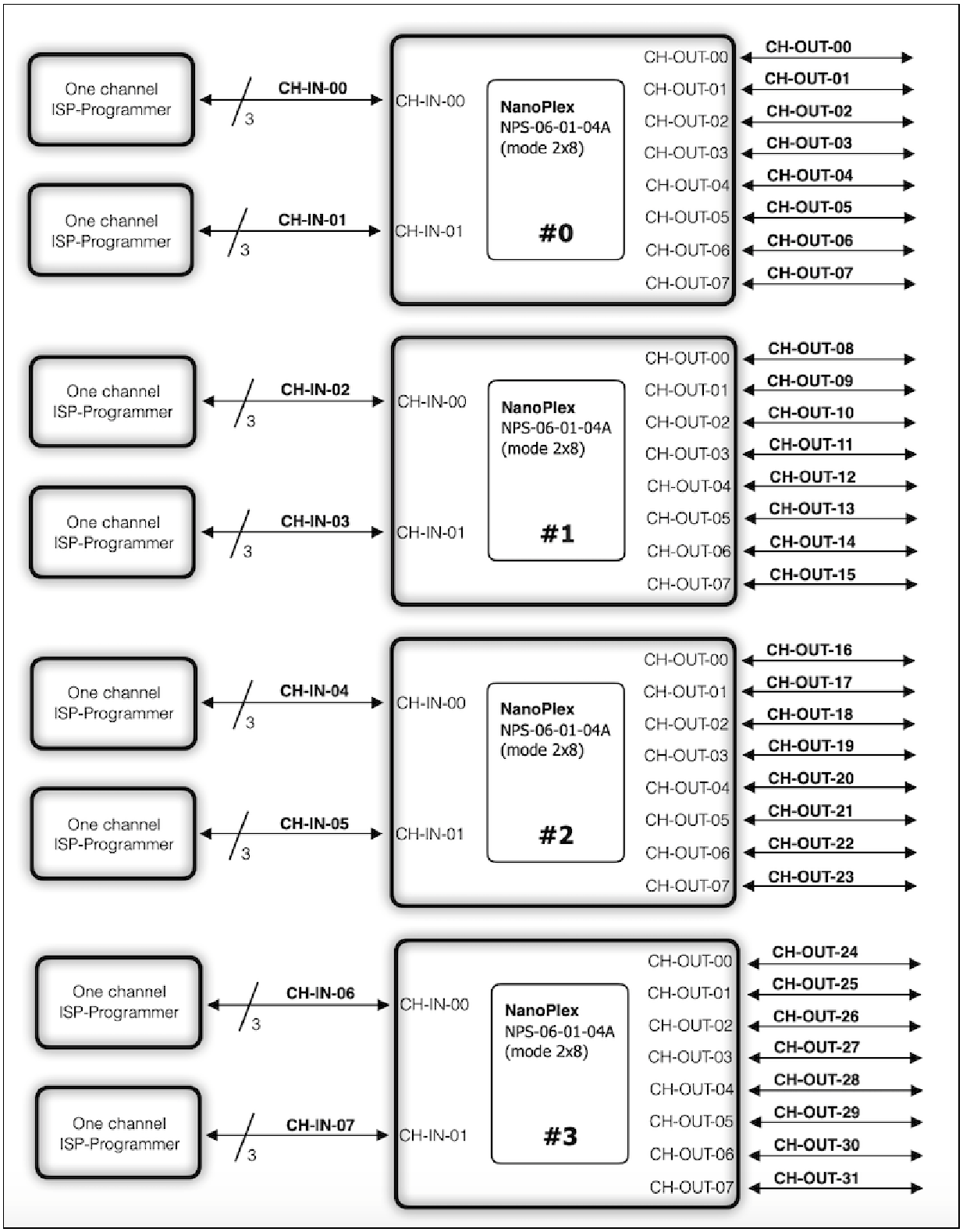
Signal	Pin
CH-OUT-GND	40
CH-OUT-04.0	39
CH-OUT-04.1	38
CH-OUT-04.2	37
CH-OUT-05.0	36
CH-OUT-05.1	35
CH-OUT-05.2	34
CH-OUT-GND	33
CH-OUT-06.0	32
CH-OUT-06.1	31
CH-OUT-06.2	30
CH-OUT-07.0	29
CH-OUT-07.1	28
CH-OUT-07.2	27
A0	26
A1	25
ENA	24
GND (*)	23
GND (*)	22
Power	21

