NI 651*x* Specifications

Français Deutsch 日本語 한국어 简体中文

ni.com/manuals

This document lists specifications for the NI 651*x* devices. These specifications are typical at 25 °C unless otherwise noted.

Power Requirements

Power consumption on
+5 VDC (±5%)..... 250 mA, typical

Power consumption on
+3.3 VDC (±5%)..... 300 mA, typical

(NI 6512/6513/6514/6515 only)

+5 V power available at I/O connector (pins 50 and 100)

Voltage ..... +4.3 VDC to +6.3 VDC

Current..... 20 mA/port, typical

Note The power at the I/O connector is derived from the output Vcc (user-provided). The output Vcc must be greater than 10 VDC to ensure that the output voltage is in the range of +4.3 VDC to +6.3 VDC.

Digital I/O

Channel distribution and I/O connector. All channels are optically isolated.

Device	Inputs	Outputs	Connector Type
NI 6510*	32 source/sink	0	37-pin male D-SUB
NI 6511†	64 source/sink	0	100-pin keyed female SCSI
NI 6512†	0	64 source	100-pin keyed female SCSI
NI 6513†	0	64 sink	100-pin keyed female SCSI
NI 6514†	32 source/sink	32 source	100-pin keyed female SCSI
NI 6515†	32 source/sink	32 sink	100-pin keyed female SCSI
NI 6516*	0	32 source	37-pin male D-SUB
NI 6517*	0	32 sink	37-pin male D-SUB
NI 6518*	16 source/sink	16 source	37-pin male D-SUB
NI 6519*	16 source/sink	16 sink	37-pin male D-SUB

* All channels belong to one isolated bank and use the same ground and/or power.

† Eight lines per bank. All lines in the same bank use the same ground and/or power.

Common-mode isolation .....30 VDC (bank-to-bank and bank-to-bus)

Data transfers.....Interrupts, programmed I/O

Isolated Inputs

Maximum input voltage .....30 VDC

Level	Min	Max
Input logic low voltage (V_{IL})	0 VDC	±4 VDC
Input logic high voltage (V_{IH})	±11 VDC	±30 VDC

Input current

11 V inputs.....4.5 mA/line, maximum

30 V inputs.....12.5 mA/line, maximum

Propagation delay .....75 µs, typical

Isolated Outputs

Power-on state .....0 (open), default; user-programmable to 0 or 1

Maximum switching voltage ..... 30 VDC

The following table lists the derated current values for the PXI-6512, PXI-6513, PXI-6514, and PXI-6515 devices. Working at higher current values might damage the device.

Ambient Temperature	PXI-6512/6514, Eight Lines per Port	PXI-6512/6514, One Line per Port	PXI-6513/6515, Eight Lines per Port	PXI-6513/6515, One Line per Port
Up to 25 °C	75 mA	350 mA	125 mA	500 mA
Up to 35 °C	75 mA	350 mA	125 mA	500 mA
Up to 45 °C	75 mA	350 mA	120 mA	500 mA
Up to 55 °C	75 mA	350 mA	100 mA	500 mA

Note: The values listed in the *Eight Lines per Port* columns are the current values of each line when *all* eight lines in a port are used. The values listed in the *One Line per Port* columns are the current values of the *only* line used in a port. For more information about the current output of these devices, refer to the KnowledgeBase document, *Per Channel Current Output of an NI 651x Digital Data Acquisition Device*, by going to `ni.com/info` and entering the Info Code `651xoutput`.

These devices have a self-resetting fuse on each output port for overcurrent protection. The actual current value might be lower depending on the device working temperature, which is affected by the ambient temperature, air flow, I/O voltage, I/O usage, and duty cycle. For more information about the self-resetting fuse on the device, refer to the KnowledgeBase document, *Why does my 651x Shut Down When Outputting Over Maximum Current?*, by going to `ni.com/info` and entering the Info Code `651xfuse`.

The following table lists the derated current values for the PCI-6512, PCI-6513, PCI-6514, PCI-6515, PCI-6516, PCI-6517, PCI-6518, and PCI-6519 devices. Working at higher current values might damage the device.

Ambient Temperature	PCI-6512/6514/ 6516/6518, Eight Lines per Port	PCI-6512/6514/ 6516/6518, One Line per Port	PCI-6513/6515/ 6517/6519, Eight Lines per Port	PCI-6513/6515/ 6517/6519, One Line per Port
Up to 25 °C	75 mA	350 mA	125 mA	475 mA
Up to 35 °C	65 mA	350 mA	125 mA	425 mA
Up to 45 °C	55 mA	350 mA	115 mA	375 mA
Up to 55 °C	50 mA	300 mA	100 mA	325 mA

Note: The values listed in the *Eight Lines per Port* columns are the current values of each line when *all* eight lines in a port are used. The values listed in the *One Line per Port* columns are the current values of the *only* line used in a port. For more information about the current output of these devices, refer to the KnowledgeBase document, *Per Channel Current Output of an NI 651x Digital Data Acquisition Device*, by going to `ni.com/info` and entering the Info Code `651xoutput`.

These devices have a self-resetting fuse on each output port for overcurrent protection. The actual current value might be lower depending on the device working temperature, which is affected by the ambient temperature, air flow, I/O voltage, I/O usage, and duty cycle. For more information about the self-resetting fuse on the device, refer to the KnowledgeBase document, *Why does my 651x Shut Down When Outputting Over Maximum Current?*, by going to `ni.com/info` and entering the Info Code `651xfuse`.

