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# 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

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## 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 6510/6511..... 15.1 cm × 12.1 cm (5.94 in. × 4.75 in.)

NI 6512/6513/6514/6515/ 6516/6517/6518/6519..... 14.1 cm × 11.4 cm (5.54 in. × 4.47 in.)



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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.



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## 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`.)



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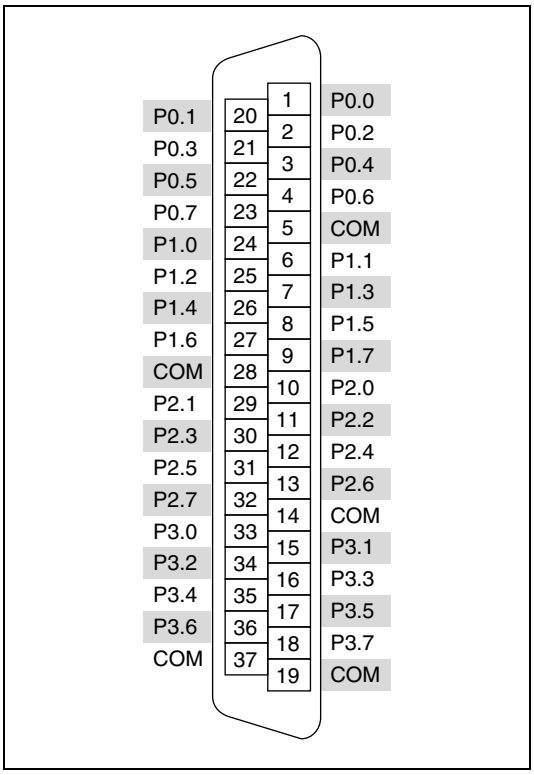



