100 Countries worked via 2 meter EME!

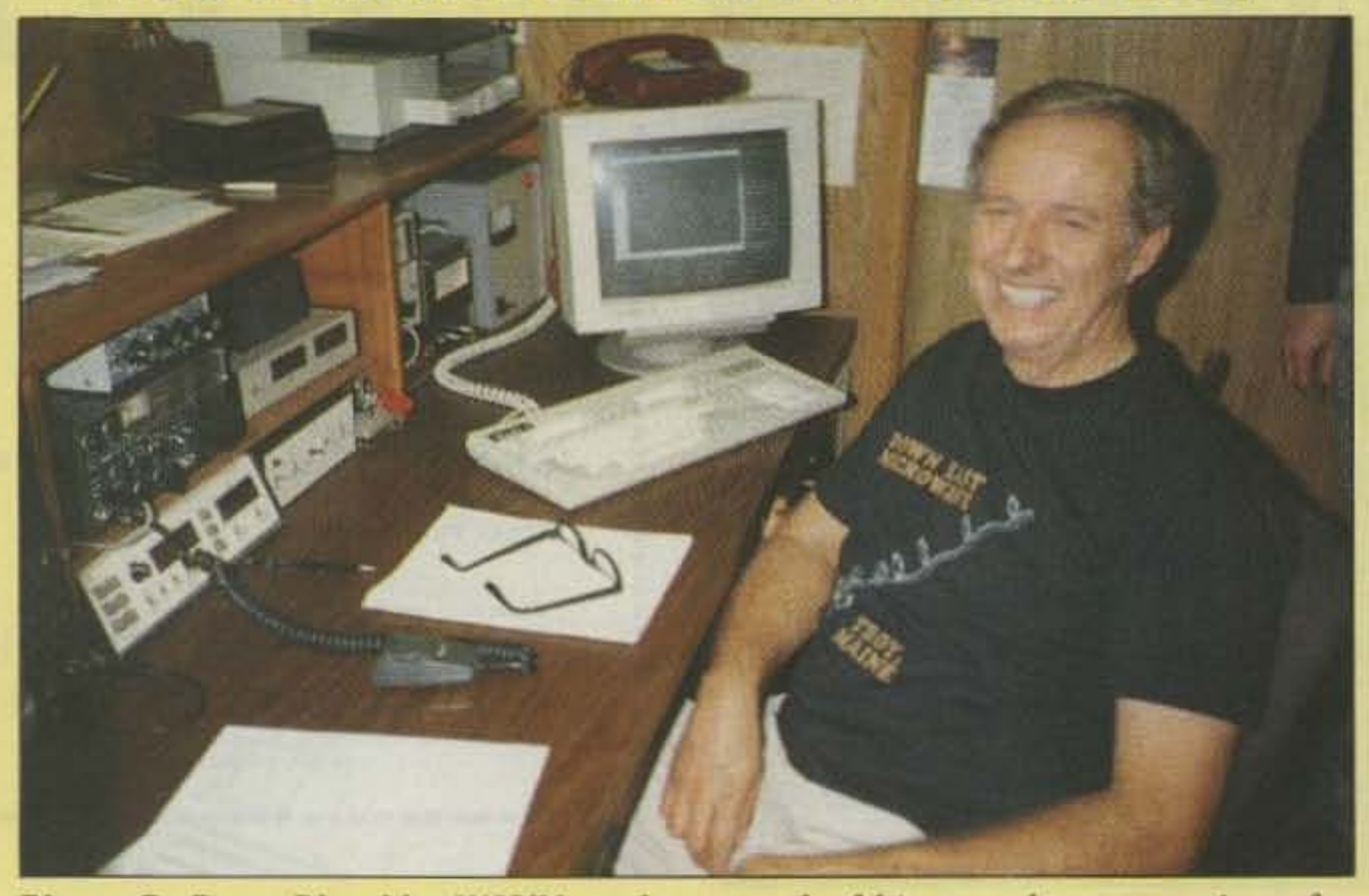

Photo C. Dave Blaschke W5UN at the control of his moonbounce station after working VS6BI and J79/W6JKV for countries 100 and 101 on October 28, 1990. It took him eight years to reach the century mark (his first EME contact was with K1WHS in 1981). He's currently up to 105 countries worked after contacting CE0ZZZ, 9M8SEA, 7P8EN (Lesotho) and ZS9Z (Walvis Bay). [Ed. Note: Looks like EME could be a great way to avoid those pile-ups to work those rare ones!]

