

# CRaMS: Controlled Resolution and Manipulation System

## Barry Johnson – May 21, 2011

### Introduction

CRaMS is a system of calling that encourages the use of modules or extemporaneous calling while working within a framework of known dancer relationships. The fundamental tenet of CRaMS is this: If you know the relationships between the dancers, then resolving the square is simple.

Let's take the last half of that statement first. If you (through some mechanism) happen to know that each man has his original corner as his current partner, then you can easily see ways to resolve the square.

If you know that each man is with his original partner, once again resolution is simple: put the couples in sequence, and call a zero-line get-out.

Most callers are very comfortable with those two "stations" (everyone with their corner, or everyone with their partner). A caller that uses CRaMS extends that comfort zone just a little further by using two more "stations": one where every man is with his opposite lady, and a final station where every man is with his right-hand lady.

If you can remember a get-out for each of those four stations, then you can use CRaMS. It's just that easy.

### Stations

As you can tell, the concept of "stations" is integral to CRaMS. So what's a station?

A station is simply a group of four dancers (two men and two ladies) that have known relationships to one another.

At first glance, it would seem that there are many different possibilities. After all, callers are very good at scrambling the squares. So how many possibilities are there? The answer might surprise you: If we use symmetric choreography, and if we ignore (for the moment) sequence and arrangement, it turns out that there are exactly **four** possible stations:

- Each man's partner is somewhere within his group
- Each man's corner is somewhere within his group
- Each man's opposite lady is somewhere within his the group
- Each man's right-hand lady is somewhere within his group

There are no other possibilities. If we split the square in half into two groups of two men and two ladies, at any point in the sequence of calls, exactly one of those four conditions will be true.

That seems like a strong statement. It's actually stronger than it seems, because the same relationship will be true for *both* men in a group at the same time. *Both* men will have either their partner, corner, opposite or right-hand lady in the group. In fact, by symmetry, the relationships will be exactly the same in the other group as well. Baring

dancer error and if we're using symmetric choreography, there simply are no other possibilities.

Again, this concept of a station ignores sequence and arrangement. Some of the dancers might be half-sashayed. The ladies may be in a different sequence than the men. But arrangement and sequence are easy to fix with just one or two calls<sup>1</sup>.

So can this be true? Can there be just four stations? Isn't it possible to create some group of four that doesn't fit into one of these patterns?

Try it yourself. Set up some checkers and start with, say, Zero Lines. Focus on each of the two boxes. Now, switch any dancer with that dancer's diagonal opposite (switch, for example, the #1 and #3 men or #2 and #4 ladies). After a bit of work, you'll agree: In each box of four, for each man in the square (at the same time) his box will contain either his corner, partner, opposite lady or right-hand lady.

As you go through that exercise, you'll see that the relationship that each lady has with the men in her group can change. For example, consider a box containing the #1 man, #4 lady, #4 man and #3 lady. This would be a corner station – the box contains each man's corner. Now do a symmetric replacement of the #4 lady with the #2 lady. Our station has become an opposite lady station! Each man has his opposite lady in the box: the #2 lady is #4 man's opposite lady, and the #3 lady is #1 man's opposite. The one lady that remained in the box (#3) went from being #4 man's corner to #1 man's opposite.

If you work at it with checkers, you'll soon become a believer: Each group of four dancers can only be one of those four primary stations.

## Recognizing Stations

There are generalized rules that describe how each call affects the station that the dancers are in: certain calls will, for example, convert from a corner station to a partner station. While not terribly difficult, those rules are still a bit complex for beginning CRaMS. We'll discuss those rules in our "Advanced CRaMS" paper.

But it turns out that it's not all that difficult to recognize the station on the fly. The key is to find pairings *anywhere* in the square, and to realize what those pairings mean.

As we talk about recognizing stations "on the fly", we have to acknowledge that recognizing stations isn't usually instantaneous. Most callers will have some difficulty, especially at first, in sorting out the difference between, say, the opposite lady station and the right-hand lady station. It will take some beats of music, perhaps several beats, in order to check out the possibilities.

Hopefully, that shouldn't be a problem for most callers. You can use some simple sight calling or zero modules that keep the groups of four together for a few beats while you look for pairings. For example, a zero like Swing Thru, Centers Run, Ferris Wheel, Centers Pass Thru will give you about 5 seconds of relatively mindless calling while

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<sup>1</sup> Arrangement can be fixed with, for example, Tag the Line In / Out / Left / Right. Sequence can be fixed with Right and Left Thru, Flutterwheel, or Reverse Flutterwheel.

you're looking for paired couples in each group. For the purposes of identifying the station, we don't even care if we keep the shape of the group of four the same: Feel free to convert from waves to lines to columns and back, just as long as you can track the four dancers in one of your groups as you figure out the station.

