



**Operator's Panel
Reference Manual**

*Version 2.3
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(MAN512)*

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1. Introduction

The Operator's Panel is based on a combined keypad and LCD display, which has an RS485 serial port which can plug in to the auxiliary serial port of a PTS. Software running on the PTS allows the operator to control the motors and access status information etc. using the panel. This manual describes the operation of the panel and how it can be configured by the user to suit his application.

This manual describes version 2.2 of the Operator's Panel which is compatible with versions 2.6 up to 3.1 of the PTS. The software is designed to work with the new style Operator's Panel and PTS. This version of the Operator's Panel is also compatible with version 1.6 onwards of the Mini-PTS.

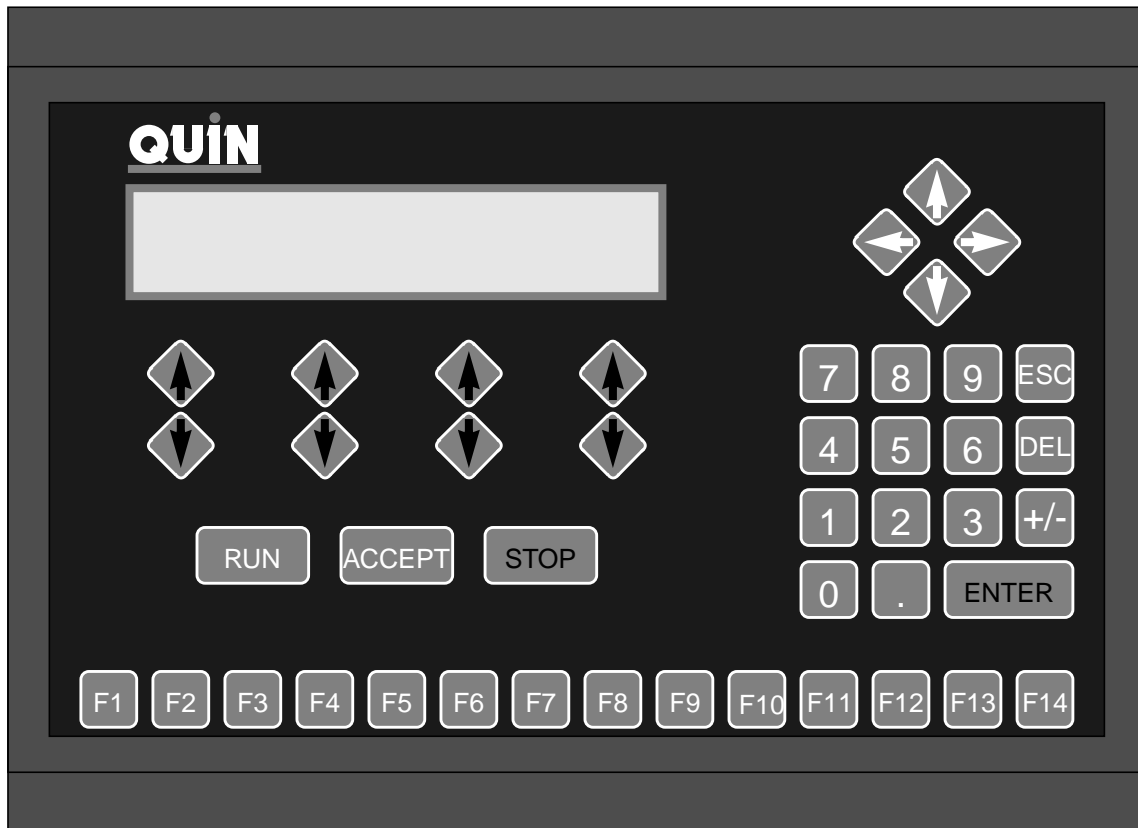
It is important to note that the Operator's Panel is designed to be located relatively close to the host Quin PTS controller, and that the data transmission, at 9600 baud, is sensitive to high levels of electrical noise. The signal cabling to the panel should therefore be screened and segregated from other cables carrying mains voltages or motor currents, and in particular away from cables carrying supplies switched by contactors or inverter drives.

The current consumption of the unit is up to 1 amp at 5 volts. The maximum supply volt drop is 0.2 volts at that current. Thus a power supply should be located near the unit. The supply 0 volts is then grounded at the unit.

2. Hardware

2.1 Keyboard Layout

The keyboard consists of a 44-key keypad and a 4 line by 40 character LCD display as shown below:



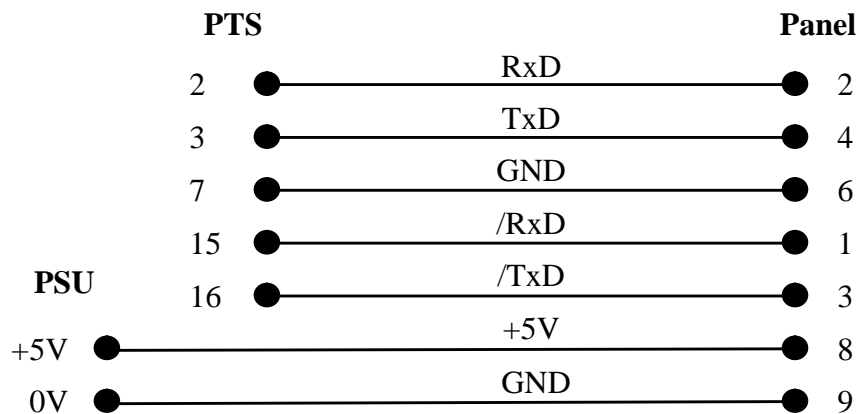
The keys fall into the following groups:

- **Increment keys**
Underneath the display there are 4 pairs of keys which are used as increment/decrement keys and are designed to associate with 4 fields in the display.
- **Cursor keys**
The cursor keys to the top right of the keyboard are used for scrolling through menus or lists on the display.
- **Numeric keypad**
The numeric keypad allows the operator to enter parameters for example when setting up a machine.
- **Control keys**
The STOP and RUN keys are used to control the modes of operation of the keyboard. The ACCEPT key is used to clear alarm messages from the display.

