Production Monitoring With SD Memory Card Storage

The Production TimeKeeper TM

TAKT timer with production counter and production statistic history storage that will monitor up to 10 production lines simultaneously.

This reference guide covers the firmware Version V1.2F production monitoring system for the following products.

- DC117B6-PROD1 with 1 serial port.
- DC117BB-PROD1 with 2 serial ports.
- DC117BB-PROD1-MP3 with 2 serial ports and MP3 player.

Programmable TAKT Timer and Lot Size Count

Traditionally, TAKT time is the time it takes to fabricate and ship one product, and is established by dividing the number of orders in hand by the number of working hours in a day. In addition to the programmable TAKT timer, the Production TimeKeeper™ also contains a user-settable Lot Size counter which allows the user to set the TAKT time to the time it takes to fabricate product lots.

Processing lots. TAKT times of less than one second do not work well with this system. When it takes less than one second to process one production unit, it is advisable to setup the system to process in lots. In this case, set the **Lot Size** factor to a standard lot size and set the TAKT time to the correct time to process one lot.

DC117B6-PROD1-MP3

The MP3 option adds the capability to play audio files stored on the SD card.

Running or Static/Shift Goals

The Production TimeKeeper™ allows production monitoring using running, or static/shift goals. The running goal is calculated from the TAKT time and Lot Size count while the static, or shift goal is easily entered by the user.

Monitor and Save Production Data

The Production TimeKeeper™ monitors production and conveniently displays the results as a deviation, and percentage between the production goal and the amount actually produced. In addition to monitoring production the Production TimeKeeper™ also tracks down-time, and other critical time events like the number of times the TAKT time expired. All of this data is stored in a conveniently accessible history memory.

Recording User Events or Reason Codes

Sometimes specific events occur that need to be recorded that are in addition to the standard events. This system includes an external port to permit special events to be recorded. For example: Machine jammed, out of material, lunch break, fire drill, service door opened, or any other event. The events can be entered manually or directly from a machine output.

Buttons and Controls

The DC117B6-PROD1 has the following buttons and controls:

- The main unit has 6 buttons and one knob.
- The RJ11 jack on the side of the unit connects to remote buttons or machine inputs for Run, Pause, Stop and Next.
- In addition, optional remote buttons or machine inputs can be added for special events.

Front Panel Buttons		
Button Name	Momentary Press and Release	Press and Hold for 2 seconds
Save	Display SD Card File Name.	Save History Memory to SD Card.
History	Display history.	Store history and reset production counter to zero.
Recall	Recall stored setting.	Save stored setting.
Run/Pause/ Stop	Run/pause production counter	Stop the Production Timer.
Mode	Toggle display modes.	Select various setup choices.
Select	Cycle knob function.	Diagnostic Modes

Table 2. DC117B6-PROD1 button reference

Remote Inputs

Remote inputs on the RJ-11 connector on the side of the unit				
Remote Input	Operation	Effect on TAKT Timer	Effect on Changeover Timer	Effect on Actual Count
Input 1	Run	runs	pauses	None
Input 2	Changeover	pauses	runs	None
Input 3	Stop	pauses	pauses	None
Input 4	Increment (Next)	None	None	Increments the count by the Lot Size factor

Table 3. Remote input function reference

The remote inputs are ground closure type. The **Run**, **Pause (ChangeOver)** and **Stop** inputs are typically connected to operator buttons. The **Increment (Next)** button may be a button for the operator or may be connected directly to a machine trigger.

Operating Modes

The system will be in one of the following operating modes:

- **Running.** The TAKT timer is running.
- **Stopped.** All timers are stopped.
- **Downtime.** The TAKT timer is running and the Down timer is running.
- **Changeover.** The Setup timer is running.

While in stopped, downtime or changeover mode:
- Pressing **start** puts system into RUNNING mode. Same as remote input one.

While in running mode:
- Momentary Pressing **start** puts system into DOWNTIME mode. (PAUSE)
- Press and hold **start** puts system into CHANGEOVER mode.

While in downtime mode:
- Momentary Pressing **start** puts system into RUNNING mode. Same as remote input two.
- Press and hold **start** puts system into STOPPED mode.

While in changeover mode:
- Momentary Pressing **start** puts system into RUNNING mode. Same as remote input two.
- Press and hold **start** puts system into STOPPED mode. Same as remote input three.

While in stopped mode:
- Momentary Pressing **start** puts system into RUNNING mode. Same as remote input two.
- Press and hold **start** puts system into STOPPED mode. Same as remote input three.

Serial data Input

RS-422 Serial data input for input from additional devices of input from a PLC or computer. A detailed list of commands is described in the programming manual.

Serial data Output

RS-422 Serial data output for operating displays, and on indicators, alarms, PLC or computer.

Monitoring Production Statistics

The Production Timekeeper™ can display the current production Data which is available on various screens. **Momentarily pressing** the **Mode** button toggles between the screens. The screen in step one is normally displayed during production monitoring.

Example **display** showing the current production data. This display includes a speaker that permits audio messages to be played from MP3 files stored on the SD card. You must have the **DC117BB-PROD1-MP3** model to play audio files.

Target and Actual

1. **Momentarily press** the **Mode** button. A four-line display similar to the following display will appear:

```
Goal  nnnnnn  HH:MM:SS
Act   nnnnnn  HH:MM:SS
Dev   nnnnnn  Run   Grn
Eff     nnnn  HH:MM:SS
```

Description

Line 1 – Goal count; TAKT time (count down)
Line 2 – Actual count; actual time (count up)
Line 3 – Deviation; Status (run/ setup/ down/ stop)
Line 4 – Efficiency; Time of day

Changeover / Setup Time

2. Momentarily press the **Mode** button again. Another four-line display similar to the following display will appear:

```
Setup Time      HH:MM:SS
Accum Setup     HH:MM:SS
----------      SetupGrn
ChangeOverTm    HH:MM:SS
```

Description

Line 1 – Actual Changeover (Setup) time for this event. (Count-up)
Line 2 – Accumulated Changeover (Setup) time. (Count-up)
Line 3 – Status (run/ setup/ down/ stop)
Line 4 – Changeover time remaining for this event. (Count-down)

Warning and Blink Count

3. Momentarily press the **Mode** button again. Another four-line display similar to the following display will appear:

```
Act   nnnnnn  RateDly Auto
Blnk  nnnnnn  0
Yel   nnnnnn  Run  Grn
Red   nnnnnn  SetClock
```

Description

Line 1 – actual count; Rate delay, Mode: Auto/Off
Line 2 – Yellow blink count, Rate delay value.
Line 3 – Yellow warning count, Status (run/ setup/ down/ stop)
Line 4 – Red warning count (TAKT time expired)

Actual Count by Hour or Production Line

4. Momentarily press the **Mode** button again. This display serves one of two purposes depending on the system configuration. By default, when using IN4 on the remote port to increment the production count, these counters show the production count for every hour of the day over a 24 hour period where 1=1AM, 2=2AM, etc throughout the entire day. Alternatively, with additional equipment to increment the production count, these counters can keep track of the production counts from multiple production lines. When counting production from multiple lines simultaneously, the actual count for individual lines will be recorded. Another four-line display similar to the following display will appear:

```
 Line  Actual  4    98453
1    2345     5    56232
2    2433     6    12987
3    9432     7    29845
```

Description

Line 1 – Production **Hour Actual** or **Line Actual**
Line 2 – Line number, Actual count
Line 3 – Line number, Actual count
Line 4 – Line number, Actual count

The individual production line counting feature requires either additional external hardware or connection to a PLC.

Grand Total Target and Actual Count

5. Momentarily press the **Mode** button again. This display shows the Grand totals for up to 24 production lines. Each time the actual counters are reset, the actual count is added to the grand total. Another four-line display similar to the following display will appear:

```
Totals: Goal     Actual
1       33241    151203
2       23447    12527
3        7922    61845
```

Description

Line 1 – **Totals: Goal Actual**
Line 2 – Line number, Goal Count, Actual count
Line 3 – Line number, Goal Count, Actual count
Line 4 – Line number, Goal Count, Actual count

The individual production line counting feature requires either additional external hardware or connection to a PLC.

