

### 3.9 Replacing and Handling the Battery

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#### Lithium Battery in the 545 and 555 -1105/-1106 CPUs

The 545-1105/1106 and 555-1105/1106 CPUs use a lithium battery for maintaining CPU memory contents while power is not present. The lithium battery is a primary cell; it is not rechargeable. The battery in these CPU models is accessible through the bezel door on the front of the module, as shown in Figure 3-9.

When the battery indicator blinks or goes off, the battery has dropped below the voltage required to maintain memory and should be replaced. Request battery kit replacement part number PPX:2587678-8005 for the appropriate replacement battery. Refer to page 3-19 for guidelines on handling batteries.

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**NOTE:** As a good engineering practice, design your user program to monitor Status Word 01 on a cyclic basis and trigger an alarm if the battery-low bit (15) is set. Additionally, you can use the battery life specifications listed in Table A-2 to determine how often you routinely replace the battery.

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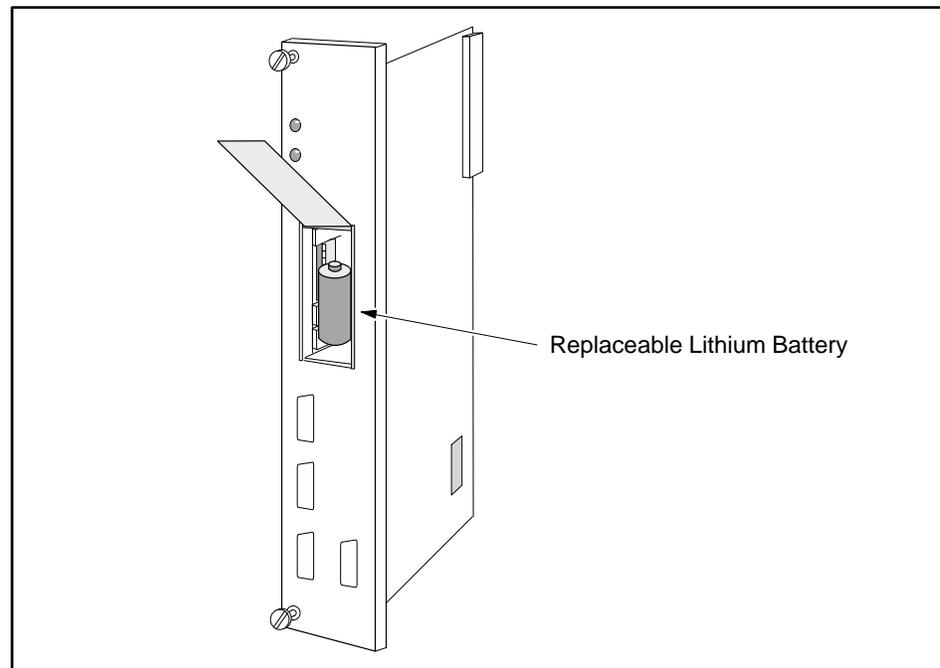


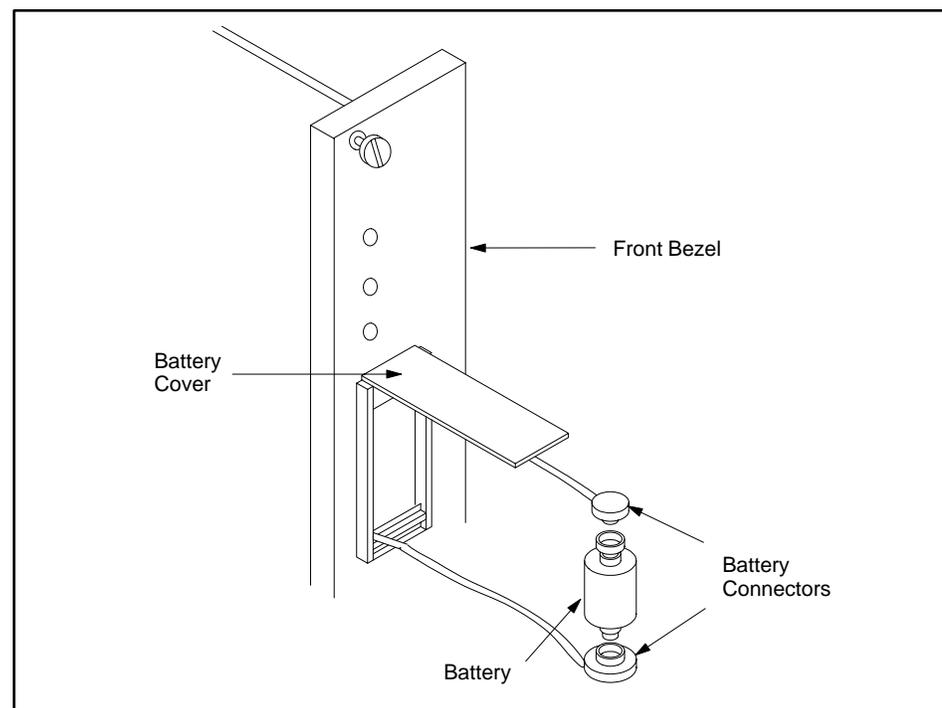
Figure 3-9 Battery Location in -1105 and -1106 CPU Modules

