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1535 COMMAND DRIVE, SUITE D-306  
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**AT-R-08**

## **AIR TRAFFIC CONTROL TRAINING SERIES**



### **EQUIPMENT**

AN/FPN-62 (N-PAR)  
CONTROLLER HANDBOOK

**1 July 1994**

**FOREWORD**

**PURPOSE:** This publication is for use in the training of USAF air traffic controllers and is not intended to replace, substitute for, or supersede official regulations, procedures, or directives.

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## INTRODUCTION

This publication is designed to be used in conjunction with hands-on training and classroom instruction to familiarize the air traffic controller with the operation of the AN/FPN-62 (N- PAR). It is designed to assist all controllers in the alignment of the N-PAR. This publication does not replace TO 31P5-2GPN24-11 (Operators Handbook) nor applicable maintenance technical orders which are the official directives for this equipment. This publication is divided into four sections as follows:

SECTION I - Indicators, Radar Set Control, Map Generator, and Associated Equipment. Contains a description of each control on the equipment.

SECTION II - Alignment Procedures. Contains step -by-step procedures for aligning the PAR equipment.

SECTION III - Normal Operating Procedures. Contains normal operating procedures.

SECTION IV- Failures and Remedial Action. Provides instruction to the controller if a system failure occurs.

The FPN-62 is an advanced, solid state, dual channel precision approach radar. It has a variable range feature which allows expansion from 6 miles out to 15 miles. All of the controls needed for alignment have been remoted to the indicators, thus eliminating the need for a maintenance person at the antenna site to make an alignment. Unlike the old map generators associated with MPN-13s, 14s, or FPN-16s, the FPN-62 uses an electronic marker generator which affects only the scope at which they're located. The radar operates in the X band and has several added circuits that can be selected to enhance the radar presentation. The accuracy of the unit is such that minimum detectable movement of a target in elevation at 1 mile is 25 feet. The moving target indicator (MTI) circuit has been refined to a point of eliminating MTI blind speeds for all practical purposes. Some limitations of the radar include operating restrictions due to low temperature and high wind. Operation is not recommended when the temperature is -20° F or the wind exceeds 65 knots.

### GLOSSARY OF TERMS

ANTENNA (ANT) SERVO	An electromechanical system for use in moving the radar antennas, and giving an indication of their position on the radar indicator.
AZIMUTH ELEVATION (AZ-EL) SCOPE	A type of radar indicator that provides azimuth, elevation and range information. This radar indicator is used in the precision radar system.
CENTERLINE ALIGNMENT (CLA)	A reflector used in performing a PAR alignment.
CIRCULAR POLARIZATION (CP)	A feature of radar used to reduce precipitation returns.
CLUTTER	The display of unwanted radar signals.
CURSOR	An electronic line displayed on a radar indicator representing the optimum flight path of an aircraft. The lower safety limits on elevation are depicted by a dashed cursor.
DIGITAL METER (DM)	A digital voltmeter on the map generator used to align the cursors and for maintenance checks.
FAST TIME CONSTANT (FTC)	The feature of radar used to break up large areas of radar returns (clutter), including heavy precipitation, allowing only the leading edge of targets to be presented on the indicator.
GROUND POINT OF INTERCEPTION (GPI)	The point where the safety cursor intercepts the runway.
ELECTRONIC MARKER GENERATOR (EMG)	Each AZ-EL indicator contains its own map generator (EMG) with cursor and range mark intensity controls. This enables each remoted AZ-EL indicator to operate independently. Each preset map generator generates a glidepath, lower limit, and decision height cursor for the elevation sector and a right or left hand operation course line for the azimuth sector. One mile range marks, intensified or deintensified (operator selectable), show the position of the elevation antenna beam in the azimuth sector and the azimuth antenna beam in the elevation sector. Intensity controls are provided to control the level of the range marks and cursors on the sector displays.
MAIN BANG	The point in time when the transmitter is triggered. When properly aligned, the main bang will appear on the scope at the origin of the sweep.
MAP LIMIT LINE	The part of the map outline showing the map limits.

MOVING TARGET INDICATOR (MTI)	The MTI cancels stationary targets such as trees, buildings, hills, and slow moving targets and reduces clutter from vertically falling rain. The MTI has no blind speeds in the approach speed region of 120 to over 600 knots. The MTI receiving system is slightly less sensitive than the normal video system but is usable to the maximum range (15NM).
NORMAL RADAR	That radar presentation which displays all radar targets both moving and stationary, as opposed to MTI radar.
PERFORMANCE MONITOR (PM)	Transmitter and receiver performance indicators. Four test targets located in the upper portion of the elevation display. A loss of one or more indicates a specific problem in either the transmitter or receiver.
RADAR INDICATOR	The radar scope. The unit of radar equipment that provides a visual indication of the reflected energy received, using a cathode ray tube for such indication.
RANGE MARKS	Electronic reference marks appearing on the radar indicator and used to indicate the distance of the target from either the antenna or the touchdown point/end of runway.
REFLECTOR	A metal device of triangular or round shape used for the purpose of providing a strong radar echo or pulse from a known position on the ground.
SCAN AREA	That area in space covered by the radar antenna pattern.
SCOPE ALIGNMENT	A means of checking the accuracy of the radar data received and displayed. It also is the means of making minor corrections to the radar display to attain proper and correct positioning of radar data.
SENSITIVITY TIME CONTROL (STC)	STC is provided to automatically maintain the size and intensity of the target as it approaches the radar from a distance. At the start of the sector sweep, close in to the radar where ground clutter is most intense, the receiver gain is lowered drastically so that the aircraft target position is not obscured by the clutter. At distant ranges, the receiver gain is raised so that the weaker aircraft target may be seen. STC is operator selectable.

