

AUTOMATE

RS 485 SERIAL COMMAND GUIDE



AUTOMATE | ARC Pulse hub supports third party system integration through RS 485 communication. These instructions outline the fundamentals of the serial protocol, enabling system programmers to communicate to ARC motors by sending simple ASCII strings from their systems to the Pulse hub.

FEATURES:

- RS 485 2 wire communication
- Simple, intuitive protocol features 3 character motor addressing
- Individual or group control capability
- Supports all ARC control and configuration functionality including favorite position
- Control of up to 32 Pulse hubs on one line
- Facilitates 433 MHz Bi-Directional RF Communication from virtually any automation/control system

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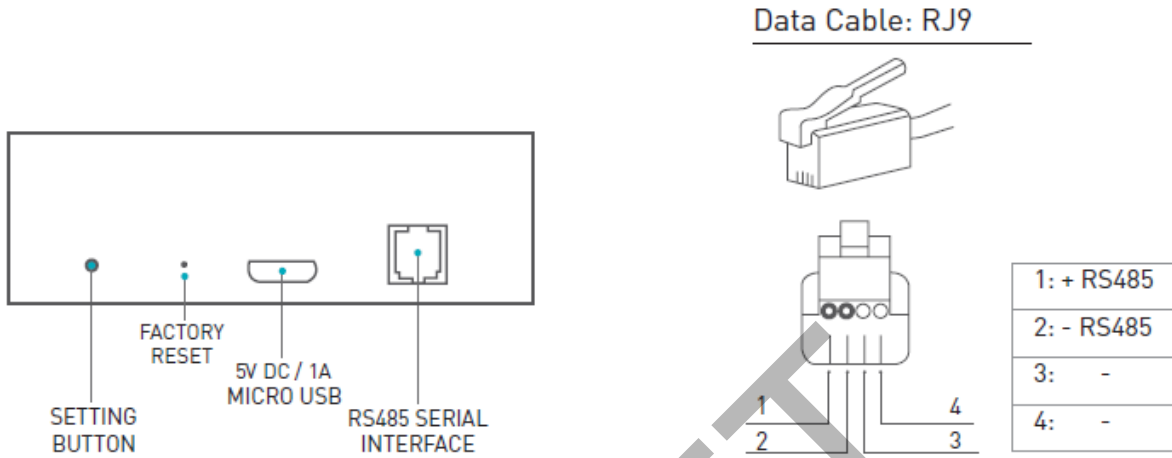
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1 CONNECTING TO THE PULSE HUB

1.1 Wiring

The Pulse hub supports RS485 communication over a 2 wire configuration.



Many control systems have only RS232 ports – in this case, a 232>485 converter will be required. Always refer to control system pinout diagram for correct communication wiring.

1.2 Connection parameters

The serial connection parameters are shown in the below table.

Communication Parameter	
Protocol	asynchronous UART
Baud Rate	9600 bps
Data Bit	8
Parity bits	N
Stop Bit	1

2 COMMUNICATION MESSAGES

Uplink — messages from the ARC motors, relayed to the Controller/PC via the Pulse Hub.

Downlink — messages from the Controller/PC, relayed to the ARC motors via the Pulse Hub.

2.1 Configuring a hub

Downlink messages to a Pulse hub are constructed with an exclamation point (!) as the header followed by a three-character address, a command character, data, then a semicolon (;) as the carriage return. (See 3.1 for list of commands)

Start Character	Address	Command	Data	End Character
!	3 Byte ASCII	1 Byte ASCII	(Optional)	;
	0-9 & A-Z, broadcast address 000 for query, range 001-ZZZ	non-numerical ASCII	"?" for inquiry of motor status	



The address "000" is reserved for global commands. The Pulse Hub has a default address of BR1.