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**Replacing the  
Battery in  
-1105/-1106 CPUs**

Follow these steps to replace the battery:

1. Maintain power to the CPU.
2. Open the battery cover.
3. Pull out the old battery and disconnect the battery connectors.
4. Connect the battery connectors to the replacement battery.
5. Place the new battery in the battery compartment, making sure the connecting wires are fully inserted through the holes in the compartment, and close the cover.
6. Check the BATT GOOD indicator on the CPU to make sure that it lights back up to confirm that the replacement battery is good.



**Figure 3-10 Replacing the Battery in -1105 and -1106 CPU Modules**

## Replacing and Handling the Battery (continued)

### Lithium Battery in the 545 and 555 -1103/-1104 CPUs

The 545-1103/1104 and 555-1103/1104 CPUs use a lithium coin battery for maintaining CPU memory contents while power is not present. The battery is a Panasonic BR2325, PPX:2587678-8010, or equivalent, 23 mm diameter, with a nominal capacity of 165 mAh. The lithium battery is a primary cell; it is not rechargeable. Figure 3-11 shows the location of the battery on the CPU card.

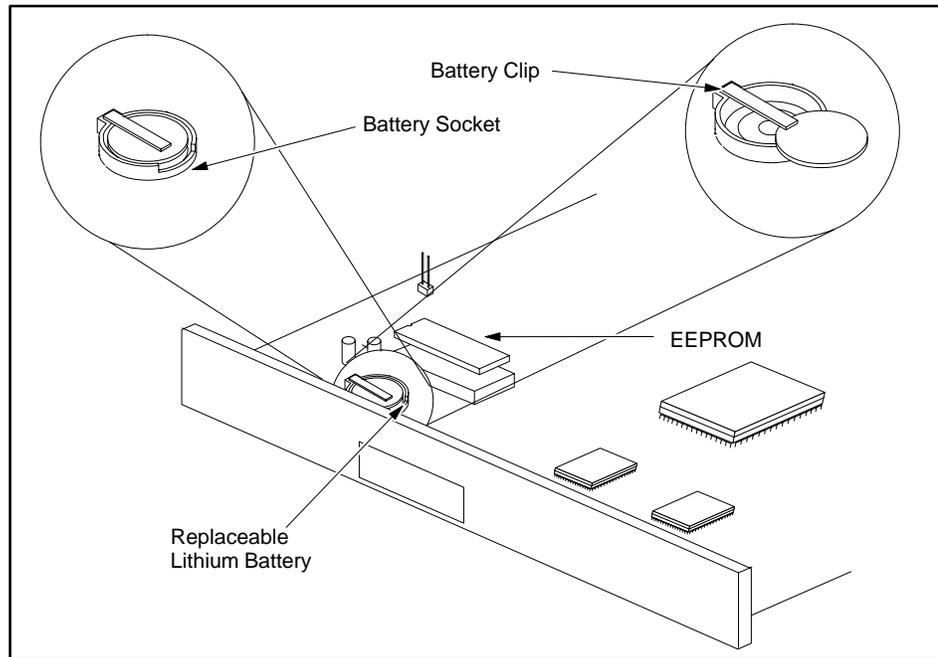


Figure 3-11 Battery Location on 545/555 CPU Modules

### Indicators

A fresh battery can typically maintain your system with power off for three months at room temperature, or a substantially shorter time at elevated temperatures. The battery indicator is illuminated as long as power is present and the battery voltage is adequate for maintaining the memory; however, the indicator does not show the amount of battery life remaining. When the battery indicator blinks or goes off, the battery has dropped below the voltage required to maintain memory and should be replaced. See page 3-20, "Replacing the Battery."

### **⚠ WARNING**

**Charging a primary lithium battery can cause the battery to explode.**

**An exploding lithium battery can result in death or serious injury to personnel, and/or damage to equipment.**

**Do not attempt to charge primary lithium batteries. Instead, replace your battery following the procedure on page 3-20, and dispose of the battery according to the instructions of its manufacturer.**

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Use the following safety instructions to minimize the risk of personal injury or fire hazard when handling lithium batteries.