Up Time and Down Time

6. Momentarily press the **Mode** button again. Another four-line display similar to the following display will appear:

```
AccumUpTime  HH:MM:SS
AccumDnTime  HH:MM:SS
UpEf     100 Run  Grn
DownTime     HH:MM:SS
```

Description

Line 1 – Accumulated Up time for for the current shift.
Line 2 – Accumulated Down time for for the current shift.
Line 3 – Percent efficiency 0 to 100 percent of Up time verses down time, Status (run/ setup/ down/ stop).
Line 4 – Actual downtime for the current event.

Seconds Gained/Lost Per Wigit Made

7. Momentarily press the **Mode** button again. Another four-line display similar to the following display will appear:

```
Cgan     22    Gain
Clos      0    Lost
Tgan    120
Tlos     82    Seconds
```

Description

Line 1 – Seconds less than the TAKT time for the current wigit built.
Line 2 – Seconds greater than the TAKT time for the current wigit built.
Line 3 – Accumulated Seconds less than the TAKT time for the current shift.
Line 4 – Accumulated Seconds greater than the TAKT time for the current shift.

Performance Results in a given Time Period

8. Momentarily press the **Mode** button again. Another four-line display similar to the following display will appear:

```
Performance  Results
Tcnt         1200
Acnt         1255
```

Description
Line 1 – Title
Line 2 – Target count for the current time period.
Line 3 – Actual count for the current time period.
Line 4 – Not used.

- The Yellow Blink (Blnk) warning indicates the number of times the Yellow Blink time was reached before the TAKT time expired to complete a production unit. If the TAKT time is 100 seconds and the Yellow Blink time is 20 seconds, then this count will be incremented if it takes 80 or more seconds to complete a production unit.
- The Yellow (Yel) warning indicates the number of times the Yellow Warning time was reached before the TAKT time expired to complete a production unit. If the TAKT time is 100 seconds and the Yellow Warning time is 10 seconds, then this count will be incremented if it takes 90 or more seconds to complete a production unit.
- The Red (Red) warning indicates the number of times it took longer than the TAKT time to complete a production unit.

Analyzing and Improving productivity

There are three warning counts called Yellow Blink (Blnk), Yellow Warning (Yel) and Red Warning (Red).

These warnings can be used to indicate whether the actual time is longer or shorter than the TAKT time and determine whether there is a problem with production or whether a particular operator is slower or faster or whether the TAKT time is too long or too short.

Ideally, the TAKT time should be set such that the yellow blink count and the yellow warning count increments the same as the actual count, but that the Red warning count always remains at zero.

The production workers can observe the Green-Yellow-Red Andon indicators to determine whether they are ahead or behind the expected TAKT time. These indicators are great for **Slide-Lines** where several production workers need to synchronize together.

The status field indicates the operational mode of the unit.

- Run Grn
- Run Yel
- Run Red
- Changeover (Setup)
- Down Time
- Stopped

One of several error messages may appear on the lower right corner of the display.

- SetClock Indicating that the time of day clock needs to be set.
- ClkError Indicating that there is a problem with the TIME of day clock.
- LowBatt Indicating that the battery needs to be replaced. The battery can be replaced by removing the rear cover and replacing the battery with a new CR2032 coin cell type battery.

Storing and Resetting Production Data

The Production Timekeeper™ will **save** production data each time the Production Timekeeper™ is reset. The events 0 to 11 shown in table 1 are saved, and then the counters are reset to zero and the timers are set to their preset values.

1. **Press and Hold** the **History** button. The following display will appear:

```
Save to History
and Clear Counters
```

2. **Press and Hold** the **History** button again. The following display will appear:

```
Goal  nnnnnn  HH:MM:SS
Act         0  00:00:00
Dev         0  Run  Grn
Eff         0  HH:MM:SS
```

The Goal, Actual, Yellow Blink, Yellow Warning and Red Warning counters are set to zero. The Actual time and Down time is reset to zero. The TAKT time is set to the preset value.

Table of Event Codes

The following data can be stored. The time and date is saved along with each history entry.

The event codes are also used by the "**Setup Remote Display**" menu for output data to a remote display.

The following events and/or data are stored whenever the **Save to History and Clear Counters** command is executed.		
Event	**Name**	**Description**
0	**Goal**	Production goal count. This can be either a running, or static goal.
1	**Act**	Actual production count. This can be incremented manually, or by machine.
2	**Dev**	Deviation count. (Goal – Actual).
3	**Eff**	Efficiency percent. (Goal/Deviation*100)
4	**Down**	Accumulated Machine Down Time in seconds.
5	**Takt**	TAKT time in seconds.
6	**Time**	Actual Time since the current wigit was started. This value is in seconds.
7	**Red**	Red warning indicator count. This indicator occurs after the TAKT time has expired.
8	**Yel**	Yellow warning indicator count. This indicator occurs during the TAKT time prior to the red warning indicator. When this occurs is user-programmable.
9	**Blnk**	Yellow blink indicator count. This indicator occurs during the TAKT time prior to the red warning indicator. When this occurs is user-programmable.
10	**Time**	Actual count for the current hour
11	**Tset**	Total accumulated changeover (Setup) time in seconds.
12	**----**	Reserved for future use.
13	**Cgoa**	Goal Changeover (Setup) Time.
14	**Cact**	Actual Changeover (Setup) time for the current event.
15	**Cdev**	Deviation between the goal and actual changeover (Setup) time in seconds.
16	**Ceff**	Efficiency of the current changeover (Setup) time represented as a percentage.
17	**----**	Reserved for future use.
18	**----**	Reserved for future use.
19	**----**	Reserved for future use.
20	**Gpre**	Current static/shift goal.
21	**Scal**	Current Lot Size factor.

The following events are recorded whenever one of the remote inputs **Run**, **Pause**, **Stop** or **Next** is activated. The recording of these events can be individually enabled or disabled using the **Setup Event Save** menu.		
Event		Description
22	**Run**	The RUN mode was started. The value field will be the downtime in seconds.
23	**Paus**	The RUN mode was paused. The value field will be the actual time in seconds.
24	**Stop**	The RUN mode was stopped. The value field will be the actual time in seconds.
25	**Wigi**	A new unit is completed. The value field will be the actual time in seconds to complete this wigit.

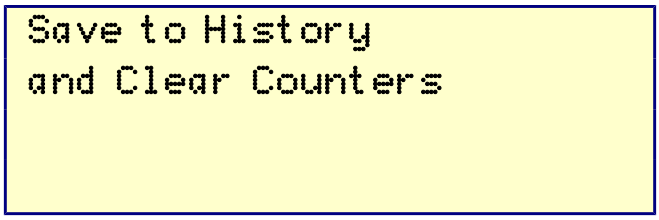
Other Events.		
Event		Description
27	**Save**	The history memory was saved to the SD card. The value field contains the number of entries stored.
28	**Clr**	The history memory was cleared. The value field contains the number entries in the history memory at the time it was cleared.
29	**Key**	A remote "KPn command was received. The 'n' is the value portion of the event.
30	**TOD**	Display the time of day clock.
31	**Rcll**	Recall a stored setting.
32	**Sser**	Save data to external device connected to the serial port.
33	**Tgoa**	Grand total Goal Count
34	**Tact**	Grand total Actual Count
35	**UpTm**	Accumulated up time.
36	**UpEf**	Accumulated up time verses down time efficiency.
37	**Time**	Time remaining to build the current wigit. Changes to actual time, if the time remaining is zero. This value is in seconds.

