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ÉLECTRONIQUE & CONTRÔLE
INFORMATIQUE & SYSTÊME

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

This manual is divided by section

Content of manual:

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**

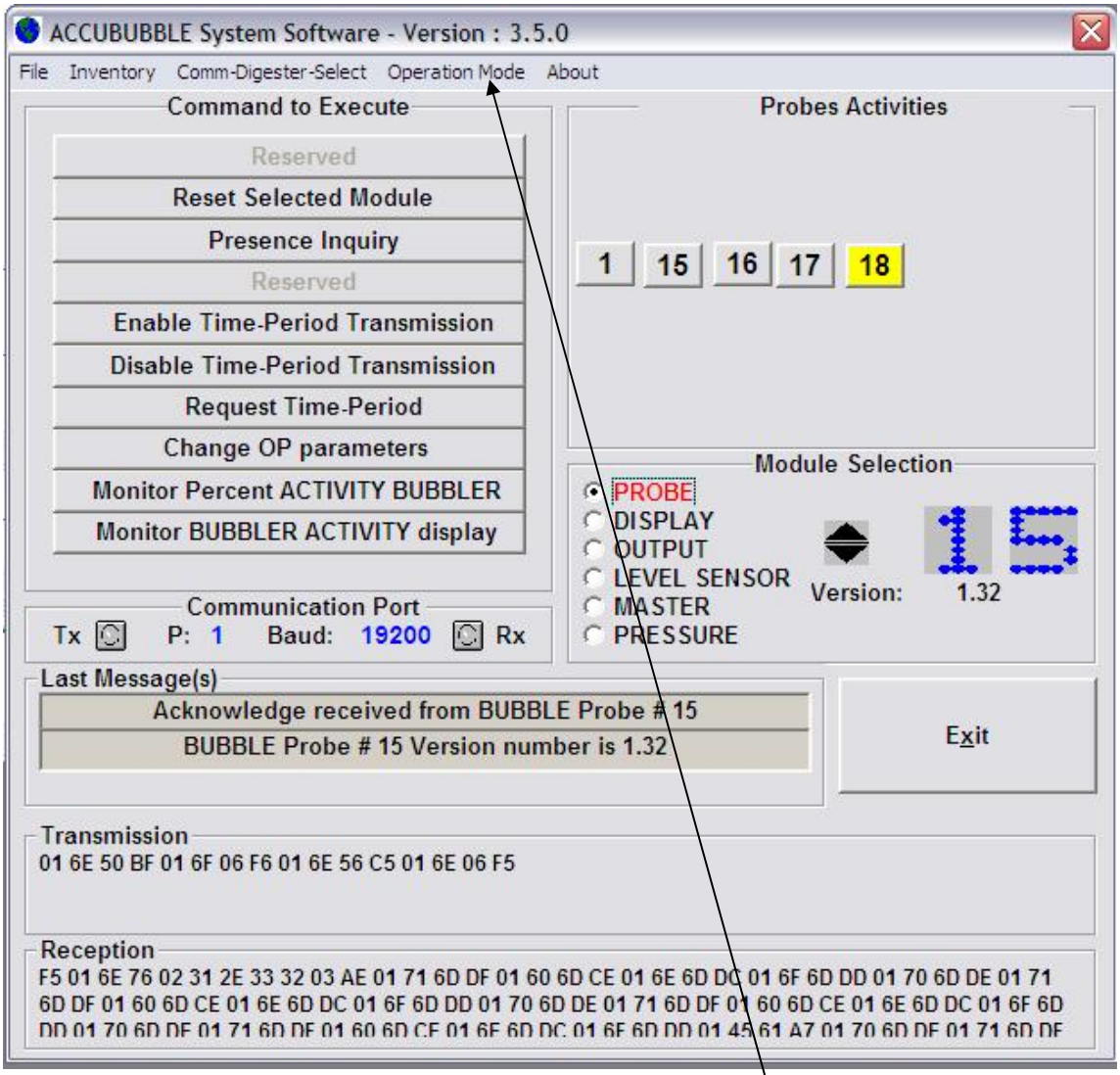
When installation is completed; you can remove disk and click on Earth icon to start program.

SECTION 2: ACCUBUBBLE SOFTWARE

NOTE: when we took pictures of software screens to put them in manual; 5 ACCUBUBBLEs, 1 Display,
1 Output, 1 Master Controller, 1 ACCULEVEL & 1 ACCUPRESSURE were present

AT first time start software may ask to select port of communication then:

Main window is shown.



Clicking on [**Operation Mode**] will show selection of modes:

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

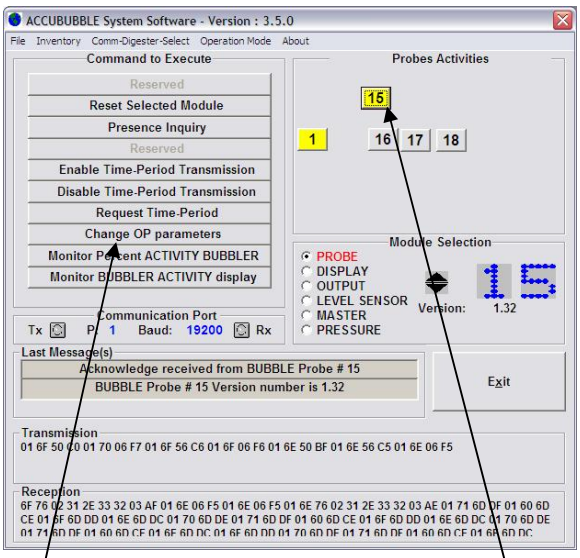
Belcatec When enable allows seeing and modifying identification text of each component.

Debug When enable shows debug windows when possible.
That windows shows communication problems when they occurs.
When disable remove debug window.

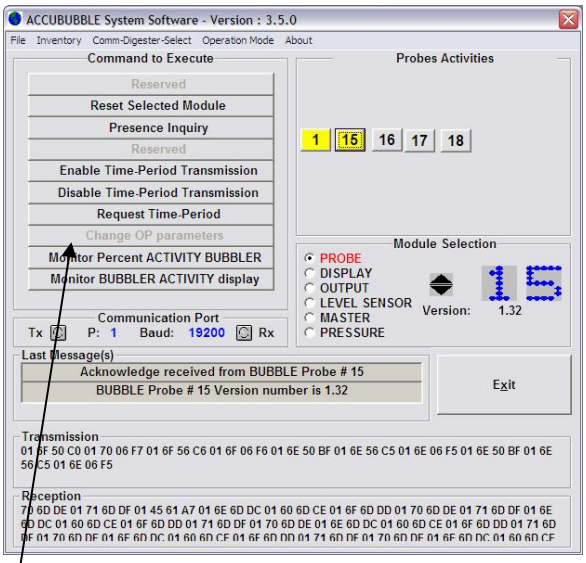
Following pictures shows different choices

Setup

Enable



Disable

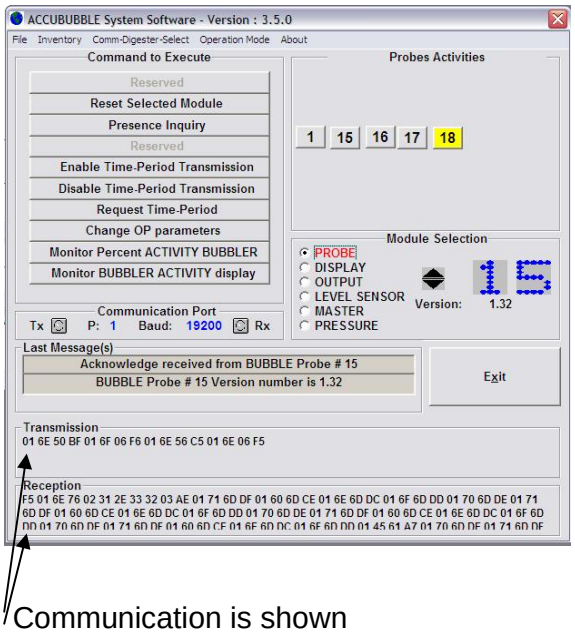


Change OP parameters is enable ACCUBUBBLE activity may be moved

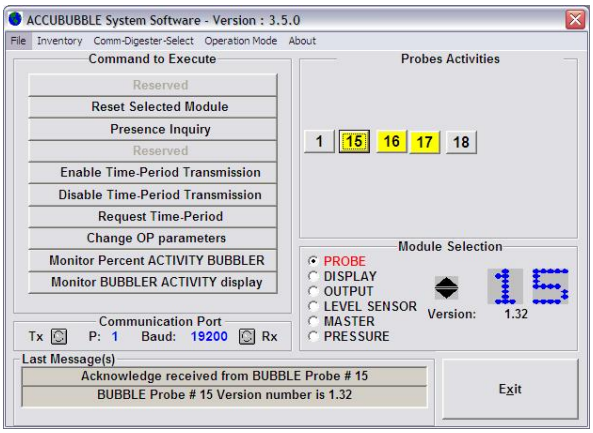
Change OP parameters is disable ACCUBUBBLE activity are fixed

Comm

Enable



Disable

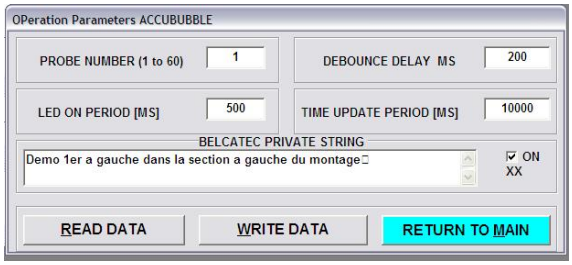


Communication is shown

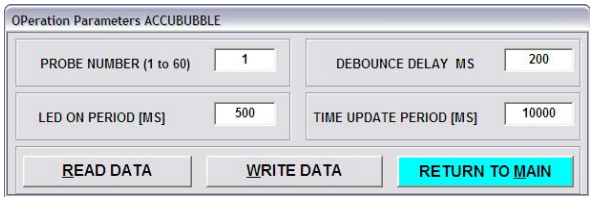
Communication is removed

Belcatec

Enable



Disable



Belcatec string shown and modifiable

Belcatec 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:

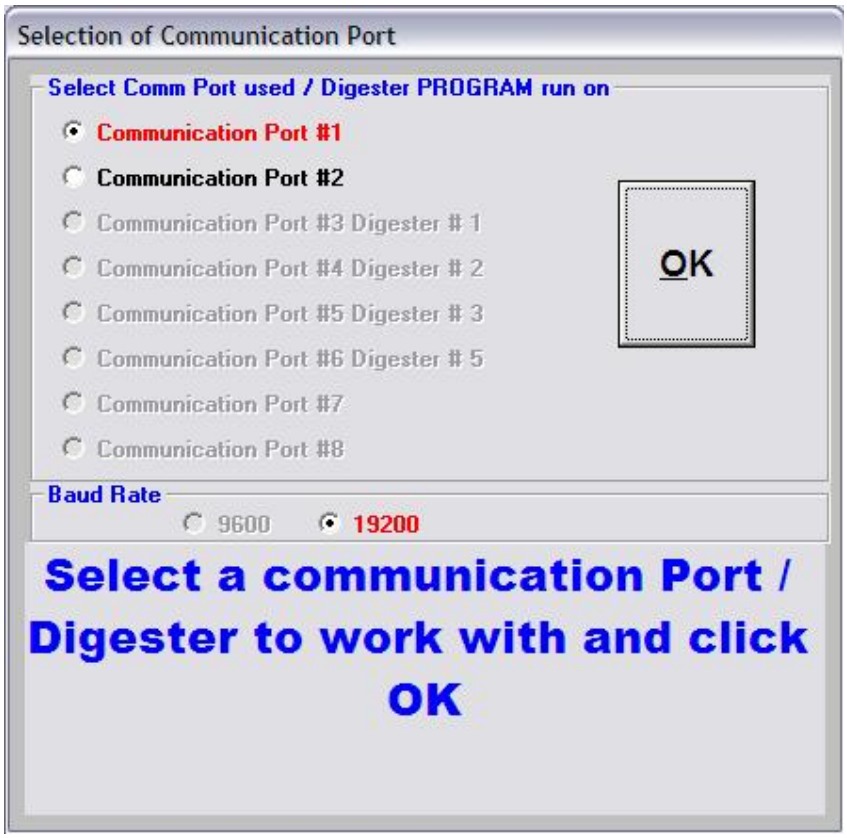
Clicking on About will show about window

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)

