

RollSCAN-1 Scanner Controller I/O Summary
- preliminary -

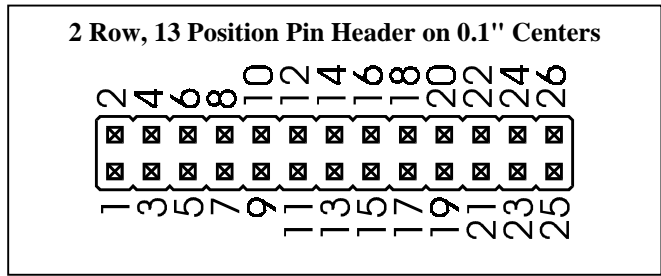
RollSCAN-1 Scanner Controller Interface Summary

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The following notation convention applies to signal type in all pin function tables:
I=input, O=output, P= power/gnd, AO=analog output, AI=analog input

J1 - Host Port Connector



J1 Pin Locations (Top View)

The host port on the RollSCAN-1 controller is jumper-configurable for either parallel port mode (EPP- bidirectional) or microcontroller (8051-style) interface. (see JP3 description below). In parallel port mode, the interface can be connected directly to a PC's EPP-compatible parallel port connector. In microcontroller (μ C) mode, data bits 0-7 are an 8-bit bidirectional data bus, and the -CS , -RD , and -WR signals control the bus transactions with the microcontroller. See the LM9830 data sheet for timing details.

J1 Pin Functions

Pin #	Name	Type	Function/Description
1	-Strobe/-WR	I	PP Mode: STROBE, μC Mode: Write Strobe
3	HI_D0	I/O	Data Bit 0 – (Bidirectional)
5	HI_D1	I/O	Data Bit 1 – (Bidirectional)
7	HI_D2	I/O	Data Bit 2 – (Bidirectional)
9	HI_D3	I/O	Data Bit 3 – (Bidirectional)
11	HI_D4	I/O	Data Bit 4 – (Bidirectional)
13	HI_D5	I/O	Data Bit 5 – (Bidirectional)
15	HI_D6	I/O	Data Bit 6 – (Bidirectional)
17	HI_D7	I/O	Data Bit 7 – (Bidirectional)
19	-ACK	O	PP Mode: ACK, μC Mode: <unused>
21	-BUSY	O	PP Mode: BUSY, μC Mode: <unused>
23	PAPER_ERR	O	PP Mode: PAPER OUT Signal, uP Mode: <unused>
25	-SLCTIN/ALE	I	PP Mode: SELECT IN, μC Mode: ALE (address latch enable)
2	-AUTOFD/-RD	I	PP Mode: AUTOFD, μC Mode: Read Strobe
4	-ERROR	O	PP Mode: Error, μC Mode: <unused>
6	-INIT/-CS	I	PP Mode: INIT, μC Mode: Chip Select
8	SELECT	O	PP Mode: SELECT, μC Mode: <unused>
All others	GND	-	Digital Ground

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J2 - Printer Port Passthrough Controls

Single Row, 4 Position Pin Header on 0.1" Centers

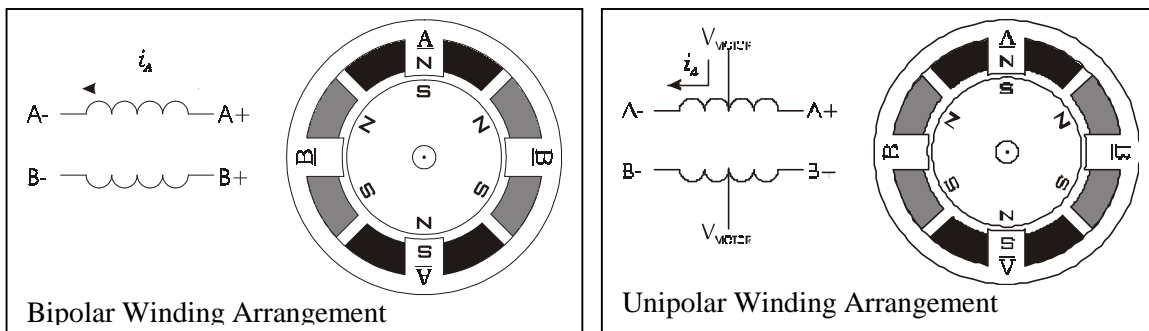
The RollSCAN-1 supports printer port pass-through operation with the addition of two external components: a 74HCT244 buffer and a 74HCT374 buffer/latch. See the LM9830 data sheet for application details.

