ACM39U-Y Reader Module

User Manual V1.00

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1.0. Introduction

The ACM39U-Y provides a solution for secured access control by employing the globally recognized ACR39 core. It comes in module form to enable easy implementation of smart card-based solutions in embedded systems. The ACM39U-Y utilizes the latest microchip technology, bringing you high security for your confidential files in a convenient and easy way. The ACM39U-Y comes in two variants: CCID and non-CCID.

This document is a guide to the use and configuration of the various connectors of the ACM39U-Y, so that users can maximize its convenience and adaptability in various embedded environments.

2.0. Configuring the LED Operation Status

2.1. For ACM39U-Y3 (CCID)

There are two LEDs on the ACM39U-Y3 that display its operation status:

- **Red** is for power
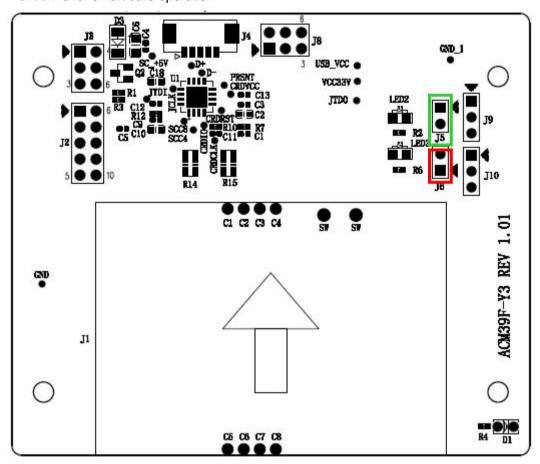- **Green** is for smart card operation

Figure 1: ACM39U-Y3 LED Configuration

2.1.1. Enable LED for Smart Card Operation Status

To enable the LED for smart card operation status (see D2), connect a jumper to (**J5**) (see **Figure 1**).

2.1.2. Enable LED for Power Status

To enable the LED for power status (see D3), connect a jumper to (**J6**) (see **Figure 1**).

2.1.3. LED Behaviors

The table below shows the behaviors of the LEDs during card polling.

LED Color	Behavior	Status
Red	On	Power
Green	Slow flash[1]	No card present/ Card power off
	On	Card power on
	Fast flash	Card operation

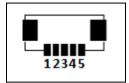[1] *The LED turns on for 200 ms every 2 seconds.*

3.0. Connecting the ACM39U-Y to Another Device via USB

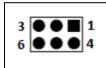The ACM39U-Y has a USB port that can be used to connect the module to another device.

To do this:

Option 1: Connect socket (**J4**) via USB cable to another peripheral device (see **Figure 2**).

1	USB VCC
2	USB D-
3	USB D+
4	USB GND
5	USB shielding

Option 2: Connect jumper (**J8**) via USB pinout to another peripheral device (see **Figure 2**).

1, **3**, **4**	USB GND
2	USB D+
5	USB D-
6	USB VCC

Note: Do not connect both J4 and J8 at the same time as it may cause abnormal behavior.
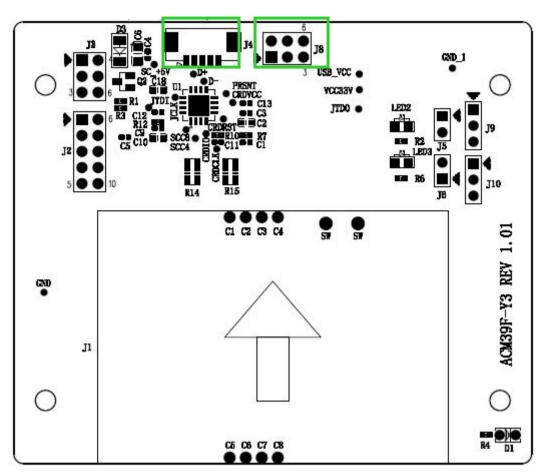
Figure 2: ACM39U-Y USB Configuration

4.0. Configuring Card Detection

There are two types of card detection:

- Normal Open
- Normal Closed

Since the ACM39U-Y offers an extendable smart card connector signal, you can choose the type of card detection to be used on the other end of the device.

To choose a type of card detection:

1. Connect a jumper in (J3).

   Note: This setting is dedicated for extended smart card connectors. By default, the ACM39U-Y card connector is Normal Open.

