

## S-Band DFTS D50 Maintenance Procedure

V 1.1

### **Introduction**

CPI's S-band Klystrons may require channel changer plunger cleaning and lubrication periodically. This is generally only the case when in normal operation there is extensive tuner usage and/or the klystron is exposed to an extremely harsh environment.

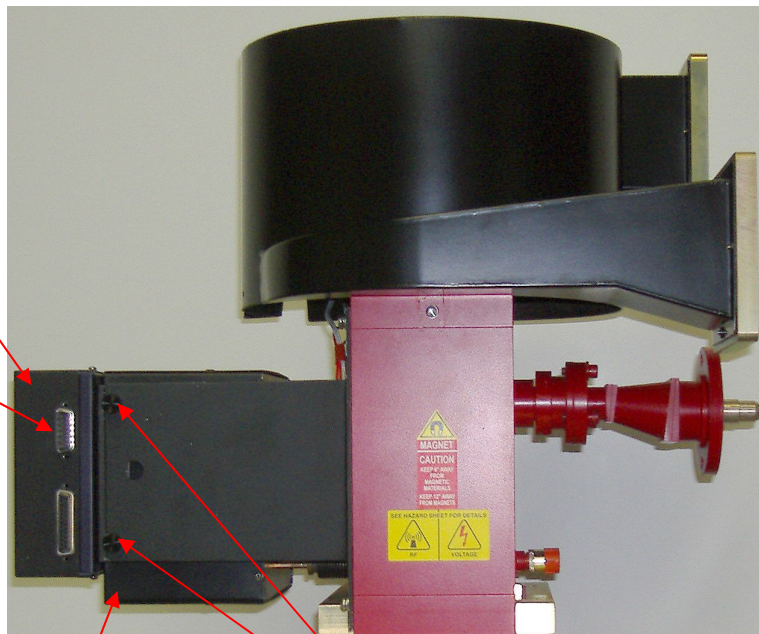
This document describes the S-band Klystron channel changer cleaning procedure which was developed for implementation at CMP Georgetown or at approved CPI service centers. Customer implementation is at the customers own discretion. Should the customer decide to perform this operation, CPI cannot be responsible for any damage to the klystron by the incorrect application of this procedure or by improper handling of the klystron.

The procedure will take a few hours. It should be implemented by qualified technicians with knowledge about CPI klystron products. The successful maintenance of the tuner may be difficult to perform while it is inside the KPA. The option of taking the klystron out of the KPA prior to implementing this procedure should be seriously considered.

If the klystron/KPA is in the power-on state, it needs to be powered down in a controlled manner as described in the operation manual allowing sufficient time for the collector to cool.

