

*INNOVATIVE, RELIABLE AND CUSTOMIZED
RF CONDITIONING SOLUTIONS*



TX RX® ADVANTAGES

Experience: TX RX developed the T-Pass® transmit combiner and Auto-Backup® tower top amplifier (TTA) in 1976. Since then, we have been the premier provider of standard and custom radio frequency (RF) conditioning solutions to the land mobile radio (LMR) market in VHF, UHF, 7/800 MHz and 900 MHz bands.

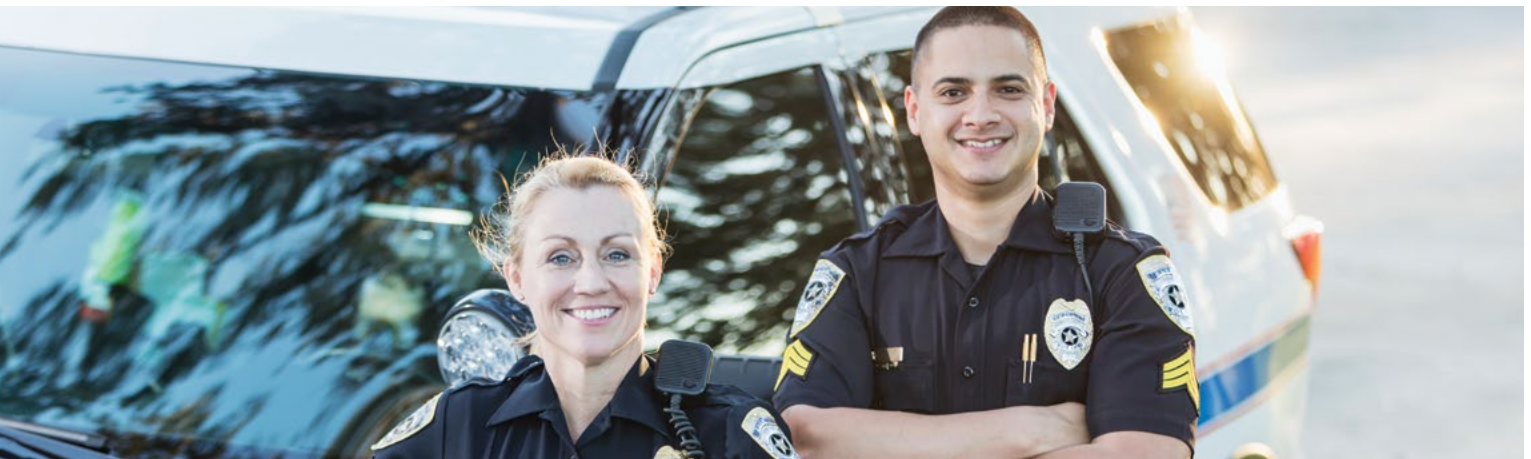
Stronger than Ever: In 2018, TX RX separated from Bird Technologies Group and joined forces with Combilent, a leading RF conditioning product supplier based in Denmark. Together, we offer a deep and broad solution portfolio for both the original equipment manufacturer (OEM) and field engineering markets worldwide.



Broad Portfolio: TTA systems | transmit combiners | receive multicouplers | duplexers | filters | antennas | remote power monitoring | RF components: power attenuation and dividing, termination, and coupling | field services: retune and reconfiguration, spectrum and noise monitoring and analysis, and interference mitigation.

Customization and Versatility: Solutions are customized to meet unique needs and address difficult frequency challenges. The combination of our engineering expertise, a proprietary software tool that streamlines the design process, and our ability to mix different filter types and sizes, allows us to produce solutions that are of exceptional performance and value.

Quote Speed and Accuracy: Our consultative sales approach and quotation process ensure quotes are accurate and delivered quickly.



Prompt Delivery: System lead times are short due to a highly cross-trained and flexible workforce, continuous process improvement, long-term supplier partnerships, and inventory programs.

Quality and Reliability: Our solutions work right out of the box, and they are known for their longevity (we have many systems that have been in service for 20 – 40 years). This is due to the quality processes we have been implementing since 1976 and the continuous improvements we make as part of ISO 9001:2015.

Innovation: TX RX has some of the smallest and most integrated combiners, filters and duplexers on the market. Integration equates to product durability due to fewer points of failure.