Propagation delay .....80 µs, typical with 100 Ω load

Programmable power-up states response time.....400 ms

Physical Characteristics

PCI dimensions

NI 6510/6516/6517/6518/6519 .. 16.5 cm × 12.6 cm (6.51 in. × 4.97 in.)

NI 6511..... 15.1 cm × 12.1 cm (5.94 in. × 4.75 in.)

NI 6512/6513/6514/6515/ ..... 18.1 cm × 12.6 cm (7.12 in. × 4.97 in.)

PXI dimensions

NI 6511/6512/6513 ..... 21 cm × 13 cm (8.38 in. × 5.12 in.)

NI 6514/6515 ..... 16 cm × 10 cm (6.3 in. × 3.9 in.)

PCI weight

NI 6510/6511 ..... 87.9 g (3.1 oz)

NI 6512/6513/6514/6515 6516/6517/6518/6519 ..... 70.9 g (2.5 oz)

PXI weight

NI 6511/6512/6513 ..... 136 g (4.8 oz)

NI 6514/6515 ..... 172.9 g (6.1 oz)

Environmental

NI 651*x* devices are intended for indoor use only.

Operating Environment

Ambient temperature range ..... 0 °C to 55 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)

Relative humidity range ..... 10% to 90%, noncondensing (tested in accordance with IEC-60068-2-56)

Altitude ..... 2,000 m (at 25 °C ambient temperature)

Storage Environment

Ambient temperature range ..... –20 °C to 70 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)

Relative humidity range ..... 5% to 95%, noncondensing (tested in accordance with IEC-60068-2-56)

Shock and Vibration (PXI-6511/6512/6513/6514/6515 Only)

Operational shock ..... 30 g peak, half-sine, 11 ms pulse (tested in accordance with IEC-60068-2-27; test profile developed in accordance with MIL-PRF-28800F)

Random vibration

Operating ..... 5 Hz to 500 Hz, 0.3 grms

Nonoperating ..... 5 Hz to 500 Hz, 2.4 grms

Random vibration is tested in accordance with IEC-60068-2-64. The nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.

Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cables.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit `ni.com/environment/weee`.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

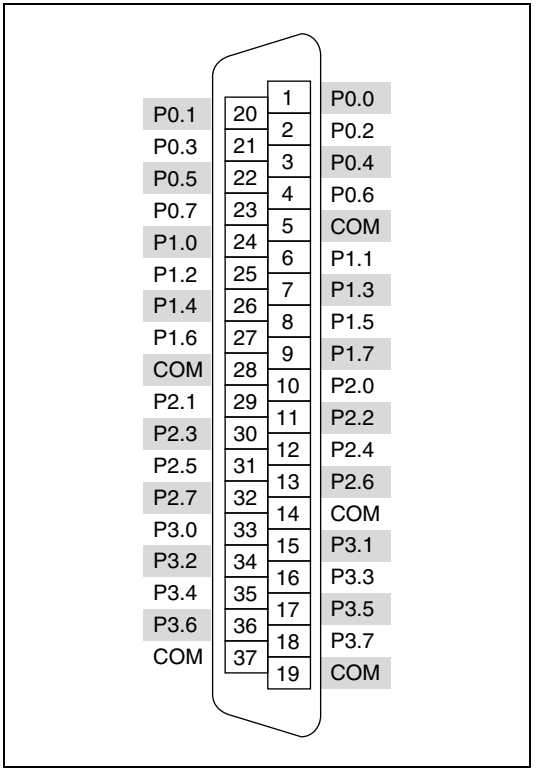


Figure 1. NI 6510 Pin Assignments

P0.0	1	51	P1.0
P0.1	2	52	P1.1
P0.2	3	53	P1.2
P0.3	4	54	P1.3
P0.4	5	55	P1.4
P0.5	6	56	P1.5
P0.6	7	57	P1.6
P0.7	8	58	P1.7
P0.COM	9	59	P1.COM
P0.COM	10	60	P1.COM
P0.COM	11	61	P1.COM
P0.COM	12	62	P1.COM
P2.0	13	63	P3.0
P2.1	14	64	P3.1
P2.2	15	65	P3.2
P2.3	16	66	P3.3
P2.4	17	67	P3.4
P2.5	18	68	P3.5
P2.6	19	69	P3.6
P2.7	20	70	P3.7
P2.COM	21	71	P3.COM
P2.COM	22	72	P3.COM
P2.COM	23	73	P3.COM
P2.COM	24	74	P3.COM
NC	25	75	NC
P4.0	26	76	P5.0
P4.1	27	77	P5.1
P4.2	28	78	P5.2
P4.3	29	79	P5.3
P4.4	30	80	P5.4
P4.5	31	81	P5.5
P4.6	32	82	P5.6
P4.7	33	83	P5.7
P4.COM	34	84	P5.COM
P4.COM	35	85	P5.COM
P4.COM	36	86	P5.COM
P4.COM	37	87	P5.COM
P6.0	38	88	P7.0
P6.1	39	89	P7.1
P6.2	40	90	P7.2
P6.3	41	91	P7.3
P6.4	42	92	P7.4
P6.5	43	93	P7.5
P6.6	44	94	P7.6
P6.7	45	95	P7.7
P6.COM	46	96	P7.COM
P6.COM	47	97	P7.COM
P6.COM	48	98	P7.COM
P6.COM	49	99	P7.COM
NC	50	100	NC