Channel changer  
controller assembly

D15 connector

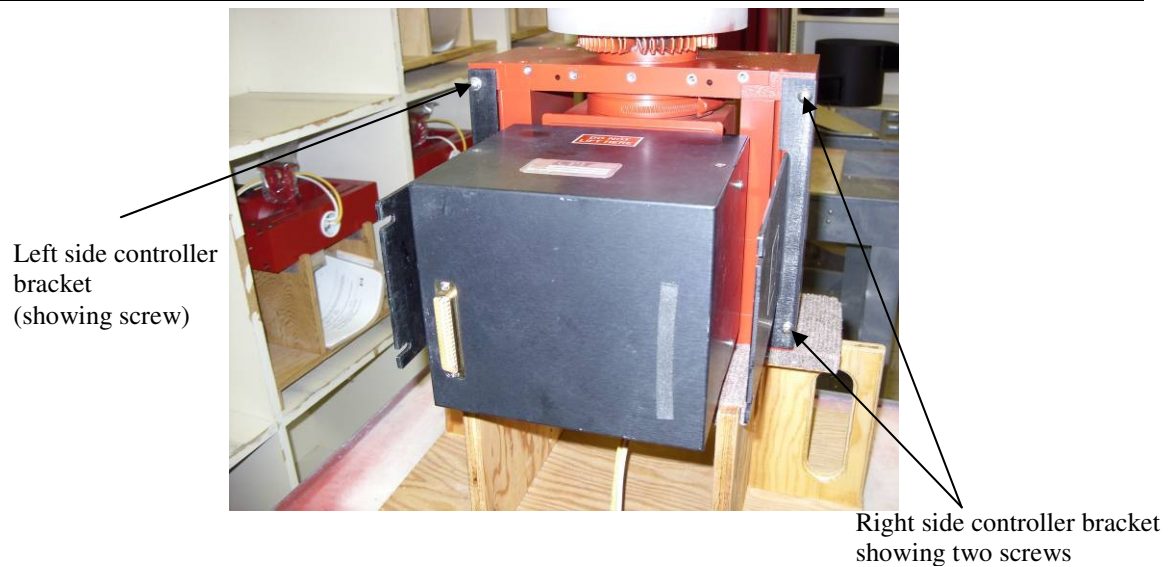


Motor  
Module

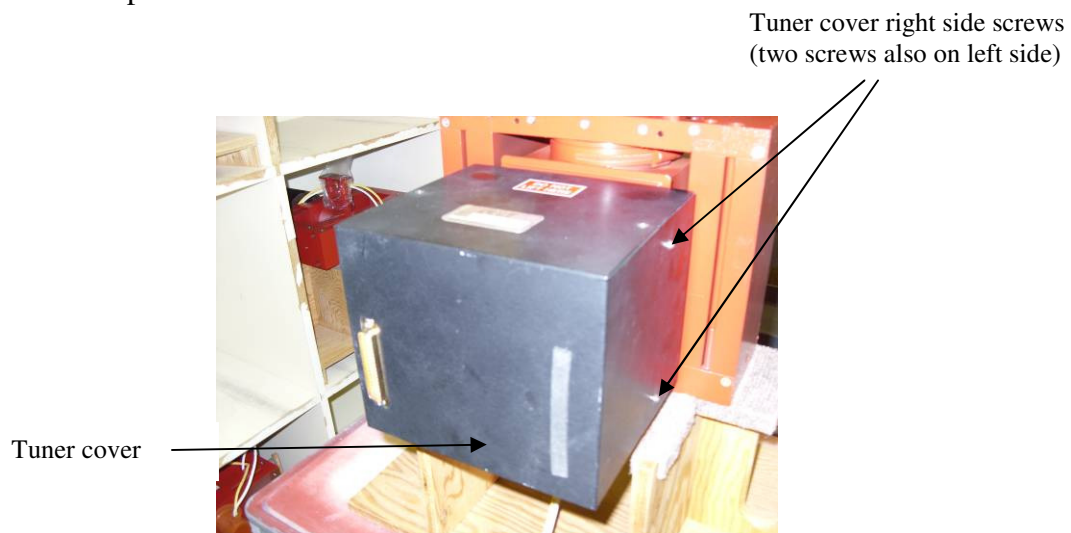
Thumbscrews - two on each  
side of controller bracket  
mounting plates

## Procedure

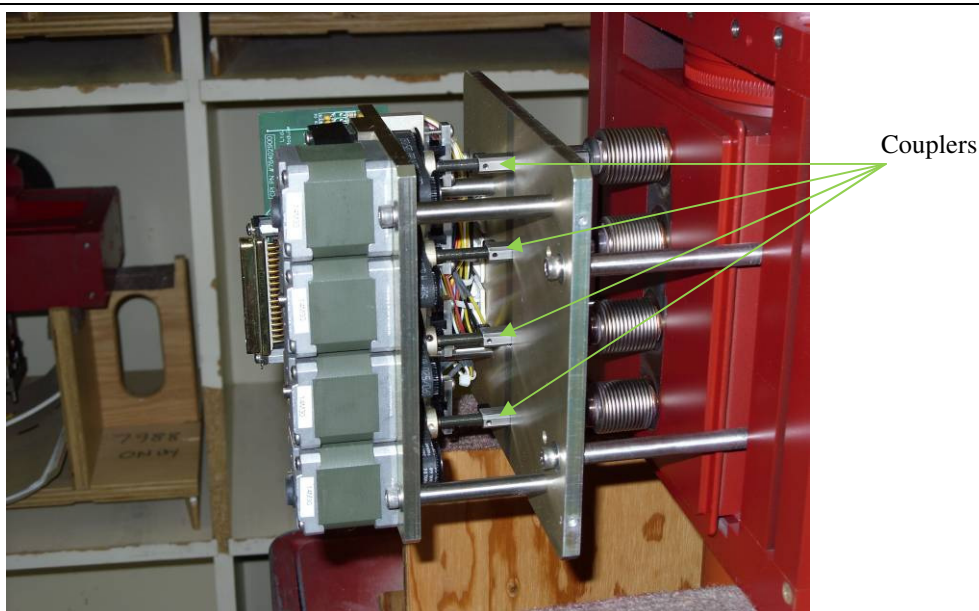
The channel changer controller assembly needs to be removed. This is done by disconnecting the control cable from the D15 connector (already removed and not shown in the above picture), loosening the four thumbscrews locating on the side mounting plates, and then disconnecting and removing the channel changer controller (caution: care must be taken as you remove the channel change controller because a D50 connector exists between it and the motor module) from the motor module.