**Figure 1.** NI 6510 Pin Assignments

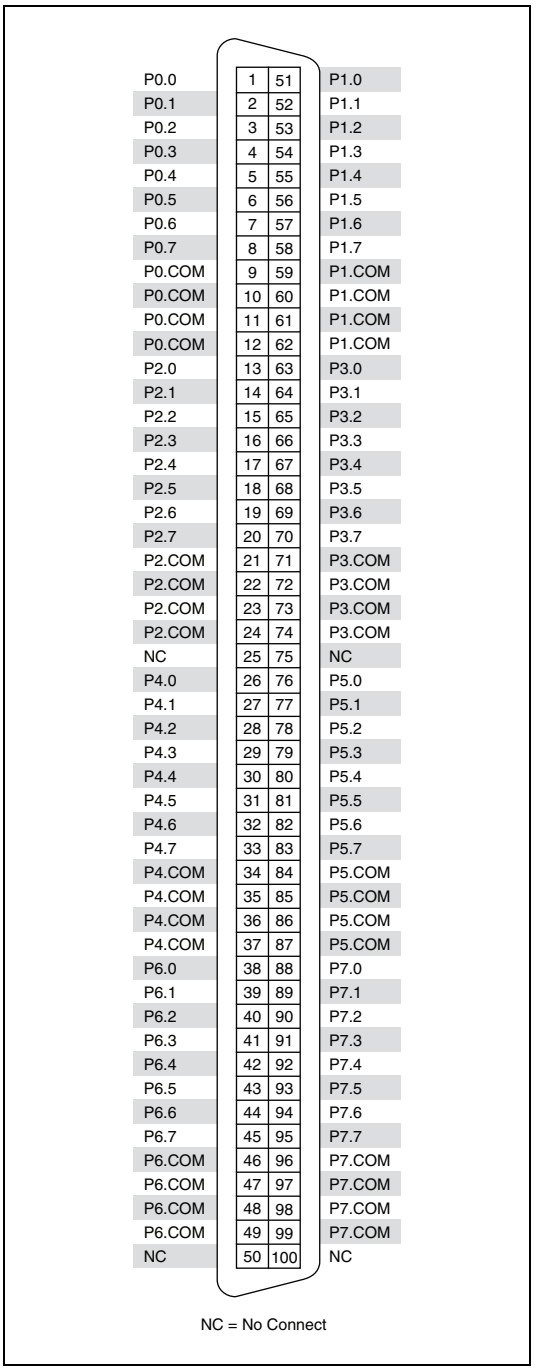



**Figure 2.** NI 6511 Pin Assignments for the SH100-100-F Cable



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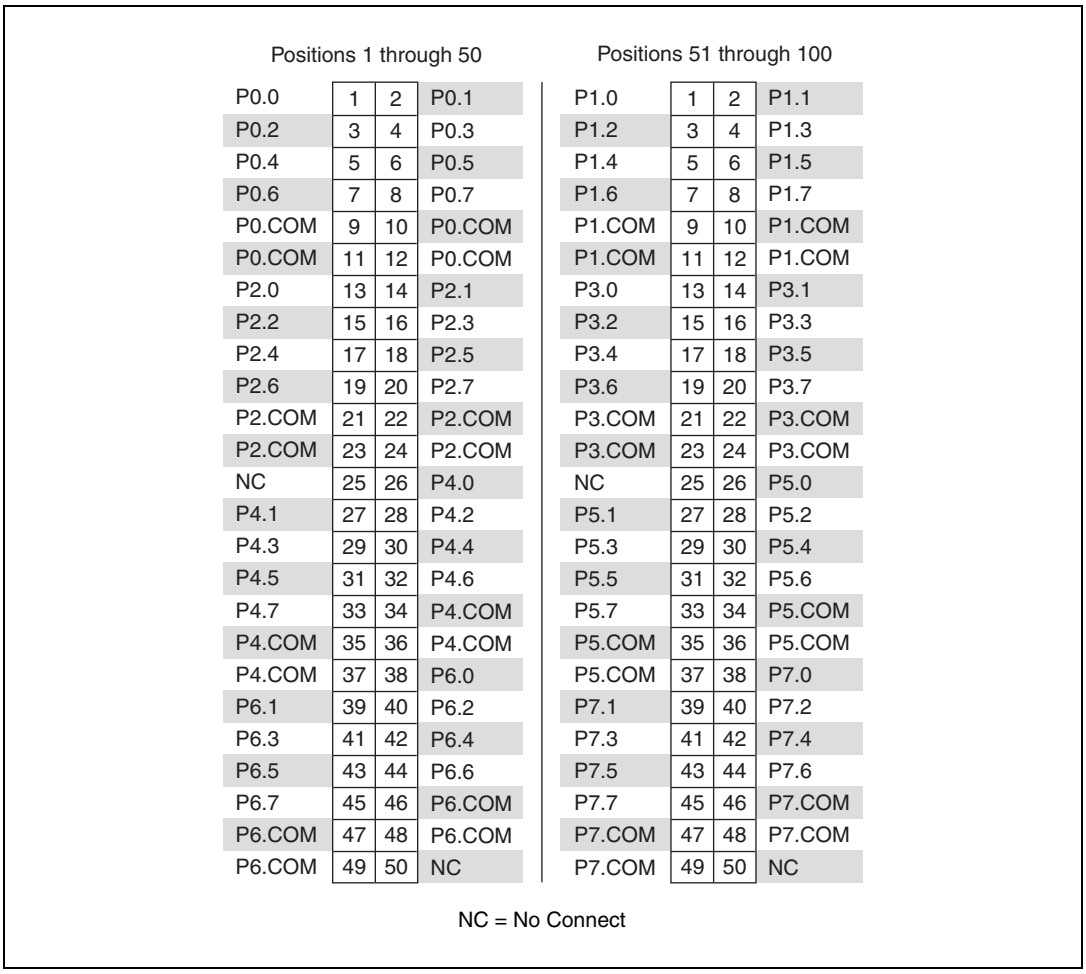



**Figure 3.** NI 6511 Pin Assignments for the R1005050 Cable



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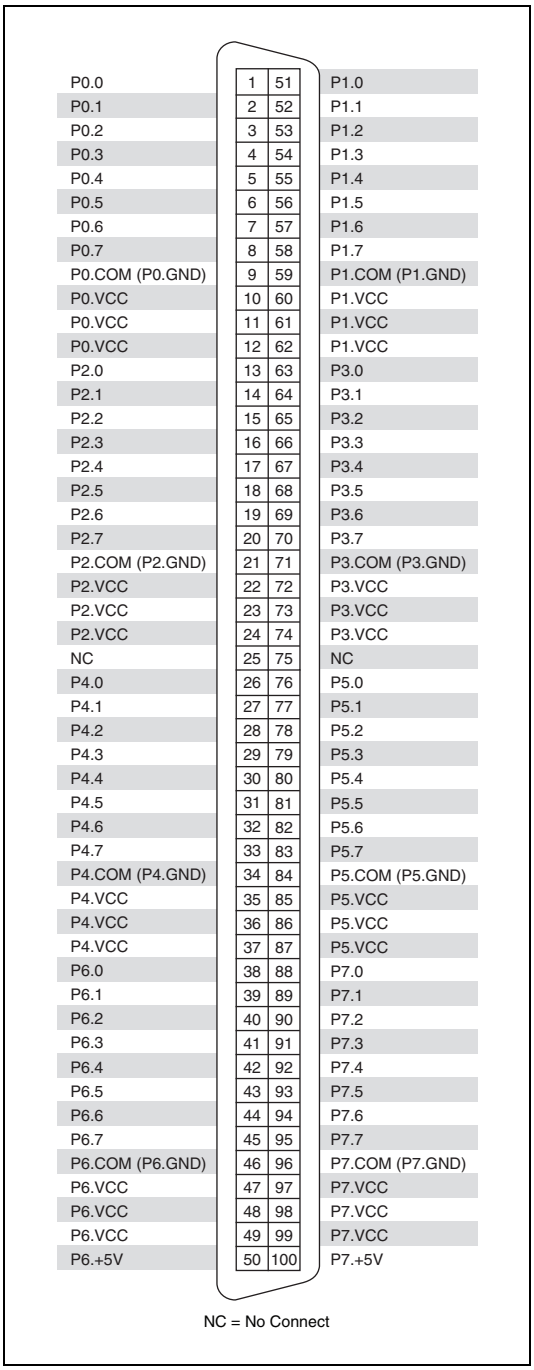



