LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I²C or SPI communication

The **CJMCU-750** is a breakout board that houses the **NXP SC16IS750** chip, a high-performance UART (*Universal Asynchronous Receiver/Transmitter*) with a single channel and support for either I²C or SPI interfaces. It is often used to add a serial port to microcontrollers. The **CJMCU-752** also includes the **NXP SC16IS752** IC.

The primary difference between the **SC16IS750** and **SC16IS752** is the number of UART channels: the SC16IS750 is a single-channel UART, while the SC16IS752 is a dual-channel UART. Both chips convert I²C or SPI bus signals to serial ports and share many other features.

Comparison of SC16IS750 and SC16IS752

		
Feature	NXP SC16IS750 **CJMCU-750**	NXP SC16IS752 **CJMCU-752**
UART Channels	Single full-duplex UART	Dual full-duplex UART
Host Interface	Selectable I²C or SPI	Selectable I²C or SPI
FIFOs	64-byte transmit/receive	64-byte transmit/receive per channel
Baud Rate	Up to 5 Mbit/s	Up to 5 Mbit/s
SPI Clock Speed	Up to 4 Mbit/s	Up to 4 Mbit/s
Programmable I/O	8 GPIO pins	8 GPIO pins
Compatibility	16C450 industrial standard	16C450 industrial standard
Operating Voltage	2.5 V or 3.3 V (5 V tolerant inputs)	2.5 V or 3.3 V (5 V tolerant inputs)
Packages	HVQFN24, TSSOP24	HVQFN32, TSSOP28

Key Features and Specifications

- **Function:** Converts I²C-bus or SPI signals to a single full-duplex UART (Universal Asynchronous Receiver/Transmitter) for protocol conversion.
- **Interfaces:** Features selectable I²C (up to 400 kHz) or SPI (up to 4 Mbit/s) interfaces.
- **UART Data Rates:** Supports baud rates up to 5 Mbit/s in 16x clock mode.
- **FIFO:** Includes 64 bytes of transmit and receive FIFOs.
- **Programmable I/O:** Provides 8 additional programmable I/O pins, which can be accessed via the I²C or SPI interface.
- **Compatibility:** Fully compatible with the industrial standard 16C450 and equivalent devices.
- **Operating Voltage:** Operates on a 3.3 V or 2.5 V supply and logic levels.
- **Flow Control:** Supports auto hardware flow control (RTS/CTS) and auto software flow control (programmable Xon/Xoff characters).

- **Applications:** Ideal for industrial control, portable devices, and battery-operated applications due to its low power consumption and compact design.

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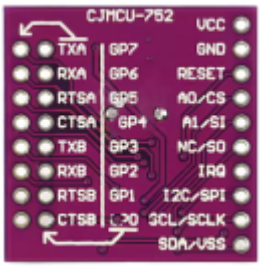
CJMCU-752 Pinout



Pin Number	Pin Name	Description
1	A0	I²C address selection or SPI chip select
2	A1	I²C address selection or SPI chip select
3	RESET	Active-low reset input
4	XTAL1	Crystal oscillator input or external clock input
5	XTAL2	Crystal oscillator output
6	VSS	Ground
7	TXB	UART channel B transmit output
8	RXB	UART channel B receive input
9	RTSB	UART channel B request-to-send output
10	CTSB	UART channel B clear-to-send input
11	GPIO0	General-purpose I/O pin
12	GPIO1	General-purpose I/O pin
13	GPIO2	General-purpose I/O pin
14	GPIO3	General-purpose I/O pin
15	GPIO4	General-purpose I/O pin
16	GPIO5	General-purpose I/O pin
17	GPIO6	General-purpose I/O pin
18	GPIO7	General-purpose I/O pin
19	CTSA	UART channel A clear-to-send input
20	RTSA	UART channel A request-to-send output
21	RXA	UART channel A receive input
22	TXA	UART channel A transmit output
23	VSS	Ground