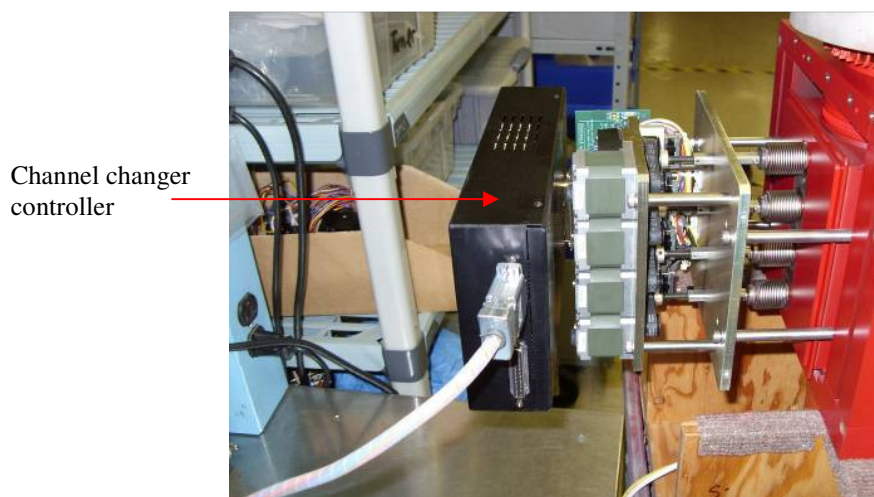
Remove right and left side controller brackets unfastening 2 Phillips screws per bracket as shown in the picture above.



Remove the tuner cover shown in above picture, unfastening 4 screws using a stubby Phillips screwdriver, taking care in the strong magnetic field. Preferably use non-magnetic tools.



The picture above shows tuner (motor module) with cover removed (couplers in the highest frequency position).



Plug the klystron's channel changer controller (make sure D50 connector is fully engaged) back into the motor module assembly as shown in the picture above. Use PC interface cable supplied with each klystron (CPI P/N 764058). Plug the DB15 (f) connector marked "CONTROLLER" into the DB15 (m) port on the channel changer controller assembly. Connect DB15 (m) connector marked "A2J7" to the cable coming

from the KPA marked the same. This will provide required power to the channel changer controller assembly. Connect the DB9 (f) connector marked "LAPTOP" to your laptop's serial port. Make sure your laptop is loaded with the "DFTS D50 FELIX" software

