Basic Contrabassoon Repair

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This article is intended to provide basic advice for otherwise experienced woodwind repairers who are faced with the unfamiliar task of working on a contrabassoon. These instruments are not common. Few repair technicians see them enough often enough to become experienced in their repair. I will attempt to give suggestions about problems to watch for and unique adjustment problems.

My primary expertise is with Fox Contrabassoons, having made several hundred of them. I am also familiar with details of other makes and will try to mention those when appropriate.

Basic Needs

Two important assets are needed in order to work on contrabassoons: confidence and space.

There are few, if any, keywork details on a contrabassoon that are so unique that an experienced woodwind technician cannot deal with them. Knowing the special techniques for working with bassoon pads is certainly valuable.

Testing your work is difficult. There is so much physical volume in a contrabassoon that leak testing machines based on low pressure can't handle it effectively. You'll have similar problems attempting to suck a vacuum. You must have confidence in your ability to seat a pad so that it doesn't leak. Be sure to recheck your padding after leaving the pads alone for a few hours.

Contrabassoons are big instruments. Placing a contrabassoon on a work bench quickly consumes all of the surface area of the bench. A bench motor at the end of a bench can take up too much space! A second bench is highly desirable. In the contra shop at Fox each of us uses two or three benches.

Don't be surprised to find that contrabassoons can steal your tools. Losing tools under the big instrument on your bench is a constant problem.

Moving the instrument on the bench to get access to another area can be a problem. Watch out for obstacles. Just by reversing the instrument end for end you will discover that the lighting hanging over your bench is too close.

An alternative to a second bench can be to place the instrument on a wheeled cart that you can place beside your bench. This can allow you to get around the instrument without needing as much manipulation of the instrument's position.

Nomenclature

Any discussion requires some common language. Let me begin by identifying the main parts of the contrabassoon: I'll begin from the small end of the bore and proceed to the big end. Directions (up and down, front and back) will relate to the instrument as it is held in playing position.

A contrabassoon **bocal** looks like a large bassoon bocal. There is no vent button on a contra bocal. When the instrument is put into a case the only part that is removed is the bocal.

Main Body Assembly

The first part of the contra is the metal **mouthpipe** which descends to a point about half way down the body where it joins a **tuning slide**. The contrabassoon is unique among woodwinds in having a true tuning slide between parallel bore segments.

From the tuning slide the bore ascends into the **wing joint**. This is the only irregularly shaped joint on the contra, having a thickened section in a manner similar to a bassoon wing joint. The ascending bore creates a condition where the sequence of the tone holes is in reverse of the fingers that operate them. The physically uppermost finger operates the physically lowest tone hole.

At the top of the wing the **top u-tube** connects the wing with the **descending column**. The descending column is comprised of the smaller **1st bass** joint and the larger **2nd bass** joint. These two joints are joined together in the middle under the **mid column band**.

At the bottom of the instrument is the **bottom u-tube** which joins the smaller descending column and the larger **ascending column**. The ascending column is comprised of the smaller **3rd bass** joint and the larger **4th bass** joint. Again, these joints are connected under a mid column band.

Structurally, the wing joint partially wraps around the 4th bass joint. They are held together by a couple of **butterfly braces** on the front side and a **mouthpipe clamp** on the back side near the bocal socket at the top of the mouthpipe.

A **curly-que brace** connects the two mid column bands together. Some players will use this brace as an attachment point for a neck strap, although a better balance will be achieved at a point several inches higher on the 1st bass joint.

Everything described to this point comprises the **main body assembly**. At the large end of the 4th bass the **bell assembly** is attached to the main body.

Bells

Any discussion of the bell assembly is complicated by diversity. There are not less than six basic versions of the bell assembly. These are described by the direction the bell takes and the lowest note it can play. All but one of these includes a large u-tube referred to as the **bow**. Most often these are made of wood but some makers produce them in metal.

Most contrabassoons descend to a low B♭. Exceptions to this will not be common. A few makers have produced contras that descend to a low A. Old contras often descended only to a low C. Some contras are provided with more than one bell so that an A or Bb bell can be exchanged with a C bell.

Opera bells always point downward. Opera C bells are exceedingly rare. The B♭ opera bell is the most common type seen on contrabassoons. The open end of the bell ends up near the level of the right hand. Opera A bells are made with the open end at the about the same level and add the necessary additional length by raising the bow higher above the main assembly of the instrument.