SECOND TIME AROUND REJECTION (STAR)	The STAR circuit automatically rejects uncorrelated second time around echoes. Second time around echoes are caused by aircraft, storms, and terrain features located beyond the range equivalent to a pulse repetition frequency (PRF) interval with their echo appearing on the display in the next PRF interval. STAR is extremely useful to prevent mistaken identity of second time around aircraft echoes for real targets on the AZ- EL display sectors, and to prevent display obliteration by distant storms which may occur at 10 to 22 NM beyond the normal 15 NM display range. STAR is operator selectable.
SNOW	A speckled background caused by random noise on an intensity modulated cathode ray tube.
SWEEP	A luminescent line formed by a stream of electrons on the face of the radar scope. The start of the sweep is the main bang.
VARIABLE DISPLAY	The display range may be set for any distance between 6 and 15 RANGE NM. The operator may decrease the display range as the target approaches. This provides more display at the close in range and permits more precise control.
ZERO DEGREE LINE	An imaginary line extending from the center of the elevation antenna used as a reference point to align the decision height cursor.

## SECTION I

INDICATORS, RADAR SET CONTROL, MAP GENERATOR AND ASSOCIATED EQUIPMENT**A. INDICATOR (Figure 1-1)**

DISPLAY RANGE	The DISPLAY RANGE control (1) permits the controller to select the range displayed on the indicator. The displayed range may be varied from a full clockwise (CW) position of 6 NM to a full counterclockwise (CCW) position of 15 NM.
<b>NOTE:</b>	Range variation causes video presentation movement because of logarithmic expansion.
MTI INTERVAL	The MTI INTERVAL control (2) is functional only at the designated master N- PAR controller's position. The master position is selectable by the active N- PAR set control (12, figure 1- 6) at the N- PAR assistant controller's position. The MTI INTERVAL control determines the range that MTI and normal returns are displayed on the indicator. When the control is fully CCW, normal returns extend from 0 to 15 NM and MTI is not displayed. When fully CW, MTI extends from 0 to 15 NM and normal returns are not displayed. In between these ranges, the type of display shown is divided with MTI extending from 0 NM to the desired range and normal returns beyond. The MTI INTERVAL control should be adjusted so that the MTI reflectors are always visible. This allows the controller to keep a constant check on range and azimuth accuracy. With the MTI INTERVAL control set to obscure all fixed targets, a failure in the equipment can cause an inaccuracy which may go undetected.
HV RESET	The HV RESET (High Voltage Reset) pushbutton control (3) is functional only at the designated master N-PAR controllers position. The master position is selectable by the active N-PAR set control (12, figure 1-6) at the N-PAR assistant controller's position. The HV RESET control is used to reset the N-PAR transmitter high voltage power supply.
PANEL DIMMER	The PANEL DIMMER control (4) controls the brightness of the luminescent panels on either side of the indicator.
SWEEP INTENSITY	The SWEEP INTENSITY control (5) controls the intensity of the radar sweep on the display. For optimum indicator display, adjust the SWEEP INTENSITY control CW until the sweep trace is barely visible.
VIDEO GAIN	The VIDEO GAIN control (6) controls intensity (CW to increase) of the radar returns on the display for both MTI and normal video.

- ANT SERVO** The ANT SERVO control (7) is a four position spring loaded cross pattern switch. This control is functional only at the designated master N-PAR controller's position. The master position is selectable by the active N -PAR set control (12, figure 1-6) at the N- PAR assistant controller's position. The ANT SERVO switch moves the elevation antenna at a constant speed (servo) in either the left or right direction and the azimuth antenna in either the up or down direction. By using the ANT SERVO switch to servo the antenna (s) in the required direction(s), the controller is then able to keep track of the aircraft it.
- PANEL LIGHTS** Two panel lights are located in the top corners of the recessed panel containing the alignment controls 8-19. The lights are used to illuminate the alignment controls. The lights are turned on or off with the Panel Light switch (20).
- SWEEP DELAY** The SWEEP DELAY screwdriver adjustment (8) adjusts the radar main bang to the vertex of the radar indicator.
- CONTOUR OFFSET** The CONTOUR OFFSET screwdriver adjustment (9) adjusts both the elevation and azimuth maps either up or down. See figure 1-2 for an illustration of the CONTOUR OFFSET control function.
- ANGLE BIAS** The ANGLE BIAS controls consist of two screwdriver adjustments. The AZ ANGLE BIAS (Azimuth Angle Bias) control (10) adjusts the bias voltage level for the azimuth angle voltage. The EL ANGLE BIAS (Elevation Angle Bias) control (12) adjusts the bias voltage level for the elevation angle voltage.
- The ANGLE BIAS controls may be used with the ANGLE BIAS pushbutton control located on the map generator next to the panel light (2, figure 1-3). The ANGLE BIAS control is used by maintenance personnel. The pushbutton when pressed, displays the actual N-PAR angle bias voltages on the digital meter (1, figure 1-3) when the METER SELECT switch (4, figure 1-3) is in the ANGLE V (VOLTS) position. This allows maintenance personnel to align the indicator and map generator angle bias voltages to the N-PAR angle bias voltages.
- TIME BASE** The TIME BASE controls consist of two screwdriver adjustments. See figure 1-2 for an illustration of the TIME BASE controls functions. The TIME BASE LENGTH control (11) adjusts the elevation and azimuth sweep lengths in the X -axis (horizontal) direction. The TIME BASE CENTER control (13) adjusts the position of the elevation and azimuth sweep origins in the X-axis direction.
- The EL (Elevation) controls consist of three screwdriver adjustments. See figure 1-2 for an illustration of the EL controls functions. The EL OFFSET control (14) adjusts the display range of the elevation sector below horizon. The EL EXPANSION control (16) adjusts the width of the elevation display angle. The EL CENTER control (18) adjusts the position

of the elevation sweep origin in the Y-axis (vertical) direction.

