

# Production Board (GE, USA) User Manual

## *Title Page*

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## 1. Introduction

### 1.1. Scope

The scope of this document covers the operation and maintenance of the Production Board Display System for GE.

### 1.2. Purpose

The purpose of the document is to provide the relevant information to enable the user to install, operate and maintain the Production Board correctly.

### 1.3. System

The system consists of a single Production Display Board connected to a control PC on an existing local Ethernet network via an RJ45 connection. The Display has three lines and all characters are 2" (50mm) high and use surface-mount LED technology.

The primary function of the Display is to show real time production information obtained from the production line using volt-free pulses.

The three lines of the Display show production data as follows:

- *TARGET*, cumulative moving target set by TAKT time
- *ACTUAL*, cumulative total of units produced during the shift
- *DIFFERENCE*, the difference between the target and actual units produced.

**NOTE:** The TARGET value will always be shown in red, while the ACTUAL and DIFFERENCE values may be shown in red, green or amber depending on the Display software settings.

The Board is operated using the production software *GESDS*, a windows based software package. A digi-connect device installed on the Logic Board enables the user to connect the Display to the customers Local Area Network (LAN). The Display becomes part of the network similar to the PCs and printers and must be given an IP address.

## 2. Installation

### 2.1. Unpacking

Carefully remove the items from their package and store the packaging safely. After unpacking, inspect the contents for any damage that may have occurred during shipment.

### 2.2. Hardware

The Display Board(s) should be located in a position where there is unrestricted viewing of the front face of the Board. Also locations where the Board is subject to bright lights or direct sunlight should be avoided. Mount the Board securely and connect the cables as shown in the figure below.

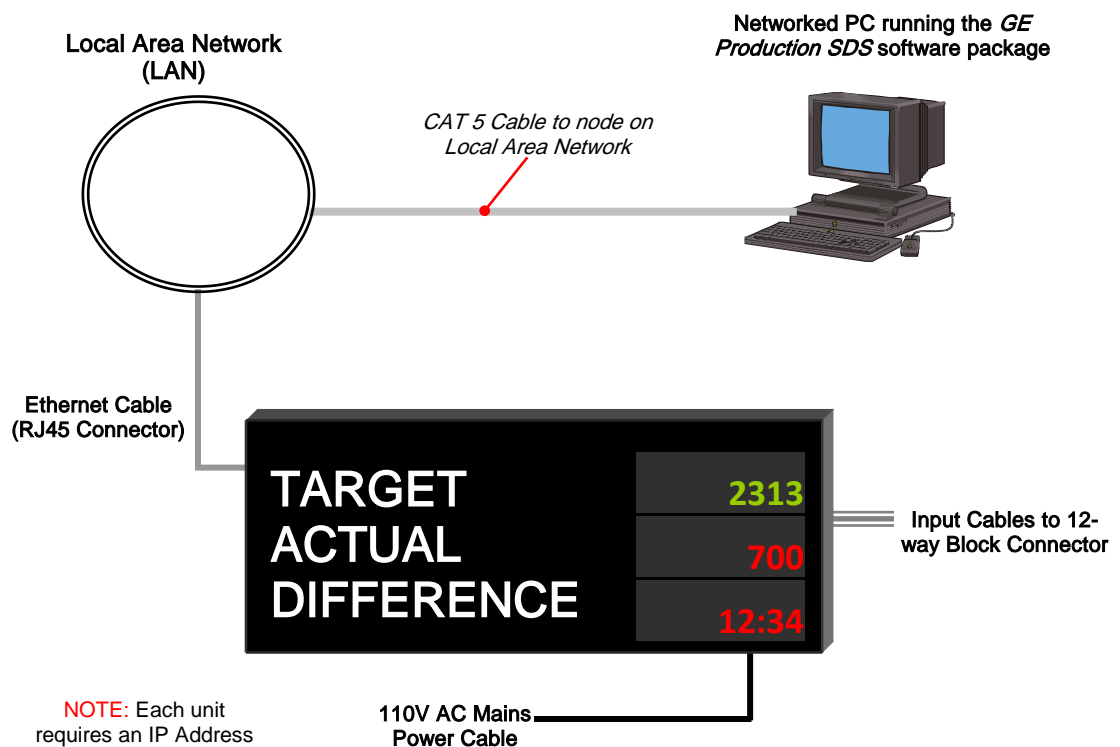


Figure 2.1 – System Configuration.

### 2.3. Software

The software package is supplied on CD-ROM. To install the software, do the following steps:

1. Insert the CD into your CD-ROM tray.
2. Where *Autorun* is enabled, the installation screen opens.
3. Click on the *Next >* button to begin the installation and follow the on-screen instructions.
4. When the process is complete, all files are stored in the ***C:\NetSDS32*** folder unless the destination folder has been changed.

