IRRISYS Irrigation Pump Protection System
Project Documentation & Development Bridge

System Overview
Platform: PIC18F2525 microcontroller
Language: XC8, IDE=VSCode
Purpose: Industrial irrigation pump protection system with multi-sensor monitoring and relay control

Core Functionality
The IRRISYS system monitors three independent sensor inputs to protect irrigation pumps from damage due to:
- Over/under pressure conditions
- Temperature extremes
- Flow anomalies (low flow)

Each input can be configured for different sensor types with automatic relay control based on setpoints and protection modes. Each sensor has its own set of timers and actions

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Hardware Configuration

Input Channels (3x Independent)
- **Analog inputs:** 4-20mA current loop sensors
- **Digital inputs:** Switch/contact closure sensors (for digital flow)
- **Configurable per channel:** Each input can be Pressure, Temperature, or Flow

Sensor Types Supported
1. **Pressure Sensors** (Analog only, 4-20mA)
- Configurable 4mA and 20mA scaling points
- Various set points (Pressure, Temp and Flow Analogue, Flow Digital)
- Various timers - including
- High Pressure Bypass (High BP). Maximum time in seconds the system will tolerate an over pressure condition.
- Primary low pressure bypass (PLPBP). Maximum time in seconds the system will tolerate an initial under pressure condition (Line fill time)
- Secondary low pressure bypass (SLPBP). Maximum time in seconds the system will tolerate any subsequent low pressure condition (once working pressure is achieved) - allows short term pressure dips

2. **Temperature Sensors** (Analog only, 4-20mA)
- Configurable 4mA and 20mA scaling points
- Units: Celsius
- Set High temperature limit (0-100c)
- High temp bypass in seconds - how long, in seconds will the system tolerate an over temp condition

3. **Flow Sensors** (Analog OR Digital)
   - **Analog mode:** 4-20mA with scaling
   - **Digital mode:** Switch input (NO/NC configurable)
   - Units: Percent or LpS (liters per second)
   - Low flow protection with dedicated setpoint
   - Low Flow Bypass. Maximum time in seconds the system will tolerate a low flow condition

Output Control
- **Relay outputs** for pump control
- **Protection modes:**
- Disabled: No relay action
- Low: Relay activates on low fault condition (e.g. low pressure)
- High: Relay activates on high condition (e.g. high temperature)

Relay output can be set to the following modes
-Latch (closes and stays closed until the fault is cleared by button press)
-Pulse (closes and stays closed for the period defined in another menu)
-No Action

any mode can be selected for any condition.
e.g. High pressure fault (over pressure) would be usually be set to Latch - since this would stop the pump and inhibit any restart - this condition could only be reset / cleared by physically pressing the button on the controller.
End Runtime would normally be set to Pulse - since this would stop the pump but would subsequently release the relay once the pump running signal is lost in order to allow remote restart for the next run.

Software Architecture

Note - the LCD is 45 x 20 chr - this is a hard constraint (Columns are numbered 1-20)

Menu System Structure

There are different formats for different menus

The overall principle for menus is:
The top line of any menu is the menu title. eg. OPTIONS - this tile is fixed and does not scroll
Remaining options are generally listed (left justified) on LCD lines 2,3 and 4.
The first item in the list is enclosed with [and] square brackets. (Cursor)
Rotating the Rotary Encoder (RE) 1 detent clockwise (CW) moves the cursor ([ ]) down one line

Eg.
Line 1 OPTIONS
Line 2 Main Menu

Line 3 [Setup Menu]
Line 4 Utility Menu
Line 5 Back   (not this line is not immediately visible)

Rotating the RE CW another detent moves the cursors down another place
EG.
Line 1 OPTIONS (fixed - no scroll)
Line 2 Main Menu
Line 3 Setup Menu
Line 4 [Utility Menu]
Line 5 Back   (not this line is not immediately visible)

and another CW detent gives us
Eg.
Line 1 OPTIONS (fixed - no scroll)
Line 2 Setup Menu
Line 3 Utility Menu
Line 4 [Back]   (now visible on line 4)

Rotating CC reverses this procedure

Pressing the button selects the item enclosed by the [ ]

For the options menu this will take us to the selected menu

The SETUP Menu operates similarly

The Sensor selected for each input is shown right justified on the same line as the Input

Eg.
Line 1 SETUP (fixed - no scroll)
Line 2 [1] Pressure
Line 3 2 Temp
Line 4 3 Flow
Line 5 Clock
Line 6 Back

Rotating the RE CW or CC moves the cursors '[ ]' as before - short press selects the item to edit and moves to the appropriate section

The Main menu, Input menu and Utility menu operates slightly differently - there are more line items in this menu and most items have an associated variable that will need to be edited. This is the LIST mode.
The list mode scrolls through each line item until the item of interest is select (short press)
The list mode shows each item left justified - but shows its associated variable / string right justified.