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

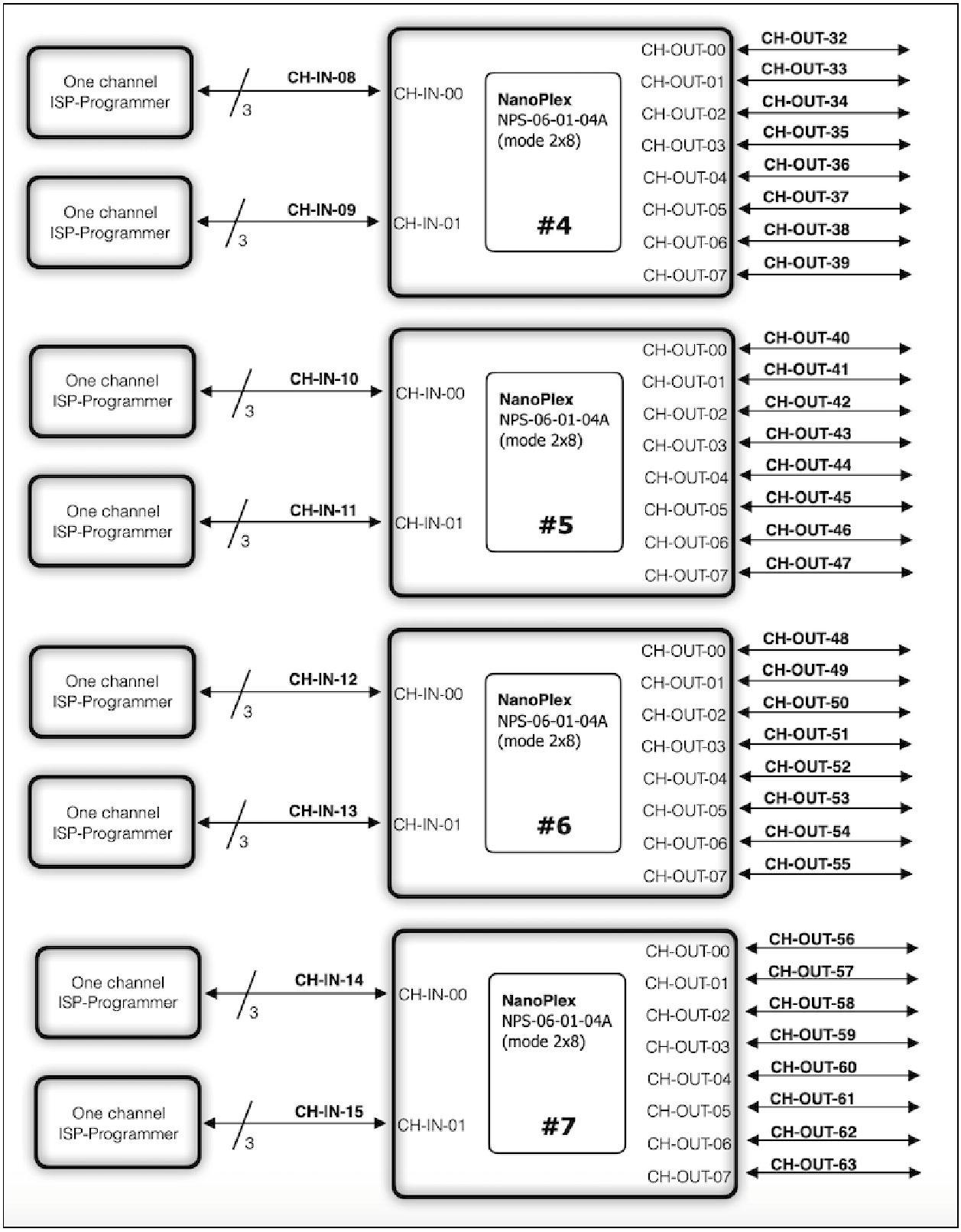
Using 8 NanoPlex NPS-06-01-04A units for a 64-channel system

The following diagram shows how 8 NanoPlex NPS-06-01-04A units can be used to create a massive, 64-channel ISP Programming multiplier. In this example, 16 input channels are from the output of any brand or type of ISP-Programming tool.