If the software is supplied by email, copy the .zip file to your desktop and double-click on the file to open. Do the following steps:

1. Double-click on the setup.exe file to begin the installation.
2. Click on the *Next >* button to begin the installation and follow the on-screen instructions.
3. When the process is complete, all files are stored in the ***C:\NetSDS32*** folder unless the destination folder has been changed.

The path to the executable file that runs the software package should be as follows:

***C:\NetSDS32\GESDS.EXE***

### 3. Setting Up the Display

To set up the Display, the following is required:

- A vacant node on the network
- A static IP Address from the Network Administrator
- The Network device setup program, dgdiscvr.exe

#### 3.1. Configuring the DigiConnect Me Device

**Note:** To use the Display on your local network, the Display must first be assigned a *STATIC* IP Address, for each network card. Addresses should be assigned by your IT network administrator. Consult your Network Administrator before doing the following steps.

##### Step 1

Connect the Display to the network.

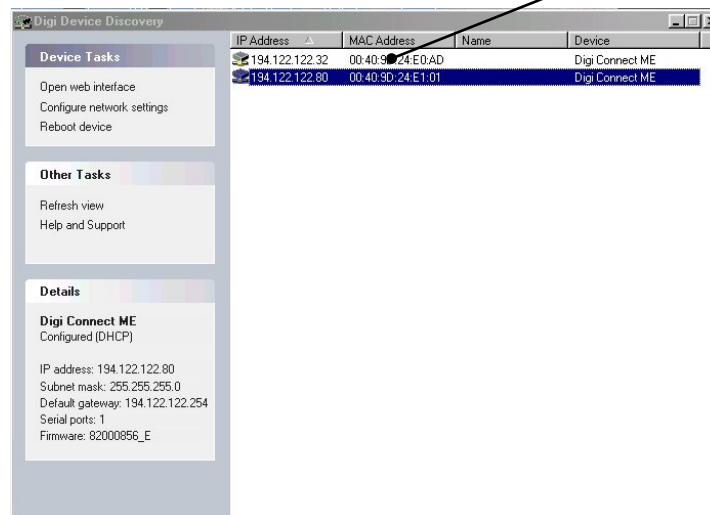
##### Step 2

Locate the dgdiscvr.exe program in the C:\NetSDS32 directory.

##### Step 3

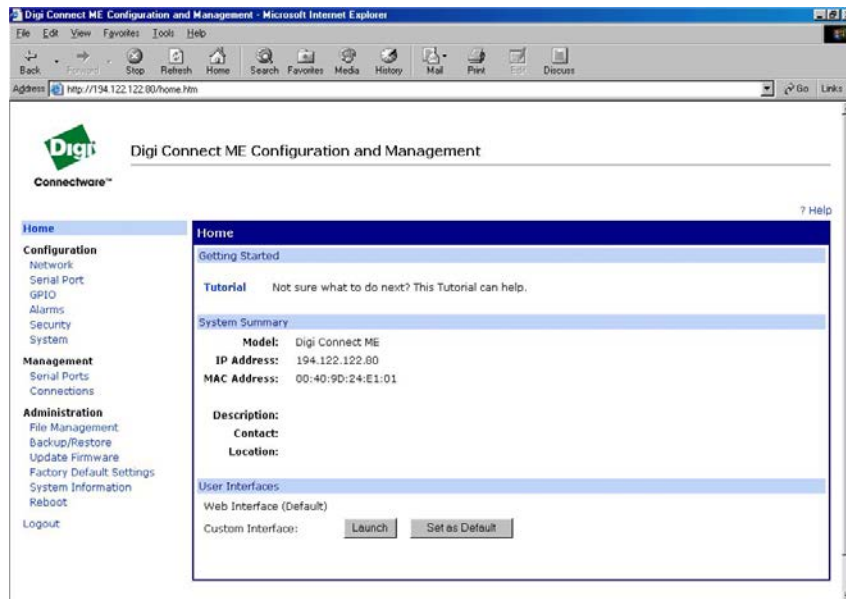
Double-click on dgdiscvr.exe to run the program.

When the program is started, it searches for devices on the network. The software will give the Display a dynamic IP address that will need to be changed to that supplied by your Network Administrator.