Forward Thinking: Transmit and receive antenna line monitors remotely and continuously measure antenna performance. This results in fewer truck rolls to LMR sites, enhanced ability to address degrading trends, and higher customer satisfaction.

Teamwork: Since the core of our operation is in one facility in Angola, NY, associates work closely together at every product stage – conception, design, production, testing and shipping – to ensure all solutions meet exacting standards. That is why the TX RX brand is synonymous with high quality and customer peace of mind.



CUSTOMER SATISFACTION

Exceptional product reliability, solution customization, and customer service have enabled us to develop long-standing partnerships with a broad range of LMR OEMs, two-way radio dealers and service shops, integrators, and radio system users.

“For over 25 years, TX RX Systems has been able to engineer, produce, and support an endless stream of custom and off-the-shelf solutions.... TX RX Systems gives us peace of mind that we know it will always work; we would never consider using another brand.”

– Mac McKnight, Vice President, Radio Communications Management, Inc., Portland, ME

“I always specify TX RX products to my customers. You have excellent customer support for both old and new systems. Your products are so versatile.”

– Scott Haner, VP, American Dynamics Group, Inc., Valdosta, GA

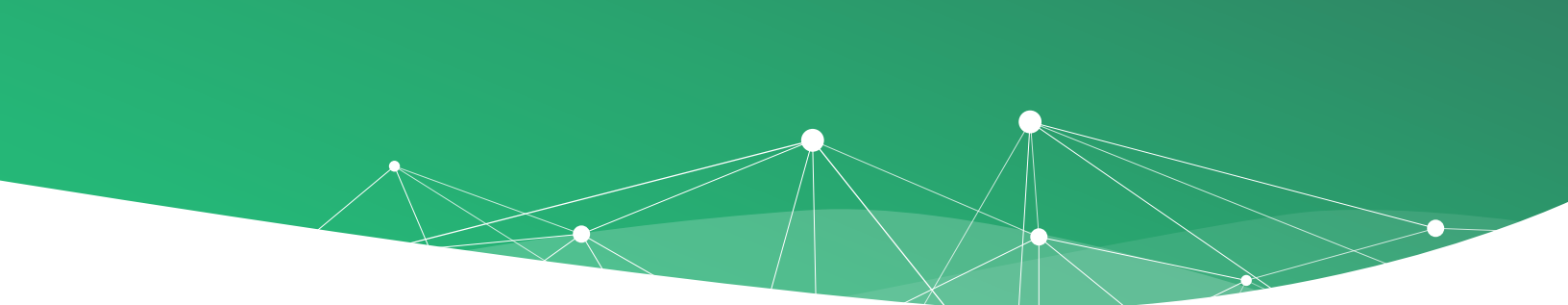
“We have worked with TX RX for over 15 years. The quality of their equipment and the flexibility to create complex combiner-multicoupler configurations have helped us provide solutions for many projects.... Their support is always outstanding.”

– Eugen Gheorghiu, VP of Engineering, American International Radio, Rolling Meadows, IL

“TX RX has been my go-to company for 25-plus years, not only for the quality products offered, but also for the responsive sales and engineering support.”

– Dennis Ondriska, Engineer, Chicago Communications, Elmhurst, IL





“Hurricane Electronics has relied on TX RX for our system combiners. Their products are always delivered on time! The quality and craftsmanship of not only their engineering, but appearance, makes TX RX the standard for Hurricane.”

– Jason Sims, Operations Manager, Hurricane Electronics, Mobile, AL

“Stolz Telecom has been using TX RX control station combiners and duplexers since our company was founded over 10 years ago. The products are always high quality and low maintenance. The sales and engineering staff are always friendly and helpful, and they are eager to help you find the best product for your needs.”

– Robert A Stolz, ENP, President, Stolz Telecom

“Marcus Communications has been an integral partner and user of TX RX products for over 44 years. We love the innovative T-pass design of combiners and multi-couplers. The flexibility of those products is one reason TX RX stands out above the competition.”

– Bruce Marcus, CTO, Marcus Communications, Manchester, CT

“We have 95 trunking sites and are growing every month. We primarily use TX RX combiners on our sites because they allow us to easily expand the number of channels at a site. We have around 300 cans of TX RX and they work great. Thanks for a great product, TX RX!”

– Jon Rock, President, Rock Communications, Fort Mill, SC



SOLUTIONS

Tower Top Amplifier systems increase receiver sensitivity, which improves wide-area LMR system coverage. Here are a few points about our new platform.