Example diagram 1/2



Example diagram 2/2

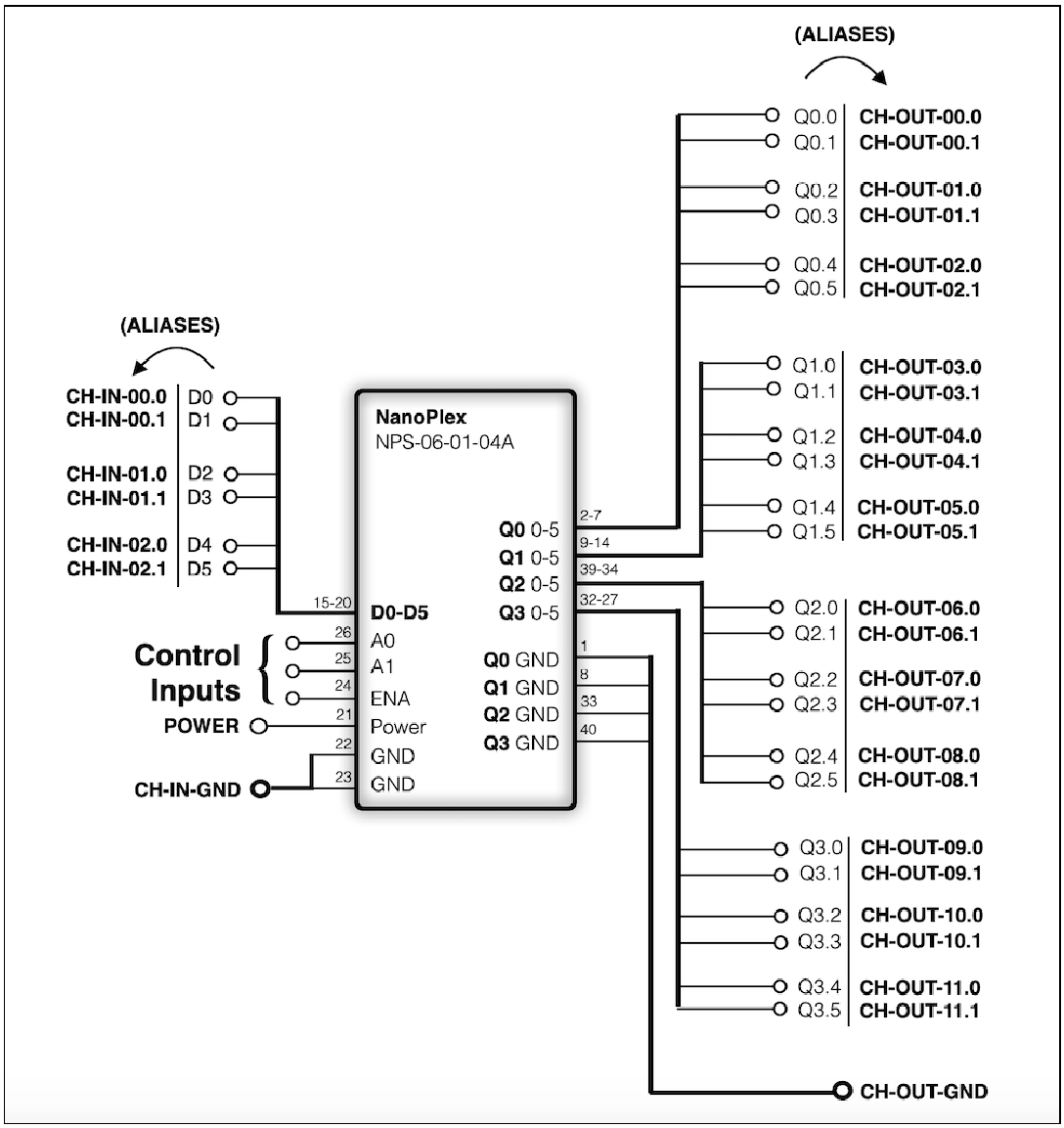


Channels and aliases

NanoPlex Unit	Input Cannels		Input Aliases	Output Cannels		Output Aliases
#0	CH-IN-00	►	**CH-IN-00**	CH-OUT-00	►	**CH-OUT-00**
#0				CH-OUT-01	►	**CH-OUT-01**
#0				CH-OUT-02	►	**CH-OUT-02**
#0				CH-OUT-03	►	**CH-OUT-03**
#0	CH-IN-01	►	**CH-IN-01**	CH-OUT-04	►	**CH-OUT-04**
#0				CH-OUT-05	►	**CH-OUT-05**
#0				CH-OUT-06	►	**CH-OUT-06**
#0				CH-OUT-07	►	**CH-OUT-07**
#1	CH-IN-00	►	**CH-IN-02**	CH-OUT-00	►	**CH-OUT-08**
#1				CH-OUT-01	►	**CH-OUT-09**
#1				CH-OUT-02	►	**CH-OUT-10**
#1				CH-OUT-03	►	**CH-OUT-11**
#1	CH-IN-01	►	**CH-IN-03**	CH-OUT-04	►	**CH-OUT-12**
#1				CH-OUT-05	►	**CH-OUT-13**
#1				CH-OUT-06	►	**CH-OUT-14**
#1				CH-OUT-07	►	**CH-OUT-15**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
#7	CH-IN-00	►	**CH-IN-14**	CH-OUT-00	►	**CH-OUT-56**
#7				CH-OUT-01	►	**CH-OUT-57**
#7				CH-OUT-02	►	**CH-OUT-58**
#7				CH-OUT-03	►	**CH-OUT-59**
#7	CH-IN-01	►	**CH-IN-15**	CH-OUT-04	►	**CH-OUT-60**
#7				CH-OUT-05	►	**CH-OUT-61**
#7				CH-OUT-06	►	**CH-OUT-62**
#7				CH-OUT-07	►	**CH-OUT-63**

Mode 3x12

2 Signals per channel
3 Input channels
12 Output channels