38	**Cact**	Changeover time remaining for the current event. Changes to actual Changeover (Setup) time if the time remaining is zero. This value is in seconds.
39	**Evnt**	Event code 0 to 99,999
40	**Cgan**	Number of seconds gained for the current wigit.
41	**Clos**	Number of seconds lost for the current wigit.
42	**Tgan**	Total accumulated seconds gained since last shift.
43	**Tlos**	Total accumulated seconds lost since last shift.
44	**---**	Reserved for future use.
45	**---**	Reserved for future use.
46	**---**	Reserved for future use.
47	**---**	Reserved for future use.
48	**Acnt**	Target count for the previous time period since last time the performance values were reset.
49	**Tcnt**	Actual count for the previous time period since last time the performance values were reset.
The following events and/or data are stored whenever the **Save to History and Clear Counters** command is executed. The following values are recorded when storing the actual counter values for production lines 1 through production line 24. These actual counters are incremented when one of the external “KP0 through “KP9 commands are received.		
60-73	**AC00 to AC23**	Actual count values for production line 1 AC00 (60) through production line 24 AC23 (73).
74-255	**---**	Reserved for future use.

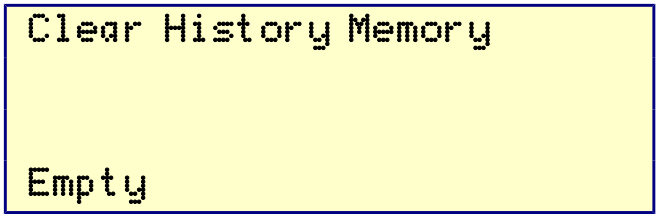
Clearing the History memory

To **reset** the production timers and counters:

3. **Press and Hold** the **History** button. The following display will appear:



4. Turn the **Knob** a number of clicks until the "Clear History Memory" message appears in the display.
5. **Press and Hold** the **History** button again. The following display will appear:

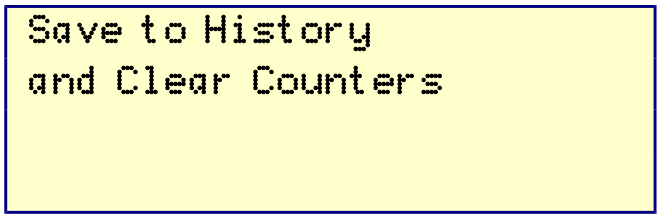


The entire history memory is cleared. A single message is added "**Clr 341**" where the number is the number of history entries that was in the history memory before it was cleared.

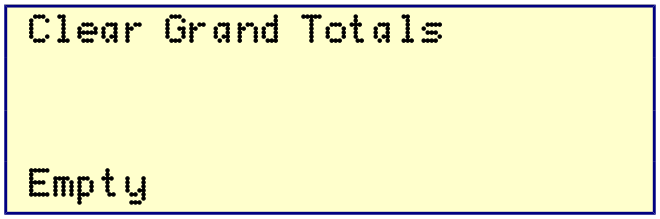
Clearing the Grand Totals

To **reset** the production timers and counters:

6. **Press and Hold** the **History** button. The following display will appear:



7. Turn the **Knob** a number of clicks until the "Clear Grand Totals" message appears in the display.
8. **Press and Hold** the **History** button again. The following display will appear:



The grand totals are cleared. Two messages for each production line that had an actual count greater than zero are added to the history memory. The "**Tgoa 12661**" which is the goal grand total count and .the "**Tact 12962**" which is the actual grand total count .

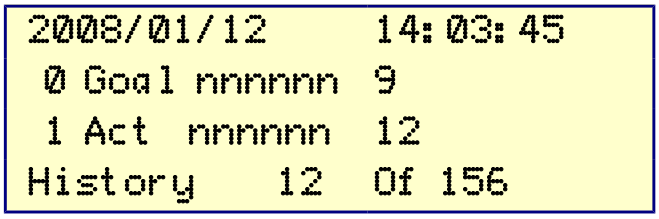
Recalling Stored Production Data

The Production Timekeeper™ can **recall** stored production data. The values shown in table 1 are monitored, and then **stored** each time the Production Timekeeper™ is **reset**:

Note: The Production Timekeeper™ has a history memory of 4095 entries. This means that the Production Timekeeper™ can often times store many days of production data.

To **recall** production data:

1. **Momentarily press** the **History** button. A four-line display similar to the following display will appear:



Note: The first line is the date and time. The second and third lines are 2 lines of historical data. The fourth line is the number of history entries and the total number of history entries.

Turn the **knob** to scroll through the production history. As you scroll, the window will show 4 entries in sequence. It helps to think of the 4-line display as a sliding window over the history memory that rolls over to the beginning when it gets to the end.

LOC	Event Display Value	Description.
00	0 Save 76	
01	4 Down 4398	
02	5 TAKT 122	
03	2007/10/22 08:22:54	line 1
04	1 Act 9	line 2
05	03 9 Grn 18	line 3
06	History 4 of 156	line 4
07	0 Goal 44	
08	6 Time 4567	
09	4 Down 4422	
10	5 TAKT 288	
.		
.		
.		
31		

Selecting the Static/Shift or Running Goal Modes

The Production Timekeeper™ provides two different methods for management of Goal values:

- In the *running goal mode*, the Production Timekeeper™ calculates the running goal. It does this by adding the Lot Size count to the goal count each time the takt time expires.

- In the *static/shift goal mode*, the user enters the desired goal count as a preset value. In this mode, that value does not change until the user reconfigures it.

In either mode, the DC117B6-PROD1 will display the goal count, the actual count, the calculated deviation between the goal and actual counts, and the calculated efficiency (the percentage of actual production versus the production goal). The reader board displays the goal count, the actual count, and the efficiency.

NOTE: To select a running goal, the preset goal count must be set to 0. Any non-zero preset goal count will remain the static goal value.. Only a preset goal count of zero changes the goal calculation mode of the Production Timekeeper™ from static/shift mode to running mode.

1. When starting a new shift or new production run, Press and hold the **History** button to clear the counters and reset the timers.
2. **Momentarily press** the **Run/Changeover/Stop** button on the DC117B6-PROD1 unit or press the remote **Run** button (remote input **IN1**) to start the TAKT, and actual timers. The TAKT timer will auto-restart when it expires.
3. **Increment** the production actual count by pressing the **Next** button (remote input **IN4**). See the following *Remote Inputs* section for details.
4. For unscheduled production stoppages, machine repairs or whenever you want downtime to accumulate, pause the TAKT and actual timers by momentarily pressing the **Run/Changeover/Stop** button on the DC117B6-PROD1.
5. For Changeovers or other setups, press the remote **Pause** button (remote input **IN2**) .
6. **Resume** the timers by momentarily pressing the **Run/Changeover/Stop** button on the DC117B6-PROD1, or press the remote **Run** button (remote input **IN1**). See the following *Remote Inputs* section for details.

*NOTE: the **Run/Changeover/Stop** button is labeled as **Run/Stop** on the unit.*

Note: Whenever the Production Timekeeper™ is in the changeover mode the TAKT and actual timers are paused and the setup time timer starts running.

Note: Whenever the Production Timekeeper™ is in the downtime mode the downtime timer starts running. In addition, the TAKT timer continues to run.

When the unit is resumed the downtime and/or setup timer is paused and the TAKT timer and actual timer is resumed.

7. For scheduled breaks or shift changes, **Stop** the TAKT and actual timers without starting the downtime timer pressing the press and holding the **Run/Stop** button or press the remote **Stop** button (remote input, **IN3**).