- **Function Keys**
These keys can be programmed to initiate control sequences on the machine. The legend for these keys is on a slide-in film so that it can be easily changed if required

2.2 Serial Connection to PTS

The Operator's panel is designed to be connected to Port B of a PTS and to a 5 volt power supply. Port B of the CPU20 should be configured for RS-485 signals with the RS-485 driver enabled on J19, as described in the PTS Installation Manual. The lead connecting the PTS to the panel should be wired as follows:

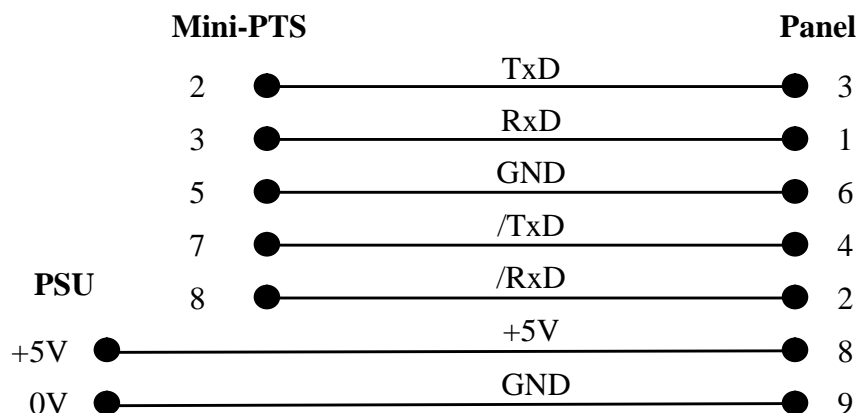


Important Note :

Power for the Operator's Panel should not be taken from the Port B connector on the PTS, as this allows electrical noise into the PTS and can lead to unreliable operation.

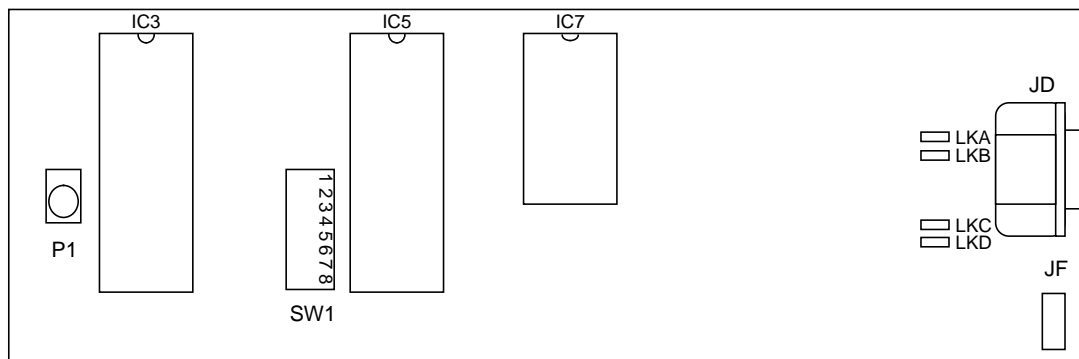
2.3 Serial Connection to Mini-PTS

The Operator's panel can also be connected to Port B of a Mini-PTS and to a 5 volt power supply. Port B of the Mini-PTS should be configured for RS-485 point-to-point signals, as described in the Mini-PTS Installation Manual. The lead connecting the Mini-PTS to the panel should be wired as follows:



2.4 Switch Settings

The following settings can be checked by removing the rear panel. The following diagram shows the electronics board with the panel turned upside down.



Potentiometer P1 controls the contrast of the LCD display. The power to the display backlight comes from connector JF which can be removed to save power. The 9 way D-type connector JD is the RS485 serial port with connections as shown above. The switch settings for SW1 are as follows, with the standard settings shown in *italic type*.

Baud Rate	S1	S2	S3	Parity	S4	S5
1200	X	X	OFF	Even	OFF	OFF
2400	OFF	OFF	ON	Odd	ON	OFF
4800	ON	OFF	ON	<i>None</i>	X	<i>ON</i>
9600	<i>OFF</i>	<i>ON</i>	<i>ON</i>			
19200	ON	ON	ON			

2.5 Relevant Directives

The product is designed to be incorporated into a system for the control of machinery, and needs external equipment to enable it to fulfil this function. It must not be relied upon to provide safety-critical features such as guarding or emergency stop functions. It must not be put into service until the machinery into which it has been incorporated has been declared in conformity with the Machinery Directive 89/392/EEC and/or its relevant amendments.

The installation instructions in this manual should be followed in constructing a system which meets requirements.

The product has been tested in typical configurations and meets the EMC Directive 89/336/EEC, when fed from power supplies which meet 89/336/EEC and 92/31/EEC. The product uses only low voltages, and is therefore exempt under 73/23/EEC as amended by 93/68/EEC.

The product as normally supplied has low voltages accessible to touch, and must be mounted within a suitable cabinet to meet any required IP rating to BS EN 60529.

3. Operator's Panel Functions

3.1 Modes of Operation

The Operator's Panel has 3 main modes of operation as follows:

- **Run Mode**
This mode is mainly used by the machine operator when the machine is making product. The display shows up to four machine operating parameters such as Speed, Bag length, etc. at a time, and the operator can use the function keys below each field to alter the parameters within preset limits. The main purpose of this mode of operation is to allow the operator to adjust the machine while it is running but only within strictly defined limits.
- **Setup Mode**
This mode is used to set the machine up for a new product or batch and allows the machine setter to do such things as selecting a profile or map and optionally to alter default parameters associated with it.
- **Configuration Mode**
Configuration mode is entered using the OP command on the main serial port of the PTS and is normally used by the engineer building the machine to configure the keyboard for his application. The engineer can define which parameters are displayed in Run mode along with their limits. He can also define which parameters are to be changed in Setup mode.

3.2 Messages and Function Keys

There are two additional facilities which are available in both Run mode and Setup mode. These are as follows.

- **Message Lists**
The panel can be configured to display status or warning messages on the top two lines of the display.
- **Function Keys**
The function keys at the bottom of the keyboard can be configured to initiate control sequences on the machine. Each key can be configured to work in Run mode, Setup mode or both.

