

ILK16

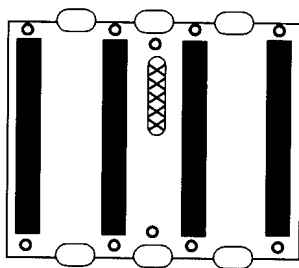
Sixteen-slot Interlink Motherboard Interconnect

ILK16 Overview

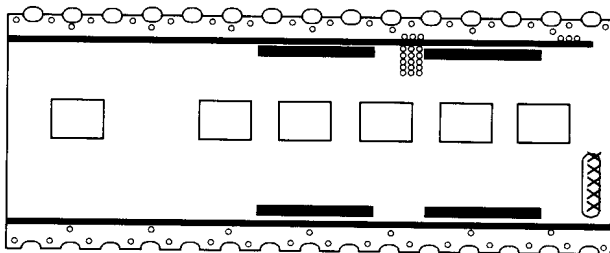
The ILK16 is a 18-port crossbar interconnect module that provides multi-port links between resources on the RACEway. The ILK16 plugs into the backplane pins of sixteen VME P2 connectors.

Note: You cannot use an ILK16 with RACE++ motherboards.

Layout



ILK-4I Interposer
(Models JR and LA)



ILK-16X Interconnect (Model KK)

XXXXX Serial number label (first two digits = model)

Connector

Indicators

None.

Switches

None.

Physical Dimensions

Dimensions (mm): 323 x 90 (12.72" x 3.54")

Weight (gm): 736 (26oz)

Slot-to-Slot spacing (mm): 20.3 (0.8")

ILK16 Specifications

Electrical Specifications

Input voltage (Vdc \pm 5%): 5.0

Input current in amps (maximum): 2.6

Environmental Specifications

Operating temperature range (°C): -20 to 50

Storage temperature range (°C): -40 to 85

Cooling requirements: natural convection

Relative humidity (% noncondensing): 10 to 90

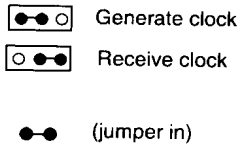
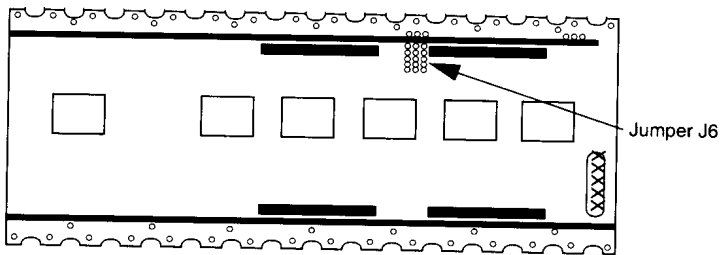
Altitude (ft above sea level): 0 to 10,000

Power dissipation (W maximum @ 5.0 Vdc): 13

ILK16 Installation

Jumpers

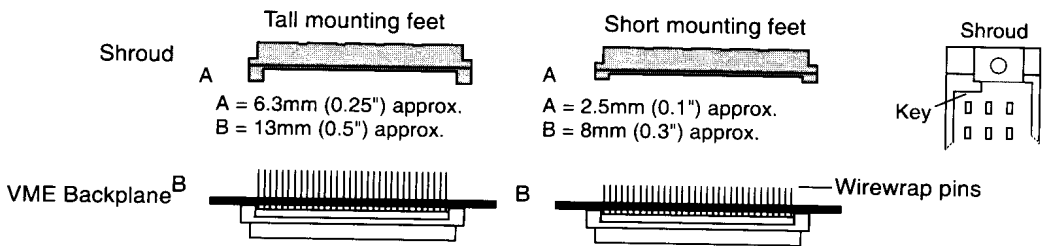
To determine whether this board should drive the clock or receive the clock, follow the assembly instructions. The clock jumper is the only field-settable jumper. Other jumpers should not be changed.



Assembly

■ Referring to Figure 1, "ILK16 Assembly Diagram," do the following:

1. Select sixteen sequential backplane slots. Do not use VME slot 1. The pins in rows A and C of the P2 connectors must be wirewrap length and must have no wirewraps.
2. Select sixteen connector shrouds to install onto the P2 wirewrap pins. Two sets of shrouds are provided: one for wirewrap pins extending about 0.5 inches from the VME backplane and one for pins extending about 0.3 inches from the backplane (see the following drawing). If your pins are longer or shorter, you may need other shrouds.



3. Install the connector shrouds onto the P2 pins. The shrouds are keyed to ensure correct orientation. Install shrouds with the keys facing the high-numbered slots.

Caution: Plugging or unplugging onto wirewrap pins without connector shrouds installed can easily break or bend the wirewrap pins.

4. Remove the screws holding the interconnect board to the four interposer boards. For ruggedized models, also remove the backplane screws. See the attached Manufacturing Assembly Drawing for details.
5. Carefully separate the interconnect board from the interposer boards.

