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AI25 Auto Iris

Direct Control

Please read the AIC10 Auto Iris Controller manual before operating this device.

Driving the AI25 Auto Iris Directly

For table-top use of the AI25, we recommend using the AIC10 Auto Iris Controller. However, if you wish to operate the AI25 directly for an OEM application, you'll find the protocols, circuits, and command list in this document. Additionally, a breakout board (the AI25B1), which can plug directly into the AI25 Iris' USB 3.0 Micro B Receptacle would be used to easily connect directly with the AI25 for an OEM application and/or development. See page 5 (drawing #16-0709) for the AI25B1 Breakout Interconnect layout and connector pin out. As you can see there are several ways to connect to the AI25B1 and in addition, you can still connect the AIC10 controller through JP1. Also, see the USB 3.0 Micro B Plug and Receptacle layout on page 4 if you wish to use this type of connection directly from your OEM system to connect to the AI25. The AI25B1 Breakout board will assist you to develop your own circuit to provide shutter control and iris serial communication. A user-supplied shutter driver circuit is required to control the optional shutter attachment.

TTL serial communication is required to communicate to the AI25, and it's similar to RS-232 communication in that the command and data are transmitted to the Iris in an 8-bit stream. See the serial protocol on page 2.

Serial communication at a TTL level will always remain between the limits of 0V and Vcc (5VDC in this case). A logic high (1) is represented by Vcc, while a logic low (0) is represented by 0V. The ASCII digital commands that control the iris require transmission in this method. Using a UART (from a microprocessor or other serial control circuitry), the command bit stream is sent to the AI25. Once the command is received, the AI25 will perform the requested task.

The command sending protocol begins with the user providing a 5V TTL level signal to the Pin 9 (Interrupt/Enable) input for 1 - 2 msec minimum. Once this "enable" pulse is provided, the AI25 iris is now ready to accept a serial TTL bit stream with the command to be sent by the user.

AI25 Direct Control ASCII Commands/Protocols

ASCII Command	Description
“H”	• Sends the iris to the “home” sensor which is step location “0”
“I”	• Commands the iris to “increase” in aperture size by one step movement
“D”	• Commands the iris to “decrease” in aperture size by one step movement
“M**”	• Commands the iris to “move” to a defined step location that is valid in the range from 00 to 54
“G**”	• Commands the iris to calibrate to the home sensor and then “go” (move) to a defined step location that is valid in the range from 00 to 54

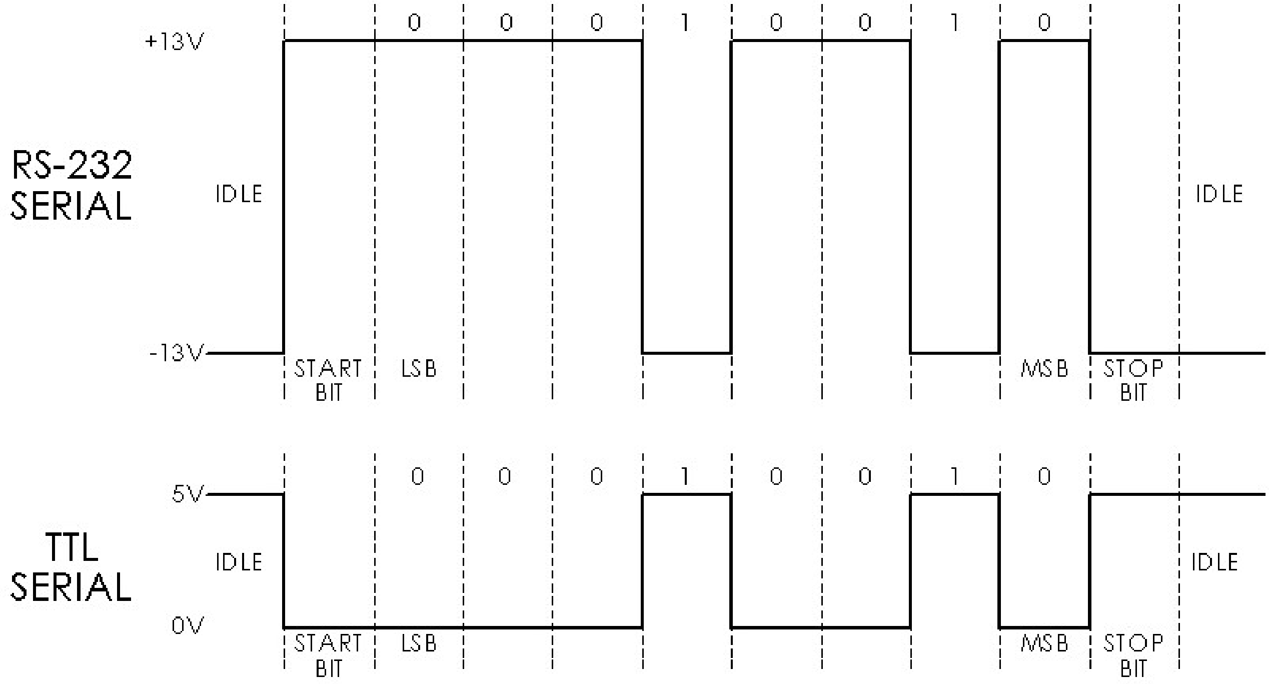
Protocol List for TTL Serial Communication