Pin Number	Pin Name	Description
24	VCC	Power supply input
25	SCL/SCLK	I²C clock input or SPI clock input
26	SDA/MOSI	I²C data input/output or SPI master-out/slave-in
27	A2/MISO	I²C address selection or SPI master-in/slave-out
28	CS	SPI chip select (active low)

How to Use the SC16IS752 in a Circuit

- **Power Supply:** Connect the VCC pin to a 3.3V power source and the VSS pins to ground.
- **Clock Source:** Use an external crystal oscillator (e.g., 14.7456 MHz) connected to XTAL1 and XTAL2, or provide an external clock signal to XTAL1.
- **Communication Protocol Selection:**
  - **For I²C:** Connect SCL and SDA to the microcontroller's I²C pins. Use A0, A1, and A2 to set the I2C address.
  - **For SPI:** Connect SCLK, MOSI, MISO, and CS to the microcontroller's SPI pins.
- **UART Connections:** Connect TXA/RXA and TXB/RXB to the respective UART devices. Use RTS and CTS for hardware flow control if needed.
- **GPIO Configuration:** Configure GPIO pins as inputs or outputs as required by your application.

Important Considerations and Best Practices

- Add pull-up resistors (usually 4.7kΩ) to the I2C lines (SCL and SDA).
- Place a 0.1 µF capacitor near the VCC pin to decouple the power supply.
- Properly terminate SPI lines to maintain signal integrity.
- Set the baud rate and UART parameters through the SC16IS752's internal registers.
- Use the RESET pin to initialize the device during power-up or fault recovery.

CJMCU-752 Set I2C address

The I²C address of the CJMCU-752 (SC16IS752) is determined by the logic levels of the A0 and A1 pins. These pins can be tied to VDD (VCC), VSS (GND), SCL, or SDA, allowing for up to 16 unique addresses on a single bus.

For most Arduino and Raspberry Pi libraries, you must use the 7-bit address. The default configuration (both pins pulled High) is typically **0x48**.

A1 Pin	A0 Pin	7-bit Address	8-bit Write Address
VDD	VDD	**0x48**	0x90
VDD	VSS(GND)	0x49	0x92
VSS(GND)	VDD	0x4C	0x98
VSS(GND)	VSS(GND)	0x4D	0x9A

Important Implementation Notes

- **Address Shifting:** Hardware documentation often lists addresses in 8-bit format (e.g., 0x90). To get the 7-bit address used in Wire.begin(), shift the value one bit to the right (0x90 » 1 = 0x48).
- **Interface Selection:** Ensure the I2C/SPI pin is tied High to enable I²C mode; otherwise, these pins may function differently for SPI communication.

- **A0 Sharing:** In SPI mode, the A0 pin functions as the Chip Select (CS) line.

Arduino

Wiring

Ensure the I2C/SPI pin on the module is tied to High (3.3V) to enable I²C mode.

- **VCC:** 5V (Board has an on-board 3.3V regulator)
- **GND:** GND
- **SDA:** Arduino A4 (Uno) or SDA pin
- **SCL:** Arduino A5 (Uno) or SCL pin
- **A0/A1:** Tie to VCC for default address **0x90** (check your specific module's documentation, as some use **0x48**).

To use the CJMCU-752 with an Arduino, the most reliable approach is to use the **Appnostic SC16IS7XX** Library, which supports both the single-channel **'750'** and dual-channel **'752'** variants over I²C and SPI.