Printer Passthrough Controls

Pin #	Name	Type	Function/Description
1	+5V	P	5V Power for external buffer/latch
2	-LATCH	O	Gate Control for external latch
3	TRISTATE	O	Output disable control for external buffer
4	GND	P	Ground for external buffer/latch

J3 - Stepping Motor Connector

Single Row, 6 Position Pin Header on 0.1" Centers



The RollSCAN-1's stepping motor drive circuitry accommodates either bipolar or unipolar drive (see illustrations above). Bipolar drive arrangements will have four-wire motor connections. Unipolar drive arrangements will have either 5 motor connections (if the winding centers are connected together) or 6 motor connections. When configured for unipolar drive, a set of power inverters is engaged to provide current source capability. The stepping motor connector pinouts are given below:

J3 Pin Functions

Pin #	Name	Type	Function/Description
1	A+	AO	Bipolar: Winding 1+, Unipolar: Winding 1 (0 degree)
2	A-	AO	Bipolar: Winding 1-, Unipolar: Winding 3 (90 degree)
3	B+	AO	Bipolar: Winding 2+, Unipolar: Winding 2 (180 degree)
4	B-	AO	Bipolar: Winding 2-, Unipolar: Winding 4 (270 degree)
5,6	MOTOR SUPPLY	P	To common wire for unipolar drive

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J4 – Paper Sensor/Buttons

Single Row, 6 Position Pin Header on 0.1" Centers

The RollSCAN-1 makes specific provision for an optical or electromechanical paper sensor (PSENSE 1) and for a Start/Pause Pushbutton (PSENSE 2). Two general purpose, software configurable I/O pins are uncommitted and can be used for any desired purpose. Logic power and ground are provided for an external photo-sensor, pull-up resistors and/or switch de-bounce circuitry.

J4 Pin Functions

Pin #	Name	Type	Function/Description
1	PSENSE 2	I	Start/Pause Pushbutton (active high)
2	PSENSE 1	I	Paper Sensor input (active high)
3	MISC I/O 2	I/O	Additional Sensor/Switch/Control Signal (uncommitted)
4	MISC I/O 1	I/O	Additional Sensor/Switch/Control Signal (uncommitted)
5	+5V	P	Power for external sensors/switches
6	GND	P	Ground for external sensors/switches

J5 – Power Connector

Single Row, 6 Position Pin Header on 0.1" Centers

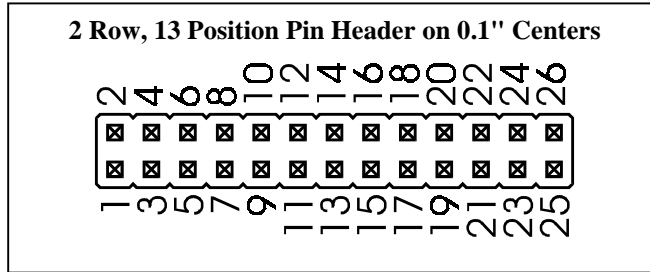
The RollSCAN-1 provides on-board regulation for the logic supply and provides connections for user-supplied CIS Power, Illuminator Power and Motor Power.