NC = No Connect

Figure 2. NI 6511 Pin Assignments for the SH100-100-F Cable

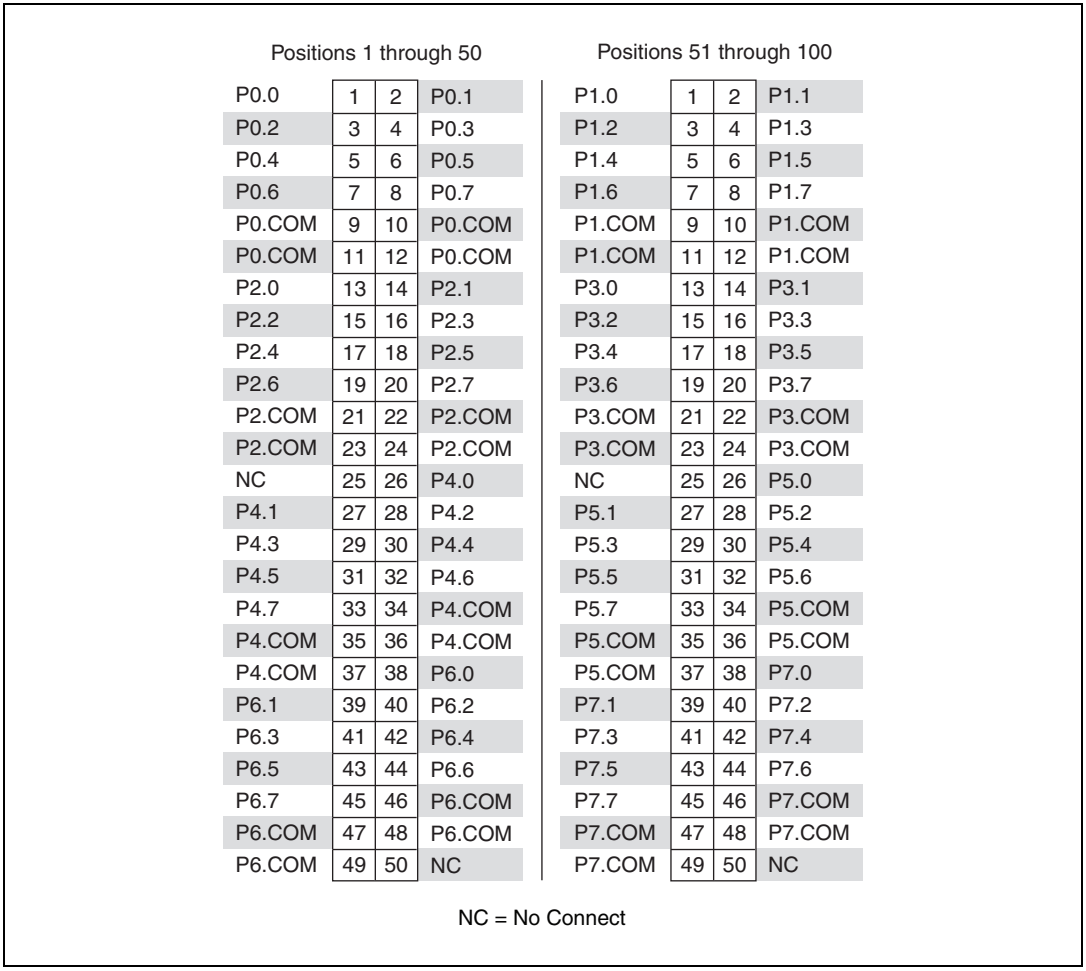


Figure 3. NI 6511 Pin Assignments for the R1005050 Cable

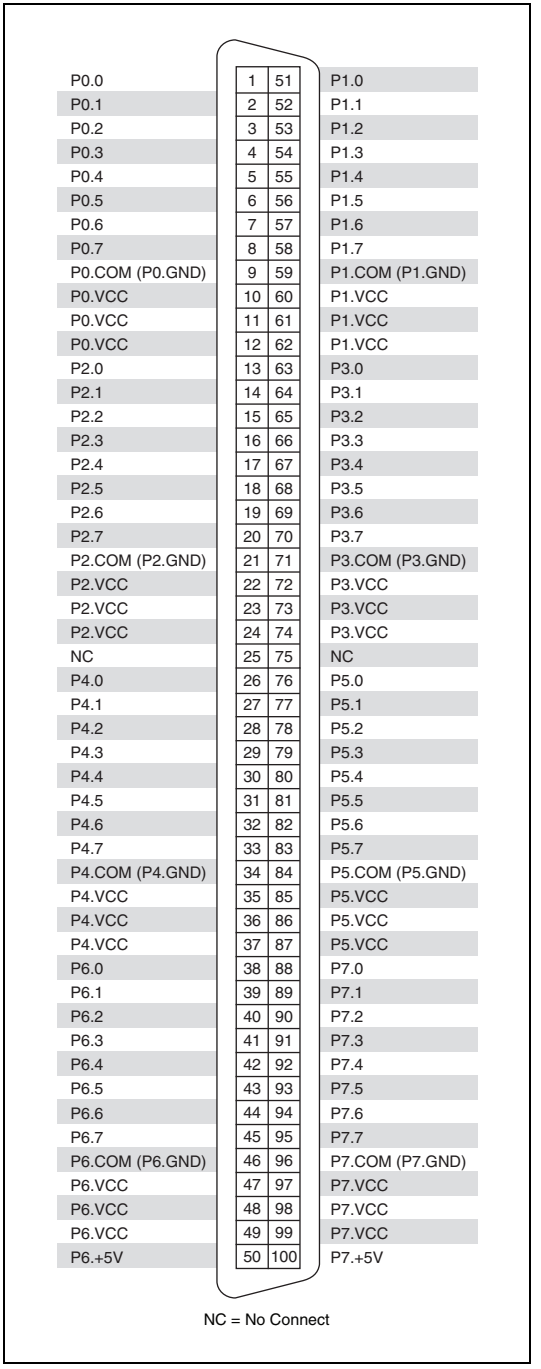


Figure 4. NI 6512 Pin Assignments for the SH100-100-F Cable

Positions 1 through 50				Positions 51 through 100			
P0.0	1	2	P0.1	P1.0	1	2	P1.1
P0.2	3	4	P0.3	P1.2	3	4	P1.3
P0.4	5	6	P0.5	P1.4	5	6	P1.5
P0.6	7	8	P0.7	P1.6	7	8	P1.7
P0.COM (P0.GND)	9	10	P0.VCC	P1.COM (P1.GND)	9	10	P1.VCC
P0.VCC	11	12	P0.VCC	P1.VCC	11	12	P1.VCC
P2.0	13	14	P2.1	P3.0	13	14	P3.1
P2.2	15	16	P2.3	P3.2	15	16	P3.3
P2.4	17	18	P2.5	P3.4	17	18	P3.5
P2.6	19	20	P2.7	P3.6	19	20	P3.7
P2.COM (P2.GND)	21	22	P2.VCC	P3.COM (P3.GND)	21	22	P3.VCC
P2.VCC	23	24	P2.VCC	P3.VCC	23	24	P3.VCC
NC	25	26	P4.0	NC	25	26	P5.0
P4.1	27	28	P4.2	P5.1	27	28	P5.2
P4.3	29	30	P4.4	P5.3	29	30	P5.4
P4.5	31	32	P4.6	P5.5	31	32	P5.6
P4.7	33	34	P4.COM (P4.GND)	P5.7	33	34	P5.COM (P5.GND)
P4.VCC	35	36	P4.VCC	P5.VCC	35	36	P5.VCC
P4.VCC	37	38	P6.0	P5.VCC	37	38	P7.0
P6.1	39	40	P6.2	P7.1	39	40	P7.2
P6.3	41	42	P6.4	P7.3	41	42	P7.4
P6.5	43	44	P6.6	P7.5	43	44	P7.6
P6.7	45	46	P6.COM (P6.GND)	P7.7	45	46	P7.COM (P7.GND)
P6.VCC	47	48	P6.VCC	P7.VCC	47	48	P7.VCC
P6.VCC	49	50	P6.+5V	P7.VCC	49	50	P7.+5V

