Machine to Machine
T E C H N O L O G Y   G U I D E

Data Capture & Forward

Your Devices & Data

- Transportation
- Energy
- Financial / Retail
- Healthcare
- Remote Monitoring

Routers & Modems

MultiTech® Systems

Open Communications Gateways

Asset Management Platform

Insight + Action + Control

- Real-Time Management
- Alerts
- Reports

Application Hosting

Multi-Tech can enable your remote devices with communications capability so you can have instant insight, take appropriate action and efficiently maintain control of your solution.
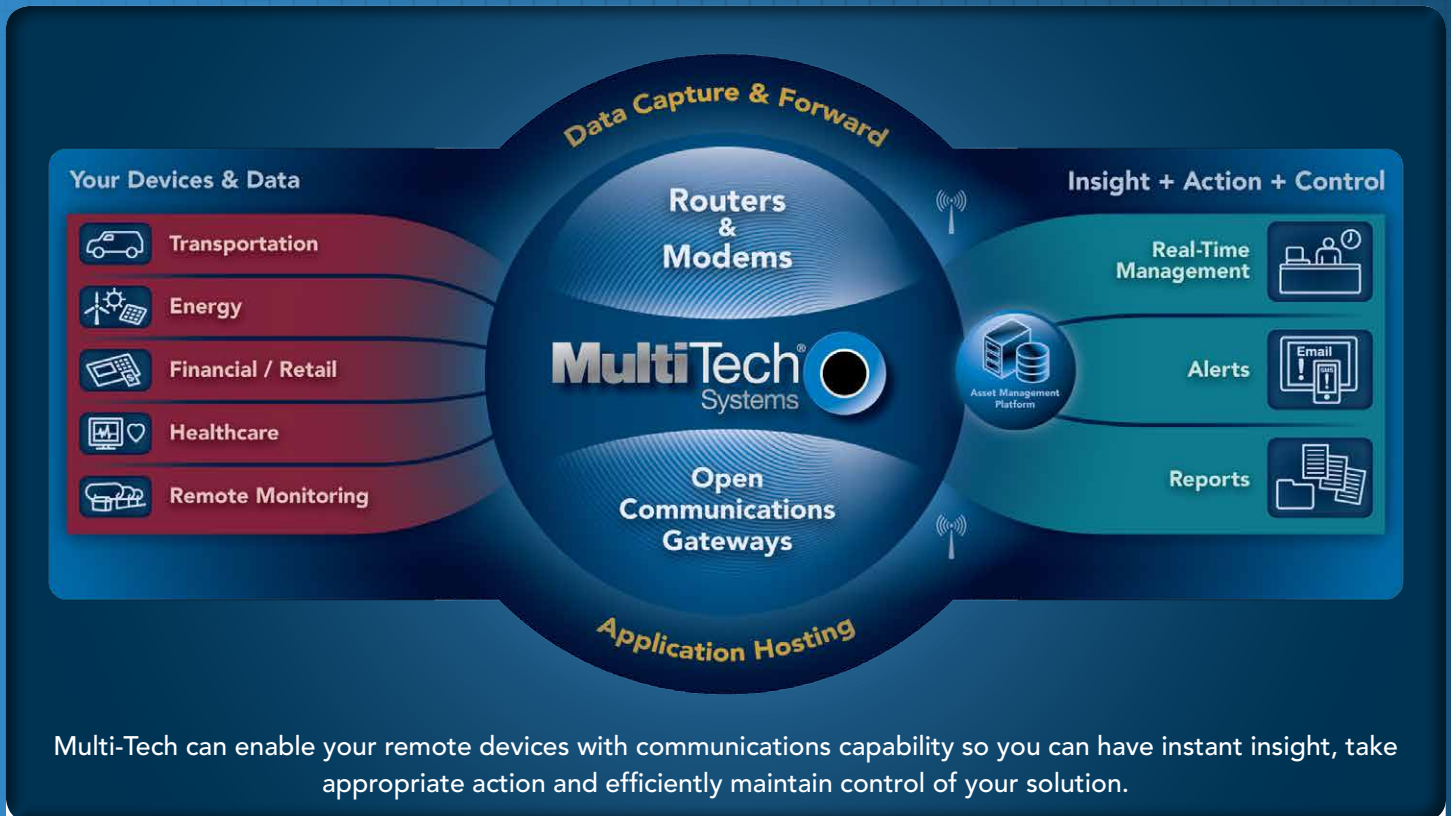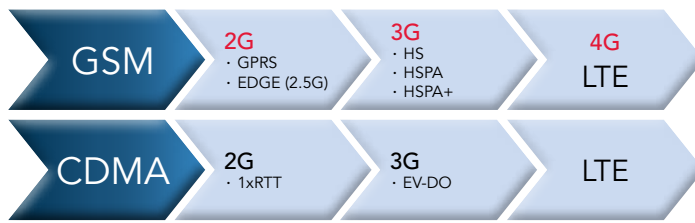
Minimize the Complexity of M2M