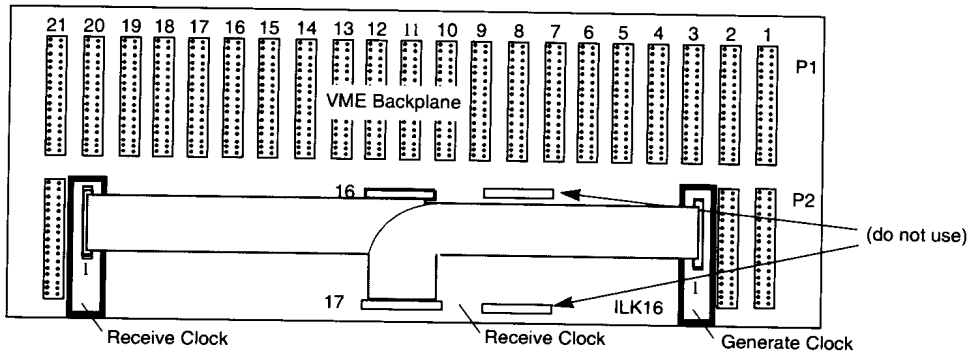
Caution: Do not attempt to install this product without separating the interconnect board from the interposer boards. Installing this product while it is assembled will damage components.

6. Using even pressure, plug each interposer board into the connector shrouds.

Caution: Align connectors carefully, to avoid bent pins. **Also note** that KEL connectors with bent pins often bend the on other KEL connectors plugged into them later, causing the problem to **propagate**.

7. Set the clock (CLK) jumper on the interconnect board (see the Field Jumpering figure). For single ILKs, set the jumper to generate the clock. If two or more ILKs are connected, set the ILK occupying the lowest VME slots to generate the clock signal. Set the other ILKs to receive the clock (see the following drawing). Motherboards connected to any ILK must also receive the clock.
8. Plug the interconnect board into the interposer boards. If installed correctly, the CLK jumper is on the edge of the board closest to the P1 connectors.
9. Replace the screws holding the interconnect board to the four interposer boards. Ruggedized models have additional installation hardware and requirements. See the attached Manufacturing Assembly Drawing for details.
10. To connect to another ILK, install an ILK interconnect cable as shown in the next figure.

Connecting ILKs



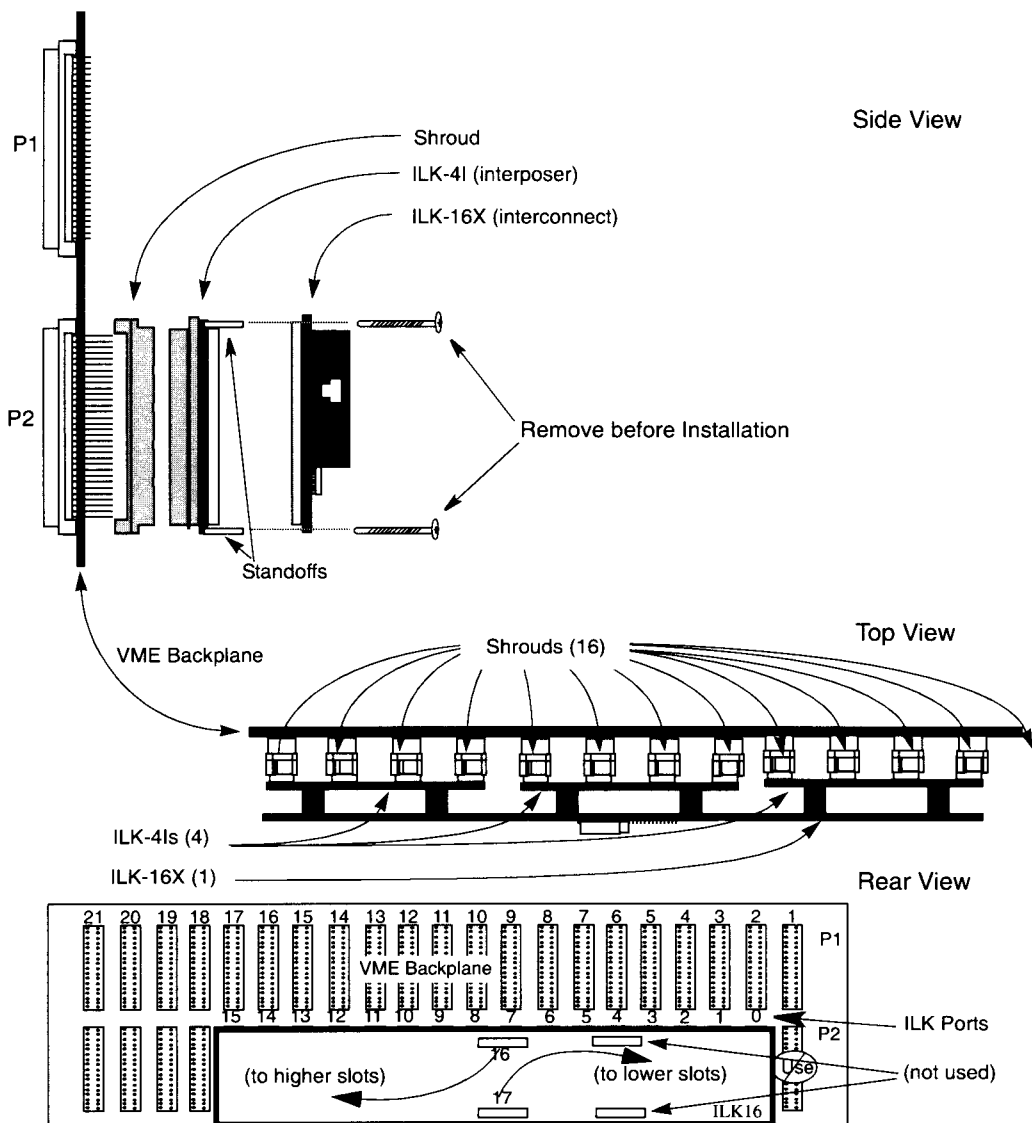
Use the bottom connector to connect to an ILK occupying lower VME slots.
 Use the top connector to connect to an ILK occupying higher VME slots.