Sending an ASCII command is contingent on the receipt of a 5VDC signal (for a minimum of 1 - 2 msec duration) on Pin 9 to prepare the iris to receive a command.

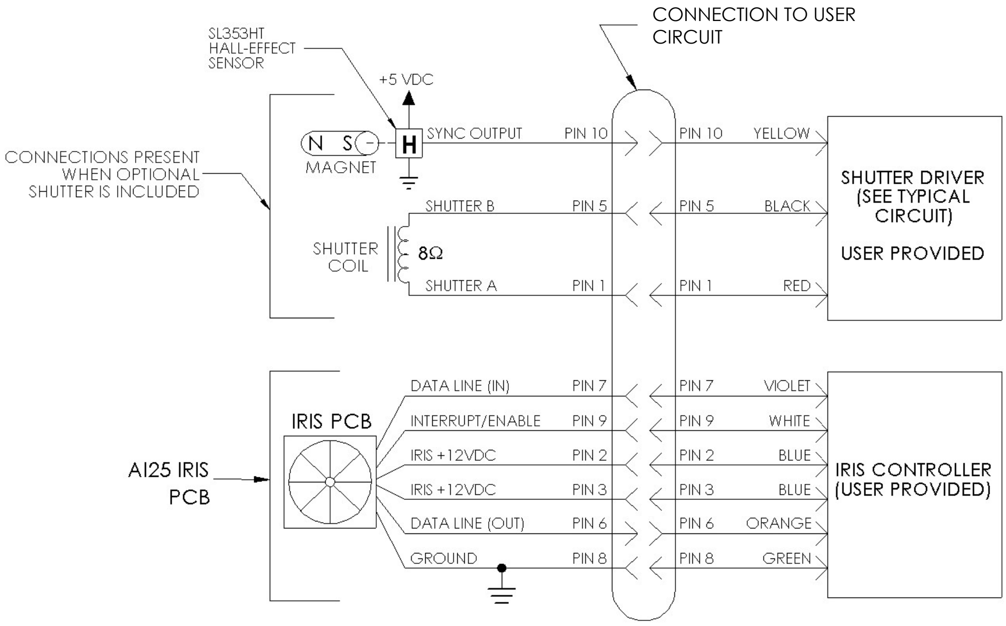
- (8) Data Bits, (1) Stop Bit, No Parity, No Flow Control
- Data Transfer Rate - 9600 Baud
- “!” Transmitted for Valid Command Received by Iris
- “?” Transmitted for Invalid Command Received by Iris

RS-232 Communication vs. TTL Serial Communication Signals

(Shown is the ASCII “H” “Home” Command stream. The AI25 utilizes TTL Serial Communication.)