The ability to monitor and manage remote assets in real-time holds many benefits. Integrating wireless communications can improve device functionality, facilitate better and faster decision-making, enhance services and reduce costs. It can also take you down an unfamiliar path of selecting carriers, certifications, hardware, and solution integration, which all play a role in cost-effectiveness, time-to-market, and the amount of risks at stake.

Understanding some of the fundamentals upfront can help enable quicker deployments and minimize total cost of ownership. This guide will arm you with some of the essentials to get you moving in the right direction. Working with Multi-Tech is the first step in making M2M Simplified™ for your solution.

Selecting Your Wireless Connectivity

GSM and CDMA are the two primary cellular technologies available today. Each of these technologies was initially deployed as a voice network by independent Mobile Operators in the 1990s. Since then, data functionality has been added allowing Mobile Operators to offer mobile-to-Internet communications for PCs, laptops and other devices. Deciding whether to use CDMA or GSM is often determined by which carrier you intend to use, their coverage area and the geographic locations in which your solution will be deployed. Whether you need 2G or 3G depends on the amount of data being sent and the time window within which the data must be sent or received. LTE is a newer technology for M2M data applications. As coverage area improves and module costs decrease, it will become more relevant for M2M applications. However, the vast majority of M2M applications do not need LTE speeds.

GSM **2G** · GPRS · EDGE (2.5G)   **3G** · HS · HSPA · HSPA+   **4G** LTE

CDMA **2G** · 1xRTT   **3G** · EV-DO   LTE

Wireless Mobile Operators & Modem Approvals

Multi-Tech's cellular modems are approved by regulatory agencies and mobile operators and considered complete end-product modems. The table below lists the industry requirements against which Multi-Tech modems have been approved and the Mobile Operator networks on which Multi-Tech has been certified. It also outlines any additional OEM actions that are required to take a device to market.

GSM Top Carriers	Technologies Supported	Multi-Tech Product Certifications
North America		
AT&T	GSM/GPRS (2016)*, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, LTE	FCC, PTCRB, AT&T Carrier approval
T-Mobile	GSM/GPRS (2016), EDGE, UMTS, HSDPA, HSUPA HSPA, HSPA+, LTE	FCC, PTCRB, Carrier approval not required
Rogers	GSM/GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, LTE	IC, PTCRB, Rogers Carrier approval on some Multi-Tech models
Bell Mobility	UMTS, HSDPA, HSUPA, HSPA, HSPA+, LTE	IC, PTCRB, Bell Carrier approval on some Multi-Tech models
Telus	UMTS, HSDPA, HSUPA, HSPA, HSPA+, LTE	IC, PTCRB, carrier approval not required
Europe		
Vodafone	GSM/GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, DC-HSDPA, LTE	Carrier approval not required
Telefonica	GSM/GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, DC-HSDPA, LTE	Carrier approval not required
Deutsche Telekom	GSM/GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, DC-HSDPA, LTE	Carrier approval not required

*AT&T has committed to 2G until 2016

CDMA Top Carriers	Technologies Supported	Multi-Tech Product Certifications
North America		
Verizon	1xRTT, EV-DO, LTE	FCC, CDG 1 & CDG 2, Carrier Approval – ODI Verizon
Sprint	1xRTT, EV-DO, Wi-Max, LTE	FCC, CDG 1 & CDG 2, Carrier Approval – Sprint