Removal

When removing interconnectors from backplanes, work slowly and make sure to keep the interconnector parallel to the backplane.

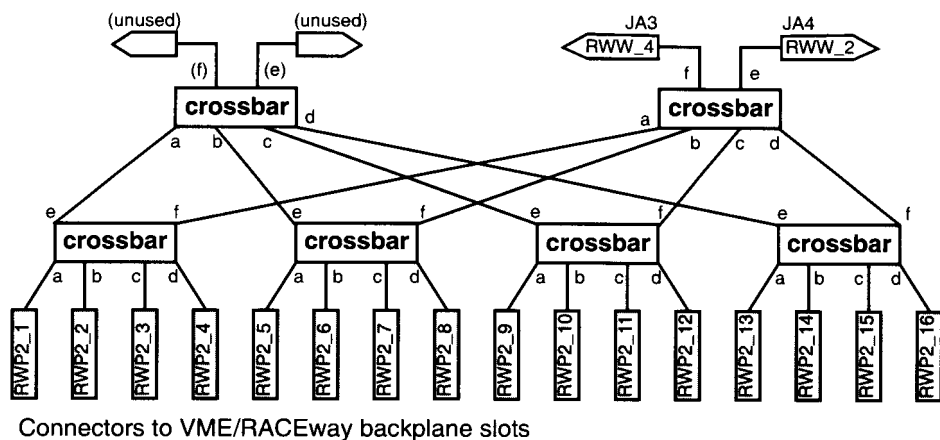
Caution: Avoid pivoting or rocking as much as possible, since this can damage the connectors.

Figure 1. ILK16 Assembly Diagram



ILK16 Topology

Optional connectors to additional ILKs



ILK16 Configuration

The following sections provide configuration file directives used for this specific device. For general information about creating configuration files and the meaning of the configuration directives, see the *Mercury System Manager's Guide*. For configuration information for MC/OS 4.5.0 or earlier, use the online manual pages available through the manmc utility.

Note: If you have multiple interconnects, or interconnects and VantageRT boards, and want to connect them via the front panel ports, also read the next section, "Cable Configuration."

Board Directive

```
board ILK16 user-assigned-name
```

where:

```
user-assigned-name
```

A name assigned by the user.

Connect Directive

```
connect user-assigned-name1.connector1 user-assigned-name2.connector2
```

where:

user-assigned-name1

user-assigned-name2

Two names assigned by the user in a board directive: one for the ILK16 and the other for the hardware device being connected to.

connector1

connector2

Two connectors, one being a connector on the ILK16 and the other a connector on the hardware device being connected to. The ILK16 connector can be:

RWP2_1 through **RWP2_16** — P2 connector (96-pin).

RWW_2 — Cable connector (80-pin).

RWW_4 — Cable connector (80-pin).

Reset Signal

The ILK16 does not automatically reset itself. Make sure that MC/OS provides the reset signal when necessary.

Cable Configuration

The following sections provide configuration file directives used for this specific device. For general information about creating configuration files and the meaning of the configuration directives, see the *Mercury System Manager's Guide*. For configuration information for MC/OS 4.5.0 or earlier, use the online manual pages available through the manmc utility.

Note: The **RWW_TO_RWW_CABLE** is an adapter cable used to connect two interconnects, two VantageRT boards, or VantageRT boards and interconnects.

Board Directive

`board RWW_TO_RWW_CABLE user-assigned-name`

where:

`user-assigned-name`

A name assigned by the user.

Connect Directive

`connect user-assigned-name1.connector1 user-assigned-name2.connector2`

where:

`user-assigned-name1`

`user-assigned-name2`

Two names assigned by the user in a board directive: one for the cable and the other for the board being connected to.

`connector1`

`connector2`

Two connectors, one being a connector on the cable and the other a connector on the board being connected to. The connector can be:

RWW_1—Cable connector (80 pin), or an end of the adapter cable

RWW_2—Cable connector (80 pin), or an end of the adapter cable

ILK16 Diagnostics

Diagnostics tool DMC supports the following test phases and tests on this hardware device. For test descriptions, see the *Mercury System Manager's Guide*.

Additional test phases and tests depend on the hardware configuration. See the *Hardware Device Note* for each motherboard, daughtercard or interconnect in the system.

ILK Phase

ILK Probe test

ILK DMA test

ILK16 Reference

Address Space

None.

Files

`${MC_ROOT_DIR}/etc/desc/ILK16.desc`

Hardware description file for this device.

See Also

None.



