Agilent Technologies

Considerations for Long Panel Division

The information that follows pertains to:

Software Revisions: 6.x
Hardware: Agilent 5DX System
99 - 25 - 001 - 02

Series 2L

Abstract: Long Panel Division requires special considerations when doing panel programming. This document discusses long panel division, covering some of the difficulties and how to deal with them.

Long panel division is an option found under the Compilation menu in CADLink for software release 6.0. It is used to divide panels longer than 18 inches and up to 24 inches into two logical boards.

Note: This is only for the Agilent 5DX Series 2L System.

Before inspecting a long panel (greater than 18 inches), Divide Long Panel must be run to divide the panel into two logical boards. The process of actually dividing the panel into two logical boards is fairly simple and is described in the online documentation under Agilent 5DX User Guide → Panel Programming → Divide Long Panel. It is important to understand how to set the Division Line and the Board Overlap, as well as the programming considerations after performing a Divide Long Panel.

After dividing a long panel into two logical boards, the steps for Panel Programming become more complicated. The intention of this document is to describe some of the issues to take into consideration when dealing with long panel division. Some users may have an existing application that needs to be divided.

This document pertains to dividing and programming a new application, although much of what is stated can be applied to both new and existing applications. In addition, there are comments concerning dividing existing applications. Many of the Long Panel Division issues actually deal with the task of programming a panel that contains two (or more) different boards.

Advice: Refer to the Application Note, "Setting Up a Panel Program That Contains Two Different Boards."

Understanding Long Panel Division

The Problem: Limited Viewable Area

The Agilent 5DX has a "viewable area" of 17.5 inches X 17.5 inches. A panel over 18 inches and up to 24
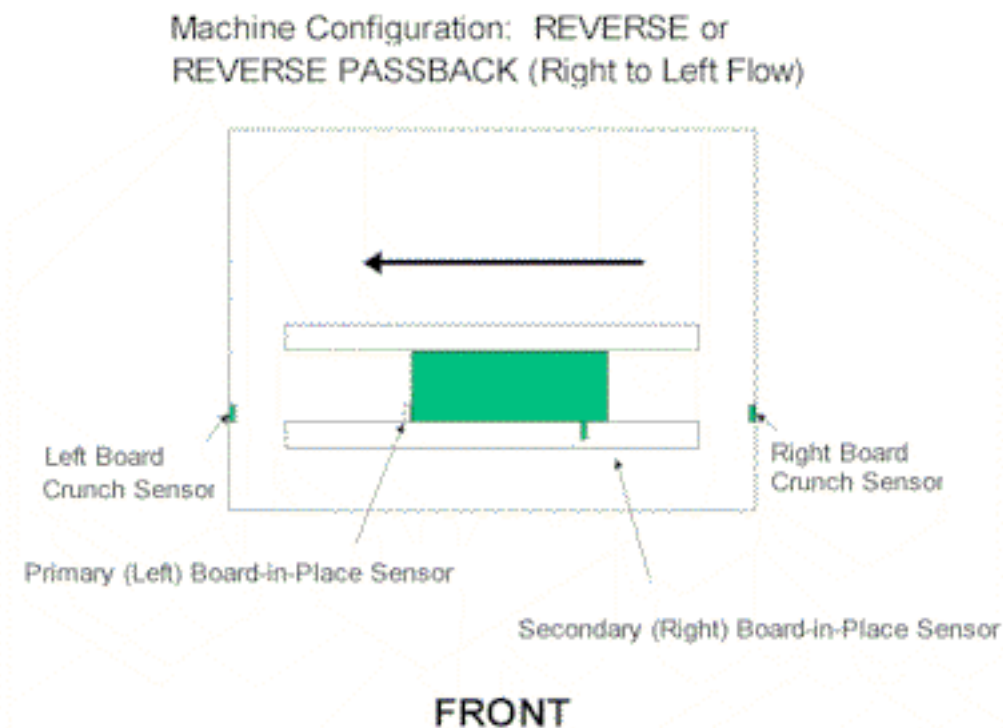
inches in length can be inspected. To do this, one 18" portion of the panel is inspected, and then the panel is shifted such that the remaining portion of the panel is under the viewable area. This is accomplished by dividing the panel into two logical boards.