User Programmable Presets

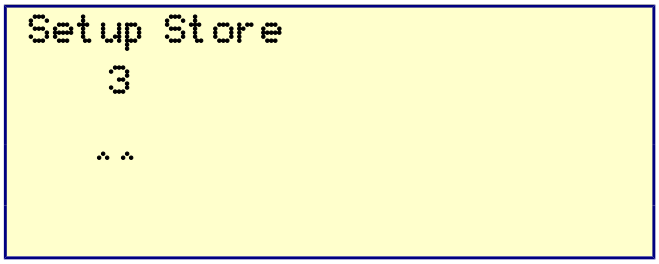
The Production Timekeeper™ can save and recall 4 user programmable setups. Each stored setup is labeled from 0 to 3, and contains the following items:

1. TAKT time.
2. TAKT Time Mode.
3. Goal Target Value.
4. Scale factor / Lot Size.
5. TAKT Timer Yellow blink time.
6. TAKT Timer Yellow warning time.
7. Beeper mode.
8. Rate Setpoint.
9. Changeover Target Time.
10. Changeover Time Mode.
11. Changeover Yellow blink time.
12. Changeover Yellow warning time.

Storing a Setup

To **store** a setup:

1. **Press** and **hold** the **Recall Setting** button. The following display will appear:

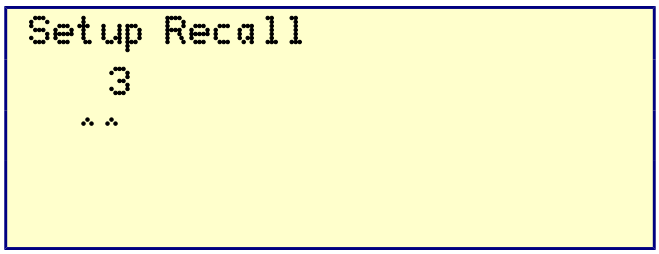


2. **Turn** the **knob** to select the desired 0 to 3 location.
3. **Press** and **hold** the **Recall Setting** button again to store the current Production Timekeeper™ setup into the selected storage location.

Recalling a Setup

To **recall** a setup:

1. **Momentarily press** the **Recall Setting** button. The following display will appear:



2. **Turn** the **knob** to select the desired 0 to 3 setup.
3. **Momentarily press** the **Recall Setting** button again to recall the Production Timekeeper™ setup from the selected storage location.

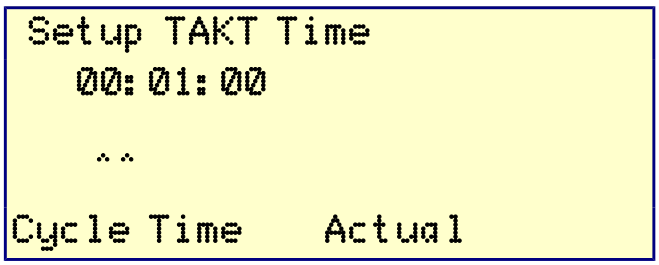
Setting Up the Production Timekeeper™

The Production Timekeeper™ contains user programmable timers and counters. Each programmable setting is selected using the **Mode** button, and modified using the **Select** button and the **knob**.

To **setup** the Production Timekeeper™:

Setup the TAKT Time

- **Press and hold** the **Mode** button. The following display will appear:



Instructions

Sets the TAKT timer.

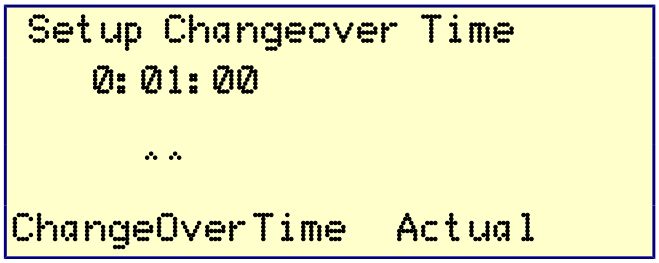
- **Turn** knob to set **seconds**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minutes**
- **Momentarily** press the **Select** button
- **Turn** knob to set **hours**
- **Momentarily** press the **Select** button
- **Turn** knob to select either **Actual** or **Over**

`Cycle Time Actual` causes the total elapsed cycle time to be displayed.

`Cycle Time Over` causes the amount of time that exceeds the cycle time to be displayed.

Setup the Changeover Time

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

Changeover or Setup time. This is the target setup time for changing the machine setup.

- **Turn** knob to set **seconds**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minutes**
- **Momentarily** press the **Select** button
- **Turn** knob to set **hours**
- **Momentarily** press the **Select** button
- **Turn** knob to select **Actual** or **Over**

The TAKT timer resumes once the target changeover time is expired.

`ChangeoverTime Actual` causes the total elapsed cycle time to be displayed.

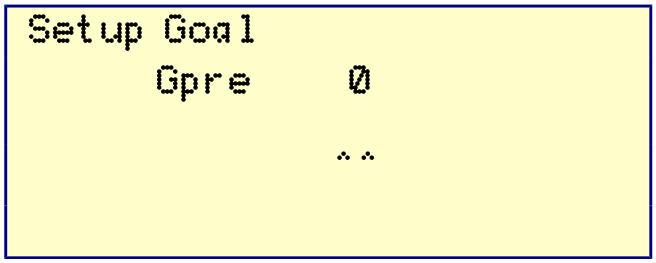
`ChangeoverTime Over` causes the amount of time that exceeds the changeover time to be displayed.

Set the **Goal** value to 0 if you want to use the TAKT timer to generate a running goal that increments throughout the day.

Set the **Goal** value to a fixed value if you want to set a fixed static goal.

Setup the Goal Preset Value

- **Momentarily press** the **Mode** button. The following display will appear:



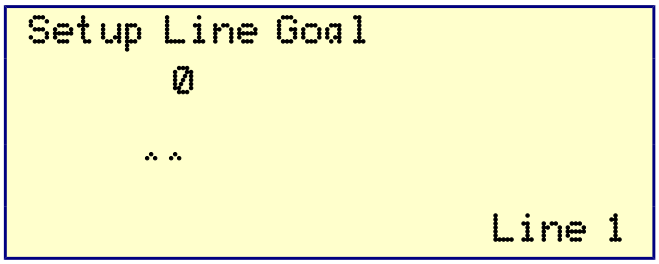
Instructions

Keep at 0 if a running goal is desired. If a static goal is desired, set this value to the desired goal.

- **Turn** knob to set goal in steps of **1**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **100**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **10000**

Setup the Line Goal

- **Momentarily press** the **Mode** button. The following display will appear:



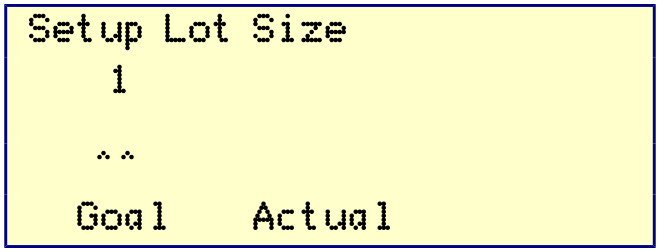
Instructions

Keep at 0 if a running goal is desired. If a static goal is desired, set this value to the desired goal.

- **Turn** knob to set goal in steps of **1**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **100**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **10000**
- **Momentarily** press the **Select** button
- **Turn** knob to select production line **2**
- Repeat the above five steps for this line.
- **Repeat for subsequent lines until all lines are setup.**

Setup the TAKT Timer Lot Size Factor

- **Momentarily press** the **Mode** button. The following display will appear:



*NOTE: Do not set the Lot Size to 0. If you set the Lot Size to 0, the **Next** button will never increment the actual count.*

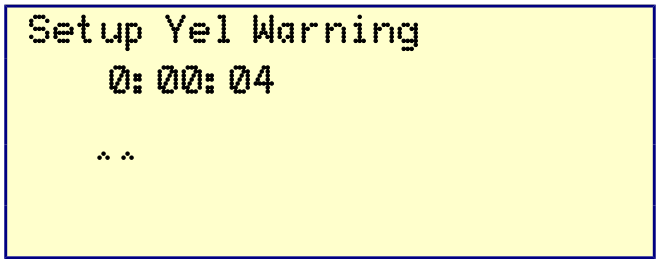
Instructions

The actual count increments by the Lot Size count. The running goal calculation also uses the Lot Size count. You can select whether the actual count, the goal count or both are affected by the Lot Size factor. For instance, if you have the goal count, but not the actual count selected, the goal will increment in steps of the Lot Size factor, while the actual count increments in steps of one.