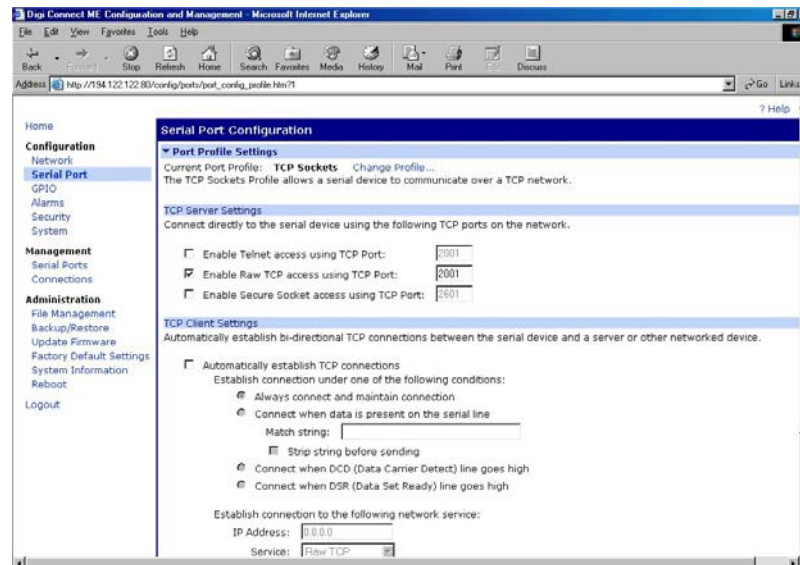


**Step 4**

Click **Serial Port** and select **TCP Sockets**. Click **Apply**.

**Step 5**

Select **Enable Telnet** and **Enable Raw**. De-select **Enable Secure Sockets**.

**Step 6**

Set **Enable Telnet** and **Enable Raw** ports to 2001. Click **Apply**

**Step 7**

Click **Basic Port Settings**. In the Description Field, type Ticket Hall Information Display. Set to 9600,N,8,1, None. Set Flow Control to None. **Apply**.

**Step 8**

Fit 3-way Molex loops to LK5 and LK6.

**Step 9**

Close the *Digi Connect Me* program.

**Step 10**

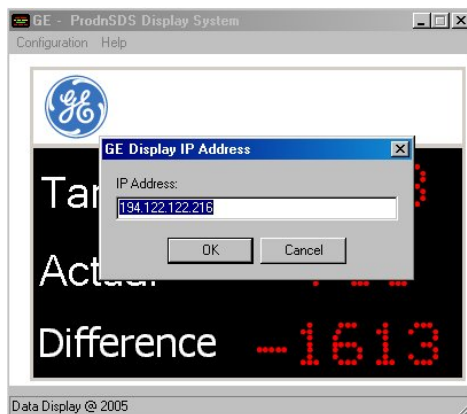
Run the GE Production Software, GESDS.

This completes the setup.

### 3.2. To change the IP Address

To change the IP Address to that supplied by your Network Administrator, do the following steps:

1. Select **Configuration > Communications**.



2. Enter the new IP Address.
3. Click **OK** to close.

The new IP Address is applied to the Display Board.



## 4. GESDS Software

The networked software is a user interactive software package designed to send and receive real time production information to the Display Board. It contains features such as:

- Shows current TARGET and ACTUAL values
- Calculates differences between TARGET and ACTUAL values
- Changeable daily shift start, stop times and build pace TAKT settings by way of a user interface

Volt-free pulses are received via the Parallel Interface installed in the Display and increments the Shift *ACTUAL* value by 1. When the Parallel Interface increments the *ACTUAL* values, the software calculates and sends a corresponding difference value on the Display.

#### 4.1. Getting Started

Double-click on the *GESDS* icon to run the program, *GESDS.exe*. The User Interface consists of the Menu Bar and a layout of the Production Display.