The Solution: Divide Panel into Two Logical Boards

To inspect panels longer than 18 inches, the panel is divided such that one board pertains to the "left" side, and the second board pertains to the "right" side. In other words, Neutral Data Files (NDFs) need to be created for a left board and a right board on the panel. To do this manually would be very time-consuming and tedious. The Divide Long Panel option allows users to perform this simply and effectively. The user need only supply information about where to divide the panel, and the rest is taken care of. Which board is "left" and which board is "right" is defined in the file PANEL.NDF. This actually tells the Agilent 5DX how to adjust the stage when loading the panel and switching between boards.

Stage Motion and BIP Sensors

After a long panel is divided and programming is completed, the Agilent 5DX will inspect one side of the board at a time. The Agilent 5DX Series 2L has two Board-In-Place (BIP) Sensors. Typically, when a panel is loaded into the machine (assuming Left to Right flow), the panel stops at the right BIP Sensor. In this position, all boards that have the BIP Sensor defined as Right can be inspected. To switch to a board that has the BIP Sensor defined as Left, the board is positioned against the Left BIP Sensor. In the illustration below, the left BIP Sensor is extended and the right BIP Sensor is retracted.

Machine Configuration: REVERSE or
REVERSE PASSBACK (Right to Left Flow)

Left Board
Crunch Sensor

Right Board
Crunch Sensor

Primary (Left) Board-in-Place Sensor

Secondary (Right) Board-in-Place Sensor

FRONT

Considerations Prior to Dividing Panel

At what point in panel programming should Divide Long Panel be performed?

Divide Long Panel should be performed after the NDFs are set up and ready to compile and initial subtyping has been completed. This should be prior to setting up alignment points and surface map setup. Before dividing, decide how the panel should be oriented when loaded into the machine, and then confirm this by drawing the panel.

Panel Division Line and Board Overlap

The panel division line is used to determine which board a component pertains to. This is based upon the centroid of the component. If the component's centroid lies above the division line, for example, it will be placed in the top board, even if some of the component's pads and pins lie on the other side. The Board Overlap is used to compensate for any components that cross the division line. The only restriction is that the Division Line plus the Board Overlap may not result in a board greater than 18 inches. It may be necessary to choose the Division Line and Board Overlap based upon a component that spans the length of the board.When deciding on the panel division line and board overlap, it is not only necessary to choose a division line that divides the panel into boards less than 18", it is also necessary to consider what effects the resulting two boards will have on alignment, surface mapping, and setting thresholds.

- Alignment - Divide Long Panel simply copies the existing alignment pads of each board to the two resulting boards. Thus, it is better to set alignment pads after dividing the panel. Alignment is performed for each board on a panel. Take into consideration that each individual board created as a result of dividing the panel will require its own alignment pads.
- Surface Mapping - Each board will require its own surface map points. The surface map mesh will not span across boards. If there is an existing surface map, then divide long panel places those surface map points on the respective boards. If a surface map point falls on both boards (in the overlap), then that surface map point will be copied to both boards. Consider increasing the overlap to allow for more area for surface mapping.
- Setting Thresholds - Setting thresholds is an important consideration when dividing a board, as it can have a large impact on the time spent in setting thresholds. Each board will have its own thresholds, as the threshold files reside in the primary board directory. When deciding on a division line, choose one that will minimize the number of subtypes common to both boards. This can reduce errors caused by copying thresholds between boards. Also, consider the impact on subtype learning. Each board contains its own learned subtype data. FPGullwing and BGA2 typically use subtype learning, so try to keep each of their subtypes to one board only, if possible.

Advice: Refer to the application note "Setting Up a Panel Program that Contains Two Different Boards."

Dividing an Existing (Already Programmed) Panel

The Divide Long Panel option assumes that it is to divide a new panel. For an existing panel, after performing Divide Long Panel, it may be necessary to clean up the alignment pads, surface map points, and camera settings. New alignment pads should be chosen for each board. The surface map mesh should be checked and any points added or removed as necessary. There will often be unused map points resulting from panel

division. The CAMERA.NDF for each divided board is copied into both of the resulting board directories.

To avoid compiler warnings, verify that any components specified in the resulting camera files pertain to the correct board. The thresholds are simply copied to each of the new board directories, so there should be no need to change these. Any changes made to the thresholds after dividing must be realized for all boards. This can be done by carefully copying the appropriate files. Results files are produced on a board-by-board basis, so there will be a separate results file for each board.

Advice: Refer to the Application Note, "Setting Up a Panel Program That Contains Two Different Boards."