**Figure 4.** NI 6512 Pin Assignments for the SH100-100-F Cable



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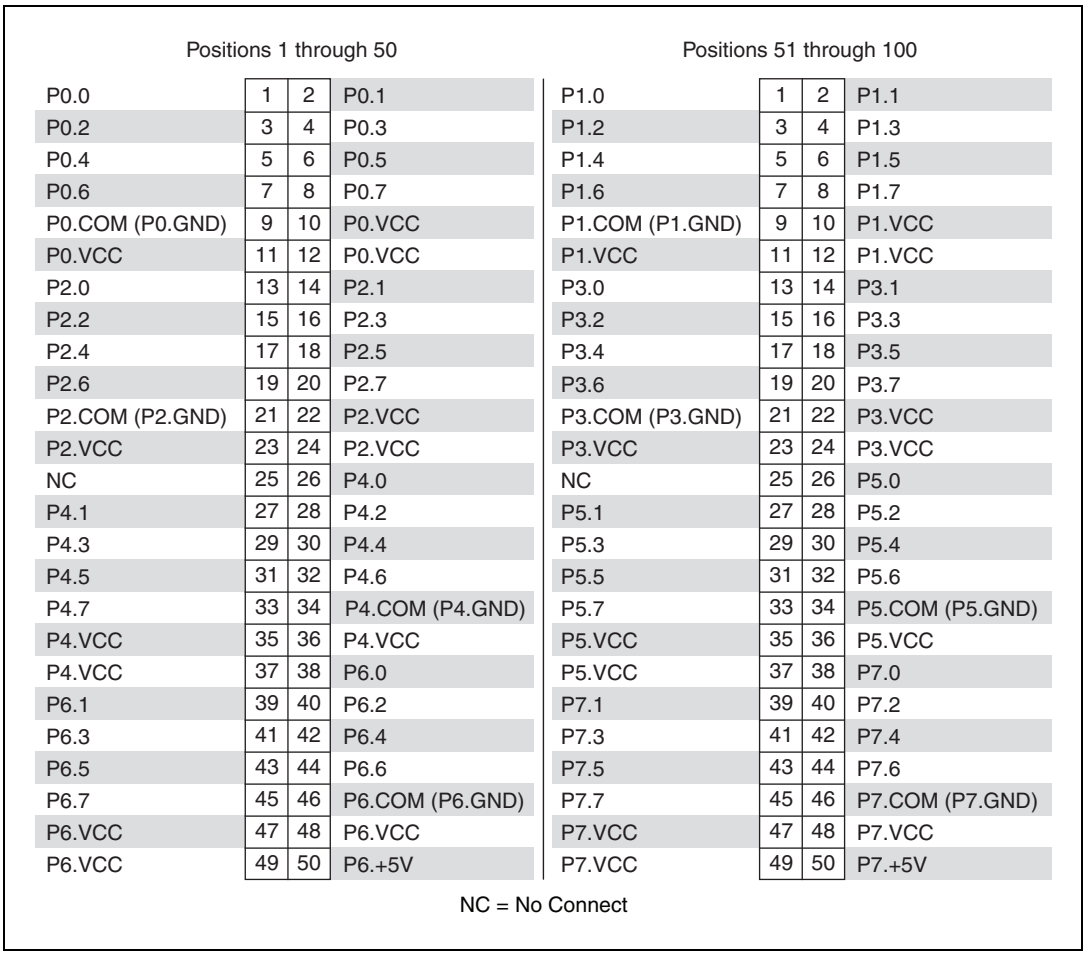