- **Turn** knob to set goal in steps of **1**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **100**
- **Momentarily** press the **Select** button
- **Turn** knob to set goal in steps of **10000**
- **Momentarily press the Select button**
- **Turn** knob to select whether the Lot Size factor affects the actual count, goal count, both or neither.

Setup the TAKT Timer Warning Times

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

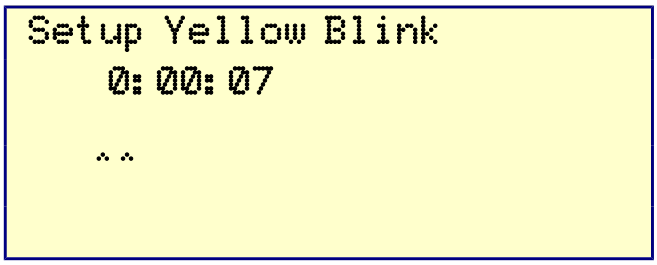
Sets when the solid yellow occurs during TAKT time.

- **Turn** knob to set **seconds**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minutes**
- **Momentarily** press the **Select** button
- **Turn** knob to set **hours**

The yellow warning (solid yellow) occurs the set time before the TAKT time expires. This is measured from the start of the Actual timer, which is reset each time the Actual count is incremented. For example: If the TAKT time is set to 14 seconds, and the yellow warning time is set to 4 seconds, the solid yellow warning will occur 4 seconds before the TAKT time expires which is 14-4, or 10 seconds into the Actual time.

Setup the Cycle Time Yellow Blink Time

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

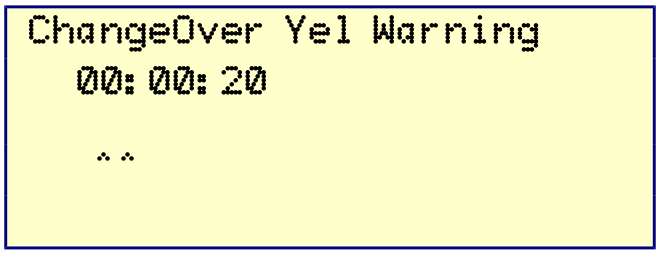
Sets when the blinking yellow occurs during TAKT time.

1. **Turn** knob to set **seconds**
2. **Momentarily** press the **Select** button
3. **Turn** knob to set **minutes**
4. **Momentarily** press the **Select** button
5. **Turn** knob to set **hours**

The Blinking Yellow warning occurs the set time before the TAKT time expires. This is measured from the start of the Actual timer, which is reset each time the Actual count is incremented. For example: If the TAKT time is set to 14 seconds, and the Yellow Blink time is set to 8 seconds, the Blinking Yellow warning will occur 8 seconds before the TAKT time expires which is 14-8, or 6 seconds into the Actual time.

Setup the Changeover Warning Times

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

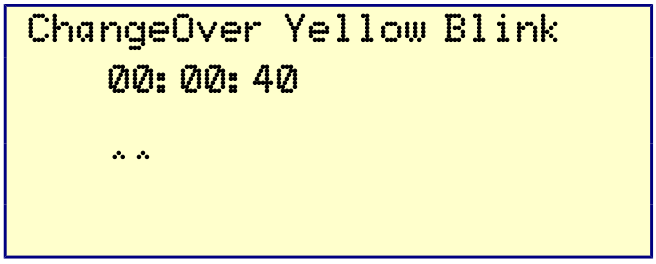
Sets when the solid yellow occurs during Changeover time.

- **Turn** knob to set **seconds**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minutes**
- **Momentarily** press the **Select** button
- **Turn** knob to set **hours**

The yellow warning (solid yellow) occurs the set time before the Changeover time expires. This is measured from the start of the Actual timer, which is reset each time the Actual count is incremented. For example: If the Changeover time is set to 14 seconds, and the yellow warning time is set to 4 seconds, the solid yellow warning will occur 4 seconds before the Changeover time expires which is 14-4, or 10 seconds into the Actual changeover time.

Setup the Changeover Warning Times

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

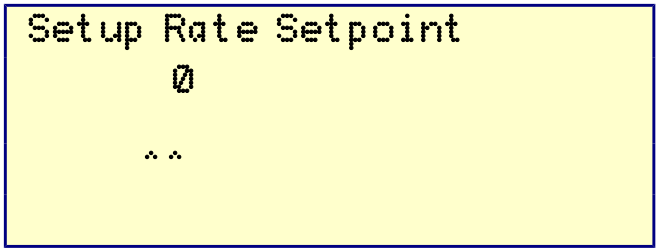
Sets when the blinking yellow occurs during Changeover time.

6. **Turn** knob to set **seconds**
7. **Momentarily** press the **Select** button
8. **Turn** knob to set **minutes**
9. **Momentarily** press the **Select** button
10. **Turn** knob to set **hours**

The Blinking Yellow warning occurs the set time before the Changeover time expires. This is measured from the start of the Actual timer, which is reset each time the Actual count is incremented. For example: If the Changeover time is set to 14 seconds, and the Yellow Blink time is set to 8 seconds, the Blinking Yellow warning will occur 8 seconds before the Changeover time expires which is 14-8, or 6 seconds into the Actual changeover time.

Setup the Rate Setpoint

- **Momentarily press** the **Mode** button. The following display will appear:



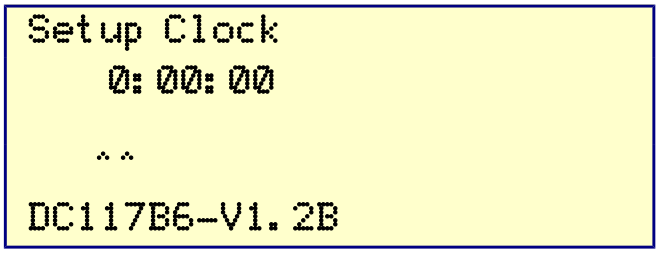
Instructions

Keep at 0 if the rate delay feature is not used. When operating a high rate production line that typically never stops, the up timer runs. When no pulses are detected on the count input for the specified number of seconds, the down timer starts running.

- **Turn** knob to set the rate delay from 1 to 255 seconds.
- **Turn** knob to set the rate delay to 0 to disable this feature.

Setup the Time Of Day Clock

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

Sets up the time of day clock.

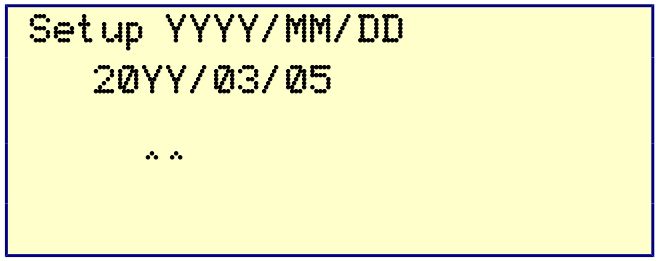
- **Turn** knob to set **hours**
- **Momentarily** press the **Select** button
- **Turn** knob to set **seconds**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minutes**

NOTE: If the clock is running slow or fast, it can be calibrated to be within 2.5PPM in most cases. Contact the factory for calibration information.

NOTE: The product version number also appears on the bottom line of this menu.

Setup Month/Day/Year

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

Sets up the date.

Turn knob to select the desired Day.

- **Turn** knob to set **year**
- **Momentarily** press the **Select** button
- **Turn** knob to set **Month**
- **Momentarily** press the **Select** button
- **Turn** knob to set **Day**

Setup the Beep Function and RYG Display

- **Momentarily press** the **Mode** button. The following display will appear:

Instructions

Sets up the beeper mode.

1. **Turn** knob to select the desired mode. Any combination of audio alerts may be enabled.