NC = No Connect

Figure 5. NI 6512 Pin Assignments for the R1005050 Cable

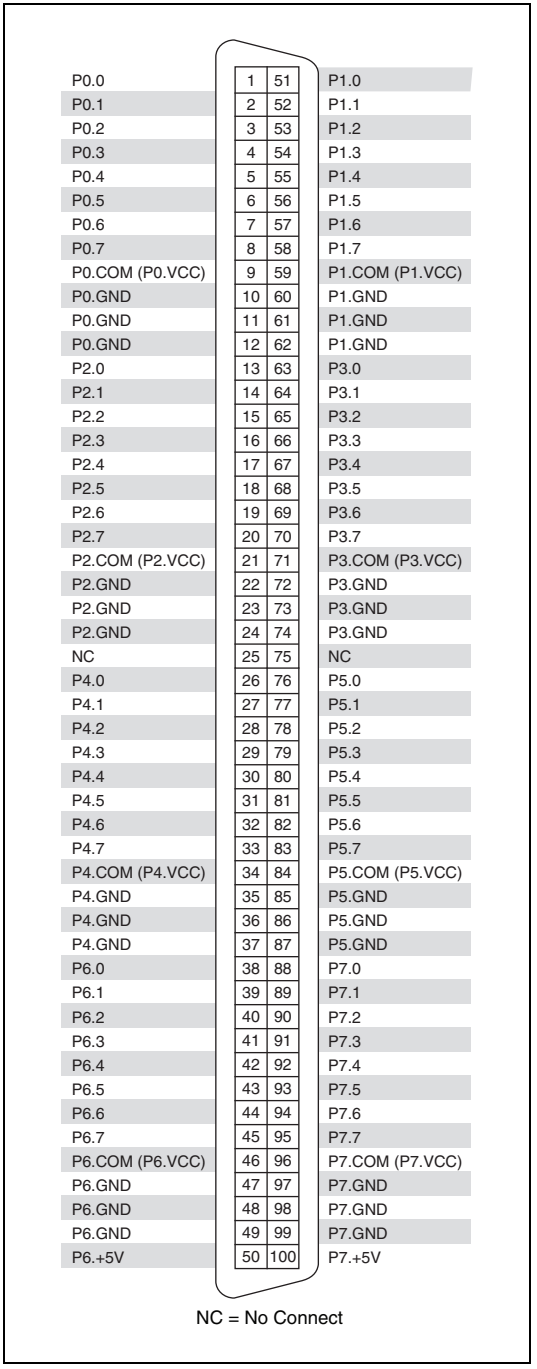


Figure 6. NI 6513 Pin Assignments for the SH100-100-F Cable

Positions 1 through 50				Positions 51 through 100			
P0.0	1	2	P0.1	P1.0	1	2	P1.1
P0.2	3	4	P0.3	P1.2	3	4	P1.3
P0.4	5	6	P0.5	P1.4	5	6	P1.5
P0.6	7	8	P0.7	P1.6	7	8	P1.7
P0.COM (P0.VCC)	9	10	P0.GND	P1.COM (P1.VCC)	9	10	P1.GND
P0.GND	11	12	P0.GND	P1.GND	11	12	P1.GND
P2.0	13	14	P2.1	P3.0	13	14	P3.1
P2.2	15	16	P2.3	P3.2	15	16	P3.3
P2.4	17	18	P2.5	P3.4	17	18	P3.5
P2.6	19	20	P2.7	P3.6	19	20	P3.7
P2.COM (P2.VCC)	21	22	P2.GND	P3.COM (P3.VCC)	21	22	P3.GND
P2.GND	23	24	P2.GND	P3.GND	23	24	P3.GND
NC	25	26	P4.0	NC	25	26	P5.0
P4.1	27	28	P4.2	P5.1	27	28	P5.2
P4.3	29	30	P4.4	P5.3	29	30	P5.4
P4.5	31	32	P4.6	P5.5	31	32	P5.6
P4.7	33	34	P4.COM (P4.VCC)	P5.7	33	34	P5.COM (P5.VCC)
P4.GND	35	36	P4.GND	P5.GND	35	36	P5.GND
P4.GND	37	38	P6.0	P5.GND	37	38	P7.0
P6.1	39	40	P6.2	P7.1	39	40	P7.2
P6.3	41	42	P6.4	P7.3	41	42	P7.4
P6.5	43	44	P6.6	P7.5	43	44	P7.6
P6.7	45	46	P6.COM (P6.VCC)	P7.7	45	46	P7.COM (P7.VCC)
P6.GND	47	48	P6.GND	P7.GND	47	48	P7.GND
P6.GND	49	50	P6.+5V	P7.GND	49	50	P7.+5V