**Figure 5.** NI 6512 Pin Assignments for the R1005050 Cable



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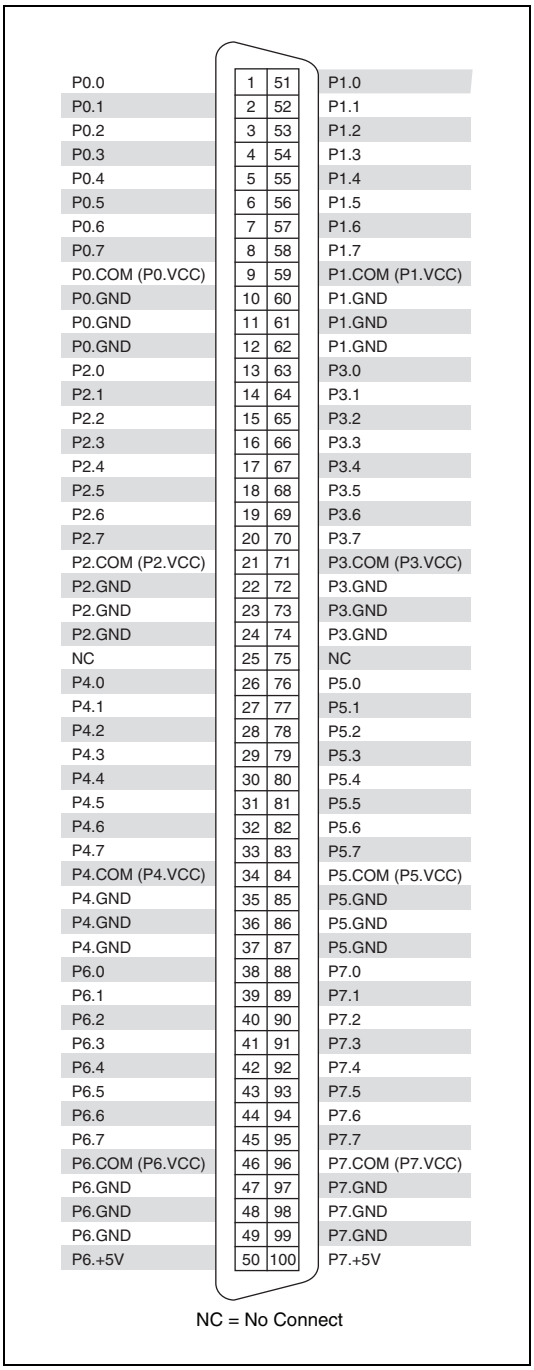



**Figure 6.** NI 6513 Pin Assignments for the SH100-100-F Cable



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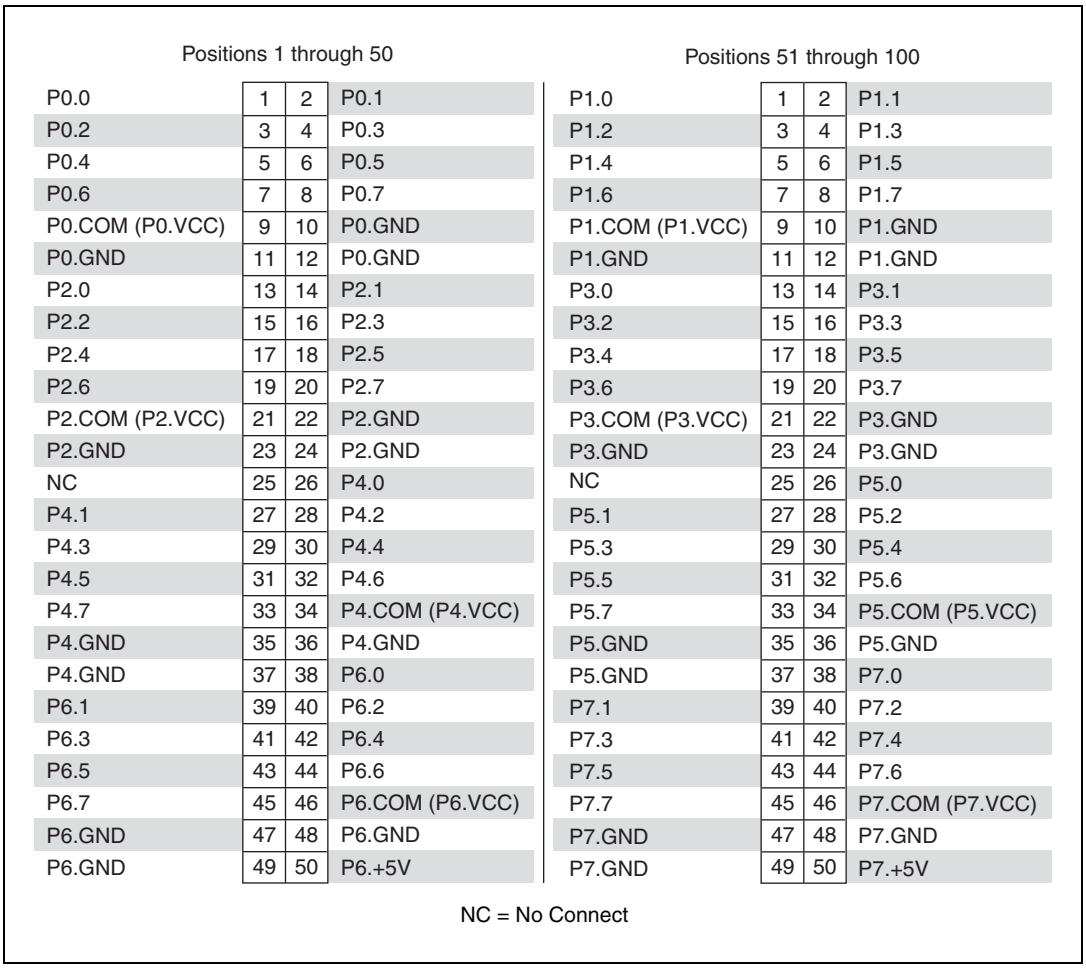