The choices are: **Off**
Timer Zero
On Warnings
Actual < Goal

NOTE: The either the MP3 player option or the beeper option must be installed for this function to produce an audible sound.

The operation of the Green-Yellow-Red display is determined by the following choices.

RYG=TIME The display is green while the TAKT timer is running. It turns yellow at the yellow warning times and red when the actual time has exceeded the TAKT time.

RYG=GOAL The display is green whenever the actual count is greater or equal to the goal. The display is red whenever the actual count is less than than the goal.

If the Actual<Goal option is selected, the Red and Green Andon indicators operate differently. When the actual count is greater than the goal count, the **Green** andon comes on. When the actual count is less than the goal count, the **Red** andon comes on.

Setup the Event Save

- **Momentarily press** the **Mode** button. The following display will appear:

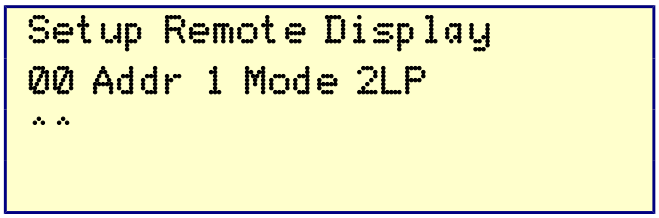
```
Setup Event Save
Run Pause Stopped Wigit
  ^ ^

And Clear Counters Every Hr
```

Instructions
Turn the knob until the desired selections appear.
• Save Run event. Each time the **Run** button (remote IN1) is pressed, an event is stored.
• Save Pause event. Each time the **Pause** button (remote IN2) is pressed, an event is stored.
• Save Stopped Event. Each time the **Stop** button (remote IN3) is pressed, an event is stored.
• Save Wigit count event. Each time the **Next** button (remote IN4) is pressed, an event is stored.
• "And Clear Counters" is a special feature that causes the counter values to be stored to internal memory at midnight. In addition, all the 24 individual production count counters will be automatically reset at midnight.
• "Every Hr" is a special feature that clears the individual hour counter that keeps track of the hourly production count. If you are using the multiple production line feature, the "Every Hr" feature should not be enabled.

Setup Remote Display Outputs

- **Momentarily press** the **Mode** button. The following display will appear:



Various types of information can be displayed on a large display or reader board. This configuration menu selects which data is transmitted on the serial port.
The first entry is the type of data to be displayed. The value ranges from 00 to 63 as listed in the instructions below.

The second entry is the display address. You can use any address here so long as it matches the address that is configured into the display. See the display documentation for configuring display addresses. The Addresses are in ASCII characters starting at '0' and going up to and including 'O'.

- Digits include 0-9.
- Characters include A-O
- Special characters include: :;<=>?@

Note: For example, the DSP1016A display default addresses are A, B, C, D for lines 1-4 respectively.

The third entry is the number of digits displayed.

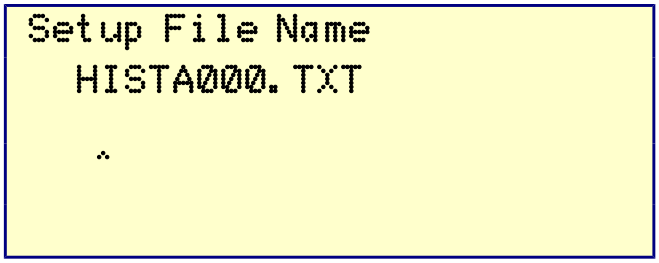
- 0 = Display data output disabled. Set all unused data outputs to 0.
- 1 = 6 digit display. Displaying counter values 0 to 999,999 or time values in hours, minutes and seconds.
- 2 = 4 digit display, right justified. Displaying counter values 0 to 9,999 or time values in minutes and seconds.
- 3 = 4 digit display left justified. Displaying counter values in steps of 100 from 0 to 999,900 or time values in hours and minutes.
- 4 = Display short four character text string representing the data value. For example goal count will display “Goal”; actual count will display “Act “; etc.
- 5 = Same as mode 1 except prefixed with a displayed text string.
- 6 = Same as mode 2 except prefixed with a displayed text string.
- 7 = Same as mode 3 except prefixed with a displayed text string.
- L = Output “Laxxx commands for use with single color displays.
- M = Output “Mxxaxxx commands for use with Tri-Color (Red-Amber-Green) displays.
- P = Enable this output only when the performance indicator command has been issued. The display appears for about 5 seconds, then returns to the normal display. The performance indication can be issued by the Time-Clock at pre-determined times or manually by a button press.
-

Types of Data Output (partial list)

Turn the knob until the desired value 0 to 63 appears.
00 = Running or static goal.
01 = Actual Count.
02 = Deviation (Goal – Actual).
03 = Efficiency Percent (Goal/Deviation*100).
04 = Accumulated Machine Down Time (Pause State).
05 = TAKT Time.
06 = Actual Time to build one wigit (Running state).
07 = Red Warning Count.
08 = Yellow Warning Count.
09 = Yellow Blink Count.
10 = Actual Count for the current hour.
11 = Accumulated Setup/Changeover time.
12 = Not used.
13 = Goal Setup/Changeover Time for current event.
14 = Actual Setup/Changeover Time for current event.
15 = Deviation Setup/Changeover Time (Goal – Actual) for current event.
16 = Efficiency Setup/Changeover Percentage.
22 = Machine down time for current event.
30 = Display the time of day clock.
35 = Accumulated up time.
36 = Accumulated up time verses down time efficiency.
37 = Time remaining to build the current wigit. Changes to actual time, if the time remaining is zero.
38 = Changeover time remaining for the current event. Changes to actual Changeover (Setup) time if the time remaining is zero.
39 = Event code 0 to 99,999
40 = Number of seconds gained for the current wigit.
41 = Number of seconds lost for the current wigit.
42 = Total accumulated seconds gained since last shift.
43 = Total accumulated seconds lost since last shift.
44 = TBD
45 = TBD
46 = TBD
47 = TBD
48 = Target count for the previous time period since last time the performance values were reset.
49 = Actual count for the previous time period since last time the performance values were reset.
For a complete list of possible output data, see the chart in the “**Table of Event Codes**” section.

Setup the History File Name

- Momentarily press the **Mode** button. The following display will appear:



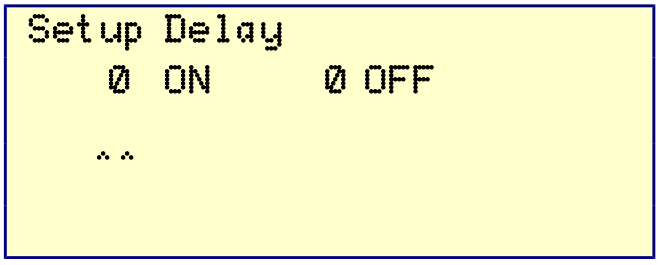
The file format is always A-Z for the first 5 characters and 000 to 999 for the last three characters. The numbers will auto-increment each time data is stored. To change an individual character in the File Name use a **momentary** press of the **Select** button to move to the character position then use the **Knob** to select the character value. To change the file type between **CSV** and **TXT**, press the **Select** button until cursor is under the file extension. Turn the **Knob** to select the desired file type.

Instructions

- Turn the knob to select the desired character.
- Press the Select button to advance to the next character
- Repeat until the desired file name is entered.
- The data may be stored in one of 2 formats plain text (TXT) or Comma separated values (CSV).

Setup the Button Delay for the Remote Inputs

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

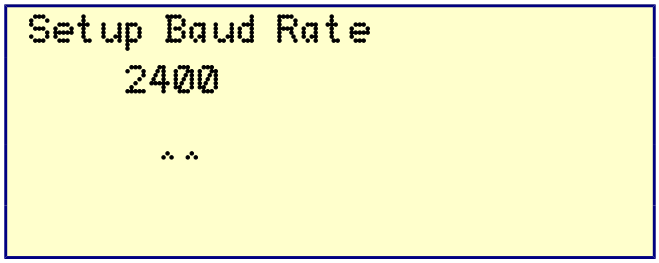
Sets when the counters are cleared. The "And Clear Counters" option must be enabled for this to work. The default value is 00:00:00 which is midnight each day.