#### Using and Handling Batteries

Lithium batteries contain flammable material. Do not open, puncture, or crush the battery case. Puncturing the battery case releases electrolyte and potentially flammable material. Exposure to electrolyte can cause throat and/or eye irritation. If the electrolyte comes in contact with your skin or eyes, flush the area thoroughly with large amounts of water.

Never use a lithium battery in a completely sealed container. Containers must have a mechanism for relieving pressure if the battery is exposed to high temperature or abuse.

If a lithium battery short-circuits, disconnect it immediately and move it to a well-ventilated area. Wear safety glasses and other protective gear when handling a disabled battery.

#### Transporting Batteries

Transportation of lithium batteries is regulated by the U.S. Department of Transportation. Lithium batteries must be shipped under exemption DOT-E 7502.

- For international shipments, IATA Regulation 2294 applies.
- Lithium batteries such as the one used in the 545 and 555 CPUs, which contains less than 0.5 grams of lithium, are not restricted in shipment, according to DOT 173.206 (f) or IATA Section X.

#### Storing Batteries

Take precautions in storing batteries.

- Do not place batteries on a metal surface; doing so could cause a potential short circuit.
- Do not store batteries loosely or in dump bins. Store batteries in the original shipping container.
- Store batteries in a cool, well-ventilated area with a maximum temperature of 70°C (158°F).

#### Discarding Batteries

Batteries to be discarded may contain a significant amount of unused energy. They must be packed for disposal and isolated electrically. Batteries must be disposed of in accordance with all local, state and federal regulations.

## Replacing and Handling the Battery (continued)

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*ATTENTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

*ATTENTION: Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.\**

\* Canadian standard CAN/CSA C22.2, No. 950-M89

### Replacing the Battery in -1103/-1104 CPUs

Battery changes require advance planning. For the 545-1103/1104 and 555-1103/1104 CPUs, keep the following guidelines in mind:

- In order to change the lithium battery, you must power down the system.
- Memory can be lost if system power is removed from the CPU for longer than twenty minutes during a battery change.
- A good battery must be in place when power is restored, or else the CPU goes through a battery-bad powerup and all memory is lost.

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**NOTE:** As a safeguard, consider using SoftShop, TISOFT, or APT to save your program before you replace the battery.

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Follow these steps to replace the lithium battery:

1. Place your process in a safe state.

 <b>WARNING</b>
<b>Installing or removing a CPU from a powered-up base disrupts your process. Disruption of your process can cause death or serious injury to personnel, and/or damage to equipment.</b>
<b>Ensure that all power is disabled before installing or removing the CPU.</b>

2. Disconnect power from the chassis.

At room temperature, you have approximately twenty minutes to replace the battery after power is removed from the CPU.

If the CPU detects a bad battery before power is either removed or lost (e.g., power failure), you must replace the battery before restoring power, or lose memory contents.

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3. Remove the CPU from the chassis and place the CPU, component-side up, on a static-dissipative surface.

The components in the CPU card can be degraded or destroyed by electrostatic discharge (ESD). Follow proper handling precautions in order to prevent ESD damage.

4. Remove the battery from the socket, observing the following precautions:

### **WARNING**

The terminals of the lithium coin cell are extremely close together. In the course of removing the battery, it is possible for you to short the battery.

Shorting the battery presents the danger of explosion and/or high temperatures, and could cause death or serious injury to personnel, and/or damage to equipment.

Follow the instructions given below in order to avoid shorting the battery.

- Use a non-conductive implement when removing the battery from the socket. Do not allow a conductive device (for example, a metal screwdriver blade) to contact both sides of the battery simultaneously. Since the battery is shaped like a coin, it is easy for the screwdriver blade to make contact with both rim and underside, which would cause a short.

### **CAUTION**

The positive contact of the battery socket is a thin metal strip, easily bent.

If you deform the positive contact of the socket, the socket is ruined.

Extract the battery gently so that you do not overflex the socket. Follow the instructions given below.

- If you pull the battery straight up from the socket, you could spring the positive contact and ruin the socket. Instead, lift the battery up to the height of the socket rim and carefully slide it out, making certain you do not bend the socket's positive contact.
5. Slide a fresh battery into the socket, being careful to observe polarity.  
  
The battery and the socket are both marked with plus signs (+), indicating positive contacts. The positive contact is the upper contact.
  6. Reinstall the CPU in the chassis.
  7. Ensure the battery is enabled (SW9 is set to On). (See page 3-22.)
  8. Restore power to the chassis.

