



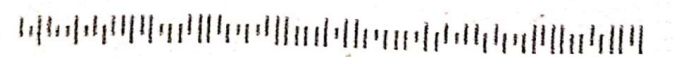
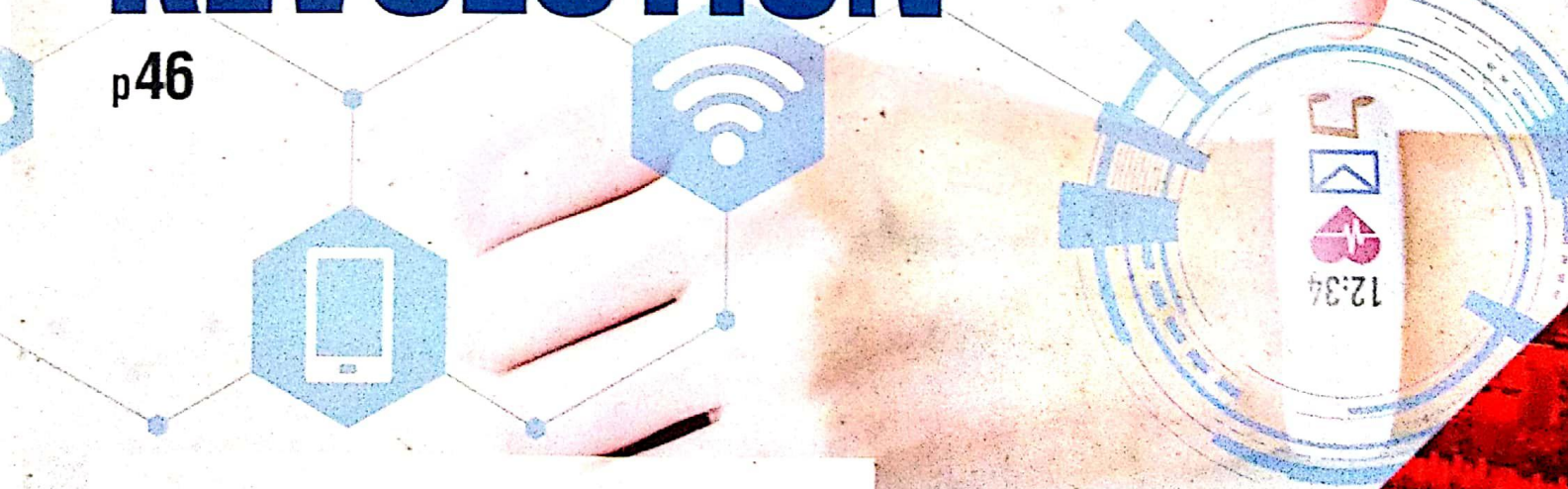
Machine Design®

THE PREMIER RESOURCE FOR THE MULTI-DISCIPLINED DESIGN ENGINEER

MARCH 2019 machinedesign.com

The IoT's HEALTHCARE REVOLUTION

p46



AUTO**S-DIGIT 90745 MIX COMAIL #1100052640/0# 0 MRS MCH001 P37 15 10514 164147 MARITE VARGAS BEN SIMBORIO 2131 MARBELLA AVE CARSON CA 90245-1339