Truth table

(the symbol ► stands for “connected to”)

ENA	A1	A0	CH-IN-	00.0 ►	00.1 ►	01.0 ►	01.1 ►	02.0 ►	02.1 ►
1	0	0	CH-OUT-	00.0	00.1	01.0	01.1	02.0	02.1
1	0	1	CH-OUT-	03.0	03.1	04.0	04.1	05.0	05.1
1	1	0	CH-OUT-	06.0	06.1	07.0	07.1	08.0	08.1
1	1	1	CH-OUT-	09.0	09.1	10.0	10.1	11.0	11.1
0	X	X	CH-OUT	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z

Operating sequence

```
ENA = 1
A1-A0 = "00"
      CH-IN-00.0 ► CH-OUT-00.0
      CH-IN-00.1 ► CH-OUT-00.1
      CH-IN-01.0 ► CH-OUT-01.0
      CH-IN-01.1 ► CH-OUT-01.1
      CH-IN-02.0 ► CH-OUT-02.0
      CH-IN-02.1 ► CH-OUT-02.1
A1-A0 = "01"
      CH-IN-00.0 ► CH-OUT-03.0
      CH-IN-00.1 ► CH-OUT-03.1
      CH-IN-01.0 ► CH-OUT-04.0
      CH-IN-01.1 ► CH-OUT-04.1
      CH-IN-02.0 ► CH-OUT-05.0
      CH-IN-02.1 ► CH-OUT-05.1
A1-A0 = "10"
      CH-IN-00.0 ► CH-OUT-06.0
      CH-IN-00.1 ► CH-OUT-06.1
      CH-IN-01.0 ► CH-OUT-07.0
      CH-IN-01.1 ► CH-OUT-07.1
      CH-IN-02.0 ► CH-OUT-08.0
      CH-IN-02.1 ► CH-OUT-08.1
A1-A0 = "11"
      CH-IN-00.0 ► CH-OUT-09.0
      CH-IN-00.1 ► CH-OUT-09.1
      CH-IN-01.0 ► CH-OUT-10.0
      CH-IN-01.1 ► CH-OUT-10.1
      CH-IN-02.0 ► CH-OUT-11.0
      CH-IN-02.1 ► CH-OUT-11.1
```