The table below shows the two types of card detection and their corresponding jumper connections.

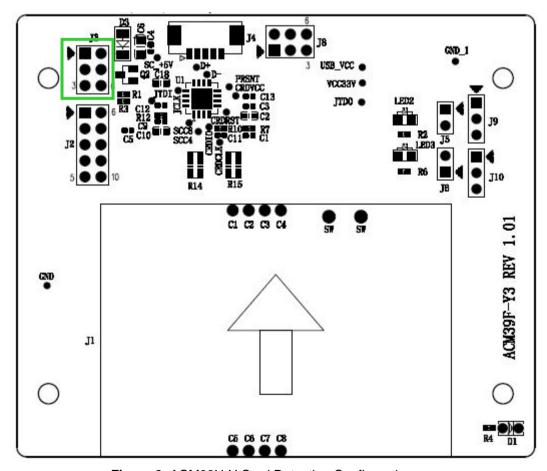| Configuration	Connection diagram	Descriptions
Normal open card detection circuit		Connect the two pins shown in red for normal open card detection
Normal closed card detection circuit		Connect the two pairs of pins shown in red for normal closed card detection.

Figure 3: ACM39U-Y Card Detection Configuration

5.0. Connecting to Card Insertion Signal

The card insertion signal can be used for the buzzer.

- The pin diagram in **green** is the connection that includes the card detection pin and GND.
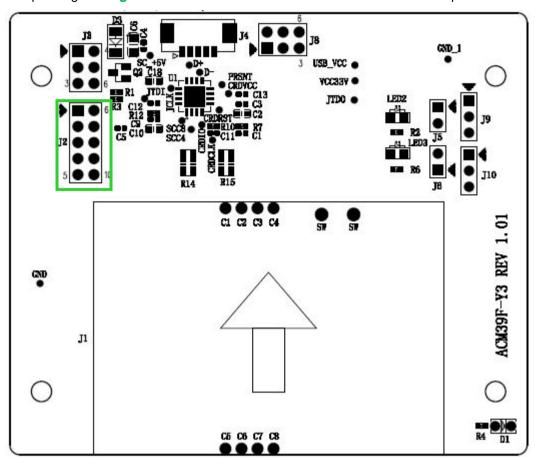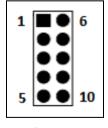

Figure 4: ACM39U-Y Card Insertion Signal

5.1. Connector Pin Details

You can make use of pin 1 and pin 6 of J2 to get the signal of card insertion. When a card is inserted to the ACM39U-Y, pin 6 will be connected to GND.

1	GND	**6**	Card detection pin

5.2. Card Detection Pin Behaviors

The table below shows the behavior of the card detection pin.

Card Status	Behavior
Card inserted	Connected to GND
Card removed	Floating

5.3. Configure Card Detection Signal

To get the card detection signal in (J2), connect a jumper in (J3) as shown in the connection diagram.
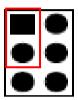

Figure 5: Card Detection Signal Pin Diagram

*Note: This setting means that the ACM39U-Y card connector is set to Normal Open as mentioned in the section **Configuring Card Detection**. If Normal Closed card detection is set, the behaviors indicated in the section **Card Detection Pin Behaviors** are reversed.*
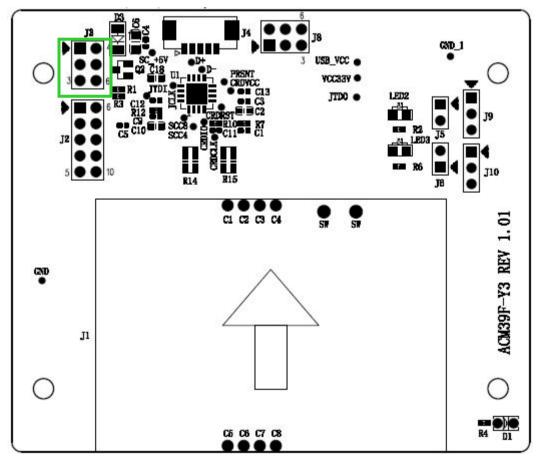

Figure 6: ACM39U-Y Card Detection Signal Configuration
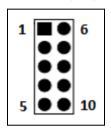
6.0. Configuring Extended Card Connector

The ACM39U-Y is designed to offer an extendable smart card connector signal that will best fit the embedded system. The ACM39U-Y may be connected to another device that is equipped with a smart card connector to interface with the smart card.