**Figure 7.** NI 6513 Pin Assignments for the R1005050 Cable



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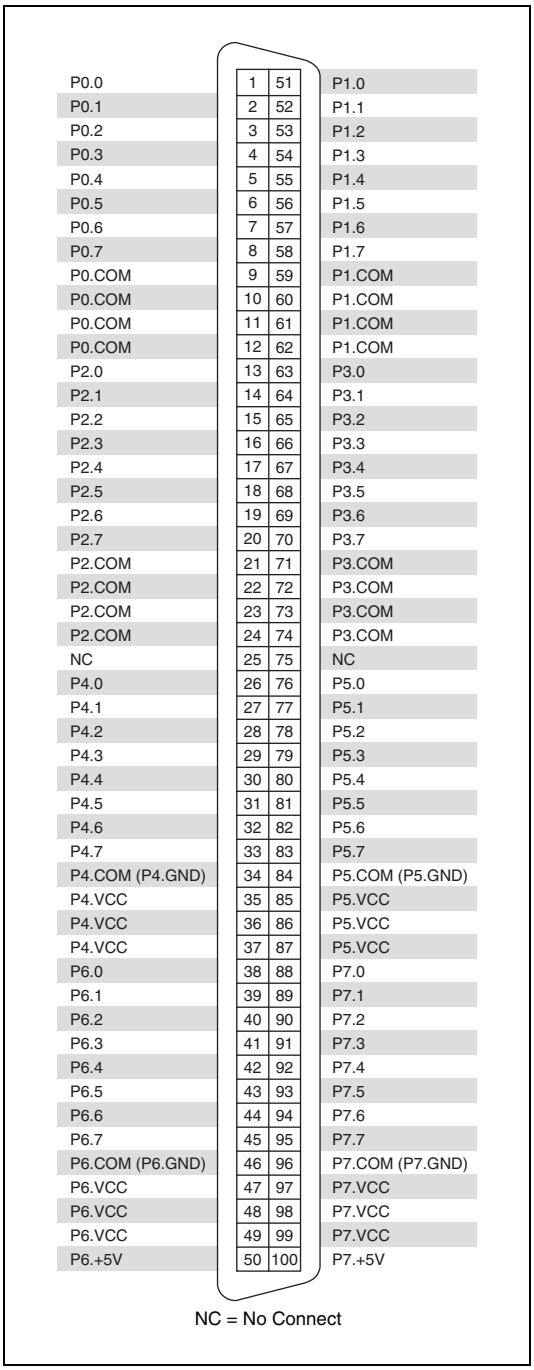