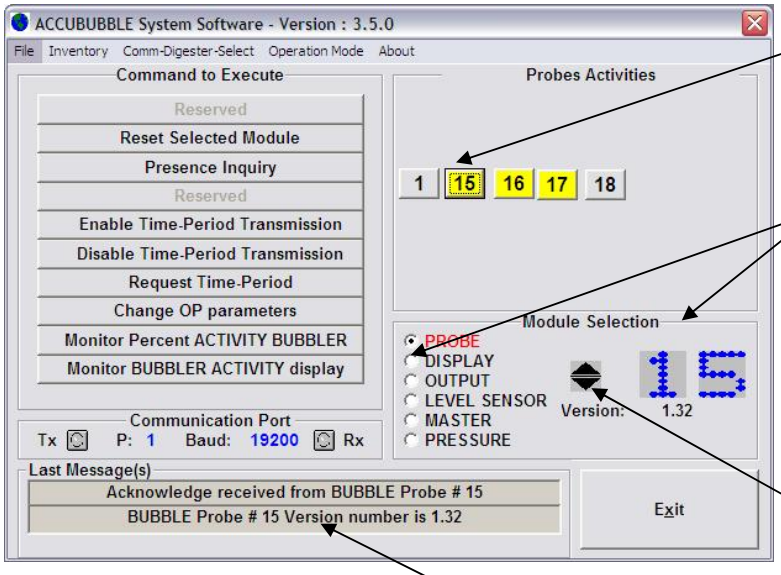
Component was removed from inventory

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



Clicking on PROBE number will select this probe to work on

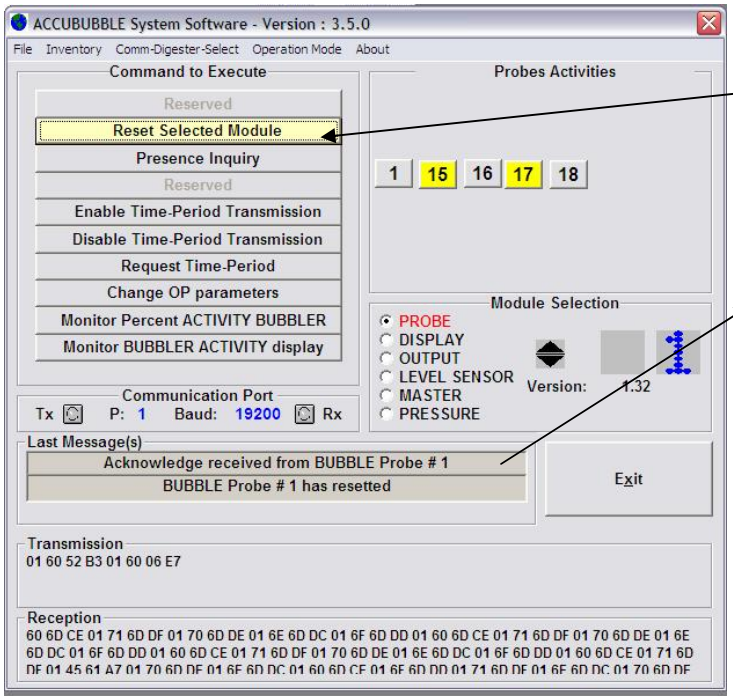
Selected number & Radio Button are set.

Using Spin Up/Down will select next or preceding component

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:

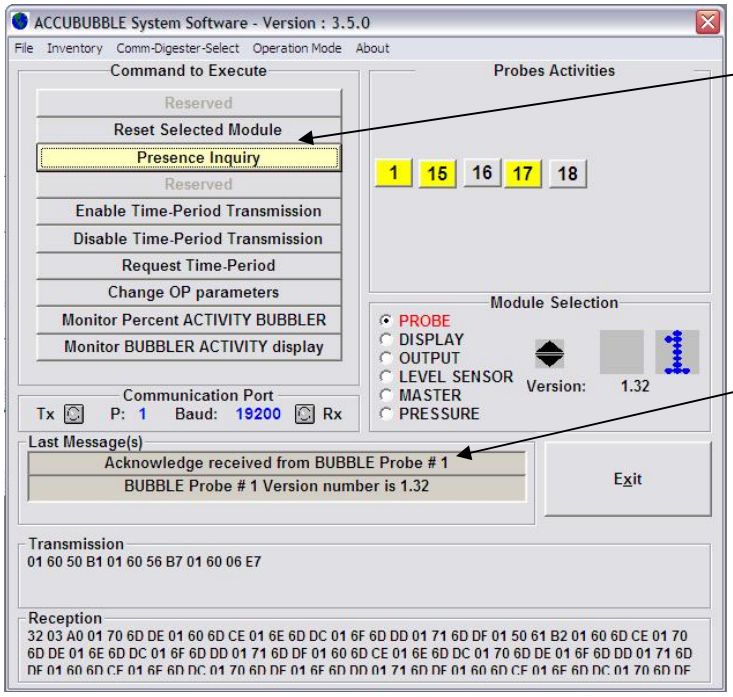
Reset the probe



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

It is confirmed by last message that probe 1 has resettled

Verify presence of probe

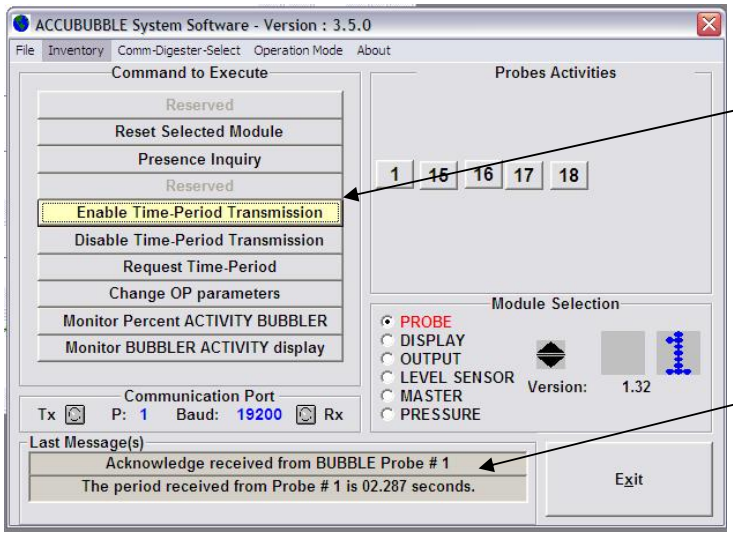


Clicking on Presence Inquiry will ask probe to send is version I.D.

It is confirmed by last message

Enable time period transmission

It is possible to look a that probe and get it period (time between Bubble)

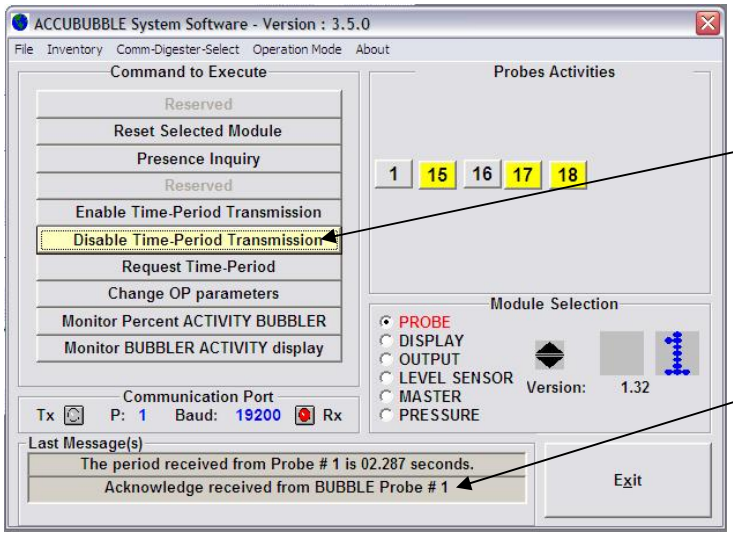


Clicking on Enable Time-Period Transmission will tell probe to send at regular interval period between bubbles

Last message shows period.

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

Disable Time-Period Transmission

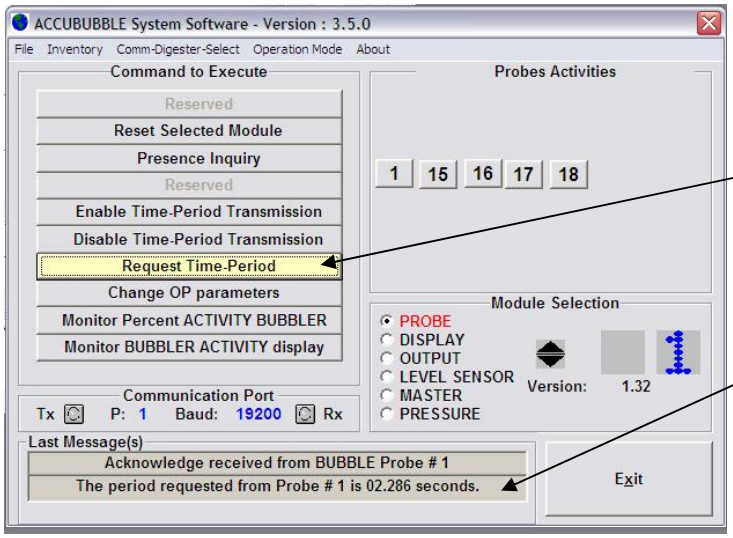


Clicking on Disable Time-Period Transmission will tell probe to stop transmitting period between bubbles

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.

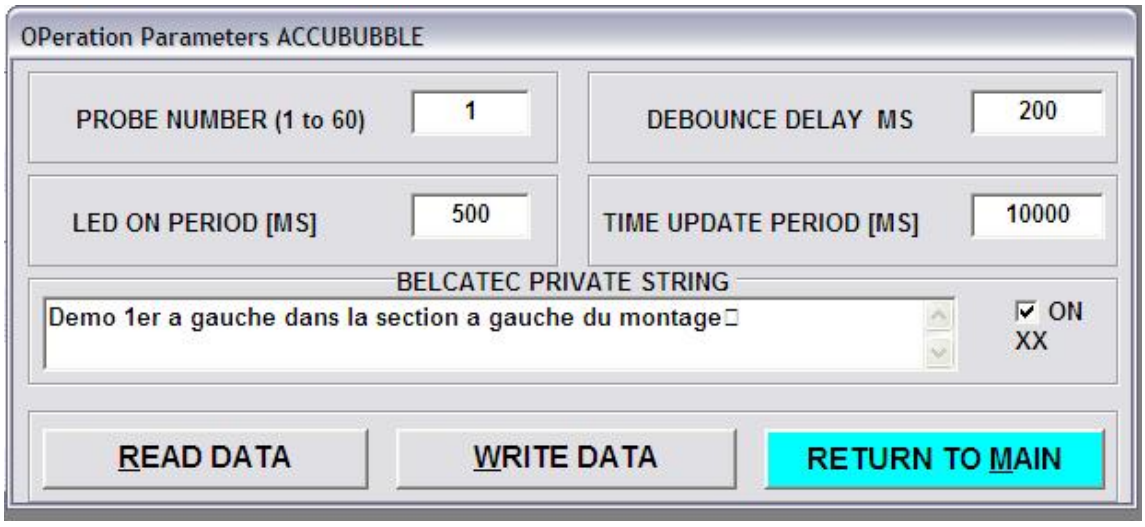


Clicking on Request Time-Period tell probe to send Time between bubbles once.

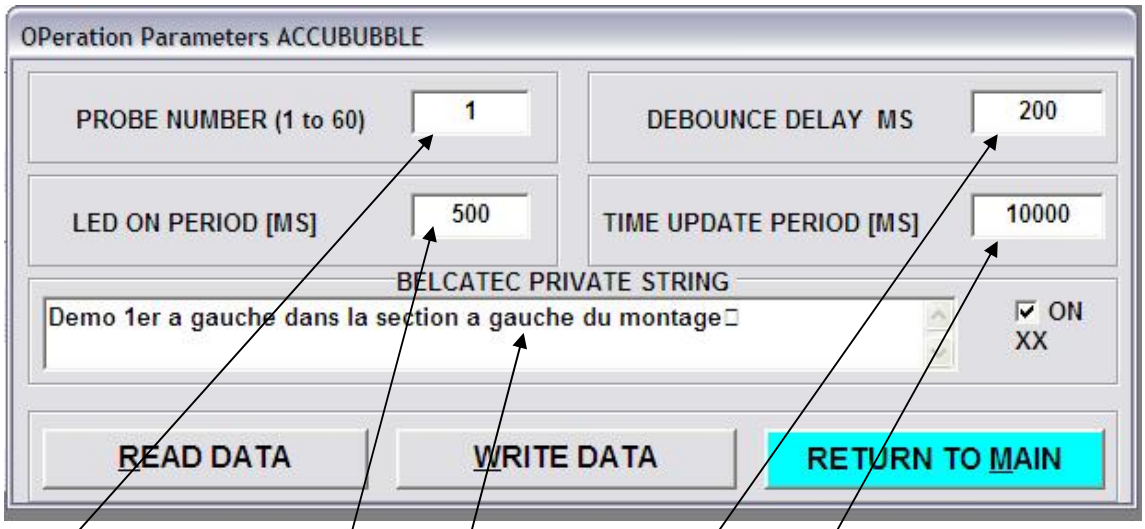
Last message shows actual time period of probe

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.