- **Turn** knob to set **hour**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minute**
- The seconds cannot be changed.

.

Setup the Serial Port Baud Rate

- **Momentarily press** the **Mode** button. The following display will appear:



Instructions

Sets up the serial port baud rate.

- **Turn** knob to select the desired baud rate
- The default baud rate is 2400

Setup the Times of day to Clear the Counters

- **Momentarily press** the **Mode** button. The following display will appear:

```
Setup Clear All
  00:00:00        00:00:00
                  vv
  00:00:00        00:00:00
```

Instructions

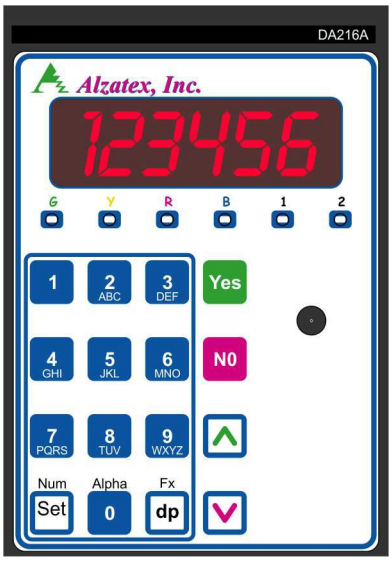
Sets when the event totals are stored into the history memory. Once the totals are stored, the counters are cleared. The "**And Clear Counters**" option must be enabled in the "**Setup Event Save**" menu for this to work. The default value is 00:00:00 which is midnight each day.

The counters can be cleared up to 4 times per day. All 4 memories are always enabled. If you need to clear the counters less than 4 times per day, you will need to set more than one memory to one of the times per day.

- **Turn** knob to set **hour**
- **Momentarily** press the **Select** button
- **Turn** knob to set **minute**
- The seconds cannot be changed.
- **Momentarily** press the **Select** button
- **Turn** knob to select memory **2**
- **Momentarily** press the **Select** button
- Repeat the above steps for memory 2, 3 and 4

Storing Event Codes to the History Memory

With the addition of the DA216A event code entry keypad, event codes may be stored to the history memory. You can assign event codes to have various meanings, like the reason production is stopped. All event codes are time stamped and recorded into the history memory.



Saving History to an SD Memory Card

The history memory can be stored on an SD (Secure Digital) card.


```
Save to SD Card File
  HISTA000

Saved
```

Make sure that the SD card is inserted into the unit. Press the **Save** button to see the name of the file to be saved to the SD card. Press and hold the **Save** button to store the contents of the history memory on to the SD card. The history file name will auto increment. The name in the display after the save is completed is the name of the next file to be saved. You may remove the SD card from the unit and put it into any computer that supports FAT12 or FAT16 type files. The message "Saved" will appear once the save is completed.

A single message is added to the history memory "**Save 227**" where the number is the number of history entries that was in the history memory at the time the save was executed.

See the example below for a sample of the saved data.

NOTE: If the SD card is not inserted, or if the card is not formatted properly an error message "SD Card Error" will appear on the display.

NOTE: Because all files are stored in the root directory of the SD card only about 500 files can be stored (this is an SD card limitation when formatted for use with MS Windows).

SD Card Status codes

- 00 – Created new file
- 01 – Overwrote an existing file
- 82 – SD Card directory read fail during file open.
- 84 – SD Card read fail during directory write.
- 88 – SD Card write error during directory write.
- 90 – SD Card sector data read fail.
- A0 – SD Card sector data write fail.

NOTE: The FAT driver is not compatible with some of the newer SD cards.

Typical data stored on the SD memory card.

HISTA023.TXT
2007-10-10 06:29:57 Time 255
2007-10-10 06:29:49 Down 714
2007-10-10 06:28:49 Save 77
2007-10-10 06:28:42 Scal 1
2007-10-10 06:28:42 Gpre 0
2007-10-10 06:28:42 Eff 55
2007-10-10 06:28:42 Dev -17
2007-10-10 06:28:42 Act 21
2007-10-10 06:28:42 Goal 38
2007-10-10 06:28:42 Grn 6
2007-10-10 06:28:42 Yel 6
2007-10-10 06:28:42 Red 5

HISTA024.CSV
"2007-10-10 06:28:27","Paus","241"
"2007-10-10 06:28:26","Run","539"
"2007-10-10 06:28:26","Paus","240"
"2007-10-10 06:27:49","Save","54"
"2007-10-10 06:27:10","Time","240"

Displaying files on an SD Memory Card

The directory listing on an SD (Secure Digital) card.

```
Files                    1
  HISTA000.CSV
Size:    34232
```

Make sure that the SD card is inserted into the unit. Tap the **Save** button. Press and hold the **Select** button to see the name of the file on the SD card. Turn the Knob to scroll through the list of files on the SD card.

When done, press any other button to exit this menu.

Remote Inputs

To **connect** remote inputs to the Production Timekeeper™:

1. Connect an RJ-11 wall plate jack to the Production Timekeeper™ remote input jack using either a six conductor modular crossover, or a six conductor modular standard telephone cord.
2. Connect a momentary (or push button) switch, or switches between the desired remote input and ground using the diagram (see installation instructions) as a guide.

The remote inputs are used as follows:

- IN-1 Put the timer into RUN mode. This is the same as pressing the **RUN/PAUSE/STOP** button.
- IN-2 Put the timer into PAUSE mode. This is the same as pressing the **RUN/PAUSE/STOP** button.
- IN-3 Put the timer into STOPPED mode. This is the same as pressing and holding the **RUN/PAUSE/STOP** button.
- IN-4 Increment the Actual Count. It also resets the actual count timer. This is labeled the **Next** button on the remote button module.

Note: As the diagram (in the installation instructions) portrays, the individual colored wires on the RJ-11 wall plate jack will function differently depending which six conductor modular telephone cord is chosen.

Remote Serial Input

Remote serial devices may be connected to the serial input on the Production Timekeeper™.

This unit has an RS422 connector for serial data input.

- The RJ-45 connectors can be used for RS-422 serial data.

This unit can be connected to an Alzatex input device, PLC, Computer or any device having a serial port. The data OUT is typically the display data. The data IN may be used to generate events or to control the unit remotely. Some of the options include:

- Connect a remote button module to the RS422 input for generating special events. Assign the buttons to specific meanings like machine jam, lunch break, change over to new product, etc.
- Connect to a KP215ASM-PROD1 Keypad to manually start and pause the system for lunch brakes and shift changes.
- Connect to a DC117B6-TC1 Time clock to automatically start and pause the system for lunch brakes and shift changes.
- Connect the output of a PLC that has a serial output or other machine outputs to a ground closure to serial adapter to record specific machine events like door open, out of material, roller not turning, etc.
- Connect to a character generator device having a video display monitor output.
- Connect the input and output to a Web server that generates web pages for displaying the production data on the world wide web on on the plant intranet. The production data may be monitored by any authorized user that has a computer with a standard web browser.

KP215ASM-PROD1

Connect to a KP215ASM-PROD1 Keypad to manually start and pause the system for lunch brakes and shift changes.

Top row of buttons

- Run - "KP[(Tap) Resume the last running state.
- Pause - "KPW (Tap) Put the TAKT timer, changeover and down timers into stopped state.
- Auto - "KP((Tap) This unit accepts commands from the Time clock.
- Off - "KP) (Tap) This unit does not accept commands from the Time clock.

Bottom Row of buttons

- Next - "KPX (Tap) Increment the actual count
- Prev - "KPY (Tap) Decrement the actual count
- Alert - "KPQ (Tap) Play the next audio message
- Alert - "KPq (Held) Play the first audio message
- Perform - "KPN (Tap) Display the performance values
- Perform - "KPn (Held) Reset the performance values

Red button to the right.

