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MAGNETIC POWER SUPPLY ASSEMBLY
OF
M509A2E1 FUZE (PHASE I)

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ARRADCOM

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US ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND
LARGE CALIBER
WEAPON SYSTEMS LABORATORY
DOVER, NEW JERSEY

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# MAGNETIC POWER SUPPLY ASSEMBLY OF M509A2E1 FUZE (PHASE I)

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MMT-5804266

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## Abstract
The objective of this study was to develop the technology of manufacturing the M509A2E1 fuze used in the 105-mm heat round. The detailed design of the assembly stations was completed and a functional layout of the line was established. Fabrication and procurement of the hardware necessary to set up the critical stations were initiated. The planned phase II of the contract will provide for fabrication, installation, and debugging of the equipment.
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INTRODUCTION

During Phase I, Bulova designed and fabricated equipment for assembly, inspection, and testing of the magnetic power supply assembly and associated electronics of the point initiating, base detonating (PIBD) fuze M509A2E1.

DISCUSSION

At the beginning of this project, it was anticipated that the existing fuze design would be available for high-volume producibility. However, as a result of tests, design modification was required. Rather than use a series of temporary modifications on an ongoing basis, Bulova proposed that basic design improvements be made which would take advantage of more sophisticated levels of technology and ensure higher reliability as well as better producibility.

Analysis and evaluation showed that certain assembly processes used in the development program were not fully suitable for high-volume production. The following examples show advances that have been made:

1. The original design for the setback generator, although functionally adequate, had some producibility shortcomings. An average time of 23 minutes was needed to wind the coil assembly. Seventeen of those 23 minutes were required to attach external leads to the coil's leads via a soldering process. To overcome this problem, and to strengthen the bobbin, the coil assembly was redesigned. External leads were replaced by resistance-welding the coil leads to pins installed in the bobbin.

2. The resistance-welding process also eliminated the need to clean up the flux residue left by the hand soldering process and further reduced the time to establish and test the coil connections to under 1 minute.

A Bulova-owned coil winding machine was modified to wind eight coils at a time, rather than one at a time, which a much less sophisticated machine had been doing during the development program.

The new improved design of the setback generator assembly included replacing the existing magnet and two core pieces with a longer single magnet of the same diameter. Test indicated two benefits:

1. Higher generator output voltage than previously available.

2. Abatement of a possible hang-up of the magnet/two core pieces on the inside of the generator coil assembly.

A new type magnetic charger and a special Gausmeter were purchased and modified by Bulova. By using these in conjunction with additional special fixtures, Bulova could magnetize and validate 24 setback generator assemblies in a single charging cycle.
The printed circuit board assembly was redesigned and repackaged for high volume production. (A wave flow soldering process will replace the hand solder process in Phase II.) Component locations were changed so that four axial and one radial lead components could be formed by component lead-forming systems. These forming systems can yield preformed components for direct installation into the printed circuit board assembly in production quantities compared to very small quantities using hand tools. The specific quantity per hour is dependent on the packaging of the components "reeled," "on cards," or bulk packed and the type component.

A flow chart; bench layout schematic; bench layout assembly, stations 1 through 21; and proposed schedule for completion of Phase I tooling are shown in figures 1 through 4.

Details of the setback generator assembly are shown in table 1; details of the magnetic power supply assembly are in table 2.

PROPOSED PHASE II

In Phase II the initial tooling and inspection equipment designs will be carried beyond the interim concepts initiated in Phase I. Several new pieces of equipment have been proposed to ensure the quality and reliability goals:

1. The centrifuge timing test console will have a print-out and computer evaluation of the fuze to be tested. In addition, it will have the capability of testing, selecting, and segregating on a multiple limit selection option.

2. The Phase II version of the electrical acceptance test console for testing the magnetic power supply will have a computer evaluation of test data and a print-out of data as additional features. Information can be stored on a printed tape and identified by lot identification number.

3. The release mechanism assembly tester is an in-process functional tester used on the VIPER fuze program to confirm proper function of the three-leaf mechanism. This equipment is capable of testing 18 units simultaneously with a potential capability of approximately 200 units per hour. Projected VIPER fuze requirements are only 65 per hour, the same as the M509A2E1 fuze.