CRITICAL LCD DISPLAY IMPLEMENTATION RULES:

- The LCD has 20 columns numbered 1-20
- Column 20 is RESERVED for the closing cursor character (']' in list mode, ')' in edit mode)
- The actual VALUE text must ALWAYS end at column 19
- Cursor brackets/parentheses must be printed SEPARATELY from the value text - NEVER include them in the value string
- Opening bracket '[' or '(' is printed immediately before the value - clear any previous '[' or '(' left over from shorter strings displayed previously.
- Closing bracket ']' or ')' is printed at column 20
- **Implementation:** Build value strings WITHOUT brackets, then print brackets as separate characters at correct positions
- **List mode (selected):** Print '[' at column (20-len-2), value, then ']' at column 20
- **Edit mode:** Print '(' at column (20-len-2), value (blinking), then ')' at column 20
- **Not selected:** Print value only, ending at column 19 (no brackets)

Eg.
INPUT x (Fixed, non scrolling - configure input X)
Enable [Enabled] (Text "Enabled" ends at col 19, ']' at col 20)
Sensor [Pressure] (Text "Pressure" ends at col 19, ']' at col 20)
Scale 4ma 000 (No brackets when not selected)
Scale 20ma 000 (No brackets when not selected)

and so on
As the RE is rotated CW and CC the square bracket cursors move up and down until the user selects which item to edit (short press)
In this case - we move from list mode to edit mode - this is and inline editor so we change the [ ] to ( ) and flash the value enclosed (see list below) - RE scrolls through the options in the same location - the rest of the screen remains undisturbed.

When in Edit more - a long press of the button (>1.5 seconds) will return to list mode without making any changes.
Where the item calls for a signed variable editing is done 1 digit at a time
eg.
000 the leftmost digit represents 100's, the middle digit represents 10s and the 3rd digit represents units.
To edit this value flash the first digit - rotate the RE clockwise increases this digit by 1 (Representing hundreds). Short press locks in this value, stops flashing. Start flashing the middle digit - same process.
Its important to keep trach of the finished variable in case I want to add boundaries later.
eg - if the boundary limit is 500 then the first digit must be <= 5, if 5 is selected for the first digit then both the second and third must be limited to 0 (since we are already at the boundary.
Where we are editing a signed value - the format is -000 for a negative value and 000 for a positive value - keep the () next to the first chr and the) next to the 3rd digit
Eg. (-500) - negative value
or (+000) - positive value

The last option in the list is 'Back' - selecting this will cancel this menu and return to the previous screen

The Exit option in the OPTIONS menu will cancel menus altogether and return to the main screen.
There is a menu timeout variable (default 30 seconds) that will double beep and exit all menus and return to the main screen - any changes should be written to eeprom when returning to the main screen - menu timeout will cancel changes and revert to the value on entering the menu before they are written to the eeprom
All menus must be non blocking in order to facilitate system functions (not yet written)

Each Input has 4 configuration registers.

The default value for these registers vary - but every input can be configured according to the user needs.

This list shows the values for each input, the Bit assignments and the default settings. These Default settings are loaded at run time (and for a factory reset). Each Value is saved in eeprom. Values can be changed in menus then saved back to eeprom. These values then persist (including post power fail) until they are changed by the user or a factory reset is performed.

Input_1_Cnfg (Word sized)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
T0	D1	D0	PS1	PS0	PP1	PP0	HP1	HP0	FS1	FS0	CE1	CE0	M0	S1	S0
0	0	1	1	-	1	0	1	0	0	0	0	0	0	1	0

Sensor

Bit 0.1 (S0.S1) 00 = Pressure
01 = Temp
10 = Flow
Default = 00 (Pressure)

Master Enable

Bit 2 (M0) 0 = Disabled
1 = Enabled
Default = 1 (Enabled)

Current Enable

Bit 3.4 (CE0.CE1) 00 = High and Low Disabled
01 = Low Disabled, High Enabled
10 = Low Enabled, High Enabled
11 =Low Enabled, High Enabled
Default = 11 (low Enabled, High Enabled)