**AZ**

The AZ (Azimuth) controls consist of three screwdriver adjustments. See figure 1-2 for an illustration of the AZ controls functions. The AZ OFFSET control (15) adjusts the upper display range of the azimuth sector. The AZ EXPANSION control (17) adjusts the width of the azimuth display angle. The AZ CENTER control (19) adjusts the position of the azimuth sweep origin in the Y-axis direction.

**PANEL LIGHT**

The PANEL LIGHT control (20) is a three position toggle switch. The switch is used to control both the panel light (2, figure 1-3) on the map generator and the panel lights on the recessed panel on the Display Console. The top position provides full light intensity. The bottom position provides a lower light intensity. The center position will turn the panel lights off.

**IF GAIN**

The IF GAIN (Intermediate Frequency Gain) controls consist of two variable controls. These controls are functional only at the designated master N-PAR controller's position. The master position is selectable by the active N- PAR set control (12, figure 1-6) at the N- PAR assistant controller's position. The IF GAIN NCRMAL/LOG control (21) controls the overall gain of the normals IF system. The control is used to achieve optimum radar return signal strength. The IF GAIN MTI control (22) controls the overall gain of the MTI IF system. The controls are used to achieve optimum signal strength on moving targets. On both controls, gain is minimized with a CCW rotation and maximized with a CW rotation. The controls should not be used to vary the display intensity; the VIDEO GAIN control (6) is provided for this purpose.

**STC**

The STC control (23) is a two position toggle switch. The control is functional only at the designated master N-PAR controller's position . The master position is selectable by the active N- PAR set control (12, figure 1-6) at the N- PAR assistant controller's position. The STC control permits the controller to select sensitivity time control operation. The control allows full target strength at distant ranges while reducing target signals at close ranges.

**NORMAL-LOG/FTC**

The NORMAL-LOG/FTC (Normal-Logarithmic/FTC) control (24) is a two position toggle switch. The control is functional only at the designated master N-PAR controller's position. The master position is selectable by the active N -PAR set control (12, figure 1-6) at the N -PAR assistant controller's position. The NORMAL-LOG/FTC control permits the controller to select either normal or fast time constant (FTC) operation. The FTC processing of radar returns on the display provides a reduction of target clutter. LOG/FTC may be used to provide reduction of objectionable ground clutter. If the target on the display is entering an area where the presence of ground

clutter or other unwanted echoes partially or wholly obscures the target, set the NORMAL-LOG/FTC control to the LOG/FTC position. This tends to reduce the effects of heavy rain or intense ground clutter.

**S TAR**

The STAR (second time around rejection) control (25) is a two position off/on toggle switch. The control is functional only at the designated master N-PAR controller's position. The master position is selectable by the active N-PAR set control (12, figure 1-6 ) at the N-PAR assistant controller's position. The switch is used to reduce or eliminate second time around radar returns. The switch should be left in the ON position in most cases to help eliminate second time around returns. In cases where radar sensitivity is low, the switch may be placed in the STAR (off) position as an attempt to regain system sensitivity on the display.

**RF GAIN-HIGH/LOW**

The RF GAIN (Radio Frequency Gain) control (26) is a two position off/on toggle switch. The control is functional only at the designated master N-PAR controller position. The master position is selectable by the active N- PAR set control (12, figure 1-6) at the N- PAR assistant controller's position. The switch is used to select high or low gain.

**WARNING**

The RF GAIN control must be left in the HIGH position during normal operation to provide optimum radar return signal strength. The LOW position should be used only in situations where system sensitivity is high enough to affect the operator's work. Use of RF GAIN in the LOW position during normal operation may result in target elimination.

**MASTER**

The MASTER indicator lamp (27) lights when that N-PAR controller's position is the designated master. The master position is selectable by the active N-PAR set control (12, figure 1-6) at the N- PAR assistant controller's position. The master controller's position has access to the following controls on the display console; MTI INTERVAL control (2), HV RESET control (3), ANT SERVO control (7), IF GAIN NORMAL control (21), IF GAIN MTI control (22), STC control (23j), NORMAL-LOG/FTC control (24), STAR control (25), and F,F GAIN control (26).