3.3 Machine Control and the Database

The purpose of the Operator's panel is to allow the operator and/or setter to control the machine and to display information on the machine's status or performance. In order to achieve this the Operator's panel has to communicate with other tasks in the system, such as the motion control task, and it does so by using the database.

The database is a centralized facility which is accessible to all tasks in the system and holds a table of integer variables. The variables are referred to by short names which are assigned by the user. Variables can be used in place of numbers in motor control commands and can also be changed by the Operator's panel, for example when the operator alters a parameter on the Run mode display. In this way, someone using the Operator's panel can change a variable in the database which is subsequently used by the motor task. This provides the basic mechanism for controlling the machine from the Operator's panel.

The mechanism also works in the reverse direction in that variables can also be changed by the motor task and subsequently be picked up and displayed by the Operator's panel. For example the motor task could run a repeating sequence which updates variable *POS* at regular intervals with the current motor position. The panel can be configured to monitor the variable and display it (suitably scaled) on the Run mode display whenever it changes.

To provide a further level of control, the motor task can be configured, using the > command, to execute a sequence whenever a specified variable is updated. For example, since the RUN key on the panel can be configured to update a variable, it is possible to make it execute a suitable startup sequence on the machine.

When specifying variable names during configuration of the panel, make sure you keep to the following rules:

- Names can consist of up to 3 alphanumeric characters
- The name must not include punctuation characters such as _(underscore) .(full stop) or any spaces.
- Upper and lower case letters are equivalent. For example *POS* and *pos* are the same variable.

4. Run Mode

In Run mode the display is split into four fields of 2 lines by 10 characters. Normally each field would show a machine operating parameter which the operator could adjust. The parameter is displayed as a floating point number (to a preset precision) in engineering units with the parameter name above it. The display has the following general appearance.

Speed	Reference	Reg.Error	Profile
1234.5	ON	4.72	5

There are a number of different types of field available on the run mode display. With an Increment field the operator can adjust the parameter value using the increment/decrement keys underneath the field. A Display field monitors the value of some machine parameter and updates the display when the parameter changes. A Binary field acts in a similar way to the increment field except that the value can only be on or off and appropriate text is displayed instead of a number.

The panel can be configured to have several different displays in Run mode. Each display has four fields as described above and the operator can toggle between displays using the cursor keys at the top right of the keyboard.

4.1 Increment field

An Increment field is used where the operator needs to adjust some operating parameter while the machine is running. The function keys below the field are used to increment or decrement the parameter by a fixed amount each time the key is pressed. The value displayed is normally in engineering units such as R.P.M. or mm. and normally needs scaling to machine units before it is used. Finally the parameter has to be mapped to a control variable on the machine so that changing the display results in an effect on the machine. This is done by specifying a database variable which is updated each time the operator changes the display.

An Increment field has a number of attributes as described below, which have to be specified when the panel is configured.

Title

This is the text of the title displayed above the parameter. The title is limited to 10 characters.

Precision

Number of decimal places to be displayed.

Scale Factor and Offset

The scale factor and offset are used to convert the displayed value to machine units before updating the associated variable.

Upper and Lower Limits

These limits are applied to the displayed parameter to prevent the operator adjusting it too far.

Increment

Increment (decrement) to be applied each time the appropriate key is pressed. Note that the increment will only have an effect if the associated variable is defined and the increment multiplied by the scale factor actually changes the associated variable by 1 or more.

Associated Variable

The variable to be updated when the displayed parameter is changed. The value of the variable is computed as follows:

$$\text{variable} = \text{display} * \text{scale} + \text{offset}$$

Where display is the displayed parameter and scale and offset are as described above.

Associated variable is initialized on startup

This option can be set to 1 (true) or 0 (false) to control whether the value of the field is output to the associated variable on power-up.

Limit Variable

The limit variable can be defined to provide a set point for the value of the displayed parameter. If the limit variable is defined then the upper and lower limits are relative to it. The range of the displayed value is as follows:

$$\begin{aligned} \text{set_pt} &= (\text{limit_variable} - \text{offset}) / \text{scale} \\ \text{set_pt} + \text{low_limit} &\leq \text{display} \\ \text{display} &\leq \text{set_pt} + \text{high_limit} \end{aligned}$$

Note that the limit variable is descaled before being used as the set point.

Limits are percentage of limit variable

This option can be set to 1 (true) or 0 (false) to control whether the upper and lower limits are treated as percentages or not. This option only applies if the limit variable is defined. If the option is set to 0 (false) the limits are calculated as above. If the option is set to 1 (true) the set point is calculated as above but the limits are calculated as follows:

$$\begin{aligned} \text{set_pt} * (1 + \text{low_limit} / 100) &\leq \text{display} \\ \text{display} &\leq \text{set_pt} * (1 + \text{high_limit} / 100) \end{aligned}$$

Clock tick updates variable

This option can be used to define a variable to be updated regularly once per second while the field is on display. The value of the variable is not changed but the fact that it is updated can be used to trigger a sequence of commands in the motor task which update the field's associated variable. For example, suppose the field has

```
Associated variable POS
Clock tick updates variable PS2
```

and the motor task has the following definition to put the demand position into POS when PS2 is updated

```
$PS2>CH1 / $POS=DD
```

then the field will show the current demand position every second. This feature is not usually used on an Increment field but is very useful on a Display field (see below).

Auto Repeat

If this option is enabled (set to 1) the increment/decrement keys will automatically repeat approximately 5 times a second if they are held down. To avoid being over sensitive the keys will not start repeating until they have been held down for approximately one second.

4.2 Display Field

A display field is used to display the value of a machine parameter and update it when it changes. This is done by attaching the field to a database variable. Since the variable is in machine units it needs to be scaled prior to display. The attributes of a Display are much the same as the Increment field except that the limits, limit variable, percentage limits, increment and auto repeat are not used.

4.3 Binary Field

A binary field is similar to an Increment field but the displayed value is only allowed to be true (one) or false (zero). The value is read from a database variable but is displayed as one of two predefined text strings. On a Binary field, the operator can set the variable to true by pressing the increment button or false by pressing the decrement button. The attributes for a Binary field are similar to a Display field without the precision or clock tick variable but including the following.

Text Strings for True/False

Two strings required (e.g. ON and OFF) for display according to the variable value. The internal value is either 1 or 0 but by using the scale factor and offset the associated variable can be made to toggle between any two values as required.

