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ÉLECTRONIQUE & CONTRÔLE
INFORMATIQUE & SYSTÈME

ACCUSYSTEM SOFTWARE

USER MANUAL

FOR USE WITH:

ACCUBUBBLE MONITORING SYSTEM

ACCUBUBBLE PROBE

DISPLAY BOARD MIMIC

OUTPUT BOARD

ACCUMASTER CONTROLLER

ACCULEVEL CONTROLLER

ACCUPRESSURE CONTROLLER



This manual shall be read by any people involved in operation of ACCUSYSTEM COMPONENTS. Not reading this manual may result in personal injury, equipment breakage and even loss of life.

This manual has been written with all possible attention but may include errors. The author shall not be considered responsible for omissions or wrongly written information. If more details are required please contact: Belcatec Design Inc. (514) 645-6353 ask for René Bellefleur

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This manual is divided by section

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SECTION 1: Description of product

ACCUSYSTEM SOFTWARE was basically designed to verify operation's of all ACCUSYSTEM family components. Some part of software allows calibrating controllers; most parts are for monitoring family components or controlling them. ACCUMASTER CONTROLLER section may allow changing controller behavior and /or changing displayed texts on it.

Software is written using compiled Microsoft Visual Basic and packaged allowing installation on any Personal Computer using Operating System Windows 98 or XP. (A version for Vista is in preparation) For the moment we do not recommend installing with VISTA.

Belcatec Design Inc. is still modifying the software to improved and/or simplifying manipulations. This manual is for version 3.5.0

Software is supplied on CDROM.

1.1 HOW TO INSTALL

Installing software is simple; just place CDROM in drive, Auto SETUP shall start and install software. Follow instruction, change directory if needed. Installation takes only few moments, it will create an ICON on desktop looking like Earth.

If installation does not start when CDROM is inserted in drive you may need to open CDROM file system and execute SETUP.

1.1.1 RS-232 to RS-485

To communicate with components of ACCUSYSTEM family you must have PC connected to [RS-232 to RS-485 interface].

See specification of interface.

1.2 HOW TO START

When installation is completed; you can remove disk and click on Earth icon to start program.

OPERATION MODE SELECTION

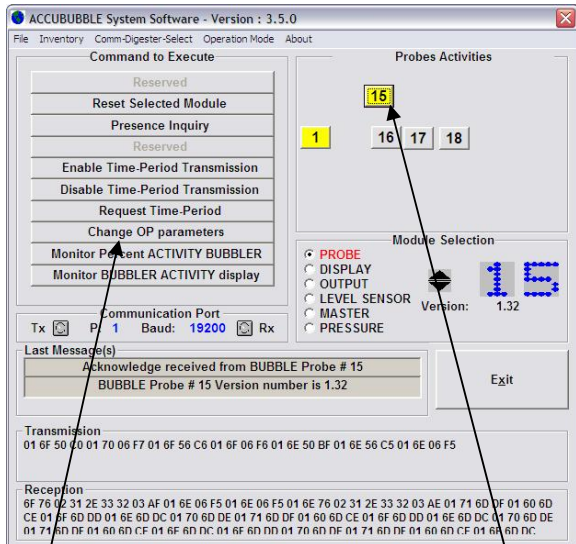
5 [Operation Mode] may be selected or not.

- Setup** When enable allows modifying position of Probes number in Probes Activity window.
Also allows modifying operation parameters of all components in system.
Disable will allow only viewing operations.
- Comm** When enable extend bottom part of main windows to show data transmission and reception.
Disable will reduced main windows
- Belcaterc** When enable allows seeing and modifying identification text of each component.
- Debug** When enable shows debug windows when possible.
That windows shows communication problems when they occurs.
When disable remove debug window.

Following pictures shows different choices

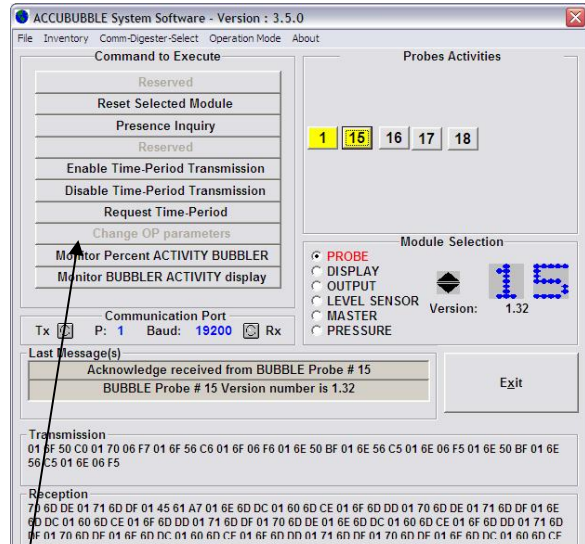
Setup

Enable



Change OP parameters is enable
ACCUBUBBLE activity may be moved

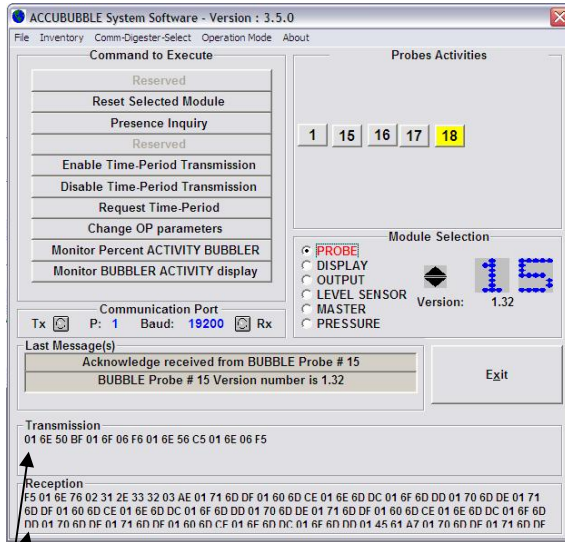
Disable



Change OP parameters is disable
ACCUBUBBLE activity are fixed

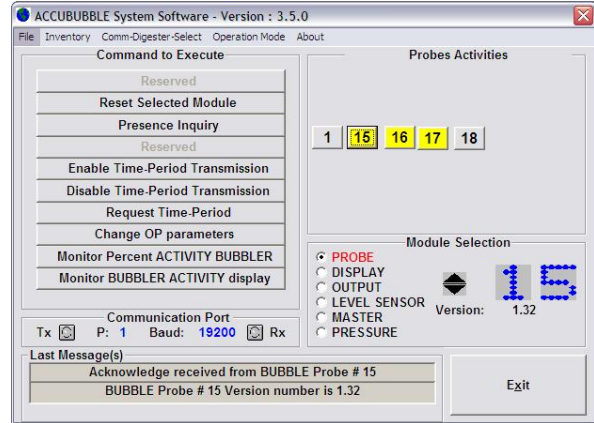
Comm

Enable



Communication is shown

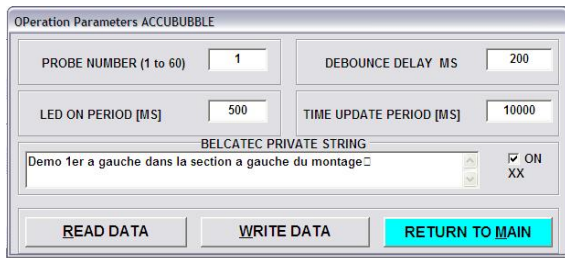
Disable



Communication is removed

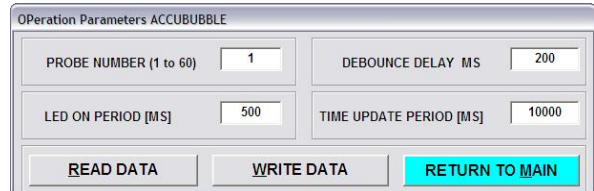
Belcaterc

Enable



Belcaterc string shown and modifiable

Disable



Belcaterc string not shown

[Example show setting ACCUBUBBLE probe parameters]

Debug

When enabled Debug windows is shown when possible at right of active window



Each communication error is recorded, Tough communication errors are not frequent they may happened and number of errors are cumulated.

That window shows all possible errors up to 100.

Clicking on [Reset Counters] will clear counts.

Having few BREAK, Framing or Time Out is normal, Communication using RS-485 protocol usually have communication errors.

ABOUT SELECTION:

Clicking on About will show about window



That window shows which components are supported by software, Version and others pertinent information's.

Clicking on [OK] will cleared window

COMM-DIGESTER-SELECT SELECTION

Clicking on [Comm-Digester-Select] will show following window.



Clicking on selected [Radio Button] allows selecting communication port to work with.

If port is not available, it is shown in light grey. In preceding window only two ports are available. When communication port is selected clicking on [OK] will close window and return to software using selection.

INVENTORY SELECTION

Clicking on Inventory allows starting scan of all connected components. It builds a file and writes all present components in it.

File created is used by software to speed up operations. In rare circumstance component may be removed from file (When is not answering properly as example)

Following window will appear to show it number. (See next page)

Component was removed from inventory

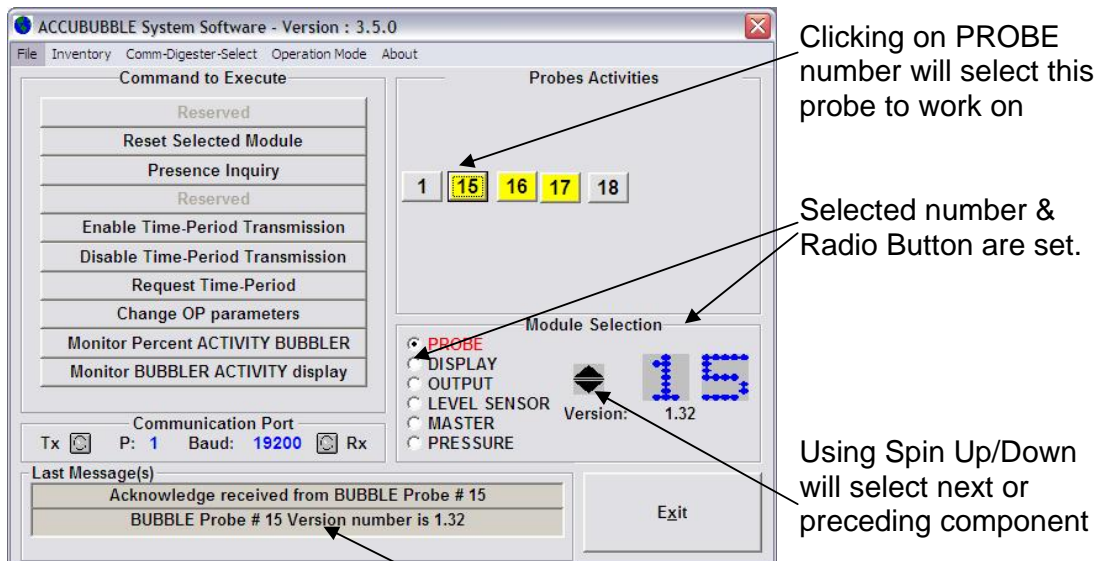


In example MASTER CONTROLLER #1 has been removed from inventory

If removed component is the last one of group, radio button on main window will also be removed. If it is reconnected an inventory update will put it back in inventory and put back radio button if so.

2.1 ACCUBUBBLE PROBE

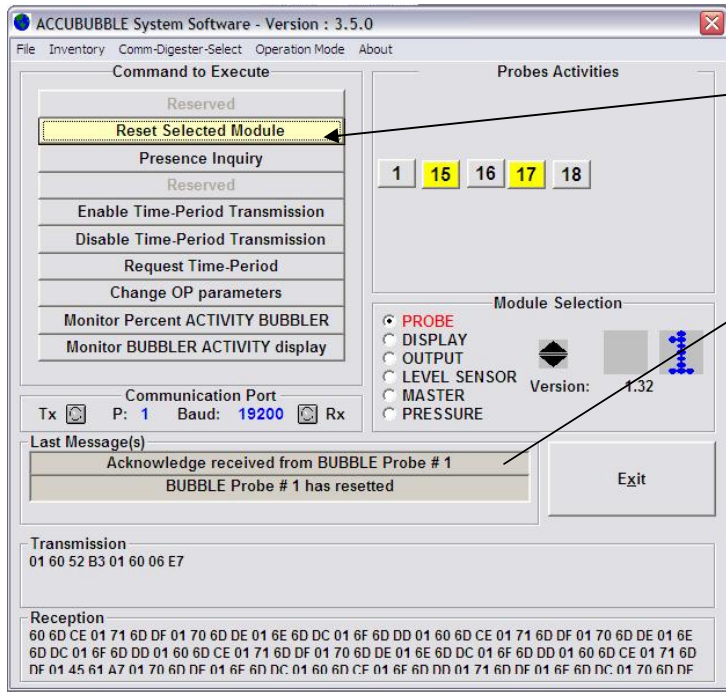
This section show operation over ACCUBUBBLE components



Last message shows that probe was contacted and answer properly with it version number.