NC = No Connect

Figure 7. NI 6513 Pin Assignments for the R1005050 Cable

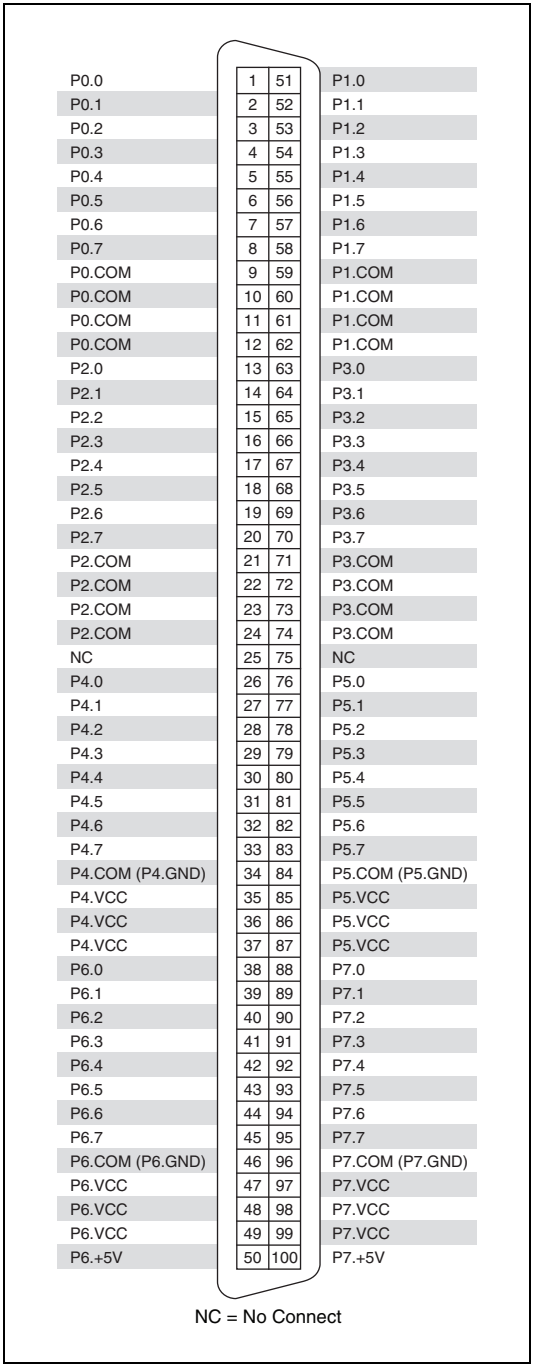


Figure 8. NI 6514 Pin Assignments for the SH100-100-F Cable

Positions 1 through 50				Positions 51 through 100			
P0.0	1	2	P0.1	P1.0	1	2	P1.1
P0.2	3	4	P0.3	P1.2	3	4	P1.3
P0.4	5	6	P0.5	P1.4	5	6	P1.5
P0.6	7	8	P0.7	P1.6	7	8	P1.7
P0.COM	9	10	P0.COM	P1.COM	9	10	P1.COM
P0.COM	11	12	P0.COM	P1.COM	11	12	P1.COM
P2.0	13	14	P2.1	P3.0	13	14	P3.1
P2.2	15	16	P2.3	P3.2	15	16	P3.3
P2.4	17	18	P2.5	P3.4	17	18	P3.5
P2.6	19	20	P2.7	P3.6	19	20	P3.7
P2.COM	21	22	P2.COM	P3.COM	21	22	P3.COM
P2.COM	23	24	P2.COM	P3.COM	23	24	P3.COM