Therefore, the release mechanism assembly tester should easily be capable of supporting both the VIPER and the M509A2E1 fuze programs. Approval for use of this equipment will be requested of the VIPER prime contractor, General Dynamics. However, if required, a full set of existing drawings are available for replicating this unit.

As the need arises, Bulova will recommend improvements for all tooling and equipment designed in Phase I. Analysis will be made to determine whether replication or new designs are required to maintain or increase rates as required. Additional tooling, not previously considered, will be suggested if such is essential to the manufacture of a high reliability product.

A flow chart for Phase II is shown in figure 5.
<table>
<thead>
<tr>
<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>USED WITH PART/ASSY NO.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>273-19002</td>
<td>Modified Production Type Coil Winding Machine</td>
<td>KC90211 Coil Assy</td>
<td>Wind Coi Assy of Setback Generator (Bulova Capital Equipment)</td>
</tr>
<tr>
<td>273-19003</td>
<td>(2) Tension Devices</td>
<td>KC90211 Coil Assy</td>
<td>Wire Tension Control Device</td>
</tr>
<tr>
<td>273-19006</td>
<td>Air Press &amp; Sliding Anvil Fixture</td>
<td>KC90207 Bobbin Assy</td>
<td>Install (2) Terminal Posts</td>
</tr>
<tr>
<td>273-19007</td>
<td>Holding Fixture</td>
<td>KC90211 Coil Assy</td>
<td>Support and rotate Coil Assembly during application of insulating tape over winding.</td>
</tr>
<tr>
<td>273-19008</td>
<td>Trays Peg Board</td>
<td>KC90211 Coil Assy</td>
<td>Storage Tray for Coil Assy</td>
</tr>
<tr>
<td>BW-158862</td>
<td>Resistance Welding Machine-Unitek Weldmatic</td>
<td>KC90211 Coil Assy</td>
<td>Welding Machine - Power Pack, Welding Head and Remote Control Unit (Bulova Capital Equipment)</td>
</tr>
<tr>
<td>273-19010</td>
<td>Modified Electrodes &amp; Table (Pressure Meas.,) for Welding Machine</td>
<td>KC90211 Coil Assy</td>
<td>Special Welding Electrodes &amp; Table</td>
</tr>
<tr>
<td>273-19011</td>
<td>Welding Fixture - Indexing Two Position</td>
<td>KC90211 Coil Assy</td>
<td>Fixture to Position Assy for Welding</td>
</tr>
<tr>
<td>273-60007</td>
<td>Welding Test Fixture (Fixture &amp; Gage)</td>
<td>KC90211</td>
<td>To Measure Weld Strength</td>
</tr>
<tr>
<td>273-19013</td>
<td>Air Cylinder &amp; Press-in Fixture</td>
<td>P/0 KD90200 Setback Generator Assy</td>
<td>Press fit Armature Plt. into Armature Body</td>
</tr>
</tbody>
</table>

* Tooling to be completed during Phase II of program
### Table 1. (cont)

<table>
<thead>
<tr>
<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>USED WITH PART/ASSY NO.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>273-19014</td>
<td>Trays, - Storage</td>
<td>P/0 KD90200 Setback Gen. Assy.</td>
<td>For Armature Subassy</td>
</tr>
<tr>
<td>273-19015</td>
<td>Air Cylinder &amp; Press-in Fixture</td>
<td>P/0 KD90200 Setback Gen. Assy.</td>
<td>Press fit Shearing Plt. into Generator Cover</td>
</tr>
<tr>
<td>273-19017</td>
<td>Air Press &amp; Tooling</td>
<td>KD90200 Setback Gen. Assy.</td>
<td>Swage Body of Armature 360° Around Cover Sub Assy</td>
</tr>
<tr>
<td>273-60004</td>
<td>Continuity Tester Assy</td>
<td>KC90211</td>
<td>V.O.M. and Interface Fixture (Measure Continuity of Coil Assy)</td>
</tr>
<tr>
<td>273-60001</td>
<td>Gaussmeter and Holding Fixture W/Probe Built In</td>
<td>KD90200 Setback Gen. Assy.</td>
<td>Measures Gen. Flux Leakage after Magnetic Charge</td>
</tr>
<tr>
<td>273-60009</td>
<td>Pin Pull Out Tester</td>
<td>KD90207 Bobbin Assy.</td>
<td>Pull Test of (2) Pins Pressed into Flange of Bobbin</td>
</tr>
</tbody>
</table>