- Reject - "KPZ (Tap) Increment the reject count.
- Test - "KP? (Held) Display the unit addresses.
- Once the Test button has been press and held, Tapping the Test button continues to send "KP? commands. Pressing any other button returns this button to generating "KPZ commands.

Press and hold the red button, then tap the Alert button generates "KS101 through "KS115 commands. Pressing any other button returns this button to generating "KPQ commands.

The Auto/Off mode only disables the following commands coming from the time clock.

- RESUME - Resume the last running state.
- RSTART - Start the TAKT timer.
- RRESET - Stop all timers for breaks and lunch.

Diagnostics Tests

This mode is used to test the communications with the displays.

Press and hold the **Select** button to enter the diagnostics mode. Tap the **Select** button to toggle through each of the diagnostic modes.

- Mode A. Broadcast the message "123456" to all displays.
- Mode B. Initiate the LED segment test. The segments will start rotating.
- Mode C. Broadcast the message "------" to all displays.
- Mode D. Display the unit address "A02" on all displays.
- If the MP3 player option is installed, the MP3 files are played in sequence. Turn the **knob** to select the next MP3 file to be played.
- Tap the **Mode** button to display the SD card directory. Turn the **knob** to scroll through the SD card directory entries.
- While in the diagnostics menu, tap the **Run/Pause** button to initialize the SD memory card.

*Note: Press the **Mode** button twice or press any other button to exit the diagnostics mode.*

Remote Control Commands

Connect the **DC117B6-TC1** Time clock to the DC117B6-PROD1 to automatically start and pause the system for lunch brakes and shift changes. In addition, you can automatically copy data to the SD memory card, clear the history memory, etc.

Any function that can be manually performed from the front panel of the unit or from any of the remote inputs can also be accessed remotely and triggered automatically.

The **DC117B6-TC1** time clock may be connected to the system to automatically start and stop the system at specified times. In addition, audio files may be played on command. See the enclosed list of function codes that may be used to generate various actions.

The buttons on the DC117B6-PROD1 can be operated remotely using the following commands.

Audio alerts and beep tones		
“KSnnn		Play the audio file with the name AUDIOnnn.MP3. For example, “KS23A plays the audio file with the name AUDIO23A.MP3. Value nnn may be any valid ASCII characters.
Front Panel Buttons		
“KPk	6B	Press and hold to Save to SD card
“KPH	48	History Display Button
“KPh	68	Press and hold to Save History and Clear Counters
“KPG	47	Recall Stored Setting Button
“KPg	67	Press and hold to Save Stored Setting
“KPL	4C	Run/Pause Button
“KPl	6C	Press and hold to enter Stopped mode.
“KPA	41	Mode Button
“KPa	61	Press and hold to Enter the Changeover (setup) mode.
“KPB	42	Select Button
“KPb	62	Press and hold to display Directory Entries
Front Panel Knob		
“KP+ or “K+	2B	Rotate knob clockwise.
“KP- or “K-	2D	Rotate knob counter clockwise.
Remote Inputs		
“KPT	54	Start the Changeover (Setup) Timer, Stop the other timers. (Remote input IN2)
“KPU	55	Put the unit into RUN mode. (Remote input IN1)
“KPW	57	Put the unit into STOPPED mode. (Remote input IN3)
“KPX	58	Increment the Actual count and reset the actual timer. (Remote input IN4)
Other Commands. (There are no corresponding buttons on the unit for these commands)		
“KPV	56	Put the unit into DOWNTIME mode.
“KP[	5B	Resume the last running state
“KP(	28	Line enabled. Run and Pause commands from the time clock are enabled.
“KP)	29	Line disabled. Run and Pause commands from the time clock are ignored.
“KPY	59	Decrement the actual count. *Be careful with this command. It does NOT reverse hourly values or history values.*
“KPQ	51	Test Mode. Play the next audio message in the list.
“KPq	71	Test mode. Play the first audio message in the list.
“KPN	4E	Display the performance values as set up in the remote display outputs.
“KPn	6E	Display the performance values as set up in the remote display outputs. Also, archive the performance values into the history memory, then reset the performance values to zero for the next time period.
“KPY	59	Decrement the Actual count.
“KP?	3F	Query the History memory. Returns the number of history entries.
“KP=	3D	Put a marker into the history memory.
“KP>	3E	Get the first 8 history memory entries.

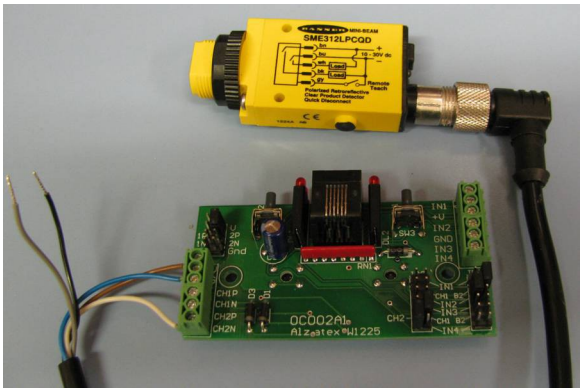
“KP<	3C	Get the next 8 history memory entries.
Machine Inputs Generated from additional input devices. External hardware can be added to handle these additional inputs.		
“KP0 to “KP9	30 to 39	Increment the Actual count for a specific production line 1 (“KP0) through 10 (“KP9). These commands also increment the overall actual count, the same as “KPX. (There are no corresponding buttons on the unit for these commands) Assign the buttons or machine inputs to increment the count from multiple production lines.
“KP0 to “KPz	30 to 7A	All other key codes in the range of ASCII “0” (Decimal=48) to ASCII “z” (Decimal=122) not listed above generates an event **Key xxx**, where the number will be the corresponding decimal value for the character that is stored in the history memory. Assign the buttons or machine inputs to specific meanings like machine jam, lunch break, change over to new product, etc.

Remote Sensor Wiring Example

Using a KP04B-OC to connect remote inputs to the Production Timekeeper™. The KP04B-OC has buttons for Resume, Pause, Stop and Next (Increment the actual count).

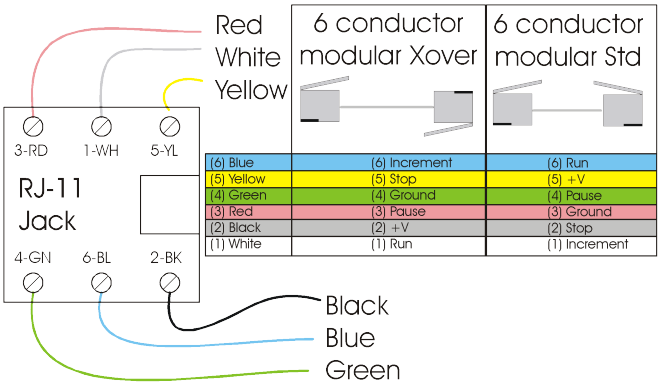
- Connect the KP04B-OC to the Production Timekeeper™ remote input jack using a six conductor modular crossover telephone cord.
- Connect a mushroom button, sensor, PLC or other machine input to the remote input marked **Next**. This input operates in parallel with the **Next** button.
- Refer to the KP04B-OC manual for details of wiring options.

Note: The photo below represents the connections to a typical Banner Engineering sensor.



Using a Standard RJ11 wall jack to **connect** remote inputs to the Production Timekeeper™:

- Connect a RJ-11 wall plate jack to the Production Timekeeper™ remote input jack using either a six conductor modular crossover, or a six conductor modular standard telephone cord.
- Connect a momentary (or push button) switch, or switches between the desired remote input and ground using the following diagram as a guide.



Note: As the diagram (in the installation instructions) portrays, the individual colored wires on the RJ-11 wall plate jack will function differently depending which six conductor modular telephone cord is chosen.