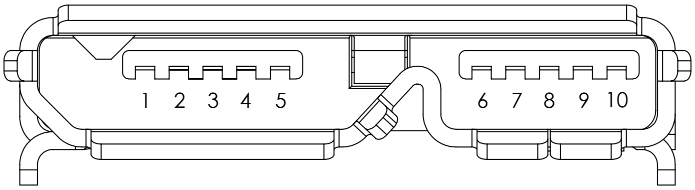


AI25 Schematic

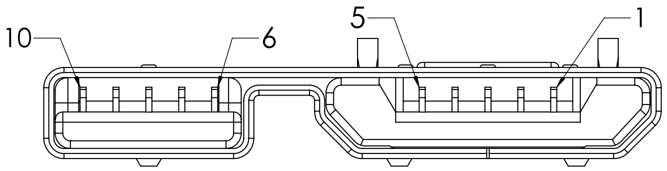


The AI25 schematic to the left depicts a device connected to user control circuits through the AI25’s USB 3.0 Micro B Receptacle. Use the AI25B1 Breakout Board to assist in developing your interface circuitry and protocol.

AI25 USB 3.0 Mirco B Pin Out



This is a front view of the USB Micro B Receptacle affixed to the AI25 Iris's control board. This shows the pin out for connection and design of your own circuitry.