- ▶ Small and light units ease the installation process and reduce tower loading
- ▶ Powerful computing to support software that simplifies installation, optimization and maintenance
 - ▶ Auto set-up
 - ▶ Feedline resistance monitoring
 - ▶ High-level carrier detection
 - ▶ Continuous analysis of both amplifiers and automatic switching based on their performance
 - ▶ TTA autonomous operation in the unlikely event the control unit fails
- ▶ Low noise figure – less than 2.4 dB typical
- ▶ Enhanced lightning protection – 40 kA on the antenna port
- ▶ More information: [RX Sensitivity Improvement Products](https://txrx.com/products) at txrx.com/products



New Platform Tower Top Amplifier System

Receive Multicouplers allow multiple receive (Rx) signals to run through one Rx antenna, thus decreasing equipment, installation and maintenance costs.

- ▶ Compact size – 1 rack unit (RU)
- ▶ Broadband amplifiers cover an entire frequency band, accommodating any filter bandwidth
- ▶ Easily adjustable gain in increments of 1 dB through an electronic attenuator
- ▶ Quadrature coupled, low noise amplifier provides redundancy to ensure continuous operation
- ▶ Easily accessible port on the front panel to simplify testing
- ▶ More information: [RX Sensitivity Improvement Products](http://txrx.com/products) at txrx.com/products



1-Rack Unit Receive Multicoupler

Transmit Combiners allow multiple transmit (Tx) signals to run through one Tx antenna, thus decreasing equipment, installation and maintenance costs.

- ▶ Customized to meet your combining and filtering requirements
- ▶ To cost effectively achieve optimum performance, different filter types and sizes can be utilized in one system
- ▶ Daisy chained T-Pass combiners make it easy to add or replace channels
- ▶ Small cavity combiners include an integrated Tx antenna power monitor
- ▶ Each system sold during our 45-year history is saved in our database. Thorough record-keeping simplifies future system reconfiguration and expansion.
- ▶ More information: [TX Combining Systems](http://txrx.com/products) at txrx.com/products



12-Channel Transmit Combiner



8-Channel Short Haul Control Station Combiner



4-Channel Cavity Combiner, 2-Channel Expansion Module, and Integrated Power Monitor

Two-Channel Hybrid Combiner–Duplexers allow two pairs of Tx and Rx signals to run through one antenna.

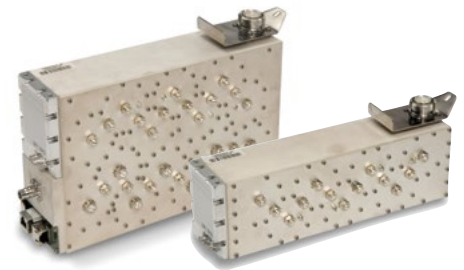
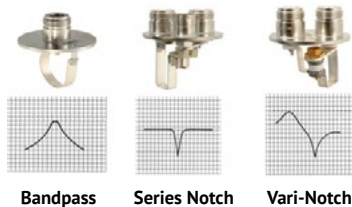
- ▶ More economical and easier to install compared to two duplexers, two antennas and two cables
- ▶ Compact – takes up a small amount of rack space (2 RU's, 19" wide, 15.8" deep)
- ▶ Low noise amplifier for maximum sensitivity
- ▶ Low insertion loss for the unit's small size
- ▶ More information: [TX Combining Systems](http://txrx.com/products) at txrx.com/products



2-Channel Combiner–Duplexer System

Filters prevent RF signals from interfering with the LMR system operation.

- ▶ TX RX is adept at designing solutions that eliminate the most severe frequency interference problems
- ▶ Bandpass, Vari-Notch® and Series-Notch® filters use the same cavities but with different coupling loops



Left: Milled Duplexer with Integrated Power Monitor and Receive Multicoupler
Right: Milled Rx Filter with Integrated Receive Multicoupler

- ▶ Optimal size-to-performance balance is achieved from using a mix of milled and traditional/separate cavities
- ▶ Milled filters are integrated with cables, components and connectors; integration means fewer points of failure
- ▶ More information: [Filter Products](http://txrx.com/products) at txrx.com/products



Duplexer with Vari-Notch Filters

Transmit and Receive Antenna Line Monitors remotely and continuously measure antenna performance. This decreases the number of truck rolls to LMR sites and increases the ability to address degrading trends before end users become aware.