5. Setup Mode

Setup mode is used to change the machine's parameters ready for a new type or size of product etc. and would typically be used by the machine setter rather than the operator. The keyboard enters Setup mode when the STOP key is pressed. This brings the user into the top level of a system of menus or lists which he can move around to change machine parameters for the new product.

Within each list the operator can use the scroll keys to preview the available choices. The following types are available.

- **Numeric field.**
This allows machine parameters to be changed.
- **Setup list.**
A lower level list which can also be password protected. Setup lists can be nested to any depth.
- **Save option.**
This option allows the current parameters to be saved in nonvolatile memory.
- **Interlock option.**
Selecting this option starts a control sequence. The panel then waits for the interlock variable to be updated before continuing.

To change the value of a numeric field, the number keys are used followed by ENTER. In order to select a sub-list, the ENTER or Scroll Right key (→) key is used on its own. Each list includes an end marker which must be selected (using the ENTER key) to return to the next level up, or in the case of the top level list, to return to Run mode. In order to save scrolling to the end of the list, you can also press the Scroll Left key (←) to return to the next level up.

The structure and contents of the lists is defined when the keyboard is configured. The following paragraphs describe the attributes of lists, numeric fields, the save option and the interlock option.

5.1 Setup List

The main setup list and all lower level ones have the same structure and attributes. A list can be protected by a passcode which must be entered before the rest of the list becomes visible. A list also has an associated variable which is set to a predefined value when the list is selected. The following attributes are specified when the list is configured.

Password

A four digit number which must be keyed in to allow access to the body of the list. Setting this value to zero turns the password off.

Text and Prompt

The text and prompt specified here are displayed before entering the list. If this is the top level list, the text and prompt are displayed when the STOP key is pressed. The list is then selected (i.e. the user can scroll through its options) by pressing the ENTER key. If the list is below the top level, the text and prompt are displayed as an option in the list above.

Associated Variable and Value

The associated variable is set to the specified value when the list is selected.

5.2 Numeric Field

A Numeric field displays a text message and current value in brackets on the top line of the display. On the lower line a standard message is displayed prompting the user to key in a new value if required. The user can change the parameter by typing in a new value followed by ENTER. As with parameters in Run mode the data will be presented to the user in engineering units which means that generally the value will have to be scaled to convert it to machine units. The scaled value is used to update a database variable which in turn can be used to control some aspect of the machine. Data values will also be confined within absolute upper and lower limits. The following information has to be specified for each field when the keyboard is configured.

Title

The text to be displayed on the top line of the display (up to 40 characters).

Precision

Number of decimal places to be displayed.

Scale and Offset

Scale factor and offset to convert the displayed value to machine units.

Upper and Lower Limits

These limits will be applied to the displayed parameter to prevent the operator adjusting it too far.

Associated Variable

The variable to be updated when the displayed parameter is changed. The value of the variable will be as computed as follows:

$$\text{variable} = \text{display} * \text{scale} + \text{offset}$$

Where `display` is the displayed parameter and `scale` and `offset` are as described above.

Associated variable is initialized on startup

This option can be set to 1 (true) or 0 (false) to control whether the value of the field is output to the associated variable on power-up.

Limit Variable

The limit variable can be defined to provide a set point for the value of the displayed parameter. If the limit variable is defined then the upper and lower limits are relative to it. The range of the displayed value is as follows:

```
set_pt = (limit_variable - offset) / scale
set_pt + low_limit <= display
display <= set_pt + high_limit
```

Note that the limit variable is descaled before being used as the set point.

Limits are percentage of limit variable

This option can be set to 1 (true) or 0 (false) to control whether the upper and lower limits are treated as percentages or not. This option only applies if the limit variable is defined. If the option is set to 0 (false) the limits are calculated as above. If the option is set to 1 (true) the set point is calculated as above but the limits are calculated as follows:

```
set_pt * (1 + low_limit / 100) <= display
display <= set_pt * (1 + high_limit / 100)
```

5.3 Save Option

The Save option allows the operator to save values which have been entered into fields on the Setup page and/or the Operator's page. By using the Save option, you can set the machine up for a new product and then save the setup so that system remembers the new product when it is switched off. Because saving is not automatic, you can safely alter parameters to experiment with new settings without losing the original set-up. You should only select the Save option when you are satisfied that the new settings are correct.

The Save option includes text and prompt messages which are displayed when you scroll through the parent menu. To save parameters, you must select the option by pressing the ENTER key when the text and prompt are displayed. The parameters to be saved may be either the Increment and Binary fields on the Operator's page or the Numeric fields on the Setup page or both. This is specified during configuration of the panel. While the parameters are being saved the following message is displayed:

Saving values...

followed by:

Values have been saved
Press ENTER key to continue :

Pressing the ENTER key returns you to the parent menu pointing at the Save option. Note that fields which have been saved will not be restored on startup unless the Startup write option has been set to 1 on the relevant fields.

The following attributes are specified for the Save option during configuration of the panel.

Text and Prompt

These are displayed on the upper and lower lines of the display respectively when you scroll through the parent menu. The default text is *Save setup parameters* but this can be changed as required. The text and prompt messages can be up to 40 characters long.

Save Operator's page

If this attribute is set to 1, then the values on the Operator's page will be saved when the Save option is selected. If this attribute is set to zero, the Operator's page values will not be saved.

Save Setup values

If this attribute is set to 1, then the values on the Setup page will be saved when the Save option is selected. If this attribute is set to zero, the Setup page values will not be saved.

5.4 Interlock Option

The Interlock option is designed to start some machine control sequence and force the operator to wait until the sequence has finished before continuing. Typical applications might be downloading a map or initializing position where it is necessary to complete the action successfully before the machine can be run. When the interlock option is selected the associated variable is updated. This is used to trigger the relevant control sequence. The panel then displays the message *Waiting for end variable...* and waits for the interlock variable to be updated. You can set up a message list tied to the Interlock variable so that when it is updated a suitable message is displayed. This allows the operator to be informed of the success or failure of the control sequence.