The older form of bells are often referred to as upright bells, or sometimes as symphony models. These are rarely made today. Upright bells always terminate above the main body assembly and are typically removed from the body and cased separately. C bells are simple extensions with no keys extending straight up from the 4th bass joint. B♭ and A upright bells also extend upward but include a bow to bring the open end of the bell down to the level of the top u-tube.

With a few exceptions almost all contrabassoons made today are in the form of Bb opera bell instruments. The exceptions will be opera bell instruments descending to A. Fox contrabassoons have been made only with Bb opera bells.

Various makers will produce bell assemblies in varying combinations of metal and wood. Except for C bells the terminal end will always be made of metal and similar in appearance to a saxophone bell.

In addition to the bow most bell assemblies include one or more straight sections. On Fox contras the single straight section is called the **wood bell** with a **metal bell** at the terminal end.

It can be highly convenient if the bell assembly can be removed during any repair work. For upright models this requires no special effort. For opera models remove the screws that attach the two or three bell braces that extend between the wood bell and the main body at the main body end, leaving them attached to the bell. Then remove the bow at the end of the 4th bass.

Looking for problems.

There are several areas that should always be checked before anything else is done. These are often problem areas that are ignored but can have significant influence on the instrument's performance.

Joint Problems

Begin by testing the connections between the joints. Most of the instrument is put together with the intention that it will stay that way for many years. If any of these connections get loose and start leaking the entire instrument may need to be disassembled and all of the joints resealed.

Most European made contras use one or two large screws through the bands at each connection. These screws often extend completely through the tenon and the socket and into the bore. The intrusion into the bore may be annoying but it is not a problem in itself. However, if a leak around the screw occurs this will need to be sealed. Fox contras use several small screws around each joint instead of the large screws.

The large joint screws can get sloppy. If any connection shows any evidence of being loose the instrument will need to be disassembled and resealed. The integrity of each screw hole will need to be corrected.

The worst joint problems occur at the mid column connections. Brace the ends of a column and attempt to wiggle the center. Any movement at this point is bad. The two mid column connections *must* be secure. To fix these the entire instrument must be disassembled as these are the last connections you can get to.

Lower Vent to Low E Key Adjustment

The most common keywork adjustment problem on contras is at the connection between the lower vent key on the mouthpipe and the low E key on the 2nd bass joint. When the player depresses the lower vent key this connection should operate the low E key closing the pad on the 3rd bass joint.

The first sign of a problem is usually a gob of tape or cork at this connection. This common player's solution to an adjustment problem produces a mushy action that needs to be corrected.

Before the adjustment is corrected try to find the origin of the problem. Body movements often are the culprit. Eliminate the problem before attempting to readjust the mechanism. One serious source is stripped screw threads at the lower butterfly bracket. This will be discussed in the next section.

The actual connection can be a simple knuckle connection between two arms. Fox contras and some others use a side roller connection in which a roller extends to the side of the arm from the vent key and picks up an arm from the low E key. The basic adjustment is the same for either type of connection.

Begin with the pad for the low E key removed. With the vent key pad closed and the foot of the low E key on the body there should be little or no free play between the parts of the connection. It will usu-

ally be more productive to adjust the arm from the low E key. Ignore the vent key spatula at this point. Just concentrate on the connection.

Next reinstall the pad key on the 3rd bass. First make certain that the connection between the spatula key and the pad key is correct, then check the pad opening.

Finally adjust the vent key spatula first so that its position relative to the two adjacent keys is good and second so that its movement closes the low E key pad and third so that it does not have excess unneeded travel available after the low E key pad closes.

Butterfly Brackets

Always check the lower butterfly brace for stripped screws. If this brace does not securely hold the wing and 4th bass together the resulting body movement will cause mechanical problems, particularly with the connection between the lower vent key and the low E key.

The lower butterfly bracket tends to be at risk from improper handling of the instrument in its case. The most common cause comes from adding wheels to the case and bouncing the case down steps or curbs. The resulting shock puts excessive stress on the middle of the instrument and strips the screws out of this brace. It is rare for the upper butterfly to be affected.

The stripped screw hole needs to be drilled out and filled with a plug of new maple. Avoid drilling through to the bore but make the hole as deep as you dare. Install a plug two to three times the diameter of the screw thread. Don't make it so large that it shows along the sides of the brace.

The brace may have become distorted. Check and restore it to match the contours of the two joints. The addition of a third brace is a possible option.

While reinstalling the brace wrap a strap around the body joints to securely hold the joints together. Straps with Velcro are convenient for this purpose.

After the butterfly's integrity is restored check the adjustment of the lower vent to low E key connection.

