Multiplier Passing in DX Contests

Chris R. Burger ZS6EZ

Version 0.2, 2015-12-05

I recently had occasion to operate from a competitive multi-multi. It was a lot of fun. I enjoyed the camaraderie with some very sharp and interesting guys, the ambience of white beaches and wide open spaces, and the pileups. Although I've seen pileups like these before, the consistency of callers, especially on the low bands, was well outside my realm of experience. I delighted in working over 600 stations in 80 countries on 80 m by sunrise—something that is completely unheard of in southern climes.

We were moderately successful, despite some setbacks. We lost some equipment. We had some niggles with the listening antenna. We lost power for more than six hours. We lost the Internet connection, along with all the spots, for the last 12 hours or so, greatly eating into our multiplier potential. Nevertheless, we managed to make a respectable score, including a nicely-balanced tally across all the bands.

One thing that we didn't do well was to pass multipliers. I estimate that we could have easily added several million points to our score by just exploiting the opportunities to pass multipliers from one band to the next. Given that we were a unique multiplier, with little other activity in our DXCC entity, I expect that most of the stations asked would have moved with us to another band, especially the ones that called us in the pileup.

To be sure, we did have some multiplier-passing success. I spent a lot of time operating on 28 MHz, shoulder to shoulder with an experienced operator on 21 MHz. We managed to pass more than two dozen multipliers, including a handful of double mults. We figure that this mult passing earned us over a million points, with no noticeable down-side on our run rates.

What is it?

Let's start with the concept of multipliers. Most DX contests use a multiplier structure. You earn points by making contacts. Often, you get more points for making distant contacts. In the CQ World Wide contests, you get no points for your own country, one for your own continent and three for another continent. North Americans get two points for their own continent.

The CQ World Wide is the undisputed leader of DX contests, and will form the basis for the rest of this discussion. However, the principles hold true for other contests too.

These points are then multiplied by a multiplier. This multiplier might consist of geographic areas or geographic areas by band or even callsign prefixes, depending on the contest. In CQWW, the multiplier consists of the number of CQ zones and countries per band. There are 40 zones. In CQWW, one can reasonably expect all 40 zones to be active, although they may not all be workable from your location on a specific band. The countries consist of DXCC entities plus a few more from the WAE list, for a total of over 340. In CQWW Phone, you can reasonably expect about 200 of them to be on the air. On CW, the tally may be a little lower.

For a single-band entry, the formula is simple. A leading single-band station will make around 3000 QSOs, with close to 40 zones and around 150 countries. Depending on location, the station will earn between one and three points per QSO. For Africans and South Americans, the value is likely to be very close to three, as very few contacts are made in one's own continent. European stations might

have a value of closer to one. Theoretically, the value could drop below one, presuming that one works stations in one's own country.

For a leading single-band station, then, the score will be approximately 3000 x 3 x (40+150) = 1,7 M.

For all-band stations, including all single operators and all multi-operators, the situation is a little more complex. Add all the points from all bands, and multiply by the multiplier from all bands. A leading Multi-Multi station may have 12 000 contacts, 190 zones and 700 countries. The score would then be 12 000 x 3 x (190+700) = 32 M.

For the single-band station, there are 3000 contacts and 190 multipliers. Adding one contact will add approximately 1/3000 (or 0,03%) to the score. Adding one multiplier will add 1/190 (or 0,5%) to the score. The ratio of their values is 3000/190 or about 16 to one.

For the multi-band station above, there are 12 000 contacts and 890 multipliers. Adding one contact will add approximately 1/12 000 (or 0,01%) to the score. Adding one multiplier will add 1/790 (or 0,1%) to the score. The ratio of their values is 12 000/790 or about 15 to one.

A multiplier might be a new country or a zone. It is immaterial which; either is worth the same amount. However, the number of zones is smaller, so typically a zone multiplier is subjectively more sought after.

Some contacts are double multipliers, stations that are both in a new zone and in a new country. Obviously, a double multiplier is worth twice as much as a single multiplier.

