Technical White Paper

The Review of IoT-500, a Handy, Flexible Little Panel PC for Visualizing, and Responding to, What the Internet of Things is Doing

ARBOR Technology modestly calls their new IoT-500 a "5-inch RISC-based Panel PC." They also call it an HMI panel, where HMI stands for Human Machine Interface. It's both of these, but it's really a whole lot more. ARBOR goes on to say that the IoT-500 provides great flexibility and compatibility "no matter what system you need to control or monitor." And that gets to what the IoT-500 is all about. It's a neat way for people to interact with the emerging Internet of Things.

The Internet of Things, or IoT, of course, is the hugely promising vision of a world where internet communication is no longer limited to people communicating with people or machines with machines, but where "things" communicate as well. These things — vehicles, doors, wash machines, fuel injectors, locks, cameras, or entire offices or homes — collect data via sensors, and then pass that data on for information, processing and action.

The ARBOR IoT-500's role is to display data from all sorts of sensors, and, if need be, allow human feedback. Easy as that. And very important.

So what does such a miraculous box look like, and what's in it? It's small, just 5.9 x 4.3 inches, and only weighs 13 ounces or so. It technically *is* a little panel PC, but one that runs Android 5.1 and has a very nice 5-inch screen with capacitive multi-touch. And just like in any modern smartphone, flush glass extends well beyond the perimeter of the LCD screen, so that your fingers can easily operate it without bopping into a frame.

Turn the little device around, though, and it shows its industrial side. There are full-size PC ports and industrial block connectors. The picture below shows what the IoT-500 looks like from all sides.

The connectors along the bottom are familiar: a couple of USB 2.0 ports, an RJ45 LAN jack for Ethernet, a legacy DB9 serial port that's software switchable to RS232, RS422 and RS485. The green industrial-looking terminals on the right side are for power (the IoT-500 doesn't have a battery), and for digital I/O and a CAN Bus and OBD-II interface. Digital I/O lines can be used to interact with all sorts of equipment and sensors. CAN Bus is an electronic bus standard for vehicles, and OBD-II is a standard interface for onboard diagnostics. A vehicle dock and screw-on antennae are optionally available.

To stay on the technical side of things for a moment, the ARBOR IoT-500 is powered by a dual-core MediaTek MT2601 System on Chip, which the company calls an IoT solution chipset. There's 512MB of RAM, 4GB of onboard eMMC storage, a frontal 2mp camera, GPS, Bluetooth 4.1, state-of-the-art 801.11a/b/g/n/ac WiFi, and optional mobile Broadband. Below is what it all looks like inside:
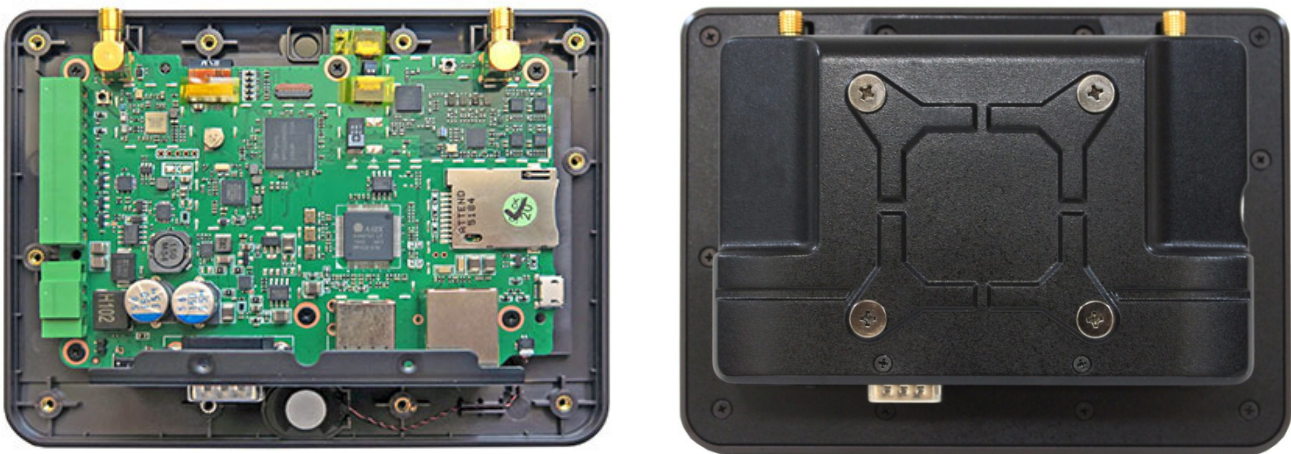
The picture on top of this article gives you an idea of what ARBOR has in mind with the IoT-500. It can be connected, directly or wirelessly, to all sorts of vehicular, commercial, and industrial equipment, and act as an instrument panel or dashboard for them. Thanks to its bright, high-res 960 x 540 pixel display (that's 220 ppi, as good as a "retina" Apple iMac or MacBook), the IoT-500 can display detailed, complex systems data and sensor readings. And thanks to its projected capacitive touch interface, it allows for easy human monitoring, interaction, response, and control.

