IOtech ADC488

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Programming Card

Input Configuration	A0	Set 8 Differential Input channels - Master
	A1	Set 8 Differential Input channels - Slave
	A2	Set 16 Single-ended Input channels - Master †
	A3	Set 16 Single-ended Input channels - Slave †
	A?	Return present Input Configuration setting
Scan Buffer Pointer	B±n	Set the Buffer Location pointer to '±n'.
	B?	Return present Buffer Location number.
Scan Group	Cn	One channel defined
	Cn,n	Two channels defined
	Cn,n,n,n	Four channels defined
	Cn,n,n,n,n,n,n,n	Eight channels defined
	Cn,n,n,n,n,n,n,n,n,n,n,n,n,n,n,n	Sixteen channels defined
	C?	Returns the defined channels
Digital Output	Dn	Set digital lines to binary equivalent of 'n'.
	D?	Returns value of the present digital outputs.
Error Query	E?	Return and clear present error condition
	E0	No Error has occurred
	E1	Invalid Device Dependent Command
	E2	Invalid Device Dependent Command Option
	E4	Conflict Error (Mode/parameter conflict)
	E8	NVRAM Setup Error
	E16	Calibration Error
	E32	NVRAM Calibration Error
Buffer Pointer Mode	F0	Buffer Pointer Auto-Increments (default)
	F1	Buffer Pointer Auto-Decrements
	F2	Buffer Pointer does not change
	F?	Returns present buffer pointer mode.
Output Format	G0	Compensated ASCII Fixed Point with leading '+' sign (default)
	G1	Uncompensated ASCII Fixed Point with leading '+' sign
	G2	Compensated ASCII Fixed Point with '+' sign implied
	G3	Uncompensated ASCII Fixed Point with '+' sign implied
	G4	Compensated Integer Decimal with '+' sign implied
	G5	Uncompensated Integer Decimal with '+' sign implied
	G6	Compensated Hexadecimal
	G7	Uncompensated Hexadecimal
	G8	Compensated 2's Complement Integer binary - high byte first
	G9	Uncompensated 2's Complement Integer binary - high byte first
	G10	Compensated 2's Complement Integer binary - low byte first
	G11	Uncompensated 2's Complement Integer binary - low byte first
	G?	Return present Format selection

† These commands are only available on the ADC488/16.

Calibration	H0	Calibrate offset on selected range & channel
	H1	Calibrate full-scale on selected range & channel
	H2	Save all calibration constants to NVRAM
	H?	Returns last Calibrate command issued
Scan Interval	I0	10 µsec ----- 100,000 Hz
	I1	20 µsec ------ 50,000 Hz
	I2	50 µsec ------ 20,000 Hz
	I3	100 µsec ----- 10,000 Hz
	I4	200 µsec ------ 5,000 Hz
	I5	500 µsec ------ 2,000 Hz
	I6	1 msec -------- 1,000 Hz
	I7	2 msec ---------- 500 Hz
	I8	5 msec ---------- 250 Hz
	I9	10 msec --------- 100 Hz
	I10	20 msec ---------- 50 Hz
	I11	50 msec ---------- 20 Hz
	I12	100 msec --------- 10 Hz
	I13	200 msec ---------- 5 Hz
	I14	500 msec ---------- 2 Hz
	I15	1 sec ---------- 1 Hz
	I16	2 sec ---------- 0.5 Hz
	I17	5 sec ---------- 0.2 Hz
	I18	10 sec ---------- 0.1 Hz
	I19	20 sec ---------- 0.05 Hz
	I20	50 sec ---------- 0.02 Hz
	I?	Query the present Scan Interval
User Terminator	J0	Set User Terminator to 'NUL' (default)
	Jn	Set User Terminator to 'n'. (0 to 255)
	J?	Query present value of User Terminator
Command Channel EOI	K0	EOI enabled (default)
	K1	EOI disabled
	K?	Return Command Channel EOI selection
Trigger Level	L±n	Set Analog Trigger Level to ±n% of range
	L?	Query the present Analog Trigger value.
SRQ Mask	M0	SRQ's are disabled, the mask is cleared
	M1	SRQ On Trigger
	M2	SRQ On Trigger Overrun
	M4	SRQ On Buffer Overrun
	M8	SRQ On Error
	M16	SRQ on Self-Test Error
	M32	SRQ On Ready
	M128	SRQ on Acquisition Complete
Scan Count	Nm	Set pretrigger count to 0 and post-trigger count to 'm'. (m ≤ ScanBufferSize/NumberOfChannels)
	Nn,m	Set pretrigger count to 'n' and post-trigger count to 'm'. (n ≤ 16,000,000 and m ≤ ScanBufferSize/NumberOfChannels)
	N?	Query the present Scan Count pretrigger and post-trigger values.
End of Reading Terminator	O0	CR LF EOI (default)
	O1	CR LF
	O2	LF CR EOI
	O3	LF CR
	O4	CR EOI
	O5	CR
	O6	LF EOI
	O7	LF
	O8	User Terminator (Jn) with EOI
	O9	User Terminator (Jn)
	O?	Return current reading delimiter selection

