



**Before the Committee on Foreign Affairs
U.S. House of Representatives**

**Hearing on
“Export Controls, Arms Sales, and Reform:
Balancing U.S. Interests, Part II”**

**Statement of
Mikel Williams
Chairman, Government Relations Committee
IPC – Association Connecting Electronics Industries**

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Chairman Ros-Lehtinen, Ranking Member Berman, and Members of the Committee, I am pleased to be here today to discuss export control reform and to underscore the importance of clear and appropriate U.S. export controls on printed circuit board designs for sensitive military technologies.

I am Mikel Williams, President and CEO of DDi Corporation, a printed circuit board manufacturer headquartered in Anaheim, CA. Founded more than thirty years ago, my company has over 1,600 employees *and* six manufacturing facilities in the U.S. and one in Canada. Although the majority of DDi’s printed boards go into commercial products, we are a trusted partner of the U.S. government, helping to equip the Defense Department and intelligence agencies with the 21st century capabilities needed to protect our country.

I am also on the Board of Directors and Chairman of the Government Relations Committee of IPC —Association Connecting Electronics Industries, and it is in this capacity that I appear before you today. The IPC is a U.S. headquartered global trade association, representing all facets of the electronic industry, including but not limited to companies that design, manufacture and assemble printed circuit boards. IPC has more than 3,000 member companies of which 1,900 are located in the U.S. Contrary to common perception of electronics manufacturing, over 90% of IPC’s U.S. printed circuit manufacturers are small businesses. As a member-driven organization and the leading source for industry standards, training, market research and public policy advocacy, IPC supports programs to meet the needs of an estimated \$1.7 trillion global electronics industry.

On behalf of IPC’s members, I would like to express our support for modernizing and streamlining export control regulations. The current export control system neither adequately protects our national security, nor facilitates the export opportunities we need to grow our economy. Reform is long overdue.

Most importantly, IPC believes that the administration must use the opportunity provided by the reform of our nation's export control laws to clarify the frequently misunderstood regulatory treatment of printed circuit boards that underpin our critical defense technology. In addition to clarifying the rules, IPC seeks to ensure that the proper controls are put in place to ensure that U.S. national security is not compromised through the export of technical information related to printed boards and the military equipment for which they are designed. This is also an issue of strengthening our U.S. manufacturing base generally. Outsourcing printed boards used for sensitive defense applications threatens not only our national defense, but the industries that support our national security capabilities today and for the future.

Printed boards are essential to many defense systems. Specifically and uniquely designed for each and every one of those systems, printed boards are used to mechanically support and electrically connect electronic components. Printed board designs reveal critical information about the board as well as about the devices for which they are designed. Accordingly, clear and appropriate protection of printed board designs for USML items is needed to safeguard from U.S. adversaries inherently sensitive information about U.S. weaponry and military equipment.

My testimony details our concerns and offers suggestions for clarifying export controls to clearly regulate printed boards and printed board designs in controlled items.

I. Description of Printed Boards and Electronics Assemblies

Specialized printed board and printed board assemblies are custom-made and uniquely designed for the specific function of the electronic items in which they are incorporated. Each printed board is exclusively designed to hold and connect specific additional components and therefore contains a roadmap of the operation of the United States Munitions List (USML) item for which it is custom-designed. The design and placement of the parts that constitute a printed board are dictated precisely by the nature and type of electronic components to be mounted on the board, which are in turn dictated by the specifications of the product into which the printed board assembly is to be incorporated. Further, as technology has evolved, the actual board material and circuitry pattern contained therein has been integrated into the systems performance, such as with radio-frequency and microwave products that are utilized in our modern warfare systems. In fact, knowing these items provides keen insight into the operating characteristics, including frequencies, of our most secure weapon systems. Manufacture of the printed board requires access to and use of all of the board's design information. This access exposes a significant portion of the intellectual property for both the printed board and the item for which it is uniquely designed.

The following are just a few examples of printed board designs that convey technical data regarding the defense items for which the printed board was designed:

- Fly-by-wire flight controls: The design of the printed boards that are incorporated into flight controls can reveal the data buses used in the controls. Data buses are the communications channel between the flight computer and the aircraft control surfaces. Understanding the data bus types can suggest potential weaknesses of the aircraft that may be exploited, including how sensitive the aircraft is to electronic disruption.

- **Electronic Warfare Systems:** Design instructions necessary for manufacturing the printed boards that are incorporated into phased-array systems and tactical radar and jamming systems outline the dimensions and placement of conductive and insulating patterns. Data of this type reveal specific frequency information about the systems themselves. Further, access to the printed board design imparts knowledge about the general system design, such as which components must be separately packaged and how the system may be countered or disrupted by external means.
- **Unmanned Air and Ground Vehicles (UAV and UGV) –** An increasingly important part of U.S. arsenal, UAV and UGVs save lives and improve national defense capabilities by relying on control system architectures, advanced sensor systems, and research services to achieve autonomous mobility. Electronics is vital to advanced system sensors and telemetry of the vehicles, and electronics depend on printed boards. The design features of the printed circuit boards for these items can reveal means of electronic disruption of the operation of unmanned vehicles.

In sum, printed boards—the central nervous systems for all electronics—hold valuable and specific information about the workings of the underlying defense articles themselves. Companies with access to the designs of printed boards for defense articles thereby also have access to sensitive information about controlled technologies. This exposes these technologies to malicious intrusion by U.S. adversaries that may destroy the reliability of U.S. weaponry and other critical defense equipment. Failure to properly secure the information embedded in printed boards that are custom-designed for defense articles could result in a breach of national security, theft of critical defense-related intellectual property and allow for reverse engineering of our critical defense systems.