So look at some examples. Consider any box of four dancers with two men and two ladies. Hopefully you would be able recognize pairs of couples if they were present in the box. For the purpose of recognizing the stations, the formation and arrangement of the dancers in the group of four doesn't matter: if we see original partners *anywhere* in the group of four, it counts.

Of course, there can only be three possibilities: there are no pairs, one pair, or two pairs of original partner couples in the box. (There certainly can't be three pairs in a box of four dancers!)

If there are two pairs, you're in the partner station! If there are no pairs, you're in the opposite lady station! As the comedian would say, "it's just that easy."

If there's only one pair, then you have to take a second look at the group. Look for the paired man's (or lady's) corner. If the corner is in the same group, then you've got a corner station, otherwise it's a right-hand lady station ("across the street").

Wait a minute. Can it be that simple? If there's only one paired-up couple in the group of four, then all we have to do is see whether the group has a corner present? And if not, then the dancers are in a right-hand lady station (they're across the street)?

Surprisingly, yes, it is that simple. If you can recognize all of the couples in a square and know a corner, you can tell in a glance or two the station in which the dancers are in.

### **If you only know two couples...**

"Well," you might be saying, "that's all well and good if I can recognize all four couples in the square. But what if I only know two of the four couples in the square?"

If so, you can still recognize stations on the fly, but it takes a little more work. Look at your groups of four, finding the dancers you recognize.

#### ***If all four known dancers are together:***

Of course, if you see both of your known couples in the same group of four, then the dancers are obviously in the partner station.

#### ***If three of your four known dancers are together:***

Whenever you have three of your four known dancers together, then they'll either be in the corner or the right-hand lady station. So which is it? Simple -- do you see your known corners in that box? If so, the dancers are in the corner station. If you don't see your known corners, then the dancers are in the right-hand lady station!

#### ***If just two of your four known dancers are together:***

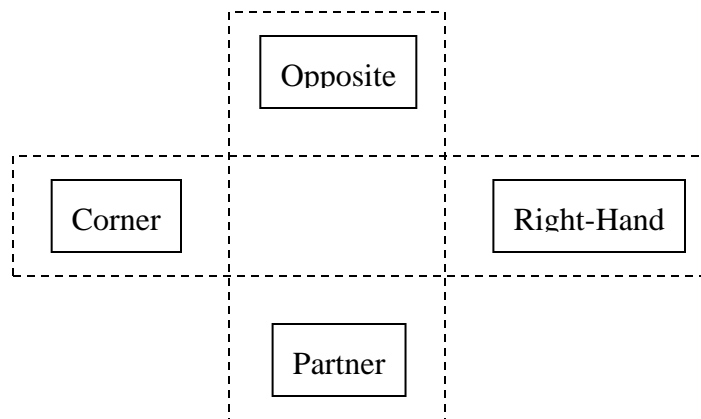
If your two known couples are paired up in the same group, or if they are paired up in different groups of four, then you're in the partner station!

If you see just the two men or just the two ladies from your known couples in the same group of four, then you're in the opposite lady station.

Again, it might take a few seconds to figure out these pairings. Just keep calling while you're looking: call some easy sight calling or zeros that keep the groups intact while you sort things out.

## Switching Between Stations

Think of the stations organized like Heads and Sides: The Partner station works with the Opposite-Lady station and the Corner station works with the Right-hand Lady station. The stations along each axis are across from one another, like this:



Two Groups of Stations

Our "Advanced CRAMS" paper has more details on this point, but there are three simple rules that tell us how various calls affect the stations that the dancers are in.

1. ***If a call doesn't change the dancers in a group of four, then the call will never change the station.*** It doesn't matter if the group moves to a different spot on the floor, or if the group changes shape, or if the sequence of the dancers changes. Consider lines of four: a Pass Thru doesn't change *who* is in one of your groups of four so it cannot change the station, although the call does move the lines across the floor, changes the sequence the dancers are in, and so on.)
2. ***If a call swaps a single dancer from each group to the other group, then the new station will be on the other axis.*** Consider Spin Chain Thru: Because it moves just one dancer from each wave to the other wave, the axis of the station will change. If the dancers start the call in either the Partner or Opposite Lady station, then they'll end up in either the Corner or Right-Hand Lady station. If they start in Corner or Right-Hand Lady, then they are certain to finish in either the Partner or Opposite Lady station.
3. ***If a call swaps a pair of dancers from each group to the other, then the call will not change the axis of the station.*** A call like Couples Circulate (from two-faced lines) will move two dancers from one two-faced line to the other. Obviously, there are cases where Couples Circulate will not change the station: If every man

is with his original partner and you call Couples Circulate, then you'll still be in a partner station. But if a call like this does change the station, then it can only change it to the one station that's "across" from the original. The new station will never be on the other axis.