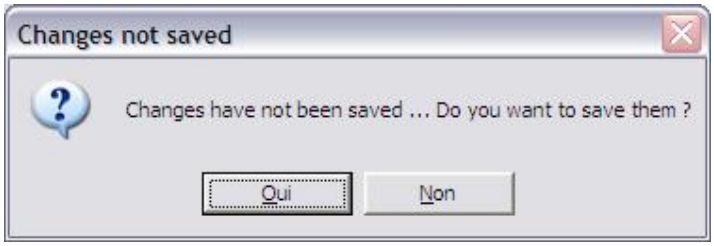
LED ON PERIOD can be changed
LED ON PERIOD is time LED atop of ACCUBUBBLE probe is illuminated. Example shows 0.5 sec of illumination.

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.

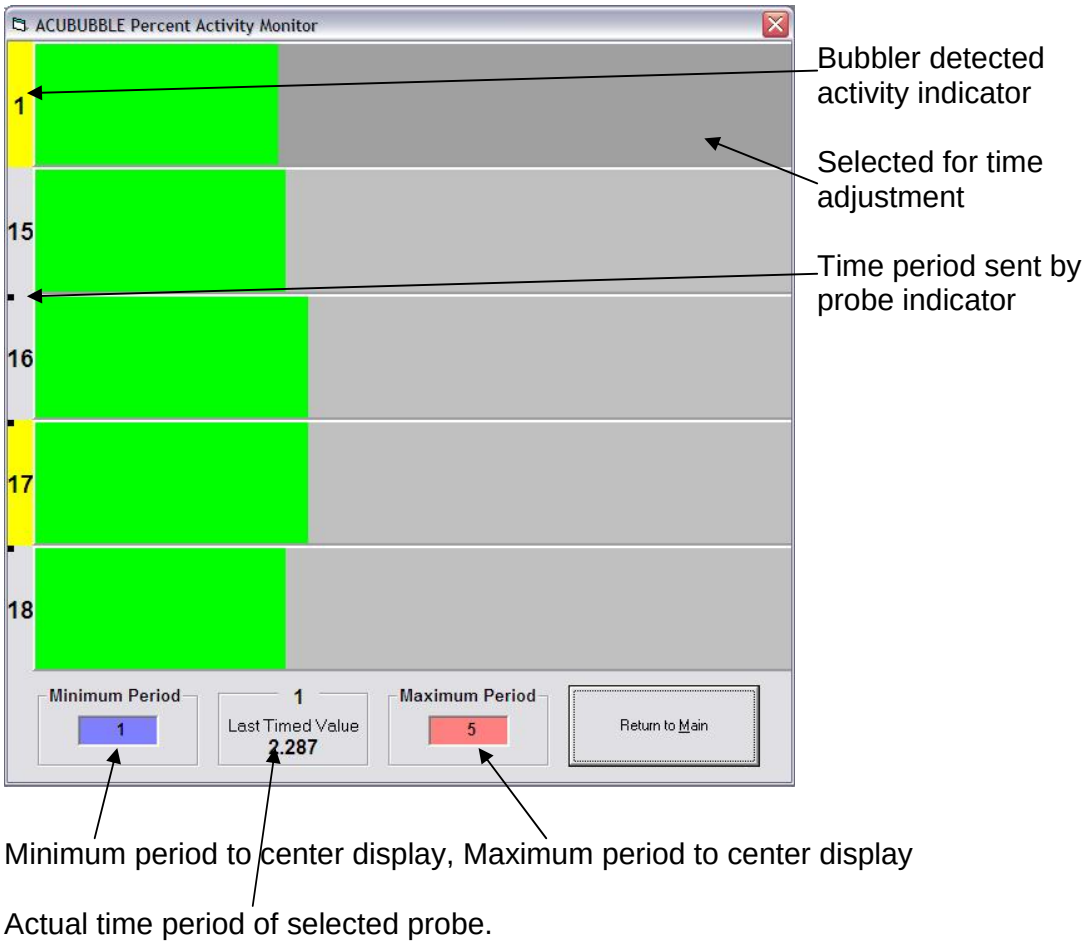
If changed parameters were not saved following window will shows.



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

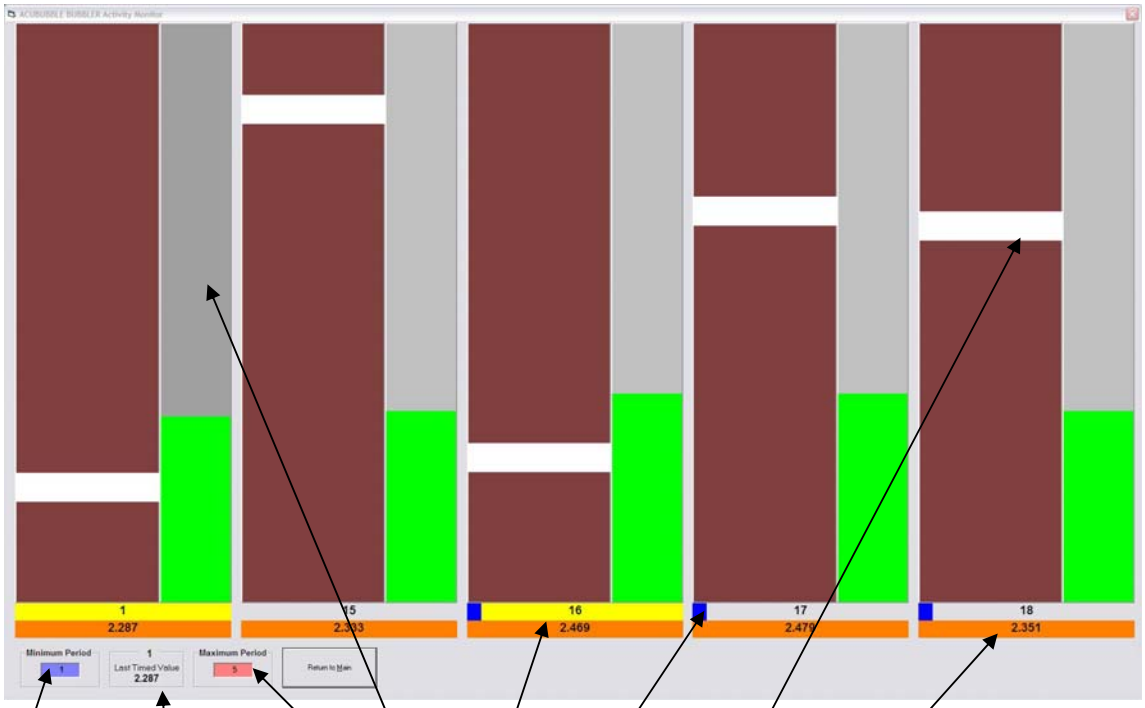
Clicking on [MONITOR PERCENT ACTIVITY BUBBLER] will show window



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

Actual time period

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.

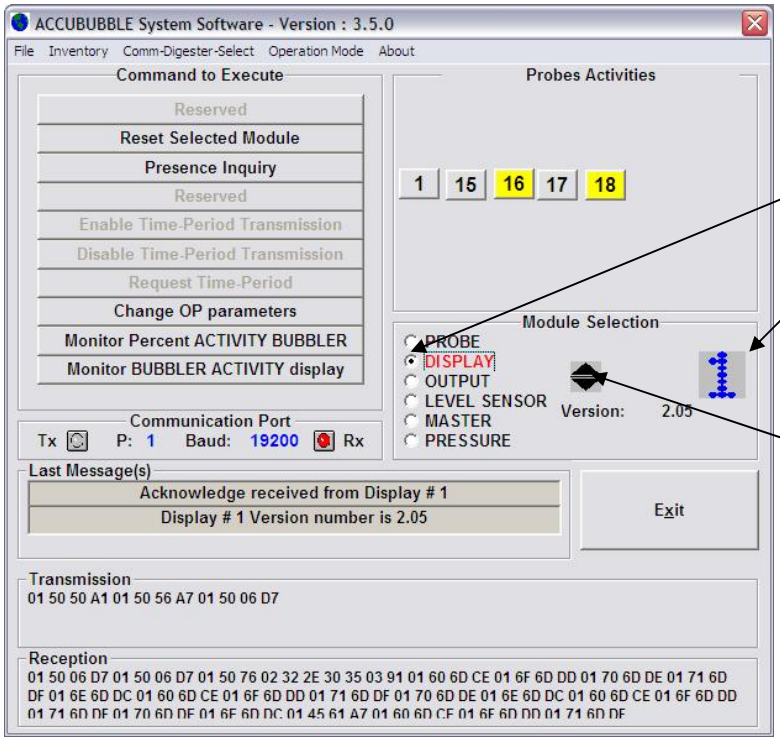
When showing display, processor is quiet busy.

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.



Selection of DISPLAY

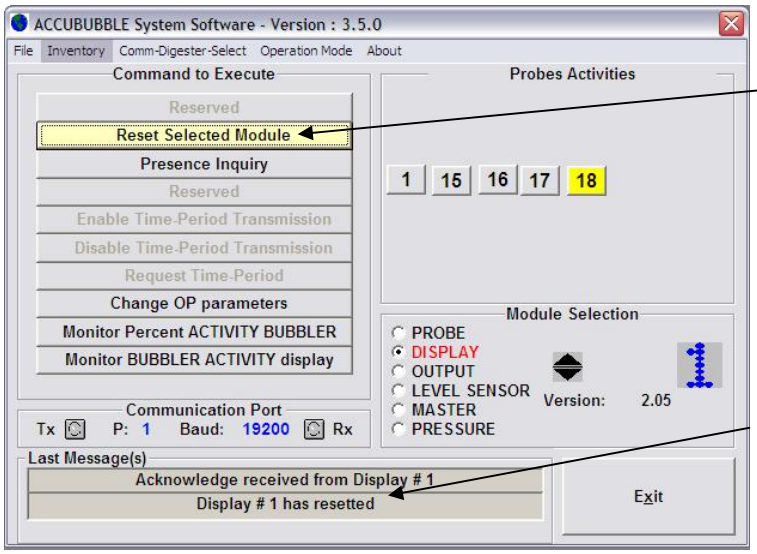
Number of component

Spin up/down to select next or precedent component

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

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

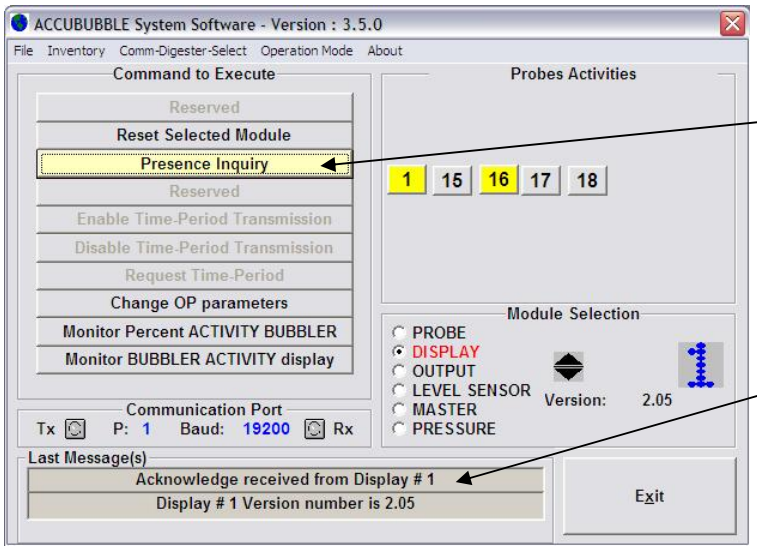
Next figure shows Reset command



Reset command was clicked.

Last message indicate action executed.