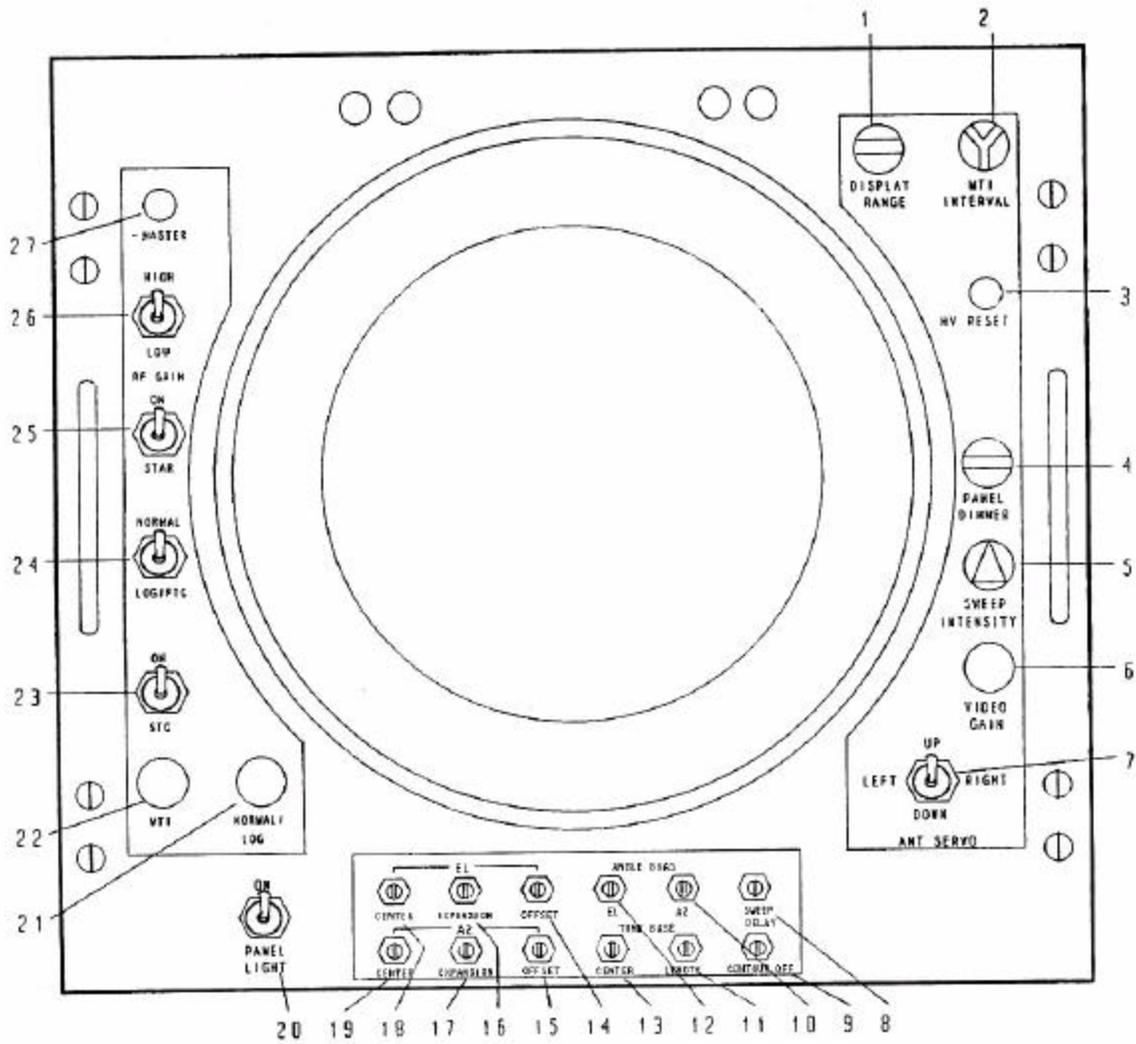
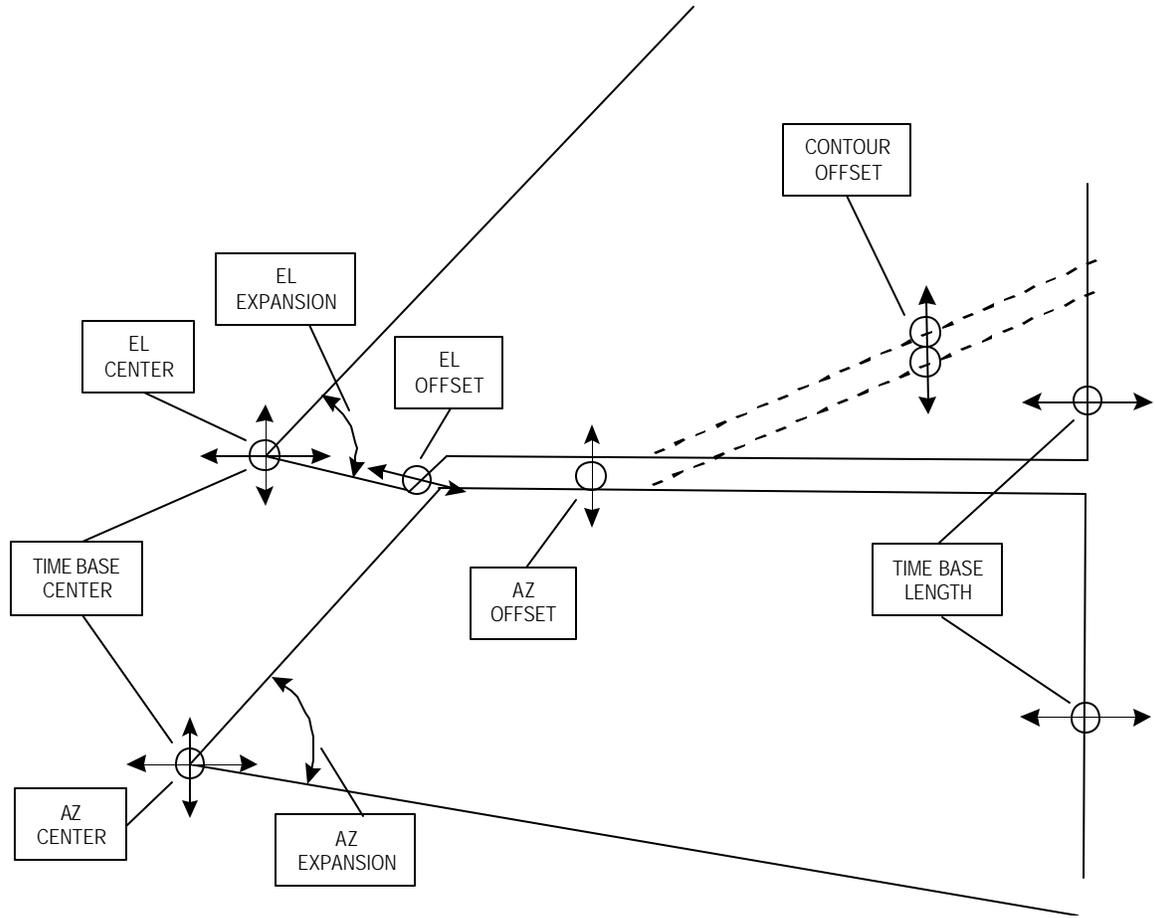