- Test equipment to be completed during Phase II of program
<table>
<thead>
<tr>
<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>273-60010</td>
<td>Polarization Tester</td>
<td>Test Electrically Direction of Winding of Coil and Validate Start Lead. After Completion.</td>
</tr>
<tr>
<td></td>
<td>Vacuum Test Device</td>
<td>N.H.A. Bobbin Assy KC90207</td>
</tr>
<tr>
<td></td>
<td>Molds</td>
<td>N.H.A. Setback Generator Assembly KC90200</td>
</tr>
<tr>
<td></td>
<td>Bobbin</td>
<td>N.H.A. Setback Generator Assembly KC90200</td>
</tr>
<tr>
<td></td>
<td>Cover Generator</td>
<td>N.H.A. Setback Generator Assembly KC90200</td>
</tr>
<tr>
<td></td>
<td>Dies</td>
<td>Used for inspection of Shear Disc.</td>
</tr>
<tr>
<td></td>
<td>Armature Body</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bumping Die</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Projection Chart</td>
<td></td>
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Test equipment/Inspection Gage to be completed during Phase II of program
<table>
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<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>USED WITH PART/ASSY NO.</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>273-19009</td>
<td>Crimping Tool, &quot;AUTOMATOR&quot;</td>
<td>KB90184 S2 Contact Assy</td>
<td>Crimp Contact Wire in Switch Terminal</td>
</tr>
<tr>
<td>273-19012</td>
<td>Holding Fixture Soldering</td>
<td>KB90184 S2 Contact Assy</td>
<td>Solder Contact Wire to Switch Terminal</td>
</tr>
<tr>
<td>273-19018</td>
<td>Tray-Storage</td>
<td>KB90184 S2 Contact Assy</td>
<td>Storage Tray</td>
</tr>
<tr>
<td>273-19019</td>
<td>Press-In Fixture w/Horizontal Slide Lever</td>
<td>KB90190 S2 Switch Housing Assy</td>
<td>Press-In (2) S2 Switch Contacts in S2 Housing</td>
</tr>
<tr>
<td>273-19020</td>
<td>Staking Tool, Air Press</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Stake Switch S2 Contact Assy to P.C. Board</td>
</tr>
<tr>
<td>273-19021</td>
<td>Tray-Storage</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Storage Tray</td>
</tr>
<tr>
<td>273-19005</td>
<td>Radial Lead Component Forming System</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Heller Radial Capacitor Lead Former Model RD-70C and Custom Die Set</td>
</tr>
<tr>
<td>273-19022</td>
<td>Press-In Fixture &quot;Potence&quot;</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Press-In Connector Jack to P.C. Board</td>
</tr>
<tr>
<td>TOOL NO.</td>
<td>TOOL DESCRIPTION</td>
<td>USED WITH PART/ASSY NO.</td>
<td>REMARKS</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>273-19023</td>
<td>Holding Fixture, for P.C.B. Assy</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Holding Fixture for P.C.B. Assy during Installation of Components</td>
</tr>
<tr>
<td>273-19024</td>
<td>Component Lead Bending/Clinching Hand Tool</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Hand Tool for Clinching Component Leads on P.C. Board</td>
</tr>
<tr>
<td>273-19025</td>
<td>Holding Fixture Soldering &amp; Switch S4 Perpendicularity Requirements</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Hand Soldering - P.C. Board Assy (Less Sw.S2 &amp; Setback Generator Assy's)</td>
</tr>
<tr>
<td>273-19026</td>
<td>Assembly Holding and Soldering Fixture</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Assemble and Solder S2 Switch Housing Assy &amp; Setback Gen. Assy to P.C.B.</td>
</tr>
<tr>
<td>273-19027</td>
<td>Staking Tool, &quot;Automator&quot;</td>
<td>KD90156 H'sg., Pin &amp; Contact Assy</td>
<td>Stake - Ground Wire in Rotor Housing Assy</td>
</tr>
<tr>
<td>273-19028</td>
<td>Staking Tool Air Press</td>
<td>KD90217 Molded Housing Assy</td>
<td>Stake P.C. Board (M.P.S.) in Housing Assy.</td>
</tr>
<tr>
<td>273-19029</td>
<td>Holding Fixture (Special Vise) Soldering</td>
<td>KD90217 Molded Housing Assy</td>
<td>Solder (2) Wires from Housing Assy to P.C. Board Assy</td>
</tr>
<tr>
<td>273-19030</td>
<td>Press-In Fixture, Probe Grommets</td>
<td>KD90217 Molded Housing Assy</td>
<td>Install (5) Probe Grommets in Power Supply Cover</td>
</tr>
</tbody>
</table>