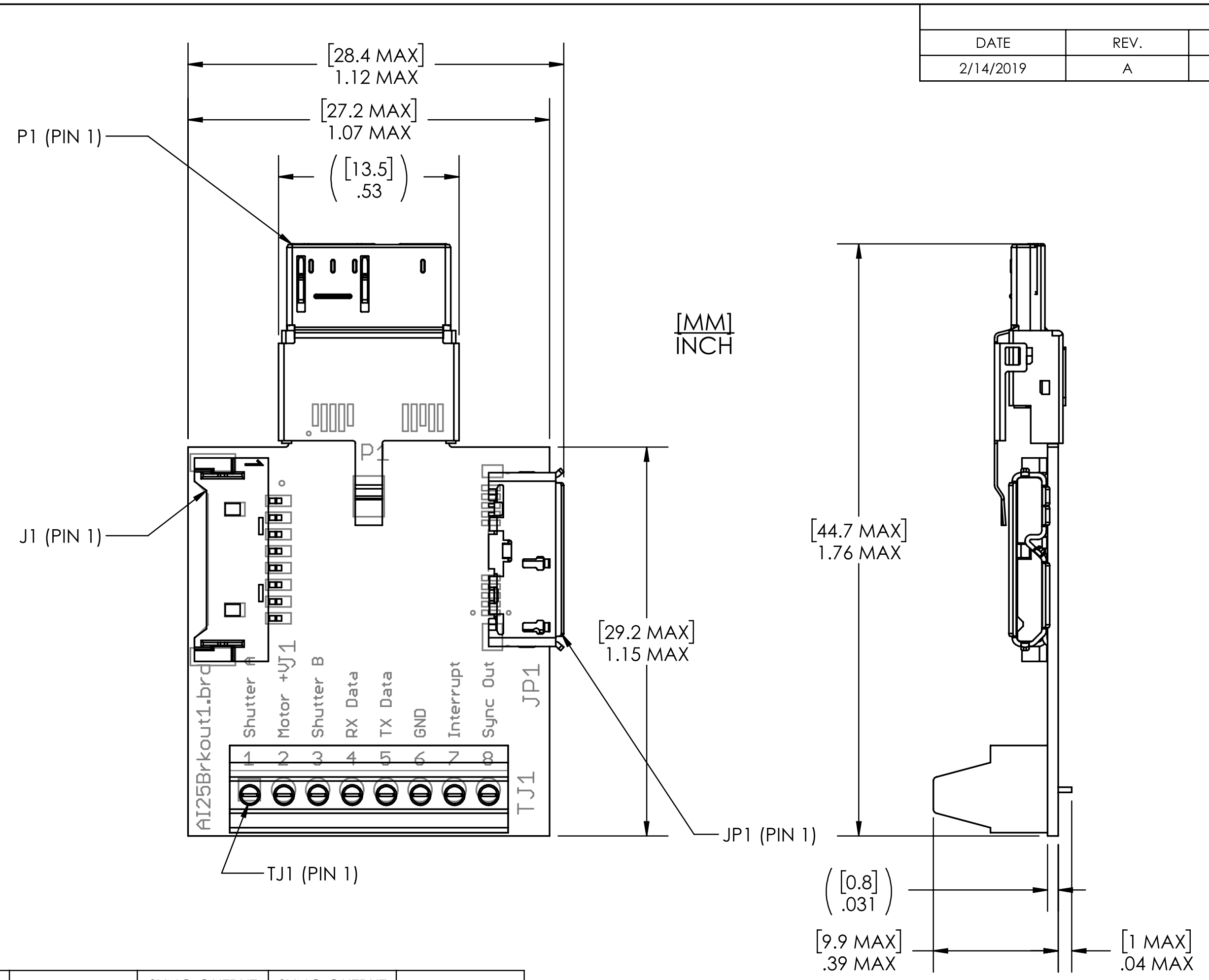


This is a front view of the USB 3.0 Micro B Plug which will directly interface to the receptacle. Again, this shows the pin out for connection and design of your own circuitry.

Pin Number	Connection Description	Recommended Wire Color
1	Shutter Coil (A)	Red
2	Vcc [Positive Supply Voltage] 12VDC, Minimum 2.0A	Blue
3	Vcc [Positive Supply Voltage] 12VDC, Minimum 2.0A	Blue
4	No Connection	N / C
5	Shutter Coil (B)	Black
6	Data Line Output [Sends back an ASCII "!" for Valid Command Received or sends an ASCII "?" for an Invalid Command Received]	Orange
7	Data Line Input [User to Send Serial TTL Commands]	Violet
8	Ground	Green
9	Interrupt/Enable [Needs to go high, 5VDC, for approximately 1-2msec, preparing the Iris to receive Serial TTL commands being sent	Gray
10	Sync. Output 5V TTL Output active high when the Optional Shutter transfers to the Open state.	Yellow

If the AI25's optional shutter attachment is utilized, you are required to provide a typical shutter driver circuit shown on page 6 (H-Bridge type). Timing data and sync output timing are shown on page 6.

REVISIONS					
DATE	REV.	DESCRIPTION	DR.	APPR.	CK.
2/14/2019	A	INITIAL RELEASE	DMK	DJV	RSL



10	---	SYNC OUTPUT	SYNC OUTPUT	---
9	---	INTERRUPT	INTERRUPT	---
8	SYNC OUTPUT	GND	GND	SYNC OUTPUT
7	INTERRUPT	TX DATA	TX DATA	INTERRUPT
6	GND	RX DATA	RX DATA	GND
5	TX DATA	SHUTTER B	SHUTTER B	TX DATA
4	RX DATA	N/C	N/C	RX DATA
3	SHUTTER B	MOTOR +VDC	MOTOR +VDC	SHUTTER B
2	MOTOR +VDC			MOTOR +VDC
1	SHUTTER A	SHUTTER A	SHUTTER A	SHUTTER A
PIN #	TJ1	JP1	P1	J1

CONNECTION CHART

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/32
ANGULAR: MACH ± 1° BEND ± 1°
TWO PLACE DECIMAL ±.010
THREE PLACE DECIMAL ±.003
PRIMARY FINISH: REMOVE ALL BURRS
BREAK SHARP EDGES
SECONDARY FINISH:
N/A
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	DMK	02/14/19
CHECKED	RSL	02/20/19
ENG. APPR.	DJV	02/20/19