Many operations are possible on ACCUBUBLE probe or others components such as:

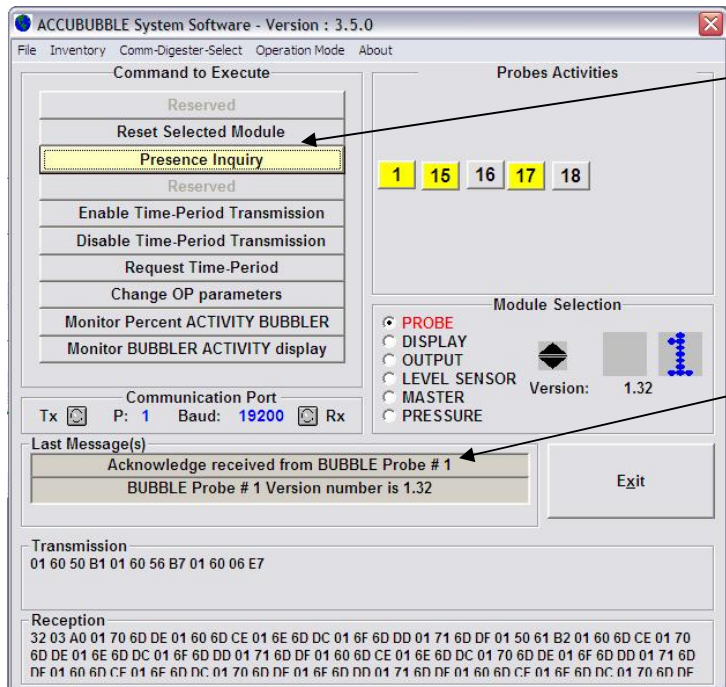
Reset the probe



Clicking on Reset Selected Module will do a reset of probe.

It is confirmed by last message that probe 1 has resetted

Verify presence of probe

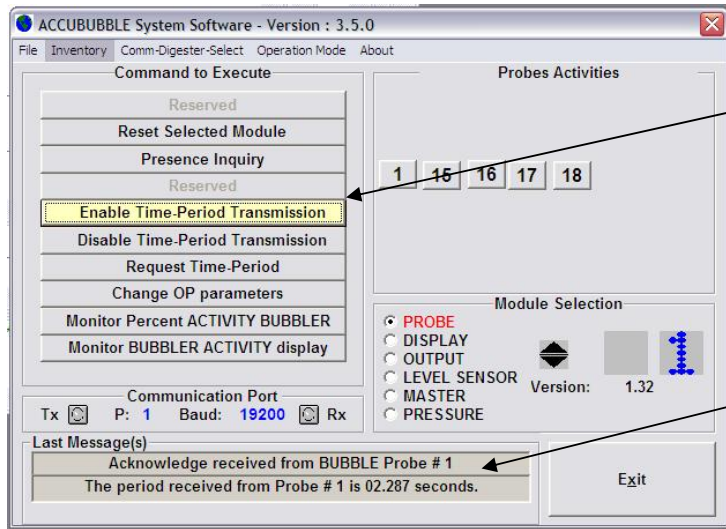


Clicking on Presence Inquiry will ask probe to send its version I.D.

It is confirmed by last message

Enable time period transmission

It is possible to look at that probe and get its period (time between Bubbles)

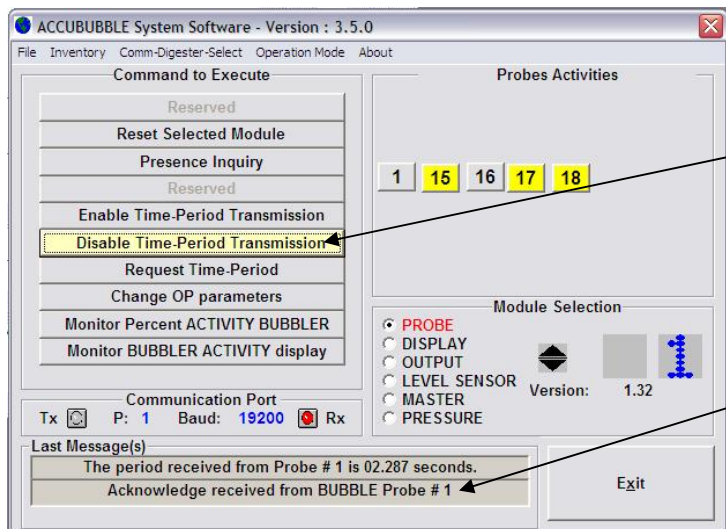


Clicking on Enable Time-Period Transmission will tell probe to send at regular interval period between bubbles

Last message shows period.

Before you select another component it is recommended to disable transmission of time period.

Disable Time-Period Transmission

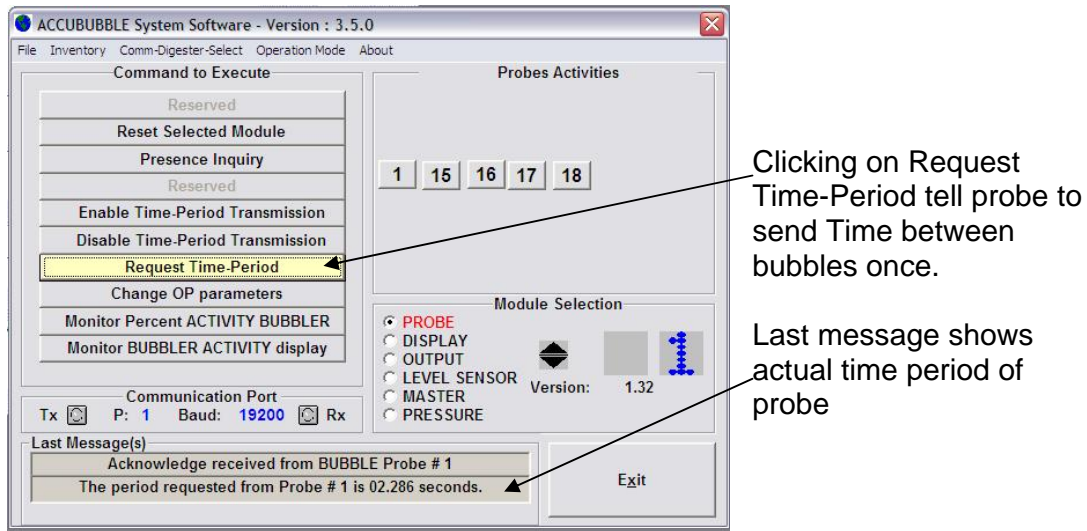


Clicking on Disable Time-Period Transmission will tell probe to stop transmitting period between bubbles

Last message shows that command has been received from probe

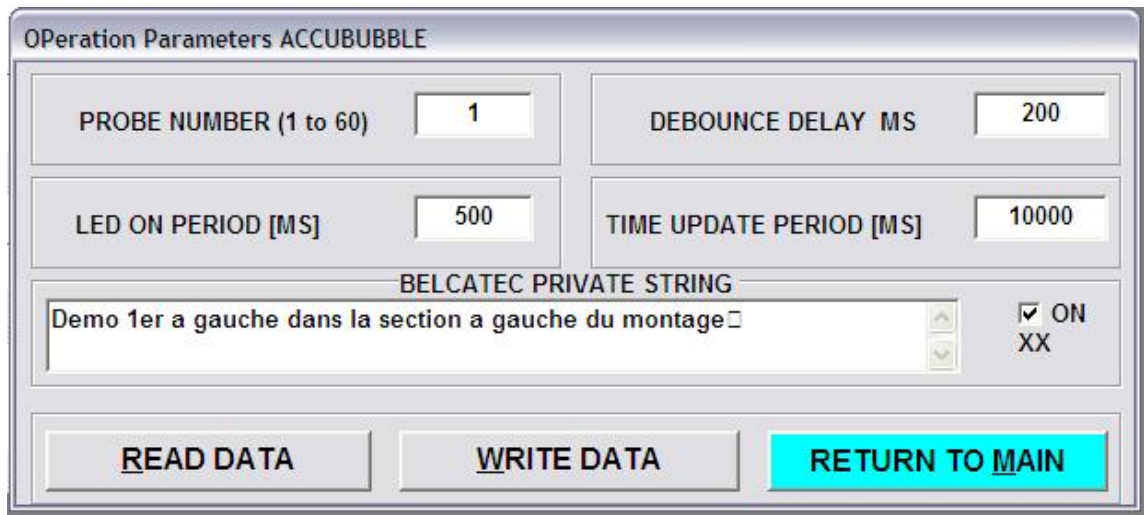
Request Time-Period

If a verification of time period is needed, following shows how to ask actual time period.

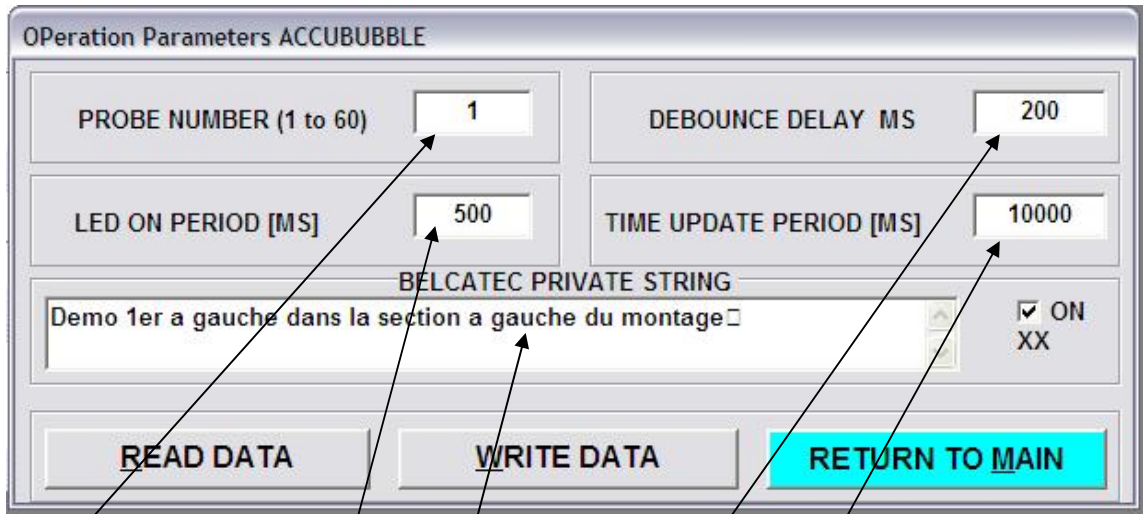


Change Operational Parameters

Clicking on [Change OP parameters] will show following window



See next page for more details



ACCUBUBBLE probe number may be changed
 If you change probe number be sure that number not already exists. Verification is done before changing number. Two components cannot have same assignation number. Example shows probe number #1

DEBOUNCE DELAY MS can be changed
 DEBOUNCE DELAY is time period after detection of bubble when probe is not active allowing precise reading by eliminating bouncing of bubble detection signal. Example shows Debounce Delay 0.2 Sec.

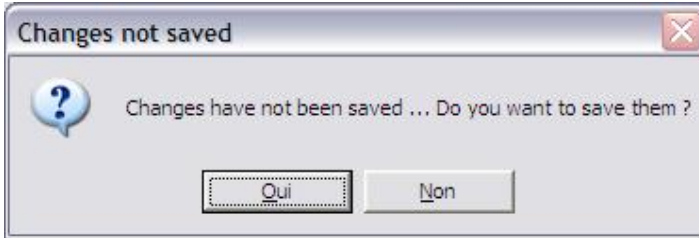
LED ON PERIOD can be changed
 LED ON PERIOD is time LED atop of ACCUBUBBLE probe is illuminated. Example shows 0.5 sec of illumination.

TIME UPDATE PERIOD can be changed
 TIME UPDATE PERIOD is time interval of probe sending period when function is activated. Example shows period of 10 sec. between each send.

BELCATEC PRIVATE STRING can be changed
 BELCATEC PRIVATE STRING is used to identify probe, location, number or anything else of useful information. Text is not use for monitoring purpose but only for reference.