There are some surprising points in here. First, it absolutely doesn't matter *who* trades from one group to another. A call that moves two dancers can move *any* two dancers from one group to another, and the rules will apply. Consider Couples Circulate again: It doesn't matter if the couple changing groups is boy-girl, boy-boy or girl-girl. It doesn't matter if the dancers are in sequence or out of sequence. The three rules above will still apply in all of those cases.

Knowing this, you can control the station the dancers are in. Put them into one station and call anything you wish that keeps those four dancers together (or takes them apart and puts them back together) and they'll still be in that same station.

Switch any one dancer to the other group, and you'll know the new station is on the other axis – with that hint, recognizing the new station is even easier. Switch any two dancers to the other group of four and you'll know that either the dancers are in the same station or its opposite, and another quick glance will tell you which it is.

## **Overlapping Stations**

So far, we've been describing stations as groups of four, and our principal examples have been the two boxes of facing lines. But we've also said the stations are independent of formations and arrangements. Doesn't that mean that each line (when we're in facing lines) can represent a station, too?

Absolutely. In fact, facing lines are a good example of overlapping stations. We can look at each line as a group of four, or we can split the lines in half and look at the two boxes of four.

It's easy to see that the stations for these two groups are related: Either the boxes and the lines will be in the same station, or they'll be in stations that are opposite one another, depending on how the dancers are partnered.

Consider the case of Zero Lines, where every man has his original partner. Obviously, since every couple has original partners, then it doesn't matter how you group the couples (either in lines or boxes) – it will always be a partner station. But now, from these Zero Lines, chain the ladies across. Each box will still be a partner station. But each *line* is an opposite lady station!

We can use overlapping stations to our advantage. Consider a Right-Handy Lady station that you've arranged into facing lines. Since the boxes are in the right-hand lady station, then your corners are close at hand: If the lines aren't already in a corner station, then all you have to do is chain the ladies across, and the lines will switch into the corner station! Bend the Line, and you've got a box where every man has his corner!

There's another way to look at it, too. Suppose you can see that the boxes for your facing lines are in an opposite lady station. Look down your lines for a couple pairing – you can see a paired couple down the lines, then your lines are in the partner stations (Bend

the Line, and you've converted your Opposite-Lady box to a partner box!) But if you don't see a paired couple, try looking for any pairing *diagonally*. If you see any pairing diagonally, then just chain the ladies across – and your lines will be in a partner station.

This process works with parallel waves as well as parallel lines. In fact, columns can be considered to have overlapping stations: The station of each column overlaps the station of the two boxes on the ends of the columns.

So flipping between each station and its opposite can be as simple as just changing your perspective – you don't even have to move the dancers.

## Using Stations to Resolve

We've spent a lot of time talking about stations: what they are, how to convert from one to another, and how to recognize the stations on the fly if you lose track. But why are we bothering with all this work?

We're doing it to help you resolve the square.

We all know how to resolve when we have corners or partners at hand. But if we can learn just a little more – if we can learn get-outs to use from right-hand lady and opposite lady stations as well, we don't have to work nearly as hard to resolve.

In fact, since we have proven that these are the only four possible stations, all we need to memorize are four get-outs and we can resolve from *any* station!

“But,” you might ask, “Don't I have to worry about arrangement and sequence? CRaMS generally ignores arrangement and sequence – aren't they important when I want to pull the trigger on a get-out? And if I do have to worry about sequence, then what has CRaMS done for me? Why is this any better?”

Yes, arrangement is important: Of course, there's a difference between, say, BGBG lines and BBGG lines. But most callers won't have any difficulty in converting back to normal BG formations whenever they wish.

Sequence, on the other hand, is much harder for some callers to see – especially newer callers. There are few, if any, visual clues that can help a caller see the sequence of the men and ladies. Sequence is also “unstable” – it's so very easy to change the sequence, particularly for just some of the dancers, that it almost has to be recognized immediately – in between two calls, yet without interrupting the flow of the dance.

As you've seen, the focus on CRaMS is on recognizing the relationship of dancers – which is keyed by recognizing paired couples wherever they may appear within groups of four dancers. When you combine the ability to recognize paired couples together with knowledge of the station, then CRaMS offers techniques to resolve squares *without* inspecting the sequence of dancers!