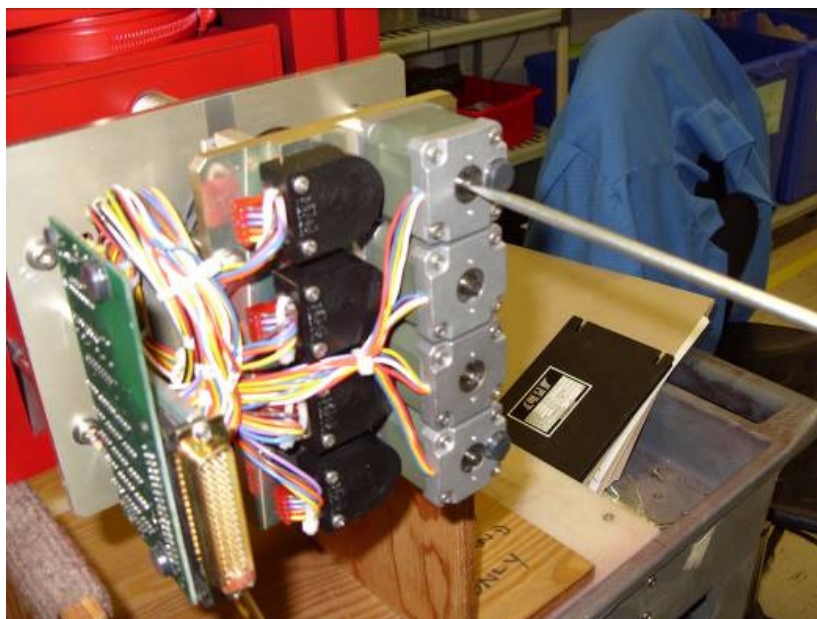


application, available from CPI's website at [www.cpii.com/product.cfm/7/37](http://www.cpii.com/product.cfm/7/37). Plugged cable should resemble configuration in the picture above.

Turn on the KPA power ignoring the channel change link fault. Tuner should move to the HOME position and then it will assume the last active channel settings.

Start your "FELIX" software application. For detailed instruction on how to operate "FELIX" software please refer to the supplied DFTS Manual or download it at <http://www.cpii.com/docs/related/37/dftsmanual.pdf>.

Enter PASSWORD and then send it to the HOME position.

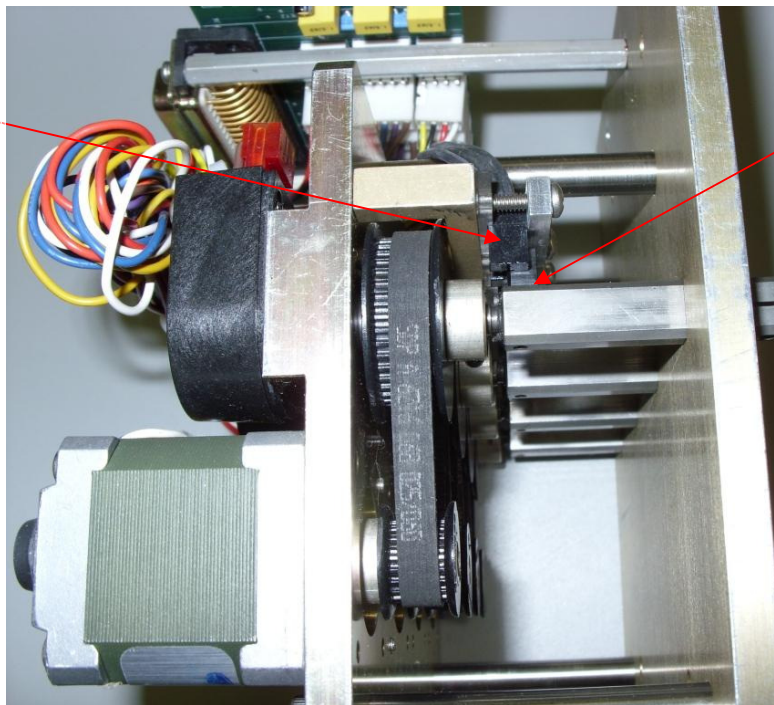


If the motors are struggling to execute this command, give them a helping hand. A gentle turn of the struggling pulley in the same direction the motor is trying to turn should suffice. Be extremely careful doing this!

**Caution:** Do NOT place fingers inside the belt loop as they could be pinched by the pulley.

Now turn the KPA power OFF. This removes the holding current from the motors, making the next step much easier. Remove the channel changer controller. Insert the flat-head screwdriver in the slotted shaft of each motor and turn it four turns clockwise as shown in picture above. This moves the plungers behind home and ensures that any dirty grease is moved out of the active area of the threads. For details see the picture on the next page.