Connector pinout (aliases signals, top view)

Pin	Signal
01	CH-OUT-GND
02	CH-OUT-00.0
03	CH-OUT-00.1
04	CH-OUT-01.0
05	CH-OUT-01.1
06	CH-OUT-02.0
07	CH-OUT-02.1
08	CH-OUT-GND
09	CH-OUT-03.0
10	CH-OUT-03.1
11	CH-OUT-04.0
12	CH-OUT-04.1
13	CH-OUT-05.0
14	CH-OUT-05.1
15	CH-IN-00.0
16	CH-IN-00.1
17	CH-IN-01.0
18	CH-IN-01.1
19	CH-IN-02.0
20	CH-IN-02.1

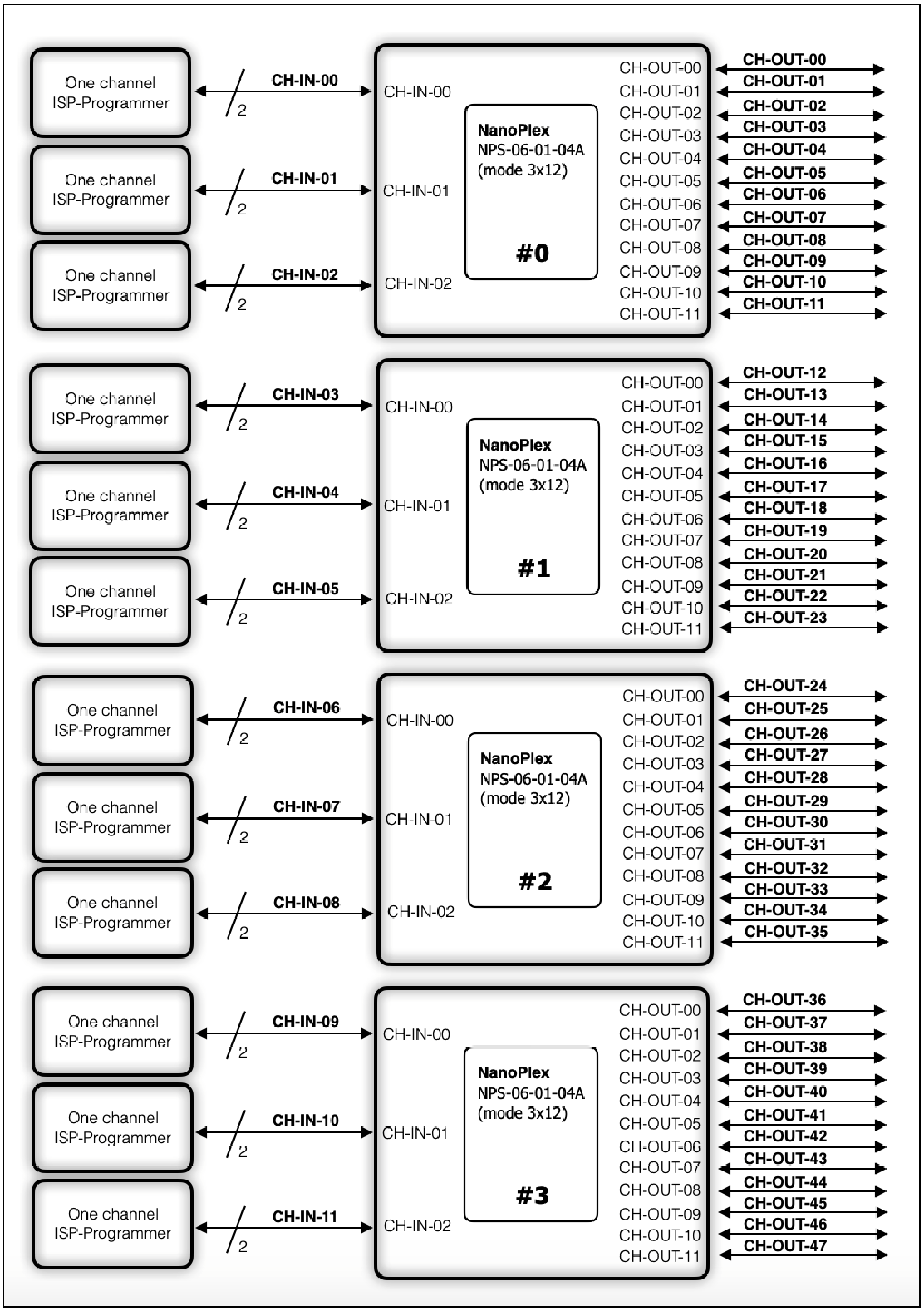
Signal	Pin
CH-OUT-GND	40
CH-OUT-06.0	39
CH-OUT-06.1	38
CH-OUT-07.2	37
CH-OUT-07.3	36
CH-OUT-08.4	35
CH-OUT-08.5	34
CH-OUT-GND	33
CH-OUT-09.0	32
CH-OUT-09.1	31
CH-OUT-10.0	30
CH-OUT-10.1	29
CH-OUT-11.0	28
CH-OUT-11.1	27
A0	26
A1	25
ENA	24
GND (*)	23
GND (*)	22
Power	21