**Figure 8.** NI 6514 Pin Assignments for the SH100-100-F Cable



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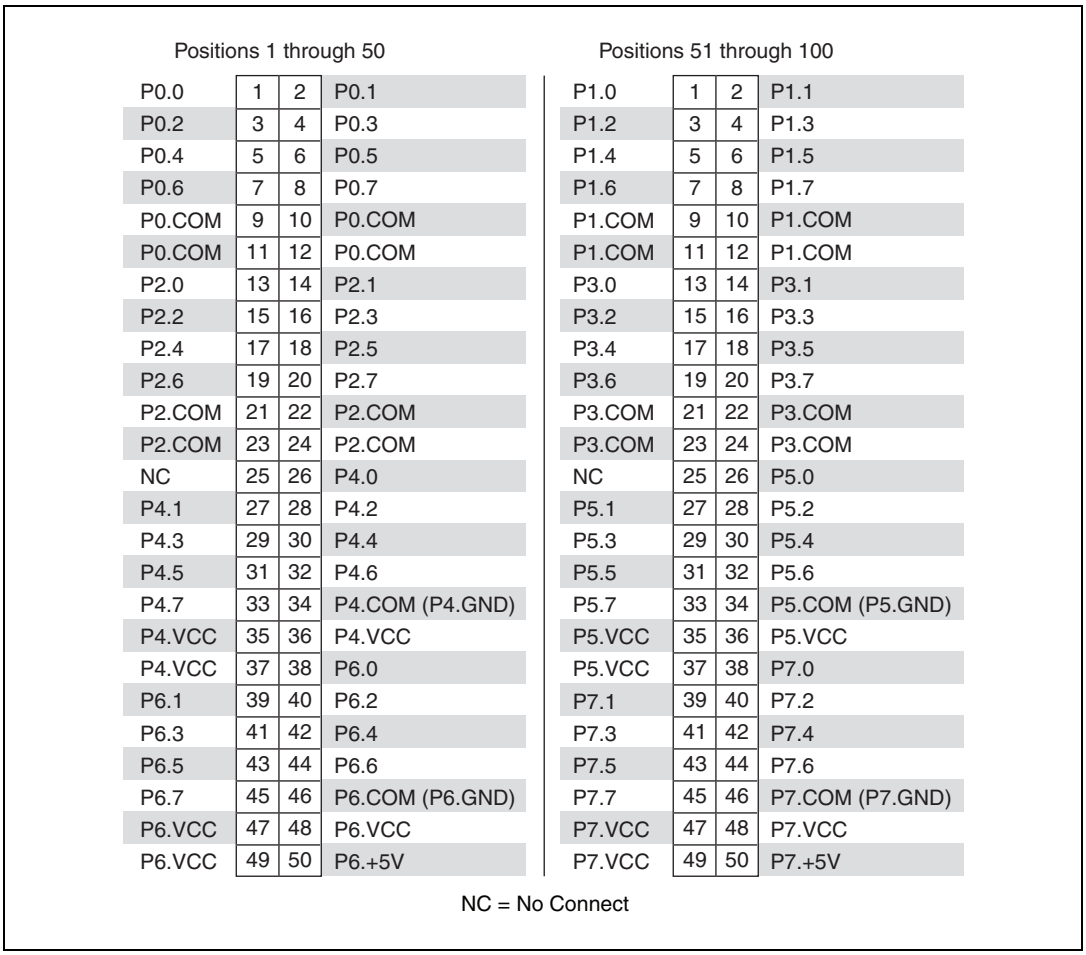