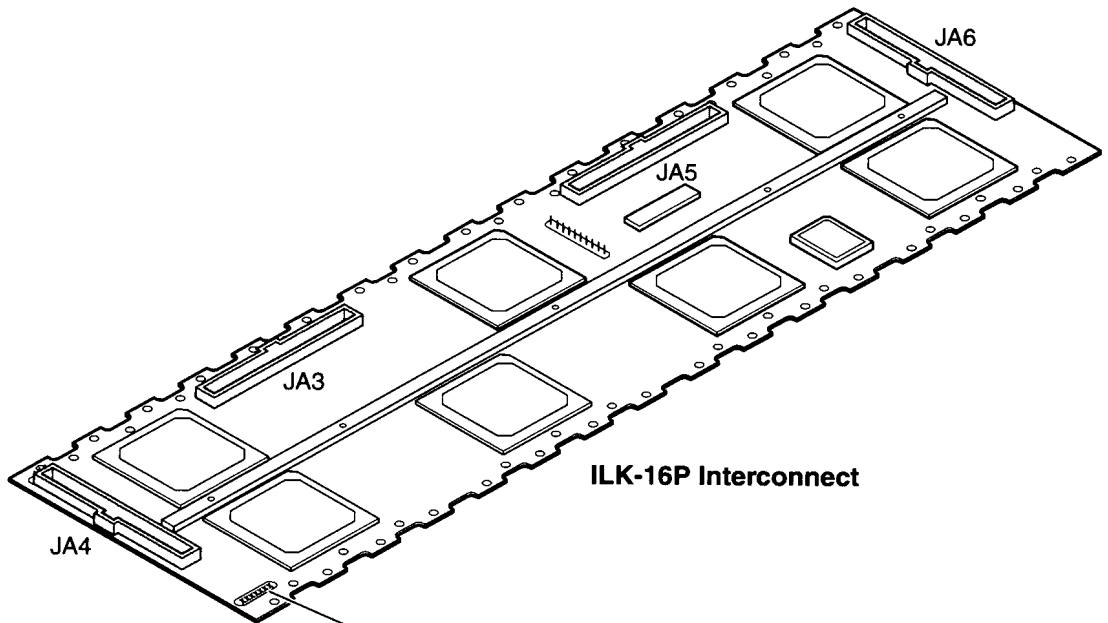
ILK16P

Sixteen-slot RACE++ Interlink Motherboard Interconnect

ILK16P Overview

The ILK16P is a RACE++ 16-port interconnect module that provides multi-port links between resources on the RACEway. It consists of seven 8-port crossbars with sixteen VME P2 connectors and four expansion connectors to connect to other ILKP devices. The ILK16P plugs into the backplane pins of sixteen VME P2 connectors.

Layout



Serial Number
(First two digits = Model)
(Last numeral = Revision)

Copyright © 1995-2002 Mercury Computer Systems, Inc. All rights reserved.

MC107

Indicators

None.

Switches

None.

Physical Dimensions

Dimensions (mm): 323 x 95 (12.72" x 3.74")

Weight (gm): 736 (18 oz)

Slot-to-Slot spacing (mm): 20.3 (0.8")

ILK16P Specifications

Electrical Specifications

Input voltage (Vdc \pm 5%): 5.0

Input current in amps (maximum): 2.6

Power dissipation (W maximum @ 5.0 Vdc): 13

Environmental Specifications

Commercial Model (XK):

Operating temperature range (°C): 0 to 40

Storage temperature range (°C): -40 to 85

Cooling requirements: natural convection

Relative humidity (% noncondensing): 10 to 90

Altitude (ft above sea level): 0 to 15,000

Rugged RACE Level 1 (Model ZQ, Part # ILK16P-TVH):

Operating temperature range (°C): -25 to 55

Storage temperature range (°C): -55 to 85

Cooling requirements: natural convection

Relative humidity (% noncondensing): 5 to 95

Altitude (ft above sea level): 0 to 30,000 (operating) and 0 to 50,000 (storage)

Rugged RACE Level 2 (Model ZQ, Part # ILK16P-T2VH):

Operating temperature range (°C): -45 to 70

Storage temperature range (°C): -55 to 125

Cooling requirements: natural convection

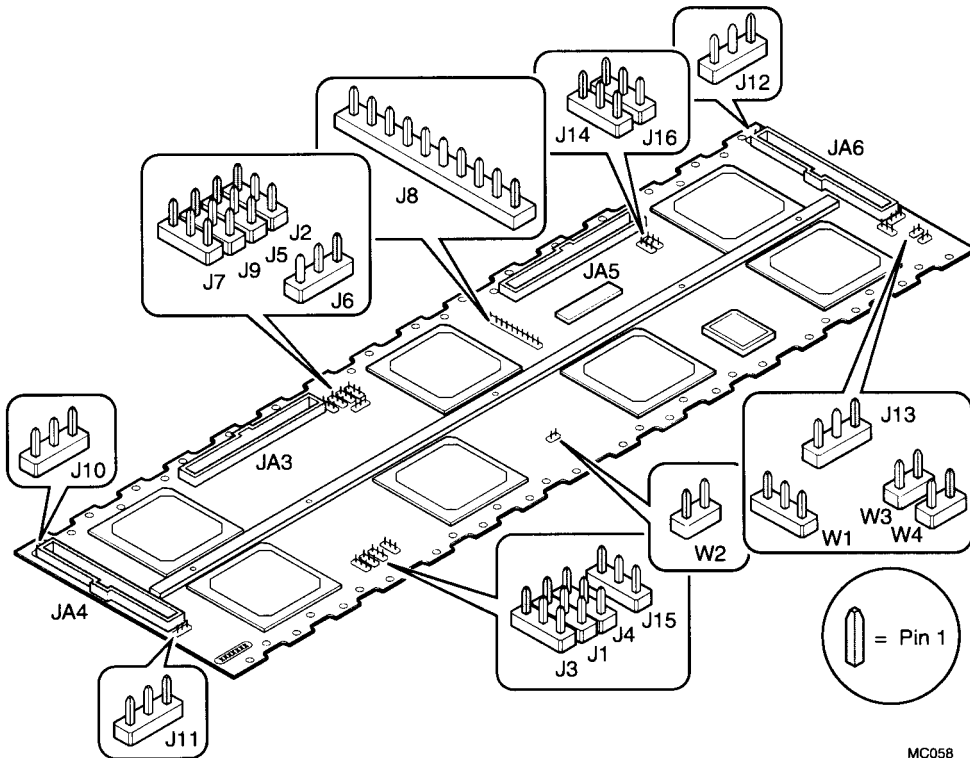
Relative humidity (% noncondensing): 5 to 95