Notes:

1. *Normal open or normal closed should be set if an extended smart card connector is being used.*

2. *The extended card connector and the on-board card connector cannot be used at the same time.*

To extend the smart card connector signal to another peripheral:

1. Connect a jumper to (J2).

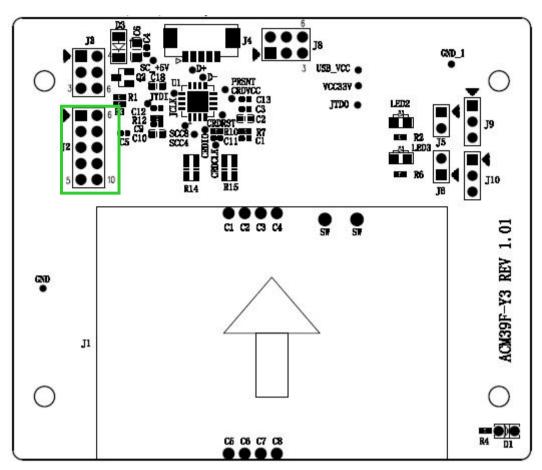| 1	GND	6	Card detection pin
2	GND (C5)	7	Card VCC (C1)
3	NC (C6)	8	Card reset pin (C2)
4	Card I/O (Data input/output) (C7)	9	Card clock signal (C3)
5	Card contact (C8)	10	Card contact (C4)

Figure 7: ACM39U-Y Extended Card Connector Configuration

To use the external card connector, the selection resistor jumper should be changed. The resistor array should be soldered on **R14** instead of **R15**.
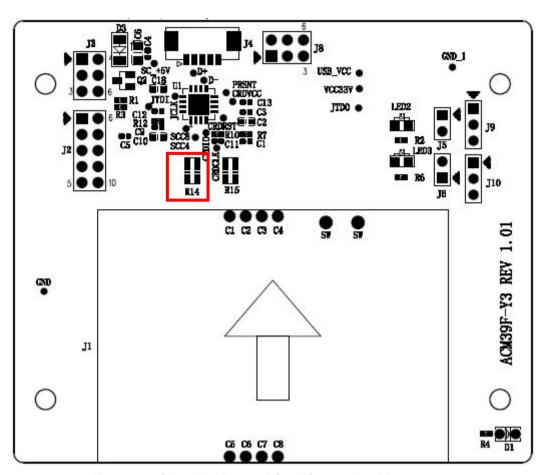
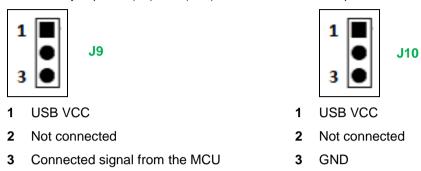**Figure 8**: ACM39U-Y External Card Connection Diagram

7.0. Extending Power and Card Operation Status Signals

Aside from the smart card connector's signal, the LED status for power and card operation can be extended to other peripherals as well.

To do this:

1. Connect a jumper to (J9) and (J10) for the LED status of power and card signals.
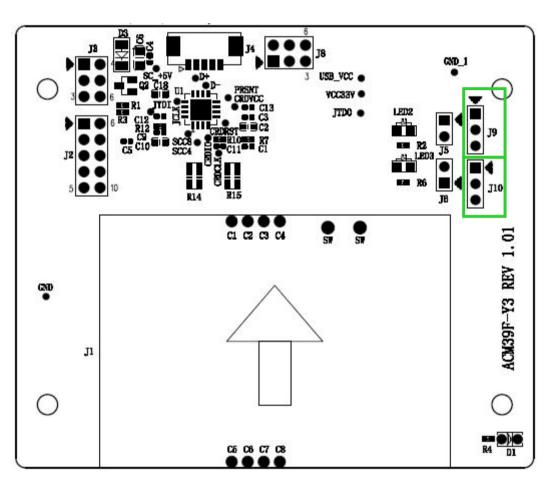

J9

1	USB VCC
2	Not connected
3	Connected signal from the MCU

J10

1	USB VCC
2	Not connected
3	GND

Figure 9: ACM39U-Y Extended Power and Card Operation Status Signals