When it's time to resolve, take a moment to figure out the station the dancers are in.

### ***Resolving from Corner Stations:***

Resolution from corner stations (without inspecting for sequence) is trivial: There will be only one paired couple in each group of four. As we all know, we can just put that paired couple on the outside of an Eight Chain Thru formation and an Allemande Left will resolve the square.

### ***Resolving from Right-Hand Lady Stations:***

Resolving from a right-hand lady station is just as easy: You just put the paired couple on the inside (instead of on the outside), and everyone will be in sequence. If you wish, just call Pass Thru, Trade By and you'll be at corners.

Did we have to inspect sequence for either of those cases? NO! We did have to take a moment to recognize our station, then find one paired couple (that might even be dressed alike!), and put that one couple in a known spot.

### ***Resolving from Partner Stations:***

Again, we can use visual pairings to help us correctly resolve from partner stations. If you have boxes in a known partner station, arrange facing lines where every man has his partner. Look for pairings of corners: If you see corners paired facing each other on either end of the lines, you've got Zero Lines. If not, you should see corners facing each other in the center of the lines, and a Right and Left Thru would give you Zero Lines.

### ***Resolving from Opposite Lady Stations:***

Once again, the secret is looking for pair of corners. This time, you *don't* want your paired corners to be on the outsides of facing lines: you want corners facing as the *centers* of facing lines. From this station, if you see corners as temporary partners in facing lines, then chain the ladies across. If you then see your corners facing each other on the end of the lines, do a Right and Left Thru. Everyone will then have their opposite lady as a temporary partner, and they'll all be in sequence.

So within any of our stations, we can force the pairings and sequence of the square into a known state just by looking for one pairing, and moving the dancers in that pairing into an appropriate position within the group of four.

The opposite lady station is, for some callers, the most difficult station for resolution since there are no original couples paired anywhere. But in this case, you know that you can trade any two dancers between the groups (taking you to a corner or right-hand lady station), or trade four dancers between the groups (taking you to partner stations) to make it easier.

## **Sample Get-Outs**

Each of these get-outs are intended to be called from facing lines in BGBG arrangement, where the station describes the relationship of the facing couples in each of the two boxes. For those folks new to CRaMS, we'll just focus facing lines that are in sequence,

and where each man has “his” lady (original corner, partner, right-hand or opposite lady as appropriate) as his current partner:

**Corner Station Get-Out:**

Star Thru, Dive Thru, Square Thru 3, Left Allemande

**Partner Station Get-Out:**

Slide Thru, Square Thru 3, Left Allemande

**Right-Hand Lady Station Get-Out:**

Square Thru 4, Trade By, Left Allemande

**Opposite Lady Station Get-Out:**

Star Thru, Pass Thru, Trade By, Square Thru 3, Left Allemande

Of course, many other get-outs are possible from each of these stations. There are also get-outs for each of the combinations of sequence within the station, and we’ll talk more about those in the “Advanced CRaMS” paper.

**Sample Get-Ins**

These get-ins can be used from an initial static square to get into each of the four stations:

Corner: Heads Square Thru 4

Partner: Heads Lead Right, Circle to a Line

Opposite Lady: Side Ladies Chain, Heads Star Thru, Pass Thru, Circle to a Line

Right-Hand Lady: Heads Star Thru, Pass Thru, Slide Thru, Right and Left Thru

**Learning CRaMS**

CRaMS may seem complex in total, but is relatively easy to learn by pieces.

First step: Learn the nature of the four stations, and accept the concept that those are the *only* stations possible (assuming symmetric choreography and no dancer errors).

Next, learn how to recognize the stations that the dancers are in at any moment, and understand the three simple rules about how to convert from one station group to the other group.

Finally, start using memorized get-outs for each of the stations (after you put the dancers into the appropriate arrangement and sequence). If you wish, start with just one station. Put dancers into those stations and get them back out often enough that you feel you “own” the station – then repeat the process with a second station.

When you’re comfortable with these points, consider reading the “Advanced CRaMS” paper to learn exactly how to control switching from one station to another.

**Summary**

CRaMS, the Controlled Resolution and Manipulation System, is built around recognition that with symmetric choreography there are just four possibilities for dancer relationships in each group of two men and two ladies: Each group will contain either all of the men’s



partners, their corners, their opposite ladies or their right-hand ladies. The stations are easy to understand, and relatively easy to recognize.

There are simple rules that describe how any given call affects the station the dancers are in, and specifically describing when the “group” of the station will change. Knowing those rules will allow a caller to keep a hint of which station is active, and armed with that hint it becomes fairly easy to bring dancers to a known FASR for use with a get-out.