Tx Antenna Power Monitor

- ▶ Monitors forward power, antenna return loss, temperature and door alarms
- ▶ Frequency selective power monitor (PM) is integrated into many UHF, 700 MHz, 800 MHz and 900 MHz combiners and filters
- ▶ Composite PM is included in some 700 MHz and 800 MHz Tx filters
- ▶ Stand-alone units available
- ▶ Locally tune a combiner while a system is live
- ▶ Data is accessed via an integrated web server, SNMP and SYSLOG
- ▶ More information: [RF Monitoring](http://txrx.com/products) at txrx.com/products

Rx Antenna Monitor

- ▶ Measures return loss at a customer-specified frequency, as well as board and room temperature
- ▶ Performs frequency sweeps of the Rx antenna
- ▶ Installed in-line with the Rx antenna
- ▶ Compact unit simplifies the design and installation process, and helps save rack space
- ▶ Data is accessed via an integrated web server, SNMP and SYSLOG
- ▶ More information: [RF Monitoring](http://txrx.com/products) at txrx.com/products



Stand-alone Frequency Selective Power Monitor with Ethernet Interface, Integrated Web Server, SNMP and Relay Alarm Output



Stand-alone Composite Power Monitor with Ethernet Interface, Integrated Web Server, SNMP and Relay Alarm Output



Stand-alone Rx Antenna Monitor with Ethernet Interface, Integrated Web Server, SNMP and Relay Alarm Output



SERVICES

Customized, Turnkey Configurations

RF issues are often quite complex. Sometimes our portfolio of standard products may not meet a customer's needs.

In those situations, our engineers will perform a customer needs analysis, gather data, conduct intermodulation studies, analyze transmitter noise and receiver de-sense, and then design a customized system to accommodate the unique needs of the project.

Systems are designed with our proprietary, computer-aided design tool, which streamlines the labor-intensive design process.

This approach, and our ability to mix different filter types and sizes, enables us to produce solutions that are second-to-none in performance and value.

Field Services help maximize LMR antenna site potential, eliminate RF signal and noise interference, and improve radio coverage.

- ▶ Retune/reconfiguration of existing RF conditioning equipment
- ▶ Spectrum and noise monitoring and analysis
- ▶ Interference mitigation
- ▶ Signal level mapping to diagnose the root cause of poor coverage
- ▶ More information: [Technical Services](https://txrx.com/services) at txrx.com/services

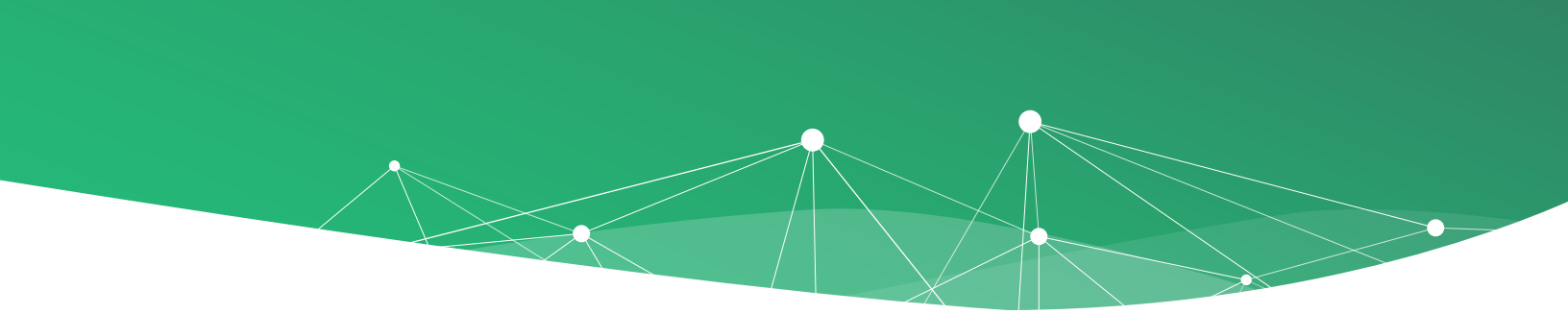
Other Services

- ▶ Telephone and field technical support, depot repair, spares programs, and service level agreements
- ▶ Training on RF fundamentals and all RF conditioning solutions
- ▶ Inventory programs to decrease short lead times further
- ▶ Racking and staging LMR systems, including customer-supplied equipment



TX RX Field Services Trailer





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