

## Scanners

This module is composed of three scanners and the associated vibrato phase-shift lines.

First thing to do is to remove the belt and turn each pulley to check if they are rotating freely. In my case, the Tab Voice scanner did not run properly while Celeste and Drawbar scanners were normal.

First action is to disorder the cables that are not part of the scanner block itself, unscrew the fixation screws of the chassis and remove the whole unit from the console.

There are several reasons to do so. Having the scanner unit on the bench will facilitate the cleaning and visual inspection. A lot of dust, debris was accumulated on the components as well as substantial layer of magnetic particules (dendrite formation) on the metal parts. Visual control is far easier so.

Also the contacts (busbars and thin plates) activated by the three solenoids V1 to V3 were so dirty, greasy, dusty... that it would be unpractical to clean them properly while keeping the scanners module inside the console.

### Tab Voice Scanner.

The main idle of this scanner was stuck on ! No other choice than to dismount it completely. It's not that difficult, it's just a simple question of patience and work method. It took me about two hours to do it in the correct way.



*Here again, it is strongly recommended to refer to the 'Hammond Inside' DVD. Alain Kahn has assigned a dedicated chapter on 'Scanner'.*

Despite over-oiling, the main idle was blocked. First, clean with alcohol all traces of oil and start dismounting, cleaning.. just follow the instructions as indicated on AK's DVD. The back side bearing has been cleaned, degreased, then lubricated with H-oil and that was it. Careful attention to be taken on the spindle. Do not touch it with fingers, protect it with foam material, clean it gently with alcohol just before remounting.

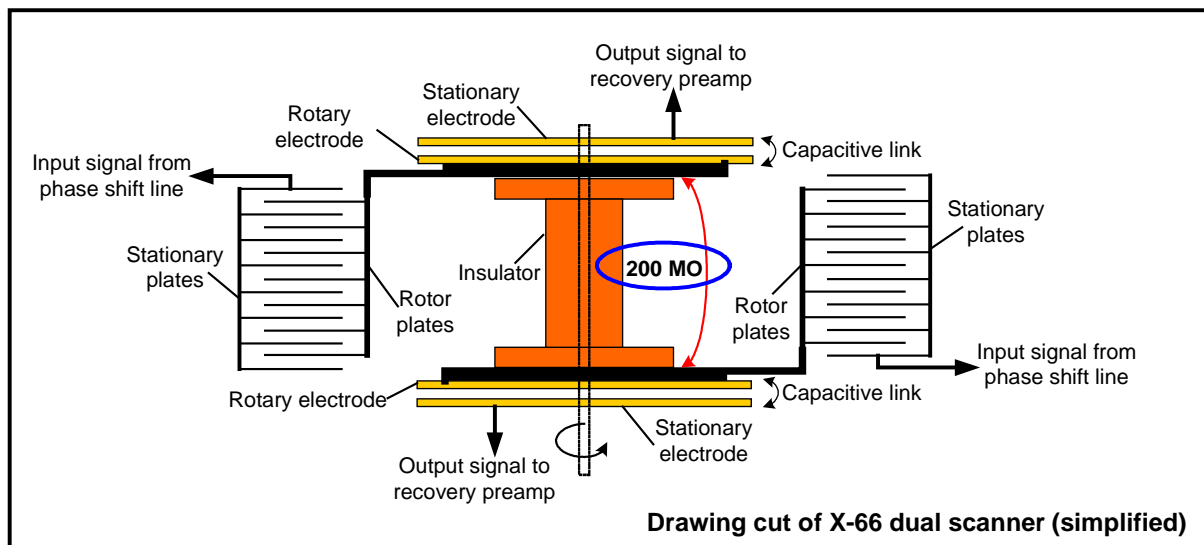
Don't forget that signals of the whole console is going through this famous spindle when vibrato is On.

Remove all screws, lockwashers, screws, flatwashers, round insulators, stators, square insulators and immerse in acetone directly. Leave them so for about 30 minutes. Remove them and let them dry so, all oil residues are gone away. Denatured alcohol can also be used but it will take more time. Double-check for correct re-cabling and confirm that the rotor is now rotating quite freely now.

Previous foam strips that were oil-stuffed were replaced by new ones before closing the back panel. In case of broken or missing oiling threads, be sure to replace or splice them properly. If not the scanner will not be lubricated !

### Celeste and Drawbar scanners.

Fortunately, those two scanners were perfectly turning. Back panels were dismantled but inside was clean, no excess of oil and perfectly rotating. So, I decided to leave them as it is since those two scanners are much more difficult to dismount than the Tab Voice scanner. My advice: only do it if it is really necessary.



So, the only way is to firstly clean with air-pressure and try to clean with alcohol from the front side.

Insulating resistance between both rotary arms is 200 MΩ !

Any little conductive layer between both rotary arms will be lower than this value and will create problems.

### Phase-Shift lines.

Most capacitors were disordered on one side for capacitance check-up. Those Sprague cap's are quite stable in function of the time. All cap's measured were still well fully within tolerances to the exception of one capacitor of 22 nF that was replaced (value 20% above nominal value) in the Celeste phase-shift line. Of course, coils were not touched at all.

### **Drawbar scanner: Vibrato switching.**

The solenoids V1 to V3 are activated by 'Vibrato Treble I', 'Vibrato Treble II' and 'Vibrato Bass' tabs. Since the amount of dust, oxydation, grease accumulated with years on the small busbars and switching blades was so noticeable, the whole switching part has been dismantled, cleaned and tested , just to be 100% sure of getting correct contacts afterwards.

Of course, it is always faster and easier to use some "contact cleaning sprays" or the like but cleaning those busbars and blades once every 30 years is not exaggerated to my opinion. It takes one hour more to do it, why not ? After cleaning, no additional chemical agent were added.



*Personnally, I got bad experiences in the past with some contact cleaning sprays that I refrain from using them whenever possible. Combination of different brands of contact cleaning sprays generates verdigris coatings, oxydations and one year later, problems are getting even worst than before and at the end you will be forced to clean them properly to get rid of those poor contact problems.*

When completed, check with the ohmmeter if all contacts are now perfect. Since the solenoids are disconnected, feed them with +12Vdc to check for proper operation and noise. Each solenoid should have a DC resistance in the range of 30  $\Omega$  to 32  $\Omega$ . The 100  $\mu$ F/25V cap's in paralell with each solenoid have been replaced. Values were about doubled ! The 15 K resistor on the last cap was also changed (measured 19K).

### **Animation motor.**

This motor has been also removed and with air-pressure cleaned. A little drop of H-oil added on bearings, check for any axle slacks (was OK). The AC mains cord feeding this motor was replaced for security reasons since cracks were noticed on this AC mains cable. The speed of the motor was controlled with a tachymeter and something was questionable concerning the speed of this motor at 50 Hz.

This motor should turn at 1.550 RPM at 60 Hz. Since in Europe AC Mains frequency is 50Hz, logically, it should run at 1.291 RPM. Measurements with tachometer indicate 1.390 RPM !

More info on scanners: <http://theatreorgans.com/hammond/faq/hammond-faq.html>