



* HIGH POWER MICROWAVE * POWER ELECTRONICS * HIGH VOLTAGE * LIQUID POWER COOLING *

TAILORED SUBSYSTEMS FOR AEROSPACE, DEFENSE AND MEDICAL SYSTEMS INTEGRATORS

From first article through large-scale production, ETM has the capabilities to meet your subsystem requirements. For over 30 years ETM has engineered a comprehensive set of building blocks. ETM combines these building blocks to perfectly fit your system needs and delivers a tailored subsystem at the price and level of quality you demand.

ETM's manufacturing facility is filled with proactive problem solvers who are experienced in tailoring our designs to fit unique system requirements. Tailoring Subsystems is ETM's core business, not just part of it.

Tailored means that you are in control from the beginning of how the equipment is delivered. A *Subsystem* implies that we are considering your larger system when designing and building the equipment. Along with electrical and RF performance characteristics, the following are typical requirements our customers have tailored:

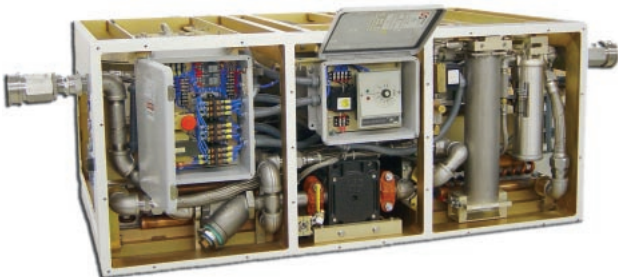
- * Exact size and shape of package (form & fit)
- * Locations of inputs and outputs
- * User and electrical interface
- * Specialized qualification and testing procedures
- * Color and Branding



APPLICATIONS

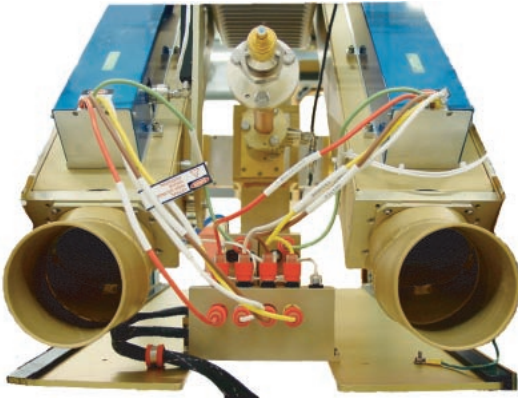
By creatively combining ETM's standard building blocks and providing unparalleled service and support ETM helps our clients successfully execute their missions. Achieving this goal results in subsystem solutions for a number of applications:

- * Radar, Threat Simulation and Jamming
- * Medical and Industrial
- * Instrumentation and Satellite Component Testing
- * Satellite, Deep Space and Troposcatter Communications
- * Automated Testing: TWT, Microwave Components, Power Supplies



Drawing from a toolbox of standard building blocks, ETM is able to offer tailored subsystem solutions quickly at the lowest possible cost. This approach takes these existing or slightly modified

HIGH-POWER MICROWAVE



1.0 - 2.5 GHz Pulsed TWT Power Combining

ETM has built high power transmitters around a wide variety of tubes. Each system is typically built for a tailored application and can then be replicated during production. ETM has built systems ranging from 100 MHz to 45 GHz with power levels up to **200 kW CW and 5 MW pulsed**.

Military X-band systems include production runs of 2.25 kW and 7.5 kW CW, as well as 10 kW and 20 kW CW. ETM is also currently in production with our 125 watt Ka-band hub mount outdoor unit.

Power combining of TWTs is used to provide higher power levels over bands where tubes with such levels do not exist. Broadband power combining, tube linearization, and millimeter wave are a small sample of ETM's many capabilities.

POWER ELECTRONICS

ETM has developed and taken into production a comprehensive series of power inverter modules. These inverters range from **500 watts to 100's of kW** and include standard families of AC to DC and DC to AC converters.