Figure 1-1. PAR Indicator



**Figure 1-2. AZ-EL Display.**

**B. MAP GENERATOR (Figure 1-3)**

DIGITAL METER	The digital meter (1) provides a readout to the controller as selected by the four position METER SELECT switch (4). There is no readout with METER SELECT in the OFF position. With METER SELECT in D HEIGHT (Decision Height) (FEET) position, the digital readout on the meter will display the present decision height in feet. In the ANGLE V (VOLTS) position, the meter will indicate the angle voltage as determined by the switch position of the ANGLE V switch (3). The EXT (External) (Volts) position is used by maintenance personnel.
PANEL LIGHT	The panel light (2) has a long, flexible neck to permit the operator to position the light as needed. Though primarily used for the map generator, the light may be used to illuminate any other area within range. The panel light is controlled by the PANEL LIGHT switch (20, figure 1-1), located on the N-PAR indicator.
ANGLE V	The ANGLE V control (3) is a three position rotary switch that selects operating or artificial (ART) angle voltages for both the indicator and map generator. With the METER SELECT switch (4) in the ANGLE V (Volts) position and the ANGLE V switch in the OPERATE position, the digital meter (1) will display the scan angle voltages as the radar is scanning. With the ANGLE V switch in either the ART EL or ART AZ position, the digital meter will display the corresponding elevation or azimuth scan angle voltages as displayed on the indicator. This allows the controller to align the indicator using the ART ANGLE V control (5).
METER SELECT	The METER SELECT control (4) is described under the digital meter (1).
ART ANGLE V	The ART (Artificial) ANGLE V control (5) adjusts the artificial elevation angle voltage or the artificial azimuth voltage for both the indicator and the map generator. For the ART ANGLE V control to be used, the ANGLE V control (3) must be positioned to ART EL or ART AZ. A CCW rotation of the ART ANGLE V control will result in a decrease in angle voltage. A CW rotation will result in an increase in angle voltage. The readout will appear on the DM.
RUNWAY MAP SELECT	The RUNWAY MAP SELECT switch (6) is a four position rotary switch that selects one of four runway maps for display. This displayed runway map is aligned by the runway alignment controls (16-28).
ALIGN	The ALIGN screwdriver adjustment (7) aligns the map cursor's start time to the main transmitter pulse located toward the left side of the indicator. The control is functional only when the STROBE pushbutton control (9) is pressed.

STROBE	The STROBE pushbutton control (9), when pressed, provides a strobe pulse for calibration of the displayed map cursor, using the ALIGN adjustment (7).
CURSOR INTENSITY	The CURSOR INTENSITY controls adjust (CW to increase) the intensity of the four cursors on the map. The DHC (Decision Height Cursor) control (8) varies the DHC intensity, the SC (Safety Cursor) control (10) varies the SC intensity, and the GP/CL (Glidepath/ Courseline ) control (12) varies the GP and CL cursor intensities.
RM CALIB	The RM CALIB (Range Mark Calibration) controls consist of an ON/OFF toggle switch (13) and a screwdriver adjustment (11). The ON position permits range mark calibration. In the OFF position, range mark calibration cannot be performed. The screwdriver adjustment aligns the first range mark to the main transmitter pulse.
RM INTENSITY	The RM INTENSITY (Range Mark Intensity) control (14) adjusts (CW to increase) the intensity of the range marks. The control should be set to the point where the range marks are clearly visible, yet not so bright as to distract attention from weak signals. Excessive brilliance causes a blooming effect, which can obliterate the weak targets near the range marks.
SERVO MOD	The SERVO MOD (Servo Modulation) control (15) is a two position toggle switch. The DE- INT (Deintensify) position provides deintensified range marks for the servo area. The INT (Intensify) position provides intensified range marks for the servo area.
DECISION HEIGHT CURSOR	The DECISION HEIGHT CURSOR controls consist of four screwdriver adjustments. See figure 1- 4 for an illustration of the cursor. The LENGTH adjustment (16) adjusts the length from the starting point of the DHC. The GRD LEVEL (Ground Level) adjustment (18) sets the zero height of the DHC ON THE ZERO DEGREE LINE. With the ground level properly adjusted to the ZERO DEGREE LINE the HEIGHT adjustment (17) adjusts the height of the DHC above the zero degree line. The START adjustment (19) adjusts the start position of the DHC.
SAFETY CURSOR	The SAFETY CURSOR controls consist of two screwdriver adjustments. See figure 1 -4 for an illustration of the cursor. The START adjustment (20) sets the safety cursor angle at 1 mile. The ANGLE adjustment (21) sets the safety cursor angle at 5 miles.
GLIDEPATH	The GLIDEPATH controls consist of three screwdriver adjustments. See figure 1- 4 for an illustration of the cursor. The GRD LEVEL adjustment (22) adjusts the ground level of the glidepath cursor to the touchdown reflector (TDR) video. The GP ANGLE (Glidepath Angle) adjustment (23) sets the glidepath cursor angle at 5 miles. The D to TD (Distance to Touchdown) adjustment (25) sets the glidepath cursor angle at 1 mile.

## COURSE LINE

The COURSE LINE controls consists of two screwdriver adjustments. See figure 1 -4 for an illustration of the cursor. The CL ANGLE adjustment (24) sets the courseline cursor angle at 5 miles. The D to RWY (Distance to Runway) adjustment (26) sets the courseline cursor angle at 1 mile.

## RM -TD

The RM-TD (Range Mark Touchdown) screwdriver adjustment (27) sets the first range mark on the leading edge of the touchdown reflector.

## RWY SELECT L-R

The RWY SELECT L-R (Runway Select Left-Right) control (28) is a two position toggle switch that selects left or right hand operation of the cursor depending on the orientation of the NPAR radar set to that runway.