### 3.10 Setting the CPU Dipswitches

#### Dipswitch Location and Settings

Dipswitches are used to set 545/555 CPU operating parameters. The dipswitches are located near the front of the CPU, behind the bezel or battery door. See Figure 3-12. To gain access, lower the access door. With the CPU in its (normal) vertical position, dipswitches pushed to the left are On; dipswitches pushed to the right are Off.

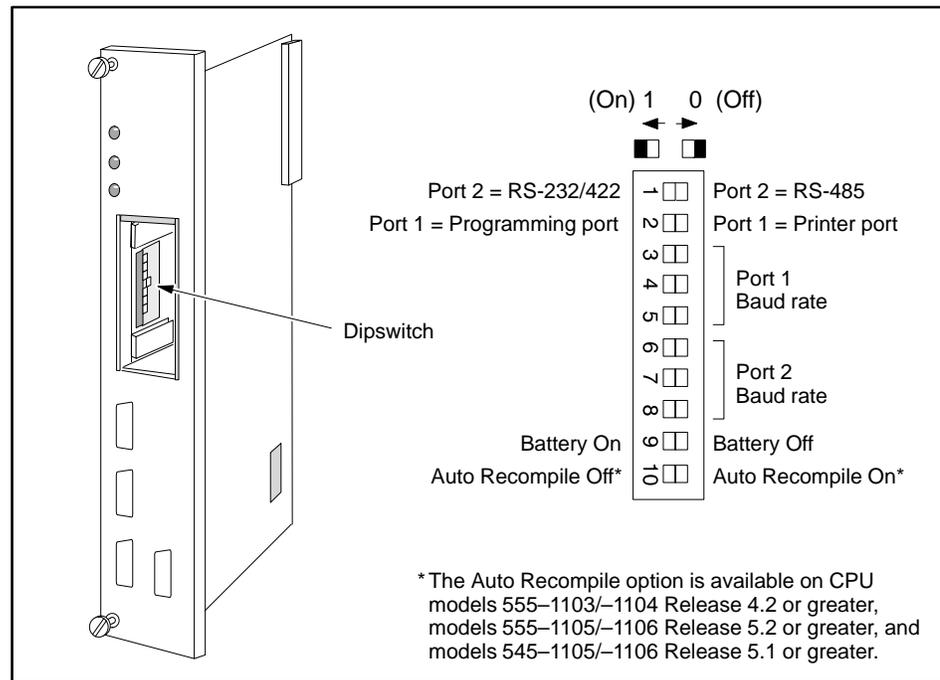


Figure 3-12 545/555 CPU Dipswitch Location

#### Enabling Battery Backup

Switch 9 is used to set the back-up battery On or Off. As Figure 3-12 indicates, moving the switch to the left enables the back-up battery; setting the switch to the right disables the back-up battery.

**NOTE:** When SW9 is set to the On position, the battery LED indicates the state of the battery back-up circuit. If the battery LED is illuminated, memory contents should be maintained; if the LED is not illuminated, memory contents will not be maintained.

#### Enabling the Auto Recompile Function

Switch 10 is used to allow the CPU to perform an Auto Recompile during runtime. Switch 10 is shipped in the disabled (left) position. To activate this feature, set the switch to the right (enabled) position. Refer to Appendix F for more information about the Auto Recompile function.

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## Setting Baud Rates

Switches 3 through 8 are used to set baud rates for Ports 1 and 2. Switches 3, 4, and 5 set Port 1 baud rates. See Table 3-3. Switches 6, 7, and 8 set Port 2 baud rates. See Table 3-4.

Table 3-3 Port 1 Baud Rate Settings

<b>Baud Rate</b>	<b>SW3</b>	<b>SW4</b>	<b>SW5</b>
115200 <sup>1</sup>	1 (On)	1 (On)	0 (Off)
57600 <sup>1</sup>	1 (On)	0 (Off)	1 (On)
38400	1 (On)	0 (Off)	0 (Off)
19200	1 (On)	1 (On)	1 (On)
9600	0 (Off)	1 (On)	1 (On)
2400	0 (Off)	0 (Off)	1 (On)
1200	0 (Off)	1 (On)	0 (Off)
300	0 (Off)	0 (Off)	0 (Off)

<sup>1</sup>These baud rates are available only on the 555–1105 and 555–1106 CPUs.