J5 Pin Functions

Pin #	Name	Type	Function/Description
1	Bulk Power	-	Unregulated Power for Logic (8V – 12V DC)
2	CCD/CIS Pwr	-	Power Supply for CCD/CIS
3	Illum. Pwr	-	Power Supply for Illuminator
4	Motor Pwr	-	Motor Supply
5, 6	GND	-	Main Input Ground Connection point

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J6 – CCD/CIS Connector



J6 Pin Locations (Top View)

J6 Pin Functions

Pin #	Name	Type	Function/Description
1,2	+5V	P	5 Volt Logic Supply
3,4	PGND	P	Main Power Ground (Illum Return ONLY)
5,6	CCD PWR	P	CCD Power (User Supplied – See J5-2)
7,8	ILLUM PWR	P	Illuminator Power (User Supplied – See J5-3)
9	LED_R	AO	Red LED Drive (May be used to control CCFL Intensity)
10	LED_G	AO	Green LED Drive (May be used to drive CCFL)
11	LED_B	AO	Blue LED Drive (May be used to control CCFL Intensity)
12	PGND	P	Main Power Ground (see pins 3,4)
13	VREF	AO	Buffered Reference Voltage (See HDR 1)
14	AGND/DGND	P	Signal Ground (selectable, see JP4)
15	OS_R	AI	CCD/CIS Red Output Signal (tri-linear color only)
16	OS_G	AI	CCD/CIS Green Output Signal (tri-linear color only)
17	OS_B	AI	CCD/CIS Blue Output Signal or CCD/CIS out (single output)
18	AGND/DGND	P	Signal Ground (see pins 13,14)
19	CP1	O	CCD/CIS CP1 signal (Clamp Pulse 1)
20	CP2	O	CCD/CIS CP2 signal (Clamp Pulse 2)
21	TR1	O	CCD/CIS TR1 signal (Transfer/Shift Pulse 1)
22	TR2	O	CCD/CIS TR2 signal (Transfer/Shift Pulse 2)
23	Φ1	O	CCD/CIS Clock Signal, Phase 1
24	Φ2	O	CCD/CIS Clock Signal, Phase 2
25	RST	O	CCD/CIS Reset Pulse (Integration Start/Stop)
26	DGND	P	Digital Ground

The RollSCAN-1's CCD/CIS interface provides a great deal of flexibility in connecting to Contact Image Sensor (CIS) modules and Charge-Coupled Device (CCD) line arrays. In most cases, additional circuitry is not required, although a CCFL inverter is not provided. The 5V logic supply is brought out to the connector, and separate CCD Power and Illuminator Power connections are provided, if necessary. If a CCFL or other white light source is to be used, an LED output can be adapted to control the CCFL inverter. 4-step CCFL dimming (off-low-med-high) is possible by adapting the two remaining LED outputs in to control the dimming circuitry on the inverter.

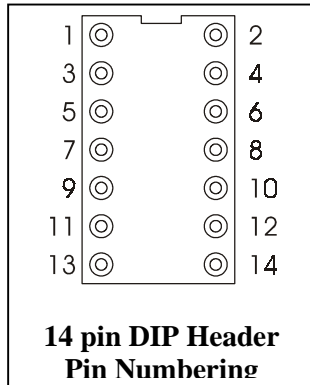
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On tri-linear color sensors (using white illumination), all three CCD/CIS analog output signals are used. When cycled R-G-B illumination is employed on a single-output sensor, the CCD/CIS output is connected to the BLUE input. The 9830 takes care of the rest under software control.

