WinDaq Starter Kit / DI-100 Series Instruments Raw Data Format

All the info provided here is "AS IS", please do not email DATAQ for further support/explanation

If you have questions regarding programming these devices click here

(Samples in various programming languages are available)

RS-232 Connections

	Pin# (DB-9)	DI-100	DI-110	DI-120	DI-130	DI-140	DI-151RS/150RS/ 190/195B	DI-170	DI-180	DI-194/154
CD	1	NC	+V	NC	+V	NC	Power for 5B of DI-195, NC for others	+V	NC	NC
Rx	2	D_{out}	D_{out}	D_{out}	D_{out}	D_{out}	Data	D_{out}	D_{out}	Data
Tx	3	CLK, -V	D_{in}	-V	NC	-V	Command	Command	CLK, -V	Command
DTR	4	+V	+V	+V	RESET	+V	+V		+V	+V
GND	5	GND	GND	GND	GND	GND	GND	GND	GND	GND
DSR	6	+V	+V	+V	+V	+V	+V		+V	+V
RTS	7	+V	+V	NC	NC	+V	+V		+V	+V
NC = No connection; +V = 9 to 12 volts; -V = -9 to -12 volts										

Specification Summary

	DI-100	DI-110	DI-120	DI-130	DI-140	DI-151RS/150RS/ 190/195B	DI-170	DI-180	DI-194/154
A/D Channels	1	0	2	1	1	2	4	1	4
Digital Bits (In/Out)	1/0	8/8	1/0	0/0	0/0	Model-depended/0	1/1	1/0	3/0
Resolution (Bits)	10	8	10	16	18	12	12	12	8
Baud Rate	2,400 to 115,200	9,600 19,200 38,400	2,400 4,800 9,600 19,200 38,400	9,600 19,200 38,400	38,400	4,800	19,200	2400 to 115,200	4,800
Format	8, N, 1	8, N, 1	8, N, 1	8, N, 1	8, N, 1	8, N, 1	8, N, 1	8, N, 1	8, N, 1
Encryption Table	T100	T110	T120	T130	T140	T190	T170	T180	T194
WinDaq Support	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes

DI-100 Encryption Table (T100)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A4	A5	A6	A7	A8	A9	1	1
Byte2	1	1	D_{in}	A3	A2	A1	A0	0
Ax is the inverse of the xth bit of the ADC reading. D_{in} is the digital input bit								

DI-110 Encryption Table (T110)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte	D7	D6	D5	D4	D3	D2	D1	D0
Dx is the xth bit of digital I/O. The output is the inverse of the data sent to the DI-110.								

DI-120 Encryption Table (T120)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	0	A4	A5	A6	A7	A8	A9	0
Byte2	0	D_{in}	Chn	A0	A1	A2	A3	1
Byte3	0	B4	B5	B6	B7	B8	B9	1
Byte4	0	Bat	0	B0	B1	B2	B3	1
Ax is the inverse of the xth bit of the ADC reading from channel one. Bx is the inverse of the xth bit of the ADC reading from channel two. D_{in} is the digital input bit. Chn is the number of channels setting.								

Bat is the battery status.

DI-130 Encryption Table (T130)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A15	A14	A13	A12	A11	A10	A9	A8
Byte2	A7	A6	A5	A4	A3	A2	A1	A0
Ax is the xth bit of the ADC reading.								

DI-140 Encryption Table (T140)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A15	A16	A17	A18	A0	A1	A2	0
Byte2	A8	A9	A10	A11	A12	A13	A14	1
Byte3	0	0	A3	A4	A5	A6	A7	1
Ax is the xth bit of the ADC reading, which is in 2's complement format.								

WinDaq Starter Kit DI-151RS/DI-190 Encryption Table (T151RS/T190)

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(Samples in various programming languages are available).

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A4	A3	A2	A1	A0	1	D_{in}	0
Byte2	A11	A10	A9	A8	A7	A6	A5	1
Byte3	B4	B3	B2	B1	B0	1	D_{in}	1
Byte4	B11	B10	B9	B8	B7	B6	B5	1

Commands

Cmd	Data	Default	**Action**
C	0, 1, 2	0	channel (0, 1, both)
D	0, 1	0	DI-190: (digital output, input) DI-151RS: (single-ended, differential)
L	0...255	?	LS byte of counter
M	0...255	0	MS byte of counter
G	0, 2	0	DI-150RS only 0 = gain x1 channel 1 2 = gain x100 channel 1
H	0, 2	0	DI-150RS only 0 = gain x1 channel 2 2 = gain x100 channel 2
S	0, 1	0	ADC (stop, start)
R	none	-	reset

Ax is the xth bit of the ADC reading from channel one.
Bx is the xth bit of the ADC reading from channel two, if enabled.
Din is the digital input bit.
Send NULL before any command.
? is 20 for single channel setup, 40 for dual channel setup.
Throughput rate = baud rate/counter.

