

## Abstract

- The increasing of number of electrical signals required for the manufacturing of modern PCBAs leads to new ISP Programming and Testing switching systems solutions.
- PCBA are getting every day smaller, quite a lot of boards are tied together in panels - this is an essential requirement in high-volume PCBA manufacturing lines.
- Due to the lack of cost-convenient, off-the-shelf, professional and flexible switching systems, the industry is too often solving this problem with home-made and manually-wired solutions.
- The result is certainly not the best in terms of precision, reliability and lifetime.

## Home-made switching solutions analysis

When home-made solutions for switching systems are chosen, a series of disadvantages arise. Producing any type of electronic system requires several expensive phases, never justified for a tool produced in quantity of few units to be used in PCBA assembly lines. Disadvantages of home-made solutions vs. professional off-the shelf tools are evident. Let's assume that the switching system to be implemented is for **48 signals** and that an industry average engineering time is quantified in **USD 50**.

### 1. Research and Development

Characteristics need to be carefully determined, in terms of size, connectors, power, input voltage, switching elements type (Relay or SSR). The switching element type is a key factor: its contact current, package, size are to be carefully studied. Relays quality (number of operations before failure) needs a special care for a tool destined on high quality manufacturing line. Then a schematic diagram and BOM are created, necessary for the following phases of industrialization, testing and support.

► *Minimum cost for the Research and Development (20 hours): **USD 1,000.***

### 2. Physical realization

Once a schematic diagram is ready, the designer has to decide the implementation type of the switching tool. If many systems are to be realized, then the PCB is the obvious choice. But in most case the number of systems do not allow the development of a PCB, so the obvious choice is to manually wire all of the connections of the tool. This is quite dramatic, for the very-low reliability of such a wired-and-welded board.

Parts cost (high-quality swiching element): USD 300, **Plus:**

(PCB-based tool)	PCB routing (25 hours)	USD 1,250
	PCB fabrication	USD 1,000
	PCB mounting (10 hours)	USD 500
(Wired-and-welded tool)	Board mounting (30 hours)	USD 1,500

► **Minimum cost for physical realization: USD 1,500.**

### 3. Test

As for any other electronic system, and especially in the case of tools to be used in PCBA manufacturing lines, a super-comprehensive functional test must be performed. The execution, but especially the creation of a Test Systems for only few boards is a real nonsense. Nevertheless, a very accurate test of the swiching tool must be performed.

This Test System must be created and used before the installation of the tool on PCBA manufacturing line and must remain ready for post-installation when the functionality of the tool has to be checked.

► **Minimum cost for functional test industrialization (40 hours): USD 2,000.**

### 4. Documentation

As for any other electronic system, having a good documentation is essential.

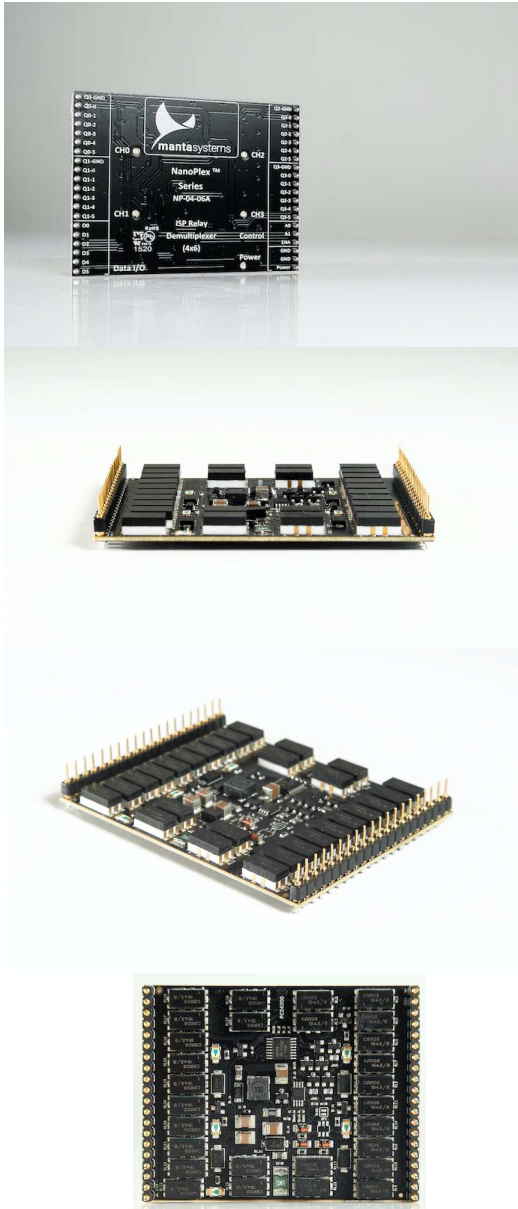
► **Minimum cost for documentation (16 hours): USD 800.**

## Final considerations

Undeniable advantages of ready-to-use, off-the-shelf vs. home-made swiching systems are:

- More convenient cost, at least 50% off vs. ready-to-use tools
- Higher compactness
- Higher reliability
- Better documentation
- Earlier technical support
- Faster substitution in case of fault

# Introducing Manta Systems NanoPlex™



## Typical application

- PCBAs production lines
- ATE-controlled ISP programming
- Hi-number of paneled PCBAs requiring ISP-Programming

## General characteristics

- Part of Manta Systems' acclaimed NanoPlex Series of Relay Demultiplexers
- Ultra-small size, only 51.0 x 66.5 mm
- Designed for piggyback mounting, takes easily place in your Test Fixture
- NanoPlex is universal and compatible with all types of ISP-Programming tools

## Benefits

- Very simple implementation of ISP programming to panels of PCBAs.
- Multiply the number of your ISP-Programmer channels for sequential device programming.
- Provides galvanic isolation of your ISP programmer to target boards.
- Ready to use Relays Demultiplexers save days/weeks of your workmanship when creating home-made systems.
- Higher reliability, no need to wait long time in case of system fault.

## General description

NPS-06-01-04A Universal ISP Relay Demultiplexer allows you to multiply the number of channels of your ISP-Programmer by a factor of four with a galvanic isolation.

The number of signals of any relays-switched-channel is six. You can address one of the four channels by using A1, A0 input control signals.

ENA is also present and allows you to un-connect all relays-switched channels from you target PCBA.

*“NanoPlex™ brings the Total Cost of Ownership at the industry lowest, while mantaining high quality standards”.*

## Recommended Readings / Further Documentation

- ▶ DC04023 NanoPlex NPS-06-01-04A Data Sheet
- ▶ DC04016 NanoPlex NPS-06-01-04A Flexibility Application Note

## About Manta Systems

Manta Systems is a high-tech company, global leader in high-density signal switching for In-System Programming (ISP) and Testing Systems. The company targets the electronic boards assembly market, where a high number of connections is required. Manta Systems flagship product is NanoPlex™, a series of Channels Multipliers for In-System Programming (ISP) and Testing instruments. NanoPlex is the **world's first universal tool** providing end-user with the possibility of having compact, easy-to-use, professional, reliable In-System Programming (ISP) and Testing Channel Multiplication functionality.

## Warranty

All Manta Systems products are covered by a **three-year warranty** against defects and workmanship from the purchase date. The warranty only covers products when properly installed and used.

## Orders

All NanoPlex™ Series products are generally **off-the-shelf**.

Shipping is within **24 hours** from order reception.

**Free shipping** & 30-day money back guarantee.

## Disclaimer

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