Fault State

Bit 5.6 (FS0.FS1) 00 = Not Used
01 = High Going
10 = Low Going
Default = 01 (High Going)

Fault Action High

Bit 7.8 (HP0.HP1) 00 = No Action
01 = Pulse
10 = Latch
Default = 10 (Latch)

Fault Action PL

Bit 9.10 (PP0.PP1) 00 = No Action
01 = Pulse
10 = Latch
Default = 10 (Latch)

Fault Action SL

Bit 11.12 (PS0.PS1) 00 = No Action
01 = Pulse
10 = Latch
Default = 10 (Latch)

Display

Bit 13.14 (D0.D1) 00 = No Display
01 = Always Display
10 = Display if Enabled
Default = 01 (Always Display)

Type

Bit 15 (T0) 0 = Analogue
1 = Digital

Input_1_Dig_Cnf (Byte Sized)

7	6	5	4	3	2	1	0
-	-	-	-	-	-	U0	S0
-	-	-	-	-	-	-	0

Input

Bit 0 (S0) 0 = Active Low
1 = Active High

Units

Bit 1 (U0) 0 = %
1 = LpS

Input_2_Cnfg (Word sized)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
T0	D1	D0	PS1	PS0	PP1	PP0	HP1	HP0	FS1	FS0	CE1	CE0	M0	S1	S0
0	0	1	1	-	1	0	1	0	0	0	0	0	0	1	0

Sensor

Bit 0.1 (S0.S1) 00 = Pressure
01 = Temp
10 = Flow
Default = 01 (Temp)

Master Enable

Bit 2 (M0) 0 = Disabled
1 = Enabled
Default = 1 (Enabled)

Current Enable

Bit 3.4 (CE0.CE1) 00 = High and Low Disabled
01 = Low Disabled, High Enabled
10 = Low Enabled, High Enabled
11 =Low Enabled, High Enabled
Default = 11 (low Enabled, High Enabled)

Fault State

Bit 5.6 (FS0.FS1) 00 = Not Used
01 = High Going
10 = Low Going
Default = 01 (High Going)

Fault Action High

Bit 7.8 (HP0.HP1) 00 = No Action
01 = Pulse
10 = Latch
Default = 10 (Latch)

Fault Action PL

Bit 9.10 (PP0.PP1) 00 = No Action
01 = Pulse
10 = Latch
Default = 00 (No Action)

Fault Action SL

Bit 11.12 (PS0.PS1) 00 = No Action
01 = Pulse
10 = Latch
Default = 00 (No Action)

Display

Bit 13.14 (D0.D1) 00 = No Display
01 = Always Display
10 = Display if Enabled
Default = 01 (Always Display)

Type

Bit 15 (T0) 0 = Analogue
1 = Digital

Input_2_Dig_Cnf (Byte Sized)

7	6	5	4	3	2	1	0
-	-	-	-	-	-	U0	S0
-	-	-	-	-	-	-	0

Input

Bit 0 (S0) 0 = Active Low
1 = Active High

Units

Bit 1 (U0) 0 = %
1 = LpS

Input_3_Cnfg (Word sized)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
T0	D1	D0	PS1	PS0	PP1	PP0	HP1	HP0	FS1	FS0	CE1	CE0	M0	S1	S0

0	0	1	1	-	1	0	1	0	0	0	0	0	0	1	0

Sensor

Bit 0.1 (S0.S1)

00 = Pressure
01 = Temp
10 = Flow
Default = 01 (Flow)

Master Enable

Bit 2 (M0)

0 = Disabled
1 = Enabled
Default = 0 (Disabled)

Current Enable

Bit 3.4 (CE0.CE1)

00 = High and Low Disabled
01 = Low Disabled, High Enabled
10 = Low Enabled, High Enabled
11 =Low Enabled, High Enabled
Default = 11 (High and Low Disabled)

Fault State

Bit 5.6 (FS0.FS1)

00 = Not Used
01 = High Going
10 = Low Going
Default = 01 (High Going)

Fault Action High

Bit 7.8 (HP0.HP1)

00 = No Action
01 = Pulse
10 = Latch
Default = 00 (No Action)

Fault Action PL

Bit 9.10 (PP0.PP1)

00 = No Action
01 = Pulse
10 = Latch
Default = 10 (Latch)

Fault Action SL

Bit 11.12 (PS0.PS1)

00 = No Action
01 = Pulse
10 = Latch

Default = 10 (Latch)