Clicking on [WRITE DATA] will write changed parameters to component.
 Clicking on [RETURN TO MAIN] will return to main window.

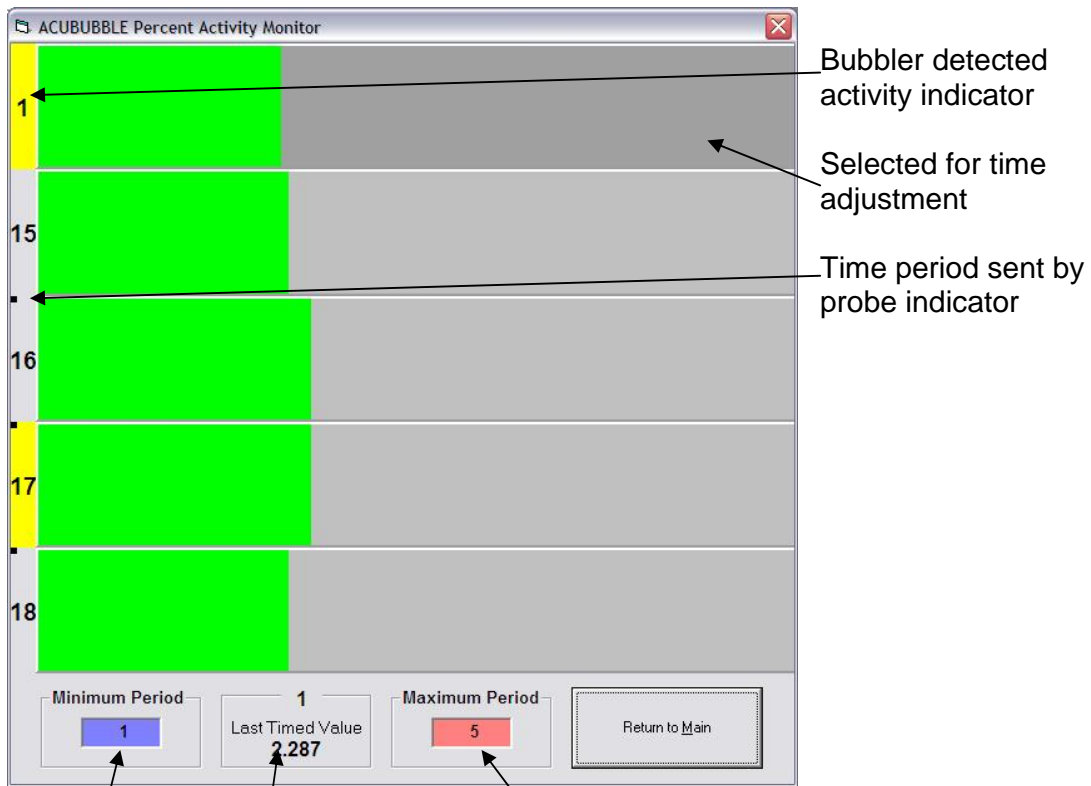
If changed parameters were not saved following window will shows.



Clicking on [YES] (oui) will saved to component and return to main window.
Clicking on [NO] (non) will not saved changes.

MONITOR PERCENT ACTIVITY BUBBLER

Clicking on [MONITOR PERCENT ACTIVITY BUBBLER] will show window



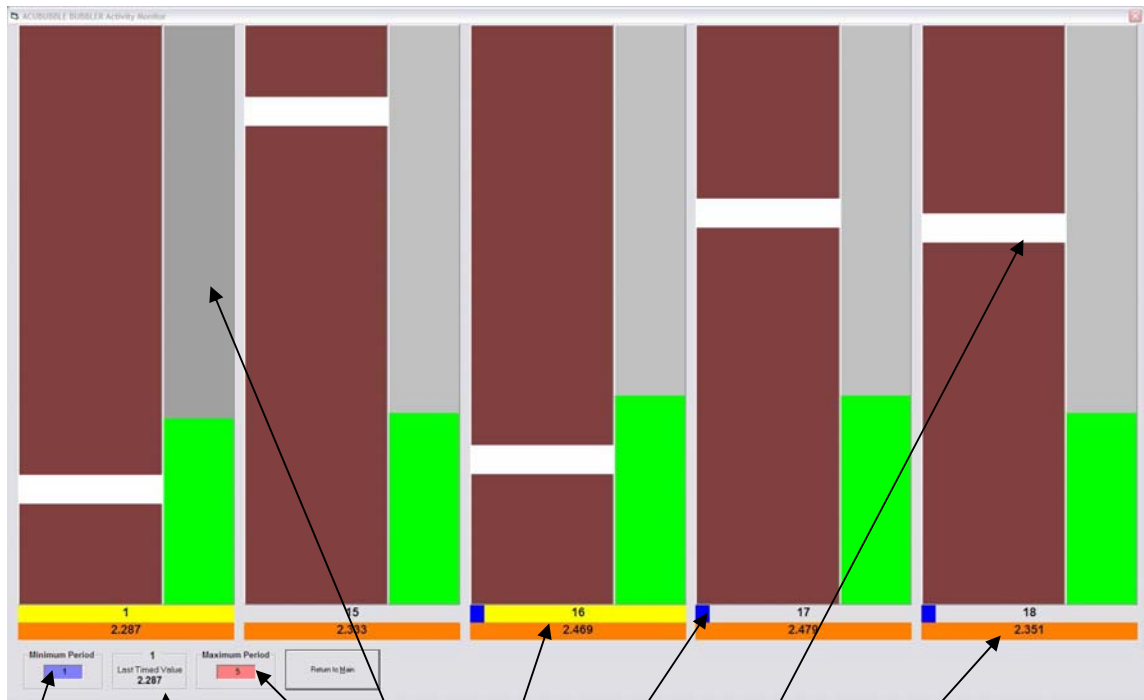
Minimum period to center display, Maximum period to center display

Actual time period of selected probe.

Preceding window allows adjusting green bars to be centered or close to center. By the fact allows seeing in a blink, if bubblers in digester are running fine. Clicking somewhere on row area of probe number will selected it and you can modify time for minimum or maximum to center green bar. Software recorded new value in file. Blue bar means period is shorter than minimum. Red bar means period is longer than maximum. Clicking [Return to Main] will close window and shows main window.

MONITOR BUBBLER ACTIVITY DISPLAY

Clicking on [MONITOR BUBBLER ACTIVITY DISPLAY] will show window



- Bubbler detected activity indicator
- Selected for time adjustment
- Time period sent by probe indicator
- Minimum period to centered display, Maximum period to center display
- Actual time period of selected probe.
- Animation bubble moving up in digester



Similar as percent display window bubble activity display shows bubbler activity, with green bar, with time period sent indicators, actual time period and animation showing bubbles going up in mixer. A fix time of 2.5 second is set for animated movement. Time of yellow strips is fixed at 1 second.

It is also possible to modify minimum and maximum to center green bars.

Click on column selects probe to work with.

If blue bar, time period is lower than minimum.

If red bar, time period is higher than maximum.

Display is running in real time but may occasionally stop for a short moment, Sorry Window Operating System may have some others jobs to do.

Display will automatically adjust size of column to fit 90% of monitor.
All ACCUBUBBLE PROBE's of digester are shown.

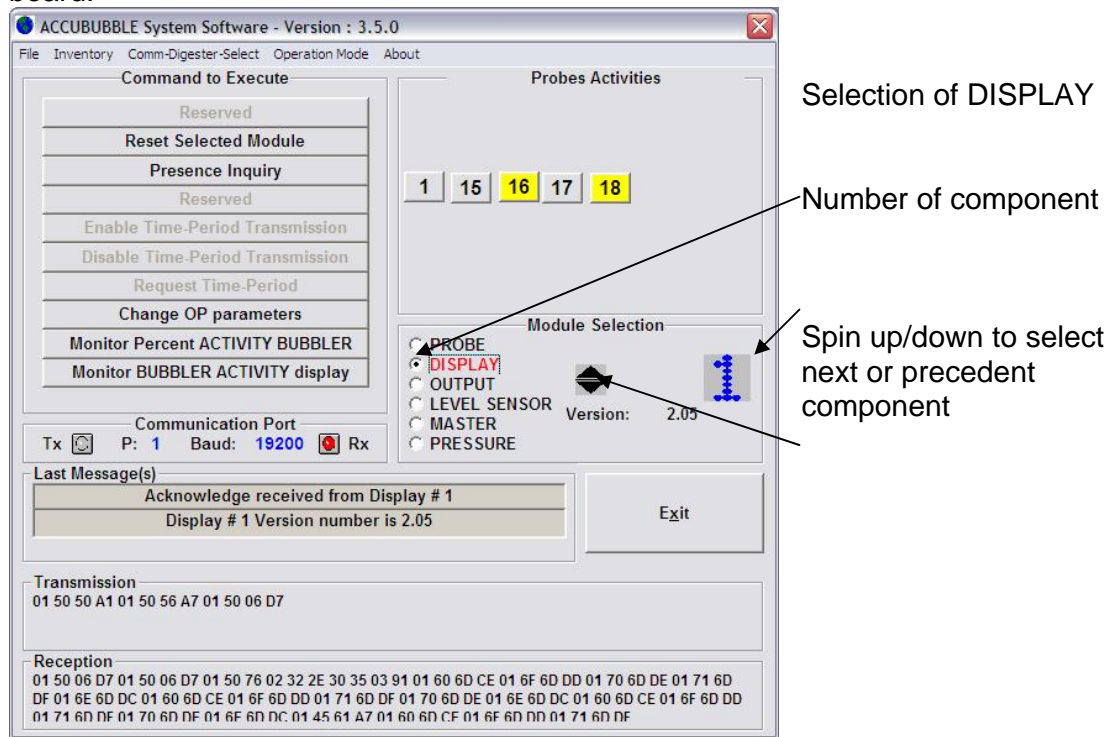
When showing display, processor is quiet busy.

Clicking to [RETURN TO MAIN] will close window and return to main window.

2.2-Display BOARD ACTIVITIES MIMIC monitor

Display board activity called MIMIC is used to show on centralized point bubblers activity. Usually build using plastic support which includes LED's. Each LED represents one bubbler. Drawing on plastic board is engraved and shows view of top digester. Assembly usually includes MIMIC board to connect and controlled LED's. This section of manual shows how to access and setup MIMIC board.

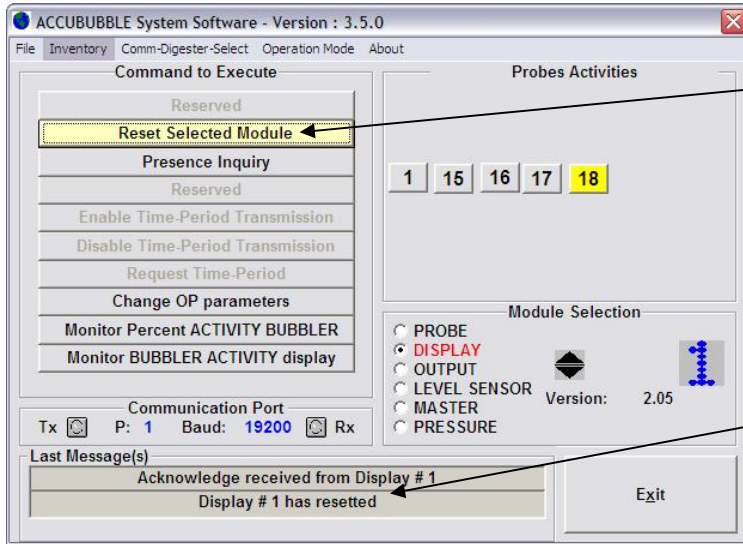
When main window is shown clicking on Radio Button [Display] will select MIMIC board.



As you can see choice of operation are limited. Compare to ACCUBUBBLE

Clicking on [Reset Selected Module] will send reset command to MIMIC board

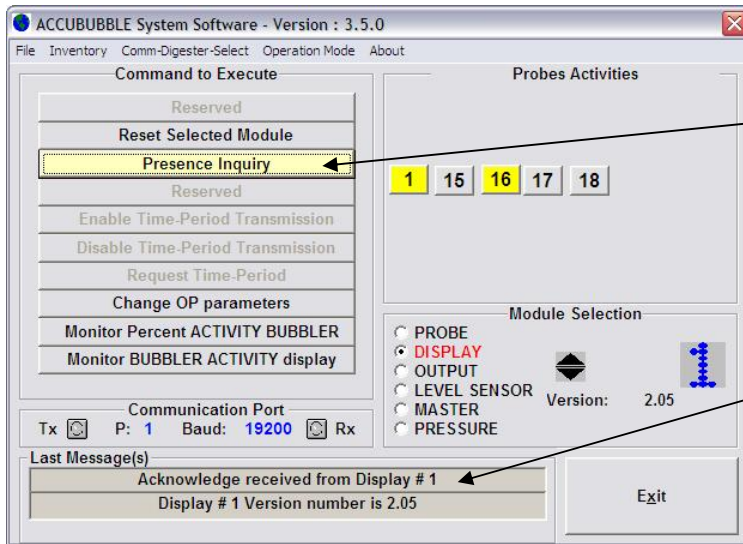
Next figure shows Reset command



Reset command was clicked.