Tooling to be completed during Phase II of program
<table>
<thead>
<tr>
<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>USED WITH PART/ASSY NO.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>273-19031</td>
<td>Press-In Fixture, Shell Receptacle</td>
<td>KD90217 Molded Housing Assy</td>
<td>Install (1)Shell Receptacle in Power Supply Cover</td>
</tr>
<tr>
<td>273-19032</td>
<td>Swaging Tool P.S. Cover to Rotor Housing</td>
<td>KD90217 Molded Housing Assy</td>
<td>Swage P.S. Cover to Rotor Housing</td>
</tr>
<tr>
<td>273-19033</td>
<td>Special Fittings for Encapsulating System</td>
<td>KD90217 Molded Housing Assy</td>
<td>Install Special Fittings on Encapsulating System</td>
</tr>
<tr>
<td>273-19034</td>
<td>Tray-Storage</td>
<td>KD90217 Molded Housing Assy</td>
<td>Storage Tray</td>
</tr>
<tr>
<td>273-19035</td>
<td>Radial Riveting Machine</td>
<td>KF80049 Rear Bearing Plate &amp; Spacer Assy</td>
<td>Install (2) Pin, Leafs in Rear Bearing Plate and Spacer Assy</td>
</tr>
<tr>
<td>273-19036</td>
<td>Fixture - Peening</td>
<td>KF80049 Rear Bearing Plate &amp; Spacer Assy</td>
<td>Spacer Assy</td>
</tr>
</tbody>
</table>

To be Assigned Wave Flow Soldering System | KF90194 Magnetic Power Supply Assy | Wave Flow Soldering of M. P. S. Assy |

* Tooling/Test equipment to be completed during Phase II of program
<table>
<thead>
<tr>
<th>TOOL NO.</th>
<th>TOOL DESCRIPTION</th>
<th>USED WITH PART/ASSY NO.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>To be Assigned</td>
<td>Carriers for W.F.S. System (Sheet 6)</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Wave Flow Soldering of M.P.S. Assy</td>
</tr>
<tr>
<td>To be Assigned</td>
<td>Fixtures for W.F.S. System (Sheet 6)</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Wave Flow Soldering of M.P.S. Assy</td>
</tr>
<tr>
<td>To be Assigned</td>
<td>Cleaning System for W.F.S. (Sheet 6)</td>
<td>KF90194 Magnetic Power Supply Assy</td>
<td>Wave Flow Soldering of M.P.S. Assy</td>
</tr>
<tr>
<td>331-60001</td>
<td>Acceptance Test Console &amp; Centrifuge</td>
<td>KF90215 Housing &amp; Mech. Assy</td>
<td>Arming Time Test Computer Evaluated Including Print Out (Centrifuge-Bulova Capital Equipment)</td>
</tr>
<tr>
<td>To be Assigned</td>
<td>Sonic Welding Machine to Weld S2 Switch Housing to P.C. Board Assy (M.P.S.A.)</td>
<td>KF50194 Magnetic Power Assy</td>
<td>To Heat Stake S2 Switch Housing to Magnetic Power Supply Assy</td>
</tr>
<tr>
<td>273-90003</td>
<td>Molds Mold section for Fork</td>
<td>KC90154 Fork</td>
<td>Mold for Fork - used in Cam Follower Assy. KC90153</td>
</tr>
<tr>
<td>273-90004</td>
<td>Injection Mold for S2 Switch Housing</td>
<td>KD90185</td>
<td>S2 Switch Housing used in all Magnetic Power Supply Assemblies</td>
</tr>
</tbody>
</table>