Display

Bit	13.14	(D0.D1)	00 = No Display 01 = Always Display 10 = Display if Enabled Default = 01 (Always Display)

Type

Bit	15	(T0)	0 = Analogue 1 = Digital

Input_3_Dig_Cnf (Byte Sized)

7	6	5	4	3	2	1	0
-	-	-	-	-	-	U0	S0
-	-	-	-	-	-	-	0

Input

Bit	0	(S0)	0 = Active Low 1 = Active High

Units

Bit	1	(U0)	0 = % 1 = LpS

Additional Input Configuration registers

Input 1

In_1_Scale_4	Signed Word, Range = -500 to +500, Default = 0
In_1_Scale_20	Signed Word, Range =-500 to +500, Default = +362
In_1_Dig_Scale	Word, Range = 1 to 1000, Default =250

Input 2

In_2_Scale_4	Signed Word, Range = -500 to +500, Default = -50
In_2_Scale_20	Signed Word, Range = -500 to +500, Default = +100
In_2_Dig_Scale	Word, Range = 1 to 1000, Default =250

Input 3

In_3_Scale_4	Signed Word, Range = -500 to +500, Default = 0
In_3_Scale_20	Signed Word, Range = -500 to +500, Default = +100
In_3_Dig_Scale	Word, Range = 1 to 1000, Default =250

ClockRegisters

Clock_reg (Byte Sized)

7	6	5	4	3	2	1	0
-	-	-	-	-	TO1	TO0	E0
-	-	-	-	-	0	0	1

Enable
Bit 0 (E0) 0 = Use
1 = Don't Use
Default = 0

Timeout
Bit 1.2 (TO0.TO1) 00 = No Action
01 = Pulse
10 = Latch
Default = 01 (Pulse)

Reserved
Bit 3.7

There are a number of System Configuration Registers

Menu Timeout	Word Sized, Default is 60 seconds, Range 10 to 300 seconds
Contrast	Byte Sized, Default is 50, Range is 30 to 100
Backlight	Byte Sized, Default is 50, Range is 10 to 100
Rly Pulse Time	Byte Sizeed, Default is 2, Range is 1 to 60
PWR_Fail_Dly	Byte Sized, Default is 5, Range is 1 to 120
Log_Ent	Word Sized, Default is 10, Range is 10 to 500
RunTime	Long Sized, Default is 0, Range 0 to 5999000 seconds

Overall Project Objectives:

A device used for Control and Supervision of Irrigation systems. This device has 4 Digital and 3 analog inputs. It also has 2 Digital outputs. There is a Newhaven 4 x 20chr LCD, a rotary encoder and single pushbutton. There are 3 Indicator leds and a magnetic buzzer.

Procedure to edit a signed variable

The first 4 lines of the screen will look like this ('.' should be read as a space)

Input X

Enable.....[Enabled]

Sensor.....Pressure

Scale4ma.....0000

As we rotate the RE 1 click clockwise, we move the cursor ([])

Input X

Enable.....Enabled

Sensor....[Pressure]

Scale4ma.....0000

Another click clockwise will be

Input X

Enable.....Enabled

Sensor.....Pressure

Scale4ma.....[0000]

Short press will change to editing mode

Input X

Enable.....Enabled

Sensor.....Pressure

Scale4ma.....(0000)

Screens

E	n	a	b	l	e						(	E	n	a	b	l	e	d	)

E	n	a	b	l	e						(							)

E	n	a	b	l	e					(	D	i	s	a	b	l	e	d	)

E	n	a	b	l	e					(									)

H	i	g	h		B	P							[	0	0	:	0	0	]

H	i	g	h		B	P							(	0	0	:	0	0	)

[	I	n	p	u	t		1	]				P	r	e	s	s	u	r	e
	I	n	p	u	t		2									T	e	m	p
	I	n	p	u	t		3									F	l	o	w

[	I	n	p	u	t		1	]								T	e	m	p
	I	n	p	u	t		2					P	r	e	s	s	u	r	e
	I	n	p	u	t		3									F	l	o	w

[	I	n	p	u	t		1	]								F	l	o	w
	I	n	p	u	t		2									T	e	m	p
	I	n	p	u	t		3					P	r	e	s	s	u	r	e

Flow setup example
Set this input to use an analogue flow sensor
Set the units to be Liters per Seconds (LpS - option is LpS or %)
Scale 4ma will generally be 0 flow LpS (or 0%)
Scale 20ma will be determined by the capacity of the pump (300 LpS in this case or 100%)
LF BP is the Bypass time MM:ss
LF Relay is the ‘Latch’, ‘Pulse’ or ‘Not Used
Display is Y/N
Back returns us to the previous menu