Last message indicate action executed.

Clicking on [Presence Inquiry], next figure show

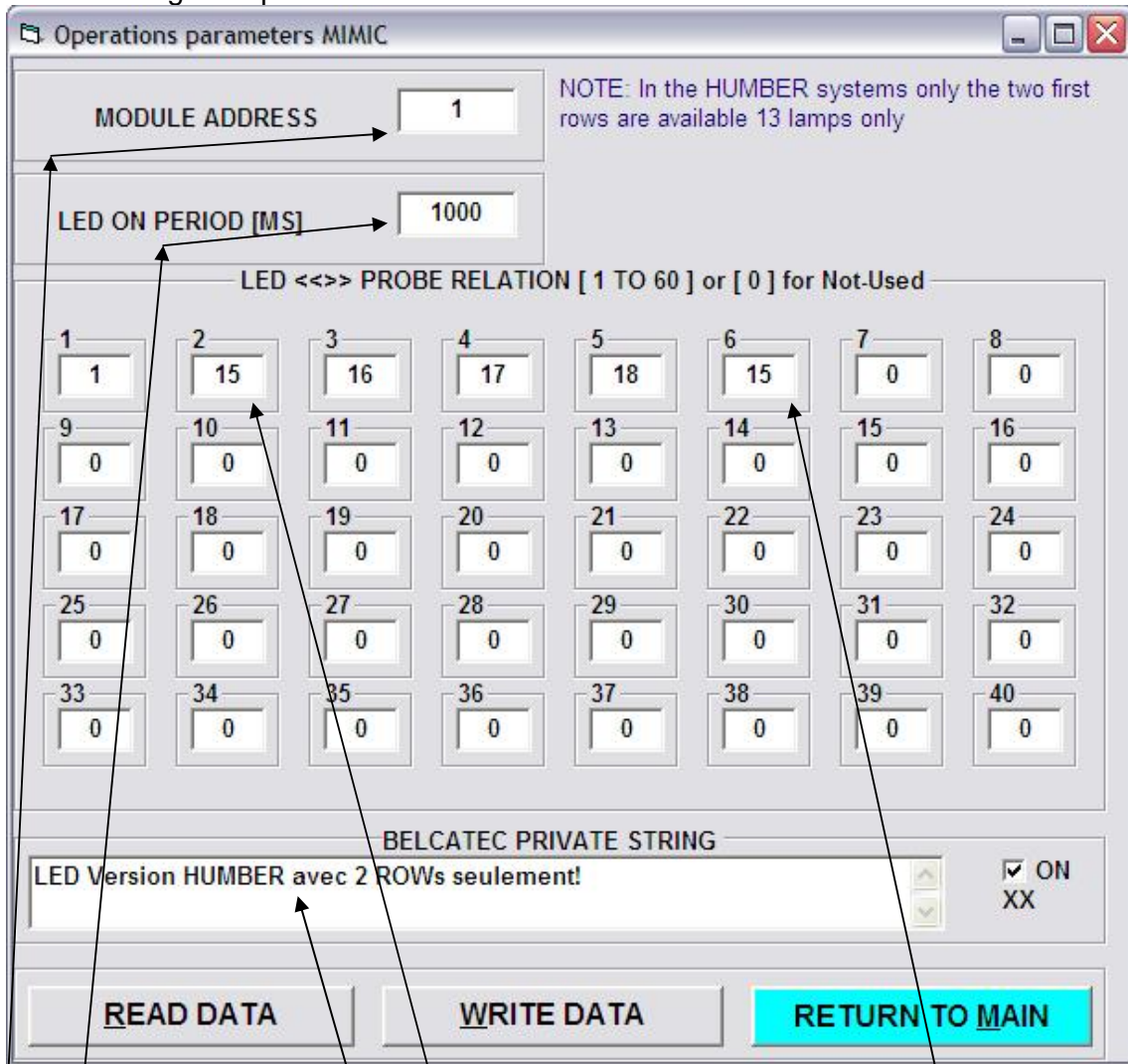


Presence Inquiry was clicked.

Last message indicates presence and version of component.

Clicking on [Change OP parameters] allows changing assignation of LED's on MIMIC display to ACCUBUBBLE number. Following window is shown.

MIMIC change OP parameters



Operations parameters MIMIC

NOTE: In the HUMBER systems only the two first rows are available 13 lamps only

MODULE ADDRESS: 1

LED ON PERIOD [MS]: 1000

LED <<>> PROBE RELATION [1 TO 60] or [0] for Not-Used

1	2	3	4	5	6	7	8
1	15	16	17	18	15	0	0
9	10	11	12	13	14	15	16
0	0	0	0	0	0	0	0
17	18	19	20	21	22	23	24
0	0	0	0	0	0	0	0
25	26	27	28	29	30	31	32
0	0	0	0	0	0	0	0
33	34	35	36	37	38	39	40
0	0	0	0	0	0	0	0

BELCATEC PRIVATE STRING

LED Version HUMBER avec 2 ROWs seulement!

ON
 XX

READ DATA WRITE DATA RETURN TO MAIN

Component number may be changed

LED on period may be changed. Value set is 1 Sec.

Assignations to ACCUBUBBLE probe may be changed more than one LED by ACCUBUBBLE is allowed.

Belcaterc string may be changed

Clicking on [RETURN TO MAIN] will show main window.

Assignation number is dependant of MIMIC wiring. See technical manual of your installation and specification of MIMIC board.

2.3-OUTPUT BOARD

OUTPUT BOARD is interfacing signal from ACCUSYSTEM to external world like user PLC. 24 output lines are available. They are connected trough, output relay board or output opto isolated board, to isolate ACCUSYSTEM from external inputs of user PLC.

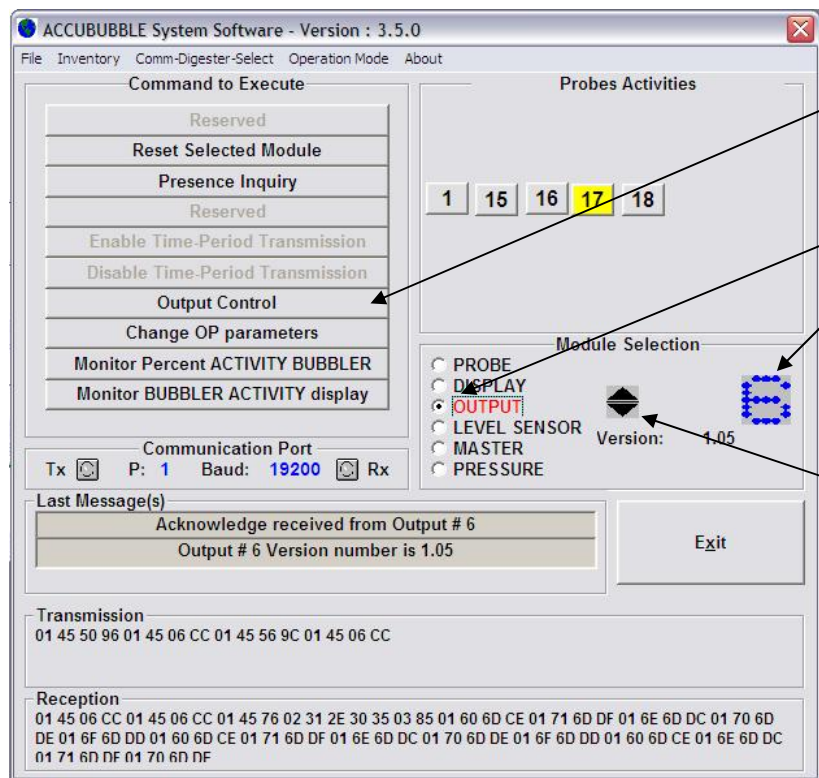
18 different modes are available for each output lines.

This section explains how to modify each line

Depending of selected mode control may be available on line.

This section explains how to do control on programmed lines.

Selection of OUTPUT radio button will change main window as:



The screenshot shows the ACCUBUBBLE System Software interface. The 'Command to Execute' section on the left lists various actions, with 'Output Control' highlighted. The 'Probes Activities' section on the right shows a row of buttons numbered 1, 15, 16, 17, and 18, with '17' highlighted in yellow. The 'Module Selection' section at the bottom has radio buttons for PROBE, DISPLAY, OUTPUT (selected), LEVEL SENSOR, MASTER, and PRESSURE. A spin button is visible next to the 'OUTPUT' radio button. The 'Last Message(s)' section shows 'Acknowledge received from Output # 6' and 'Output # 6 Version number is 1.05'. The 'Transmission' and 'Reception' sections show hexadecimal data.

Note: New command is shown [Output Control]

Selection of OUTPUT

Number of component

Spin up/down to select next or precedent component

Clicking on [Reset Selected Module] will send Reset command to component. Resetting OUTPUT will stopped any running control. During initialization of OUTPUT all lines are cleared. After restart; output lines are set to corresponding programmed values.



Clicking on [Change OP parameters] will show following window

Operations Parameters OUTPUT

OUT POINT	PROBE NUMBER	OPERATION TYPE CODE	FUNCTION	VALUE IN 1/10 OF UNITS		
				TIME--1	TIME--2	TIME--3
1	14	2	PROBE BUBBLE NEG.	10	SEC	
2	15	2	PROBE BUBBLE NEG.	10	SEC	
3	16	2	PROBE BUBBLE NEG.	10	SEC	
4	17	2	PROBE BUBBLE NEG.	10	SEC	
5	18	2	PROBE BUBBLE NEG.	10	SEC	
6	1	6	HIGH ALARM NEG.	20	SEC	20 SEC
7	1	7	LOW HIGH AL. POS.	30	SEC	20 SEC
8	1	8	LOW HIGH AL. NEG.	30	SEC	20 SEC
9	0	0	NO OPERATION			
10	0	17	ONE SHOT POS.	20	SEC	
11	0	18	ONE SHOT POS.	10	MIN	
12	0	19	ONE SHOT NEG.	20	SEC	
13	0	20	ONE SHOT NEG.	30	MIN	
14	0	21	PULSE POS.	10	SEC	10 SEC
15	0	22	PULSE POS.	20	SEC	5 MIN
16	0	23	PULSE POS.	5	MIN	5 MIN
17	0	24	PULSE NEG.	20	SEC	20 SEC
18	0	25	PULSE NEG.	20	SEC	5 MIN
19	0	16	DIRECT DATA			
20	14	1	PROBE BUBBLE POS.	10	SEC	
21	15	1	PROBE BUBBLE POS.	10	SEC	
22	16	1	PROBE BUBBLE POS.	10	SEC	
23	17	1	PROBE BUBBLE POS.	10	SEC	
24	18	1	PROBE BUBBLE POS.	10	SEC	

BELCATEC PRIVATE STRING

prototype board the BLUE board

MODULE ADDRESS

OUT POINT identifies output line from 1-24

PROBE NUMBER variable, assigns probe number to output line.

CODE value is assigning mode of operation to output line.

8 modes are available for probe number.

10 modes are available for control.

Module address (component) number may be changed, also Belcaterc string.

If any value was changed clicking [RETURN TO MAIN] send reset to output board.



Following code values which can be used
If PROBE NUMBER is not (0).

If code value is 1 (**PROBE BUBBLE POS.**) output will follow signal from probe and activate output for duration of $\text{TIME-1} \times 1/10$ of second, every time probe detect piston bubble emission.

If code value is 2 (**PROBE BUBBLE NEG.**) output is always on, but will follow signal from probe and remove output for duration of $\text{TIME-1} \times 1/10$ of second, every time probe detect piston bubble emission.

If code value is 3 (**LOW ALARM POS.**) output board will activate output if time between interval of BUBBLE is longer than $\text{TIME-1} \times 1/10$ of second. Output will remain activated after reset for minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is shorter than TIME-1 .