While the panel is waiting for the interlock variable the function keys and message lists still work as normal. If for some reason the interlock variable does not get updated there are two ways of escaping. The first is to press the ESC key. The second way is to set up a timeout period after which the interlock will be aborted. In either case a message is displayed to alert the operator that the interlock has been aborted prematurely.

The following attributes can be set up during configuration.

Text and Prompt

These are displayed on the upper and lower lines of the display respectively when you scroll through the parent menu. The text and prompt messages can be up to 40 characters long.

Associated Variable and value

This variable is updated to the specified value, when the Interlock option is selected by pressing ENTER. This variable must be defined before leaving the configuration menu.

Interlock Variable

When this variable is updated it causes the interlock to finish normally. In this case a message from the associated message list will be displayed if possible.

Timeout

This is the timeout period in seconds before the interlock is aborted if the interlock variable has not previously been updated. Setting the timeout to zero disables this feature.

Wait message

The message to be displayed when the interlock has been selected and the system is waiting for the interlock variable to be updated. This message can be up to 40 characters long.

Message List

The message list is automatically associated with the interlock variable. When the interlock variable is updated to finish the interlock, the variable's value will be used to display a message from the list if one is available. The message list is configured as described in the chapter on messages.

6. Messages

The Operator's panel can be used to display error messages and warnings. The panel monitors specified database variables and prints a preprogrammed message when a variable changes. The message normally fills the top line of the display, while the second line prompts the operator to clear the message by pressing the ACCEPT key. In order to make the keyboard as flexible as possible, the text of the messages and prompts is specified when the keyboard is configured. The messages are held in a table for which the variable value provides an index so that the appropriate message can be retrieved for each situation. Several Message lists can be defined, each tied to a different variable so that messages can be triggered by several different causes.

Messages can be specified as queuing or non-queuing. If a queuing message is displayed it can not be overwritten until the ACCEPT key has been pressed when the next message in the message queue will be displayed. Non-queued messages are only displayed if there is not a queued message on the display or in the queue. Non-queued messages are overwritten by any new message that occurs. The following items have to be specified for each message list.

Associated Variable

The database variable to monitor for changes.

Variable Mask

A mask value which is ANDed with the variable value to decide which message to display.

Queue messages

If this option is set to 1 then messages in the list will be queued. Otherwise the messages will not queue.

Message Text and variable value

For each message the message text and prompt are specified. In addition the variable value which triggers the message is specified. It is not necessary to have a message for all possible values of the variable.

7. Function Keys

The new Operator's Panel has 14 function keys along the bottom of the keyboard. Each key can be configured to initiate a control sequence on the machine at any time. The legend on the key is removable and can be replaced by one customized for a particular machine.

Each function key can be configured so that when it is pressed a variable is updated. This can be used to trigger a control sequence on the machine. The key can also update a variable when it is released. This allows the function keys to be programmed to do jog type actions where the machine moves while a key is pressed and stops when the key is released.

Function keys can be used in both Run mode and Setup mode or they can be configured to only operate in one mode. Function keys will not operate during configuration or while parameters are being saved using the Save option on a setup list.

Function keys can be configured as follows.

Associated variable when key is pressed

This variable is updated when the key is pressed. It can be used to trigger a control sequence by defining it as a trigger variable using the > command.

Key press variable's value

The value the above variable is set to when the key is pressed.

Associated variable when key is released

This variable is updated when the key is released. This variable can also be used to trigger a control sequence. For example to implement a jog function you could configure function key F1 to update variable \$GO when pressed and variable \$STP when released. The following motor commands would then make channel 1 move at constant speed while F1 is held down.

```
$GO>CH1/SV5000/VC+  
$STP>CH1/ST
```

Key release variable's value

The value the above variable is set to when the key is released.

Operational in Run mode

If this option is set to 1 the key works in Run mode. If it is set to zero the key does not work in Run mode.

Operational in Setup mode

If this option is set to 1 the key works in Setup mode. If it is set to zero the key does not work in Setup mode.

8. Configuration Mode

Configuration mode can only be accessed using the OP command on the main serial port. When OP is entered the following message will be displayed. Note that normal motor command processing is suspended while you are configuring the panel.

Operator's Panel Configuration

Whilst in this mode the system will not execute any motor commands

After configuring the Panel press the ~ key to return to motor control

Press a key to continue

Once in Configuration mode the user has access to all the information which defines the contents of the Run mode display, the structure and contents of the Setup mode display, the Message lists and the Function keys. He is able to change any aspect of the two displays including adding or deleting fields, setup lists etc.

Configuration is menu driven using a simple menu implementation which makes no assumptions about the type of terminal being used. In particular, cursor keys are not used so that making a selection from a menu is done by entering the number corresponding to your choice. When the panel has been configured, the user has the option of saving the new configuration, or he may prefer to test the new configuration first and save it later.

8.1 Main Menu

The Main menu provides access to the main configuration options and appears as follows.

Operator Interface Configuration. Version 2.1 Date 9/6/91
Do you want to...

- 1) Configure Operator's display page
- 2) Configure Setup page
- 3) Configure Message Lists
- 4) Configure Function Keys
- 5) Save configuration to NVM
- 6) Read configuration from NVM
- 7) Upload configuration to PC
- 8) Download configuration from PC
- 9) Configure Run Button
- 10) Configure Stop Button

Please enter selection or 0 to cancel :

8.2 Operator's Display Configuration

To configure one of the display pages, select option 1 (Configure Operator's display page) when a menu of the currently available pages will be displayed as in the following example.

Operator's Display - available pages

- 1) Page 1
- 2) Page 2

Please enter page number or 0 to exit :

When a page is selected from the menu the following menu is displayed.

Do you want to

- 1) Add a new page before this one
- 2) Add a new page after this one
- 3) Change the page
- 4) Delete the page

Please enter choice or 0 to cancel :

The first two options allow you to insert a new blank display page either before or after the selected one. The order of the pages in the menu is the order in which they will appear when the operator toggles through them using the up/down arrow keys next to the STOP button. Option 4 (Delete) allows you to delete the selected page. If you are adding a new page or changing an existing one, the next menu will show a list of the four field titles so that you can select a field to change. The example below shows a page with three fields already defined (Speed, Reference and Position) and the fourth left blank.