Resealing joints

Resealing all of the body joints is a major project. This should be done as a regular part of any major overhaul or complete repad. Doing it during any lesser repair service should be avoided.

Before disassembling any connection of the main body assembly check for alignment marks. At every connection between a metal socket or band and the wood body joint there should be one or two marks that will aid in aligning the connection. These can be important. Make sure you locate them or add them before you take the connection apart.

Whenever possible complete any work that can be done on a single joint. Most of the padding and key fitting work can be done on single joints. As the joints are assembled the instrument becomes more difficult to work on. The reassembly work can be easier if you remove the keys for the event.

Make certain that each connection will be snug and that screws will tighten securely. The tenons will usually be thread wrapped and this can be adjusted to get a good fit. Be sure to do this before you do the actual resealing.

Sealing can be done with either silicone sealer, such as Dow Corning Clear Silicone Sealant, or with beeswax. All of the main body connections on Fox contras are done with silicone sealer. This is the most effective method of sealing and securing the connections but can make later disassembly difficult. Beeswax can be easier to work with on many makes of contras but is not as secure and long lasting as the silicone sealer. Silicone sealer is also messier to clean up than wax.

Good mid column connections are essential. Do whatever is necessary to get a solid mechanical fit before adding the sealant. Silicone sealer will make these connections more secure than beeswax.

Fox contras are made with separate u-tube brackets and u-tubes that can be secured to the brackets with nuts. With the u-tube removed the bracket can be sealed with silicone and the mess easily cleaned up. All other makes make the socket assembly and u-tube as a single entity. This makes cleaning the mess difficult and the silicone can ooze into the bore and become a problem. For that reason sealing one piece u-tube assemblies is better done with beeswax.

Since it is convenient to remove the bell assemblies for servicing it is better to seal this connection with beeswax so the connection can be easily disassembled. The bows on the earliest Fox contras were sealed with silicone and they can be a problem to work on because of the difficulty of removing the bell assembly. Since then all of the bows have been sealed with beeswax.

Wing F Adjustment

There is a special adjustment on the wing keys that seems wrong to the uninitiated. This involves the first three standard tone holes on the wing which are operated by the forefinger and middle finger of the left hand.

The first hole on the wing joint is a small angle drilled hole which serves the same function as the half holed fingerings on the bassoon. It is essentially a mechanical half hole. The second hole is the real F tone hole comparable to the first of the three finger holes of the bassoon wing joint. A connection from the forefinger half hole key closes this hole whenever the half hole key is depressed. The key operated by the middle finger also has a connection that closes the F tone hole whenever the middle finger is depressed.

The F tone hole has no direct closure by the player but is indirectly closed by the keys that operate the two holes on either side of it.

The special adjustment is that the middle finger should not perfectly close the F tone hole. A small amount of error should allow the F tone hole to not quite be closed perfectly. The amount is small—just enough for the pad to barely leak. A feeler gauge will feel the pad but will slip through easily. If the error is too great the excess amount of leakage can cause other problems.

It is important to adjust the forefinger half hole key to perfectly close the F tone hole. Otherwise a leak would prevent the low end range of the instrument from responding properly.

This adjustment improves the clarity of response for notes that are played with the half hole key open. It also enables the response of several notes that are above the normal range limit of the contrabassoon.