T194 Encryption Table of WinDaq Starter Kit DI-194/154

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If you have questions regarding programming this device, click here.

(Samples in various programming languages are available).

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A4	A3*	A2*	A1*	D2/A0*	D1	D0	0
Byte2	A11	A10	A9	A8	A7	A6	A5	1
Byte3	B4	B3*	B2*	B1*	D2/B0*	D1	D0	1

Byte4	B11	B10	B9	B8	B7	B6	B5	1
Byte5	C4	C3*	C2*	C1*	D2/C0*	D1	D0	1
Byte6	C11	C10	C9	C8	C7	C6	C5	1
Byte7	E4	E3*	E2*	E1*	D2/E0*	D1	D0	1
Byte8	E11	E10	E9	E8	E7	E6	E5	1

Notes

* 8 bit device uses bit 11 to bi4
10 bit device uses bit 11 to bit 2
12 bit device uses bit 11 to bit 0

Ax is the xth bit of ADC reading from channel one
Bx is the xth bit of ADC reading from channel two if enabled
Cx is the xth bit of ADC reading from channel three if enabled
Ex is the xth bit of ADC reading from channel four if enabled
Dx is the digital input bits

To program DI-194/154 under VisualBASIC or LabView, please click here

Commands

Cmd	Data	Default	Action
C	0 thru 15	0	Channels 000 thru 1111
D	0, 1	0	0 = output square wave 1= input
L	0...255	0	Ls byte of counter
M	0...255	0	Ms byte of counter
S	0, 1	0	ADC stop, start
R	Z		reset
E	key	N.A.	If you don't have the key when you got the unit, you can purchase it from DATAQ for $15. (RS version doesn't require key to unlock the channels)
N	Z		Return 10 bytes serial number of the device. If you run WinDaq, you can also inqure the serial number from the About dialog box
Send NULL before any command, which can be sent out by keying in <Ctrl-2> under VT100 mode if you are using HyperTerminal			

DI-170 Encryption Table (T170)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	A11	A10	A9	A8	A7	Dig	1	0
Byte2	A6	A5	A4	A3	A2	A1	A0	1
Byte3	B11	B10	B9	B8	B7	Dig	0	0
Byte4	B6	B5	B4	B3	B2	B1	B0	1
Byte5	C11	C10	C9	C8	C7	Dig	0	0
Byte6	C6	C5	C4	C3	C2	C1	C0	1
Byte7	D11	D10	D9	D8	D7	Dig	0	0
Byte8	D6	D5	D4	D3	D2	D1	D0	1

Commands

Command (Binary)	Dependence	Action
1ccc cccc	None	Burst count = 1ccc ccccm ranging from 0x80 to 0xFF.
0000 0000	None	No operation.
0001 0000	None	Reset.
0001 1000	None	Stop scanning.
0001 1001	None	Start scanning.
0001 110d	None	Set digital output pin to state d.
01eb ChGa	None	Enable/Bipolar/Channel/Gain. Inquiry bit 7 = 1 is PGH (gain = 1, 2, 4, 8) bit 7 = 0 is PGL (gain = 1, 10, 100, 1000) bits 5, 4, 3 are the range index as follows:

0001 0001	Stopped	000: ± 5V 001: ± 10V 010: ± 2.5V 011: ± 2.048V 100: ± 1.28V 101: ± 500V 110: Reserved 111: ± 100%

If all four channels are running, then
A = Channel 0, B = Channel 1, C = Channel 2, D = Channel 3.

If channels 0, 2, and 3 are running, then
A = Channel 0, B = Channel 2, C = Channel 3 (" D" group will not exist).

The throughput rate = 307200/(65536 - burst count × 256), except when the burst count = 0xFF, in this case the data throughput rate = 800

The sample rate per channel = throughput rate / number of channels

When the data throughput rate is lower than 600 S/s, the data transmitted through the RS-232 port will be spread evenly.

The default data throughput rate from RESET is 2.5 S/s

DI-180 Encryption Table (T180)

	B7	B6	B5	B4	B3	B2	B1	B0
Byte1	0	A5	A6	A7	A8	A9	A10	A11
Byte2	1	0	D_{in}	A0	A1	A2	A3	A4

Ax is the xth bit of the ADC reading.
D_{in} is the digital input bit.
Sample rate = baud rate/24.

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