Clicking on [Presence Inquiry], next figure show

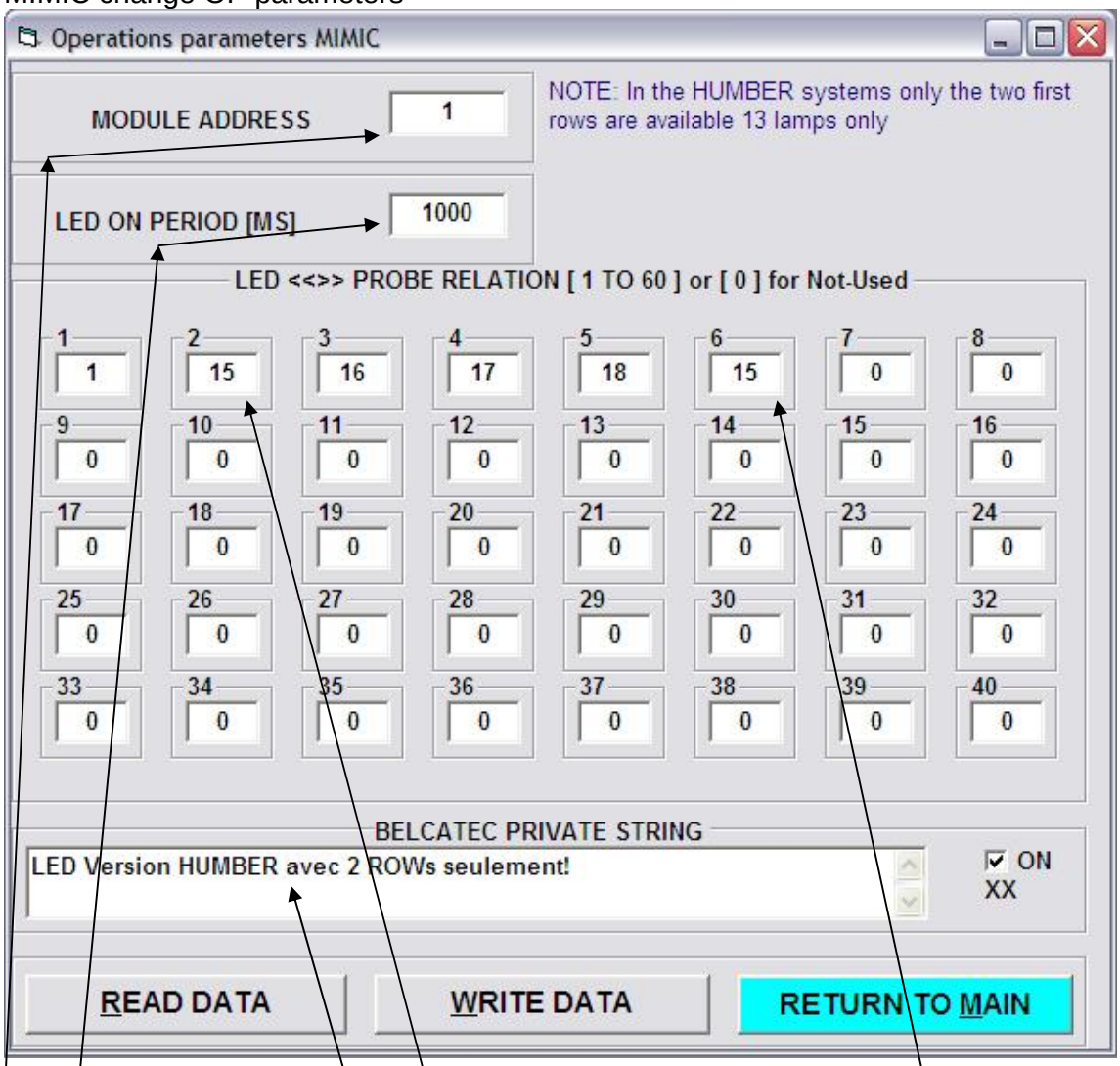


Presence Inquiry was clicked.

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



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.

Belcatec string may be changed

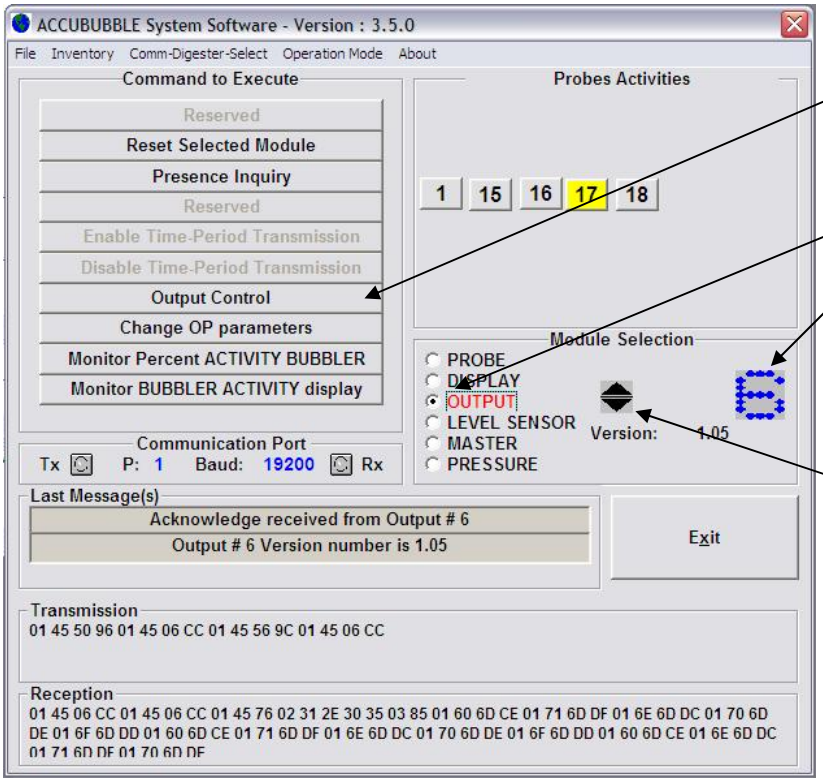
Clicking on [RETURN TO MAIN] will show main window.

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:



Note: New command is shown [Output Control]

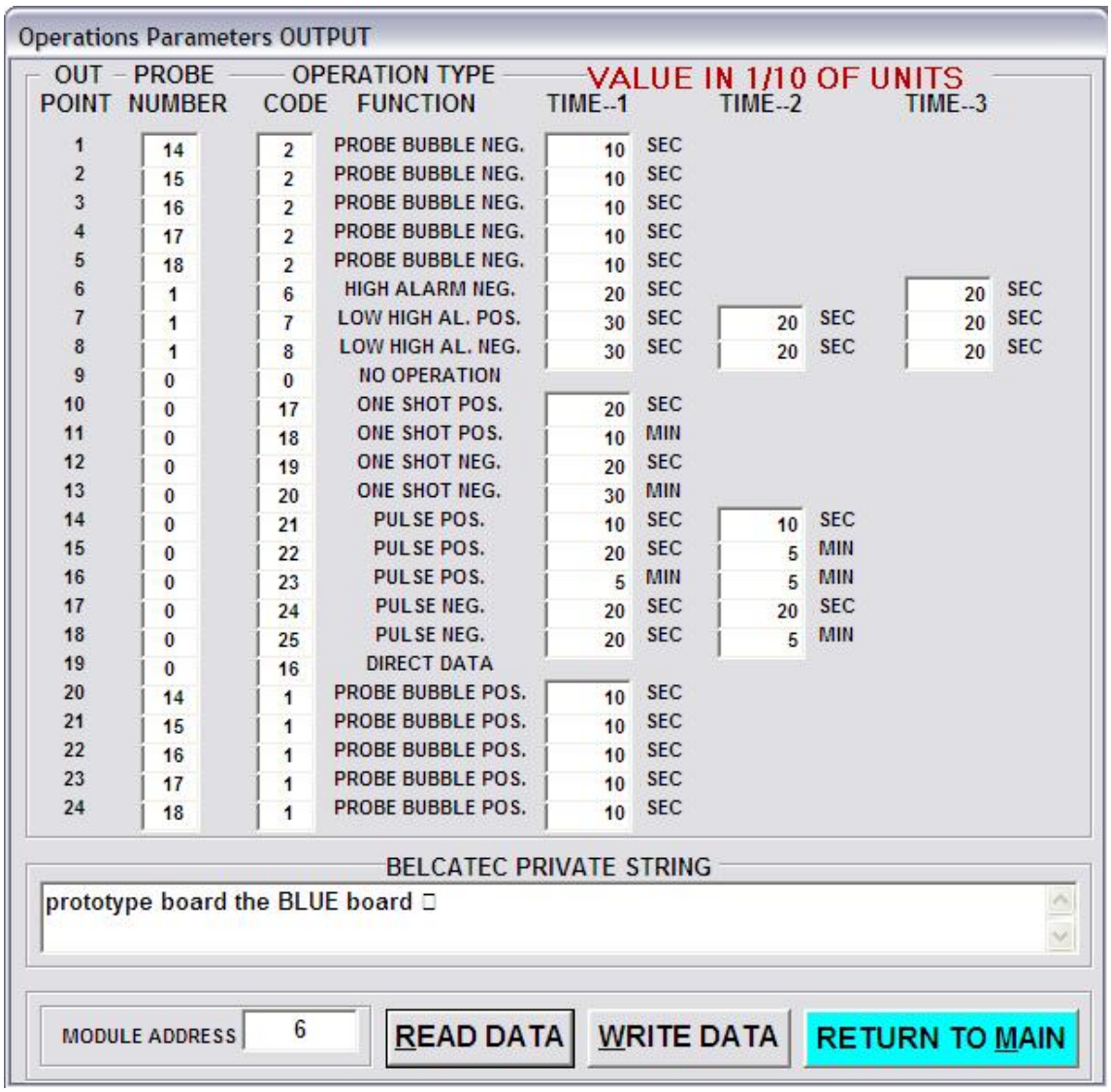
Selection of OUTPUT

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



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 Belcatec 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 TIME-1*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 TIME-1*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 TIME-1*1/10 of second. Output will remain activated after reset for minimum duration of TIME-3*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 TIME-1*1/10 of second. Output will remain off after reset for minimum duration of TIME-3*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 TIME-1*1/10 of second. Output will remain activated after reset for the minimum duration of TIME-3*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 TIME-1*1/10 of second. Output will remain off after reset for minimum duration of TIME-3*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 TIME-1*1/10 of second or shorter than TIME-2*1/10 of second. Output will remain activated after reset for minimum duration of TIME-3*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 TIME-1*1/10 of second or shorter than TIME-2*1/10 of second. Output will remains off after reset for minimum duration of TIME-3*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

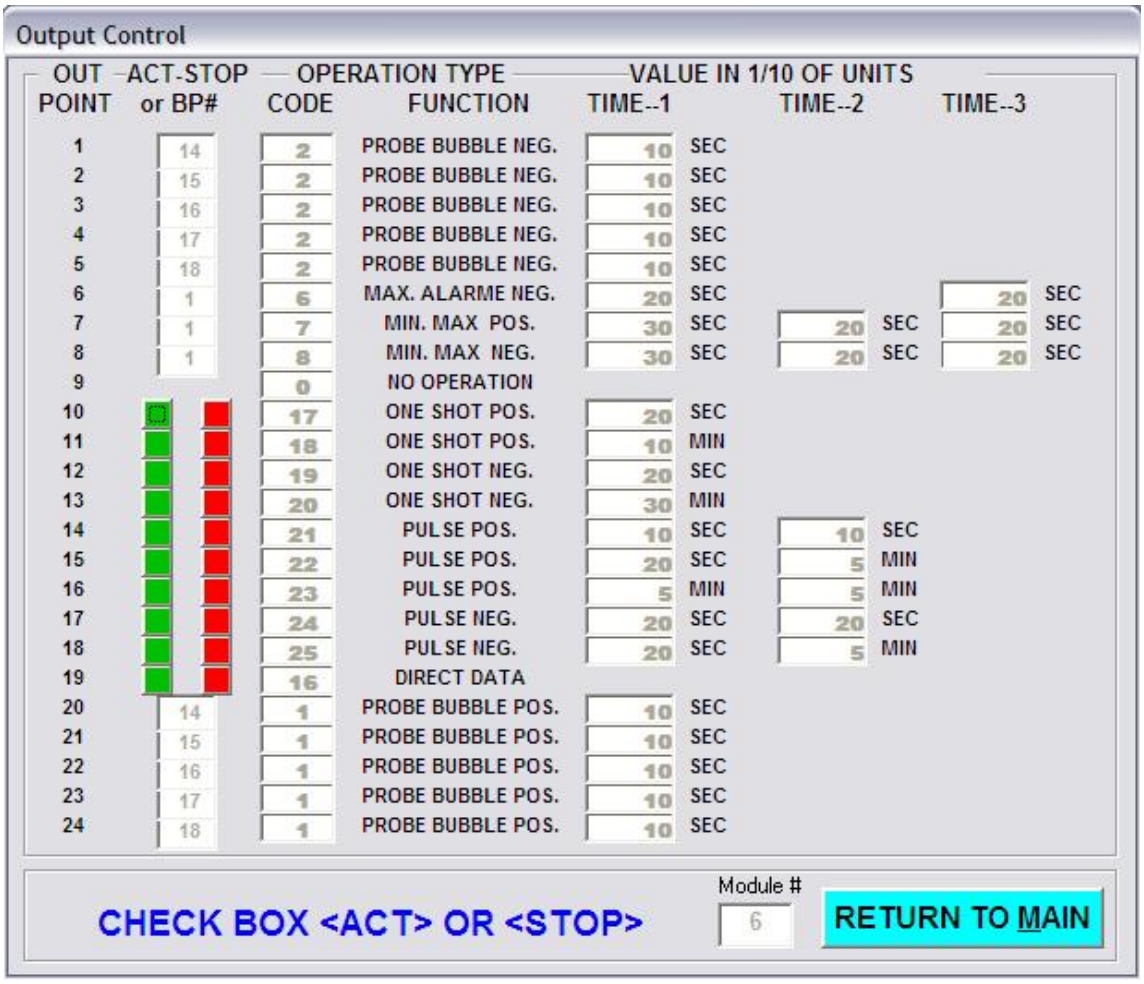
If code value is 24 (**PULSE NEG. SEC.SEC**) output is always on. Sequencer is started by command from OUTPUT CONTROL and cycle off on for duration of TIME-1*1/10 of second (OFF time) TIME-2*1/10 of second (ON time). Sequencer is turned off by command in OUTPUT CONTROL