The blue row is the fixed title - does not scroll
The remaining 3 rows of the LCD are available for the list items to scroll

I	n	p	u	t		X												
E	n	a	b	l	e						[	E	n	a	b	l	e	d	]
S	e	n	s	o	r										F	l	o	w	
S	e	n	s	o	r		T	y	p	e			A	n	a	l	o	g	
U	n	i	t	s												L	p	S	
S	c	a	l	e	4	m	a									0	0	0	
S	c	a	l	e	2	0	m	a								3	0	0	
L	F		B	P										0	0	:	0	0	
L	F		R	L	Y									P	u	l	s	e	
D	i	s	p	l	a	y										Y	e	s	
															B	a	c	k	

Example of a flow setup using a Digital flow sensor
Set this input to use a digital flow sensor (switch)
NoFlow Input is the logic state of the input with no flow
LF BP is the bypass time 00:00 in MM:ss
LF Relay is the ‘Latch’, ‘Pulse’ or ‘Not Used
Display is Y/N
Back returns us to the previous menu

I	n	p	u	t		X												
E	n	a	b	l	e						[	E	n	a	b	l	e	d	]
S	e	n	s	o	r										F	l	o	w	
S	e	n	s	o	r		T	y	p	e		D	i	g	i	t	a	l	
N	o	F	l	o	w		l	n	p	t						L	o	w	
L	F		B	P										0	0	:	0	0	
L	F		R	L	Y									P	u	l	s	e	
D	i	s	p	l	a	y										Y	e	s	
															B	a	c	k	

I	n	p	u	t		X												
E	n	a	b	l	e						[	E	n	a	b	l	e	d	]
S	e	n	s	o	r						P	r	e	s	s	u	r	e	
S	e	n	s	o	r		T	y	p	e			A	n	a	l	o	g	
U	n	i	t	s												L	p	S	
S	c	a	l	e	4	m	a									0	0	0	
S	c	a	l	e	2	0	m	a								3	0	0	
L	F		B	P										0	0	:	0	0	
L	F		R	L	Y									P	u	l	s	e	
D	i	s	p	l	a	y										Y	e	s	
															B	a	c	k	

Options Menu

O	P	T	I	O	N	S												
[	M	a	i	n		M	e	n	u	]								
	S	e	t	u	p		M	e	n	u								
	U	t	i	l	i	t	y		M	e	n	u						
	A	b	o	u	t													
	B	a	c	k														

Setup Menu

S	E	T	U	P															
[	P	r	e	s	s	u	r	e	]										*
	T	e	m	p															*
	F	l	o	w															*
	C	l	o	c	k														*
	B	a	c	k															

Lines 2,3 and 4 are populated with the names saved in eeprom - in this case, the default sensor for input 1 is Pressure, 2 is Temp and 3 is Flow - any input can be configured to be be any sensor - populate accordingly.

Column 20 ‘*’ is shown when the adjacent input is enabled. This is omitted if the input is disabled.

Clock

C	L	O	C	K															
E	n	a	b	l	e							E	n	a	b	l	e	d	
E	n	d		R	u	n								L	a	t	c	h	
D	i	s	p	l	a	y									S	h	o	w	
B	a	c	k												B	a	c	k	

Hardware

There are 2 Relay outputs
Rly 1 is the primary control output

Rly 2 is shared with an ‘Run’ input - for this project, Rly 2 will always be an input and is therefore renamed as RunStop

Rly 1 is controlled by Pin 12 (RC1) of the PIC - This pin should be normally low - driving this pin high closes the relay.

The relay output is determined by the relevant relay setting in the setup. ‘Pulse’ is a given time in seconds, Latch remains closed until the front panel button is pressed (note: this must persist past a power fail reset - which we will define at a later point)

We should setup the relay to follow an isr timer. If the relay is closed we should start a countdown time - if the relay is set to pulse it should remain closed until that timer expires.

The PLPBP time (and the HPBP and SLPBP) time editing procedure break the values up into 2 x 2 pairs of digits (Hours and Minutes - or Minutes and seconds) ‘HH:mm or MM:SS

This is decided by a flag set in the calling procedure

To start the editing the existing value is converted from seconds to hh:mm or mm:ss and displays as follows (example 2 minutes)

[02:00]
Short press > beep
Change the display to (02:00) Note the digits in red flash - since this is the pair we are going to edit.