Should I try to work it?

The contest is a tradeoff between points and multipliers. In general, trying to work a multiplier costs points, as the station is not running common stations while calling in the pileup. On the other hand, running common stations comes at the expense of multipliers, as the station remains on one frequency. This latter statement is not entirely true, as some of the calling stations will represent multipliers. In fact, a semi-rare station can expect to work most of the European multipliers and even some of the exotic ones by running, as callers are keen to work the multiplier represented by the semi-rare station.

Here is where the difference between a DXer and a contester comes to the fore. A DXer will be tempted to call in pileups on semi-rare stations, just to pad the number of countries of zones on that specific band, while most contesters will tend to want to run stations at the highest rate possible. The DXer may end up with an impressive country count, but will not have enough points to multiply that impressive multiplier by. The speed addict will have lots of points, but not much of a multiplier to multiply those points by.

In general, though, the speed freak will beat the DXer, only because the speed freak will also have worked a nice bunch of multipliers, while the DXer will have pitifully few QSOs to show.

Clearly, therefore, there must be a balance.

In modern times, spotting has changed all the rules. In years gone by, multiplier hunting was an expensive pastime, as one had to tune the band kHz by kHz to find those juicy multipliers. Given the wrong combination of beam heading and frequency, very often one could not even hear the multiplier, even if one was on the right frequency.

Nowadays, multi-operators and assisted single-operators can see multipliers on a band map, and can click on the spot and instantly end up on the right frequency. Provided one is loud enough, one could pop back to the run frequency without losing it, or even unduly delaying the pileup.

Either way, the running operator must make a decision as to whether the right thing to do is to keep running or to work a multiplier.

The first thing to understand is the value of the multiplier. In both examples above, the value of a multiplier was about 15 times as much as that of a QSO. This ratio does not change through the contest, even though most logging software tries to estimate the value and shows an increasing number as the contest progresses. Do not be misled. Keep in mind that your first contact is, by definition, a double multiplier. It may be worth 0, 1, 2 or 3 points. At this moment, it appears that a QSO is worth almost as much as a multiplier, or even more than a multiplier! Not true. Soon, you'll see the estimated ratio rising. At the end of the contest, it will reflect the true value (around 15:1 in these examples).

Let's assume you're running at some rate; perhaps 120 per hour. Most modern logging programs will show you a rate for the last 10 and 100 QSOs. Although it's a huge ego trip to watch the 10 rate soaring, it does not win contests. The 100 rate is a far better reflection of how things are really going. Let's use this rate for the discussion.

A rate of 120 per hour is equivalent to two contacts per minute, or one every 30 seconds. This figure is nice and easy to work with. Rates of 30, 60, 90, 120, 150, 180, 210 and 240 per hour might be good figures to remember, as they represent half, one, 1½, 2 QSOs per minute, and so on[1]. They provide some useful references with simple arithmetic. Play with them often, so you can do it in the heat of battle with minimum strain.

At this particular moment, a QSO is worth 30 s. It therefore follows that a multiplier is worth about 7½ minutes, and a double multiplier is worth about 15 minutes. You can afford to take a quarter of an hour off in exchange for working one double multiplier! Of course, if you can keep running at the same rate, the double multiplier is clean profit.

You obviously also have to take account of how certain you are that you can work the multiplier. It's no good wasting 15 minutes to call a potential double multiplier if there is a thick pileup and you are the weakest station on the band.

So: The time you can afford to spend on the multiplier in this case is the time equivalent (15 minutes for a double mult) times the probability of working it (let's say 50% or 0,5). You can afford to spend about 8 minutes calling the mult if you think you have a 50% chance of working it. Don't be tempted to keep calling forever. You must give up and go on if the multiplier proves impossible to work. A kitchen timer is a good accessory to have handy. When it rings, gnash your teeth and move on.

Moving Mults

As we have figured out, something like one in fifteen stations represents a multiplier. If you can work this station on several bands in quick succession, you can really cash in. Moving a double mult through three band buys you six multipliers, or the equivalent of 90 QSOs. In this case, you've bought yourself the equivalent of 45 minutes of running!