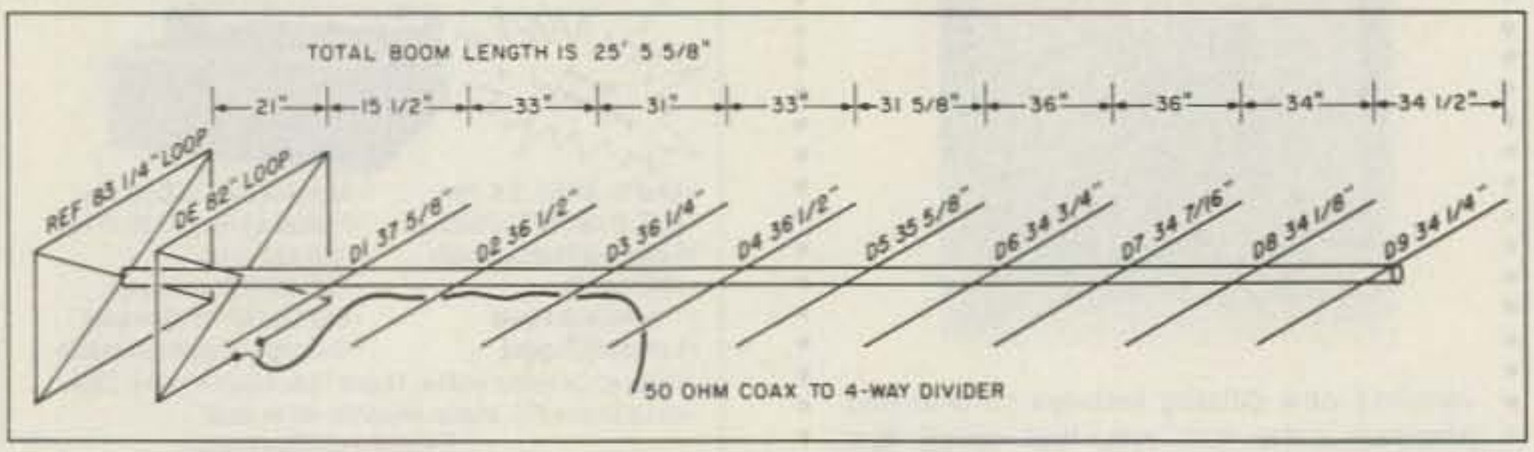

Figure 1. Modified W5UN quagi (optimzed for 144.050 MHz - gain of 13.25 dBd). All directors are ⅛" solid aluminum rod cut to within ±1.16". Reflector and driven elements are shaped into square loops using number 12 solid copper wire with TW type insulation. Leave the insulation in place. Boom is either non-conductive sealed wood or Fiberglas™.

station, W5UN, make it possible for small stations to make EME QSOs today (see Photos A and B).

After *QST* published the article about W5UN's Texas MBA (Mighty Big Antenna) in the January 1989 issue, I was deluged with requests for information and schedules by amateurs who knew nothing about EME communications. Most who wrote or called me had never listened for return echoes before. EME communications requires more structured operating procedure and equipment specifications. For example, antennas must be reasonably sized, and receiving systems must have fairly quiet, sensitive front ends.

Antennas

The first, and most important, piece of equipment needed for EME work is an adequate EME antenna system. Such a system is defined here as one having sufficient elements, properly spaced and phased to yield the gain required for successful EME communications. (Path-loss formulas can give you an idea of the power and antenna gain required.) To communicate by moonbounce, you must be heard by, as well as be able to hear, other moon-reflected signals. It is not known precisely what the minimum gain of an antenna needs to be, but based on a lot of operating experience, I have found that the minimum gain stations need in order to be heard by my station reliably, is around 13 true dB referenced to a dipole when transmitter power into that antenna is no less than 100 watts.

Such antenna and power will permit W5UN to hear you during most of the schedules you're likely to run. A random QSO with W5UN is even possible if a small station calls until heard (this might take weeks or months, but it *is* possible).

"What kind of antenna do I need for an EME station?" is an often-asked question. EME stations use many different types, but the long boom yagi is the most popular. By long boom, I mean boom lengths greater than four wavelengths (about 27 feet). Several of this type are sold commercially. A few which come to mind are the KLM17LBX, Cushcraft 32-19, 42-18XL, Cu-dee, F9FT, and the M² 2M5WL.

For those who find commercial antennas a bit too much for the budget, an inexpensive long boom quagi, with the necessary gain for EME listening and a few QSOs, can be home-brewed (see Figure 1).

Due to computer modeling, advances in design have changed older home-brew antenna dimensions, resulting in better performance. So, if you are contemplating building your own EME antenna, please keep this in mind, and make sure the design you are going to build has been properly modeled and range-tested to ensure optimum performance.

It is possible for stations using OSCAR satellite antennas to hear EME signals from the very large stations. Stations using these antennas have been challenging for W5UN to hear. However, it can be done if such stations will make EME schedules in advance. Recent OSCAR antenna stations worked on schedule by W5UN were CE0ZZZ (KLM22C and 170 watts), KB6BA (KLM22C and 300 watts), and 9M8SEA (unknown OSCAR antenna and 300 watts). The problem with most satellite antennas is that they have circular polarization. This reduces the signal by 3 dB for EME stations, who nearly always use linearly polarized antennas.

The key to all of this is that whatever type of antenna you choose, it must work at its peak capability. Feedline losses, misphasing, and other problems will reduce its effectiveness.

Power

High power is preferred because most stations cannot put up large-sized arrays to make

TIME	FIRST 1½ MIN	LAST ½ MIN	COMMENTS
0000—0002	W4ZD de ZD8MB	W4ZD de ZD8MB	Initial transmission
0002—0004	ZD8MB de W4ZD	ZD8MB de W4ZD	Nothing hrd yet by ZD
0004—0006	W4ZD de ZD8MB	O O O O O O O	MB heard calls from ZD
1006—1008	ZD8MB de W4ZD	ZD8MB de W4ZD	ZD didn't hear calls
1008—1010	W4ZD de ZD8MB	O O O O O O O	MB still needs RO's
1010—1012	ZD8MB de W4ZD	ZD8MB de W4ZD	ZD got O's but not calls
1012—1014	W4ZD de ZD8MB	O O O O O O O	MB waiting for RO's
1014—1016	RO RO RO RO RO	RO RO RO RO	ZD got calls and O's
1016—1018	W4ZD de ZD8MB	O O O O O O O	MB didn't hr ZD's RO's
1018—1020	RO RO RO RO RO	RO RO RO RO	ZD sends RO, needs R's
1020—1022	R R R R R R R	R R R R R R R	MB heard RO's, sends R's
1022—1024	R R R R R R R	73 73 73 73	ZD completes the QSO

Table. Example of a scheduled EME contact between W4ZD in Florida (western station) and ZD8MB on Ascension Island (eastern station).