



FRMUC/T-6940

**FREQUENCY MULTIPLIER UP CONVERTER WITH RETURN LASER
TRANSMITTER FOR SA-6940 NODE**

INSTRUCTION MANUAL

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INSTALLATION INTO SCIENTIFIC-ATLANTA 6940 NODE

- Install the converter/transmitter in the 6940 node per the instructions located on page 4.
- Use caution in handling the SMB connectors on the RF cables used with the converter and the node. Always remove them by pulling them straight out. Try to pull on the connector, not the cable. Always install them by pushing them straight in.
- If this installation is being done on an operating node, **CONNECT THE FIBER TO THE TRANSMITTER BEFORE PLUGGING-IN THE DC POWER CABLE FROM THE CONVERTER/TRANSMITTER.**
- If this installation is being done on a non-operating node, **CONNECT THE FIBER TO THE TRANSMITTER BEFORE APPLYING POWER TO THE NODE WHEN THE NODE IS INSTALLED.**

DANGER- -LASER RADIATION- -DANGER

**THIS UNIT EMITS INVISIBLE LASER RADIATION FROM THE LASER TRANSMITTER THAT
CAN CAUSE PERMANENT EYE DAMAGE**

AVOID DIRECT EXPOSURE TO BEAM

**APPLY DC POWER AND OPERATE ONLY WITH PROPER OPTICAL FIBER INSTALLED IN
TRANSMITTER CONNECTOR**

For demonstration purposes a base configuration SA-6940 is being shown. Other configurations may exist.

NOTE: The OT FRMUC/T-6940 unit uses 75Ω type SMB connections on the RF cables. These connections (and those they mate with) can be damaged if inadvertently abused. Use caution in handling and plugging/unplugging these. Always press them straight in and pull them straight out.

NOTE: The upconverter/laser transmitter has thermally conductive material applied to its mounting surface. This material is an important part of the thermal management design. It must be present as originally installed. This material is somewhat soft and can be damaged by abuse or mishandling. Be sure that no debris gets between the thermally conductive material and the surface it mounts-to.

Step 1: Remove all cables necessary to remove cover plate from SA-6940. (See Figure 1)

Figure 1:



Step 2: Remove the cover plate.

Step 3: Remove the Feeder Return Combiner from PDD2 (See Figure 2). You may then install the Olson Port Interface Board (40-000620), which is supplied with this kit, at PDD2 (See Figure 3)

Figure 2:



Figure 3:



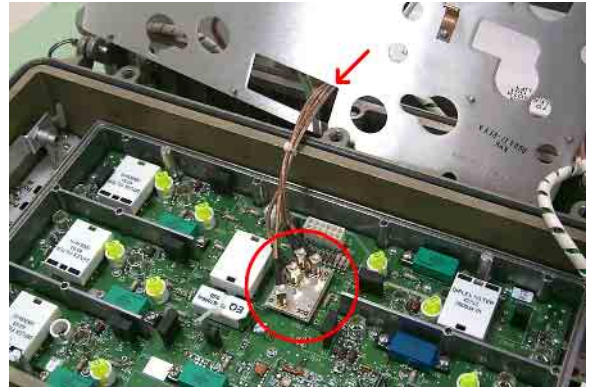
Step 4: Install the upconverter/laser transmitter using its captive screws. Route the R.F. cables down between the FRMUC and the fiber management tray as shown. (See Figure 4) **NOTE:** Use Caution so the screwdriver does not damage the band 4 cable connection as the hinge-side screw is started and tightened. Tighten the mounting screws firmly

Step 5: Feed the RF cables through the cover plate and then connect them as shown in Figure 5. The cables are marked on each end to show where they connect. (Example: A cable marked with B1 and P3, will connect to band 1 on the upconverter, and port 3 on the port interface board.)

Figure 4:



Figure 5:



Step 6: Install the cover plate into its original position, making sure the RF cables go out through the cutout. Arrange the cables so they are not pinched between the cover and the feeder forward splitter at PDD1. Tighten the cover screws.

Step 7: Re-connect the node DC power cable to PWR-2 and the RF cables to their proper connectors as shown in Figure 6.

Step 8: Connect the FRMUC DC power cable to the DC power connector J11 located under the fiber management tray. Route the cable along the dotted line shown in Figure 7. Arrange it under the aluminum ear and AC cable to hold it down in place.

Figure 6:



Figure 7:



NOTE:

If this installation is being done on an operating node, CONNECT THE FIBER TO THE TRANSMITTER BEFORE PLUGGING-IN THE DC POWER CABLE FROM THE CONVERTER/TRANSMITTER. If this installation is being done on a non-operating node, CONNECT THE FIBER TO THE TRANSMITTER BEFORE APPLYING POWER TO THE NODE WHEN THE NODE IS INSTALLED.

DANGER--LASER RADIATION--DANGER

THIS UNIT EMITS INVISIBLE LASER RADIATION FROM THE LASER TRANSMITTER THAT CAN CAUSE PERMANENT EYE DAMAGE

AVOID DIRECT EXPOSURE TO BEAM

APPLY AC POWER AND OPERATE ONLY WITH PROPER OPTICAL FIBER INSTALLED IN TRANSMITTER CONNECTOR.

Step 9: Carefully check cable flexing and fit by closing the housing several times. Arrange cables as necessary to ensure there are no problems.

OPERATIONAL SETUP - RF

- The converter accepts four separate return inputs, one from each feeder leg. It up-converts three of them to three different bands, and combines them with one un-converted band. This combination of four bands plus a pilot carrier at 4.5MHz is fed into the laser transmitter for return transmission via fiber.
- If the FRMUC/T-6940 is installed properly, the frequencies of the four bands and their relationship to the four feeder legs are as follows:

FEEDER PORT THREE	BAND ONE	5MHz to 42MHz
FEEDER PORT FOUR	BAND TWO	51.5MHz to 88.5MHz
FEEDER PORT FIVE	BAND THREE	121.5MHz to 158.5MHz
FEEDER PORT SIX	BAND FOUR	169.5MHz to 206.5MHz

- The return carrier levels from each feeder leg into the converter should be checked and adjusted if necessary. The levels from the four feeders can be checked at RTP3 through RTP6 and the levels can be padded with RPAD3 through RPAD6 in the SA main RF chassis if necessary.
- The specification for MAXIMUM carrier level into each converter band is defined as +15dBmV per (CW) carrier with six carriers present. For best return optical system performance, the input level should be a MINIMUM of +12dBmV per (CW) carrier with six carriers present. The carrier levels may be adjusted as necessary to provide channel-loading equivalent to the six-carrier levels.
- Remember to factor-in the test point value when making carrier level measurement at the test points. The levels mentioned above are ACTUAL levels at the feeder legs/converter inputs.

OPERATIONAL SETUP - TRANSMITTER

- The DFB Laser Transmitter included with the FRMUC/T-6940 has been adjusted at the factory for the proper optical modulation index provided the RF levels are in the range mentioned above. No further adjustment to the transmitter is required.
- The optical power of the Laser Transmitter has been set at the factory at 3mW. No further adjustment to the transmitter is required. If the optical power is measured and found to be much less than 3mW, optical connector cleaning may be required.
- The Laser Transmitter has two DC test points. One is for laser current and is scaled at 1V per 50mA. The other is for optical output power at the laser and is scaled at 1V per mW. It recommended that these two test points be measured (with a DMM) and that their readings be retained as historical data.