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



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

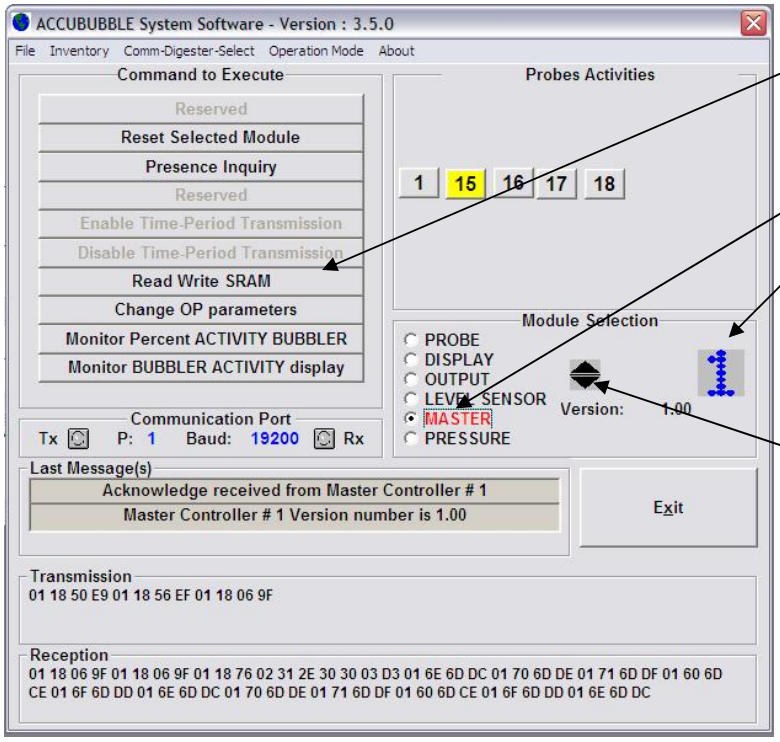
Clicking [RETURN TO MAIN] will remove window and shows main window.

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



Note: New command is shown
[Read Write SRAMl]

Selection of MASTER

Number of component

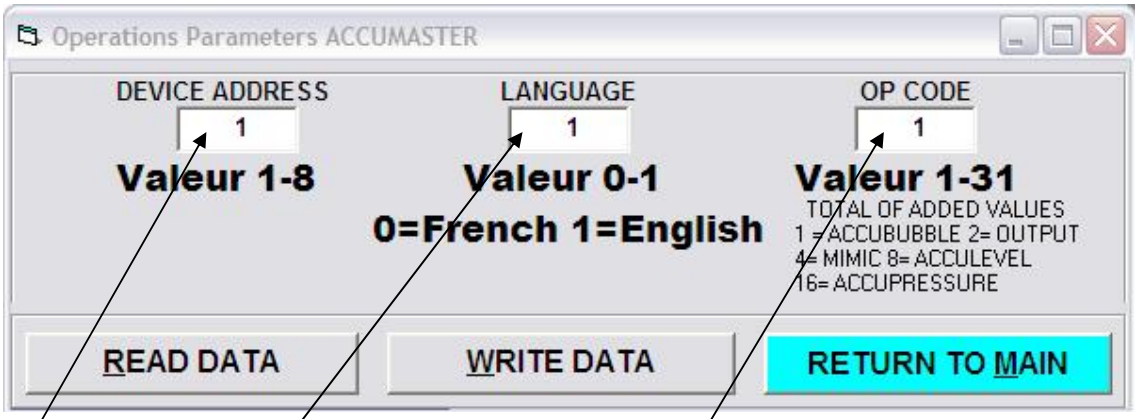
Spin up/down to select next or precedent component

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.

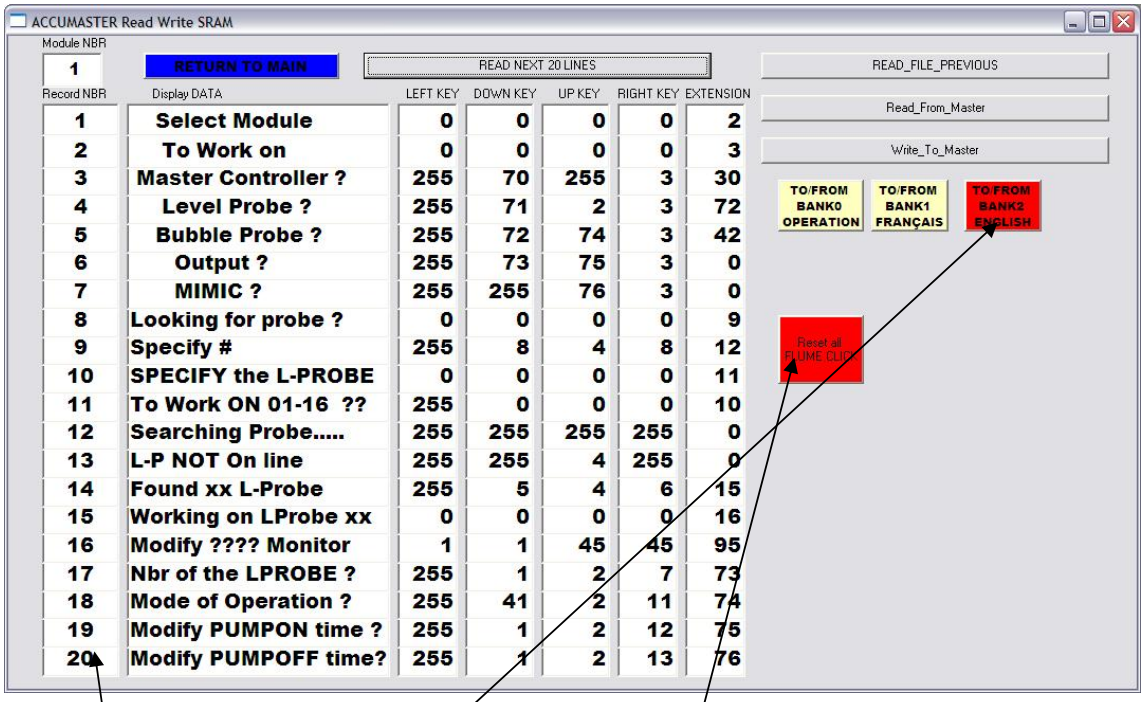
Tough it is possible to change texts and numeric values **it is not recommended**. Especially numeric values it may create endless loop or bizarre operations.

Doing changes is 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



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.

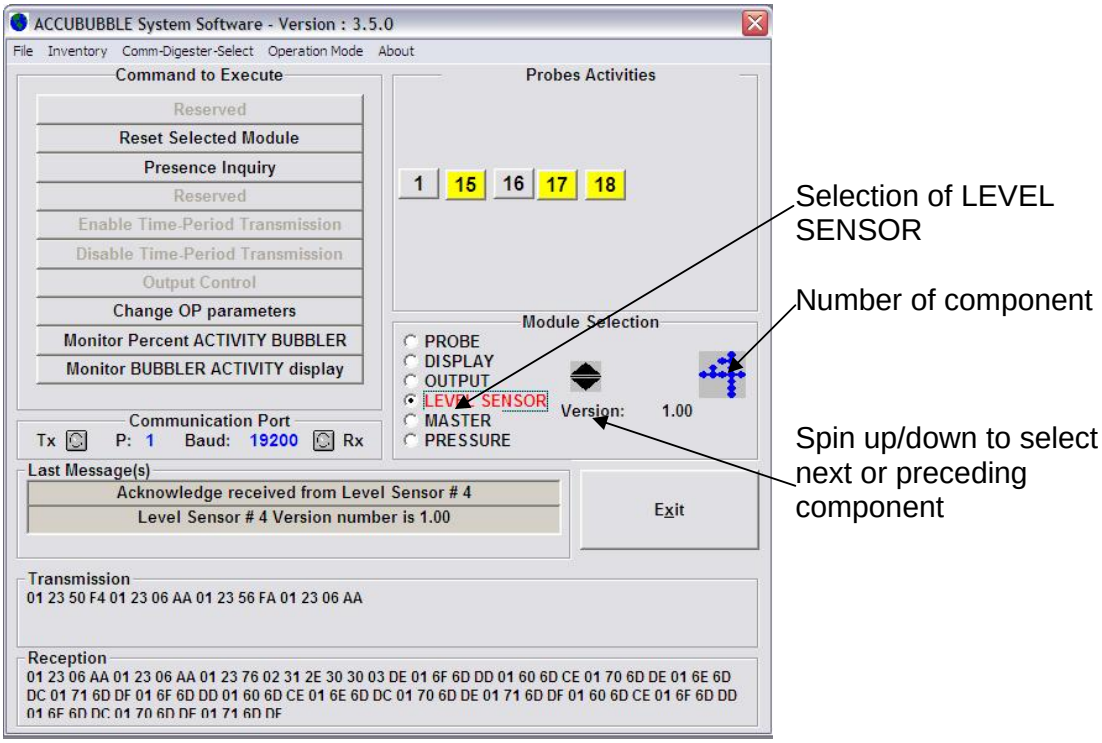
Clicking on [RETURN TO MAIN] will show main window.

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

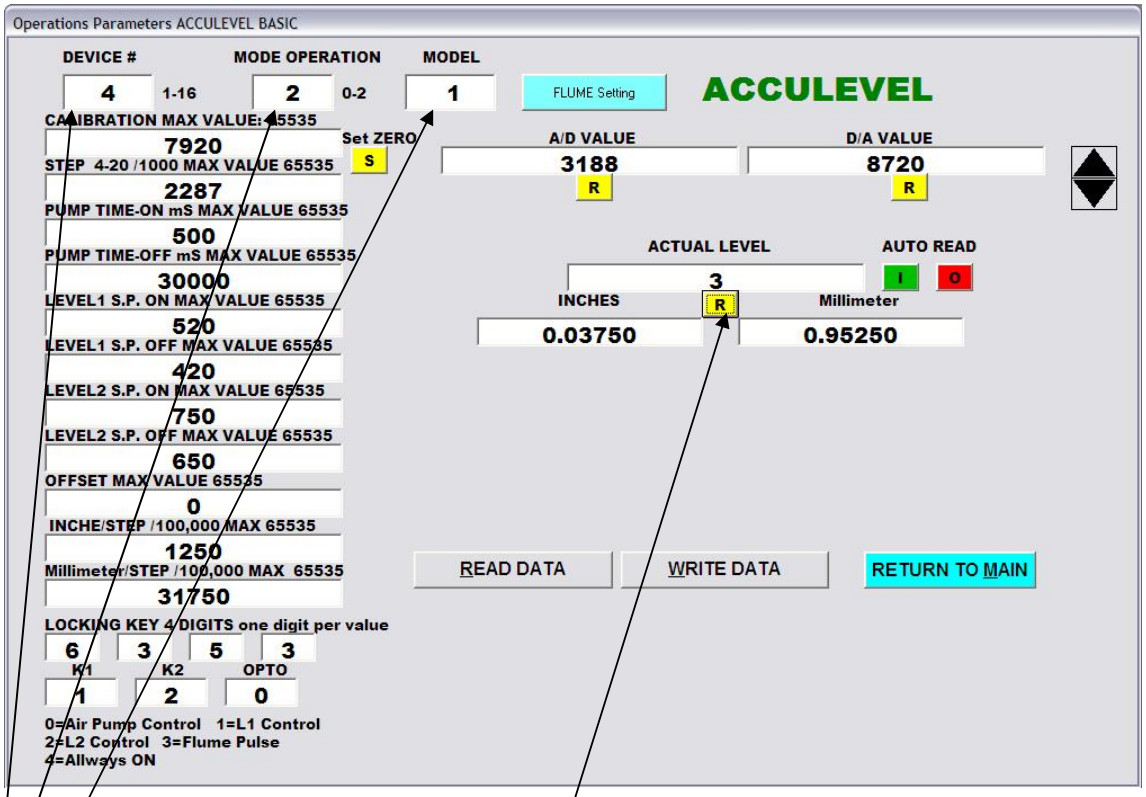


Clicking on [Reset Selected Module] will send Reset command to component.

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

Clicking on Change OP parameters will show following window.