Altitude (ft above sea level): 0 to 30,000 (operating) and 0 to 50,000 (storage)

ILK16P Installation

Jumpers

Revision 1

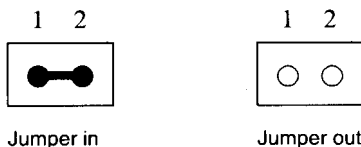


MC058

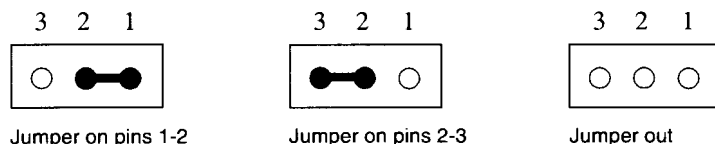
See the last numeral of the serial number for the board's revision number.

The user-settable numbered jumpers on the ILK16P consist of either two or three pins. The two-pin jumpers can be set either in or out. The three-pin jumpers can be set out or in one of two positions: on pins 1 and 2, or on pins 2 and 3. The following figure shows these positions:

Two-pin Jumpers







Three-pin Jumpers




















Set the following jumpers according to the clock frequency for your system:

Table 1. Clock Frequency Jumper Settings for Revision 1

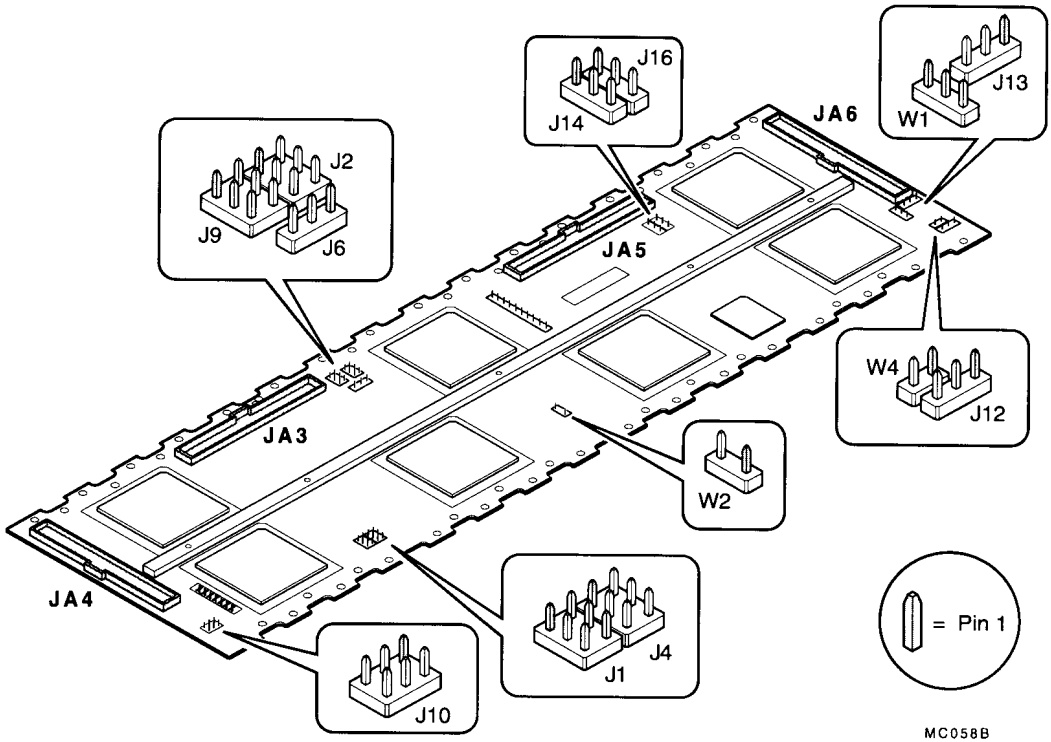
Jumper	Clock Frequency 40 MHz	Clock Frequency 66 MHz
J1	Jumper on pins 2-3, or jumper out. 	Jumper on pins 1-2, the default. 
W1	Jumper on pins 2-3, or jumper out. 	Jumper on pins 1-2, the default. 

The following jumpers are factory-set; do not change the settings on them except for cabling, as described in the next section; restore any alterations:

Table 2. Factory-Set Jumper Settings for Revision 1

Jumper	Factory Settings	Jumper	Factory Setting
W2	Jumper out. 	J9	Jumper out. 
W3	Jumper in. 	J10	Jumper on pins 1-2. 
W4	Jumper out. 	J11	Jumper on pins 1-2. 
J2	Jumper on pins 2-3. 	J12	Jumper on pins 1-2. 
J3	Jumper on pins 2-3. 	J13	Jumper out. 
J4	Jumper on pins 1-2. 	J14	Jumper on pins 1-2. 
J5	Jumper out. 	J15	Jumper on pins 1-2. 
J6	Jumper on pins 1-2. 	J16	Jumper on pins 1-2. 
J7	Jumper on pins 1-2. 		