[1] If you have a big station on a little island, you may also want to look at 300, 360, 420 and 480 QSOs per hour…

Here is the thought process when your logging software identifies a multiplier for you (if you don't already know up front that it is a juicy multiplier):

1. Look at the multiplier map to see if you need the multiplier on adjacent bands.
2. Assess the probability that there will be propagation on the adjacent bands where you need it.
3. Request the station to move if you think it's worth a try.

Requesting the move is as simple as saying "Please QSY to 21346" on Phone, or "Pse QSY 21080" on CW.

There are several possible outcomes. One is that the station rejects you. This outcome is likely if you are not a unique multiplier (i.e. if you are a US or German station in CQWW), if you are weak (i.e. the target station does not believe that you are going to be workable on the adjacent band) or if the station is only on a single band. If you're old enough to have faced rejection a few times before, the only harm done is that you have wasted a few seconds asking.

If the other operator agrees, there are a few outcomes. You can make it, and smile. You can find that the frequency is congested, and not make it. You can find that there is no propagation. Again, the outcome can be unfavourable, but not disastrous. At least you tried.

If you make it on the second band, you can obviously also try another band. And another. Somewhere along the line, the party could come to an end, or you may end up with lots of happy multipliers. It is possible to drag someone through all six bands, gathering 12 multipliers in the process. The worst that can happen is that you waste a few seconds.

Perhaps just a quick word about propagation. Nearby stations with good antennas and equipment are almost always workable by back-scatter if there is any propagation. You can therefore expect to work them on almost any band during the day. Keep your beam pointed in the same direction that you are running in, and you should hear them. If they are too close (let's say under 1500 km), you will never work them with your beam pointed directly towards them.

If you are passing from a difficult band to an easy band, the pass almost always works. If you are passing to a harder band, the pass is less likely to be successful. Passing from 10 to 15 m almost always works, but passing from 15 to 10 sometimes doesn't. Likewise, passing from 80 to 40 or 40 to 20 is almost guaranteed to be successful. Going the other way may not be so easy.

Where to?

One question that needs to be answered is which frequency to drag the station to, and which way to point the beam.

In a Multi-Multi, the question of frequency is easy. Just pass them to your station's own run frequency. However, you want to prevent them getting stuck in the pileup, so you must alert your run operator on that band. Send a network chat message, or just holler across the room. You may elicit a scowl or two, but you'll be contributing hugely to your score.

If you are single-op or your multi-op doesn't have a run frequency at that moment, use a fringe frequency. You definitely don't want to pass the station to 21001, as you're likely to end up in the middle of a frequency fight between two big multi-multis. You will not win. However, if you pass to 28149 or 21135, your chances of success improve greatly. The same is true on SSB. If you can stay outside the US phone band, great. If not, go right to the top end. You're much less likely to get trampled on.

As for beam headings, use backscatter for close-in stations and direct beams for distant stations, unless you know about scatter paths or other propagation anomalies.

Some Psychology

Some multi-operator stations use a multiplier bell to raise excitement in the heat of battle. When you work a multiplier, you hit the bell—twice for a double mult. Hopefully, the occasional bell chime will remind everyone of the importance of multipliers, so that they can remain in the right mindset.

Technique

Here are a few specific pointers on multiplier passing strategies.

Do not pass semi-rare multipliers (such as small countries in Europe) in the early part of the contest, as there is a good chance that you will work them later.

If it's late on Sunday and you still need the multiplier, drag them, regardless of how common they are. Common mults are as valuable as "rare" ones, and have exactly the same impact on your score. Remember, working a GM on 20 helps your score just as much as working a P5 on 160, even though your DXer genes may not think so.

Rare multipliers, which may not return on Sunday or may not be workable later due to propagation, must always be moved to another band, even in the early hours of the contest.