Cloud Partners

Cloud platforms can simplify the development and deployment of your M2M solution. A cloud platform quickly provides you the ability to manage your remote assets, collect statistics, create alerts when events occur and generate reports, among other tasks. You can quickly customize your solution to fit your needs, eliminating the need to develop the solution from the ground up. Multi-Tech has relationships with top cloud platform companies. This means our products work seamlessly with theirs, which further simplifies the M2M development process.
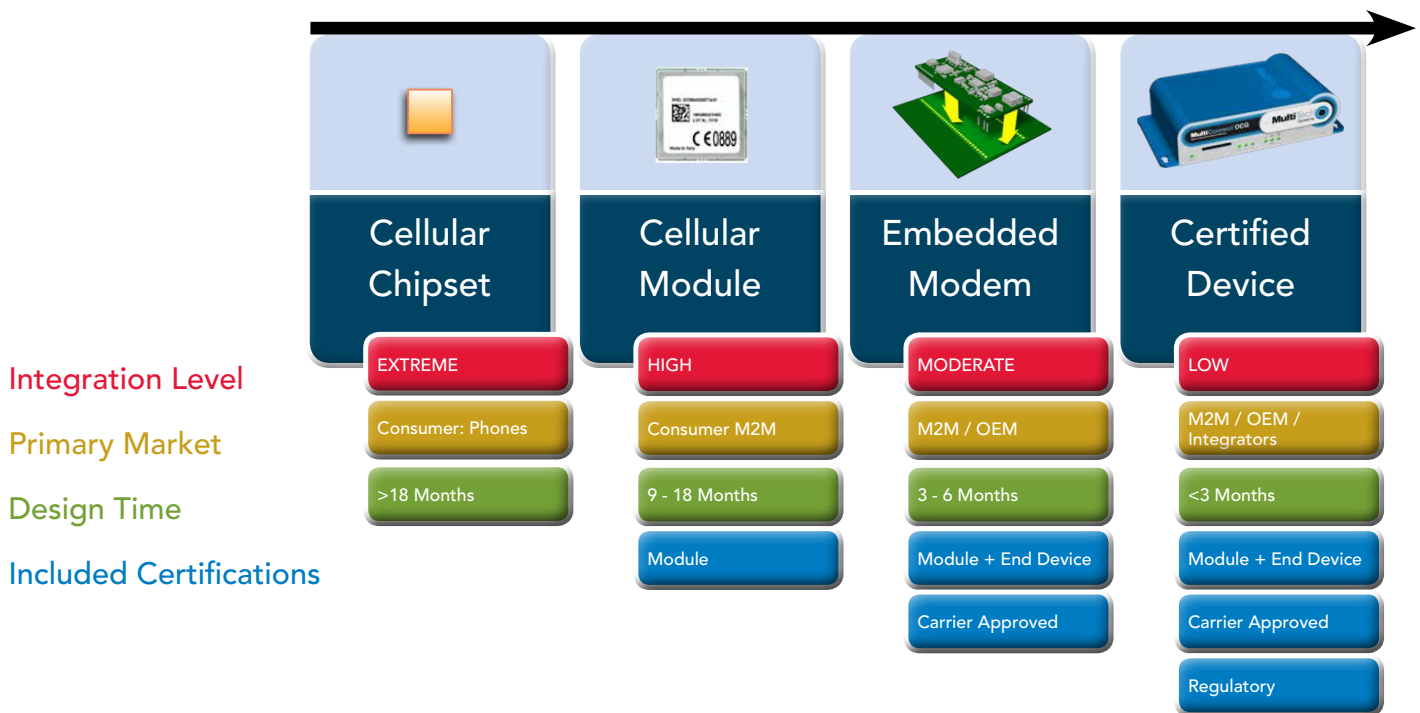
Mobile Virtual Network Operators (MVNOs)

An MVNO is essentially a Mobile Operator that does not own its own spectrum, but has its own network infrastructure. MVNOs focus on enabling customers with data communications over cellular networks. Multi-Tech has partnered with the leading MVNOs to provide design and implementation expertise for quick activation of customer solutions.

MVNO	GSM (US)	Global GSM	CDMA
M2M Air by Telit	AT&T	Vodaphone (UK), Telefonica	Sprint/Verizon
Wyless	T-Mobile	Rogers (Canada), Telefonica, O2	Sprint/Verizon
KORE Telematic	AT&T		Sprint/Verizon
Aeris*	T-Mobile	Rogers (Canada), Telefonica, O2	Sprint, Verizon, US Cellular and more
Wireless Logic	AT&T	Vodafone, O2	Sprint
Wyless	T-Mobile		Sprint/Verizon

* Aeris is considered a dedicated M2M Carrier, as it has its own CDMA infrastructure, with Radio Access Network through Sprint. Aeris optimizes data and voice transmission through its cellular infrastructure on Sprint, Verizon, US Cellular and 50+ roaming partners. Aeris offers GSM solutions as an MVNO, supporting T-Mobile and 80 countries internationally through Rogers, Telefonica and O2.