ETM has taken into production specific families of converters at the 2 kW, 3.5 kW, 8 kW, 12 kW and 20 kW power levels. Additionally, ETM's catalog includes high power, high frequency switches which are capable of switching at MHz PRFs and thousands of volts.



30 kV Solid State Switch



building blocks and combines them for each new requirement. Modules are conducive to LRU type architecture which greatly facilitates logistic or field support for ease of replacement and maintenance.

LIQUID POWER COOLING

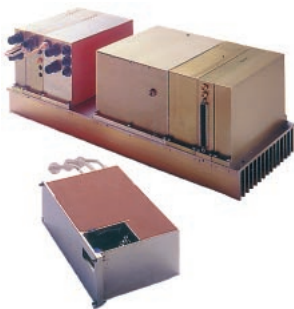
ETM heat exchangers range in capacity from **3 kW to over 200 kW**, and provide coolant flow from 3 GPM to 60 GPM. They use various technologies such as liquid-to-liquid, liquid-to-air and active refrigeration. ETM can use any cooling medium available including low conductivity deionized (DI) water, coolanol, PAO, and others.

In addition to the basic job of removing heat from high power electronics, ETM heat exchangers are also designed and built to meet additional specifications that are customer driven for their specific application.



35 kW Liquid-to-Air Heat Exchanger

HIGH VOLTAGE



2 kW Switch Mode Modular Power Supply

ETM's high voltage experience ranges from **1 kV to 500 kV** with current levels from 10 mA CW to 100 A peak. ETM has developed discrete high voltage products such as power supplies, line modulators, hard tube modulators, and electronic crowbars. In addition, our high voltage expertise is commonly used together with our high power microwave capabilities in order to power the tubes that are used in our high power transmitters.

ETM can also take advantage of a number of different dielectric insulation techniques depending on the requirement. High voltage products that include an ETM control unit or digital display utilize glass fiber optics on the Machine Interface Board and Display Board to isolate the high voltage and prevent damage against the interface, control and display functions of the product.



CLIENT FOCUSED MANAGEMENT APPROACH



7.3 kW CW Power Combined X-Band

ETM is organized according to a Client Management structure that is geared to the needs of the Defense, Aerospace and Medical Industries. Our goal is to help our clients successfully execute their missions. Client satisfaction is the key element in achieving this goal and it is attained with a combination of services and support through the life of the program.

With proprietary tools such as RAPiD™ and C³COM™ our Client Managers are able to respond quickly to issues that arise during initial build and large-scale production. In addition, ETM provides services in a number of key areas to aid in the system integration process.

- * Proposal, Logistics, Depot, Integration, and Through-Life Support
- * Program and Configuration Management
- * DCAA Accounting
- * Training and Service
- * Auxiliary and Accessory Peripherals
- * DOD Clearance

In the field, clients can count on around-the-clock support as ETM has established service centers around the world providing real time service and support.

Realizing that client satisfaction starts well before service and support, the culture of ETM is one of respect for individuals, honesty and integrity. Each employee has a meaningful stake in the reliability and value of the products that leave our manufacturing facility.

Many system integrators around the world rely on ETM's tailored approach for designing and bringing a subsystem solution into large-scale production. A few of our clients include:

L-3 Communications * EADS Astrium * Harris Corporation
Northrop Grumman * Comtech Systems

DESIGN CONTROL AND CONFIGURATION MANAGEMENT

ETM is ISO 9001:2000 certified. Furthermore, our quality management system is designed to meet the more stringent needs of the Defense, Aerospace and Medical industries. All designs, manufacturing instructions, and test procedures are maintained and controlled. Our configuration management system is composed of the most up-to-date software such as Oracle® and Agile®.

ETM offers clients access to our IT-Anywhere™ system, which provides online access to information allowing clients to stay updated on system details such as:

- * System subassemblies and bill of materials
- * System schematics
- * Recent ECOs
- * Component specifications and part numbers
- * Test procedures



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