

Pin and Socket Pallets

INTRODUCTION

Integra technologies offers a range of pin and socket pallets. These have a number of ease-of-use advantages compared with conventional implementations:

- No soldering required, just push in and screw down.
- Does not require any skilled labor for assembly.
- Ease of removal and replacement.
- Excellent repeatability during repeated insertions and removals.
- Frequency range DC - 3.5GHz.
- DC current handling up to 20A

Figure 1 illustrates the concept while Figure 2 shows an example of a Pin and Socket pallet inserted into its test fixture.

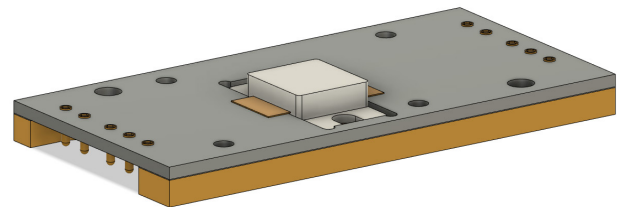


FIGURE 1: Pin and Socket Pallet



FIGURE 2: Pin and Socket Pallet IGNP1214L250 inserted into its test fixture

PIN AND SOCKET INTERFACE DESIGN AND PERFORMANCE

Figure 3 shows the pallet just before insertion into its test fixture. The two pins on the left are DC connections while the right three form a ground-signal-ground RF connection. The pins are capable of carrying up to 20A current.

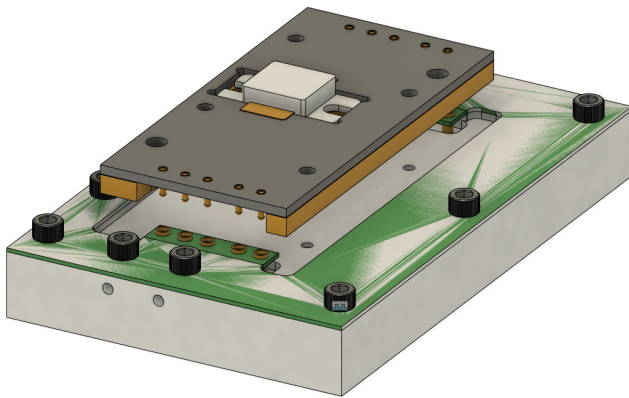


FIGURE 3: Pallet just prior to insertion in the test fixture

A key aspect of the pin and socket concept is the RF performance of the interface. Figure 4 shows how the interface was simulated using 3D electromagnetic finite element software while Figure 5 shows the simulated return loss from which it can be seen that it is better than 35dB over a 3:1 bandwidth for an S band pallet.

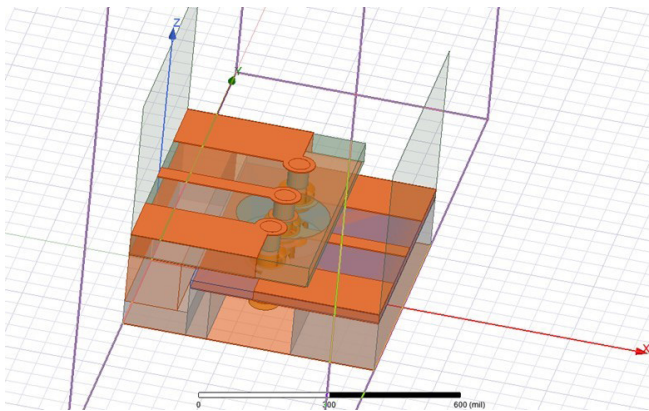


FIGURE 4: 3D Electromagnetic analysis of pin and socket Interface

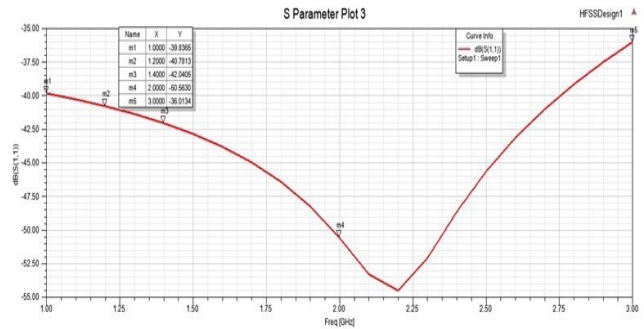


FIGURE 5: Simulated input VSWR

Obviously, the pin and socket come as pair and so the customer must use the correct Mill-Max [1] socket to match the Mill-Max pin used by Integra. Also, to obtain the same quality of RF performance as demonstrated in Figure 5 it is recommended that the customer uses the same mounting configuration as shown in Figure 4 which involves a cut-out underneath the pcb. The pcb used in this example is 20 mils thick Rogers RO4350B [2]. The pin positions on the pallet need to be agreed between Integra Technologies and the customer.