Optical sensor

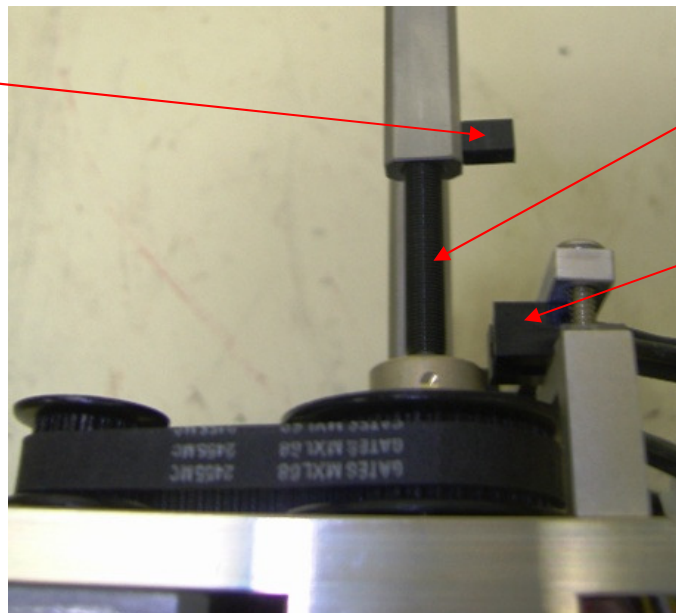


Home position marker –  
at least half way into the  
optical sensor!

Now rotate each of the slotted shafts at least five turns anti-clockwise.

Attach back channel changer controller and re-apply KPA power. Once the tuner initialization is complete, use “FELIX” software to select the highest frequency channel as shown in picture below. This will allow access to the driving screw threads to be inspected.

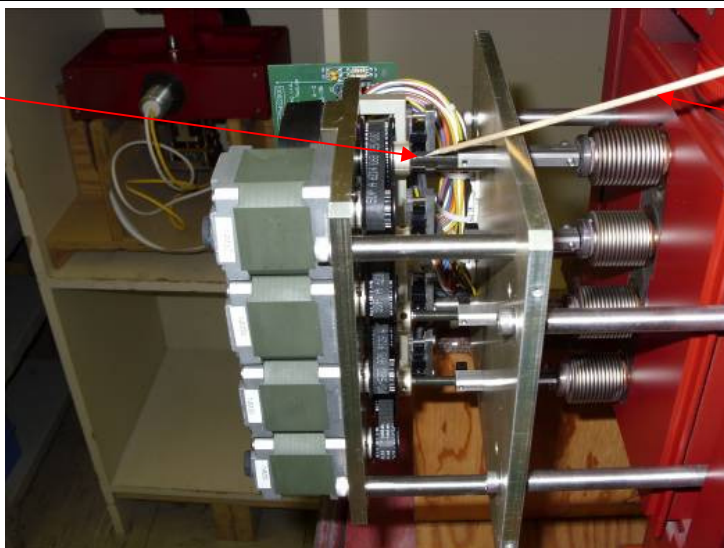
Home position  
marker



Tuner @ the highest  
channel. Exposed  
driving screw thread

Optical sensor

Thread HOME  
area.



Wooden stick.

Power KPA off one more time and remove channel changer controller.

There are total of four driving screws to be cleaned. The threads should be cleaned with lint free cloth and a suitable solvent, acetone is recommended. If there is a contamination of dry/dirty (solid) grease in the thread's home area (upper end), use wooden or plastic tooth stick to remove it. See picture above for the details. Use the flat screw driver to rotate driving screw in order to have access to the entire thread perimeter and do the thorough cleaning.

**Please do NOT spray the solvent directly as it may damage optical sensor.**

**Please do NOT use cotton Q-tips to clean threads.** This could leave cotton fibers on the threads.

After cleaning, allow sufficient time for solvent to dry. Inspect the threads for the dirt residue. The entire exposed thread should now be coated in PTFE-based grease (e.g. "Super Lube" Synthetic Grease with Syncolon (PTFE). For more information go to: [www.super-lube.com](http://www.super-lube.com) .

**Make sure that excess grease doesn't contaminate optical sensors, remove grease carefully from those places, if necessary.**

Re-attach channel changer assembly and apply power to KPA. Using "FELIX" software exercise the channel changer by selecting a routine of running from "HOME" to channel 1 to channel 50 to "HOME" for at least ten cycles. This can be done using the "TUNER CYCLING" function in the "TUNING" menu of the "FELIX" software.

If the channel changer achieves this faultlessly, run the KPA down and rebuild using the reverse steps of the process detailed previously.

If the channel changer gets stuck at any point, or errors are reported on “FELIX”, repeat the cleaning and lubrication procedure and retest.

**Note:** As a guideline, travel from Channel 1 to 50 should take about 12 seconds with well functioning channel changers. Channel change faults will not be shown on the KPA until this time exceeds 30 seconds. The “HOME” process will take longer than 30 seconds but only happens when KPA is powered on.