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

Using 4 NanoPlex NPS-06-01-04A units for a 48-channel system

The following diagram shows how 4 NanoPlex NPS-06-01-04A units can be used to create a massive, 48-channel ISP Programming multiplier. In this example, 12 input channels are from the output of any brand or type of ISP-Programming tool.

Example diagram

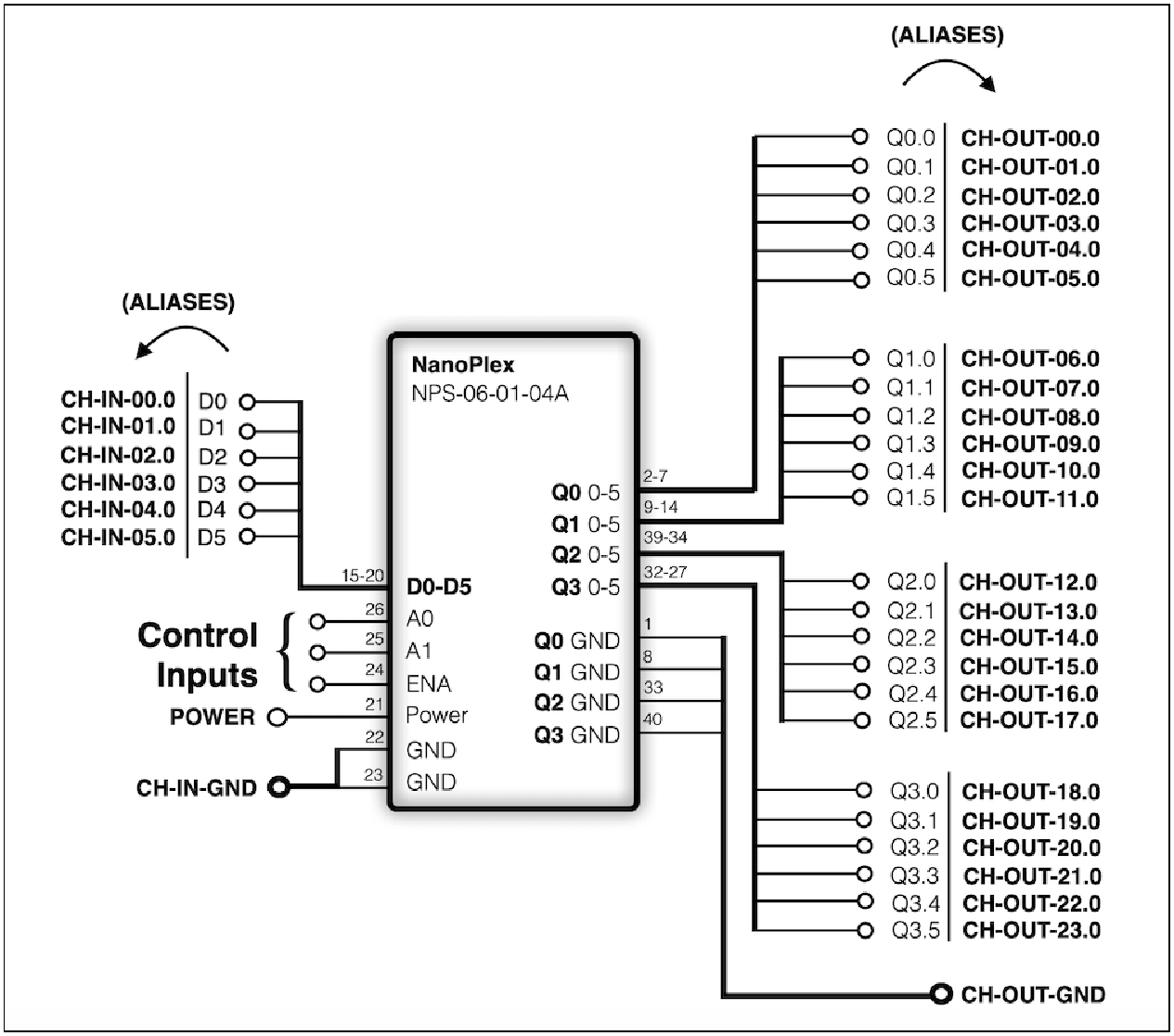


Channels and aliases

NanoPlex Unit	Input Cannels		Input Aliases	Output Cannels		Output Aliases
#0	CH-IN-00	►	**CH-IN-00**	CH-OUT-00	►	**CH-OUT-00**
#0				CH-OUT-01	►	**CH-OUT-01**
#0				CH-OUT-02	►	**CH-OUT-02**
#0				CH-OUT-03	►	**CH-OUT-03**
#0	CH-IN-01	►	**CH-IN-01**	CH-OUT-04	►	**CH-OUT-04**
#0				CH-OUT-05	►	**CH-OUT-05**
#0				CH-OUT-06	►	**CH-OUT-06**
#0				CH-OUT-07	►	**CH-OUT-07**
#0	CH-IN-02	►	**CH-IN-02**	CH-OUT-08	►	**CH-OUT-08**
#0				CH-OUT-09	►	**CH-OUT-09**
#0				CH-OUT-10	►	**CH-OUT-10**
#0				CH-OUT-11	►	**CH-OUT-11**