**Figure 9.** NI 6514 Pin Assignments for the R1005050 Cable



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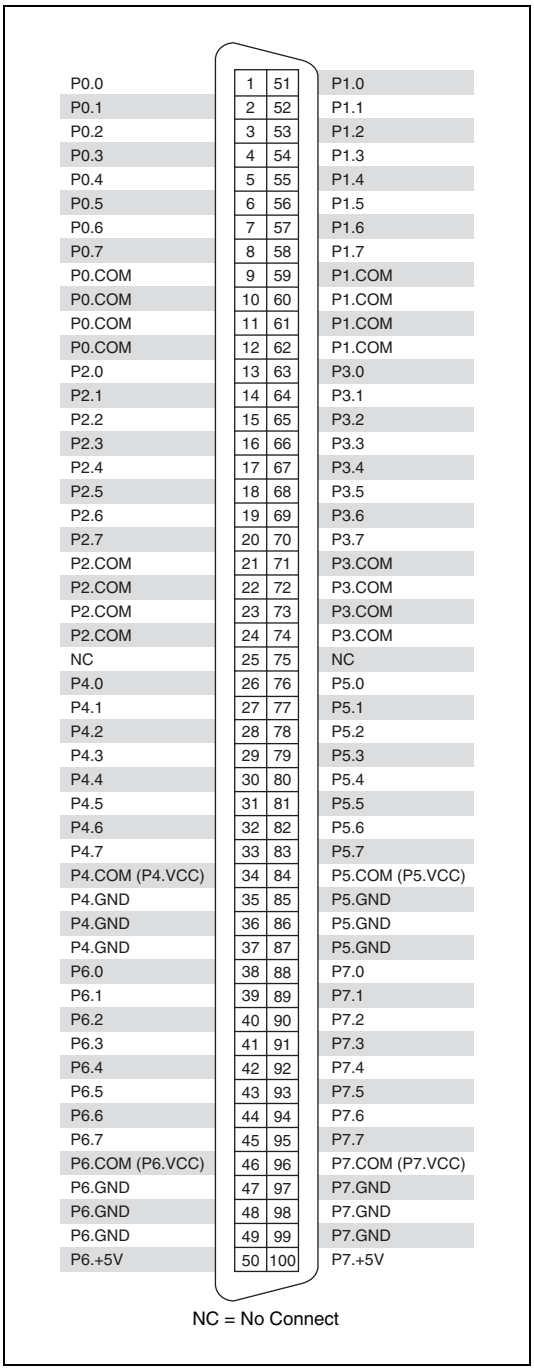
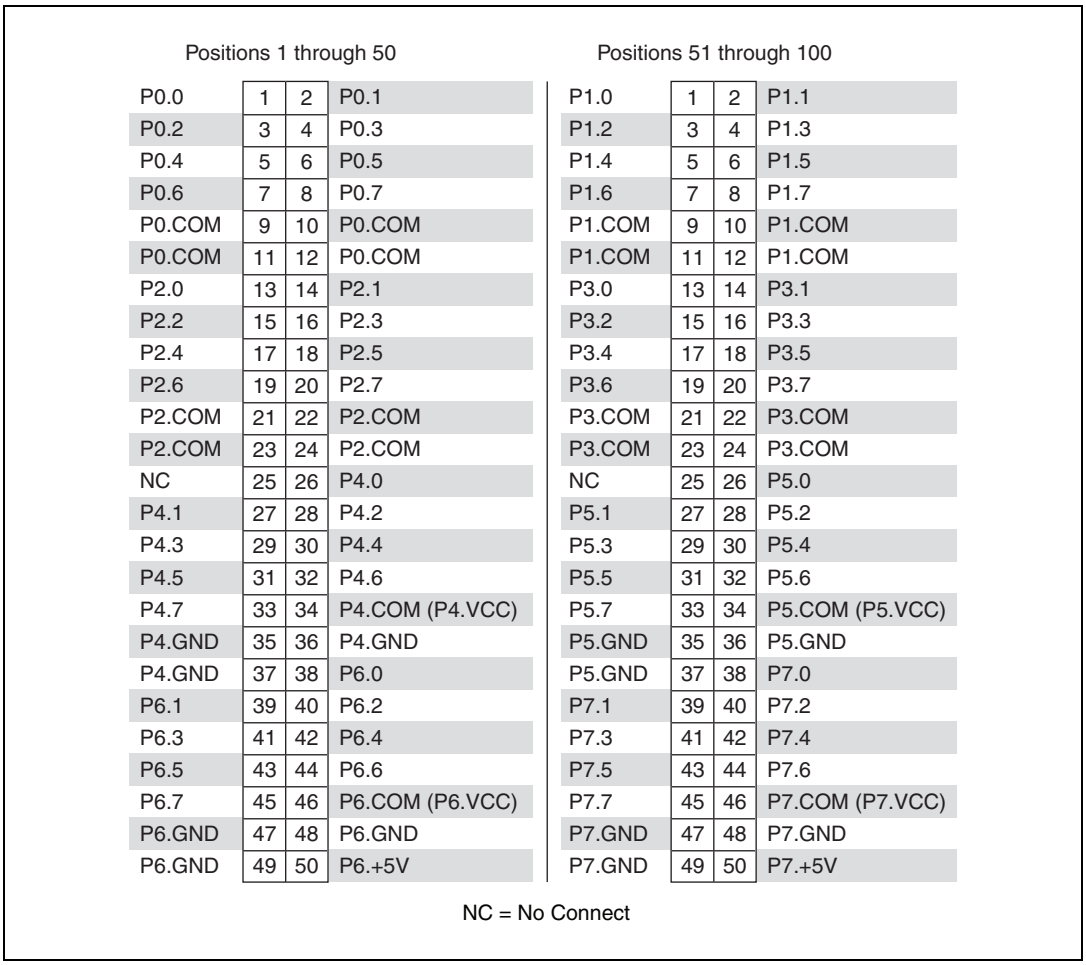



**Figure 10.** NI 6515 Pin Assignments for the SH100-100-F Cable



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Positions 1 through 50

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

Positions 51 through 100

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

NC = No Connect

**Figure 11.** NI 6515 Pin Assignments for the R1005050 Cable



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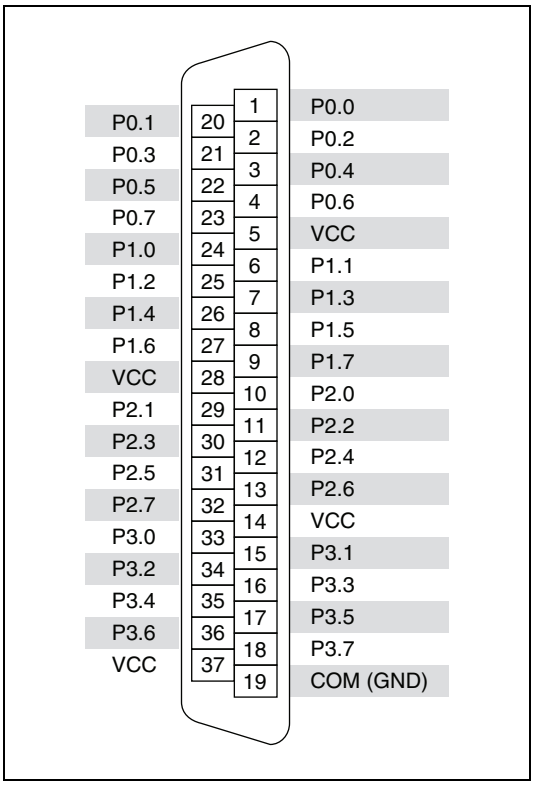