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HDR 1-3

Three 14-pin DIP sockets are provided on the RollSCAN-1 circuit board for monitoring certain critical signals to aid in debugging your scanner design. The even-numbered pins of these sockets are all grounded. Note that the pinout of these headers does NOT conform to "standard" DIP pin numbering. The correct pinout is shown below:



HDR 1 – CCD/CIS Analog Signals

HDR 1 provides monitoring points for the CCD/CIS analog signals. HDR1 also permits selection of one of four reference voltages to be provided to the CCD/CIS via the reference amplified, and permits bridging of the three CCD/CIS input decoupling capacitors. **MONITOR THESE SIGNALS ONLY WITH HIGH-IMPEDANCE INSTRUMENTATION TO AVOID DISRUPTING PROPER CIRCUIT FUNCTION.**

HDR 1 Pin Functions

Pin #	Name	Type	Function/Description
1	OS_R_DC	AI	Red output signal from CCD/CIS (9830 side of decoupling cap)
3	OS_G_DC	AI	Green output signal from CCD/CIS (9830 side of decoupling cap)
5	OS_B_DC	AI	Blue output signal from CCD/CIS (9830 side of decoupling cap)
7	VREF_HI	AO	LM9830 internal high reference
9	VREF_MID	AO	LM9830 internal mid reference
11	VREF_LO	AO	LM9830 internal low reference
13	VBANDGAP	AO	LM9830 internal bandgap reference
2	OS_R	AO	Red output signal from CCD/CIS (sensor side of decoupling cap)
4	OS_G	AO	Green output signal from CCD/CIS (sensor side of decoupling cap)
6	OS_B	AO	Blue output signal from CCD/CIS (sensor side of decoupling cap)
8	REF AMP	AI	Input to reference buffer amplifier – (buffered output -> J6-13)
10,12,14	AGND	P	Analog Ground Reference

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HDR 2 – CCD/CIS Timing Signals

HDR 2 provides monitoring points for the CCD/CIS timing signals.

HDR2 Pin Functions

Pin #	Name	Type	Function/Description
1	CP1	O	Clamp Pulse 1 (see LM9830 data sheet)
3	CP2	O	Clamp Pulse 2 (see LM9830 data sheet)
5	RST	O	Reset Signal (Integration Control) (See LM9830 data sheet)
7	Φ1	O	Clock Signal – Phase 1 (see LM9830 data sheet)
9	Φ2	O	Clock Signal – Phase 2 (see LM9830 data sheet)
11	TR1	O	Clamp Pulse 1 (see LM9830 data sheet)
13	TR2	O	Clamp Pulse 2 (see LM9830 data sheet)
even pins	DGND	P	Digital Ground

HDR 3 – Motor Signals

HDR 3 provides monitoring points for the stepping motor control signals and for monitoring the winding current sense signals as the LM9830 sees them.

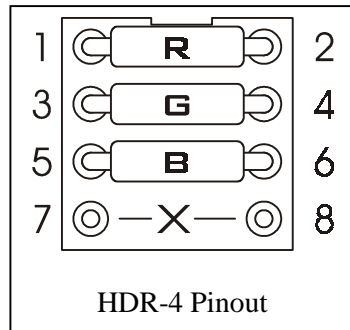
HDR 3 Pin Functions

Pin #	Name	Type	Function/Description
1	A+	O	"A" winding "+" side logic drive signal
3	A-	O	"A" winding "-" side logic drive signal
5	B+	O	"B" winding "+" side logic drive signal
7	B-	O	"B" winding "-" side logic drive signal
9	B_SENSE	AI	Voltage at "B" winding Current Sense Resistor
11	A_SENSE	AI	Voltage at "A" winding Current Sense Resistor
13	GND_SENSE	AI	Ground Voltage at Motor Drive Circuit
even pins	DGND	P	Digital Ground

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HDR4 – Header for LED current setting resistors