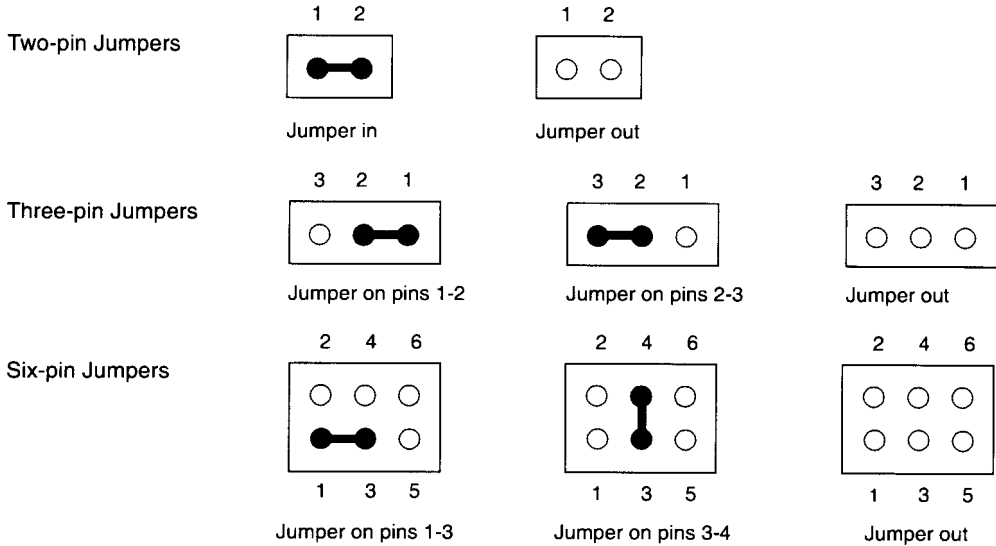
Revision 2



MC058B

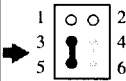
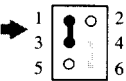


See the last numeral of the serial number for the board's revision number.

The user-settable numbered jumpers on the ILK16P consist of either two, three, or six pins. The two-pin jumpers can be set either in or out. The three-pin jumpers can be set out or in one of two positions: on pins 1 and 2, or on pins 2 and 3. The six-pin jumpers can be set on any two adjacent pins. The following figure shows these positions:







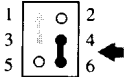






Set the following jumpers according to the clock frequency for your system:

Table 3. Clock Frequency Jumper Settings for Revision 2

Jumper	Clock Frequency 40 MHz	Clock Frequency 66 MHz
J1	Jumper on pins 3-5, or jumper out. 	Jumper on pins 1-3, the default. 
W1	Jumper on pins 1-2. 	Jumper on pins 2-3, the default. 

The following jumpers are factory-set; do not change the settings on them except for cabling, as described in the next section; restore any alterations:

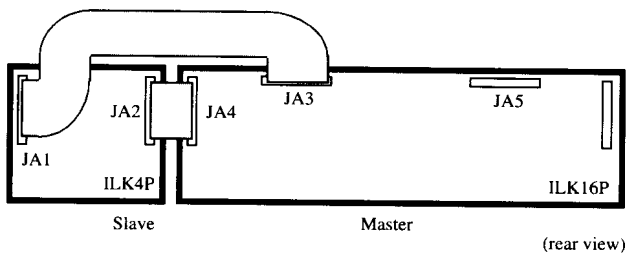
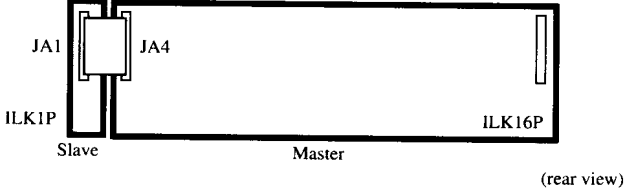
Table 4. Factory-Set Jumper Settings for Revision 2

Jumper	Factory Settings	Jumper	Factory Setting
W2	Jumper out. 	J10	Jumper on pins 1-3 and 2-4. 
W4	Jumper out. 	J12	Jumper on pins 1-2. 
J1	Jumper on pins 4-6. 	J13	Jumper on pins 1-2. 
J2	Jumper on pins 4-6. 	J14	Jumper on pins 1-2. 
J4	Jumper on pins 1-3 and 2-4. 	J16	Jumper on pins 1-2. 
J9	Jumper on pins 1-3 and 2-4. 		

Jumpering for Cabled ILK16Ps

The ILK4P can be cabled to other ILKP interconnects. Mercury supports the following configurations:

Table 5. Supported Configurations

<p>4 + 16: An ILK4P cabled to an ILK16P by JA2 on the ILK4P to JA4 on the ILK16P, and by JA1 on the ILK4P to JA3 on the ILK16P. The ILK16P is on the lower-numbered slots and is master.</p>	 <p>(rear view)</p>
<p>1 + 16: An ILK16P cabled to an ILK1P, from JA1 on the ILK16P to JA1 on the ILK1P. The ILK16P is on the lower-numbered slots and is master.</p>	 <p>(rear view)</p>

Overriding the factory settings, set the following jumper according to the configuration you use:

Table 6. Cabled ILK16P Jumper Settings for Revision 1







Jumper	4 + 16	1 + 16
J5	Jumper on pins 2-3. 	Jumper on pins 2-3. 
J7	Jumper on pins 2-3. 	Jumper on pins 1-2. 
J9	Jumper on pins 2-3. 	Jumper out. 

Table 6. Cabled ILK16P Jumper Settings for Revision 1







Jumper	4 + 16	1 + 16
J10	Jumper on pins 2-3. 	Jumper on pins 1-2. 
J11	Jumper on pins 2-3. 	Jumper on pins 1-2. 