* Test equipment/Tooling to be completed during Phase II of program
Figure 1. Phase I--Flow chart
Figure 2. Phase I—Bench layout schematic

**BENCH LAYOUT**

![Diagram of bench layout with dimensions and flow direction]

**STATIONS DIMENSIONS**
- 5 FT x 2 1/2 FT (as per bench detail sheets)
- 6 FT x 2 1/2 FT (" " " " " " )

**LEGEND**
- 22 Assembly Stations (Benches)
- 4 Inspection Stations (Benches)
TYPICAL BENCH LAYOUT

UNITS IN

PART BINS

WORKPLACE

UNITS OUT

CHAIR FOR ASSEMBLER

SETBACK GENERATOR ASSEMBLY
ASSY NO. KD90200
OPERATION SHEET NO. 273-1

PARTS LIST (QTY PER ASSY)
(1) KC90207 BOBBIN ASSY
(2) KB90201 POST, TERMINAL

ASSEMBLY STATION NO. 1

SHEETS to be determined (T.B.D.)

SPECIAL TOOLS/EQUIPMENT
TOOL NO. 273-19006
TOOLING TO INSTALL (2) TERMINAL POSTS IN BOBBIN ASSY.
TOOL NO. 273-60009
PULL TEST OF (2) PINS PRESSED INTO FLANGE OF BOBBIN.

Figure 3a. Phase I—Bench layout, assembly station no. 1
Figure 3b. Phase I—Bench layout, assembly station no. 2
TYPICAL BENCH LAYOUT

COIL ASSEMBLY
ASSY NO. P/O KC90211
CONTINUED

ASSEMBLY STATION NO. 2
SHEET 2 OF 2

SPECIAL TOOLS/EQUIPMENT CONTINUED

TOOL NO. 273-19007
HOLDING FIXTURE FOR APPLYING TAPE TO WINDING

TOOL NO. 273-19008
STORAGE TRAY FOR COIL ASSY.

Figure 3b. (cont)
Figure 3c. Phase I—Bench layout, assembly station no. 3
Figure 3c. (cont)
Setup: Generator Assembly

**ASSY NO.** KD90200

**OPERATION SHEET NO.** 273-4

**PARTS LIST (QTY PER ASSY):**

1. **KC90211 COIL ASSY**
   (Supplied by ASSY Station No. 3)
2. **KC90203 BODY, ARMATURE**
3. **KD 90206 PLATE ARMATURE**
4. **KB90325 INSULATING SLEEVES**

**ASSEMBLY STATION NO. 4**

**SPECIAL TOOL/EQUIPMENT**

1. **TOOL NO. 273-19013**
   Press-in fixture to install coil assy, and armature plate into armature body
2. **TOOL NO. 273-19014**
   Storage tray for armature sub assy.

**Figure 3d. Phase I—Bench layout, assembly station no. 4**
TYPICAL BENCH LAYOUT

PARTS LIST (QTY PER ASSY)
(1) KD90198 COVER, GENERATOR
(1) KD90199 PLATE, SHEARING

SPECIAL TOOLS/EQUIPMENT
TOOL NO. 273-19015
PRESS FIT SHEARING PLATE INTO GENERATOR COVER.

Figure 3e. Phase I—Bench layout, assembly station no. 5
TYPICAL BENCH LAYOUT

UNITS IN

24" x 18" WORKPLACE

UNITS OUT

CHAIR FOR ASSEMBLER

PARTS LIST (QTY PER ASSY)

(1) P/O KD90200 GENERATOR COVER SUB ASSEMBLY (SUPPLIED BY ASSY STATION NO. 5)
(1) P/O KD90200 ARMATURE SUB ASSY (SUPPLIED BY ASSY STATION NO. 4)
(1) KB 90130 MAGNET
(1) KC90205 DISC, SHEAR

SETBACK GENERATOR ASSEMBLY
ASSY NO. KD90200
OPERATION SHEET NO. 273-6

ASSEMBLY STATION NO. 6
SHEETS T.B.D.