If code value is 4 (**LOW ALARM NEG.**) output is always on, but will go off if time between interval of BUBBLE is longer than $\text{TIME-1} \times 1/10$ of second. Output will remain off after reset for minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is shorter than TIME-1 .

If code value is 5 (**HIGH ALARM POS.**) output board will activate output if time between interval of BUBBLE is shorter than $\text{TIME-1} \times 1/10$ of second. Output will remain activated after reset for the minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is longer than TIME-1 .

If code value is 6 (**HIGH ALARM NEG.**) output is always on, but will go off if time between interval of BUBBLE is shorter than $\text{TIME-1} \times 1/10$ of second. Output will remain off after reset for minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is longer than TIME-1 .

If code value is 7 (**LOW HIGH AL. POS.**) output board will activate output if time between interval of BUBBLE is longer than $\text{TIME-1} \times 1/10$ of second or shorter than $\text{TIME-2} \times 1/10$ of second. Output will remain activated after reset for minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is shorter than TIME-1 and longer than TIME-2 .

If code value is 8 (**LOW HIGH AL. NEG.**) output is always on, but will turn off if time between interval of BUBBLE is longer than $\text{TIME-1} \times 1/10$ of second or shorter than $\text{TIME-2} \times 1/10$ of second. Output will remains off after reset for minimum duration of $\text{TIME-3} \times 1/10$ of second. Alarm resets if rate is shorter than TIME-1 and longer than TIME-2 .



If PROBE NUMBER IS 0

If code value is 16 (**DIRECT DATA**) output is activate or put to off by command from OUTPUT CONTROL (See CONTROL windows)

If code value is 17 (**ONE SHOT POS SEC**) output is activate by command from OUTPUT CONTROL and remains activated for duration of TIME-1*1/10 of second. When time is exhausted output return to off. OUTPUT CONTROL may retrigger timer.

If code value is 18 (**ONE SHOT POS MIN**) output is activate by command from OUTPUT CONTROL and remains activated for duration of TIME-1*1/10 of minute. When time is exhausted output return to off. OUTPUT CONTROL may retrigger timer.

If code value is 19 (**ONE SHOT NEG SEC**) output is always on. It is put to off by command from OUTPUT CONTROL and remains off for duration of TIME-1*1/10 of second. When time is exhausted output returns to on. OUTPUT CONTROL may retrigger timer.

If code value is 20 (**ONE SHOT NEG MIN**) output is always on. It is put to off by command from OUTPUT CONTROL and remains off for duration of TIME-1*1/10 of minute. When time is exhausted output returns to on. OUTPUT CONTROL may retrigger timer.

If code value is 21 (**PULSE POS. SEC.SEC**) output is activate by command from OUTPUT CONTROL and cycle on off for duration of TIME-1*1/10 of second (ON time) TIME-2*1/10 of second (OFF time). Sequencer is turn on off by a command in OUTPUT CONTROL

If code value is 22 (**PULSE POS. SEC.MIN**) output is activate by command from OUTPUT CONTROL and cycle on off for duration of TIME-1*1/10 of second (ON time) TIME-2*1/10 of minute (OFF time). Sequencer is turn on off by a command in OUTPUT CONTROL

If code value is 23 (**PULSE POS. MIN.MIN**) output is activate by command from OUTPUT CONTROL and cycle on off for duration of TIME-1*1/10 of minute (ON time) TIME-2*1/10 of minute (OFF time). Sequencer is turn on off by a command in OUTPUT CONTROL

If code value is 24 (**PULSE NEG. SEC.SEC**) output is always on. Sequencer is started by command from OUTPUT CONTROL and cycle off on for duration of TIME-1*1/10 of second (OFF time) TIME-2*1/10 of second (ON time). Sequencer is turned off by command in OUTPUT CONTROL

If code value is 25 (**PULSE NEG. SEC.MIN**) output is always on. Sequencer is started by command from OUTPUT CONTROL and cycle off on for duration of TIME-1*1/10 of second (OFF time) TIME-2*1/10 of minute (ON time). Sequencer is turned off by command in OUTPUT CONTROL

Any other codes are not valid and will reset code value to 0 (**NO OPERATION**)

Clicking [RETURN TO MAIN] will show main window

In man window clicking [Output Control] will show following window

OUT POINT	ACT-STOP or BP#		OPERATION TYPE CODE	FUNCTION	VALUE IN 1/10 OF UNITS		
					TIME--1	TIME--2	TIME--3
1		14	2	PROBE BUBBLE NEG.	10	SEC	
2		15	2	PROBE BUBBLE NEG.	10	SEC	
3		16	2	PROBE BUBBLE NEG.	10	SEC	
4		17	2	PROBE BUBBLE NEG.	10	SEC	
5		18	2	PROBE BUBBLE NEG.	10	SEC	
6		1	6	MAX. ALARME NEG.	20	SEC	20 SEC
7		1	7	MIN. MAX POS.	30	SEC	20 SEC
8		1	8	MIN. MAX NEG.	30	SEC	20 SEC
9			0	NO OPERATION			
10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17	ONE SHOT POS.	20	SEC	
11	<input type="checkbox"/>	<input type="checkbox"/>	18	ONE SHOT POS.	10	MIN	
12	<input type="checkbox"/>	<input type="checkbox"/>	19	ONE SHOT NEG.	20	SEC	
13	<input type="checkbox"/>	<input type="checkbox"/>	20	ONE SHOT NEG.	30	MIN	
14	<input type="checkbox"/>	<input type="checkbox"/>	21	PULSE POS.	10	SEC	10 SEC
15	<input type="checkbox"/>	<input type="checkbox"/>	22	PULSE POS.	20	SEC	5 MIN
16	<input type="checkbox"/>	<input type="checkbox"/>	23	PULSE POS.	5	MIN	5 MIN
17	<input type="checkbox"/>	<input type="checkbox"/>	24	PULSE NEG.	20	SEC	20 SEC
18	<input type="checkbox"/>	<input type="checkbox"/>	25	PULSE NEG.	20	SEC	5 MIN
19	<input type="checkbox"/>	<input type="checkbox"/>	16	DIRECT DATA			
20		14	1	PROBE BUBBLE POS.	10	SEC	
21		15	1	PROBE BUBBLE POS.	10	SEC	
22		16	1	PROBE BUBBLE POS.	10	SEC	
23		17	1	PROBE BUBBLE POS.	10	SEC	
24		18	1	PROBE BUBBLE POS.	10	SEC	

Module #

CHECK BOX <ACT> OR <STOP>

If OUT POINT was programmed to be controlled, clicking on green square will start programmed control, clicking on red square will stop it.

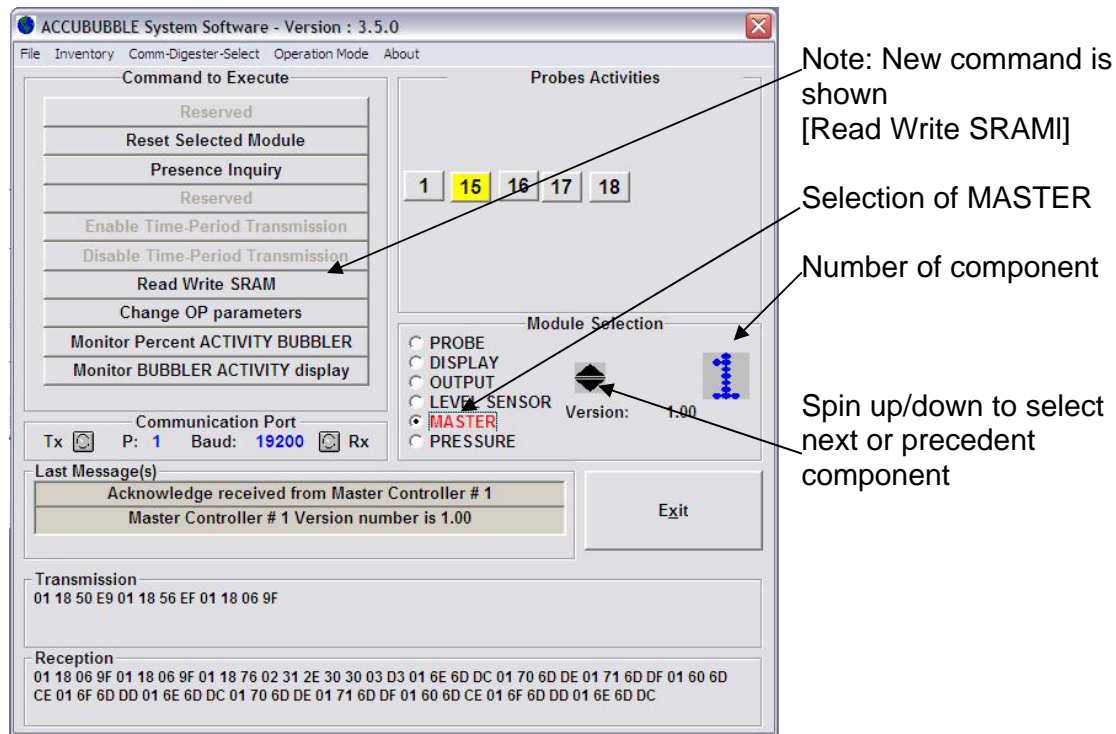
Clicking [RETURN TO MAIN] will remove window and shows main window.

2.4-ACCUMASTER CONTROLLER

MASTER CONTROLLER is a simple controller which can access, control and modify all components in ACCUSYSTEM. It is equipped with 4 lines of 20 characters and 4 keys keyboard.

This section explains how to modify ACCUMASTER behavior.

Clicking on [radio button MASTER] will show this main window



The screenshot shows the ACCUBUBBLE System Software interface. The 'Command to Execute' list includes: Reserved, Reset Selected Module, Presence Inquiry, Reserved, Enable Time-Period Transmission, Disable Time-Period Transmission, Read Write SRAM, Change OP parameters, Monitor Percent ACTIVITY BUBBLER, and Monitor BUBBLER ACTIVITY display. The 'Probes Activities' section shows a row of buttons numbered 1 to 18, with button 15 highlighted in yellow. The 'Module Selection' section has radio buttons for PROBE, DISPLAY, OUTPUT, LEVEL SENSOR, MASTER (selected), and PRESSURE. A spin button is located next to the MASTER selection. The 'Communication Port' section shows Tx and Rx status, P: 1, and Baud: 19200. The 'Last Message(s)' section displays: 'Acknowledge received from Master Controller # 1' and 'Master Controller # 1 Version number is 1.00'. The 'Transmission' section shows the hex string: 01 18 50 E9 01 18 56 EF 01 18 06 9F. The 'Reception' section shows the hex string: 01 18 06 9F 01 18 06 9F 01 18 76 02 31 2E 30 30 03 D3 01 6E 6D DC 01 70 6D DE 01 71 6D DF 01 60 6D CE 01 6F 6D DD 01 6E 6D DC 01 70 6D DE 01 71 6D DF 01 60 6D CE 01 6F 6D DD 01 6E 6D DC. Annotations with arrows point to: 'Note: New command is shown [Read Write SRAM!]' pointing to the 'Read Write SRAM' button; 'Selection of MASTER' pointing to the 'MASTER' radio button; 'Number of component' pointing to the highlighted button '15' in the 'Probes Activities' section; and 'Spin up/down to select next or precedent component' pointing to the spin button next to the 'MASTER' radio button.

Clicking on [Reset Selected Module] will send Reset command to component.

Clicking on [Presence Inquiry] will show presence in last message lines

Clicking on Change OP parameters will show following window.

ACCUMASTER CHANGE OPERATION PARAMETERS



Component number (DEVICE ADDRESS) may be changed.

Language of operation may be changed.

OP CODE (operation code) may be changed; by adding respective value up to 31. It allows ACCUMASTER to work with component in system.

Clicking [RETURN TO MAIN] will close window and return to main window.

ACCUMASTER is built using micro controller and static RAM (equipped with real time clock) maintained by lithium battery.

Data in SRAM are used to maintain texts for it display for both languages French or English.

Data in SRAM use numeric values to control the behavior of ACCUMASTER.