#1	CH-IN-00	►	**CH-IN-03**	CH-OUT-00	►	**CH-OUT-12**
#1				CH-OUT-01	►	**CH-OUT-13**
#1				CH-OUT-02	►	**CH-OUT-14**
#1				CH-OUT-03	►	**CH-OUT-15**
#1	CH-IN-01	►	**CH-IN-04**	CH-OUT-04	►	**CH-OUT-16**
#1				CH-OUT-05	►	**CH-OUT-17**
#1				CH-OUT-06	►	**CH-OUT-18**
#1				CH-OUT-07	►	**CH-OUT-19**
#1	CH-IN-02	►	**CH-IN-05**	CH-OUT-08	►	**CH-OUT-20**
#1				CH-OUT-09	►	**CH-OUT-21**
#1				CH-OUT-10	►	**CH-OUT-22**
#1				CH-OUT-11	►	**CH-OUT-23**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
…	…		**…**	…		**…**
#3	CH-IN-00	►	**CH-IN-09**	CH-OUT-00	►	**CH-OUT-36**
#3				CH-OUT-01	►	**CH-OUT-37**
#3				CH-OUT-02	►	**CH-OUT-38**
#3				CH-OUT-03	►	**CH-OUT-39**
#3	CH-IN-01	►	**CH-IN-10**	CH-OUT-04	►	**CH-OUT-40**
#3				CH-OUT-05	►	**CH-OUT-41**
#3				CH-OUT-06	►	**CH-OUT-42**
#3				CH-OUT-07	►	**CH-OUT-43**
#3	CH-IN-02	►	**CH-IN-11**	CH-OUT-08	►	**CH-OUT-44**
#3				CH-OUT-09	►	**CH-OUT-45**
#3				CH-OUT-10	►	**CH-OUT-46**
#3				CH-OUT-11	►	**CH-OUT-47**