A practical way of helping operators to make the decision is to mark all "rare" multipliers (ones that cannot be expected to get into the log automatically) with a symbol in the .CTY file. If the prefix shows up as "GM" in the logging software, you don't need to drag it. However, if "GD*" shows up, you will know that it is rare enough to move. Check the multiplier sheet and move it if it is required on an adjacent band (or even a widely-different band, if propagation allows). Flagging rare mults requires an experienced contester, but all the operators will benefit from that wisdom in the contest.

Here is an extract from a multiplier sheet in a contest. You should have this multiplier sheet on the screen all the time if you want to make intelligent multiplier decisions.

See if you can identify some multiplier opportunities. First assume that you are the 15 m operator, then assume that you're on 40. Think about which multipliers you would pass if you found them.

	160	80	40	20	15	10
OA*						
OD*						
OE						
OH						
OH0*						
OJ0*						
OK						
OM						
ON						
OX*						
OY*						
OZ						

You'll notice that OA, OD, OH0, OJ0, OX and OY are marked with "*", as suggested earlier. Obviously, you would pass these multipliers to other bands, even in the early hours of the contest. In your particular situation, this valuable information may not be available.

If you're the 15 m operator, these multipliers might represent opportunities:

	160	80	40	20	15	10
OA*						
OD*						
OE						
OH						
OH0*						
OJ0*						
OK						
OM						
ON						
OX*						
OY*						
OZ						

You've already worked an OA. However, if you meet one that's not too busy, or if one calls you, you may want to ask if they want to move. Think about propagation. If the signal is weak on 15, it's unlikely that you'll make it on 10, unless you have substantially better antennas there.

If you work an OD or OY (either by running or by calling them), drag them to 10 if you think there's a reasonable chance of propagation. You may ask your 10 m operator for advice.

If an OJ0 or OX calls in, ask to move to 20 and then to 10. If there is a sharp operator at the other end and you are a rare multiplier, give both frequencies. Chances are that the other operator will visit both your run stations and provide you with two juicy multipliers. Be mindful that the OX is probably a double multiplier (rare Zone 40), so you should have a real sense of urgency about this idea.

You've already worked OH0. However, if you find one that's not too busy, it's a great idea to ask them to move to 20 and then to 10. Psychologically, it's a better idea to get them to the certain band first. They will be more likely to move again if they make it than if they don't. With spectacular high band conditions, 10 is a surer bet. Under most conditions, 20 is a surer bet.

For the 40 m operator, the thinking is similar.

	160	80	40	20	15	10
OA*						
OD*						
OE						
OH						
OH0*						
OJ0*						
OK						
OM						
ON						
OX*						
OY*						
OZ						

If you meet an OH0, OJ0 or OX, you must move them to 20. Chances of success are pretty good, unless it's in the middle of the night and 20 is stone dead. Liaise with your 80 m op to assess the probability of the others. OE, OH0, OX and OY should be relatively easy if there is any 80 m propagation to Europe at all. The OD is a different story, and may need to be discussed separately

with your 80 m operator. Again, remember that OX is likely to be a double multiplier, while the others are less likely. If you are in the Americas, you may well still be needing Zone 20, and the OD may also be a double mult.

The same thinking can be extended to other bands too. A 40 m operator must always be mindful of Top Band opportunities, especially with competitive stations that are known to have good low band antennas.