Buffer Select	Pn	Select buffer 'n'. (n = 1 to 16)
	P0	Select channel '0'. Requests scan data.
	P?	Request presently select channel.
End of Scan Terminator	Q0	CR LF EOI (default)
	Q1	CR LF
	Q2	LF CR EOI
	Q3	LF CR
	Q4	CR EOI
	Q5	CR
	Q6	LF EOI
	Q7	LF
	Q8	User Reading Delimiter(Jn) with EOI
	Q9	User Reading Delimiter(Jn)
	Q?	Return current End of Scan Terminator
Range	Rn,n,n,n,n,n,n,n	(Differential Inputs)
	Rn,n,n,n,n,n,n,n,n,n,n,n,n,n,n,n	(ADC488/16)
		n = 0 for ±1 volt range
		n = 1 for ±2 volt range
		n = 2 for ±5 volt range
		n = 3 for ±10 volt range (default)
	R#c,n	Set channel c to range n
	R?	Returns the present ranges of all channels.
Setup (Save,Recall)	Sn,0	Recall configuration 'n'.
	Sn,1	Save present setup in buffer 'n'.
	S?	Request the last Setup operation.
Trigger	T0	Continuous on TALK (default)
	T1	Continuous on GET
	T2	Continuous on rising edge external TTL
	T3	Continuous on falling edge external TTL
	T4	Continuous on rising edge analog level
	T5	Continuous on falling edge analog level
	T6	One-shot on TALK
	T7	One-shot on GET
	T8	One-shot on rising edge external TTL
	T9	One-shot on falling edge external TTL
	T?	Returns the present trigger configuration
Status	U0	Send the ADC488 status when next addressed to talk
	U1	Send the value on the digital input lines when next addressed to talk
	U2	Send pretrigger and post-trigger address limits when next addressed to talk
	U3	Send the internal sample counter value
	U4	Return calibration gain and offset values
	U?	Always returns U0
Version Query	V?	Return firmware revision level
Test	W0	Turn TEST LED off
	W1	Turn TEST LED on
	W?	Return on/off indication of TEST LED.
Execute	X	Execute command string
Command Channel Terminator	Y0	CR LF (default)
	Y1	LF CR
	Y2	CR
	Y3	LF
	Y?	Return current Command Channel Terminator selection
Trigger Delay	Z0	Set Trigger Scan Delay to zero (default)
	Zn	Set Trigger Scan Delay to 'n'. (n = 0 to 16,000,000)
Query	?	Return the present configuration or mode of the command preceding the ?

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Programming Card

Output Format

Each of the formats allow for compensated, gain and offset, and uncompensated outputs. The six output formats are:

G0 G1 - ASCII Fixed point format returns an ASCII decimal numeric representation of the voltage. Provides both leading positive and negative signs.

Typical Output	Range	Typical Resolution
±10.00000	10 volt range	0.00033V
±1.00000	1 volt range	0.00033V

G2 G3 - An alternative ASCII fixed point format returns an ASCII decimal numeric representation of the voltage. Provides data with the positive sign implied and the negative sign expressed.

Typical Output	Range	Typical Resolution
-10.00000	10 volt range	0.00033V
01.00000	1 volt range	0.00003V

G4 G5 - A decimal format returns a signed integer decimal representation of each reading.

Decimal Value	Voltage equivalent (10v Range)
32767	+ Overflow indication
30000	+10.00000V
-30000	-10.00000V
-32768	- Overflow indication

G6 G7 - A Hexadecimal format returns a 4 character representation of the twos-complement integer binary value of each reading.