Arduino 1st code: Check channels

```
#include <Wire.h>
#include <SC16IS7xx.h>

// Initialize for I2C with address 0x90 (adjust if your module uses 0x48)
SC16IS7xx dualUart = SC16IS7xx(SC16IS7xx_PROTOCOL_I2C, 0x90);

void setup() {
  Serial.begin(115200);

  // Initialize both UART channels (A and B) at 9600 baud
  dualUart.a().begin(9600);
  dualUart.b().begin(9600);

  Serial.println("SC16IS752 Dual UART Initialized");
}

void loop() {
  // Example: Bridge Channel A data to Channel B
  if (dualUart.a().available()) {
    char c = dualUart.a().read();
    dualUart.b().write(c); // Echo to the other channel
    Serial.print("Channel A received: ");
    Serial.println(c);
  }

  // Example: Bridge Channel B data back to A
  if (dualUart.b().available()) {
```

```
    char c = dualUart.b().read();
    dualUart.a().write(c);
    Serial.print("Channel B received: ");
    Serial.println(c);
  }
}
```

Key Implementation Details

- **Dual Channels:** Use *.a()* and *.b()* methods to target specific serial ports on the SC16IS752.
- **Crystal Frequency:** Most CJMCU boards use a 14.7456 MHz crystal. If your baud rates seem incorrect, verify your crystal and use *dualUart.setCrystalFrequency(14745600)*; before *begin()*.
- **5V Tolerance:** The chip operates at 3.3V, but the input pins are 5V tolerant, making it safe for direct connection to an Arduino Uno.

Arduino 2nd code: Use GPIO

To use GPIO0 on the CJMCU-752 (SC16IS752) with an Arduino, you treat the chip as an I/O expander via the same I²C or SPI interface used for the UART channels.

On the CJMCU-752 board, look for the pin labeled GP0 or GPIO0.

- **Role:** This is one of 8 programmable I/O pins (GPIO0–GPIO7).
- **Voltage:** While the board is 5V tolerant, these pins typically operate at 3.3V logic levels.

The **Appnostic SC16IS7XX** library provides direct methods to control these pins without needing manual register writes.

```
#include <Wire.h>
#include <SC16IS7xx.h>

// Use address 0x90 (7-bit 0x48) for I2C
SC16IS7xx dualUart = SC16IS7xx(SC16IS7xx_PROTOCOL_I2C, 0x90);

void setup() {
  Serial.begin(115200);

  // Set GPIO0 as an OUTPUT
  // The second argument is the pin number (0-7)
  dualUart.pinMode(0, OUTPUT);
}

void loop() {
  // Turn GPIO0 High
  dualUart.digitalWrite(0, HIGH);
  Serial.println("GPIO0 HIGH");
  delay(1000);

  // Turn GPIO0 Low
```

```
  dualUart.digitalWrite(0, LOW);
  Serial.println("GPIO0 LOW");
  delay(1000);
}
```

If you are writing your own driver, GPIO0 is controlled via the IOControl, IODir, and IOState registers:

- **Direction:** Set bit 0 of the IODir register (0 = Input, 1 = Output).
- **State:** Read or write bit 0 of the IOState register to interact with the physical pin.
- **Latching:** Ensure the IOControl register is configured to enable GPIO functions rather than special UART functions (like modem signals).

Note on SC16IS752 vs 750: In the dual-channel SC16IS752, the GPIO pins are shared and managed at the device level, not per-channel.