NC	25	26	P4.0	NC	25	26	P5.0
P4.1	27	28	P4.2	P5.1	27	28	P5.2
P4.3	29	30	P4.4	P5.3	29	30	P5.4
P4.5	31	32	P4.6	P5.5	31	32	P5.6
P4.7	33	34	P4.COM (P4.GND)	P5.7	33	34	P5.COM (P5.GND)
P4.VCC	35	36	P4.VCC	P5.VCC	35	36	P5.VCC
P4.VCC	37	38	P6.0	P5.VCC	37	38	P7.0
P6.1	39	40	P6.2	P7.1	39	40	P7.2
P6.3	41	42	P6.4	P7.3	41	42	P7.4
P6.5	43	44	P6.6	P7.5	43	44	P7.6
P6.7	45	46	P6.COM (P6.GND)	P7.7	45	46	P7.COM (P7.GND)
P6.VCC	47	48	P6.VCC	P7.VCC	47	48	P7.VCC
P6.VCC	49	50	P6.+5V	P7.VCC	49	50	P7.+5V

NC = No Connect

Figure 9. NI 6514 Pin Assignments for the R1005050 Cable

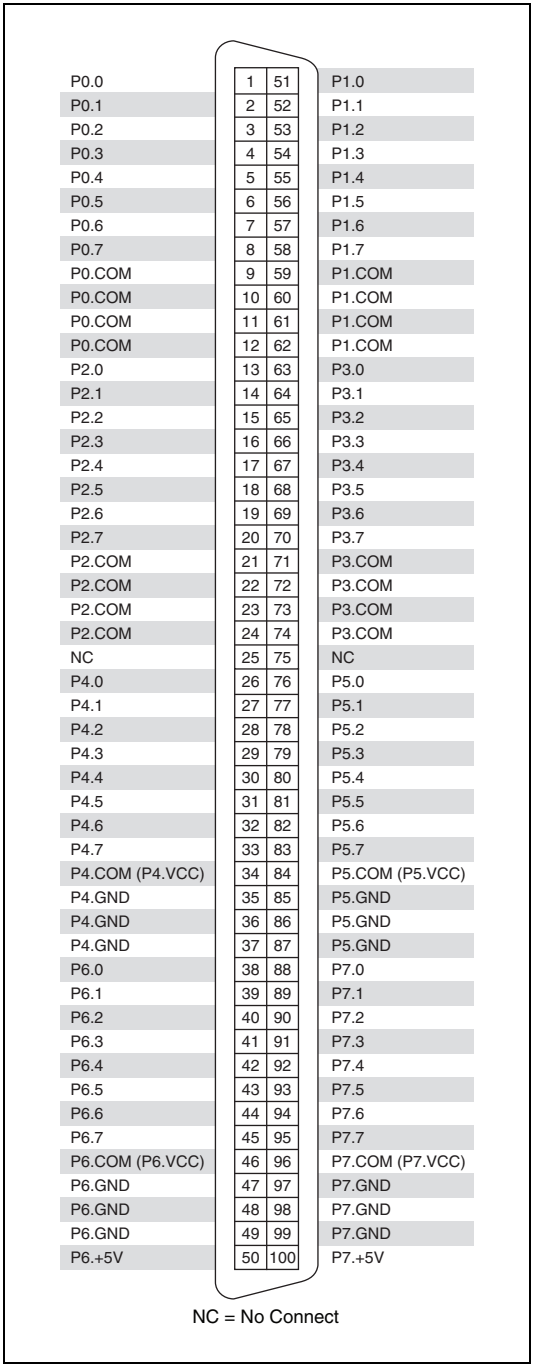
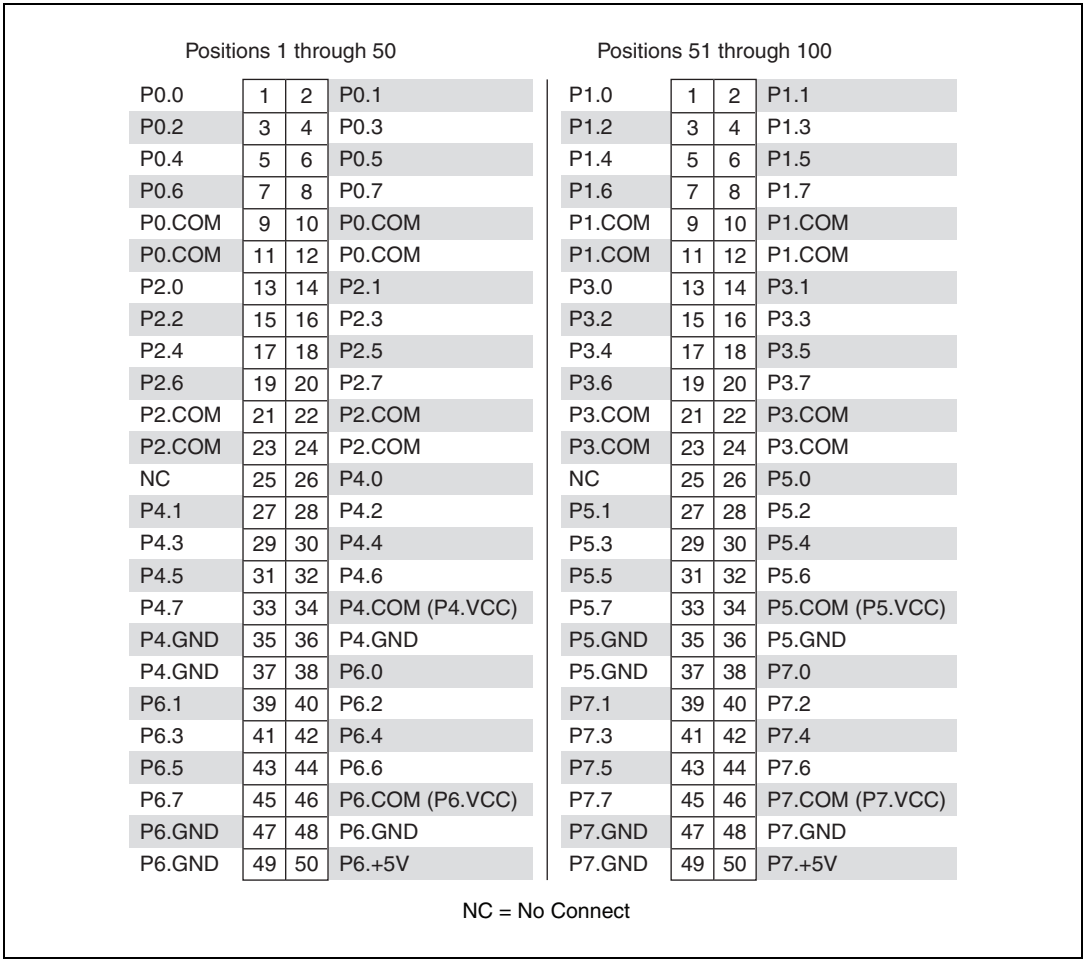