Table 7. Cabled ILK16P Jumper Settings for Revision 2

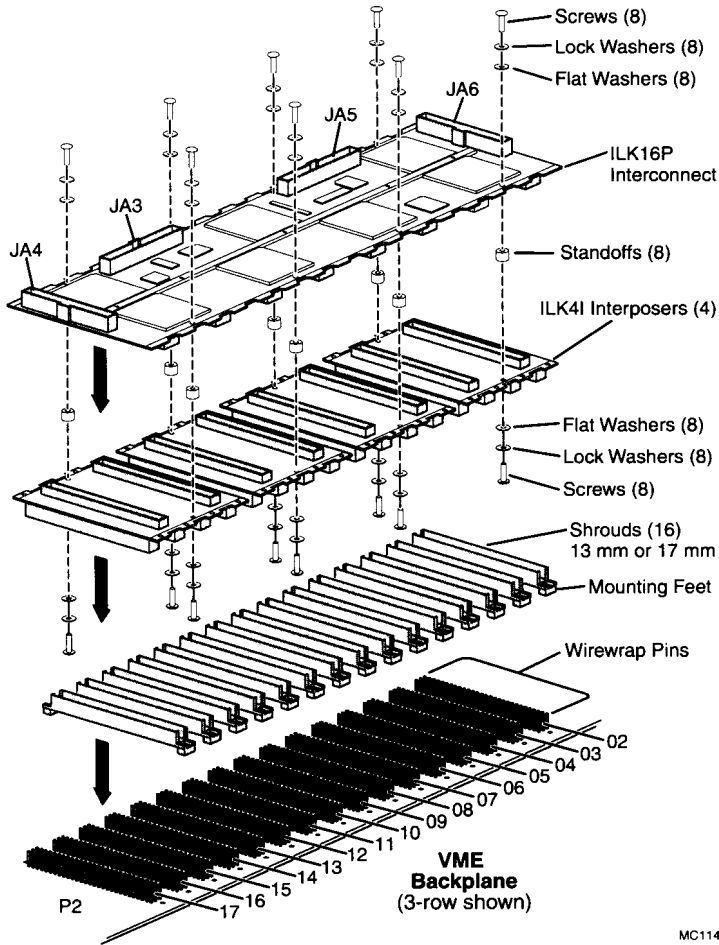
Jumper	4 + 16	1 + 16
J9	Jumper on pins 3-5 and 4-6. 	Jumper on pins 1-3. 

Assembly

Review your host's instructions for adding new devices.

Assembly results in a row of four ILK-4I interposers sandwiched between the VME backplane and the ILK16P interconnector. Each interposer covers four

sequential slots. Each slot has a shroud. The total covers sixteen sequential slots on the VME backplane.



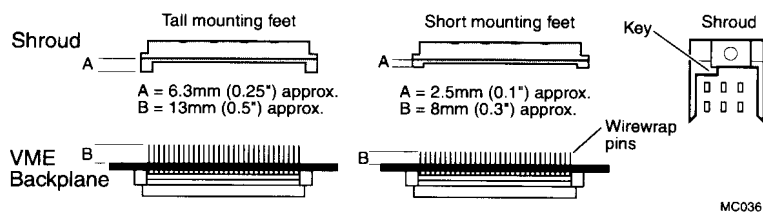
MC114

Caution: Make sure slots containing a Mercury device have rows A and C of the P2 connector uncommitted. Slots in some VME backplanes (such as Sun) make proprietary use of rows A and C of the P2 connector. A Mercury device in a proprietary slot will not work and might damage boards. Contact the backplane manufacturer to determine compliant slots.

■ **To install:**

1. Select sixteen sequential backplane slots. Make sure all slots covered by the ILK are available for interconnection; slot 1 is often used by other devices. The pins in rows A and C of the P2 connectors must be 13mm with low profile or 17mm with standard profile, and must not have any wirewraps.
2. If you have a 5-row backplane, make sure you use 5-row shrouds. If you have a 3-row backplane, make sure you use 3-row shrouds.

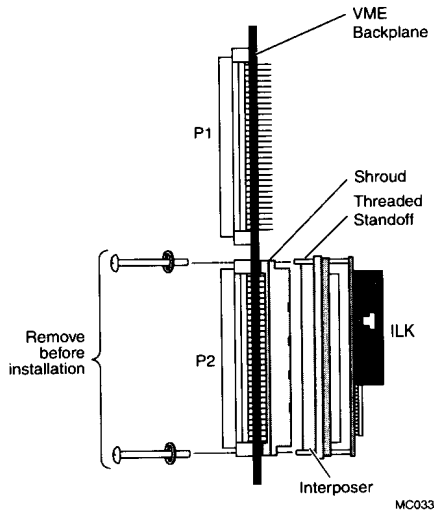
If you have standard 5-row ILK-4I interposers, the backplane must already have shrouds installed. If you have a 3-row backplane, select sixteen connector shrouds to install onto the P2 wirewrap pins (see the illustration that follows). If the wirewrap pins extend about 0.5 inches from the VME backplane, use shrouds with the tall mounting feet. If the wirewrap pins extend about 0.3 inches from the VME backplane, use shrouds with the short mounting feet. If the wirewrap pins are longer or shorter, you might need other connector shrouds.



Install the connector shrouds onto the P2 pins on the rear of the VME backplane. The shrouds are keyed to ensure correct orientation with the ILK. Install the shrouds with the key facing the high-numbered VME slots.