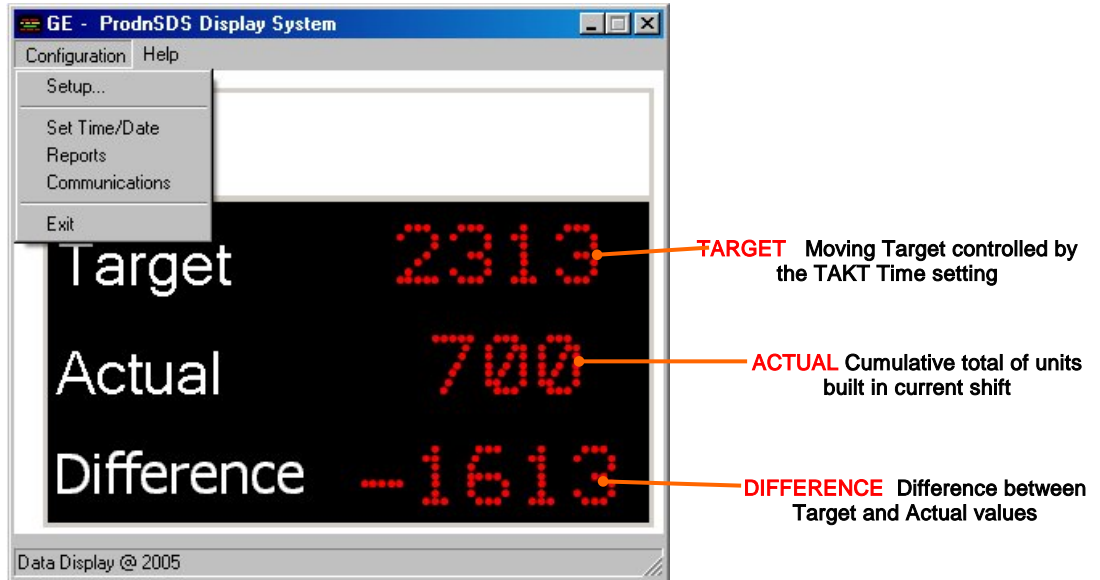


Figure 4.1 - User Interface.

## 4.2. Editing the Schedule File

To achieve an accurate production calculation, the user enters a detailed listing of:

- Shift Start and Stop times
- Break Times
- Goal values for each Job
- TAKT Settings in seconds, e.g. 10 = 30 seconds

To enter the various parameters, do the following steps:

1. Select **Configuration > Setup**.
2. This opens the *Setup* form.
3. Enter the details as required.

The screenshot shows the 'Setup - GE Production Display' dialog box. It contains several sections: 'Display Title' (Pulp Line 1), 'Manual Operation' (OFF), 'Show Clock' (checked), 'Target' (2570), 'Actual' (700), 'Efficiency' (-1870), 'Break 1' (15 mins), 'Break 2' (30 mins), 'Amber' (95%), and 'Red' (90%). Below these is a 'Start / Stop Times' table with columns for days of the week and a 'TAKT' column. The table contains shift start and stop times for Monday through Sunday. Annotations with orange arrows point to various elements: 'Suitable name for the Display' points to the 'Display Title' field; 'Enter the Break Times in the' points to the 'Break 1' and 'Break 2' fields; 'Toggles between manual or automatic operation.' points to the 'Manual Operation' radio buttons; 'If selected, the current time will alternate on the bottom line of the Display' points to the 'Show Clock' checkbox; 'Sets amber % value of TARGET minus ACTUAL. When the value falls below this % value, the ACTUAL and DIFFERENCE data is shown in amber.' points to the 'Amber' percentage field; 'Sets red % value of TARGET minus ACTUAL. When the value falls below this % value, the ACTUAL and DIFFERENCE data is shown in red.' points to the 'Red' percentage field; 'TAKT: The TAKT value is the number of seconds it takes to build one unit. E.g. TAKT set to 15 results in the TARGET value incrementing by four every minute.' points to the 'TAKT' column in the table; 'Display Simulation' points to the 'Update' button; and 'To set the Shift Start and Stop Times, click on the *Shift Start* button. Enter each Shift Start and Stop Time in the fields. Up to three shift times may be entered per day.' points to the 'Start' and 'Stop' rows in the table.

**Display Simulation**

**Suitable name for the Display**

**Enter the Break Times in the**

**Toggles between manual or automatic operation.**

**If selected, the current time will alternate on the bottom line of the Display**

**Sets amber % value of TARGET minus ACTUAL. When the value falls below this % value, the ACTUAL and DIFFERENCE data is shown in amber.**

**Sets red % value of TARGET minus ACTUAL. When the value falls below this % value, the ACTUAL and DIFFERENCE data is shown in red.**

**TAKT: The TAKT value is the number of seconds it takes to build one unit. E.g. TAKT set to 15 results in the TARGET value incrementing by four every minute.**

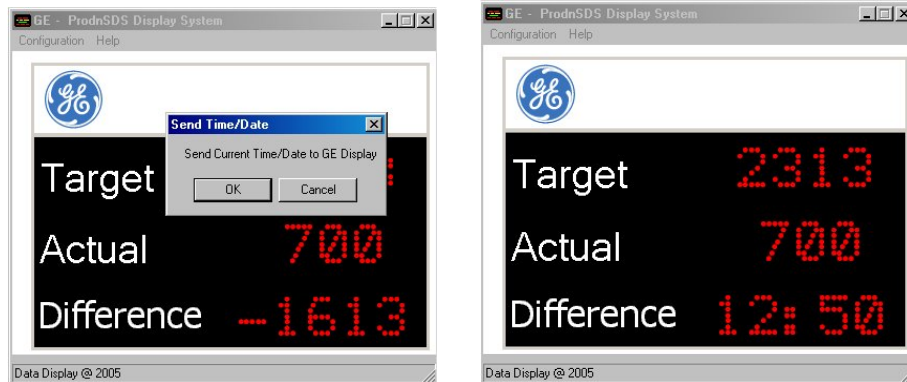
**To set the Shift Start and Stop Times, click on the *Shift Start* button. Enter each Shift Start and Stop Time in the fields. Up to three shift times may be entered per day.**

