Graphical Documentation for Electronic Assembly

Optel's GDOC provides dynamic graphical work instructions for PCB hand assembly and box build with instructions linked to parts instead of static PDF files.

Additionally as staffing changes occur such as shift to shift of day to day, Optel's GDOC rebalances the workload and updates the work instructions dynamically for each available station.

Optel Graphical Documentation (GDOC)

Graphical work instructions for box build and PCB assembly are typically static PDF files that are time consuming to create and very difficult to change to reflect latest product revisions. Companies spend large amount of time changing multiple documents for small changes in product designs. What is needed is a database-driven, modular, and dynamic state-of-the-art graphical documentation package that will allow for changes to be propagated to all products sharing common components. The paperless documentation should be created on the fly when needed on the shop-floor by dynamically generating work instructions from the latest information in the database.

GDOC Overview

Optel's Graphical Documentation (GDOC) provides paperless graphical work instructions for box-build, circuit assembly, rework and for QA inspection. GDOC allows assembly instructions and multimedia content to be assigned to assemblies either at the component level or at the assembly level. Multimedia content including text, pictures, video, documents and links GDOC includes a graphical editor for engineers and a viewer for operations with work instructions centrally stored in the Optel database.

GDOC Benefits

- **Hierarchical** – Supports hierarchical BOM and creating work instructions for product assemblies that may contain multiple circuit assemblies or subassemblies.

- **Comprehensive** – GDOC covers the complete process of manual assembly from scheduling and line balancing, to creating specific documents for each operator on the line.
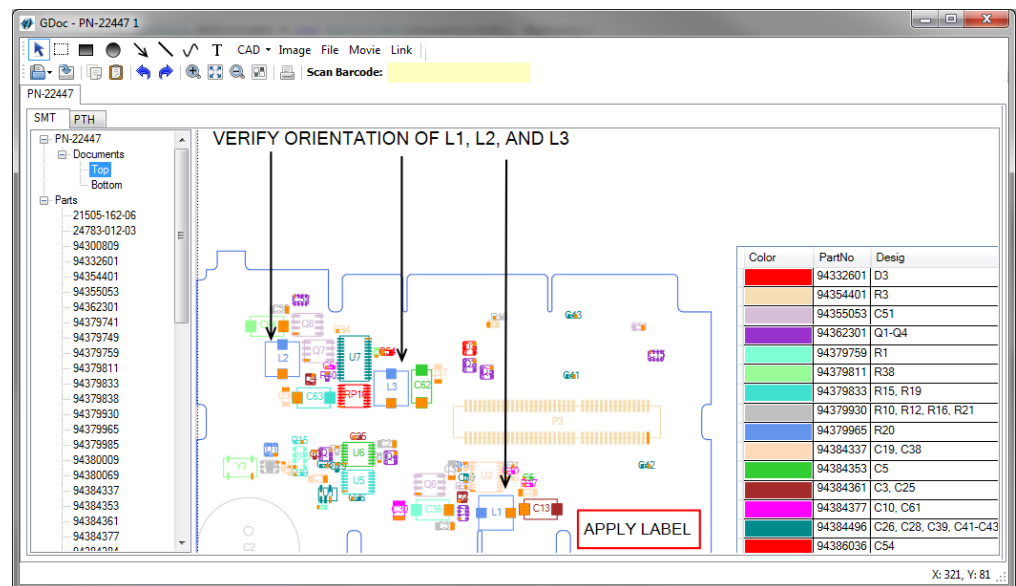
GDOC Editor— Hand-place Material BOM with Installation Notes

- **Modular** – Customers can chose to implement GDOC for single manual station, or to manage and control multiple manual assembly lines.

- **Dynamic Staffing Adjustments** - Hand assembly can vary significantly by shift due to assembler staffing per shift causing major problems with static documentation, but with GDOC you quickly adjust the assembly instructions to the number of stations available by rebalancing the workload instructions for each station.

- **Dynamic Where-Used Inheritance** – As work instruction changes are made at the part level or sub-assembly level, the work instructions are dynamically updated for all product assemblies that use that part or subassembly allowing instructions to be maintained once at the lowest level in the BOM hierarchy to support

multiple products.

- **Multimedia Content** - Any type of media can be used that the clients PCs or tablets have viewers for. Thus movies, pictures, PDFs, Microsoft Office documents and more can be used.

- **Easy to Use** – GDOC is very easy to use and engineers and operators can be trained in very short period of time.