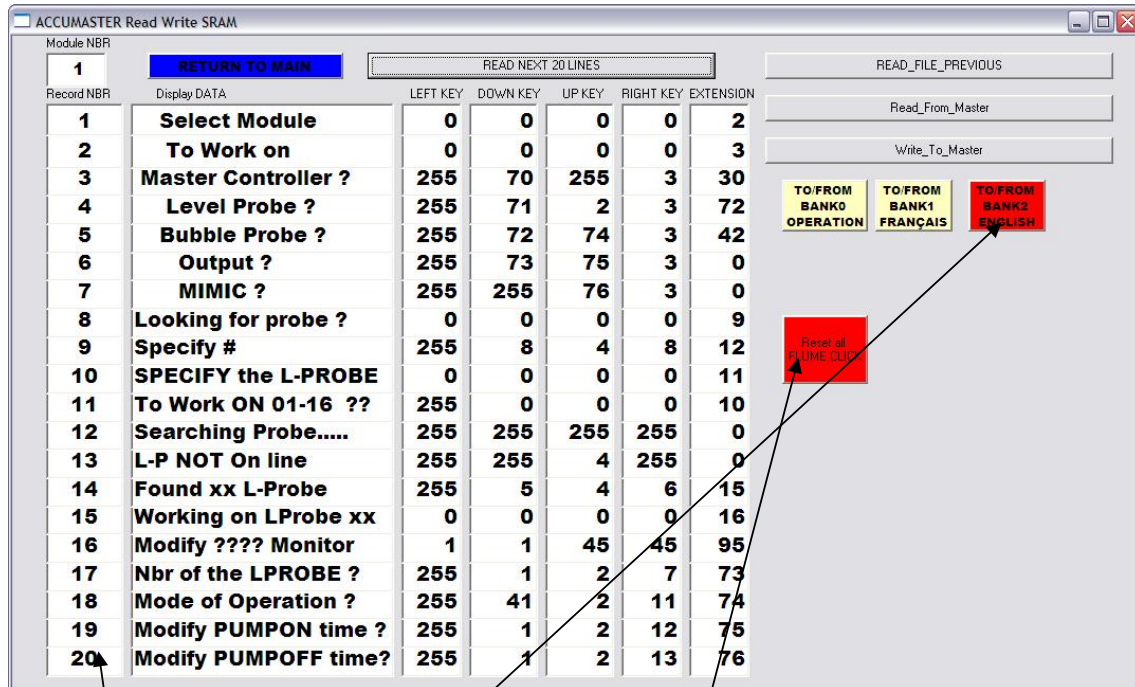
Tough it is possible to change texts and numeric values **it is not recommended**. Especially numeric values it may create endless loop or bizarre operations.

Doing changes in SRAM other than texts may require reloading SRAM from factory default which is only available from factory.

You can change texts for your used operations but leave numeric not changed.

Clicking [Read Write SRAM] will show following window.

Window of Read Write SRAM



Record NBR	Display DATA	LEFT KEY	DOWN KEY	UP KEY	RIGHT KEY	EXTENSION
1	Select Module	0	0	0	0	2
2	To Work on	0	0	0	0	3
3	Master Controller ?	255	70	255	3	30
4	Level Probe ?	255	71	2	3	72
5	Bubble Probe ?	255	72	74	3	42
6	Output ?	255	73	75	3	0
7	MIMIC ?	255	255	76	3	0
8	Looking for probe ?	0	0	0	0	9
9	Specify #	255	8	4	8	12
10	SPECIFY the L-PROBE	0	0	0	0	11
11	To Work ON 01-16 ??	255	0	0	0	10
12	Searching Probe.....	255	255	255	255	0
13	L-P NOT On line	255	255	4	255	0
14	Found xx L-Probe	255	5	4	6	15
15	Working on LProbe xx	0	0	0	0	16
16	Modify ???? Monitor	1	1	45	45	95
17	Nbr of the LPROBE ?	255	1	2	7	73
18	Mode of Operation ?	255	41	2	11	74
19	Modify PUMPON time ?	255	1	2	12	75
20	Modify PUMPOFF time?	255	1	2	13	76

Selected language file is English.

255 lines are available to enter text.

To reset ALL [flume click] click of this red square (See ACCULEVEL specifications)

IT IS NOT RECOMMENDED TO CHANGE TEXTS OR NUMERIC VALUES which are controlling MASTER CONTROLLER key pressed behavior.

If modification is made you must press on [Write To Master] to implement them.

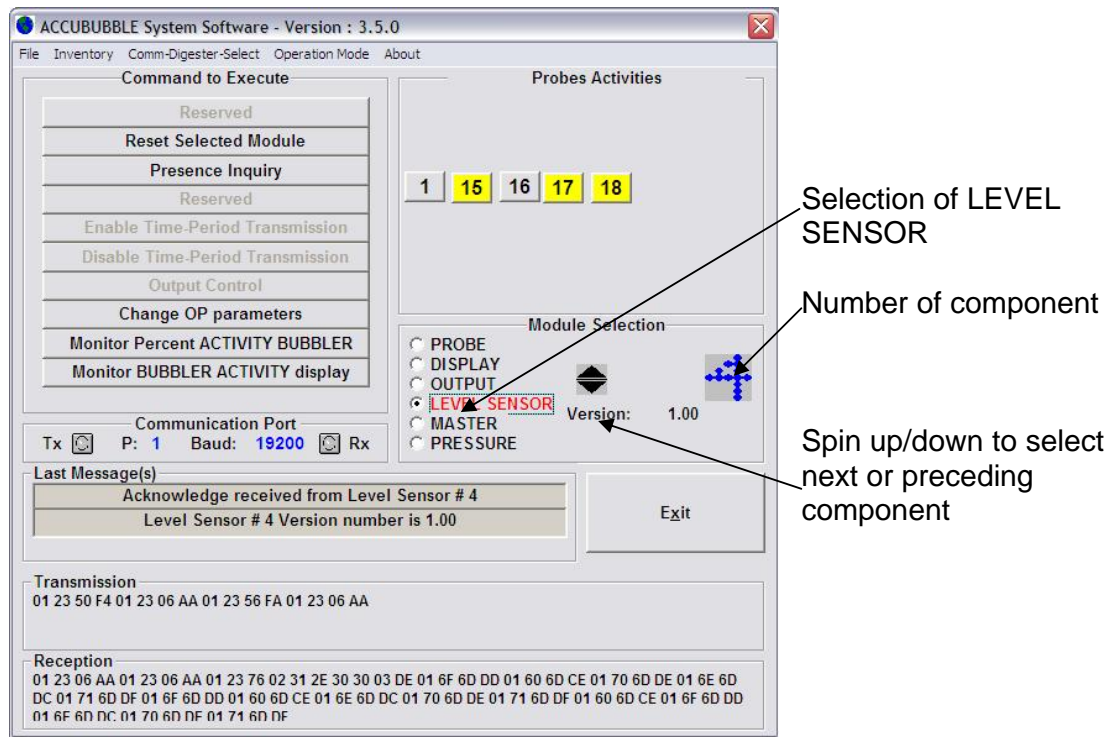
Clicking on [RETURN TO MAIN] will show main window.

2.5-ACCULEVEL CONTROLLER

ACCULEVEL CONTROLLER is pressure sensible controller which can measure level of liquid using hydrostatic pressure. Rig with gas pump or other means, ACCULEVEL is able to measure levels from 0 to 54 feet of liquid height. ACCULEVEL using both pressure sensors may be used for level differential controls
 ACCULEVEL may also be used for measuring flow of WIER or PARSHALL FLUME and may be used for measuring vessel level and quantity.
 ACCURACY is very sensible: 0.0125" of water column per step of measure
 Build with three isolated digital outputs and one isolated 4-20 mA transducers.

This section explains how to adjust parameters of operation.

Clicking on [radio button LEVEL SENSOR] will show this main window



Clicking on [Reset Selected Module] will send Reset command to component.

Clicking on [Presence Inquiry] will show presence in last message lines

Clicking on Change OP parameters will show following window.

ACCULEVEL CHANGE OPERATION PARAMETERS

Operations Parameters ACCULEVEL BASIC

DEVICE #	MODE OPERATION	MODEL
4	1-16	2
1-16	2	0-2
4	1-16	2

FLUME Setting **ACCULEVEL**

Set ZERO

CALIBRATION MAX VALUE: 65535
7920

STEP 4-20 /1000 MAX VALUE 65535
2287

PUMP TIME-ON mS MAX VALUE 65535
500

PUMP TIME-OFF mS MAX VALUE 65535
30000

LEVEL1 S.P. ON MAX VALUE 65535
520

LEVEL1 S.P. OFF MAX VALUE 65535
420

LEVEL2 S.P. ON MAX VALUE 65535
750

LEVEL2 S.P. OFF MAX VALUE 65535
650

OFFSET MAX VALUE 65535
0

INCH/STEP /100,000 MAX 65535
1250

Millimeter/STEP /100,000 MAX 65535
31750

LOCKING KEY 4 DIGITS one digit per value

6	3	5	3
K1	K2	OPTO	
1	2	0	

0=Air Pump Control 1=L1 Control
2=L2 Control 3=Flume Pulse
4=Always ON

A/D VALUE: 3188 [R]

D/A VALUE: 8720 [R]

ACTUAL LEVEL: 3 [R]

INCHES: 0.03750

Millimeter: 0.95250

AUTO READ: [I] [O]

READ DATA WRITE DATA RETURN TO MAIN

Component number may be change

Mode of operation may be change (See ACCULEVEL specifications)

Model may be change but it is set at factory for reference only. **DO NOT CHANGE IT**

Clicking on [R] will get actual level and others values

See next page for more...

Operations Parameters ACCULEVEL BASIC

DEVICE #	MODE OPERATION	MODEL	ACCULEVEL	
4	1-16	2	0-2	1
CALIBRATION MAX VALUE: 65535				
7920		Set ZERO	A/D VALUE	D/A VALUE
STEP 4-20 /1000 MAX VALUE 65535		S	3188	8720
2287			R	R
PUMP TIME-ON mS MAX VALUE 65535				
500			ACTUAL LEVEL	
PUMP TIME-OFF mS MAX VALUE 65535			AUTO READ	
30000			I O	
LEVEL1 S.P. ON MAX VALUE 65535			INCHES	
520			0.03750	
LEVEL1 S.P. OFF MAX VALUE 65535			Millimeter	
420			0.95250	
LEVEL2 S.P. ON MAX VALUE 65535				
750				
LEVEL2 S.P. OFF MAX VALUE 65535				
650				
OFFSET MAX VALUE 65535				
0				
INCH/STEP /100,000 MAX 65535				
1250				
Millimeter/STEP /100,000 MAX 65535				
31750				
LOCKING KEY 4 DIGITS one digit per value				
6	3	5	3	
K1	K2	OPTO		
1	2	0		
0=Air Pump Control 1=L1 Control				
2=L2 Control 3=Flume Pulse				
4=Allways ON				

READ DATA WRITE DATA RETURN TO MAIN

Multiplicator for 4-20 mA transducer may be change

Pump ON time may be change

Pump OFF time may be change

Level 1 ON Set Point may be change

Level 1 OFF Set Point may be change

See next page for more....

Operations Parameters ACCULEVEL BASIC

DEVICE #	MODE OPERATION	MODEL	ACCULEVEL	
4	1-16	2	0-2	1
CALIBRATION MAX VALUE: 65535				
STEP 4-20 /1000 MAX VALUE 65535		Set ZERO	A/D VALUE	D/A VALUE
7920		S	3188	8720
2287			R	R
PUMP TIME-ON mS MAX VALUE 65535				
500		ACTUAL LEVEL		AUTO READ
PUMP TIME-OFF mS MAX VALUE 65535		3		I O
30000		INCHES		Millimeter
LEVEL1 S.P. ON MAX VALUE 65535		0.03750		0.95250
LEVEL1 S.P. OFF MAX VALUE 65535		R		
420				
LEVEL2 S.P. ON MAX VALUE 65535				
750				
LEVEL2 S.P. OFF MAX VALUE 65535				
650				
OFFSET MAX VALUE 65535				
0				
INCHES/STEP /100,000 MAX 65535				
1250				
Millimeter/STEP /100,000 MAX 65535				
31750				
LOCKING KEY 4 DIGITS one digit per value				
6	3	5	3	
K1	K2	OPTO		
1	2	0		
0=Air Pump Control 1=L1 Control				
2=L2 Control 3=Flume Pulse				
4=Always ON				

READ DATA WRITE DATA RETURN TO MAIN

Level 2 ON Set Point may be change

Level 2 OFF Set Point may be change

OFFSET value may be change

INCHES/STEP may be change

Millimeter/STEP may be change

See next page for more...