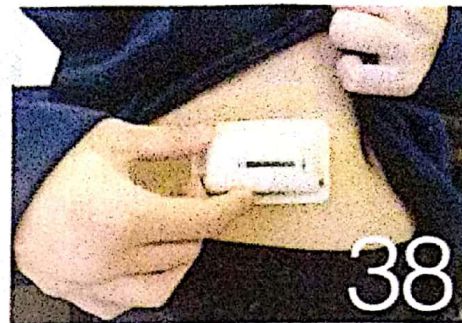
Access to 8.5 Million+ Products Online

DIGIKEY.COM

IN THIS ISSUE

FEATURES

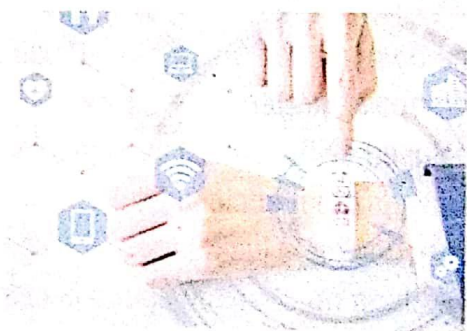
- 38 MD&M 2019: Medical Materials**
Materials take on new challenges in the medical industry as companies exhibiting at this year's MD&M educate us on what is needed.
- 44 11 of the Best Images from the 2019 Medical Design & Manufacturing West Conference**
MD&M hosts several thousand medical exhibitors and holds the largest MedTech conference in North America.
- 46 The IoT Ushers in a Healthcare Industry Revolution**
Introducing IoT as a platform and concept has redefined the machine-to-human (M2H) interaction for efficient healthcare facilities—and increased the vulnerability to hackers.
- 51 Is Vibration Detection the Canary in the Mines for Manufacturing?**
Keep excess vibration in check using IIoT-enabled condition-monitoring sensors.
- 56 Designing with Motion Control in Mind**
What OEMs and design engineers need to know about motors, drives, and controllers.
- 64 Will Commercial Cloud Providers Increase the Cost of Federal Data?**
If federal agencies choose to save money by putting data (and lot of it) on commercial services, will the cost of that data go up and its use decline?
- 67 Book Review: Simplify Work**
As new technology such as the IoT creates more complex systems, simplifying work will take on greater value.
- 70 Advancements in Robotic Safety**
Collaborative and traditional robots have safety limitations, but can you get the best of both worlds?
- 72 11 Myths About Additive Manufacturing, Part 1**
AM is surrounded by much hype, but are you getting the whole story?



38



44



46



51



DEPARTMENTS

- 4 ON MACHINEDESIGN.COM**
- 12 NEWS**
- 77 AD INDEX**
- 78 CLASSIFIEDS**

COLUMNS

- 6 EDITORIAL**
It's That Time Again: The Fourth Annual Engineering Bracket Challenge
- 80 R&D—PRODUCT DEVELOPMENT**

JOIN US ONLINE

-  twitter.com/machinedesign
-  facebook.com/MachineDesignMagazine

Printed in U.S.A., Copyright © 2019, Informa Media, Inc. All rights reserved. MACHINE DESIGN (ISSN 0024-9114) is published monthly by Informa Media, Inc., 5000 Market Ave., Overland Park, KS 66212. Paid subscriptions include issues 1-12. Rates: U.S. \$130/year, \$190/two years, Canada/Mexico \$150/year, \$230/two years. All other countries \$180/year, \$260/two years. Cost for back issues are U.S. \$10 (US per copy plus tax, Canada \$11.00 per issue)

plus tax, and \$17.00 per issue. OEM Handbook and Supplier Directory \$50.00 plus tax. Project subscription Informa Media Inc. MACHINE DESIGN, P.O. Box 2100, Dulles, VA 20116. Periodicals postage paid at Kansas City, MO and additional mailing offices. Can GST #R126411984. Canadian Post Publication Mail Agreement No. 89617638. Canada return address: MCK Group (Canada), P.O. Box 10540, Toronto, ON, M5C 1B5

Digital subscription rates: U.S. \$69/year, Canada/Mexico \$79/year. All other countries \$99/year. Print/Digital combo subscription rates: U.S. \$174/year, \$248/two years, Canada/Mexico \$199/year, \$270/two years. All other countries \$249/year, \$374/two years. POSTMASTER: Send change of address notice to Customer Service, MACHINE DESIGN, P.O. Box 2100, Dulles, VA 20116-2100.

(Continued from page 45)

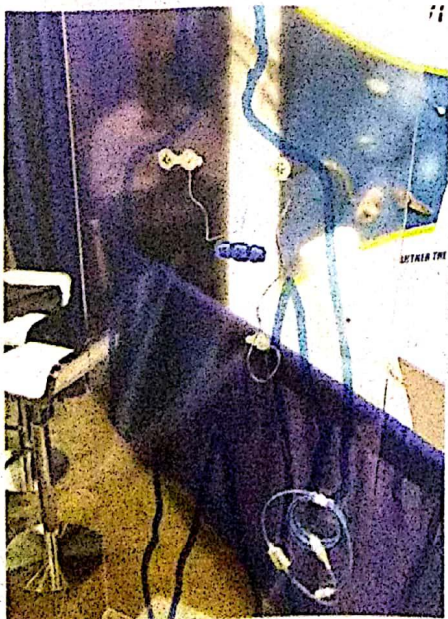


TE Connectivity offers virtual training for surgeons.

lated models and real-world controllers for surgeons to hone their accuracy and steady their hands. They simulation tool here was built in partnership with 3D Systems and Symbionix.