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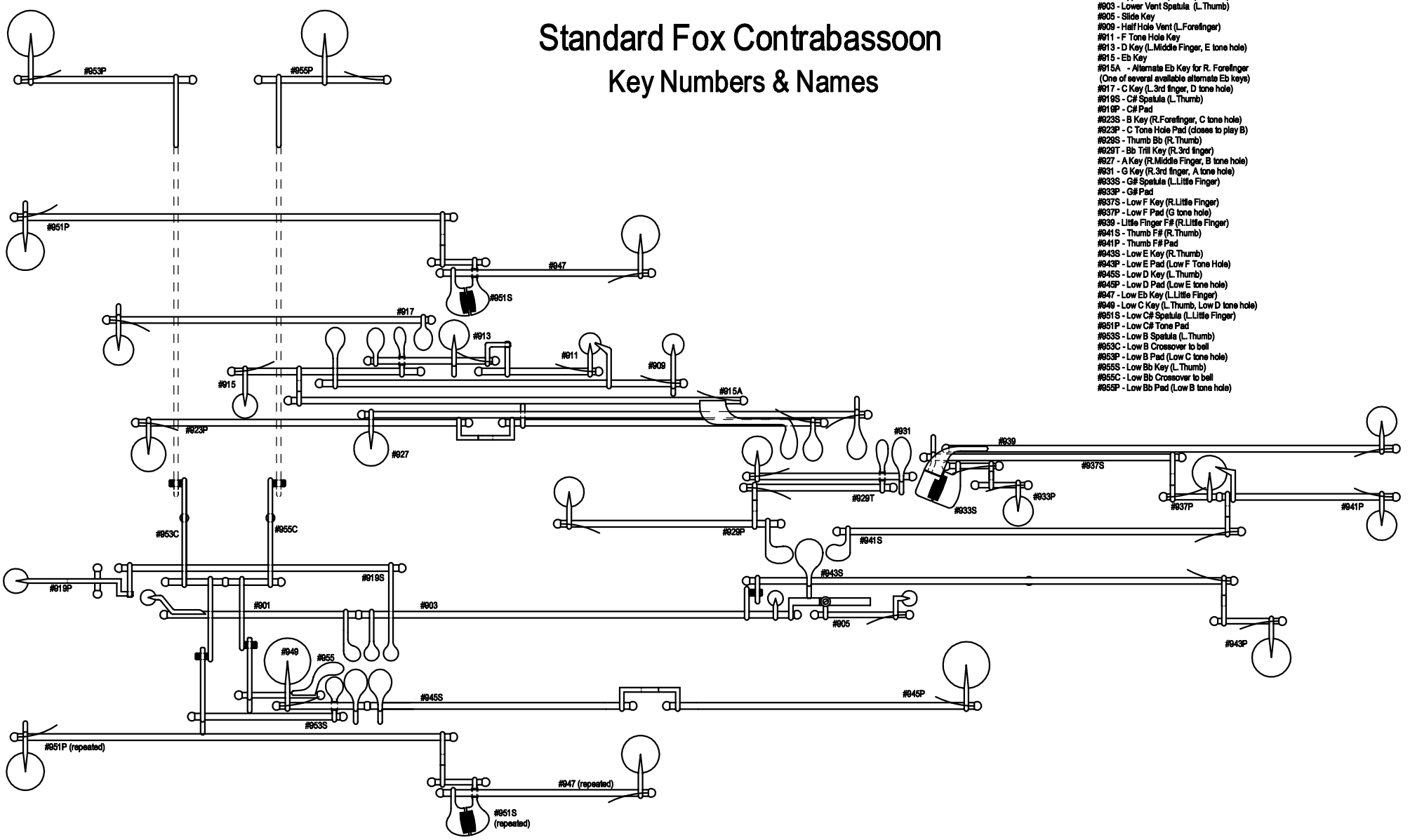
Standard Fox Contrabassoon

Key Numbers & Names



#901 - Upper Vent Spatula (L.Thumb)
#903 - Lower Vent Spatula (L.Thumb)
#905 - Slide Key
#909 - Half Hole Vent (L.Forefinger)
#911 - F Tone Hole Key
#913 - D Key (L.Middle Finger, E tone hole)
#915 - Eb Key
#915A - Alternate Eb Key for R. Forefinger
(One of several available alternate Eb keys)
#917 - C Key (L.3rd finger, D tone hole)
#919S - C# Spatula (L.Thumb)
#919P - C# Pad
#923S - B Key (R.Forefinger, C tone hole)
#923P - C Tone Hole Pad (closes to play B)
#929S - Thumb Bb (R.Thumb)
#929T - Bb Trill Key (R.3rd finger)
#927 - A Key (R.Middle Finger, B tone hole)
#931 - G Key (R.3rd finger, A tone hole)
#933S - G# Spatula (L.Little Finger)
#933P - G# Pad
#937S - Low F Key (R.Little Finger)
#937P - Low F Pad (G tone hole)
#939 - Little Finger F# (R.Little Finger)
#941S - Thumb F# (R.Thumb)
#941P - Thumb F# Pad
#943S - Low E Key (R.Thumb)
#943P - Low E Pad (Low F Tone Hole)
#945S - Low D Key (L.Thumb)
#945P - Low D Pad (Low E tone hole)
#947 - Low Eb Key (L.Little Finger)
#949 - Low C Key (L.Thumb, Low D tone hole)
#951S - Low C# Spatula (L.Little Finger)
#951P - Low C# Tone Pad
#953S - Low B Spatula (L.Thumb)
#953C - Low B Crossover to bell
#953P - Low B Pad (Low C tone hole)
#955S - Low Bb Key (L.Thumb)
#955C - Low Bb Crossover to bell
#955P - Low Bb Pad (Low B tone hole)