Cellular Technology Options for Your M2M Connected Product Strategy

	Cellular Chipset	Cellular Module	Embedded Modem	Certified Device
Integration Level	EXTREME	HIGH	MODERATE	LOW
Primary Market	Consumer: Phones	Consumer M2M	M2M / OEM	M2M / OEM / Integrators
Design Time	>18 Months	9 - 18 Months	3 - 6 Months	<3 Months
Included Certifications		Module	Module + End Device	Module + End Device
			Carrier Approved	Carrier Approved
				Regulatory

Which Cellular Solution is Best for Your Solution?

The table above outlines cellular technology options and the needed level of expertise (Integration Level), the primary market or use, and the approximate design time needed for each. In addition, each technology option carries a different level of approvals and certifications; a Cellular Chipset will need to undergo many more approvals and certifications, while the Certified Device is already pre-approved and is ready-to-deploy. The most appropriate cellular solution for your project will be clear when you ask the following questions:

- What is your volume?
- How quickly do you need to get to market?
- What's your appetite for risk?
- Do you have cellular integration and hardware design knowledge in-house?
- What's your experience level dealing with regulatory certifications and carrier approvals?

M2M Innovation Since 1970

1968 • CarterFone decision allows non-AT&T devices access to telephone lines. Dr. Raghu Sharma took $300 of savings, purchased supplies and headed to a University of Minnesota student workshop to make an acoustic coupler.

1970 • Multi-Tech Systems was founded and incorporated by Dr. Raghu Sharma.

1976 • Introduced first direct-connect modem.
 1979 • First year to hit $1 million in sales

1982 • Multi-Tech awarded first patent.

1985 • MultiModem® modem line was introduced. Started to ship internationally.
 1991 • Fax capabilities added to modems
 1992 • Produced millionth modem
 1996 • Landed IBM and Xerox as customers

1999 • Embedded line introduced.
 2002 • *"Most Innovative Company Award" - Inc. Magazine*
 2003 • Introduced cellular modems

2004 • FaxFinder® fax server introduced.
 2004 • 800,000+ units sold and produced this year

2005 • Lead-free electronics manufacturing implemented. (RoHS and C-RoHS directives, WEEE Statement and WEEE Certificate)

2007 • Pat Sharma succeeded Dr. Raghu Sharma as President and CEO.

2008 • Intelligent SMS server and new line of intelligent cellular modems introduced. Multi-Tech named a Women's Business Enterprise by the WBENC, which opens doors to companies with diversity in supply chain purchasing guidelines.
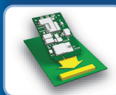
2010 • Open Communications Gateways introduced. Developers can now embed applications directly on Multi-Tech's industry-leading hardware.
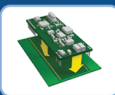
Today 22+ million devices deployed and thousands of customers worldwide, Multi-Tech holds more than 80 patents and has earned certifications from more than 30 carriers and over 80 countries.

Product Portfolio

PCIe Express	SocketModem	USB Modem	Cellular Modems	Cellular Routers	Application Platforms

Multi-Tech Systems Products Make M2M Simplified

All Multi-Tech solutions are carrier approved and ready-to-integrate, providing the quickest way to get to market. Multi-Tech's embedded modems are approved as end solutions by carriers, providing a quick-to-market option for higher volume new products and a cost-effective migration path for next generation products.

M2M Simplified.
Innovative Designs, Innovative Solutions.

Multi-Tech Systems has been delivering industry-leading M2M (machine-to-machine) communications solutions since 1970. With more than 22 million devices deployed worldwide, Multi-Tech focuses on helping customers achieve the shortest path to M2M connectivity – from concept to implementation. Whether a project is simple or very complex, Multi-Tech has the resources and expertise to work with any development team to customize a hardware or software solution that maximizes speed to market and return on investment. With carrier-approved routers, modems and gateways, Multi-Tech makes it easy and fast to connect your device to networks anywhere in the world. We offer cellular, analog, Bluetooth® and GPS capabilities with customer solutions in many vertical markets, including healthcare, energy, financial and transportation. Multi-Tech has made M2M Simplified for thousands of customers around the globe. For more information, visit www.multitech.com.

bsi. ISO 13485 Medical Devices Quality Management
FM 586973

bsi. ISO 9001 Quality Management
FM31060

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