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TAKT
Start	07:00	07:00	07:00	07:00	07:00	07:00	07:00	1
Stop	14:59	14:59	14:59	14:59	14:59	14:59	14:59	
Start	15:00	15:01	15:00	15:00	15:00	15:00	15:00	5
Stop	22:59	22:59	22:59	22:59	22:59	22:59	22:59	
Start	08:00	23:00	23:00	23:00	23:00	23:00	23:00	10
Stop	06:50	06:51	06:59	06:59	06:59	06:59	06:59	

Figure 4.2 – Display Setup.

### 4.3. Set the Time and Date

To set the current Time and Date, do the following steps:



*Figure 4.3 – Time & Date Setup.*

1. Click on **Configuration > Set Time**
2. On the dialog box, click on the *OK* button.

**NOTE:** Make sure your PC is set to the correct Date and Time as this is the Date and Time that will be stored in the Displays memory.

#### 4.4. Exporting Data

As the days production data is being processed, the user can view the days data via a spreadsheet.

To view the production data, do the following steps:

1. Select Configuration > Reports.
2. This opens a spreadsheet show the production data.

Time	Date	Target	Actual	Difference	On Time	DownTime	TAKT
12:08	3-Sep	546	380	-166	4Min	0Min	5
14:59	3-Sep	126	0	-126	2Min	0Min	1
15:16	3-Sep	21	0	-21	0Min	1Min	1
15:14	3-Sep	21	0	-21	0Min	0Min	1
14:59	3-Sep	475	0	-475	7Min	0Min	1
6:59	2-Sep	88	110	22	5Min	0Min	10
22:59	2-Sep	529	500	-29	3Min	0Min	5
14:59	2-Sep	4739	5500	761	79Min	0Min	1
0:00	00/00				Min	Min	
0:00	00/00				Min	Min	

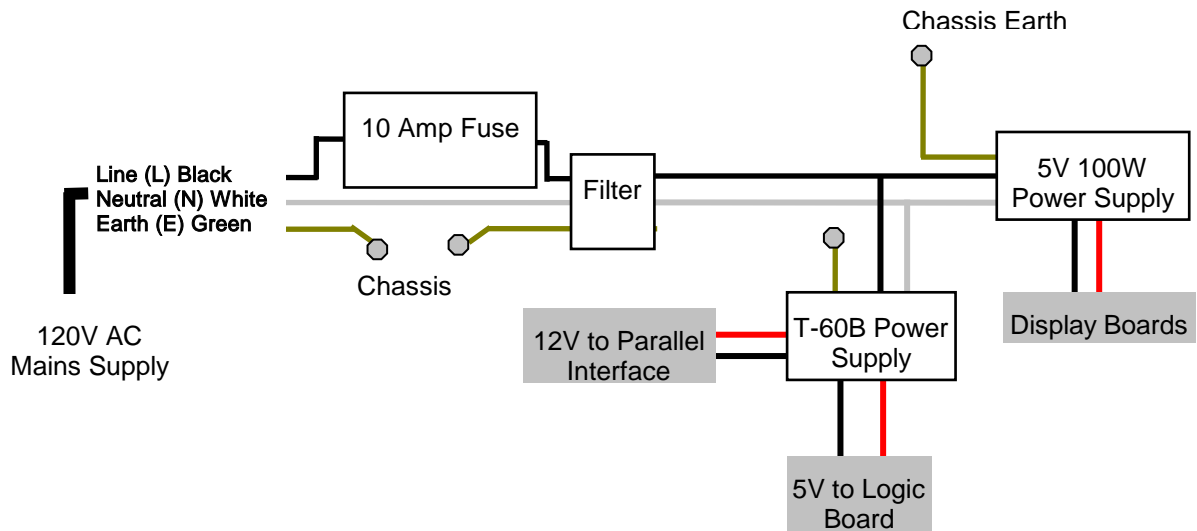
<b>Target</b>	<b>2570</b>
<b>Actual</b>	<b>700</b>
<b>Difference</b>	<b>-1870</b>

Figure 4.4 – Sample Spreadsheet Data.