ACCULEVEL CHANGE OPERATION PARAMETERS



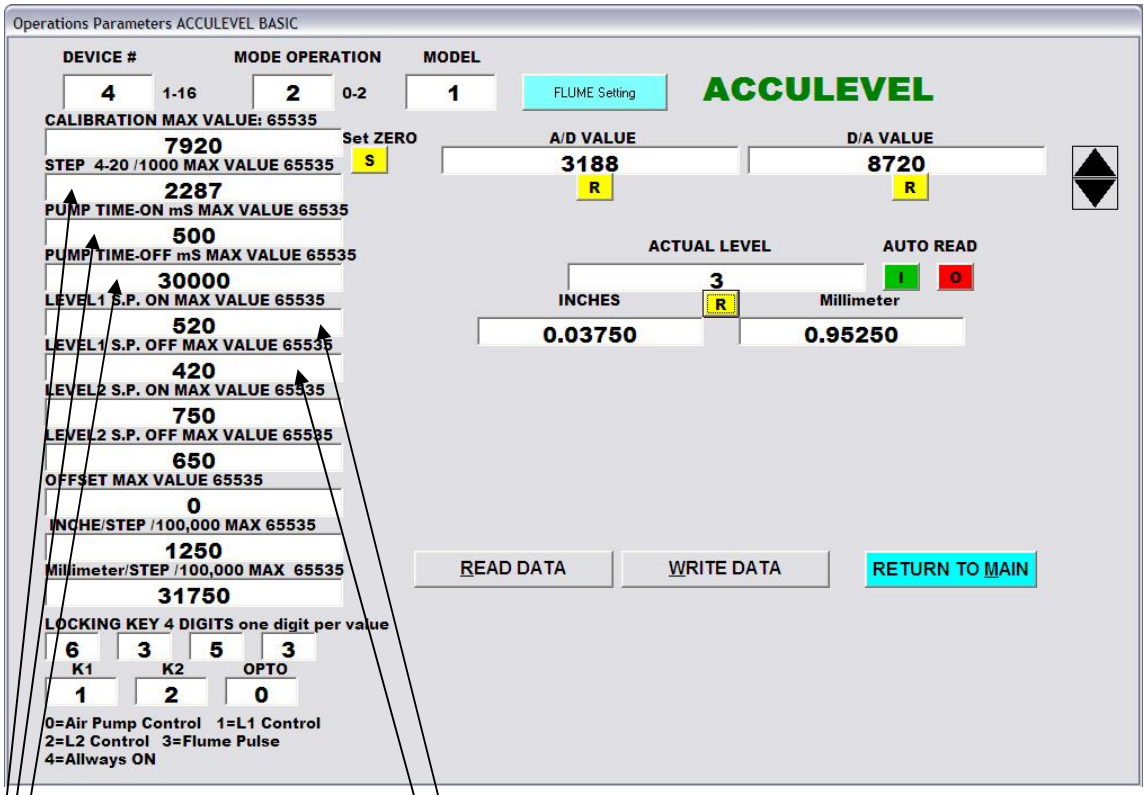
Component number may be change

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...



Multiplicator for 4-20 mA transducer may be change

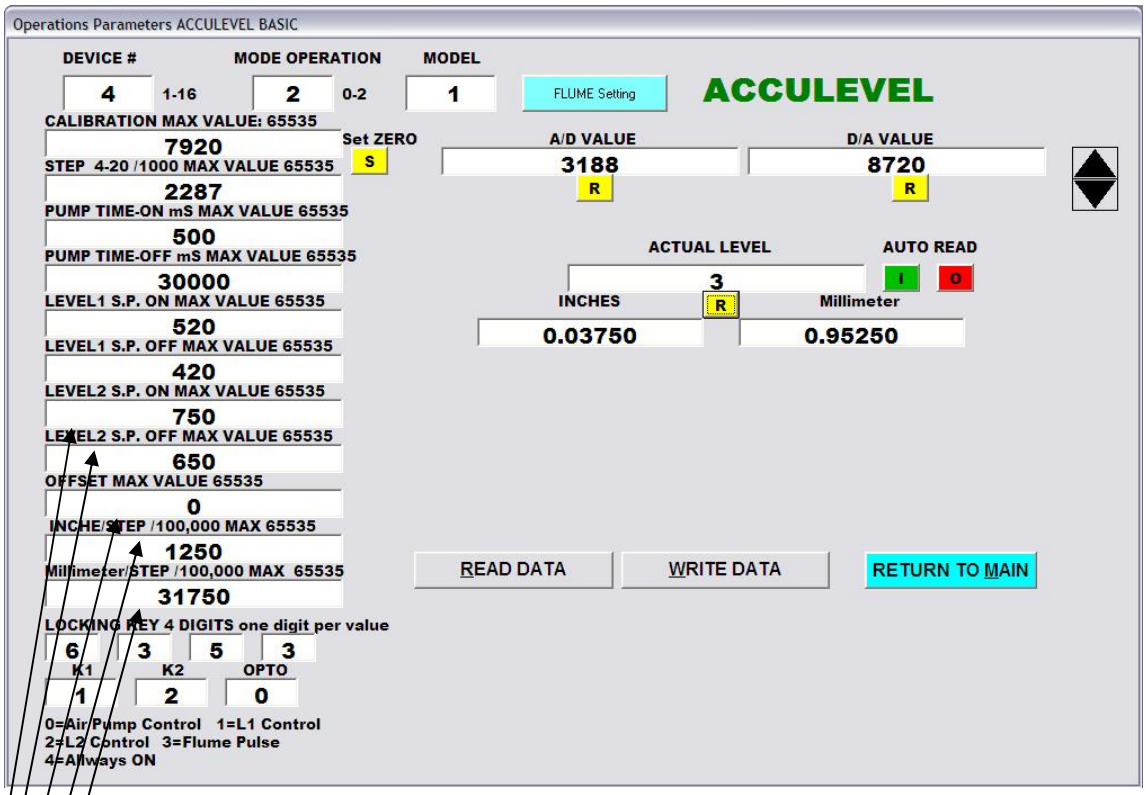
Pump ON time may be change

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....



Level 2 ON Set Point may be change

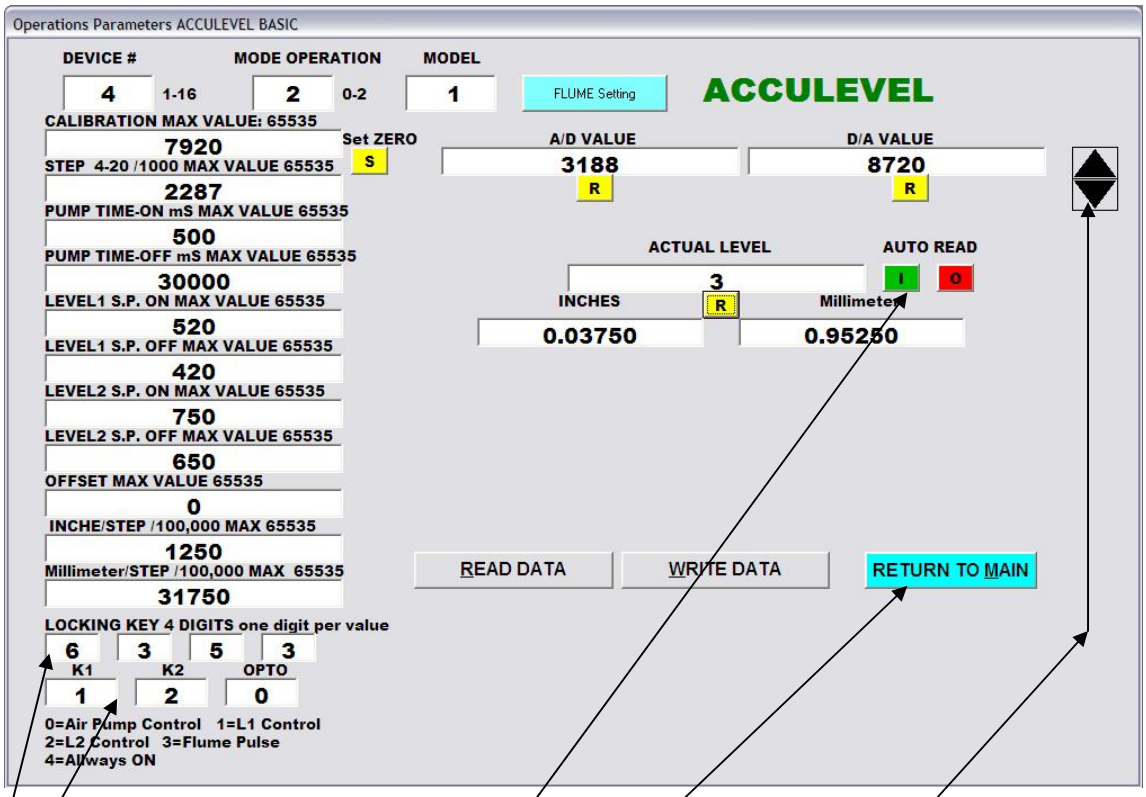
Level 2 OFF Set Point may be change

OFFSET value may be change

INCHE/STEP may be change

Millimeter/STEP may be change

See next page for more...



Locking codes may be change

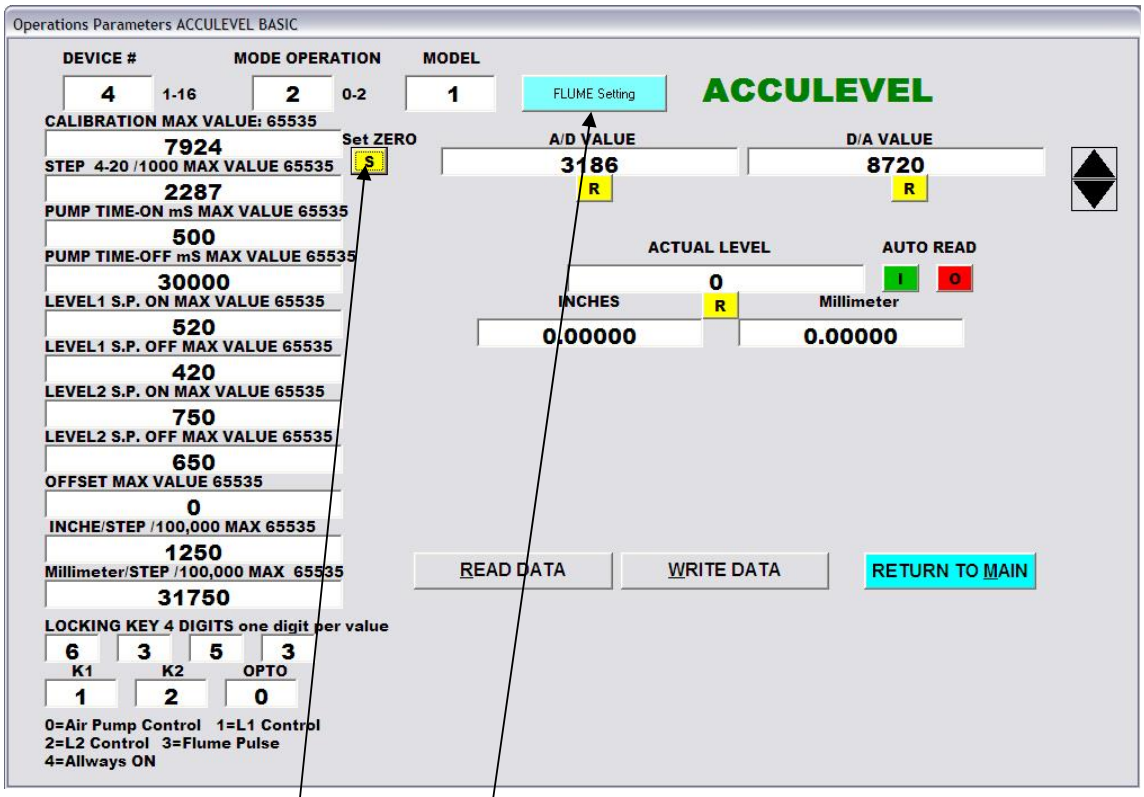
Output assignations may be change

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...

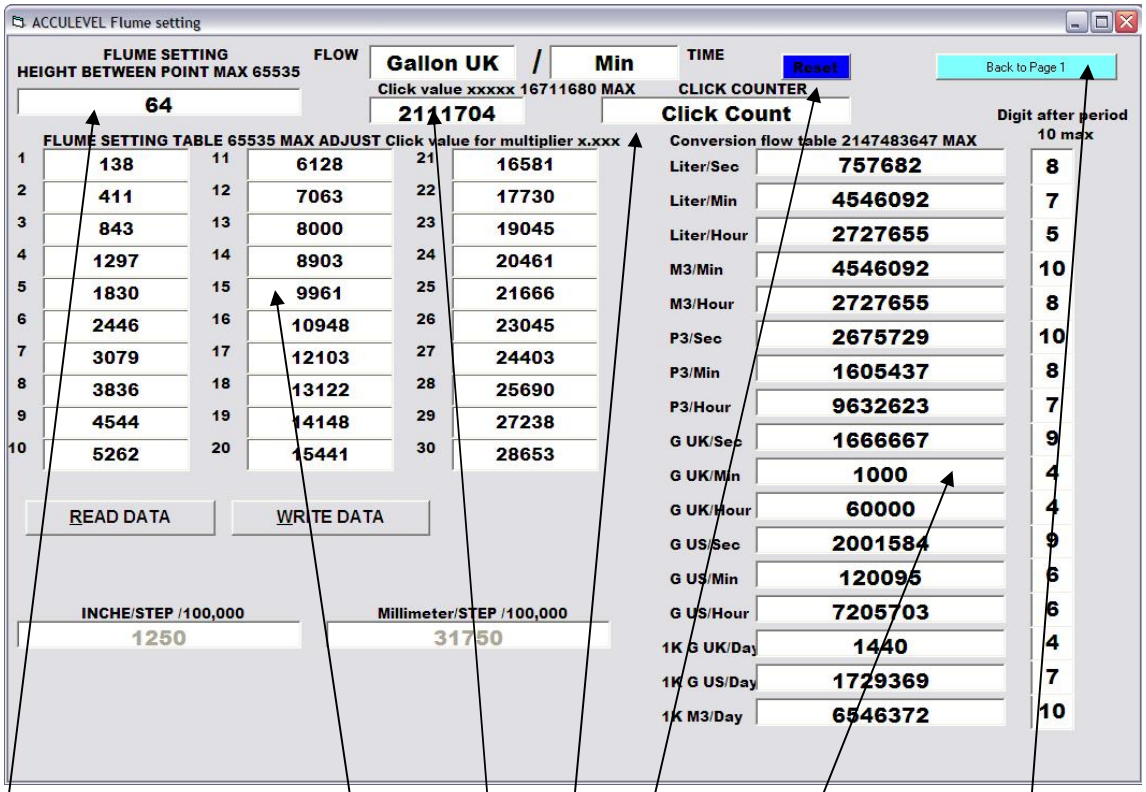


Clicking or set zero [S] will set actual value to zero and adjust CALIBRATION value

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



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.