- **Centrally Managed Documents** - Manage assembly instructions in one place by using GDOC to create and link graphic electronic documentation to assemblies and to specific components.

- **Paperless** – All documents are generated on the fly and displayed on the computer when needed. However, every document can be printed if necessary.

GDOC Key Features

State-of-the-art graphical documentation features include:

- **DB Centric Approach** – All data needed to dynamically generate work instructions is stored in the database. There are no files that need to be accounted for and maintained.

- **Supports Box and PCB assembly** – The box and PCB BOMs are imported from the ERP system in addition to the CAD files. The documentation can be created for the box-build and PCB hand assembly.

- **Scheduling and Balancing of Manual Assembly Lines** - When the optional Dynamic Scheduling module is included, work load is balanced across stations on each assembly line and graphical instructions are dynamically generated for each shift to accommodate for the number of assembler staff available for each shift.
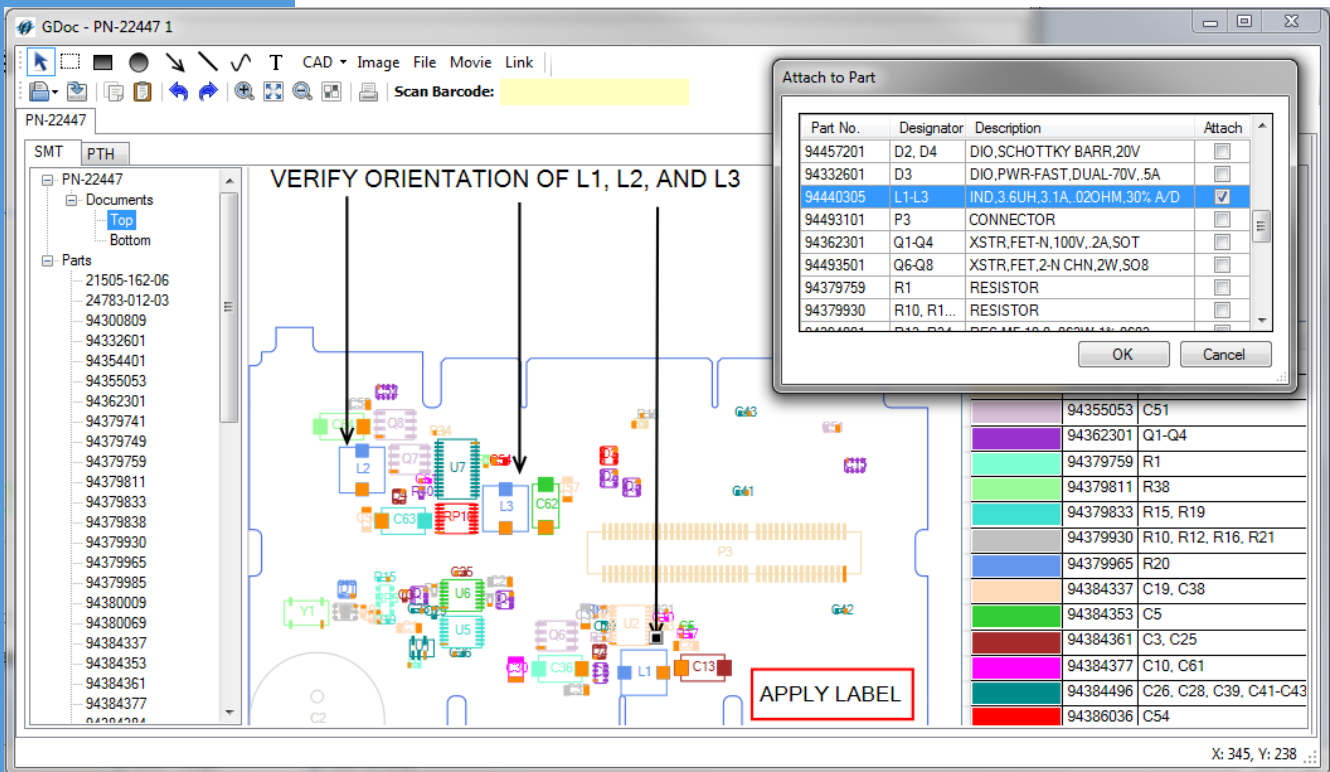
GDOC Editor — Attaching Work Instructions to a Part

- **Dynamic Document Generation** – Work instructions are dynamically generated every time an operator opens a job. All information attached to an assembly, or components in the assembly is retrieved from the database and displayed as work instructions. In most cases, a large part of the work instructions for a new assembly will be available as soon as the assembly is defined as all prior defined components with work instructions are incorporated. The engineer only needs to define assembly specific instructions and those for any new parts.