Caution: Always use connector shrouds. Plugging or unplugging ILKs onto wirewrap pins without connector shrouds installed can easily break or bend the wirewrap pins.

3. Set the jumpers. (See the "Jumpers" section.)
4. Remove the screws holding the interconnect board to the interposer boards. For ruggedized models, also remove the backplane screws. (See the following drawing.)



- Carefully separate the interconnect board from the interposer boards.

Caution: Do not attempt to install this product without separating the interconnect board from the interposer board. Installing this product while it is assembled will damage components.

- Using even pressure, plug the interposer boards into the connector shrouds.

Caution: Align connectors carefully, to avoid bent pins. **Also note** that KEL connectors with bent pins often bend the on other KEL connectors plugged into them later, causing the problem to **propagate**.

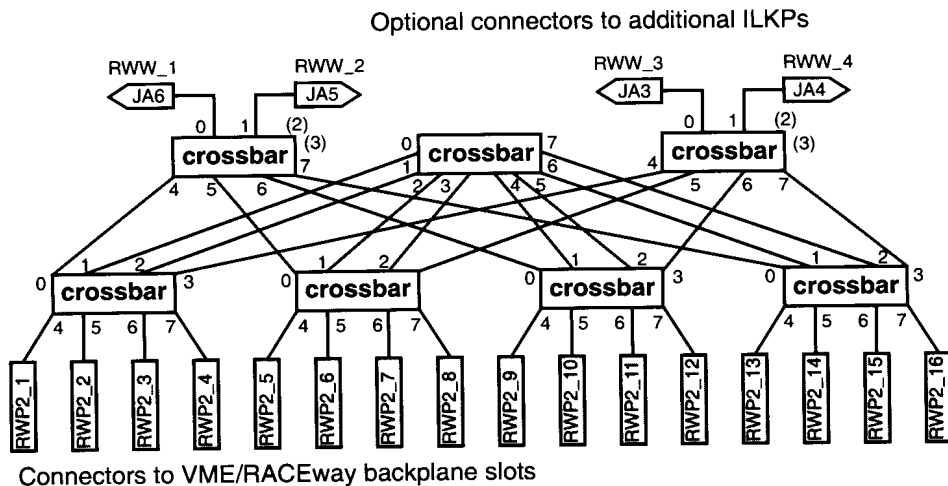
- Re-connect the interconnect board to the interposer board by replacing the screws holding the interconnect board to the interposer. Ruggedized models have additional installation hardware and requirements.
- If you are connecting the board to another ILK, install an ILK interconnect cable as shown in the section "*Jumpering for Cabled ILK16Ps*".

Removal

When removing interconnectors from backplanes, work slowly and make sure to keep the interconnector parallel to the backplane.

Caution: Avoid pivoting or rocking as much as possible, since this can damage the connectors.

ILK16P Topology



ILK16P Configuration

The following sections provide configuration file directives used for this specific device. For general information about creating configuration files and the meaning of the configuration directives, see the *Mercury System Manager's Guide*.

Note: If you have multiple interconnects, or interconnects and VantageRT boards, and want to connect them via the front panel ports, also read the next section, "Cable Configuration."

Board Directive

```
board ILK16P user-assigned-name
```

where:

```
user-assigned-name
```

A name assigned by the user.

Connect Directive

```
connect user-assigned-name1.connector1 user-assigned-name2.connector2
```

where:

user-assigned-name1

user-assigned-name2

Two names assigned by the user in a board directive: one for the ILK16P and the other for the hardware device being connected to.

connector1

connector2

Two connectors, one being a connector on the ILK16P and the other a connector on the hardware device being connected to. The ILK16P connector can be:

RWP2_1 through **RWP2_16** — 96-pin P2 connectors, from lowest to highest VME slots.

RWW_1 through **RWW_4** — 80-pin cable connectors JA6 (near lowest VME slot), JA5, JA3, and JA4 (near highest VME slot). Cable connections must be made with an **RWW_TO_RWW_CABLE**. See Table 5 for supported configurations.

Reset Signal

The ILK16P does not automatically reset itself. Make sure that MC/OS provides the reset signal when necessary.

Cable Configuration

The following sections provide configuration file directives used for this specific device. For general information about creating configuration files and the meaning of the configuration directives, see the *Mercury System Manager's Guide*.

Note: The **RWW_TO_RWW_CABLE** is an adapter cable used to connect two interconnects, two VantageRT boards, or VantageRT boards and interconnects.

Board Directive

```
board RWW_TO_RWW_CABLE user-assigned-name
```

where:

```
user-assigned-name
```

A name assigned by the user.

Connect Directive

```
connect user-assigned-name1.connector1 user-assigned-name2.connector2
```

where:

```
user-assigned-name1
```

```
user-assigned-name2
```

Two names assigned by the user in a board directive: one for the cable and the other for the board being connected to.

```
connector1
```

```
connector2
```

Two connectors, one being a connector on the cable and the other a connector on the board being connected to. For the cable, the connector can be:

RWW_1—Cable connector (80 pin), on one end of the adapter cable

RWW_2—Cable connector (80 pin), on the other end of the adapter cable

ILK16P Diagnostics

Diagnostics tool DMC supports the following test phases and tests on this hardware device. For test descriptions, see the *Mercury System Manager's Guide*.

Additional test phases and tests depend on the hardware configuration. See the *Hardware Device Note* for each motherboard, daughtercard or interconnect in the system.

ILK Phase

ILK Probe test

ILK DMA test