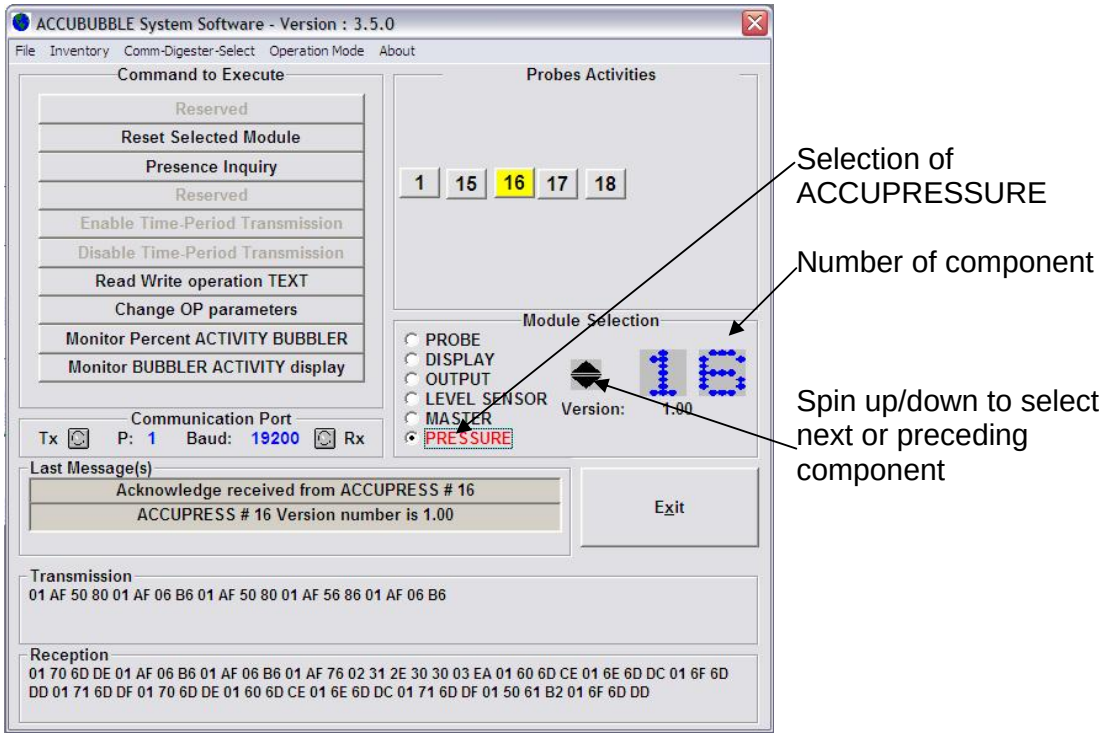
ACCUPRESSURE is built in Class I Division 1 Group B enclosure with glass window allowing seeing on the fluorescent display. (2 lines of 16 characters')

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.

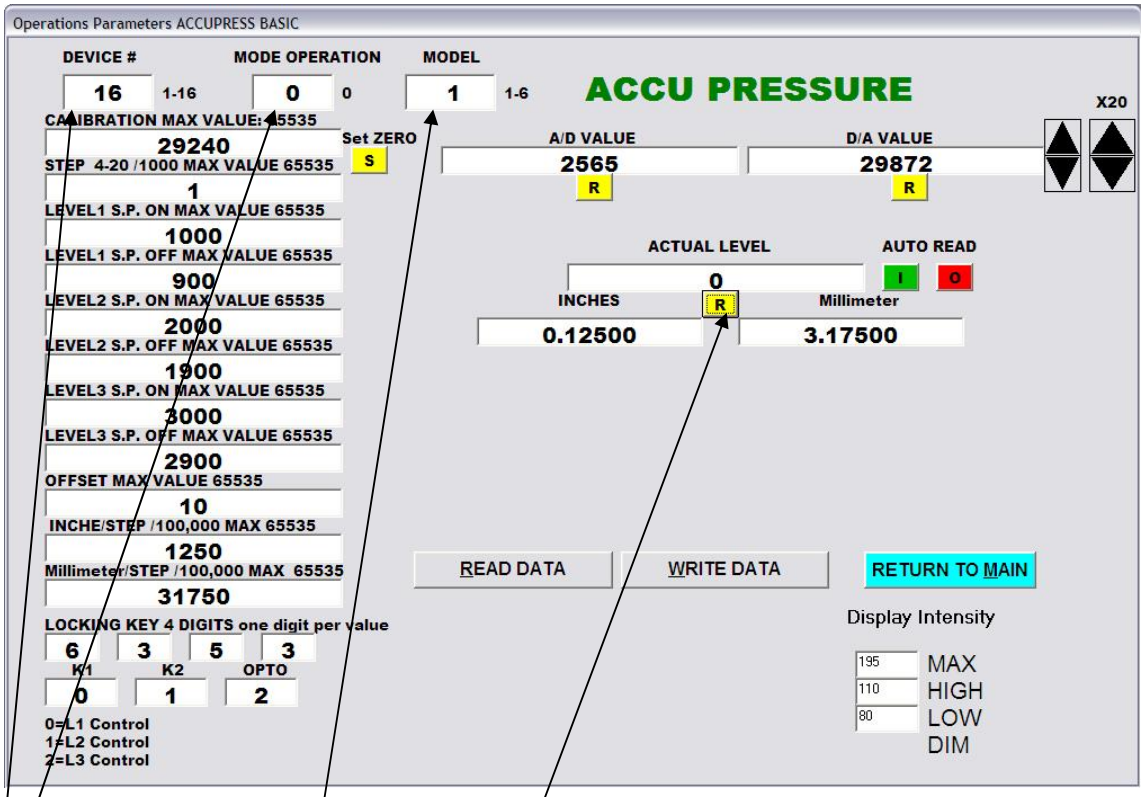
This section explains how to adjust parameters of operation.

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



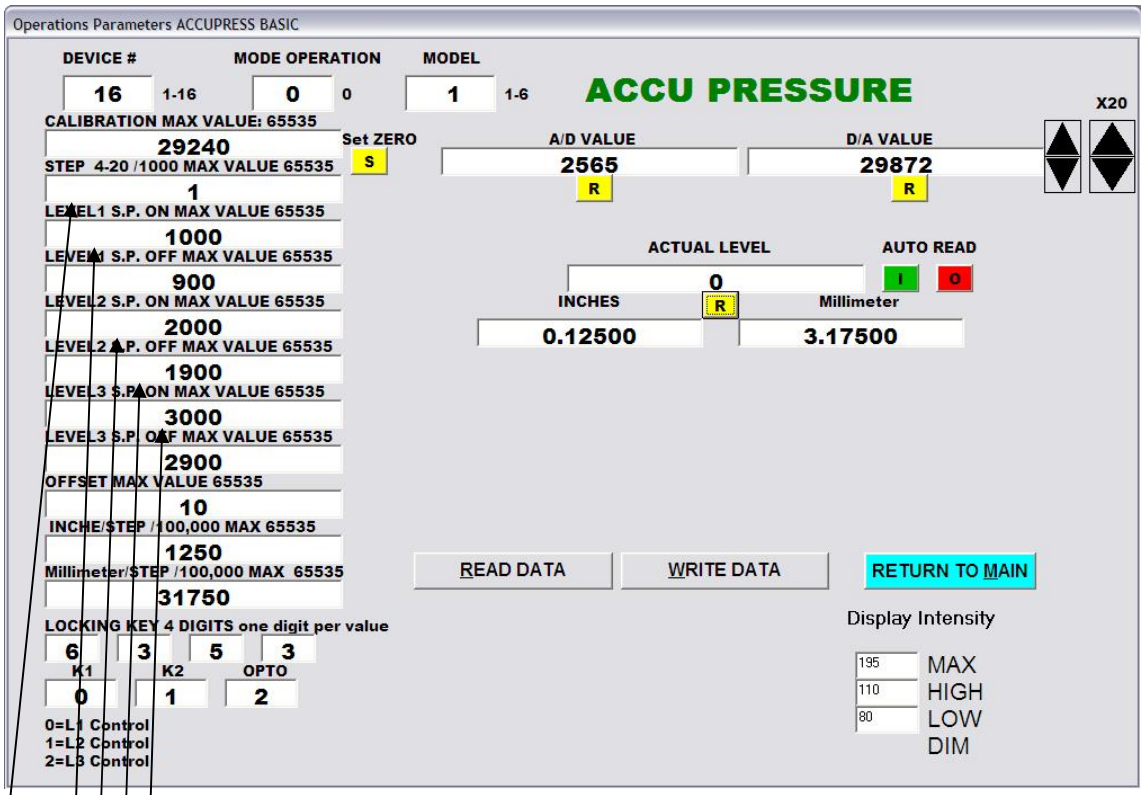
Component number may be change

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...



Multiplicator for 4-20 mA transducers may be change

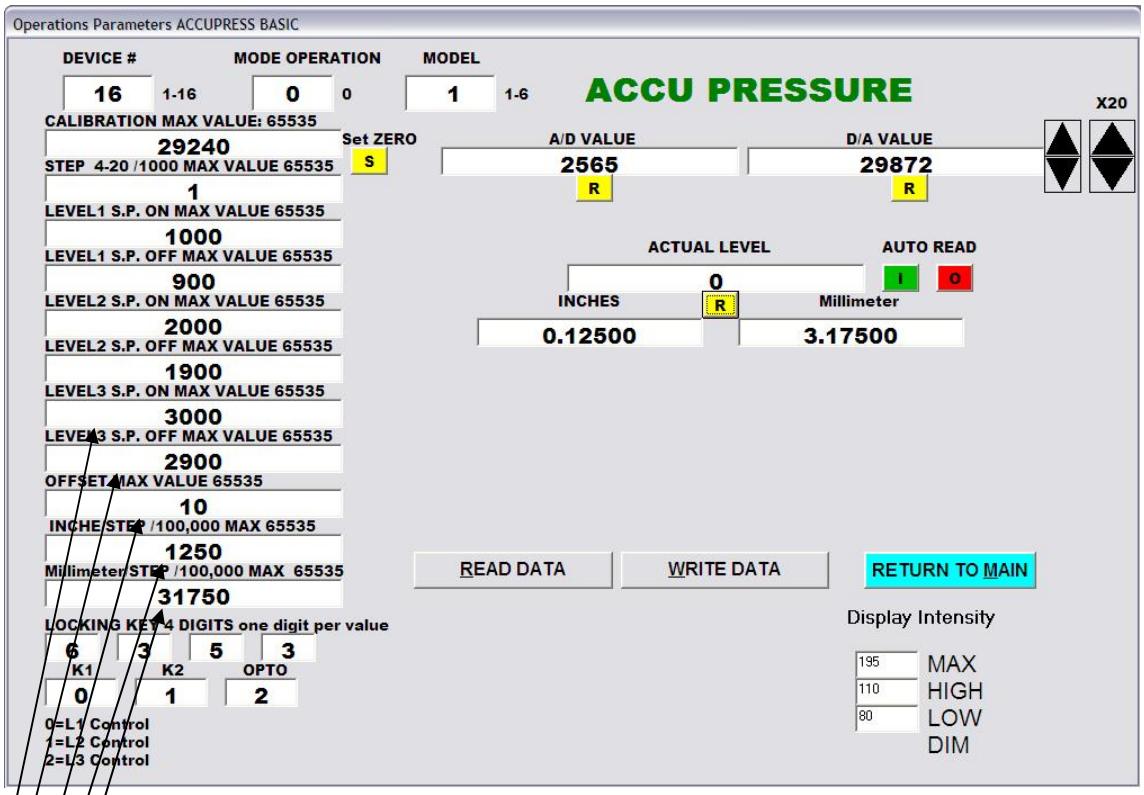
Level 1 ON Set Point may be change

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....