Mode 6x24

1 Signals per channel
6 Input channels
24 Output channels



Truth table

(the symbol ► stands for “connected to”)

ENA	A1	A0	CH-IN-	00.0 ►	01.0 ►	02.0 ►	03.0 ►	04.0 ►	05.0 ►
1	0	0	CH-OUT-	00.0	01.0	02.0	03.0	04.0	05.0
1	0	1	CH-OUT-	06.0	07.0	08.0	09.0	10.0	11.0
1	1	0	CH-OUT-	12.0	13.0	14.0	15.0	16.0	17.0
1	1	1	CH-OUT-	18.0	19.0	20.0	21.0	22.0	23.0
0	X	X	CH-OUT	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z

Operating sequence

```
ENA = 1
A1-A0 = "00"
      CH-IN-00.0 ► CH-OUT-00.0
      CH-IN-01.0 ► CH-OUT-01.0
      CH-IN-02.0 ► CH-OUT-02.0
      CH-IN-03.0 ► CH-OUT-03.0
      CH-IN-04.0 ► CH-OUT-04.0
      CH-IN-05.0 ► CH-OUT-05.0
A1-A0 = "01"
      CH-IN-00.0 ► CH-OUT-06.0
      CH-IN-01.0 ► CH-OUT-07.0
      CH-IN-02.0 ► CH-OUT-08.0
      CH-IN-03.0 ► CH-OUT-09.0
      CH-IN-04.0 ► CH-OUT-10.0
      CH-IN-05.0 ► CH-OUT-11.0
A1-A0 = "10"
      CH-IN-00.0 ► CH-OUT-12.0
      CH-IN-01.0 ► CH-OUT-13.0
      CH-IN-02.0 ► CH-OUT-14.0
      CH-IN-03.0 ► CH-OUT-15.0
      CH-IN-04.0 ► CH-OUT-16.0
      CH-IN-05.0 ► CH-OUT-17.0
A1-A0 = "11"
      CH-IN-00.0 ► CH-OUT-18.0
      CH-IN-01.0 ► CH-OUT-19.0
      CH-IN-02.0 ► CH-OUT-20.0
      CH-IN-03.0 ► CH-OUT-21.0
      CH-IN-04.0 ► CH-OUT-22.0
      CH-IN-05.0 ► CH-OUT-23.0
```

Connector pinout (aliases signals, top view)

Pin	Signal
01	CH-OUT-GND
02	CH-OUT-00.0
03	CH-OUT-01.0
04	CH-OUT-02.0
05	CH-OUT-03.0
06	CH-OUT-04.0
07	CH-OUT-05.0
08	CH-OUT-GND
09	CH-OUT-06.0
10	CH-OUT-07.0
11	CH-OUT-08.0
12	CH-OUT-09.0
13	CH-OUT-10.0
14	CH-OUT-11.0
15	CH-IN-00.0
16	CH-IN-01.0
17	CH-IN-02.0
18	CH-IN-03.0
19	CH-IN-04.0
20	CH-IN-05.0

Signal	Pin
CH-OUT-GND	40
CH-OUT-12.0	39
CH-OUT-13.0	38
CH-OUT-14.0	37
CH-OUT-15.0	36
CH-OUT-16.0	35
CH-OUT-17.0	34
CH-OUT-GND	33
CH-OUT-18.0	32
CH-OUT-19.0	31
CH-OUT-20.0	30
CH-OUT-21.0	29
CH-OUT-22.0	28
CH-OUT-23.0	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.

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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.

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Shipping is within **24 hours** from order reception.
Free shipping & 30-day money back guarantee.

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