Operations Parameters ACCULEVEL BASIC

DEVICE #	MODE OPERATION	MODEL
4	1-16	2
		0-2
		1

FLUME Setting **ACCULEVEL**

CALIBRATION MAX VALUE: 65535

STEP 4-20 /1000 MAX VALUE 65535 **7920** Set ZERO **S**

A/D VALUE **3188** D/A VALUE **8720**

PUMP TIME-ON mS MAX VALUE 65535 **2287**

PUMP TIME-OFF mS MAX VALUE 65535 **500**

LEVEL1 S.P. ON MAX VALUE 65535 **30000**

LEVEL1 S.P. OFF MAX VALUE 65535 **520**

LEVEL2 S.P. ON MAX VALUE 65535 **420**

LEVEL2 S.P. OFF MAX VALUE 65535 **750**

OFFSET MAX VALUE 65535 **650**

INCH/STEP /100,000 MAX 65535 **0**

Millimeter/STEP /100,000 MAX 65535 **1250**

31750

LOCKING KEY 4 DIGITS one digit per value

K1	K2	OPTO
6	3	5
3	5	3
1	2	0

0=Air Pump Control 1=L1 Control
2=L2 Control 3=Flume Pulse
4=Always ON

ACTUAL LEVEL **3** AUTO READ **I** **O**

INCHES **0.03750** Millimeter **0.95250**

READ DATA WRITE DATA RETURN TO MAIN

Locking codes may be change

Output assignments may be change

Auto Read may be start or stop

Clicking on [RETURN TO MAIN] will close window and show main window

Spin up/down is used for verify factory calibration

See next page for more...

Operations Parameters ACCULEVEL BASIC

DEVICE #	MODE OPERATION	MODEL
4	1-16	2 0-2

FLUME Setting **ACCULEVEL**

CALIBRATION MAX VALUE: 65535

7924
STEP 4-20 /1000 MAX VALUE 65535

2287
PUMP TIME-ON mS MAX VALUE 65535

500
PUMP TIME-OFF mS MAX VALUE 65535

30000
LEVEL1 S.P. ON MAX VALUE 65535

520
LEVEL1 S.P. OFF MAX VALUE 65535

420
LEVEL2 S.P. ON MAX VALUE 65535

750
LEVEL2 S.P. OFF MAX VALUE 65535

650
OFFSET MAX VALUE 65535

0
INCHE/STEP /100,000 MAX 65535

1250
Millimeter/STEP /100,000 MAX 65535

31750

LOCKING KEY 4 DIGITS one digit per value

6	3	5	3
K1	K2	OPTO	
1	2	0	

0=Air Pump Control 1=L1 Control
2=L2 Control 3=Flume Pulse
4=Allways ON

Set ZERO [S]

A/D VALUE 3186 [R]

D/A VALUE 8720 [R]

ACTUAL LEVEL 0 [R]

INCHES 0.00000

Millimeter 0.00000

AUTO READ [I] [O]

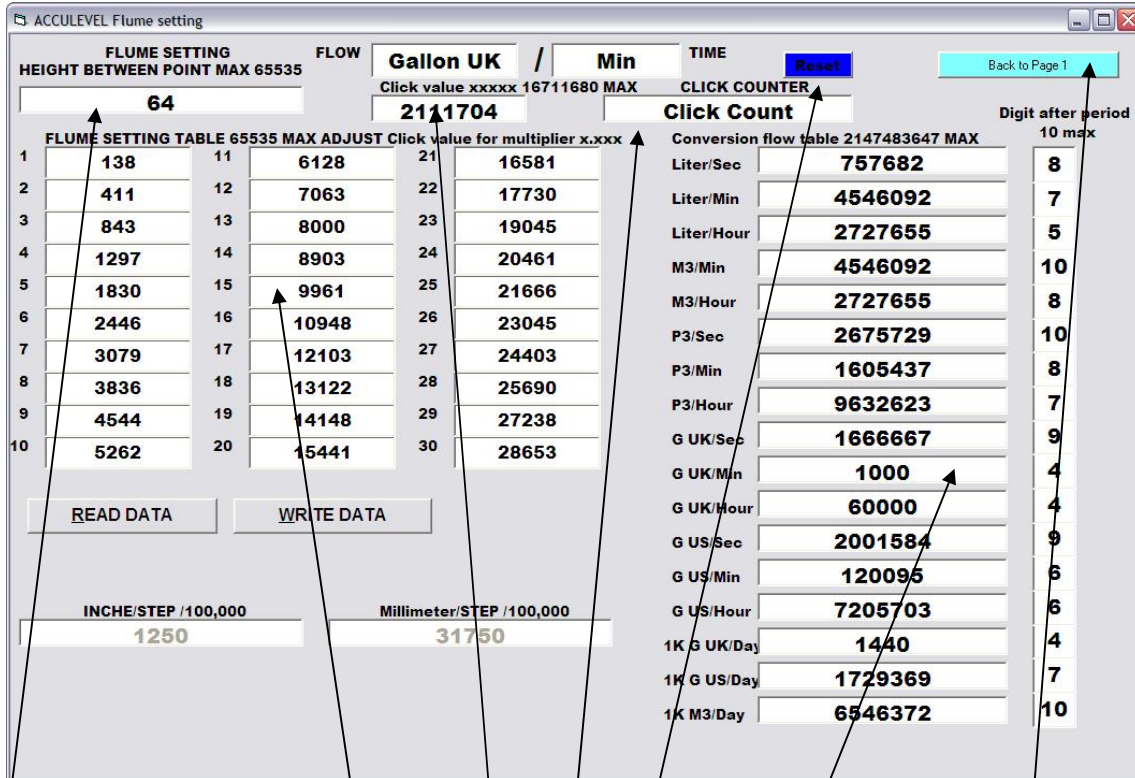
READ DATA WRITE DATA RETURN TO MAIN

Clicking or set zero [S] will set actual value to zero and adjust CALIBRATION value

If mode is 2 **FLUME** clicking on [FLUME Setting] will show next window

See next page.

FLUME setting allows changing parameters for Flume/Wier or vessel shape



The screenshot shows the 'ACCULEVEL Flume setting' window. It contains several input fields and tables:

- FLUME SETTING:** HEIGHT BETWEEN POINT MAX 65535, value: 64.
- FLOW:** Gallon UK / Min, value: 211704. Includes a 'Click value xxxxxx 16711680 MAX' field.
- CLICK COUNTER:** Click Count, value: 211704. Includes a 'Reset' button.
- Conversion flow table 2147483647 MAX:** A table with 10 rows and 2 columns. Values include 757682, 4546092, 2727655, 4546092, 2727655, 2675729, 1605437, 9632623, 1666667, 1000, 60000, 2001584, 120095, 7205703, 1440, 1729369, 6546372.
- Digit after period:** 10 max.
- INCH/STEP /100,000:** value: 1250.
- Millimeter/STEP /100,000:** value: 31750.
- Buttons:** READ DATA, WRITE DATA, Back to Page 1.

Height between setting point of FLUME or vessel shape may be changed

FLOW Value of FLUME (30 breakpoints) may be changed

Value of CLICK (10, 100, 1000 gallons or M3 or..) may be changed

Value of conversion table of FLOW and decimal position value may be changed

Click count are showing clicks real time click count

Clicking on [Reset] will reset click counter.

Clicking on [Back to Page 1] will close window and show back ACCULEVEL operations Parameters window.

Find more information's to set FLUME in ACCULEVEL specifications.



2.6-ACCUPRESSURE CONTROLLER

ACCUPRESSURE CONTROLLER is pressure sensible controller which can measure Pressure and do control. ACCUPRESSURE is able to measure pressure and vacuum from -5 PSI up to 30 PSI with accuracy steps of 0.0125" of water column.

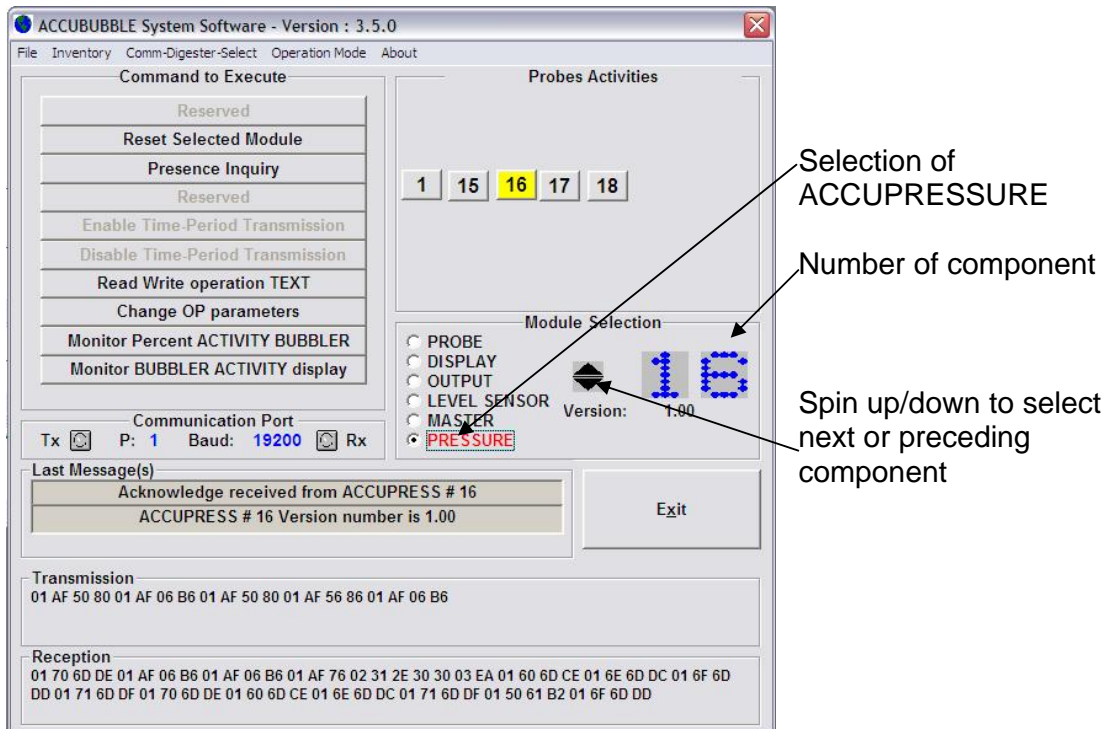
ACCUPRESSURE is built in Class I Division 1 Group B enclosure with glass window allowing seeing on the fluorescent display. (2 lines of 16 characters')

ACCUPRESSURE include tubing's with ½ union pressure port and two connector access for electrical connections. 14 wires may be connected for control purpose.

Build with three isolated digital outputs and one isolated 4-20 mA transducers.

This section explains how to adjust parameters of operation.

Clicking on [radio button PRESSURE] will show this main window



Clicking on [Reset Selected Module] will send Reset command to component.
 Clicking on [Presence Inquiry] will show presence in last message lines
 Clicking on Change OP parameters will show following window.

ACCUPRESSURE CHANGE OPERATION PARAMETERS

Operations Parameters ACCUPRESS BASIC

DEVICE #	MODE OPERATION	MODEL
16	0	1

ACCUPRESSURE

CALIBRATION MAX VALUE: 65535
 29240
 STEP 4-20 /1000 MAX VALUE 65535
 1
 LEVEL1 S.P. ON MAX VALUE 65535
 LEVEL1 S.P. OFF MAX VALUE 65535
 1000
 LEVEL2 S.P. ON MAX VALUE 65535
 LEVEL2 S.P. OFF MAX VALUE 65535
 900
 LEVEL3 S.P. ON MAX VALUE 65535
 LEVEL3 S.P. OFF MAX VALUE 65535
 2000
 1900
 3000
 2900
 OFFSET MAX VALUE 65535
 10
 INCH/STEP /100,000 MAX 65535
 1250
 Millimeter/STEP /100,000 MAX 65535
 31750

LOCKING KEY 4 DIGITS one digit per value
 6 3 5 3
 K1 K2 OPTO
 0 1 2

0=L1 Control
 1=L2 Control
 2=L3 Control

Set ZERO [S]

A/D VALUE: 2565 [R]
 D/A VALUE: 29872 [R]

ACTUAL LEVEL: 0 [R]
 INCHES: 0.12500
 Millimeter: 3.17500

AUTO READ: [I] [O]

READ DATA WRITE DATA RETURN TO MAIN

Display Intensity: 195 MAX, 110 HIGH, 80 LOW, DIM

Component number may be change

Mode of operation can not be change (Always zero)

Model may be change but it is set at factory for reference only. **DO NOT CHANGE IT**

Clicking on [R] will get actual pressure in 0.0125" of water column and others values

See next page for more...