II. Complexity of Current Rules

Printed boards designed for defense articles are regulated by the USML’s controls on “components” that are specifically designed or modified for defense articles. Companies with strict International Treaty on Arms Reductions (ITAR) compliance practices know the regulations to be unequivocal: a board is controlled by ITAR if it is designed for an ITAR controlled article. However, because printed boards are not listed explicitly in ITAR, a careful analysis of the complex ITAR rules is required in order to properly understand the control of printed boards and their designs. As a result, the applicable controls may be overlooked, leading to the unlicensed sourcing of ITAR-controlled printed boards from foreign facilities. While IPC does not have data regarding the extent of such sourcing, IPC estimates that roughly one-third of printed boards manufactured for military use are made outside the United States.

IPC has proactively launched an initiative to educate its membership and their customers about the treatment of printed boards under ITAR, and seeks to work with the defense industry in this effort. We have also engaged the U.S. Department of State’s Directorate of Defense Trade Controls (DDTC) to communicate our concerns and to ask for their cooperation in explaining and clarifying the current rules on printed boards to the manufacturing community.

III. Export Control Reform: An Opportunity to Clarify Controls

The five USML category revisions recently proposed by the DDTC would all adopt the same basic approach to the regulation of printed boards, but at this point, the nature of that new regulatory regime is a work in progress and remains a matter of interpretation. IPC understands that the proposed rules generally transfer to the new Commerce Control List (CCL) components specifically designed for military items, with the exception of certain listed components. However, the proposed rules retain on the USML all “technical data . . . directly related to the defense articles” in these categories. IPC believes that printed boards constitute “technical data” in physical form.

While IPC understands that printed boards may be migrated to the CCL, we feel strongly that printed board designs for USML items must remain on the USML because they unquestionably convey technical data regarding the USML items into which they are specifically designed. Control of printed circuit board digital data and related designs, in short, should follow the categorization of the end item itself. Accordingly, if an end item is not on the USML, then the design data for any of its printed circuit boards would not be under USML control. However, if the end item is on the USML, the design data for its printed circuit boards should remain under ITAR control as USML technical data.

In its submitted comments, IPC has recommended that DDTC clarify the status of printed board designs in its final rules by confirming that the design and digital instructions for printed circuit boards specifically designed for USML items constitute “technical data” also covered by ITAR. IPC has also urged DDTC to address specifically and unambiguously the treatment of printed boards in its rulemaking for Category XI (Electronics), for which a proposed rule has not yet been published. Revisions to Category XI offer DDTC the best opportunity to eliminate existing and future confusion regarding the treatment of printed board designs under ITAR.

IV. Safeguarding the U.S. Defense Industrial Base

IPC recognizes that the health of our defense industrial base generally does not factor into export controls. However, I would be remiss if I did not emphasize the vital importance of the printed board industry to the defense industrial base. The U.S. electronic interconnect industry is a chief reason that the U.S. leads the world in high-tech innovation. Improvement in our industry has a cascading impact, enabling a tremendous level of new innovation to expand capabilities, reduce cost, reduce weight and minimize the number of components. In the military sector, these innovations enable advancements in military navigation, guidance and control, electronic warfare, missiles, and surveillance and communication equipment.

In 2005, the National Research Council completed a study on the printed board industry, entitled *Linkages: Manufacturing Trends in Electronics Interconnection Technology*. The Linkages report predicted a continuing contraction of the North American printed board industry and a weakening of its ability to support the Defense Department. It concluded the industry must be sustained to ensure our country’s ability to maintain our military capability for the foreseeable future. It made a number of recommendations designed to support this domestic industry—

recommendations that have largely been ignored despite Congressional direction to the Defense Department to implement them.

Just as the Linkages report predicted, few U.S. companies remain today that are able to produce highly sophisticated and reliable printed boards for defense needs. In the five years following release of the Linkages report, the number of printed board manufacturers in North America fell by 36 percent, even as worldwide production grew by 28 percent. Without a robust printed board industry, the U.S. defense supply chain is at risk, leaving the Department of Defense susceptible to counterfeit parts, unreliable components and lack of technological expertise to meet its requirements. Without greater federal attention to our defense industrial base, the Department of Defense in the years ahead may be forced to rely to a great degree on overseas manufacturing for sensitive high-technology military electronics. There is no question in my mind that such a development would pose an unacceptable risk to our national security.

V. Conclusion

In conclusion, on behalf of IPC's 3,000 members, I urge that printed circuit boards be explicitly and clearly addressed in a reformed ITAR regime in order to safeguard U.S. national security. I thank you for inviting me to testify and I look forward to answering any questions you may have.

ATTACHMENT A to
"TRUTH IN TESTIMONY" DISCLOSURE FORM
For MIKEL H. WILLIAMS

Item 6:

I am the President and CEO of DDi Corp., a manufacturer of printed circuit boards ("DDi"). DDi responds to purchase orders, typically as a subcontractor to major corporations doing business with the US Department of Defense ("DoD") and other US government agencies. Approximately one-third of DDi's total annual business of this of this nature is through the military/aerospace market sector. Some of it may be for commercial aviation requirements and not DoD, but we often do not know the end user. To prepare a list of all of our purchase orders is not practical. In total, the average dollar value for a purchase order is around \$8,000, and last year DDi had roughly \$90 million of such business. DDi does not receive grants from the US Government.

I am also on the Board of Directors and Chairman of the Government Relations Committee of IPC, the global trade association for the global electronic interconnect industry. IPC has roughly 3,000 member facilities many of which do business with the federal government and provide through subcontracts, and possibly contracts, printed circuit boards, designs, and other electronic products to the government customer, including, but not limited to, the DoD. I am not able to quantify the dollar amount of those sales, but they are significant, certainly in excess of \$1 billion dollars in annual sales. To the best of my knowledge, IPC member companies do not receive grants from the US Government.