HEX Value	Voltage equivalent (10v Range)
7FFF	+ Overflow indication
7B0C	+ 10.50000V
0000	+ 0.00000V
84F4	- 10.50000V
8000	- Overflow indication

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G8 G9 - Binary, with high byte first, returns two bytes of two's-complement binary data for each converted value.

High Byte	Low Byte	Voltage equivalent (10v Range)
0111 1111	1111 1111	+ Overflow indication
0111 1011	0000 1100	+ 10.50000V
1000 0100	1111 0100	- 10.00000V
1000 0000	0000 0000	- Overflow indication

G10 G11 - Binary, with low byte first, returns two bytes of two's-complement binary data for each converted value.

Low Byte	High Byte	Voltage equivalent (10v Range)
1111 1111	0111 1111	+ Overflow indication
0000 1100	0111 1011	+10.50000v
1111 0100	1000 0100	-10.00000v
0000 0000	1000 0000	- Overflow indication

Error Query

The Error Query command is used to determine the present error condition of the ADC488. When an error has occurred, the Error LED on the front panel of the ADC488 will turn on.

E? Return and clear present error condition

After execution of the Error Query command, the ADC488 will return one, or the numeric sum of more than one, of the following error codes:

E0 No Error has occurred
E1 Invalid Device Dependent Command (@4X)
E2 Invalid Device Dependent Command Option (A7X)
E4 Conflict Error (Parameters inconsistent with mode selected)
E8 NVRAM Setup Error
E16 Calibration Error
E32 NVRAM Calibration Error

Status

Status commands are used to return information about various conditions of the ADC488.

Status strings are returned when the ADC488 is next addressed to Talk. The terminators used and the use of the End or Identify (EOI) line can be changed with the Command Channel Terminator (Yn) and Command Channel EOI (Kn) commands.

If the ADC488 is configured to trigger on TALK, requesting a status report will not cause the ADC488 to trigger.

U0 Send the ADC488 command status
U1 Send the value on the digital input lines
U2 Send the pretrigger and post-trigger address limits
U3 Send the value of the internal sample counter
U4 Send the calibration constants
U? Returns last Un command

The format of the fixed string returned by the ADC488 after receiving a Status U0 command is as follows:

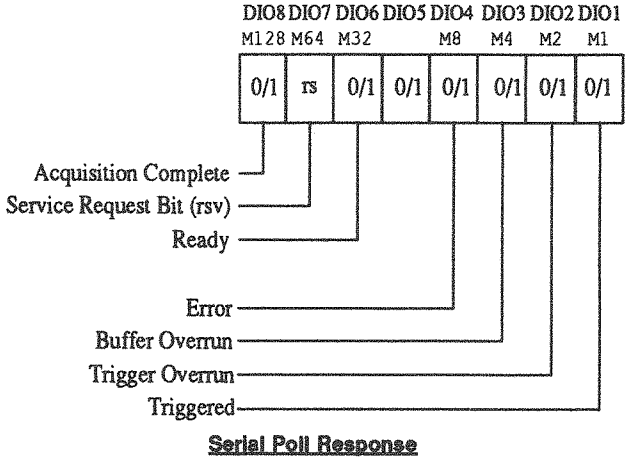
*.*A#B#####C##,##,##,##,##,##,##,##,##,##,##,##,##,##D###E##F#G##H###J###K#L+###M###N#######,#######O#P##Q#R#,#,#,#,#,#,#,#,#,#,#,#,#,#S#,#T#U#W#Y#Z######

where each # shows the current option in use for that command. The leading information *.* is the revision level (V?) of the ADC488 firmware.

SRQ Mask and Serial Poll Response

The SRQ Mask command uses the IEEE 488 Service Request (SRQ) mechanism to inform the IEEE 488 bus controller of the existence of several conditions. Multiple conditions can be enabled simultaneously. If multiple conditions are contained within the same command string, each SRQ Mask command should be proceeded by an Execute (X) command. The resulting SRQ Mask register value will be the logical ORed value of the individual values sent. Alternately, the entire value of all the desired conditions may be sent within one SRQ Mask command. The programmed SRQ Mask will remain enabled until the receipt of a M0 command or the detection of a Device Clear (DCL) or Selected Device Clear (SDC).

M0 SRQ's are disabled, the mask is cleared
M1 SRQ On Trigger
M2 SRQ On Trigger Overrun
M4 SRQ On Buffer Overrun
M8 SRQ On Bus Error
M32 SRQ On Ready
M128 SRQ on Acquisition Complete



Serial Poll Response