- **Editor –** GDOC Editor is used by engineers to define complete work instructions at the part level and at the assembly level. The Editor uses the following tools:

  - **Drawing Tool** - Drawing of objects such as arrows, boxes, circles and test boxes to further highlight information on the CAD layout. Use the CAD viewer to zoom in or to highlight a specific region or component on the board.

  - **Inherited Part Work Instructions** - Graphical documentation for specific components is inherited by any assembly that contains that component.

  - **CAD Tool** - Used to select side, area, or limit the number of designators displayed. Reference designator colors can be changed to a default color.

  - **Image Tool** - Used to insert an image file either already stored in the database, or from uploading a local file to be stored in the database.

  - **Attaching Instructions to Parts and Assemblies** – Adding instructions is simple as creating a text box and typing or pasting in text on attaching documents or multimedia.
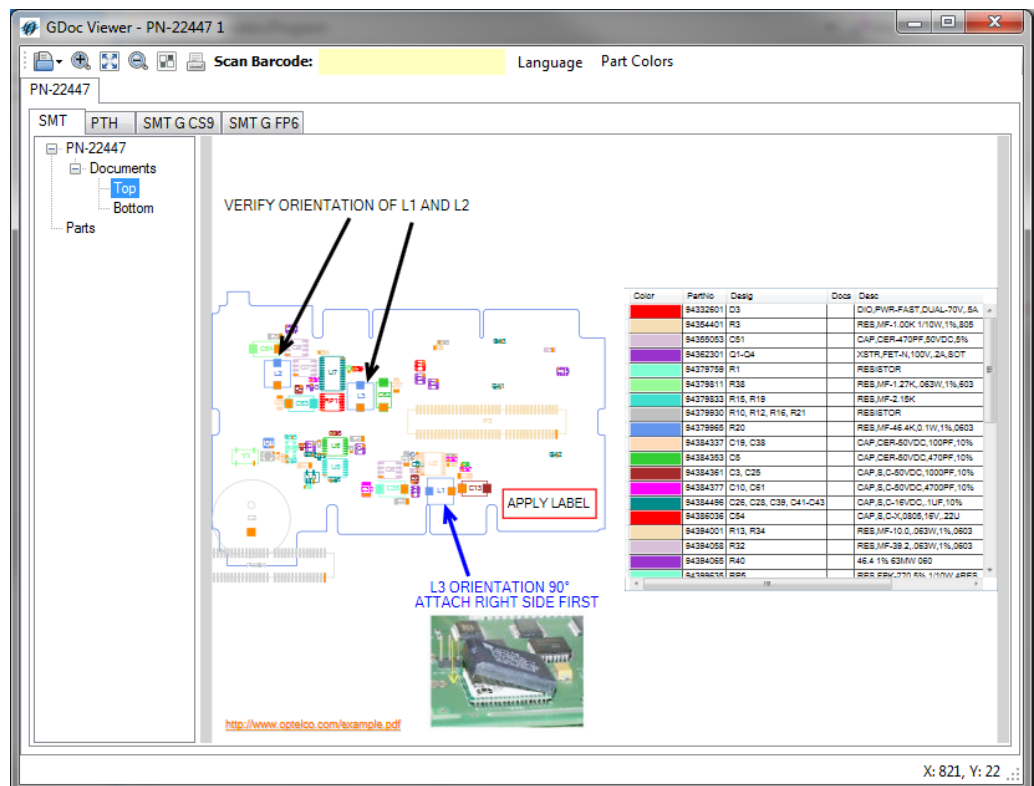
GDOC Operator Viewer— with Notes, BOM, Attached Instruction Movie

  - **CAD Editor Tools**—The CAD Editor tools are used to adjust the displayed image of the cad file to be inserted, allowing a close-up of an individual part or section of the circuit, and filtering the display for parts, pads, wire-frame, etc.

  - **Parts List** - After adding CAD view to the document the list on the right displays parts, their designators, description, and links to part-level documents if available

  - **Linking instructions to a part**- Some instructions are specific to a part number within an assembly document.

  - **Viewer –** GDOC Viewer is a used to view work instructions by an operator performing tasks assigned to a work station. The operator selects a job and parts assigned to that station are displayed in the list. The Viewer color codes parts and provides an inspection list and highlights the parts to be inspected from the prior station. The GDOC Viewer can additionally be used by inspectors for QA inspections.

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