**Figure 12.** NI 6516 Pin Assignments

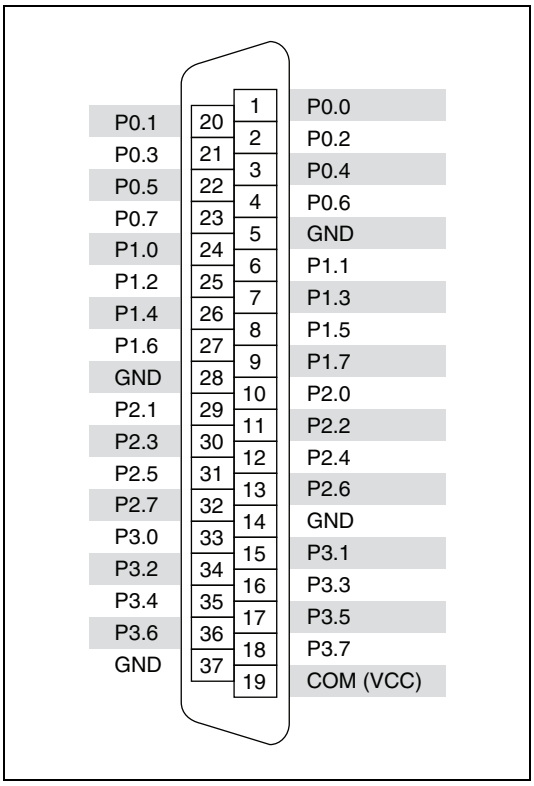



**Figure 13.** NI 6517 Pin Assignments



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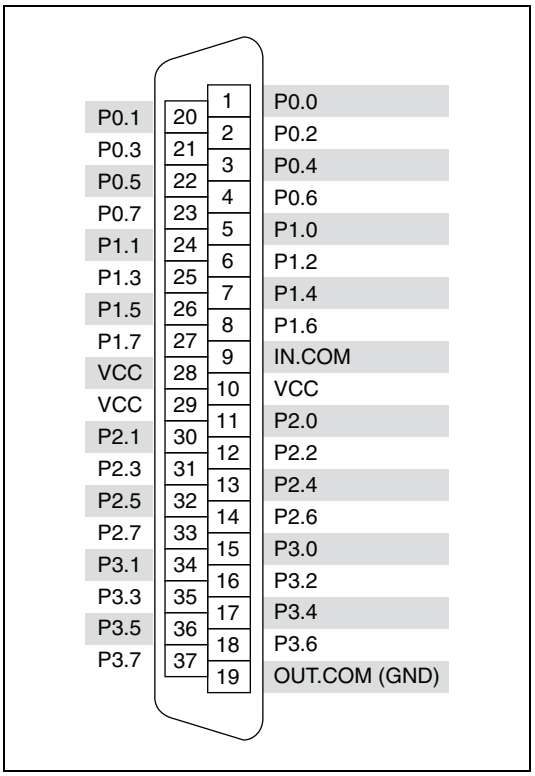



**Figure 14.** NI 6518 Pin Assignments

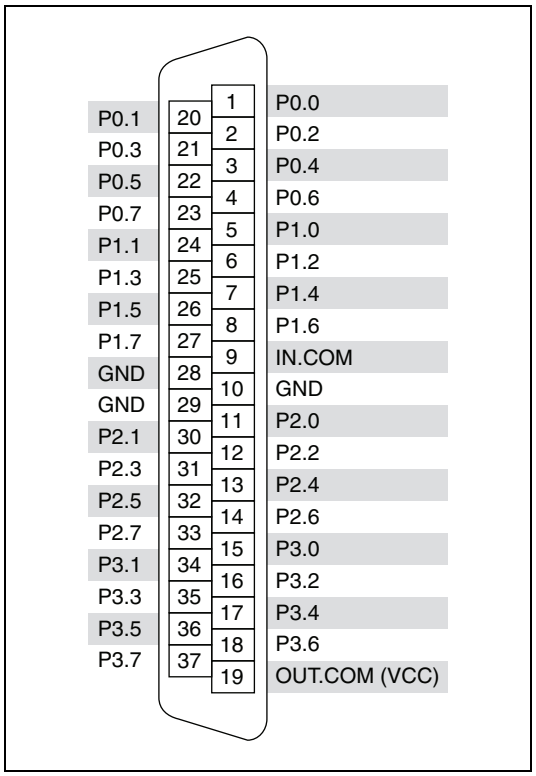



**Figure 15.** NI 6519 Pin Assignments

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