MATERIAL:
N/A

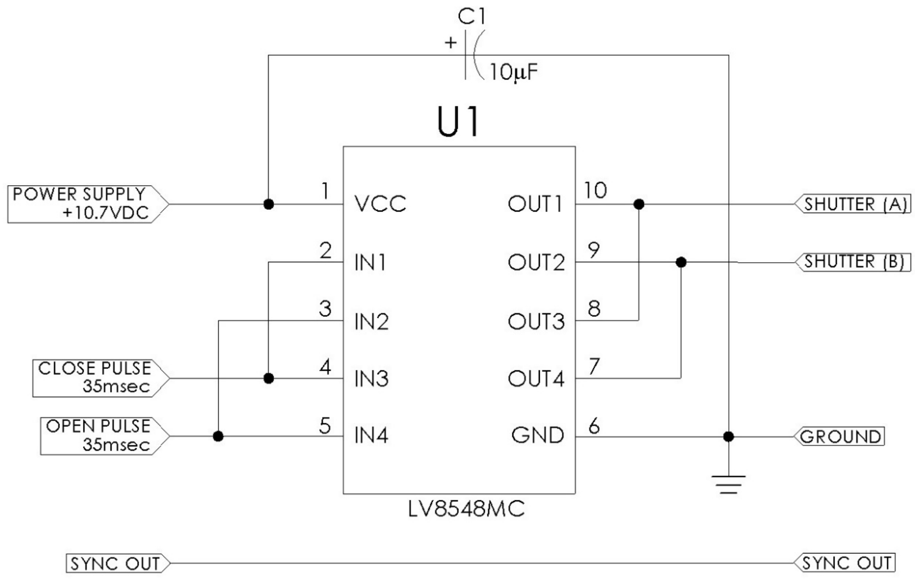
Project:
MODEL NAME: ai25BrkoutPCBAssy
DRAWING NAME: 16-0709AI25BrkoutSales

VINCENT ASSOCIATES
Rochester, NY 14625

TITLE:
AI25 MICRO-B BREAKOUT
PCB SALES LAYOUT

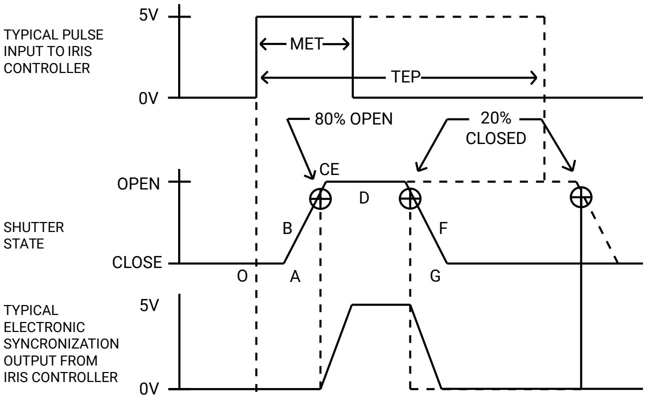
SIZE A
DWG. NO. 16-0709
REV. A
SCALE: 2:1
WEIGHT:
SHEET 1 OF 1

AI25 Optional Shutter Typical Driver Circuit



Sync signal can be a pass through as shown. The circuit to the left shows that 10.7VDC is supplied to the shutter driver circuit. If a voltage other than 10.7VDC is supplied, open and close pulse durations will need to be changed.

Optional Shutter Attachment Timing



DSS25B (w/ AIC10 and Teflon® coated blades)		Time (msec.)
O - A	Delay time on opening after current applied	13.2
A - C	Transfer time on opening	12.6
O - C	Total opening time	25.8
C - E	Min. dwell time with min. input pulse	23.2
B - F	Min. equivalent exp. time	36.6
D - E	Delay time on closing after current applied	14.0
E - G	Transfer time on closing	14.0
A - G	Total window time	50.8
MET	Min. exposure time	35.0
TEP	Typical exposure pulse	>35.0

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