Operations Parameters ACCUPRESS BASIC

DEVICE # 16 1-16 **MODE OPERATION** 0 0 **MODEL** 1 1-6 **ACCU PRESSURE** X20

CALIBRATION MAX VALUE: 65535
29240 Set ZERO A/D VALUE D/A VALUE
 STEP 4-20 /1000 MAX VALUE 65535 S 2565 29872 R R

1
 LEVEL 1 S.P. ON MAX VALUE 65535
1000
 LEVEL 1 S.P. OFF MAX VALUE 65535
900
 LEVEL 2 S.P. ON MAX VALUE 65535
2000
 LEVEL 2 S.P. OFF MAX VALUE 65535
1900
 LEVEL 3 S.P. ON MAX VALUE 65535
3000
 LEVEL 3 S.P. OFF MAX VALUE 65535
2900
 OFFSET MAX VALUE 65535
10
 INCHES/STEP /100,000 MAX 65535
1250
 Millimeter/STEP /100,000 MAX 65535
31750

ACTUAL LEVEL AUTO READ
0 I O
 INCHES R Millimeter
0.12500 **3.17500**

LOCKING KEY 4 DIGITS one digit per value
 6 3 5 3
 K1 K2 OPTO
 0 1 2
 0=L1 Control
 1=L2 Control
 2=L3 Control

Display Intensity
 195 MAX
 110 HIGH
 80 LOW
 DIM

READ DATA WRITE DATA RETURN TO MAIN

Multiplicator for 4-20 mA transducers may be change

Level 1 ON Set Point may be change

Level 1 OFF Set Point may be change

Level 2 ON Set Point may be change

Level 2 OFF Set Point may be change

See next page for more....

Operations Parameters ACCUPRESS BASIC

DEVICE # 16 1-16 **MODE OPERATION** 0 0 **MODEL** 1 1-6 **ACCU PRESSURE** X20

CALIBRATION MAX VALUE: 65535
 29240 Set ZERO A/D VALUE D/A VALUE
 STEP 4-20 /1000 MAX VALUE 65535 S 2565 29872 R R

LEVEL1 S.P. ON MAX VALUE 65535
 1000
LEVEL1 S.P. OFF MAX VALUE 65535
 900
LEVEL2 S.P. ON MAX VALUE 65535
 2000
LEVEL2 S.P. OFF MAX VALUE 65535
 1900
LEVEL3 S.P. ON MAX VALUE 65535
 3000
LEVEL3 S.P. OFF MAX VALUE 65535
 2900
OFFSET MAX VALUE 65535
 10
INCHE/STEP /100,000 MAX 65535
 1250
Millimeter/STEP /100,000 MAX 65535
 31750

ACTUAL LEVEL **AUTO READ**
 0 I O
INCHES **Millimeter**
 0.12500 3.17500 R

LOCKING KEY 4 DIGITS one digit per value
 6 3 5 3
 K1 K2 OPTO
 0 1 2
 0=L1 Control
 1=L2 Control
 2=L3 Control

READ DATA **WRITE DATA** **RETURN TO MAIN**

Display Intensity
 195 MAX
 110 HIGH
 80 LOW
 DIM

Level 3 ON Set Point may be change

Level 3 OFF Set Point may be change

OFFSET value may be change (negative reading limit)

INCHE/STEP may be change

Millimeter/STEP may be change

See next page for more...

Operations Parameters ACCUPRESS BASIC

DEVICE #	MODE OPERATION	MODEL
16	0 0	1

ACCU PRESSURE

CALIBRATION MAX VALUE: 65535

STEP 4-20 /1000 MAX VALUE 65535 **29240** Set ZERO **S** A/D VALUE **2565** D/A VALUE **29872** X20

LEVEL1 S.P. ON MAX VALUE 65535 **1**

LEVEL1 S.P. OFF MAX VALUE 65535 **1000**

LEVEL2 S.P. ON MAX VALUE 65535 **900**

LEVEL2 S.P. OFF MAX VALUE 65535 **2000**

LEVEL3 S.P. ON MAX VALUE 65535 **1900**

LEVEL3 S.P. OFF MAX VALUE 65535 **3000**

OFFSET MAX VALUE 65535 **2900**

INCH/STEP /100,000 MAX 65535 **10**

Millimeter/STEP /100,000 MAX 65535 **1250**

LOCKING KEY 4 DIGITS one digit per value

6	3	5	3
K1	K2	OPTO	
0	1	2	

0=L1 Control
1=L2 Control
2=L3 Control

ACTUAL LEVEL **0** AUTO READ **I** **O**

INCHES **0.12500** Millimeter **3.17500**

READ DATA WRITE DATA RETURN TO MAIN

Display Intensity

155	MAX
110	HIGH
80	LOW
	DIM

Locking codes may be changed

Output assignments may be changed

Auto Read may be start or stop

Clicking on [RETURN TO MAIN] will close window and show main window

Spin up/down is used for verify factory calibration

Factory settled display illumination set points may be changed

Belcaterc string (not shown) may be changed

See next page for more...

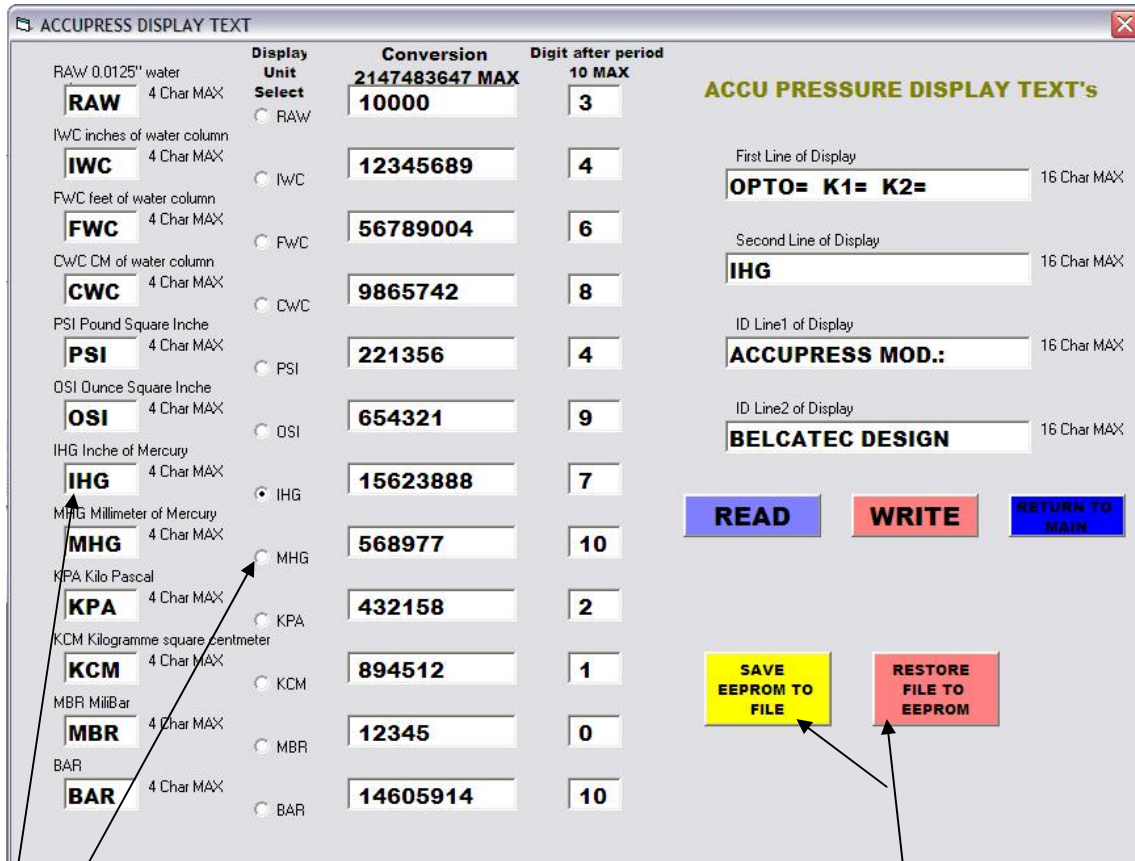
Operations Parameters ACCUPRESS BASIC

DEVICE #	MODE OPERATION	MODEL	ACCU PRESSURE		X20
16	1-16	0 0	1	1-6	
CALIBRATION MAX VALUE: 65535			A/D VALUE		D/A VALUE
29240			2565		29872
STEP 4-20 /1000 MAX VALUE 65535			R		R
1			ACTUAL LEVEL		AUTO READ
LEVEL1 S.P. ON MAX VALUE 65535			0		I O
1000			INCHES		Millimeter
LEVEL1 S.P. OFF MAX VALUE 65535			0.12500		3.17500
900			R		
LEVEL2 S.P. ON MAX VALUE 65535					
2000					
LEVEL2 S.P. OFF MAX VALUE 65535					
1900					
LEVEL3 S.P. ON MAX VALUE 65535					
3000					
LEVEL3 S.P. OFF MAX VALUE 65535					
2900					
OFFSET MAX VALUE 65535					
10					
INCHES/STEP /100,000 MAX 65535					
1250					
Millimeter/STEP /100,000 MAX 65535					
31750					
LOCKING KEY 4 DIGITS one digit per value			READ DATA		WRITE DATA
6	3	5	RETURN TO MAIN		
K1	K2	OPTO			
0	1	2			
0=L1 Control			Display Intensity		
1=L2 Control			195 MAX		
2=L3 Control			110 HIGH		
			80 LOW		
			DIM		

Clicking or set zero [S] will set actual value to zero and adjust CALIBRATION value

When main windows is shown clicking on [Read Write Operation Text] will show the following windows

Read Write Operation Text window



Display Unit	Conversion	Digit after period
<input type="radio"/> RAW	2147483647 MAX 10000	10 MAX 3
<input type="radio"/> IWC	12345689	4
<input type="radio"/> FWC	56789004	6
<input type="radio"/> CWC	9865742	8
<input type="radio"/> PSI	221356	4
<input type="radio"/> OSI	654321	9
<input checked="" type="radio"/> IHG	15623888	7
<input type="radio"/> MHG	568977	10
<input type="radio"/> KPA	432158	2
<input type="radio"/> KCM	894512	1
<input type="radio"/> MBR	12345	0
<input type="radio"/> BAR	14605914	10

ACCUPRESS DISPLAY TEXT's

First Line of Display: OPTO= K1= K2=

Second Line of Display: IHG

ID Line1 of Display: ACCUPRESS MOD.:

ID Line2 of Display: BELCATEC DESIGN

Buttons: READ, WRITE, RETURN TO MAIN, SAVE EEPROM TO FILE, RESTORE FILE TO EEPROM

Text left of line 2 may be changed to show more engineering values

Selection of engineering value to show with conversion factor and decimal position may be changed (values shown are not good sorry!)

Values from component EEPROM memory may be saved or restored

See next page for more...

ACCUPRESS DISPLAY TEXT

Display Unit	Conversion	Digit after period
RAW 0.0125" water RAW 4 Char MAX <input type="radio"/> RAW	2147483647 MAX 10000	10 MAX 3
IWC inches of water column IWC 4 Char MAX <input type="radio"/> IWC	12345689	4
FWC feet of water column FWC 4 Char MAX <input type="radio"/> FWC	56789004	6
CWC CM of water column CWC 4 Char MAX <input type="radio"/> CWC	9865742	8
PSI Pound Square Inche PSI 4 Char MAX <input type="radio"/> PSI	221356	4
OSI Ounce Square Inche OSI 4 Char MAX <input type="radio"/> OSI	654321	9
IHG Inche of Mercury IHG 4 Char MAX <input checked="" type="radio"/> IHG	15623888	7
MHG Millimeter of Mercury MHG 4 Char MAX <input type="radio"/> MHG	568977	10
KPA Kilo Pascal KPA 4 Char MAX <input type="radio"/> KPA	432158	2
KCM Kilogramme square centmeter KCM 4 Char MAX <input type="radio"/> KCM	894512	1
MBR MillBar MBR 4 Char MAX <input type="radio"/> MBR	12345	0
BAR BAR 4 Char MAX <input type="radio"/> BAR	14605914	10

ACCU PRESSURE DISPLAY TEXT's

First Line of Display: 16 Char MAX
OPTO= K1= K2=

Second Line of Display: 16 Char MAX
IHG

ID Line1 of Display: 16 Char MAX
ACCUPRESS MOD.:

ID Line2 of Display: 16 Char MAX
BELCATEC DESIGN

READ WRITE RETURN TO MAIN

SAVE EEPROM TO FILE RESTORE FILE TO EEPROM

First line of display (output states) may be modified

ID line1 of display may be modified

ID line 2 of display may be modified

Clicking on [RETURN TO MAIN] will close window and show main window.