SPECIAL TOOLS/EQUIPMENT

TOOL NO. 273-19016
PRESS FIT COVER SUB ASSY INTO ARMATURE SUB ASSY

TOOL NO. 273-19017
SWAGE BODY OF ARMATURE 360° AROUND COVER SUB ASSY.

Figure 3f. Phase I—Bench layout, assembly station no. 6
Figure 3g. Phase I—Bench layout, assembly station no. 7
TYPICAL BENCH LAYOUT

24" x 18" WORKPLACE

ASSEMBLY STATION NO. 8

SPECIAL TOOLS / EQUIPMENT

MAGNETIC CHARGER, CHARGING FIXTURE AND CHARGING TRAYS TO CHARGE MAGNET OF GENERATOR.

MEASURES GENERATOR FLUX LEAKAGE AFTER MAGNETIC CHARGE.

Figure 3h. Phase I—Bench layout, assembly station no. 8
S2 CONTACT ASSEMBLY
ASSY NO. KB90184
OPERATION SHEET NO. 273-9

PARTS LIST (QTY PER ASSY)
(1) KB90017 WIRE, CONTACT
(1) KB90183 SWITCH, TERMINAL

ASSEMBLY STATION NO. 9

SHEET T.B.D.

SPECIAL TOOLS / EQUIPMENT
TOOL NO. 273-19009
CRIMP CONTACT WIRE IN SWITCH TERMINAL
TOOL NO. 273-19012
SOLDER CONTACT WIRE TO SWITCH TERMINAL
TOOL NO. 273-19018
STORAGE TRAY FOR S2 CONTACT ASSY.

Figure 31. Phase I—Bench layout, assembly station no. 9
TYPICAL BENCH LAYOUT

MAGNETIC POWER SUPPLY ASSY
ASSY NO. KF 90194
OPERATION SHEET NO. 273-10

PARTS LIST (QTY PER ASSY)
(1) KB90184 S2 CONTACT ASSY
(SUPPLIED BY ASSY STATION 9)
(1) KF 90193 PRINTED CIRCUIT BOARD
(1) KB90210 JACK, CONNECTOR

ASSEMBLY STATION NO. 10
SHEETS T.B.D.

SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-19020
STAKE S2 SWITCH CONTACT ASSY TO P.C. BOARD
TOOL NO. 273-19022
PRESS IN CONNECTOR JACK TO P.C. BOARD
TOOL NO. 273-19021
STORAGE TRAY.

Figure 31. Phase I—Bench layout, assembly station no. 10
Figure 3k. Phase I—Bench layout, assembly station no. 11

S2 SWITCH HOUSING ASSY
ASSY NO. KB90190
OPERATION SHEET NO. 273-11

PARTS LIST (QTY PER ASSY)
(1) KD90185 HOUSING, SWITCH S2
(2) KB90155 WIRE CONTACTS

ASSEMBLY STATION NO. 11
SHEETS T.B.D.

SPECIAL TOOLS/EQUIPMENT
TOOL NO. 273-19019
PRESS-IN (2) S2 SWITCH CONTACTS IN S2 HOUSING.
Figure 31. Phase I—Bench layout, assembly station no. 12a
**TYPICAL BENCH LAYOUT**

![Diagram of typical bench layout]

- **MAGNETIC POWER SUPPLY ASSY.**
  - ASSY NO. KF90194
  - RADIAL LEAD COMPONENT FORMING STATION
  - OPERATION SHEET NO. 273-12B

- **ASSEMBLY STATION NO. 12B**
  - SHEETS T.B.D.