## 5. System Wiring

### 5.1. Power Supply

The Display operates from an incoming mains supply of 120 Volts AC. The Line (Black) and Neutral (White) wires are terminated at the PSU via a 10 Amp Fuse and Filter. The Earth (Green) is terminated using an M5 ring crimp and is securely fixed to the main Earth point on the chassis of the Display.



5.1 - Mains Power Supply Distribution.

### 5.2. Power Supply Units

Power Supply Units provide the DC power for the various electronic components in the Display Board. There is a 5V 100W and a T-60B PSU installed in the Display. The 5V 100W PSU provide DC power to the Display Boards while the T-60B provides 12V power for the Parallel Interface and 5V power for the Logic Board.

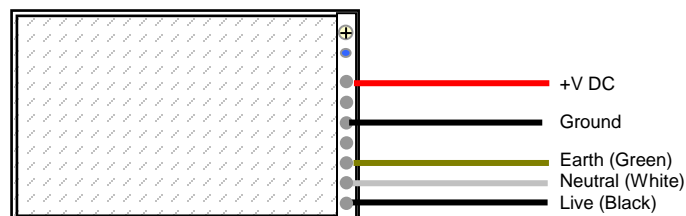


Figure 5.2 – Typical Wiring of a Power Supply Unit.

### 5.3. Logic Boards 2004

The Logic 2004 PCB Board is the principal circuit board in the Display and controls the information shown on the Display. The Board contains the CPU (16 bit Motorola 68HC912B32), memory (32K RAM, 32K ROM) and interface circuitry for the Display system. This Logic differs only from the Logic 2001 in that a female Ethernet connector is added at U19 to allow the connection of a Cat 5 Ethernet cable with an RJ45 jack plug.

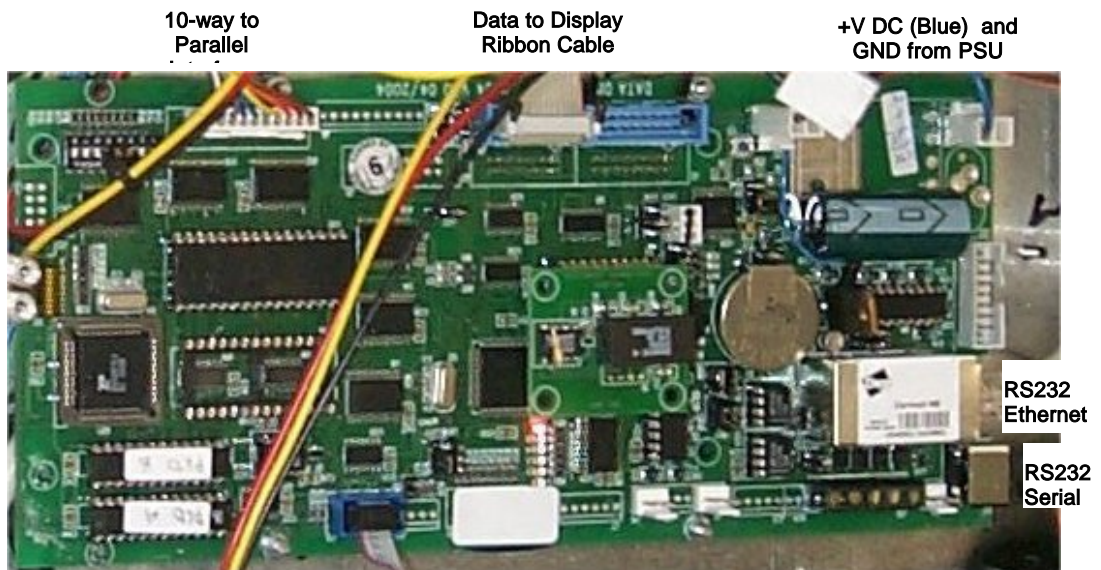



Figure 5.3 – Typical Wiring for Logic 2004.

The 5V DC to power the Logic is connected at J21 and the 15 Volt DC power and GND to drive the FETs is supplied through connector J20.

Light Sensor signal 4-way connector is connected at J10 and the Data to Display Cables are connected at J3 (Cable A) and J4 (Cable B).

## 5.4. Parallel Interface

The Parallel Interface Board is used to detect level changes and cause appropriate responses from the Display. For this application, the inputs at JL1 and JL8 are used to control the data on the Display through a series of volt-free inputs including pulses to increment the Actual build value, start and stop shift times, stop during breaks etc. The table below details each input and function.