02 is flashing these are the minutes (or hours) digits - padded to 2 decimal places. Rotate the RE counter clockwise (CCW) 1 detent - display changes to (01:00) - another detent CCW Changes the display to (00:00)

2 detents Clockwise (CW) changes the display back to (02:00) - but, since our limit for this variable is 120 seconds, 1 more detent CW will not change (limit reached)

Short press > beep

Display changes to (02:00) - 1 detent in either direction will not change the display (limit is 120 seconds)

If we wanted say 1 minute 30 seconds then we would have to exit and reenter to change (02:00) to (01:00) - short press > beep (01:00) and rotate 31 detents CW to get (01:30)

The short press > beep

Change display back to the list mode
[01:30]

C	L	O	C	K														
E	n	a	b	l	e						[	E	n	a	b	l	e	d	]
E	n	d		R	u	n								P	u	l	s	e	
R	l	y		P	u	l	s	e						0	0	:	0	2	

Focus on the Rly Pulse line - Short press > beep > edit mode

R	l	y		P	u	l	s	e					0	0	:	0	2		

This should be 02:00 (120 seconds = 2 minutes)

Rotate 1 detent CCW clockwise
Short press > beep > edit mode

Time set

The time edit function belongs to the Utility menu group - this function allows the user to set the date and time.

The function follows the standard menu approach for the project as a whole. It can reuse previous functions if that is appropriate.

The format is the standard Australian DD/MM/YY and HH:MM:SS format - in this example we will start with whatever date and time we read from the RTC (which may have been set previously) Assume the old date and time is 07/10/2025 10:59:59 - we want to set a new date and time of 08/10/2025 and time 15:00:10 All digits are padded to 2 places and bounded by standard date and time setting (dd = 1-31, mm = 1-12, year = 2025-2135, hh =0-23, mm = 0-59, ss = 0 - 59)

Digits shown here in red are flashing at my standard flash rate of 2Hz (there is code in main.c for doing this. We flash only the digit pair we are editing. Values change on screen as we change them using the rotary encoder - short press > beep will lock that value, stop flashing and move to the next pair. When editing the year a short press > beep will lock in that value then return us to the Date and Time menu. The user can then select either Time, in which case we follow the same procedure we used for setting the date but with limits set to suit time.

List mode encloses values with square brackets and edit mode encloses values in parentheses. Leaving edit mode changes back to square brackets

Date and Time menus

D	A	T	E		/		T	I	M	E									
[	0	7	/	1	0	/	2	0	2	5	]								
	1	0	:	5	9	:	5	9											
	B	a	c	k															

User can scroll through these options - scrolling to ‘Back’ and selecting (short press > beep) returns to the utility menu

Scrolling to the date line (line 2) and pressing the button > short beep. Changes the screen to

D	A	T	E		/		T	I	M	E									
(	0	7	/	1	0	/	2	0	2	5	)								
	1	0	:	5	9	:	5	9											
	B	a	c	k															

Rotating the RE in either direction changes the number in red by 1 for each detent - this number will roll over or under when it reaches the limits (0-31 in this case) - user set this value to 8 for this example - then presses the button to move on to the next field (08 is locked in and stops flashing. 10 starts flashing

D	A	T	E		/		T	I	M	E									
[	0	8	/	1	0	/	2	0	2	5	]								
	1	0	:	5	9	:	5	9											
	B	a	c	k															

Same process - select the desired value - short press of the button > short beep moves to the next field - we will leave the month set at 10 for this example.

D	A	T	E		/		T	I	M	E									
[	0	7	/	1	0	/	2	0	2	5	]								
	1	0	:	5	9	:	5	9											
	B	a	c	k															

Select the desired value for year - button press > short beep, stop flashing the year and return to the Date and time menu

D	A	T	E		/		T	I	M	E									
[	0	7	/	1	0	/	2	0	2	5	]								
	1	0	:	5	9	:	5	9											
	B	a	c	k															

Rotate clockwise 1 detent changes the screen to

D	A	T	E		/		T	I	M	E									
	0	7	/	1	0	/	2	0	2	5									
[	1	0	:	5	9	:	5	9	]										
	B	a	c	k															

Repeat the date function, but with limits for time rather than date.

Menu will timeout after x seconds with no activity on the RE or the Button. (see previous menus) A menu timeout will return to the main screen (exit menu mode altogether) without saving any changes.

Long press at any point will return to the previous menu - as with other menus.