

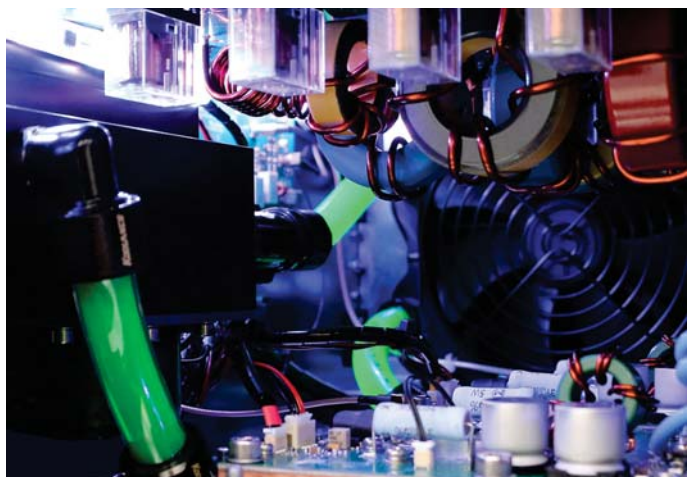
New 4075 Water Cooled High Power HF Transmitter

Barrett Communications has recently developed an advanced high-powered High-Frequency Transmitter. This has been achieved by marrying the Barrett 4050 SDR Transceiver with a new Barrett-designed liquid-cooled amplifier to produce the Barrett 4075 HF High Power transmitter.

The 4075 linear power amplifier, which comes in 500W and 1kW variants, has a unique advanced liquid cooled solid state design which is believed to be the first of its kind. This reduces the requirement for forced air cooling, resulting in lower power consumption and a quieter working environment. Where an amplifier has a less than optimum efficient cooling system it can lead to component failure, but this innovative design, which uses a water propylene glycol mixture, allows the transmitter to run continuously at optimum temperatures and therefore more efficiently, resulting in greater reliability and extended service life. Most transmitters in use in austere conditions are installed in air-conditioned containers or in an environment conducive to maintaining a suitable operating temperature, and even so still require forced air cooling within the equipment casing, consuming additional power and generating extraneous ambient noise for the operator. A liquid cooled system is less reliant on high levels of air flow and is less susceptible to variations in and extremes of temperature, making it a more suitable choice for use in any environment but particularly those where temperature control is a challenge.

The need for greater temperature control and efficiency in cooling HF equipment is partly due to the more intensive use of data, as e-mails and messaging become the common and preferred methods in modern communication. Data communication provides a more continuous transmission, than analogue voice communication where the modulation of the latter provides peaks and troughs. However, continuous transmission tends to create greater temperature in the transmitter because of the lack of variation and a more continuous duty cycle, thus giving rise to the need for efficient temperature control and an efficient cooling system.

In addition, there is also an increasing preference for the use of digital voice, which provides greater security as it can be more easily and securely encrypted. Voice modulation is digitised at the transmitter via a vocoder which renders the analogue voice signal into data for transmission; at the receiver the reverse process takes place. The resulting data transmission also results in a more continuous duty cycle and consequently much greater generation of heat.



The Barrett 4075 has a transmit frequency range of 1.6MHz-30MHz and a receive range of 250KHz-30MHz. The amplifier couples seamlessly with the Barrett 4050 with no additional tuning or adjustment.

The 4075 transmitter can operate in a number of different modes: USB, LSB (SSB), CW, FSK and AM. It includes as standard multiple 4 and 6 Digital Selective calling protocols and has available optionally the International Civil Aviation Organization (ICAO) Annex 10 Aeronautical ARINC Selcall standard; second generation (2G) Automatic Link Establishment (ALE) to J1TC certification; and the latest 3G ALE standard based on STANAG 4538.

The Barrett 4075's digital voice provides near to telephone quality communications over an HF network and at signal levels where standard analogue voice communication becomes unworkable. In order to overcome the problems of variable path quality the vocoder has variable data rates from 2400 bits per second (bps) down to 600 bps. It offers both Digital and Advanced Encryption Standards (DES and AES) up to 256-bit. Both the variable vocoder and the 256-bit AES are subject to export controls. A number of different data waveforms are available with throughput rates up to and beyond 19200 bps.

Also offered as an option is Barrett's patented GPS synchronised secure frequency hopping system, which does not need a central synchronisation station, has no entry or late entry time delay and does not require handshaking. Available hopping rates are 5 or 25 hops per second using an eight digit hopping encryption key with a user selectable hopping bandwidth to suit a variety of antenna types.

The radio can be controlled remotely via IP or Wi-Fi using the existing Barrett 4050 interface which resembles a smart phone. This has a 24-bit colour touch screen and uses the same type of icon and swipe interface as a smartphone, thus providing the modern user with the same familiar environment. Functionality is directly available through identifiable icons rather than step-through menus. The touchscreen is mounted in a 350 gram detachable wireless remote control head which also includes the handset connection. The multi-lingual operator interface has easily selectable standard language libraries, including English, French, Spanish, Russian, Arabic and Chinese, but others can be added as required.

The 4075 adds additional diagnostic functionality, providing more outputs for system monitoring, fault control and logging. The amplifier itself has graphic dot matrix organic light-emitting diode (OLED) display with a seven-key control pad which includes power and menu navigation keys.

The Barrett 4075 is field reprogrammable via USB a port, allowing the end user to update system software. A micro SD card is also fitted which provides enhanced flexibility for system, language, and display customisations. All system parameters are continuously monitored and error events are logged into the memory on the micro SD card. Event logs are available for



read-out either via the 4075 USB ports or over a wired network link. The SD card, which is formatted FAT32, can also be removed and the data accessed using a standard tablet or PC.

The radio is intended as a static base station for use in areas where HF radio may be the only viable communications infrastructure. It is aimed at a broad cross-section of the market, including such users as the UN for peacekeeping or humanitarian assistance; non-government organisations (NGO); security organisations and the police; and commercial businesses such as oil exploration.

The Barrett 4075 provides a compact, high power HF transceiver which is easy to use for the inexperienced operator. It is ideal for use in austere environments where the provision of suitable air-conditioned spaces may not be easy due to power limitations. The elimination of forced air cooling and therefore the constant noise of the cooling fan within the amplifier will also reduce operator fatigue and increase working efficiency. The small footprint makes the Barrett 4075 easy to install or incorporate into existing configurations and where space is at a premium. It would be a particularly attractive option for those users already equipped with the Barrett 4050 HF SDR as the addition of the amplifier is a seamless "plug-and-play" process.

This white paper gives a first look at the 4075 and outlines its features and capabilities. Visit the Barrett Communications stand 1249 at APCO to see the system and discuss its suitability to meet your organizations emergency communication needs.



About Barrett Communications:

Barrett Communications is the specialist Australian designer and manufacturer of commercial and tactical HF and VHF radio communication systems.

The Company's global distribution to over 150 countries and customer support network in over 65 countries allows it to provide both OTS and turnkey network solutions to meet their clients' exact requirements.

For 40 years Barrett Communications has provided HF communications solutions for government, business, humanitarian and AID organisations around the world.

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