Input No.	Function	<div style="text-align: center;">Parallel Interface inside the Display</div> 
JL1	Actual Input (Brown)	
JL2	Start Shift (Red)	
JL3	Stop Shift (Orange)	
JL4	Break 1 (Yellow)	
JL5	Break 2 (Green)	
JL6	Target Time (Blue)	
JL7	Decrement Actual (Violet)	
JL8	Reset (Gray)	



**NOTE:** Pin Outs on block connector, left to right

Figure 5.4 - Parallel Interface Wiring.



## 6. Maintenance

*Warning: Disconnect the power supply before you remove any display panels. Make sure work area is clean and clear of tools and miscellaneous items of equipment after maintenance.*

### 6.1. Maintenance Instructions

#### 6.1.1. Preventative Maintenance

Inspect the Display for defects before each operation. Do a visual check for the following:

- Damaged or dirty Lens
- Loose Cables
- Defective LEDs

#### 6.1.2. Cleaning the Display

Routine cleaning of the Display Board is at the discretion of the operator and subject to local conditions. Use damp non-abrasive materials such as a sponge, or lint-free cloth and a soft detergent (washing-up liquid) to clean the Display. Remove difficult stains or marks with a suitable solvent. **DO NOT USE** sharp or metal objects.

## 6.2. Removal and Replaceable Instructions

When removing and replacing any items, do the following steps:

1. Disconnect the Mains Power Supply to the Display.  
**WARNING:** After isolating power from the Display, wait at least one minute before performing the next step.
2. Unscrew the self-tapping screws at the right-hand side of the Display and remove the side profile.
3. Retain all hardware removed from the Display and keep in a safe place.
4. Clean the Display Board with a damp cloth after all maintenance.

### 6.2.1. Removing a Power Supply Unit (PSU)

- a) Refer to **6.2.** and do steps 1 to 4.
- b) Make sure that there is no Mains Power at the LIVE terminal on the Filter using a DMM.
- c) Locate the defective PSU and remove the clear plastic cover from the terminals, if necessary.
- d) Disconnect the crimp terminals and make note of wires and their locations.
- e) Unscrew the screws holding the PSU to the Display chassis and remove the PSU. Retain all screws, washers, spacers, nuts etc for further use.

### 6.2.2. Installing a PSU

- a) Spread a layer of Heat Sink Compound over the rear of the PSU.
- b) Attach the PSU to the Display chassis using the washers and nuts removed previously.
- c) Connect the crimp terminals.
- d) Replace the clear cover over the terminals, if necessary.
- e) Connect the mains power to the Display at the isolator.
- f) Check the DC output of the PSU.
- g) Test the Display.
- h) Close up the Display and if required, fill in the maintenance report.

### 6.2.3. Removing a Logic Board

- a) Refer to **6.2.** and do steps 1 to 4.
- b) Make sure that there is no mains power at the LIVE terminal on the Filter using a DMM.
- c) Locate the Logic Board and disconnect all plugs/sockets and screw terminals. Carefully note their locations for reconnection.
- d) Unscrew the nuts, washers etc that secure the Logic Board to the Display chassis.
- e) Remove the Board.

**NOTE:** Take care not to move the Dip Switch settings accidentally.

### 6.2.4. Installing a Logic Board

- a) Attach the new Logic Board to the Display chassis with the nuts and washers retained during removal.
- b) Connect all connectors in their correct positions, RS232, 16-way Data, Light Sensor signal and DC Power.
- c) Check that all switches and links on the new Board are set to the same as the defective Board.
- d) Connect the Mains Power to the Display at the isolator.
- e) Test the Display.
- f) Close up the Display and if required, fill in the maintenance report.

### 6.2.5. Removing a Display Board

- a) Refer to **6.2.** and do steps 1 to 4.
- b) Make sure that there is no mains power at the LIVE terminal on the Filter using a DMM.
- c) Locate the faulty Display Board.
- d) Remove the 4 screws that attach the Display Board. **NOTE:** Place the screws in a safe place for installation of new Board.
- e) Disconnect the Data and Power connectors from the Board. Note the locations of each connector and how it is connected for the installation of the new Board.
- f) Remove the Display Board.

### 6.2.6. Installing a Display Board

- a) Replace the Data and Power connectors in their correct locations. **NOTE:** Power and Data cables are keyed. Installing them incorrectly will damage the connectors.
- b) Attach the Display Board to the Display Board Door Assembly with the screws retained during removal.
- c) Restore power at the isolator.
- d) Test the Display.
- e) Close up the Display and if required, fill in the maintenance report.

### 6.2.7. Removing a Parallel Interface

- a) Refer to 7.5. and do steps 1 to 4.
- b) Make sure that there is no mains power at the LIVE terminal on the Filter using a DMM.
- c) Unscrew the nuts and washers that secure the Board.
- d) Disconnect the Molex connectors and the signal wires. **NOTE the locations of each wire.**
- e) Remove the Board.