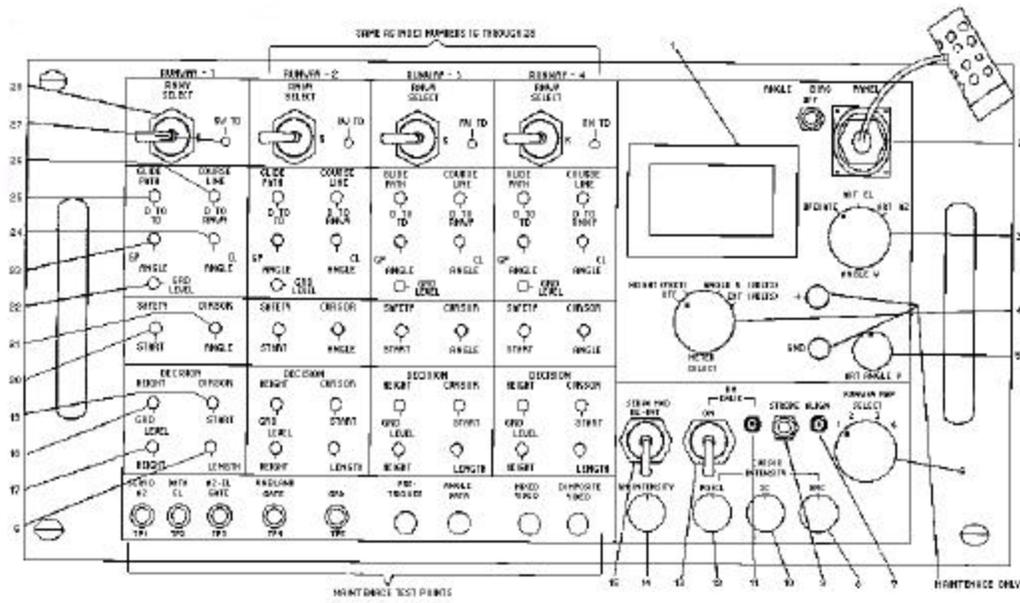


Figure 1-3. Map Generator

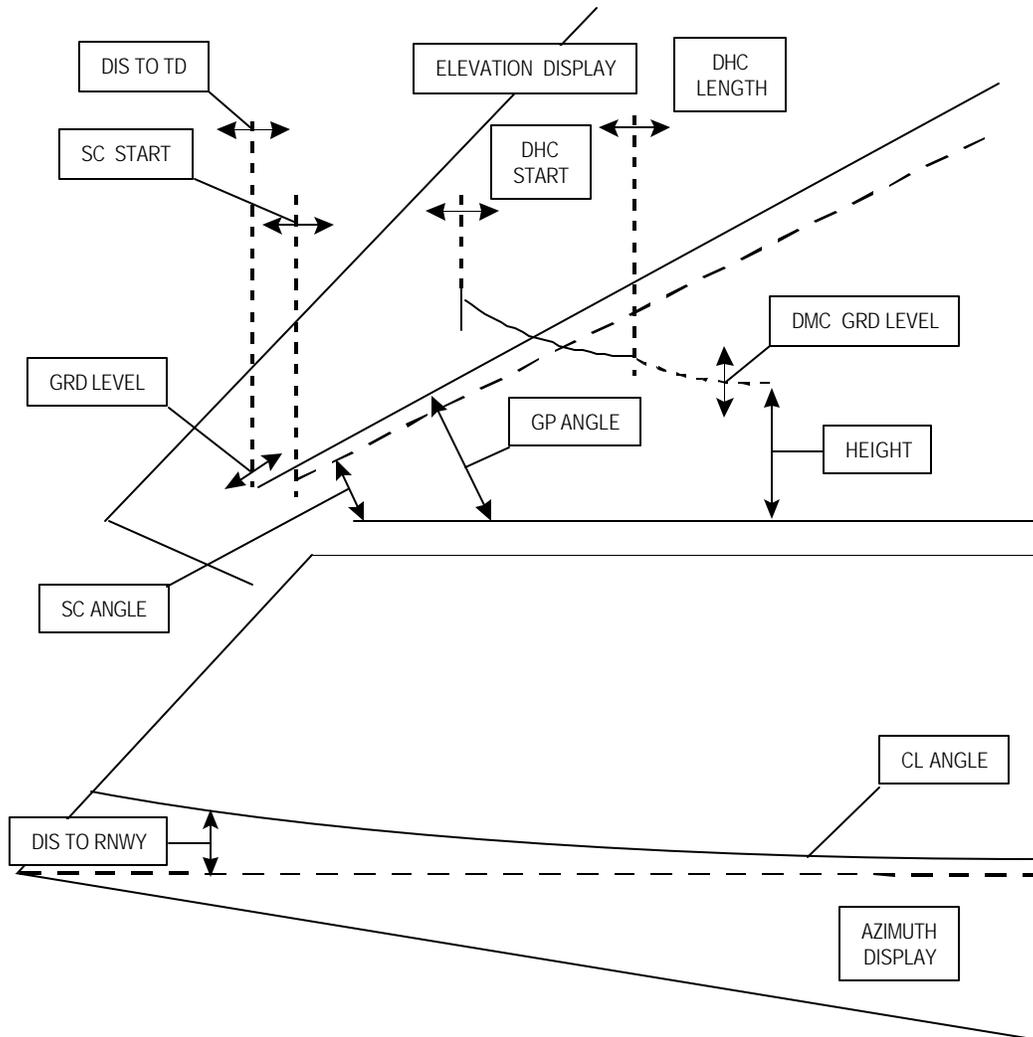


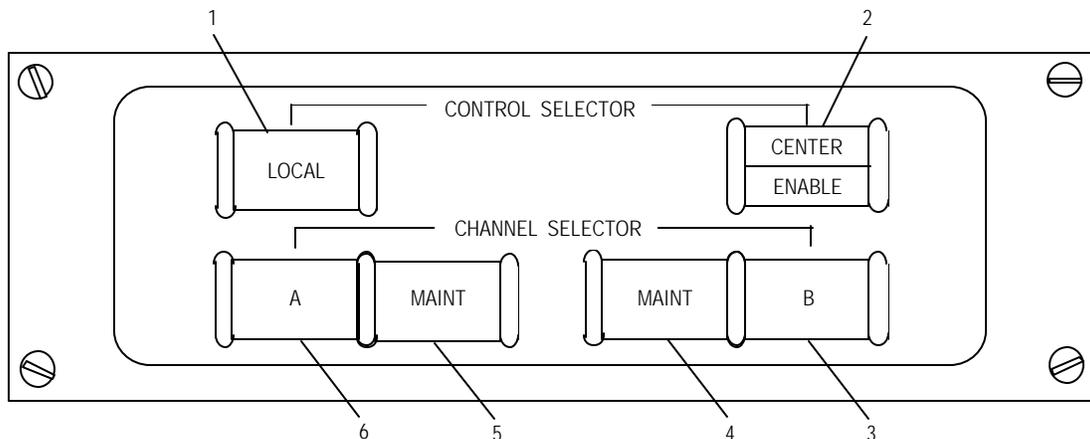
Figure 1-4. Cursor Display

**COMMON RADAR SET CONTROL (FIGURE 1-5)**

**CONTROL SELECTOR- LOCAL** The CONTROL SELECTOR- LOCAL (1) is a pushbutton control/indicator lamp. The control, when depressed, permits transfer of control of the N- PAR from the operations (OPS) segment to the maintenance segment. The ENABLE section of the CENTER/ENABLE indicator extinguishes when the LOCAL pushbutton is depressed. This also causes the ENABLE section of the LOCAL/ENABLE pushbutton control/indicator lamp at the local common radar set control (LCRSC) in the maintenance segment to light. When maintenance takes control the CENTER section of the CENTER/ENABLE indicator extinguishes and the LOCAL indicator will light.

**CONTROL SELECTOR- CENTER/ENABLE** The CONTROL SELECTOR- CENTER/ENABLE control (2), is a two section pushbutton control/indicator lamp. The ENABLE section lights white when the maintenance segment personnel depresses the CENTER pushbutton control/indicator lamp on the LCRSC. This indicates that the controller may take control of the N-PAR. This action is done by depressing the CONTROL SELECTOR CENTER/ENABLE control. When transfer is complete, the CENTER section lights white.

**CHANNEL SELECTOR** The CHANNEL SELECTOR controls consist of two pushbutton controls/indicator lamps and two status indicator lamps. When the OPS segment has control over the N-PAR, channel A may be selected by depressing the A control (6), or channel B may be selected by depressing the B control (3). In either case, the control will light to indicate the active channel. If maintenance has control of the channel, the MAINT lamp will be lit (red) and the system will reject any controller attempts to activate that particular channel.



**Figure 1-5. Common Radar Set Control**

**D. RADAR SET CONTROL (Figure 1-6)**

PANEL LIGHT	The PANEL LIGHT (1) has a long, flexible neck to permit the operator to position the light as needed. Though primarily used for the N-PAR radar set control, the light may be used to illuminate any other area within range. The panel light is controlled by the PANEL LIGHT switch (2).
HIGH/OFF/LOW	The HIGH/OFF/LOW control (2) is a three position toggle switch. The switch is used to control the panel light (1) on the N-PAR radar set control. The top position provides full light intensity. The bottom position provides a lower light intensity. The center position will turn the panel light off.
