OVER-THE-HORIZON RADIO SYSTEMS
2-GHZ OVER-THE-HORIZON RADIO SYSTEM
ITTL NUS 3653-8 10-KW POWER AMPLIFIER
MAINTENANCE

CONTENTS PAGE

1. GENERAL

1.01 This section contains the periodic maintenance procedures required to keep the NUS 3653-8 10-k W power amplifier in a safe and efficient operating condition.

1.02 The shut-down procedures contained in Section 403-405-300 must be completed before maintenance is started. The safety precautions contained in Section 010-110-001 apply to these maintenance procedures. Illustrations and a description of the power amplifiers can be found in Section 403-405-100.

1.03 Prior to conducting the detailed maintenance procedures of Parts 2 and 3, a thorough cleaning and complete inspection of the power amplifier should be accomplished. The following check list serves as a guide for establishing preliminary maintenance conditions.

ITEM	CHECK FOR
High-voltage grounding switches	Loose connections, binding
Wiring	Damaged insulation, loose lacing, missing identification tags
Coaxial cables	Loose connections, damaged or worn connectors, broken sheath connections, defective cable
Meter switches	Binding, loose knobs
Lamps	Defective lamps, broken sockets
Transformers	Oil leaks, loose connections
Terminal strips	Loose connections
Coolant plumbing	Leaks, damaged or worn hose, leaky quick-disconnect fittings
Cabinets	Doorlock operation, misplaced tools or parts, dirt, general appearance
Auxiliary components	Loose power plugs, missing hardware, damaged or worn controls

1.04 Concurrent with the preliminary inspection, the power amplifier components should be thoroughly cleaned. General cleaning methods are described in Section 069-305-301. Porcelain insulation can be cleaned using a detergent and water solution. The use of brush and vacuum cleaner is recommended for cleaning irregular surfaces. Accumulations of dust on high-voltage wiring should be removed with a damp cloth. Care must be taken to avoid disturbing controls.

2. MECHANICAL SYSTEMS

AIR COOLING SYSTEM

A. Blowers

2.01 All blower motors in the power amplifier and power supply cabinets have sealed bearings. Noisy motors or blower assemblies should be replaced. The condition of the bearings in the rectifier tube cooling blowers can be determined by spinning the fan blades by hand.

2.02 The direction of rotation of a replacement rectifier cooling blower can be determined by using a tissue streamer temporarily taped in position in the air stream. The air flow should be toward the bank of rectifier tubes.

B. Air Filters

2.03 The two air filters located on the tops of the amplifier and power supply cabinets should be removed and cleaned periodically. The filters should be soaked in a detergent and cold water solution with the dirty side down. Carefully rinse the filters in clean water and allow them to dry.

2.04 The distribution of filtering material should not be disturbed. The filters can be damaged by mishandling. Do not use compressed air, a strong stream of water, or hot water in the cleaning operation.

2.05 Wipe any accumulation of dust at the cabinet air intakes using a damp cloth. Reinstall the filters with the arrows on the edges pointing down.

2.06 Replace defective filters.

LIQUID COOLING SYSTEM

A. Flow Meter Sludge Draining

2.07 Remove the drain plug in the bottom of each flow meter and let the accumulated sludge drain into a shallow pan. Replace the plug.

B. Coolant Strainer Cleaning

2.08 Open the strainer in the main feed to the amplifier, and remove and clean the screen. Replace the screen and close the strainer.

3. ELECTRICAL SYSTEMS

TRANSFORMERS

A. Beam Supply Unitized Rectifier Transformer

3.01 The beam supply unitized rectifier transformer is a sealed unit and requires no on-site maintenance by station personnel other than external cleaning.

> ***Caution: The sealed unit contains pyranol, the vapors of which are toxic. Do not attempt to drain the tank, or open it for any reason. If a leak occurs, avoid contact with the liquid, ventilate the area, and contact the nearest General Electric Representative for assistance.***

B. Induction Voltage Regulator

3.02 The induction voltage regulator is a motor driven autotransformer requiring periodic cleaning and lubrication. The accumulation of dust on the regulator should be blown off with clean, dry compressed air. The main worm and worm gear should be lubricated periodically with a good grade of grease. Detailed maintenance procedures for motor driven autotransformers are contained in Section 028-706-701.

C. Control Variacs

3.03 The klystron filament Variac, the three magnet Variacs, and the beam voltage Variac are all manually operated autotransformers. The Variacs are of the continuously tapped type, which means that the brushes and commutators must be kept clean, and specified brush tension must be maintained, to prevent arcing. Detailed specifications for manually operated autotransformers are contained in Section 028-705-701.

BEAM CIRCUIT BREAKER

3.04 The beam circuit breaker requires moderate lubrication. Bearing points and latch surfaces should be lubricated with a thin film of high temperature, high pressure, light grease. Hardened grease and dirt should be removed from latch and bearing surfaces with kerosene. All excess lubricant should be removed with a clean cloth to avoid the accumulation of dirt and dust.

PHASE FAILURE RELAYS

3.05 The phase failure relay contacts should be cleaned with a fine burnishing tool. Coarse material, such as files and abrasive cloth should not be used on the silver contacts. Such abrasive materials, when used, leave residue, cause increased arcing, and hasten deterioration of contacts. General Electric Instruction Bulletin GEI-30971C provides detailed descriptive information on the phase failure relays.

DOOR CONTACTORS

3.06 The five Allen-Bradley contactors located on the power cabinet doors should be cleaned and inspected periodically. If any contacts should require replacement, the entire set of contacts should be replaced.

3.07 The adjusting procedures for the maintenance of Allen-Bradley solenoid-type contactors are contained in Section 026-356-701.

4. REFERENCES

BELL SYSTEM PRACTICES

010-110-001	Safety precautions
028-705-701	Autotransformers, manually operated
028-706-701	Autotransformers, motor driven
069-305-301	Cleaning Methods
403-405-100	NUS 3653-8 10-kW amplifier, description
403-405-300	NUS 3653-8 10-kW amplifier, operation
403-405-501	NUS 3653-8 10-kW amplifier, tests & alignment

403-405-801	NUS 3653-8 10-kW amplifier, klystron replacement

ITT Laboratories instruction manual for the 10-kW amplifier NUS 3653-8

GENERAL ELECTRIC BULLETINS

GEH-1807B	Beam circuit breaker
GEI-63853	Induction voltage regulator
GEI-30971C	Phase failure relays

GENERAL RADIO BULLETINS

913-A	Klystron filament Variac
650-K	Body magnets Variacs
667-D	Beam voltage Variac