Operator's Display - available fields

- 1) Speed
- 2) Reference
- 3) Position
- 4) ** BLANK **

Please enter field number or 0 to exit:

If an existing field is selected it is possible to change the attributes of the field or to delete it. Assuming option 1 (Speed) was selected on the above menu, the following options would be allowed:

Do you want to

- 1) Change field attributes
- 2) Delete the field

Please enter choice or 0 to cancel :

The selected field can be deleted by selecting option 2 (Delete) above. To change the field's attributes or simply to view them, select option 1 (Change) from the above menu. Note that the type of field (Increment, Binary or Display) can not be changed once the field has been added to the display. To change the type of a field, it is necessary to delete the current field and replace it with a new one of the correct type.

8.2.1 Configuring Fields

The attribute menu for an Increment field such as field 1 (Speed) would be as follows

Increment Field attribute menu

- 1) Title Speed
- 2) Precision 1
- 3) Scale factor 10.000000
- 4) Offset 0.000000
- 5) Lower limit 0.000000
- 6) Upper limit 100.000000
- 7) Increment 1.000000
- 8) Associated Variable SPD
- 9) Associated variable is initialized on startup 0
- 10) Limit Variable
- 11) Limits are percentage of limit variable 0
- 12) Clock tick updates variable
- 13) Auto repeat 1

Please select attribute or 0 to exit :

Any attribute can be changed by selecting the appropriate attribute number (followed by <Return>) and entering a new value for the attribute after the prompt. The menu should then be redisplayed with the new attribute value. If there is something wrong with the attribute value, for example a title longer than 10 characters, the attribute will not be updated and instead another prompt will be issued.

The attribute menu for a Binary field is slightly different as follows:

Binary Field attribute menu

- 1) Title Reference
- 2) Scale factor 1.000000
- 3) Offset 0.000000
- 4) Text for ON state ON
- 5) Text for OFF state OFF
- 6) Associated Variable REF
- 7) Associated variable is initialized on startup 0

Please select attribute or 0 to exit :

The attribute menu for a Display field is as follows:

Display Field attribute menu

- 1) Title Position
- 2) Precision 0
- 3) Scale factor 1.000000
- 4) Offset 0.000000
- 5) Associated Variable POS
- 6) Clock tick updates variable

Please select attribute or 0 to exit :

Once the attributes for a field have been updated you can return to the menu of available fields by entering zero or simply <Return> on its own.

To add a new field to the Operator's display, select a blank field from the available fields menu. The following field type menu will be displayed so that you can select what type of field to add.

Field Type menu

- 1) Increment field
- 2) Binary field
- 3) Display field

Please enter choice or 0 to cancel :

Once a type has been selected, the appropriate attribute menu will be displayed. This can be filled in to create the new field as required. Be sure to fill in the title, scale factor, upper limit, increment and associated variable, otherwise the field will not work properly.

8.3 Setup Mode Configuration

Configuring the Setup mode consists of specifying the various lists and numeric fields. There is always at least one list although initially it may contain nothing but the end-of-list marker.

8.3.1 Configuring Lists

The first action is to configure the header and password for the list as in the following example.

Do you want to change

- 1) Password 1234
- 2) Text Machine Setup
- 3) Prompt Press ENTER to change parameters
- 4) Associated Variable LS1
- 5) Variable's Value 1
- 6) List contents

Please enter choice or 0 to cancel :

This menu shows a list which has a password of 1234, header text *Machine Setup*, and a prompt *Press ENTER to change parameters*. In Setup mode, if this is the top level list, the text and prompt will be displayed when the STOP key is pressed. Otherwise, the text and prompt will be displayed as an option in the parent list. When the list is selected, by pressing ENTER in response to the prompt, the associated variable, LS1, will be set to the specified value 1, and the list contents will be displayed.

When the list attributes have been configured, selecting option 6 (List contents) will display a menu of the items in the list as shown in the example below.

Setup List - available lines

- 1) Length
- 2) End of List

Please enter line number or 0 to exit :

The list consists of a Numeric field with the title Length and an end-of-list marker. By selecting an item from the list, you have the options of adding a new item (in front of the selected one), changing the item's attributes, or deleting the item. In this case, the order of the items in the list governs which order they are displayed in which may be important, so that a little care is required when adding new items to the list. When an item is selected the following menu is displayed.

Do you want to

- 1) Add a new item
- 2) Change item attributes
- 3) Delete the item

Please enter choice or 0 to cancel :

When adding an item to the list, the Line type menu allows you to specify whether the new item should be a Numeric field, another list or the Save option.

Line Type menu

- 1) Numeric entry
- 2) List of items
- 3) Save option
- 4) Interlock

Please enter choice or 0 to cancel :

If the item to be added or changed is another list, then it is configured in exactly the same way as its parent list. If the item is a Numeric field, it is configured in a similar way to the fields on the Operator's display page

8.3.2 Configuring Numeric Fields

An example menu for a Numeric field is shown below.

Numeric Field attribute menu

- 1) Title Length
- 2) Precision 2
- 3) Scale factor 100.000000
- 4) Offset -100.000000
- 5) Lower limit -100.000000
- 6) Upper limit 100.000000
- 7) Associated Variable LEN
- 8) Write variable on startup 1

Please select attribute or 0 to exit :

The attributes can be changed by selecting the attribute number and entering a new value in response to the prompt.

8.3.3 Configuring the Save Option

If the item to be added or changed is the Save option, the attributes menu will be similar to the following.

Do you want to change

- 1) Text Save setup parameters
- 2) Prompt
- 3) Save Operator's page values 0
- 4) Save Setup values 1

Please enter choice or 0 to cancel :

This shows a Save option with the default text and configured to save the Setup page parameters only. Note that you are not allowed to set options 3 and 4 both to zero. Remember that to restore the saved values on power-up, you will have to set the Startup write option to 1 on the relevant fields.

8.3.4 Configuring Interlocks

An example attribute menu for the Interlock option is shown below.