2.2 Configuring a motor

Each ARC motor is paired to a discrete Pulse Hub. Therefore, a downlink message to configure an ARC motor includes the hub address with a delimiter character of "D", as shown in the table below. (See 3.2 for list of commands)

Start Character	Pulse Hub Address	Delimiter Character	Motor Address	Command	Data	End Character
!	3 Byte ASCII	D	3 Byte ASCII	1 Byte ASCII	(Optional)	;
	0-9 & A-Z, broadcast address 000 for query, range 001-ZZZ		0-9 & A-Z, broadcast address 000 for query, range 001-ZZZ	non-numerical ASCII	"?" for inquiry of motor status	

Example downlink messages:

Start Character	Pulse Hub Address	Delimiter Character	Motor Address	Command	Data	End Character
!	111	D	100	@	123	;
!	111	D	123	r	%%b%%	;

Example uplink messages (reply to above):

Downlink message	Uplink message	Comments
!111D123v?;	!111D123vA21;	Request to motor 123 under hub 111 for version; the motor response its version as A21 .
!111D123m100;	!111D123U;	No movement
	!111D123<09b00;	Move from 9%, direction "<"
	!111D123r100b180;	Responds at 100% when finished moving

2.3 Global commands

A downlink message with an address of "000" is considered a global message – the Pulse hub and all networked device will receive the message and provide an uplink message in response. The Pulse hub will only reply to version request – otherwise it will simply pass the uplink/downlink messages.

Downlink message	Uplink message	Comments
!000v?;	...,!123v,!124v,....	All pulse hubs and motors respond with version



The system manages communication traffic, however there is a possibility of buffer overflow if large amounts of messages are being transmitted in a short amount of time (in response to global commands).

3 TABLE OF COMMANDS

3.1 Commands for Pulse Hub

Command	Description	Downlink Message	Uplink Message	Bytes	Remark
V	Query pulse hub address	!000v?;	...,!123v, !124v,...	0	Get all pulse hub information. 123, 124 are the pulse hub address
G	Modify pulse hub address	!123G111;	! 111A ;	3	Change pulse hub address from 123 to 111
T	Test pulse hub	!111T;	!111A;	0	Hub flash 6 times

3.1 Commands for ARC motors

Command	Description	Downlink Message	Uplink Message	Bytes	Remark
%	Read forwarding status	!111D123%?;	!111D123d; Or: !111D123e;	1	? used to query the forwarding status of the module. 111D123e; module allows wireless forwarding; 111D123d; module

					prohibits wireless forwarding;
%	Set forwarding status	!111D123%e;	!111D123e;	1	111D123e; module allows wireless forwarding;
		!111D123%d;	!111D123d;		111D123d; module prohibits wireless forwarding; Note: The device address can not use 000 broadcast address
&	Pair	!111D000&;	!111D001A;	0	No data byte, a random address is generated by module to pair with motor/device
					Motor feedback !XXxA; pair successful, XXX is a random ascii address
&	Pair	!111D000&123;	!111D123A;	0	Pair the motor with address 123
@	Modify motor address under pulse hub	!111D123@145;	!111D145A;	3	Change address from 123 to 145
*	Module reset	!111D000*;	!111D000A;	0	module reset all data of pulse hub
#	Unpair(need motor feedback)	!111D123#;	!111D123A;	0	No data byte
					Motor feedback : !123A; unpair successful
\$	Delete the corresponding address in the module	!111D123\$;	!111D123A;	0	No data byte;
					Motor feedback: !123A; delete successful
A	feedback of Modify address successful	!111D123A;	!000D123A	0	It indicates that motor respond to the host PC
b	rotate angle by percentage	!111D123b150;	!111D123U;	3	No movement
			!111D123<11b39;		From 11%, 39 degrees to start the movement
			!111D123r18b152;		Stop at 18%, 152 ° Note: Percentages