CHANNEL STATUS	The CHANNEL STATUS indicators monitor channel A, channel B, and the radar set control. The CHANNEL A indicators (3) and the CHANNEL B indicators (5) each have three lamps HV, READY, and MAINT. The HV lamp lights red to indicate that high voltage is applied to the corresponding channel's transmitter. The READY lamp lights green to indicate that the 3 minute time delay has expired and the corresponding channel's transmitter is ready for operation. The MAINT lamp lights red to indicate that the corresponding channel's equipment is in the maintenance mode. The ACTIVE RSC (Active Radar Set Control) (4) lights green to indicate that the corresponding radar set control is active and has control over runway selection, turntable, and high voltage.
ALARM	The ALARM panel consists of three indicators and one two position toggle switch. The 28V PS FAULT (Power Supply Fault) lamp (8) lights red to indicate a fault in the 28 volt power supply in the maintenance segment. The OVERTEMP ALARM lamp (7) lights red to indicate an over temperature condition in the equipment in the maintenance shelter. The OVERTEMP AUDIBLE switch (6) controls the audible alarm for an over temperature condition. The ON position enables the audible alarm and the OFF position disables the audible alarm. The associated indicator lights red when the switch is in the OFF position, indicating that the audible alarm is off. When a 28V PS FAULT or OVERTEMP ALARM occurs, the operating channel must be set to maintenance mode, the other channel (if not in maintenance mode) selected for operation, and maintenance personnel notified. If the remaining channel is also in maintenance mode, the SCAN control (14) must be positioned to OFF, the HIGH VOLTAGE CONTROL- OFF pushbutton (10) must be depressed, and maintenance personnel notified.
HIGH VOLTAGE CONTROL	The HIGH VOLTAGE CONTROL panel consists of three pushbutton controls. The HIGH VOLTAGE CONTROL-ON pushbutton control (5), when depressed, applies blab voltage to the transmitter. The pushbutton is protected by a guard to prevent accidental turn on of the high voltage. The HIGH VOLTAGE CONTROL-OFF pushbutton control (10), when depressed, removes high voltage from the transmitter. The HIGH VOLTAGE CONTROL-RESET

pushbutton control (11), when depressed, resets the high voltage overload relay in the high voltage power supply. This control is used after an overload condition has occurred in the power supply and proper maintenance has been performed.

AZ-EL INDICATOR  
CONTROL

The AZ-EL INDICATOR CONTROL panel consists of the MASTER SELECT- 1/2/3 control (12), a three position rotary switch. The control is used to select a N-PAR controller position as the master position. The MASTER indicator lamp, (27, figure 1-1) on the N-PAR controller position will illuminate when the MASTER SELECT- 1/2/3 control is set to that selected N-PAR controller position.