REPEATABILITY

A sample pallet was inserted into its test fixture and its RF performance measured, it was then removed and re-inserted and the process repeated. Altogether, a total of five insertions were made and five sets of RF performance data recorded. Figures 6 to 9 show the minimum and maximum deviations from the average value at each frequency. It can be seen that excellent repeatability is obtained, for example the gain varies by less than +/- 0.05dB across the frequency range. It is believed that the worse repeatability at band center is caused by the fact that the pallet has the worst input return loss in this region.

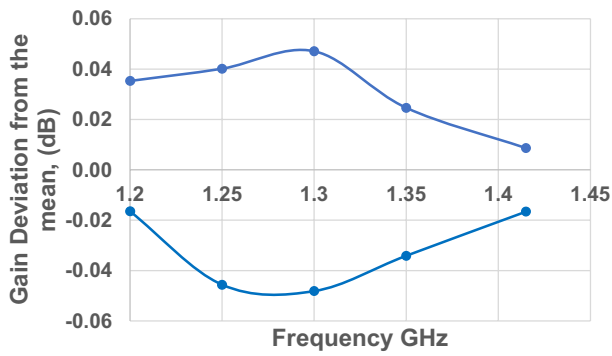


FIGURE 6: Gain Repeatability

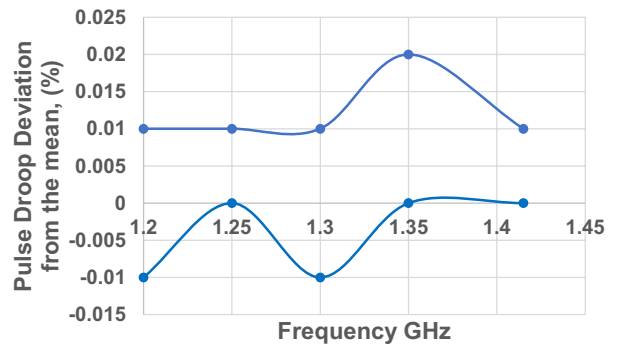


FIGURE 8: Pulse Droop Repeatability

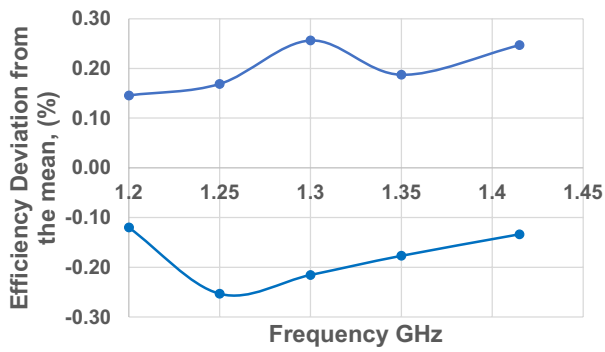


FIGURE 7: Efficiency Repeatability

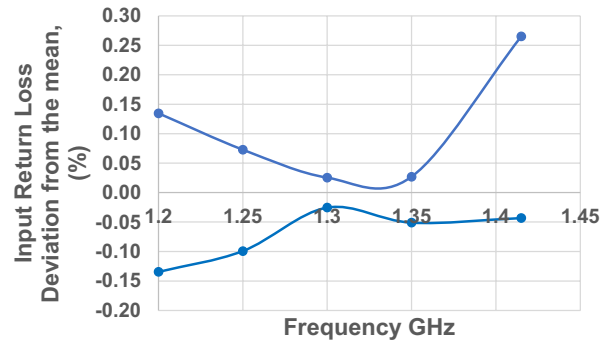


FIGURE 9: Input Return Loss Repeatability

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CONCLUSION

This Application Note has described the benefits of pin and socket pallets, and it has been shown that not only does the pin and socket interface provide an excellent input return loss but that excellent measurement repeatability is also achieved during repeated insertions and removals into its test fixture..

REFERENCES

1. <https://www.mill-max.com/>
2. <https://rogerscorp.com>