Figure 10. NI 6515 Pin Assignments for the SH100-100-F Cable



Positions 1 through 50				Positions 51 through 100			
P0.0	1	2	P0.1	P1.0	1	2	P1.1
P0.2	3	4	P0.3	P1.2	3	4	P1.3
P0.4	5	6	P0.5	P1.4	5	6	P1.5
P0.6	7	8	P0.7	P1.6	7	8	P1.7
P0.COM	9	10	P0.COM	P1.COM	9	10	P1.COM
P0.COM	11	12	P0.COM	P1.COM	11	12	P1.COM
P2.0	13	14	P2.1	P3.0	13	14	P3.1
P2.2	15	16	P2.3	P3.2	15	16	P3.3
P2.4	17	18	P2.5	P3.4	17	18	P3.5
P2.6	19	20	P2.7	P3.6	19	20	P3.7
P2.COM	21	22	P2.COM	P3.COM	21	22	P3.COM
P2.COM	23	24	P2.COM	P3.COM	23	24	P3.COM
NC	25	26	P4.0	NC	25	26	P5.0
P4.1	27	28	P4.2	P5.1	27	28	P5.2
P4.3	29	30	P4.4	P5.3	29	30	P5.4
P4.5	31	32	P4.6	P5.5	31	32	P5.6
P4.7	33	34	P4.COM (P4.VCC)	P5.7	33	34	P5.COM (P5.VCC)
P4.GND	35	36	P4.GND	P5.GND	35	36	P5.GND
P4.GND	37	38	P6.0	P5.GND	37	38	P7.0
P6.1	39	40	P6.2	P7.1	39	40	P7.2
P6.3	41	42	P6.4	P7.3	41	42	P7.4
P6.5	43	44	P6.6	P7.5	43	44	P7.6
P6.7	45	46	P6.COM (P6.VCC)	P7.7	45	46	P7.COM (P7.VCC)
P6.GND	47	48	P6.GND	P7.GND	47	48	P7.GND
P6.GND	49	50	P6.+5V	P7.GND	49	50	P7.+5V