Interlock attributes
Do you want to change

- 1) Text Initialise Position
- 2) Prompt Press ENTER to start
- 3) Associated Variable INI
- 4) Variable's Value 1
- 5) Interlock variable END
- 6) Timeout (seconds) 0
- 7) Wait message Waiting for interlock variable ...
- 8) Message List

This shows an interlock with the text *Initialise Position* and prompt *Press ENTER to continue*. When the Interlock is selected the variable *\$INI* will be updated to trigger a control sequence on the machine. At the end of the sequence the variable *\$END* will be updated to finish the interlock. In the example, the timeout is disabled by being set to zero. Selecting option 6 (Message List) from the menu brings up the message list menu with the associated variable set to *\$END*. Configuration of message lists is described in the next section.

8.4 Configuring Message Lists

Operator messages can be manipulated by choosing option 2 (Message lists) from the Operator's display menu. The next menu will show a list of the currently available message lists as shown in the following example.

Operator's Display - available message lists

- 1) Message List 1
- 2) Message List 2

Please enter page number or 0 to exit :

When a message list is selected the following menu is displayed.

Do you want to

- 1) Add a new message list
- 2) Change the message list
- 3) Delete the message list

Please enter choice or 0 to cancel :

Option 1 allows you to create a new blank message list and then configure it. Option 3 allows you to delete the selected message list. Option 2 allows you to change the existing message list. Configuring a new or existing message list is shown below.

First it is necessary to specify the database variable which will trigger the display of the messages and the mask word which will be ANDed with the variable value. This is done on the following menu.

Do you want to change

- 1) Associated Variable ERR
- 2) Variable Mask -1
- 3) Queue messages 1
- 4) Message list

Please enter choice or 0 to cancel :

This shows a message list which is triggered by a variable called ERR which is masked with a value of -1 (i.e. no masking applied). The messages will be queued. To access the messages themselves select option 4 (Message list). This brings up a menu of the current messages as shown in the following example.

Message List

- 1) Error message 1
- 2) Error message 2

Please enter message number or 0 to exit :

To change a message select the message number. There are 3 possible actions as shown in the following menu.

Do you want to

- 1) Add a new message
- 2) Change the message
- 3) Delete the message

Please enter choice or 0 to cancel :

If option 1 (Add) is selected the new message will be added to the list. The ordering of the messages is of no significance and therefore it does not matter which message is selected when adding a new message. Selecting option 3 (Delete) will remove the selected message.

8.4.1 Configuring Messages

Selecting options 1 (Add) or 2 (Change) allows the message attributes to be changed using the following menu.

Do you want to change

- 1) Text Error message 1
- 2) Prompt Press any key to continue
- 3) Variable's value 10

Please enter choice or 0 to cancel :

This example shows a message with the text *Error message 1* and a prompt *Press any key to continue*. This message will be displayed each time the message variable ERR, as defined in the Message list menu, takes the value 10.

8.5 Configuring Function Keys

When option 4 (Configure Function Keys) is chosen from the main menu the function key menu will be displayed similar to the following example.

Function Key menu

- 1) F1
- 2) F2
- 3) ** BLANK **
- 4) ** BLANK **
- 5) ** BLANK **
- 6) ** BLANK **
- 7) ** BLANK **
- 8) ** BLANK **
- 9) ** BLANK **
- 10) ** BLANK **
- 11) ** BLANK **
- 12) ** BLANK **
- 13) ** BLANK **
- 14) ** BLANK **

Please enter function key number or 0 to exit :

This menu shows function keys F1 and F2 defined with all the rest undefined. To change or delete an existing function key enter the function key number when the change menu will be displayed as follows.

Do you want to

- 1) Change function key attributes
- 2) Delete function key

Please enter choice or 0 to cancel :

To change the function key attributes enter 1 (Change function key attributes). The attribute menu is then displayed. To delete the function key definition enter 2 (Delete function key). If an undefined key is selected or a key is to be changed, a function key attribute menu similar to the following is displayed.

Function Key attribute menu

- 1) Associated variable when key is pressed INT
- 2) Key press variable's value 1
- 3) Associated variable when key is released
- 4) Key release variable's value 1
- 5) Operational in Run mode 1
- 6) Operational in Setup mode 1

This menu shows a function key which will update the variable *\$INT* when it is pressed, will not update a variable when it is released, and works in both Run and Setup modes. Note that at least one variable must be defined or the key will not do anything.

8.6 Saving the Configuration

Selecting option 5 (Save configuration to NVM) on the main menu causes the current configuration to be saved to nonvolatile memory. This configuration is automatically used in future when the system is powered up. The configuration consists of all the settings for the Run mode and Setup mode displays, the Message lists, Function keys and the current value of each field. This makes it possible to ensure that the panel powers up with appropriate default values. Note that the associated database variables will not be set unless a field's Startup Write option has been configured as true.

8.7 Reading the Configuration

Selection option 6 (Read configuration from NVM) on the main menu causes the current configuration to be cleared and replaced by the copy stored in nonvolatile memory. The configuration consists of all the settings for the Run mode and Setup mode displays, the Message lists and Function keys. The field values which are restored will either be those saved by the Setup Save option or the Save configuration whichever happened most recently.

8.8 Uploading the Configuration

In order to keep a backup of the configuration or to copy it to another machine, it is possible to send the configuration to an IBM PC computer or similar and save it on disk. The PC must have a serial port (COM1 or COM2) and you will have to run a communications program (such as PTSTERM) with the ability to capture data from the serial port and send data to the serial port. Details of the serial port setup and connection are given in chapter 2.

Important Note

This option now uploads the current configuration on display rather than the configuration in nonvolatile memory as was the case with previous versions of the panel software.

To upload the configuration, first connect the PC to the main serial port of the PTS and run the communications program in transparent mode so that the PC acts as a terminal. Enter the OP command if necessary to bring up the main configuration menu. Now set the PC to capture to a suitable file and select option 7 (Upload) from the menu. The PTS will output the configuration in ASCII text which will be stored in the designated file. When the upload has finished a banner

***** End of configuration file *****

will appear on the screen. Terminate the capture and press ENTER to return to the main configuration menu.

Before changing the configuration, type out the file and verify that it contains the following lines.

7

***** Operator's Panel Configuration. Version 2.1 *****

.
.
.

***** End of configuration file *****

The figure 7 at the beginning of the file is the menu option number and will not interfere with the download.