					can be ignored when adjusting the angle
c	Close/Down	!111D123c;	!111D123U;	0	No movement
			!111D123r77b180;		Stop during running, return the present location, %.
c	Jog close/down	!111D123cA;	!111D123U	1	No movement
			!111D123>78b180;		Jog starting position ">" indicates the running direction
			!111D123r80b180;		Jog stop position
f	Move to preferred limit position/3rd position	!111D123f;	Null	0	No data byte
			Or		Motor feedback
			!111D123r52b61;		[no preset preferred limit,no feedback]
					[preferred limit is set,feedback stop position]
f	Request the preferred limit position	!111D123f?;	!111D123U;	1	No 3rd position setting
			Or !111D123r52b61;		3rd position setting, feedback position
m	Move by percentage	!111D123m;	!111D123U;	2	No movement
			Or !111D123<09b00;		From 9% , 0 degrees in the "<" direction
			Or !111D123r100b180;		Stroke set, position as feedback
N	Request Name	!111D123N?;	!111D123NDM25LE/S;	1	? for Request name
					Motor feedback
					Name:DM25LE/S;
o	Open/Up	!111D123o;	!111D123U;	0	No movement
			Or !111D123<45b180;		Move from 45%, 18 degrees int the "<" direction
			Or !111D123r00b00		Position as feedback

o	Jog open/up	!111D123oA;	!111D123U; Or !111D123<88b10; Or !111D123r86b161;	1	No movement; Move from 88%,10 degree in the "<" direction; Position as feedback
p	Set the parameter	!111D123pPHH;	!111D123pPHH;	variable	P = parameter byte (refer to parameter chart)
r	Request current position	!111D123r?;	!111D123U;	1	"?" for Request current position
					No movement
r	Response current position	!111D123r%%b%%;	!111D123r100b180;	2	%% = 00-99 (%) percentage position
s	Stop	!111D123s;	!111D123U;	0	No movement
			Or !111D123r22b00;		[limits set, feedback current position]
U	undefined or wrong command		!000D123U;	0	No data byte
v	Request version	!111D123v?;	!111D123vA21;	1	"?" for Request version
				3	T = type
					= A AC motor
					= C Curtain motor
					= D DC motor
					= S socket
					= L lighting devices
					VV = version
= 10 V1.0					

3.3 Setting parameters

Parameter byte(ASCII)&Description		Downlink Message	Uplink Message	Description
E	Motor limit setting	!123pEoH;	!111D123pEoH;	Set the current position as upper limit
		!111D123pEcH;	!111D123pEcH;	Set the current position as lower limit
		!111D123pEoA;	!111D123pEoA;	Adjust upper limit
		!111D123pEcA;	!111D123pEcA;	Adjust lower limit
		!111D123pEaC;	!111D123pEaC;	Cancel all limits
		!111D123pEmH;	!111D123pEmH;	Set the current position as preferred limit
		!111D123pEmC	!111D123pEmC;	Cancel preferred limit
G	speed !XXpGOB O:=c lift speed = d tilt speed B : = "+" = "-"	!111D123pGc+;	!111D123pGc+;	lift speed +
		!111D123pGc-;	!111D123pGc-;	lift speed -
		!111D123pGd+;	!111D123pGd+;	tilt speed +
		!111D123pGd-;	!111D123pGd-;	tilt speed -
M	motor run mode !XXpM1stHex2ndHex; 1stHex : 2ndHex :	!111D123pM01;	!111D123pM01;	tilt or lift
		!111D123pM02;	!111D123pM02;	lift direction
		!111D123pM04;	!111D123pM04;	tilt direction
		!111D123pM08;	!111D123pM08;	The motor is set to slow-start and slow-stop mode
		!111D123pM10;	!111D123pM10;	The motor is set to full-speed start-up mode
P	Request limit position !XXpP1stHex2ndHex; 1stHex : +1 = not use +2 = not use +4 = not use +8 = not use 2ndHex : +1 = limit position set +2 = preferred limit set +4 = not use +8 = not use	!111D123pP?;	!111D123pP00;	Request 123's limit position,123 feedback :limit position not set
			!111D123pP01;	limit position set
			!111D123pP03;	limit position set and preferred limit set
S	Motor Speed	!111D123pSc?;	!111D123pSc030;	Request current speed,

				motor feedback 30rpm
R	reset to factory mode	!111D123pR*;	no feedback	reset motor to factory mode
V	Motor voltage	!111D123pVc?;	!111D123pVc01198;	Request current voltage, motor feedback "11.98V"

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