### 6.2.8. Installing a Parallel Interface

- a) Attach the new Board to the Display chassis with the nuts and washers retained during removal.
- b) Connect the Molex Connectors. Connect the wires previously removed from. **Make sure** that each wire is replaced in the same position as the original Board.
- c) Connect the mains power to the Display at the isolator.
- d) Test the Display.
- e) Close up the Display and if required, fill in the maintenance report, if required.

### 6.2.9. Removing a Mains Filter

- a) Refer to 6.2. and do steps 1 to 4
- b) Make sure that there is no mains power at the LIVE terminal on the Filter using a DMM.
- c) Disconnect the crimp terminals and note the locations. Leave the earth terminal until last.
- d) Unscrew the securing nuts holding the Mains Filter to the chassis and remove the Filter. Retain all nuts and washers for further use.

### 6.2.10. Installing a Mains Filter

- a) Attach the new Mains Filter to the chassis using the nuts and washers removed previously.
- b) Reconnect the earth connection and crimp terminals.
- c) Restore power at the isolator.
- d) Test the Display.
- e) Close up the Display and if required, fill in the maintenance report.

### 6.2.11. Replacing a Fuse

- a) Twist the cap on the Fuse holder at the rear of the Display and remove the defective Fuse
- b) Replace the Fuse and twist the cap back on.
- c) Restore power at the isolator.
- d) Test the Display.

### 6.2.12. Special Measures following a Stoppage

If the Display is out of service for a long period of time, carefully remove the Display and store it in a cool dry place.

### 6.3. Handling Equipment

- One working platform
- Standard tool kit

### 6.4. Special Tools

There are no special tools required.

### 6.5. Spare Parts

For spare parts, contact your nearest Data Display Customer Service Department.

Make sure to quote the Data Display No. in the Product Specifications section of this Manual and the Serial No. of the Display.

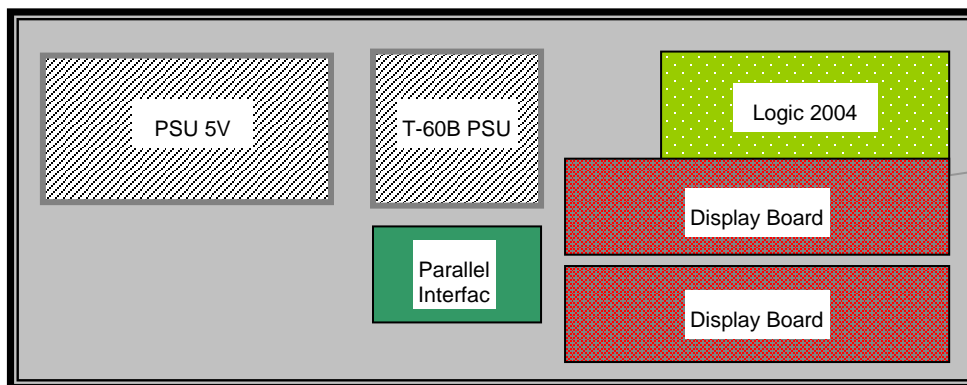


Figure 6.1 – Location of Parts.

Part Number	Description
DL306	Display Board, 3 off
AUTOLOGIC2004	Logic Board, 2004
AUTOPCBP/I	Parallel Interface
D00-2217	PSU, 5 Volt, 100W
D00-2232	PSU, T60B,
D00-3324	Fuse, 10 Amp

Table 6.1 - Replaceable Parts for Display Board.

## 7. Product Specifications

CHARACTERISTIC	VALUE
<b><i>Display Features</i></b>	
Display Type	Production Display Board
Model	PDB-030605-SMT/RED/MULTI
No. of Lines per Board	3
No. of Characters per Line	6
Character Height	2 inch
LED Colour	TARGET in red ACTUAL and EFFICIENCY in red, amber or green depending on the performance level.
<b><i>Communication</i></b>	
EPROM	TBA
Protocol	DB Win
Baud Rate	9600
Data Format	8 bit, 1 stop bit, no parity
Addressing	Pre-configured and should not be changed.
<b><i>Electrical</i></b>	
Power	120V AC
Fuse Value	10 Amp
<b><i>Housing</i></b>	
Dimensions (LxHxD)	TBA
Housing	Aluminium, Black
Front Screen	5mm Grey, Polycarbonate
<b><i>Environmental Conditions</i></b>	
Temperature Range	-5°C to 65°C
Humidity Range	5% to 80% without condensation

**Table 7.1 - Product Specifications.**