

## Parameter access through BACnet in X2

### Validity

This document is valid for X2 firmware from V1.4 onwards.

### Indirect addressing

Generally we do not encourage changing parameter value through external communications. It can however be done as a work around. This application note explains how access is given and how to interpret the associated values.

With two Analog Value objects each configuration parameter of the controller may be accessed. ParAdd (AV 12) is the address of the parameter and ParValue (AV 13) is the value. The correct address may be calculated with the static address table below. Once the address is set, the value of the parameter may be read or written using AV 13.

Object	Name (8 Bytes)	Description / Property description	Range/Type	R/W
AV 12	ParAdd	Address of parameter, see table below	AV	R/W
AV 13	ParValue	Parameter value	AV	R/W

### Static address list

With the addresses listed in the table below the settings may be changed of the controller. They correspond with the parameter settings for the addressed X2 controller.

The address is calculated by adding the parameter number to the value from the table below. To use the table, choose the type of parameter by selecting the row of the table and then choose the item with the column. UI5 would result in 3400. Parameter 5U10 would thus be address 3410.

Description	1	2	3	4	5	6	7	8	9	10	11	12
User settings	2000											
Universal input	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100
Control Loop	5000	5100	5200	5300								
Analog Output	6000	6100	6200									
Binary Output	7000	7100	7200	7300	7400	7500	7600	7700				
Fan output	8000	8100										
Alarm	9000	9100	9200	9300	9400	9500	9600	9700				
Functions	10000	10100	10200	10300	10400							
Time Schedules	11100	11200	11300	11400	11500	11600	11700	11800	11900	12000	12100	12200
Communication	13000											

## Time schedule Settings

Time schedules are slightly special as they do not operate with parameters. Time schedules addresses start at address 11100. To remotely change time schedule settings, follow the table below.

Address	Module	Description of Weekly Schedules	Range	R/W
1055	General		1bit	R/W
Table+0	SCHED1	Time of time schedule event in hex format (hh mm)	16bit	R/W
Table+1	SCHED1	Active days of time schedule event (bits) Bit 0 = Day 1 (Monday) Bit 1 = Day 2 (Tuesday) Bit 2 = Day 3 (Wednesday) Bit 3 = Day 4 (Thursday) Bit 4 = Day 5 (Friday) Bit 5 = Day 6 (Saturday) Bit 6 = Day 7 (Sunday)	8bit	R/W
Table+2	SCHED1	Type of time schedule: 0 = Disabled 1 = Operation mode 2 = Control loop set point 3 = Analog output set point 4 = Fan output 5 = Binary output 6 = Holiday	4bit Right Nibble: 0x hex	R/W
		Parameter ID: Number of chosen type (example: AO2)	4bit Left Nibble: 0x hex	R/W
Table+3	SCHED1	For weekly schedules only: ID of time schedule: Will show only if type of schedule is not operation mode.	8bit	R/W
Table+4	SCHED1	For weekly schedules only: Set point of time schedule: If type of times schedule is operation mode (Table+2=1): 0 = OFF, 1 = Economy, 2 = ON For all other types: The value represents the set point calculate value using input range dependent limit. (see parameter range table)	8bit	R/W

### Time schedule settings for annual time schedules

Annual time schedules used to define holidays have a different format than weekly time schedules. They share however the same address space. So if a time schedule is changed with Table+2 to holiday mode, the format of the other settings associated with this time schedule change as well.

Address	Module	Description	Range	R/W
1055	General	Enable time schedules	1 bit	R/W
Table+0	SCHED1	Not used	4bit Right Nibble: 0x hex	R/W
		For annual schedules only: Starting month of holiday -1 : Range 00 - 11	4bit Left Nibble: x0 hex	R/W
Table+1	SCHED1	For annual schedules only: Starting day of holiday -1: Range 00-30	8 bit	R/W
Table+2	SCHED1	Type of time schedule: 0 = Disabled 1 = Operation mode 2 = Control loop set point 3 = Analog output set point 4 = Fan output 5 = Binary output <b>6 = Holiday</b> Not used	4bit Right Nibble: 0x hex	R/W
		Not used	4bit Left Nibble: x0 hex	R/W
Table+3	SCHED1	Not used	4bit Right Nibble: 0x hex	R/W
		For annual schedules only: Finishing month of holiday -1 : Range 00 - 11	4bit Left Nibble: x0 hex	R/W
Table+4	SCHED1	For annual schedules only: Finishing day of holiday -1: Range 00-30	8 bit	R/W

### Interpretation of values based on parameter type

When reading an 8-bit parameter, the value x is within the range 0 to 255. This value needs to be conditioned in order to create a meaning full display of the value.

Description	Range	Calculation for correct display	Calculated display
Binary (on – off)	on – off	Isolate Least significant bit	00 = OFF 01 = ON
Display range value for inputs	-50...205	For non Fahrenheit value: $x - 50$ For Fahrenheit value: $(x*2) - 58$	0 = -50 255 = 205 0 = -58 255 = 401
Sensor calibration	Per input range	Non Fahrenheit: Value – 127 If Fahrenheit: $(\text{Value} - 127) * 2$	0 = -127 127 = 0 255 = 128 0 = -254 127 = 0 255 = 256
Time delays	00:00s...15:10h MM:SS...HH:MM	if $x < 60 = x * 5$ if $x > 59 = (x-50) * 30$ if $x > 159 = (x-164) * 600$	0..59 = 00:00 – 04:55 60...159 = 05:00 – 59:30 160...255 = 01:00 – 15:10h
%-Range displays	0.0 – 100%	$x * 200 / 255 * 0.5$ (calculate in this order)	0 = 0% 255 = 100%
For input dependent span settings such as PI-Band, hysteresis etc.	Per input range	$x * \text{multiplier}^1$	0 = 0 255 = 255 (multiplier = 1) or = 1275 (multiplier = 5) or = 2550 (multiplier = 10)
For input dependent limits such as set points or alarm limits	Per input range	Non Fahrenheit values: $(\text{Value} * \text{multiplier}^1) - 500 + (\text{display min} * 10)$ Fahrenheit values: $(\text{Value} * 2 * \text{multiplier}^1) - 580 + (\text{display min} * 20)$	0 = -500 255 = 2550 0 = -580 255 = 4520

<sup>1)</sup> Input dependent multiplier calculation.

Multiplier depends on input range:

display max – display min = y

If  $y < 25$  multiplier = 1

if  $y < 125$  multiplier = 5

else multiplier = 10

Note: double multiplier each for differential inputs and/or temperature inputs in Fahrenheit mode.