- **PARTS LIST (QTY PER ASSY)**
  - (1) KB90212 CAPACITOR (RADIAL LEAD)

- **SPECIAL TOOLS/EQUIPMENT**
  - TOOL NO. 273-19005
  - HELLER RADIAL COMPONENT LEAD FORMING SYSTEM (RD-70-C AND CUSTOM DIE SET)

*Figure 3m. Phase I—Bench layout, assembly station no. 12b*
MAGNETIC POWER SUPPLY ASSY
ASSY NO. KF90194
INSTALL COMPONENTS IN P.C. BOARD
OPERATION SHEET NO. 273-13

PARTS LIST (QTY PER ASSY)
(1) RESISTOR R1 (FORMED)
(1) RESISTOR R2 (FORMED)
(1) DIODE D1 (FORMED)
(1) INPACT SWITCH (FORMED)
(1) CAPACITOR C1 (FORMED)
(ABOVE SUPPLIED ASSY STATIONS 12A & 12B)

ASSEMBLY STATION NO.13
SHEET 1 OF 2
SHEETS T.B.D.

SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-19023
HOLDING FIXTURE FOR P.C. BOARD DURING INSTALLATION OF COMPONENTS

Figure 3n. Phase I—Bench layout, assembly station no. 13
TYPICAL BENCH LAYOUT

UNITS IN

PART BINS

24" x 18" WORKPLACE

SHELL PARTS

FIXT

PARTS OUT

UNITS OUT

CHAIR FOR ASSEMBLER

MAGNETIC POWER SUPPLY ASSY
ASSY NO. KF90194
CONTINUED

ASSEMBLY STATION NO. 13
SHEET 2 OF 2

PARTS LIST (QTY PER ASSY) CONTINUED

(1) KB90190 SWITCH S2 ASSY
(SUPPLIED BY ASSY STATION 11)

(1) KD90200 SETBACK GENERATOR ASSY
(SUPPLIED BY ASSY STATION 8)

(1) P/O KF90194 P.C. BOARD SUB ASSY
(SUPPLIED BY STATION 10)

Figure 3n. (cont)
TYPICAL BENCH LAYOUT

MAGNETIC POWER SUPPLY ASSY
ASSY NO. KF90194
COMPONENT LEAD CLINCHING AND SOLDERING
OPERATION SHEET NO. 273-14

PARTS LIST (QTY PER ASSY)
(1) P/O KF90194 P.C. BOARD SUB ASSY (SUPPLIED BY STATION 13)

ASSEMBLY STATION NO. 14
SHEET 1 OF 2

SPECIAL TOOLS/EQUIPMENT
TOOL NO. 273-19024
HAND TOOL FOR CLINCHING COMPONENT LEADS
TOOL NO 273-19025
HOLDING FIXTURE FOR COMPONENTS WHILE SOLDERING.

Figure 30. Phase 1—Bench layout, assembly station no. 14
TYPICAL BENCH LAYOUT

24" x 18" WORKPLACE

2 1/2'

MAGNETIC POWER SUPPLY ASSY
ASSY NO. KF90194
CONTINUED

ASSEMBLY STATION NO. 14
SHEET 2 OF 2

SPECIAL TOOLS/EQUIPMENT CONTINUED
TOOL NO. 273-19026
HOLDING FIXTURE FOR S2 SWITCH HOUSING AND SETBACK GENERATOR ASSY WHILE SOLDERING TO P.C. BOARD SUB ASSEMBLY.

Figure 30. (cont)
TYPICAL BENCH LAYOUT

HOUSING, PIN AND CONTACT ASSY.
ASSY NO. KD90156
OPERATION SHEET NO. 273-15

PARTS LIST (QTY PER ASSY)
(1) KF90222 HOUSING, ROTOR
(1) KB90228 GROUND WIRE

ASSEMBLY STATION NO. 15
SHEETS T.B.D.

SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-19027
STAKE GROUND WIRE IN ROTOR HOUSING ASSEMBLY.