Table 3-4 Port 2 Baud Rate Settings

<b>Baud Rate</b>	<b>SW6</b>	<b>SW7</b>	<b>SW8</b>
115200 <sup>1</sup>	1 (On)	1 (On)	0 (Off)
57600 <sup>1</sup>	1 (On)	0 (Off)	1 (On)
38400	1 (On)	0 (Off)	0 (Off)
19200	1 (On)	1 (On)	1 (On)
9600	0 (Off)	1 (On)	1 (On)
2400	0 (Off)	0 (Off)	1 (On)
1200	0 (Off)	1 (On)	0 (Off)
300	0 (Off)	0 (Off)	0 (Off)

<sup>1</sup>These baud rates are available only on the 555–1105 and 555–1106 CPUs.

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**NOTE:** The baud rates 115,200 and 57,600 are available only on the 555–1105 and 555–1106 CPUs.

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## Setting the CPU Dipswitches (continued)

The 545 and 555 CPUs have two communications ports. Both ports are configured as Data Terminal Equipment (DTE).

### Communications Port 1

SW2 selects Port 1 as either a programming port or a printer port on a 545/555 CPU. Port 1 uses an RS-232/RS-423 signaling protocol and an RS-232 pinout arrangement with an RS-423 (+5 V) signal level extending up to 50 feet (15 m). You can use a modem to extend this distance.

- Setting SW2 to the left selects Port 1 as a programming port.
- Setting SW2 to the right selects Port 1 as a printer port.

Figure 3-13 shows the locations of Port 1 and Port 2 on the front of the CPU.

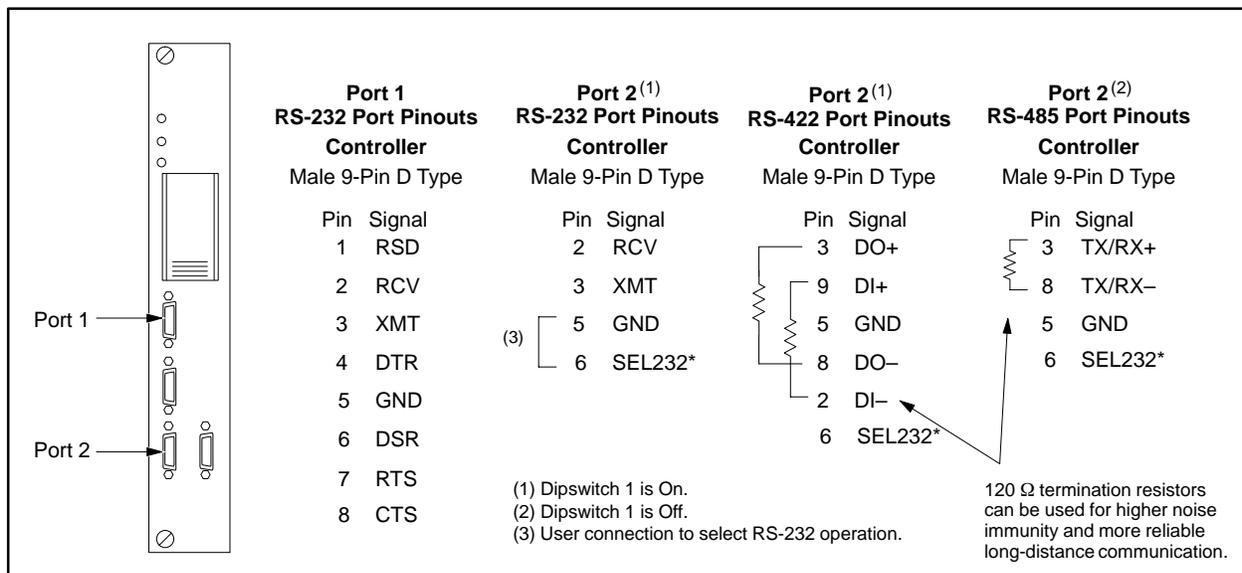


Figure 3-13 545/555 CPU Port Locations

### Communications Port 2

With the 545 and 555 CPUs, your choice of cabling determines whether Port 2 functions as an RS-232/RS-423 port or as an RS-422/RS-485 port. Figure 3-13 describes the pinouts required for the various Port 2 options.

If you use RS-422/RS-485 cabling, SW1 on the dipswitch allows you to select between RS-422 and RS-485. Use SW1 as follows:

- Set SW1 to the left when you use RS-232 or RS-422 cabling.
- Set SW1 to to the right when you use RS-485 cabling. RS-485 uses a single twisted pair to transmit and receive data between the programming device and the 545/555 CPU. Multiple CPUs or multiple programming devices (on this RS-485 link) are not supported and must not be used.