NC = No Connect

Figure 11. NI 6515 Pin Assignments for the R1005050 Cable

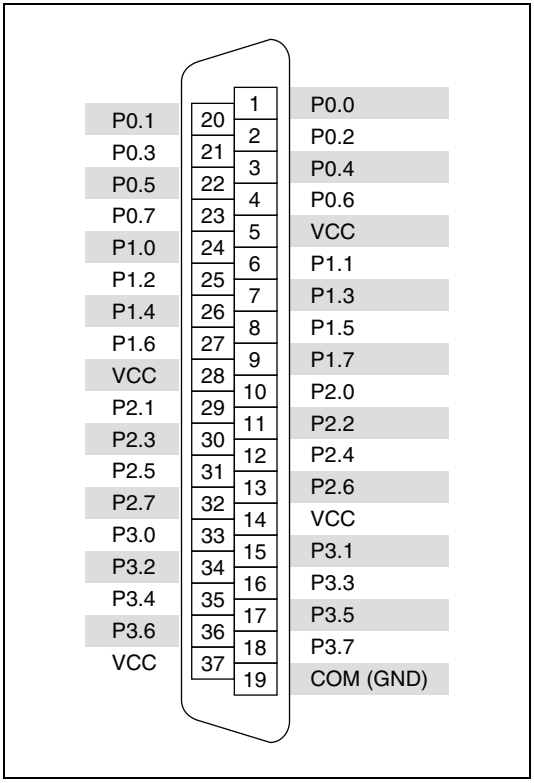


Figure 12. NI 6516 Pin Assignments

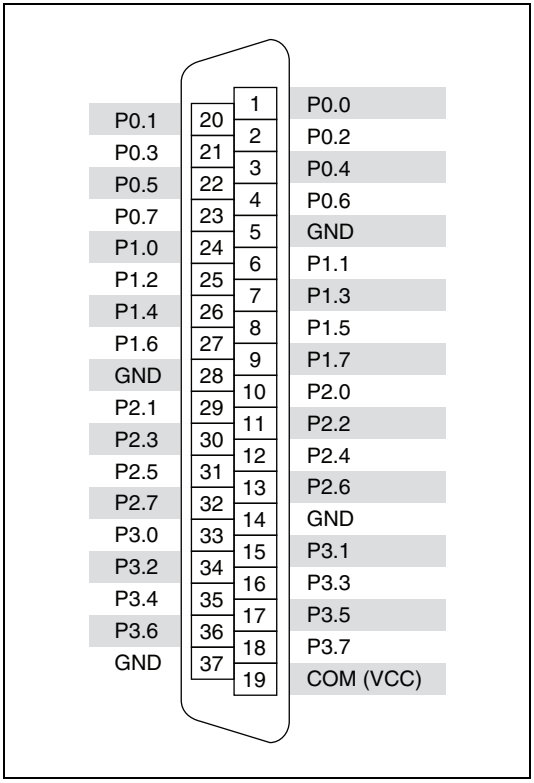


Figure 13. NI 6517 Pin Assignments

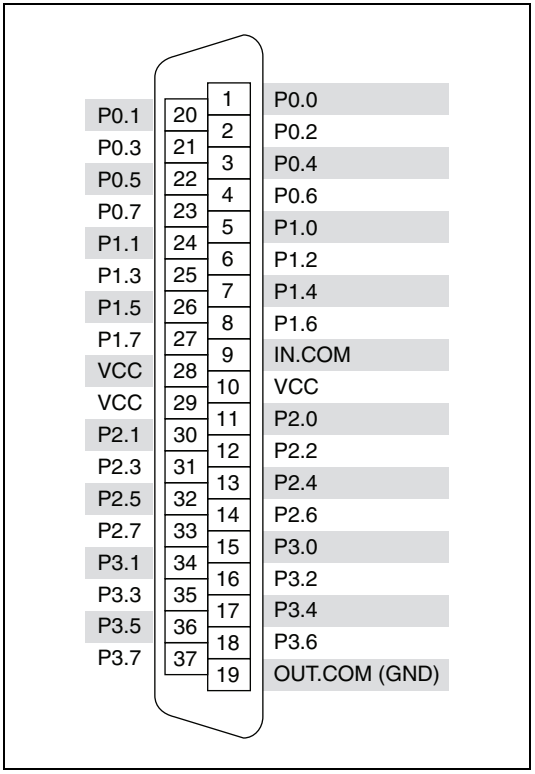


Figure 14. NI 6518 Pin Assignments

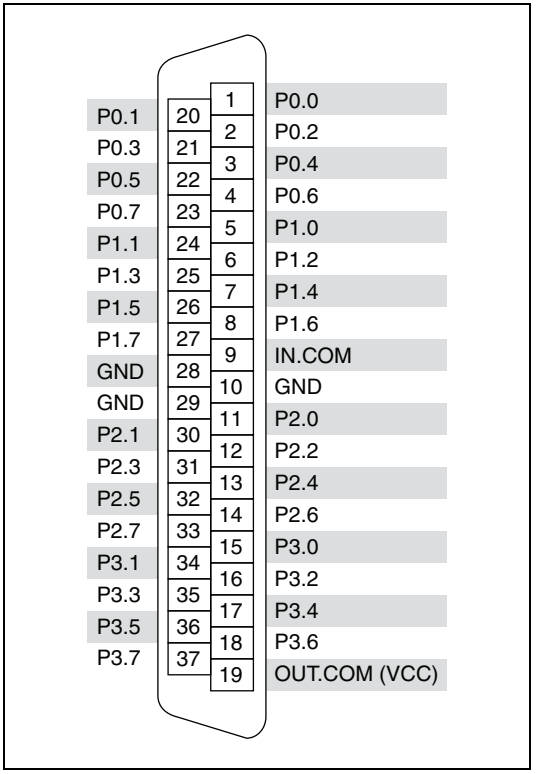


Figure 15. NI 6519 Pin Assignments