Figure 3p. Phase I--Bench layout, assembly station no. 15
MOLDED HOUSING ASSEMBLY
ASSY NO KD90217
OPERATION SHEET NO. 273-16

PARTS LIST (QTY PER ASSY)
(1) P/O KD90156 HOUSING, PIN & CONTACT ASSEMBLY
   (SUPPLIED BY ASSY STATION 15)
(1) KF90194 MAGNETIC POWER SUPPLY ASSY
   (SUPPLIED BY ASSY STATION 14)

ASSEMBLY STATION NO. 16
SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-19028
STAKE MAGNETIC POWER SUPPLY ASSY
   (P.C. BOARD ASSY) IN HOUSING ASSY
TOOL NO. 273-19029
FIXTURE TO HOLD HOUSING ASSY WHILE SOLDERING GROUND WIRE TO P.C. BOARD ASSY (ABOVE)

Figure 3q. Phase I—Bench layout, assembly station no. 16
TYPICAL BENCH LAYOUT

MOLDED HOUSING ASSEMBLY
ASSY NO. KD 90217
OPERATION SHEET NO. 273-17

PARTS LIST (QTY PER ASSY)
(1) KC90192 COVER, POWER SUPPLY
(5) KB90513 GROMMET, PROBE
(1) KC 90056 SHELL RECEPCTACLE

ASSEMBLY STATION NO. 17
SPECIAL TOOLS /EQUIPMENT

TOOL NO. 273-19030
INSTALL (5) GROMMET PROBES INTO POWER SUPPLY COVER

TOOL NO. 273-19031
INSTALL (1) SHELL RECEPCTACLE IN POWER SUPPLY COVER

Figure 3r. Phase I—Bench layout, assembly station no. 17
MOLDED HOUSING ASSEMBLY
ASSY NO. KD90217
OPERATION SHEET NO. 273-18

ASSEMBLY STATION NO. 18
SHEETS T.B.D.

PARTS LIST (QTY PER ASSY)

(1) P/O KD90217 MOLDED HOUSING ASSY
(SUPPLIED BY STATION 16)

(1) P/O KD90217 MOLDED HOUSING ASSY
(Power Supply Cover Sub Ass'y)
(SUPPLIED BY STATION 17)

SPECIAL TOOLS / EQUIPMENT
TOOL NO. 273-19033
Align and Swage Power Supply Cover
Sub Ass'y to Rotor Housing Ass'y

Figure 3s. Phase I—Bench layout, assembly station no. 18
Figure 3t. Phase I—Bench layout, assembly station no. 19
TYPICAL BENCH LAYOUT

MOLDED HOUSING ASSEMBLY
ASSY NO. KD90217
CONTINUED

PARTS LIST (QTY PER ASSY) CONTINUED
(1) SET KA90696 ENCAPSULATING COMPOUND

ASSEMBLY STATION NO. 19
SHEET 2 OF 2

SPECIAL TOOLS / EQUIPMENT CONTINUED
TOOL NO. 273-19034
STORAGE TRAYS

Figure 3r. (cont)
MOLDED HOUSING ASSEMBLY
ASSY NO. KD 90217
(ENCAPSULATION OF MAGNETIC POWER SUPPLY ASSY)
OPERATION SHEET NO. 273-20

PARTS LIST (QTY PER ASSY)
(1) P/O KD90217 PRE-TESTED MOLDED HOUSING ASSY (SUPPLIED BY ASSY STATION 19)
(1) SET KA90696 ENCAPSULATING COMPOUND

ASSEMBLY STATION NO. 20
SHOTS T.B.D.

SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-19033
SPECIAL FITTINGS FOR ENCAPSULATING SYSTEM.

Figure 3u. Phase I--Bench layout, assembly station no. 20
TYPICAL BENCH LAYOUT

UNIT 12

24" x 18" WORKPLACE

UNIT OUT

MOLDED HOUSING ASSEMBLY
ASSY KD90217
(ENCAPSULATED MAGNETIC POWER SUPPLY ASSY)
OPERATION SHEET NO. 273-21

PARTS LIST (QTY PER ASSY)
(1) P/O KD90217 MOLDED HOUSING ASSY-ENCAPSULATED MAGNETIC POWER SUPPLY ASSY (SUPPLIED BY ASSY STATION 20)

ASSEMBLY STATION NO. 21

SPECIAL TOOLS /EQUIPMENT
TOOL NO. 273-60005
ACCEPTANCE TEST CONSOLE (SAME UNIT AS AT ASSY STATION 19)

Figure 3v. Phase I—Bench layout, assembly station no. 21
### Figure 4

Phase I—Proposed schedule for completion/prove-out of uncompleted tooling and special equipment
Figure 5. Phase II--Flow chart
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