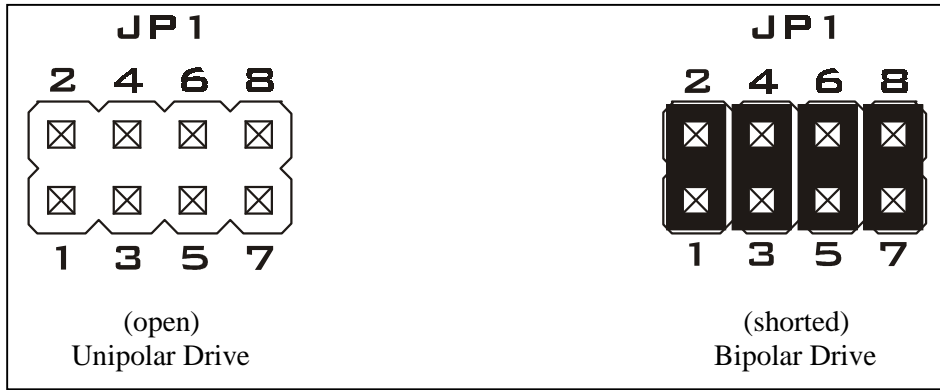
HDR 4 is an 8-pin DIP socket for installing user-provided LED current setting resistors. The pinout of HDR-4 is shown below. Note that HDR-4's pinout DOES NOT conform to "standard" DIP pin numbering.



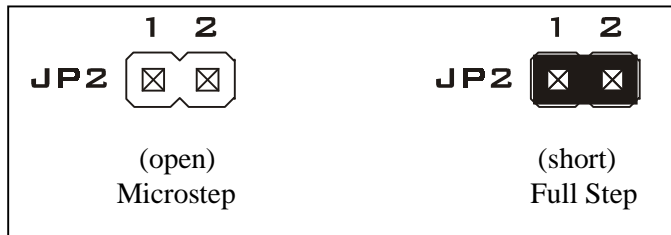
The current setting resistor for the RED Illuminator (**R**) is installed between pins 1 and 2.
The current setting resistor for the GREEN Illuminator (**G**) is installed between pins 3 and 4.
The current setting resistor for the BLUE Illuminator (**B**) is installed between pins 5 and 6.
Pins 7 and 8 are unused.

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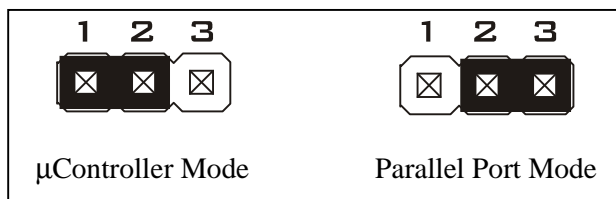
JP1 – Unipolar/Bipolar Stepper Configuration Jumpers



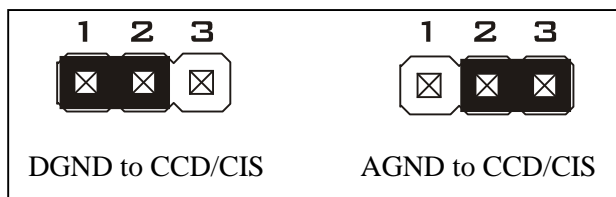
JP2 – Full Step/Microstep jumper



JP3 – Host Mode Jumper

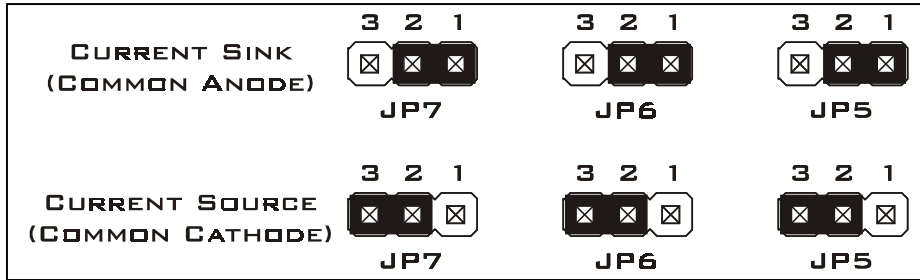


JP4 – CIS/CCD Ground Selector Jumper



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JP5 – JP7 LED Drive Configuration Jumpers



Board Layout and Connector Locations