BIOMEDICAL INNOVATIONS

IoT healthcare applications will require massive data from patients to help improve their medical treatments and provide doctors with enough information to advance patient care. Custom wearable devices like the ones from BioMedical Innovations adhere to the skin, with the ability to collect information from the patient and transmit remotely. The sensors can adhere to the skin like tape or even via a temporary tattoo process.



BioMedical Innovations offers adhesive sensors for patient monitoring.




3D printing anatomical models with Stratasys.

STRATASYS

3D printing has opened the door for a more detailed type of medical analysis. Taking information from x-rays and CAT scans, digital modeling tools can help produce 3D-printed models of a patient's inner organs and bone structure for doctors to analyze. Above is a sample set of anatomical correct models 3D printed by Stratasys. The heart model, for example, was printed on a J750 3D printer and offers more than 360,000 colors, including realistic texture finishes.

3D SYSTEMS

The model below doesn't appear like your normal human skeleton structure. That is because it has been overlaid with surgical guides for future operations. The white guides located on the forearm, head, and leg are 3D printed and help surgeons know exactly where to cut when they are in the operating room. 3D printing technology allows surgeons to be more accurate and precise with their surgical procedures. 



3D Systems offers complete human 3D printing tools for surgery.

Ad Index

ACE CONTROLS	23
AEROTECH INC.....	42
ALLIED ELECTRONICS.....	33
ALTECH CORP	1,47, 49
ALUMA CAST INC.....	62
AMACOIL INC	14
APPLIED MOTION PRODUCTS	27
AURORA BEARING CO.....	16
AUTOMATION24 INC.	IBC
AUTOMATIONDIRECT.COM	IFC
BANNER ENGINEERING CORP	37
BRAXTON MANUFACTURING	76
CAPLUGS.....	43
CARLO GAVAZZI AUTOMATION COMPONENTS ..	22
CLIPPARD INSTRUMENT LAB INC.....	39
COMSOL INC.....	35
CONTITECH	71, 73, 75
DIGI-KEY.....	5
DUER/CAROLINA COIL.....	52
DURA-BELT.....	50
EAGLE STAINLESS TUBE CORP.....	53
EBM-PAPST	10
EMERSON	15
EXAIR CORPORATION	13
FABCO AIR, INC.....	20
HARMONIC DRIVE.....	69
IGUS INC.....	3
IMI PRECISION ENGINEERING.....	79
INTECH POWERCORE CORPORATION.....	59
JOB SHOP SHOWS, INC/THE EDWARD	BELL / BAND
KNF NEUBERGER INC	41
KWIK MARK, INC.....	52
LAPP USA	21
LEMO USA INCORPORATED.....	60
LIN ENGINEERING.....	31
MASSA PRODUCTS.....	63
MAXON MOTOR USA	54
MICROMO ELECTRONICS	34
MOLON MOTOR & COIL CORP.....	55
MW INDUSTRIES	26
NABEYA BI-TECH KAISHA.....	61
NB CORP	17
NOVOTECHNIK.....	59
ONDRIVES US CORP	66
ORIENTAL MOTOR USA CORP	25
PAVE TECHNOLOGY CO	58
PHOENIX CONTACT.....	29
PYRAMID INC	30
REELL PRECISION MANUFACTURING	50, 75
ROLLON.....	9
ROTOR CLIP CO	57, 68
SEW EURODRIVE	BC
SIKA USA, INC.....	75
SMALLEY STEEL RING CO	65
SOLENOID SOLUTIONS, INC	6
SPIROL INTNL CORP.....	8
SYMMCO INC	73
TADIRAN LITHIUM BATTERIES	19
TECH-ETCH INC.....	74
THE LEE COMPANY.....	7
TRIM-LOK INC	40
XOMETRY	28