Level 3 ON Set Point may be change

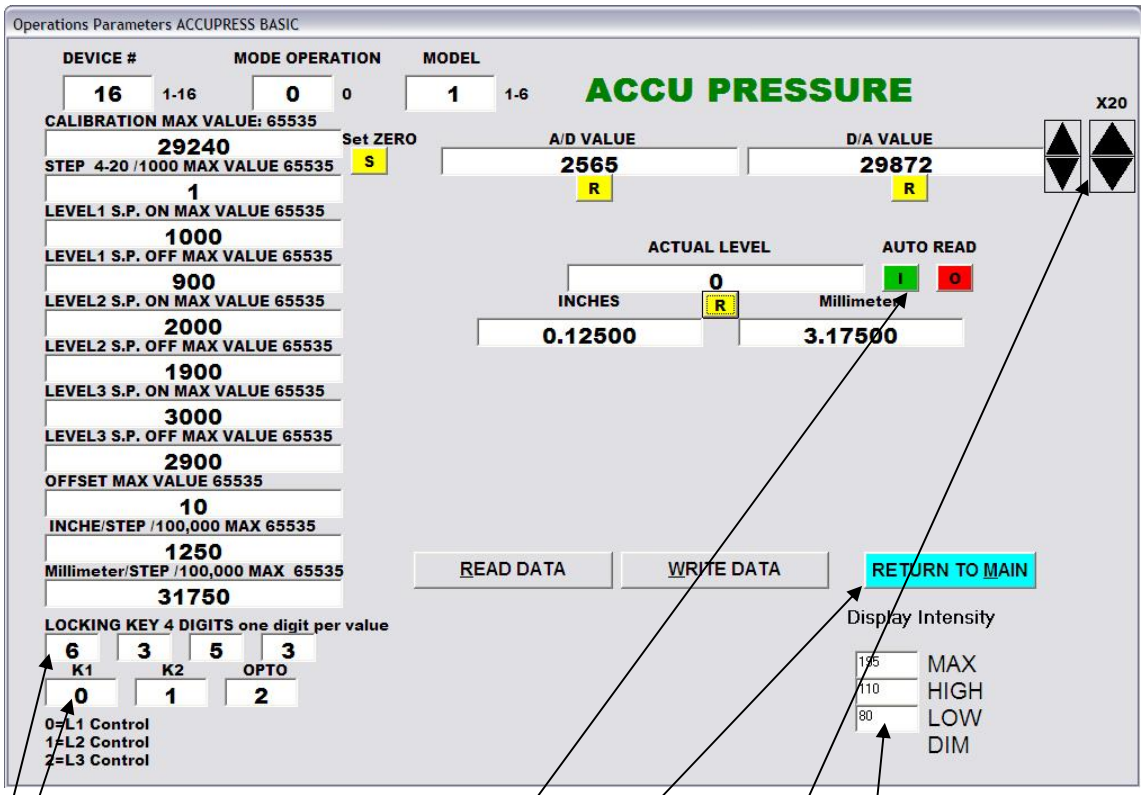
Level 3 OFF Set Point may be change

OFFSET value may be change (negative reading limit)

INCHE/STEP may be change

Millimeter/STEP may be change

See next page for more...



Locking codes may be changed

Output assignations may be changed

Auto Read may be start or stop

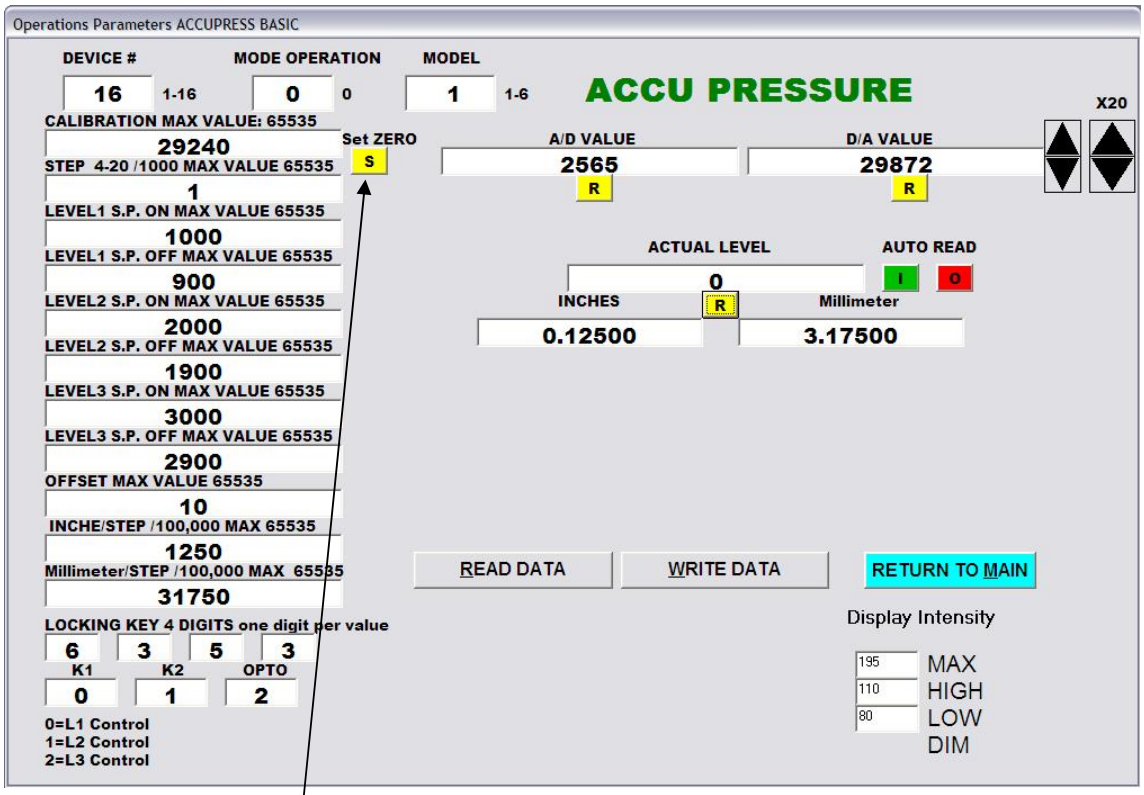
Clicking on [RETURN TO MAIN] will close window and show main window

Spin up/down is used for verify factory calibration

Factory settled display illumination set points may be changed

Belcatec string (not shown) may be changed

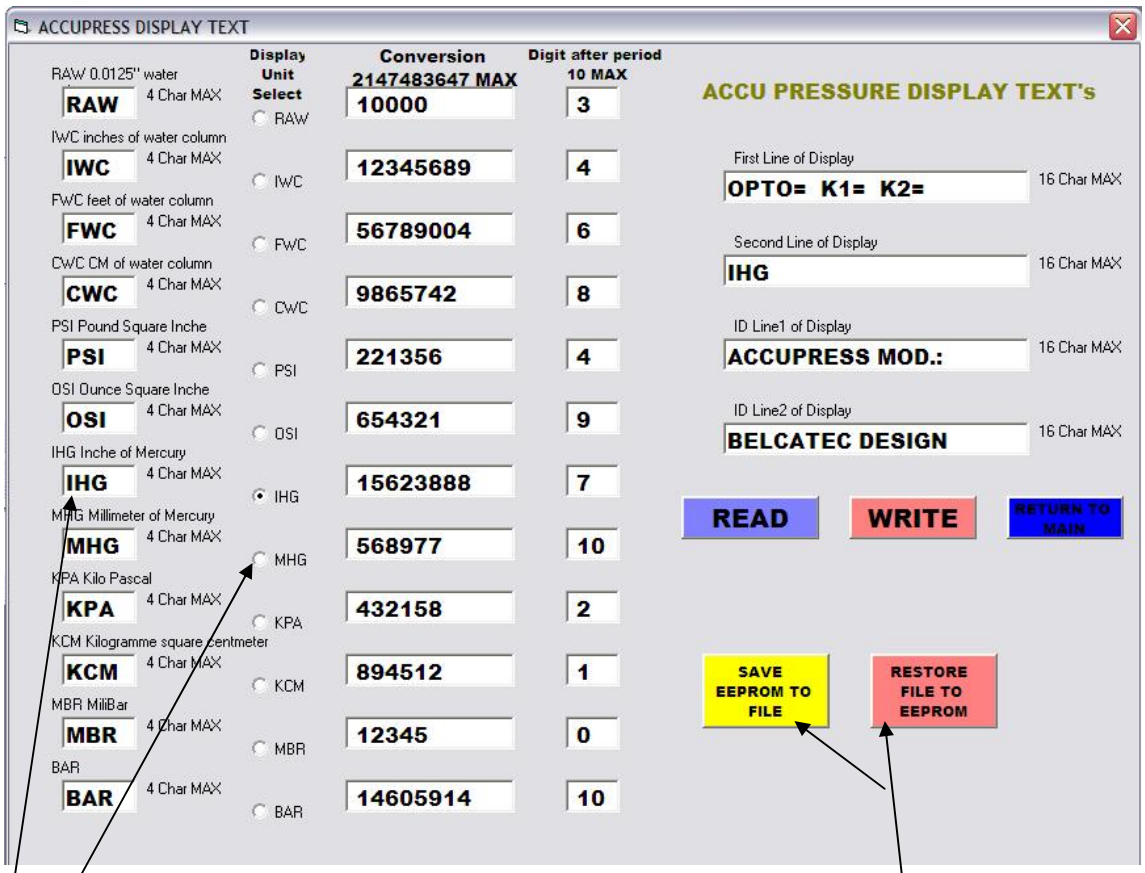
See next page for more...



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

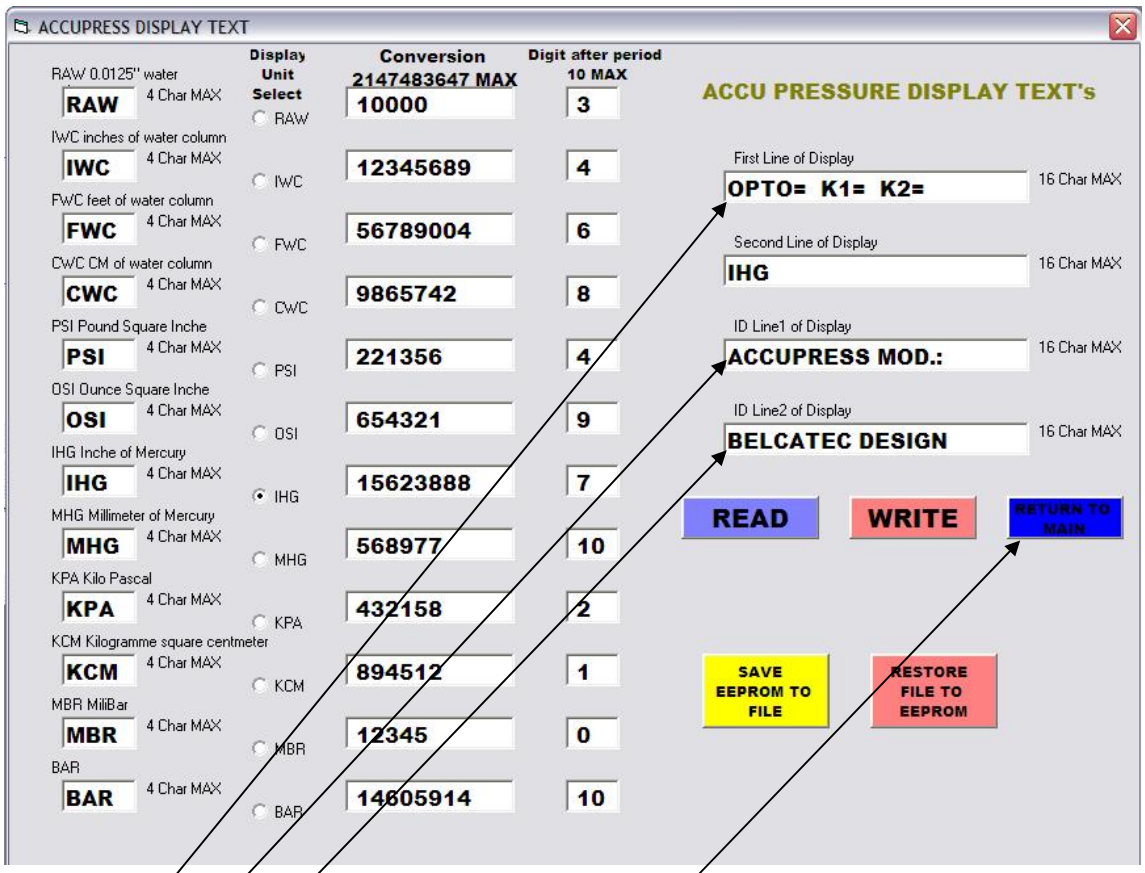


Text left of line 2 may be changed to show more engineering values

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...



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.