How to get there

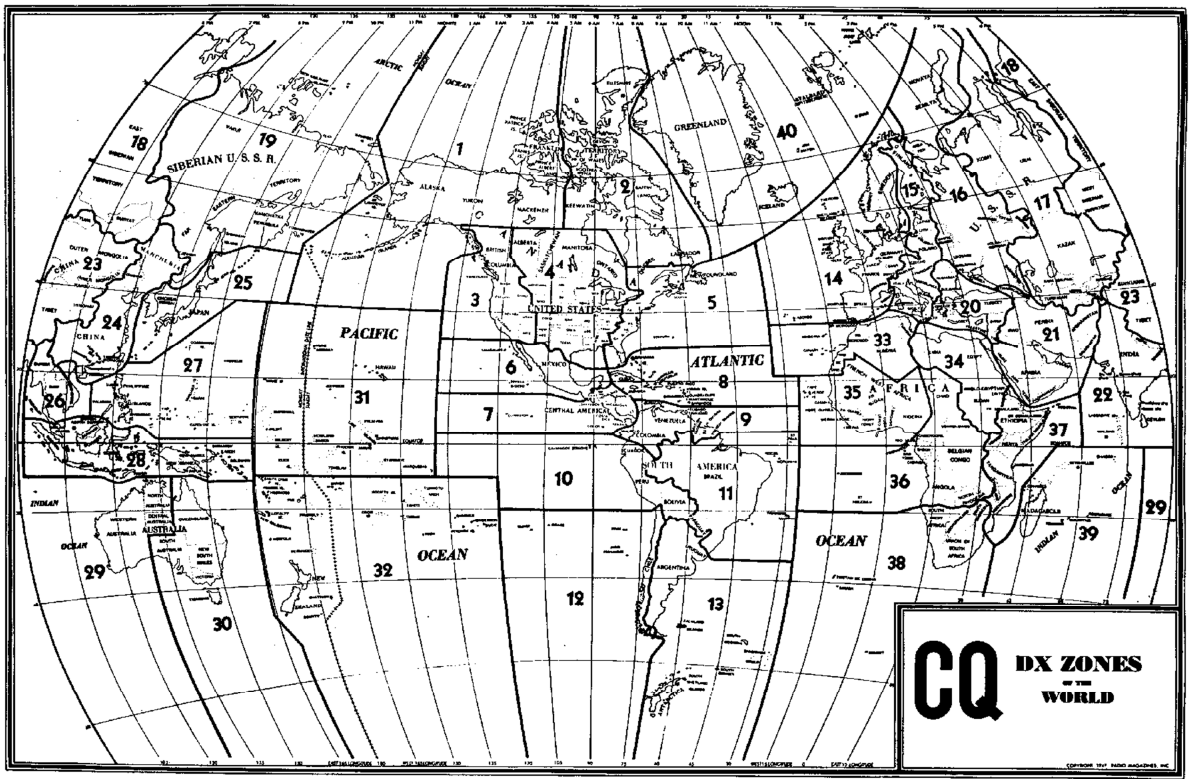
If you do not already have a strong emphasis on multipliers, you can work on it between contests. Here are a few practical tips.

Be active on the air as much as you can, to get a feeling for activity levels. If you cannot get on the air, look at the spots on the DX Summit occasionally to see what's roaming the bands.

Learn to recognise callsigns. Know which ones represent separate multipliers. HC8 is not the same as HC. HK0 is not the same as HK. 3B8 is not the same as 3B9.

Work with the mental arithmetic. Become comfortable with the rates mentioned, and learn how to estimate the time that a multiplier is worth.

Learn the CQ Zones. Here's the official CQ map, but you may want one that is a little less cluttered. Stick it in your car, next to your desk and on the back of your toilet door until you know exactly where each country lies. This ability will help you to anticipate exchanges too, so it will also speed up your runs.



Learn how your logging software will automate the passing process. N1MM+ and others have the ability to assign function keys to automatically sending QSY requests to adjacent bands, even filling

in the frequency for you. The secret is to look in the manual section dealing with macros[2]. There is also good guidance on the process of multiplier passing[3]. Specifically, if a station on a specific band is in S&P mode, that operator should set a pass frequency so that other band operators can pass to that frequency using macros.

In the absence of automation, if you are not comfortable with the process of soliciting a multiplier move, think of a syntax and try it out. Nothing more complex than a simple text request is required.

Finally, if you've mastered these simple techniques and beat your own personal record (or maybe even some continental or world record) in the next contest, please let me know. I would love to contribute to your contesting prowess in some small way!

[2] http://n1mm.hamdocs.com/tiki-index.php?page=Macros

[3] http://n1mm.hamdocs.com/tiki-index.php?page=Multiple+Computer+and+Multi-Op+Contesting#Passing