

Smart Attendance System — Detailed Wiring & Pinout

This document contains the exact Raspberry Pi GPIO pin mapping and how each hardware component should be wired. Use this as the installation and handover guide for school IT teams and hackathon judges.

Raspberry Pi 40-pin Header - Pinout & Connections for Attendance Kiosk

Pin 1	3.3V (Power)	Pin 2	5V (Power)	Camera Module (CSI) CSI Port (Use ribbon cable) No GPIO pins - connects to camera port
Pin 3	GPIO2 (SDA4, I2C)	Pin 4	5V (Power)	
Pin 5	GPIO3 (SCL5, I2C)	Pin 6	GND	
Pin 7	GPIO4 (GPIOBK0)	Pin 8	GPIO14 (TXD, UART)	Fingerprint (UART) GPIO14 TXD (Pin8) -> Sensor RX GPIO15 RXD (Pin10) -> Sensor TX 5V -> Pin2/4, GND -> Pin6
Pin 9	GND	Pin 10	GPIO15 (RXD, UART)	
Pin 11	GPIO17 (PCM_CLK)	Pin 12	GPIO18 (PCM_CLK)	
Pin 13	GPIO27	Pin 14	GND	RFID RC522 (SPI) SDA(SS) -> GPIO8 CE0 (Pin24) MOSI -> GPIO10 (Pin19) MISO -> GPIO9 (Pin21)
Pin 15	GPIO22	Pin 16	GPIO23	
Pin 17	3.3V (Power)	Pin 18	GPIO24	
Pin 19	GPIO10 (MOSI, SPI0)	Pin 20	GND	QR Scanner (USB) Connect via USB port or UART if serial scanner
Pin 21	GPIO9 (MISO, SPI0)	Pin 22	GPIO25 (RST often)	
Pin 23	GPIO11 (SCL24, SPI0)	Pin 24	GPIO8 (CE0, SPI0, SDA)	
Pin 25	GND	Pin 26	GPIO7 (CE1)	Display (HDMI/DSI) Use HDMI port (or DSI for official touchscreens)
Pin 27	ID_SD (EEPROM)	Pin 28	ID_SC (EEPROM)	
Pin 29	GPIO5	Pin 30	GND	
Pin 31	GPIO6	Pin 32	GPIO12	UPS HAT + Battery Mount on 40-pin header; provides 5V power and safe shutdown
Pin 33	GPIO13	Pin 34	GND	
Pin 35	GPIO19	Pin 36	GPIO16	
Pin 37	GPIO26	Pin 38	GPIO20	Ethernet Use Raspberry Pi RJ45 LAN port (built-in)
Pin 39	GND	Pin 40	GPIO21	

Component	Pi Pin(s)	Connections / Notes
Camera Module (CSI)	Dedicated CSI port	Connect via 15-pin ribbon cable to CSI port. Use IR camera module for low light.
Fingerprint Sensor (UART)	Pin8(TXD), Pin10(RXD), Pin2(5V), Pin6(GND)	GPIO14->Sensor RX, GPIO15->Sensor TX, Power 5V, GND to common ground.
RFID RC522 (SPI)	Pin24(CE0), Pin19(MOSI), Pin21(MISO), Pin22(SCLK), Pin27(RST), Pin4(5V), Pin6(GND)	GPIO10->Sensor RX, GPIO15->Sensor TX, Power 5V, GND to common ground. GPIO14->Sensor RX, GPIO15->Sensor TX, Power 5V, GND to common ground.
QR Scanner (USB)	USB Port or UART	Use USB for plug-and-play or UART serial for cheap scanners.
Display (HDMI/DSI)	HDMI port / DSI ribbon	Use HDMI for HDMI displays; official Pi DSI screens use DSI ribbon.
UPS HAT / Battery	40-pin header + 5V	Mount UPS HAT on 40-pin header. Connect battery pack to HAT input.
Ethernet	RJ45 port	Connect LAN cable to school network; ensure DHCP/static IP as per IT.

1. Mount Raspberry Pi inside kiosk; attach UPS HAT on 40-pin header.
2. Attach Pi Camera ribbon to CSI port; secure camera behind front glass window.
3. Wire fingerprint sensor TX/RX to GPIO14/15 and power to 5V/GND.
4. Wire RC522 module to SPI pins as per table; connect RST to GPIO25.
5. Connect 3.5-4" HDMI display to HDMI port; secure in front panel.
6. Connect Ethernet cable to RJ45; test network connectivity.
7. Power on and test each module; run enrollment for sample student.

Prepared by: Rohit Khonde