The IoT-500 isn't a mobile device in the sense that people carry it around, but it's certainly mobile in vehicles. So ARBOR gave it a wide 14 to 122 degree Fahrenheit (-10 to 50 degrees Centigrade) operating temperature range. The front panel is IP65-sealed, which means it's totally immune to dust and can also handle low pressure water jets. Drop spec isn't important in a device like this, but we'd like to see vibration resistance data in the specs.
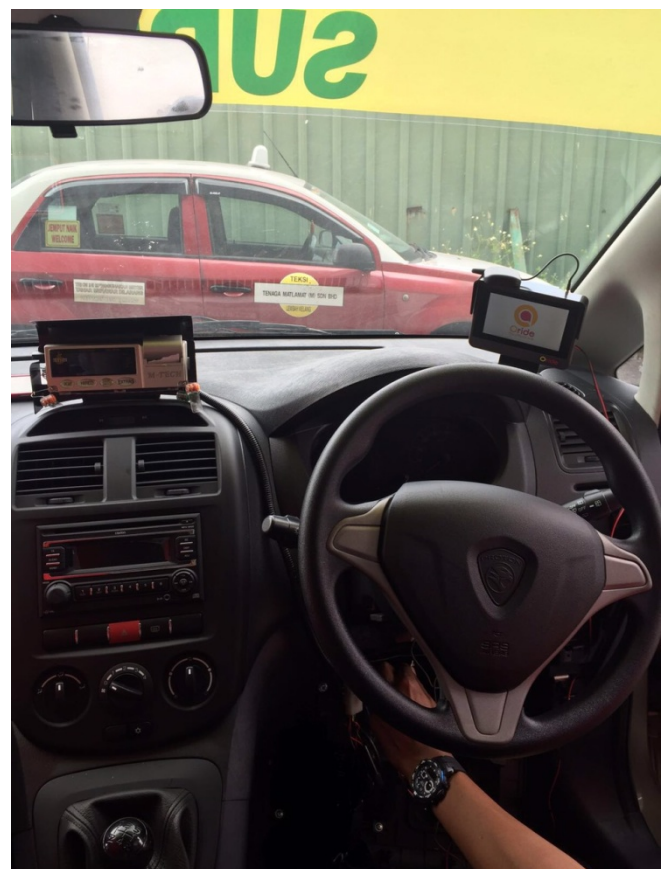
Where can it be used? Almost anywhere. The polymer plastic housing is quite tough. It has a VESA 50 x 50 mm screwhole pattern on its back, which means that there's a limitless number of mounting solutions available for it. Since it's designed like a little panel computer it can also easily be integrated into a dash or panel anywhere.

An application example is shown in the sidebar. In a Southeast Asia metropolitan area, an ARBOR GPS-based in-vehicle solution with ARBOR IoT-500 units lets dispatchers assign taxi requests from call centers faster and more accurately, allocating them to the nearest available taxi drivers, and allowing drivers to immediately respond to bids for ride orders and locate their prospective passengers within the nearest pick-up points through GPS.

So that's ARBOR's IoT-500. It's clear that this clever little window into the Internet of Things can be used in a myriad of different ways. A sample app on our eval showed how the IoT-500 can search for, receive and display input from a great variety of sensors: heart rate, bikes, watches, fitness equipment, blood pressure, scales, temperature, vehicular, speed, pressure, acceleration, geocache, audio devices, remote controls, and so on.

The opportunities are endless.

Specifications ARBOR IoT-500

Status	Added 03/2016
Form-factor	Mini-Panel PC
OS	Android 5.1 "Lollipop"
Processor	Dual-core Mediatek MTK MT2601 ARM Cortex-A7
CPU Speed base	1.0GHz
Graphics	ARM Mali-400 MP GPU
tandard/Max RAM	512MB LPDDR2
Disk/drive	4GB eMMC
Card slots	1 x miniSIM card
Display type	TFT LCD
Display size/resolution	5.0-inch, 960 x 540 pixel (220 ppi)
Digitizer/touch	5-point projected capacitive touch
Operating temperature	14° to 122°F (-10° to 50°C)
Sealing	IP65 (front bezel)
Vibration	Unknown
Humidity	10 to 95% non-condensing
Shock	Unknown
Housing	Polycarbonate, wall mount and 50 x 50mm VESA mount
Size (WxHxD)	5.9 x 4.3 x 1.45 inches (149 x 110 x 37 mm)
Weight	0.78 lb
Power	12VDC to 24VDC (auto-detected)
Camera	Front: 2.0mp
Sensors	Magnetometer
Interface	2 x USB 2.0, 1 x RJ45 10/100, 1 x RS232/422/485, 4 x DIO, 1 x CAN 2.0b/OBD-II, Bluetooth and 3G antenna, 0.8 watt speaker
Wireless	802.11a/b/g/n/ac WiFi plus Bluetooth 4.1 + HS, GSM/GPRS/EDGE, 3G WCDMA/HSPA, GPS/GLONASS/Beidou
List price	Inquire
Web	ARBOR IoT-500 product page
Data sheet	ARBOR IoT-500 spec sheet
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(by Conrad H. Blickenstorfer from RuggedPCReview)

About ARBOR

ARBOR Technology Corp., founded in 1993, is a leading provider of Smart City and IoT solutions. With more than 20 years of experience in providing customer-driven, high performance, and industrial strength computing solutions in various industries. ARBOR strives to provide a complete solution from board to system, computing to communication in healthcare, transportation, industrial automation, mobile computing, digital signage, retail, intelligent building and home. ARBOR is ISO-9001, ISO-13485 and ISO-14001-certifiied and commits to deliver high quality products with international standards and well-defined production process. More information about ARBOR is available at www.arbor-technology.com