8.9 Downloading the Configuration

A configuration file which has been saved on the PC can be downloaded to the PTS to replace the existing configuration or to initialize a new machine. Note that the existing configuration will be lost, unless it has been previously uploaded. To download a file to the PTS, connect the PC to the PTS and bring up the main configuration menu as for uploading. Select option 8 (Download) on the menu and instruct the communications program to send the appropriate file. Once the file has been downloaded, the PTS will detect the end of file and will re-display the main configuration menu.

Important Note

This option now downloads to the current configuration on display rather than to nonvolatile memory as was the case with previous versions of the panel software. This means that the configuration must be explicitly saved before turning off the power or the downloaded configuration will be lost.

The configuration files contain a checksum field which is used to verify that the file has not been corrupted during downloading or saving. If the checksum indicates that the file has been corrupted an error message will be displayed. Normally it is wise to retry the download. Versions of the Operator's Panel prior to V1.5 did not have a checksum and files saved from old versions will report a bad (i.e. missing) checksum on download. In this case the error message can safely be ignored.

8.10 Configuring the Run Button

Selecting option 9(Run Button) on the main configuration menu allows you to set up a variable which will be updated when the panel goes from Setup to Run mode. By setting up the variable to trigger a motor control sequence the Run button can be used to start the machine. The Run button configuration menu allows you to define the variable to be associated with the Run key and the value to be written to the variable when the button is pressed.

Run Button Attributes
Do you want to change

1) Associated Variable RUN
2) Variable's Value 1

Please enter choice or 0 to cancel :

8.11 Configuring the Stop Button

Selecting option 10 (Stop Button) on the main configuration menu allows you to set up a variable which will be updated when the panel goes from Run to Setup mode. By setting up the variable to trigger a motor control sequence the Stop button can be used to stop the machine. The Stop button configuration menu allows you to define the variable to be associated with the Stop key and the value to be written to the variable when the button is pressed.

Stop Button Attributes

Do you want to change

- 1) Associated Variable STP
- 2) Variable's Value 0

Please enter choice or 0 to cancel :

9. Using Variables

Variables are used by the Operator's Panel to communicate with other tasks in the PTS such as the motor control task. This chapter shows how variables can be used by the Operator's Panel to control the motor task. For additional detail on the use of variables see the PTS Reference Manual.

9.1 Variables as Command Parameters

The simplest way to use a variable is as a command parameter. This can be done in most places where you would normally enter a number. For example to set the velocity on channel 1 you would normally enter the following command.

```
1> SV5000
1> SV
5000
?
1>
```

The following example shows how you can use a variable value instead of a fixed number. Note that the variable is prefixed with a \$ to distinguish it from a command mnemonic.

```
1> $SPD=7500
1> SV$SPD
1> SV
7500
?
1>
```

Although in the above example \$SPD was explicitly set before issuing the SV command, it could be set by an Increment field on the Operator's Panel for example.

You can also use variables combined with the usual operators +, -, * and / in an expression as in the following example. Note that the expression must be enclosed in brackets.

```
1> SV( ($SPD+500) /10 )
1> SV
800
?
1>
```

9.2 Using Variables to Trigger Commands

You can also use a variable to trigger a string of commands each time it is updated. This means that by updating a variable on the Operator's Panel you can trigger a string of motor commands. In the following example the command string CH1 / SV\$SPD is triggered by the variable \$SPD so that each time \$SPD is updated (it need not change value) another SV command is executed.

```
1> $SPD>CH1/SV$SPD/SV
1> $SPD=2000
1 SV2000
1> $SPD=3000
1 SV3000
```

Once again the \$SPD variable could be changed using an increment field on the Operator's Panel so that each time the operator adjusts the field value the velocity updated to match it.

9.3 Variables with Query Commands

A query command is used to find the current value of a parameter. For example to display the current actual position of channel 1 you would type.

```
1> DP
1000
```

The position (1000) is displayed underneath the command. You can use this feature to set the value of a variable as follows.

```
1> $POS=DP
1> LV$POS
$POS=1000
```

In this example the DP query command placed the position into the \$POS variable and the LV command was used to display the value of \$POS. This technique can be used with a trigger variable to have a regularly updating display field on the operator's display page. For example, suppose the field has

```
Associated variable POS
Clock tick updates variable PS2
```

and the motor task has the following definition to put the demand position into POS when PS2 is updated

```
$PS2>CH1/$POS=DD
```

then the field will show the current demand position every second.

10. Error Messages

The following error messages can appear on the panel during startup:

Problem reading data due to bad checksum

Problem reading data due to error n

These messages indicate that a problem occurred reading data from nonvolatile memory. In either case the configuration may be completely or partially missing.

Can't read configuration due to error n

This message mean that the configuration files cannot be found either because the EEPROM device is blank or because there was a problem trying to save data previously. It will be necessary to restore the configuration by hand or by downloading from a PC if possible.

The following error messages can appear during configuration or when using the Save option in setup mode:

Can't save configuration due to insufficient space

There is not enough space on the EEPROM device for the parameters to be saved. It may be possible to reduce the size of the PTS parameter file and then try again.

Can't save configuration due to error n

Parameters can not be saved due to an operating system error. Please note the error number and contact your sales office. If parameters can not be saved due to an error or insufficient space you can avoid losing your new configuration by uploading it to a PC.

Can't download configuration due to insufficient space

The configuration can not be downloaded from the PC due to lack of space. It may be possible to reduce the size of the PTS parameter file and then try again.

Can't download configuration due to bad checksum

The configuration has been corrupted during the download from the PTS. Normally you should try the download again. This message will also be seen when downloading an old file (Operator's Panel V1.4 or before) because the file does not contain a checksum. In this case it is usually safe to ignore the message.

Can't download configuration due to error n

Parameters can not be downloaded due to an operating system error. Please note the error number and contact your sales office.

Cannot create new x due to lack of memory

Cannot create new x due to error n

These messages mean that a new item (x) cannot be added to the system due to a shortage of memory or some other operating system error.

The following error messages can appear on the main terminal:

Operator : Cannot create new x due to lack of memory

Operator : Cannot create new x due to error n

These messages mean that a new item (x) cannot be added to the system due to a shortage of memory or some other operating system error.

Operator : Can't find factory object for receiver n

Operator : Could not find selector n for receiver m

These messages indicate an internal error condition. Please contact your sales office.

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