I²C topics on lamaPLC

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• lamaPLC Communication: I²C	2025/09/23 19:25	i2c, i c, smbus, philips, bus, communication, arduino
• LamaPLC: AHT10 Modul	2026/03/21 19:20	communication, i2c, temperature, humidity, sensor, aht, aht 10, modul
• LamaPLC: AHT20 / BMP280 Modul	2026/02/15 20:33	bmp280, aht20, adafruit, temperature, humidity, pressure, sensor, arduino, code, i2c
• LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication	2026/02/14 22:24	avago, apds-9900, apds-9930, apds-9960, als, proximity, detection, gesture recognition, gesture, i2c, communication, sensor, arduino, code
• lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module	2026/03/28 22:50	communication, i2c, as5600, as-5600, magnetic, induction, angle, sensor
• lamaPLC: Bi-Directional Logic Level Converter 3.3V ↔ 5V	2026/04/11 21:51	bi-directional, logic level converter, i2c, uart, spi
• LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication	2026/02/15 20:40	bme280, bme680, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, cjmcu
• LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication	2026/02/14 23:37	cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu
• LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication	2026/02/14 22:40	cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication
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• LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication	2026/02/14 18:19	d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code
• LamaPLC: DPS Infineon Temperature/Pressure sensors with I2C communication	2026/02/14 18:11	dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code
• lamaPLC: Energy, power, current, and voltage	2025/05/31 21:32	i2c, i c, communication, arduino, energy, power, current, sensor, ina226
• LamaPLC: ENS ScioSense Multi-gas sensors with I²C communication	2026/02/14 19:29	ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco₂, tvoc, aqi, indoor air quality, iaq, co₂, voc
• lamaPLC: ESP32 / ESP8266	2025/11/21 23:07	esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai
• LamaPLC: Gas sensors	2023/07/01 15:29	gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2
• lamaPLC: GY-511 6DOF sensor module	2026/03/22 00:26	stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino
• LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board	2026/02/14 22:45	ak8963, gy-9250, mpu-9250, 9-axis, motion detection, magnetometer, communication, i c, i2c, spi
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I²C communication	2026/02/14 22:09	sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code
• lamaPLC: HT16K33 display controller	2026/02/14 17:26	i2c, 7-segment display, display, ht16k33, arduino
• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/02/14 21:54	htu, htu31d, htu21d, htu20d, sht20, htu20, sht21, htu21, si7021, gy-21, gy-213v, hdc1080, si702, gy-20, sht31, htu31, si7031, gy-31, te connectivity, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: INA modules with Arduino libraries	2026/03/28 18:02	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina219, gy-219, ina226, gy-216, ina228, gy-228, ina237, ina238, ina260, ina3221, ina

• lamaPLC: INA226 - current/voltage/power monitor with I²C communication	2026/02/14 23:58	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina226, ina219, ina
• lamaPLC: LCD 1602/2004 with I²C communication	2026/02/14 17:27	communication, i2c, display, lcd, 1602, 2004, hd44780, pcf8574, pcf8574t, pcf8574at, arduino
• LamaPLC: MAX30100/MAX30102 Heart Rate Click Sensor Module	2026/02/14 23:38	max30102, max30100, heart rate click, sensor, communication, i2c, arduino, code
• lamaPLC: MCP23017 / MCP23S17 16-Bit I/O Expander with Serial Interface I²C / SPI	2026/02/14 22:52	communication, i2c, mcp23017, mcp23s17, spi, i o expander, serial, cjmcu-2317, cjmcu
• LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication	2026/02/14 22:23	paj7620u2, gy-paj7620, pixart, gesture recognition, i2c, communication, sensor, arduino, code
• LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I²C or SPI communication	2026/02/14 22:53	cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code
• LamaPLC: SGP Sensirion TVOC/VOC sensors with I²C communication	2026/02/15 20:27	sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco₂, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I²C communication	2026/02/15 20:29	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: Signal level converters	2026/02/14 22:47	pca9306, i2c, voltage, level, converter
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• LamaPLC: VL53Lnn STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I²C communication	2026/02/14 22:21	vl53l0x, vl53l1x, vl53l0 1xv2, gy-530, time-of-flight, tof, laser-ranging, i2c, communication, sensor, arduino, code
• LamaPLC: VL6180X STMicroelectronics Time-of-Flight (ToF) sensor with I²C communication	2026/02/14 22:22	vl6180x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• Magnetic angle sensors	2026/03/05 20:19	magnetic angle sensor, magnetic flux, sensor, spi, i2c, pwm, communication, modul, as5047p, as5600, mt6701, mt6816, mt6835, tle5012b, amr, gmr, tmr, anisotropic magnetoresistive
• SSH1106/SSD1306 OLED Display with I²C communication	2026/02/14 17:27	i2c, oled, display, ssd1306, sh1106, ssh1106, arduino, cmos

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