ANTENNA CONTROL-  
POLARIZATION

The ANTENNA CONTROL-POLARIZATION control (13) is a two section pushbutton control/indicator lamp. The control is used to select linear (LIN) or circular (CIR) polarization for the N-PAR display presentation. If the N-PAR is in linear polarization, the LIN section of the indicator lamp will light white and the CIR section will not be lighted. If the N- PAR is in circular polarization, the CIR section of the indicator lamp will light white and the LIN section will not be lighted. To change from one polarization mode to the other, depress the control once. Linear polarization is used primarily for fair weather N- PAR operation. Circular polarization is used during periods of heavy precipitation to help cut out radar returns from the precipitation and give improved target definition.

ANTENNA CONTROL-  
SCAN

The ANTENNA CONTROL- SCAN control (14j) is a two position toggle switch. The switch is used to control the scanning function of the N-PAR antennas. In the OFF position, the antennas will not scan. In the ON position, the antennas will electronically scan and sweep movement will be seen on the N- PAR display.

RUNWAY SELECT

The RUNWAY SELECT control (15) is a seven position rotary switch with seven indicator lamps, one lamp is located at each switch position. The switch is used to select any one of six preset runway directions and rotates the turntable where the N-PAR antennas are located toward the selected direction. A MANUAL position is located between positions 3 and 4 to provide, when selected, manual control of the turntable. The corresponding lamp will light green to indicate the antennas are turned to that runway or runway selection is in MANUAL mode. The switch is functional only when the TURNTABLE CONTROL switch (18) is in the ENABLE position.

TOLERANCE-1/2

The TOLERANCE-1/2 INDICATORS (16) consist of two indicator lamps that both light green when the turntable is correctly positioned to the selected runway. When the unit is rotated, both TOLERANCE lights will extinguish until rotation is completed and tolerance is obtained.

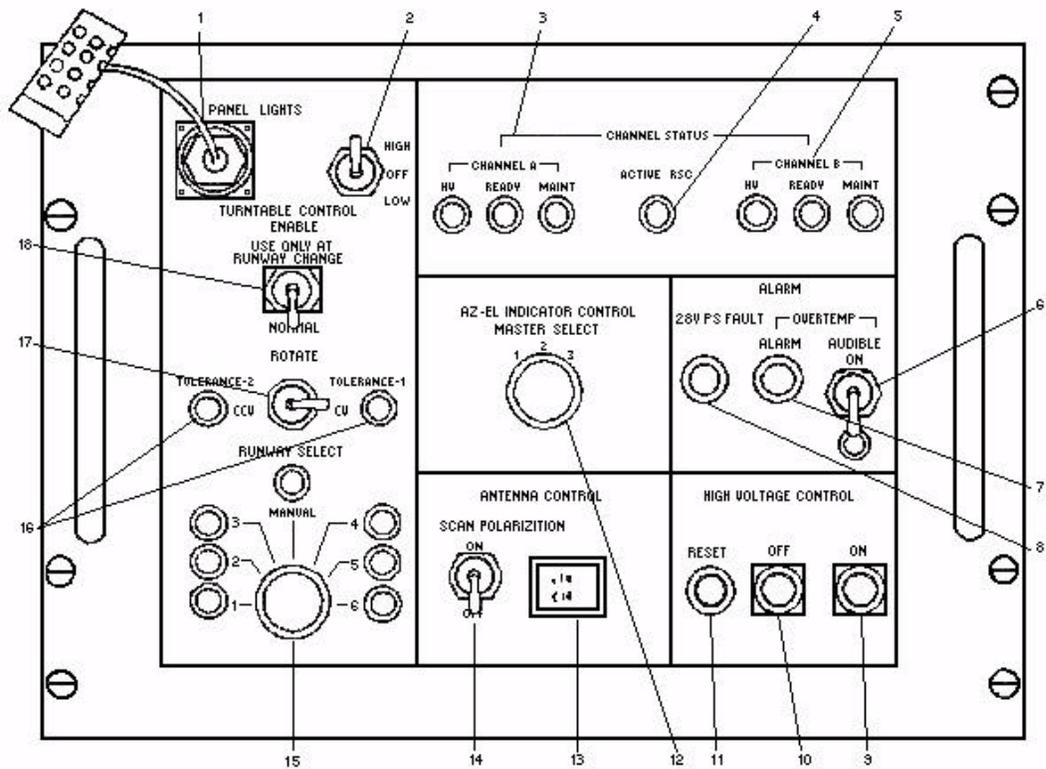
## ROTATE-CCW/CW

The ROTATE-CCW/CW control (17) is a three position toggle switch, spring loaded to the center position. The switch is used to manually rotate the turntable when the RUNWAY SELECT control is in the MANUAL position. When pressed and held in the CCW position, the turntable will rotate in a counterclockwise direction. When pressed and held in the CW position, the turntable will rotate in a clockwise direction. When the switch is released to the center position, the turntable rotation will stop. If automatic operation is desired, rotate the RUNWAY SELECT switch to the desired runway. Momentarily set and release the ROTATE switch to CCW if the RUNWAY SELECT switch was rotated CCW, or to CW if the RUNWAY SELECT switch was rotated CW. The switch is functional only when the TURNTABLE CONTROL switch (18) is in the ENABLE position.

**WARNING**

Insure the TURNTABLE CONTROL switch is in She NORMAL position when turntable rotation is not desired. With the TURNTABLE CONTROL switch in the ENABLE position, inadvertent pressing of the ROTATE switch wily cause the turntable to rotate, thus creating a hazard to maintenance personnel in the maintenance segment as well as to aircraft on final approach.

**TURNTABLE CONTROL** The TURNTABLE CONTROL control (18) is a two position toggle switch. The switch is used to permit or prevent rotation of the turntable. In the NORMAL position, the ROTATE switch (17) and the RUNWAY SELECT switch (15) are not functional and turntable rotation is not possible. With the TURNTABLE CONTROL in the ENABLE position, the ROTATE switch and the RUNWAY SELECT switch are functional and turntable rotation is possible.



**Figure 1-6. Radar Set Control**

**E. POWER SUPPLY (Figure 1-7)**

**CAUTION**

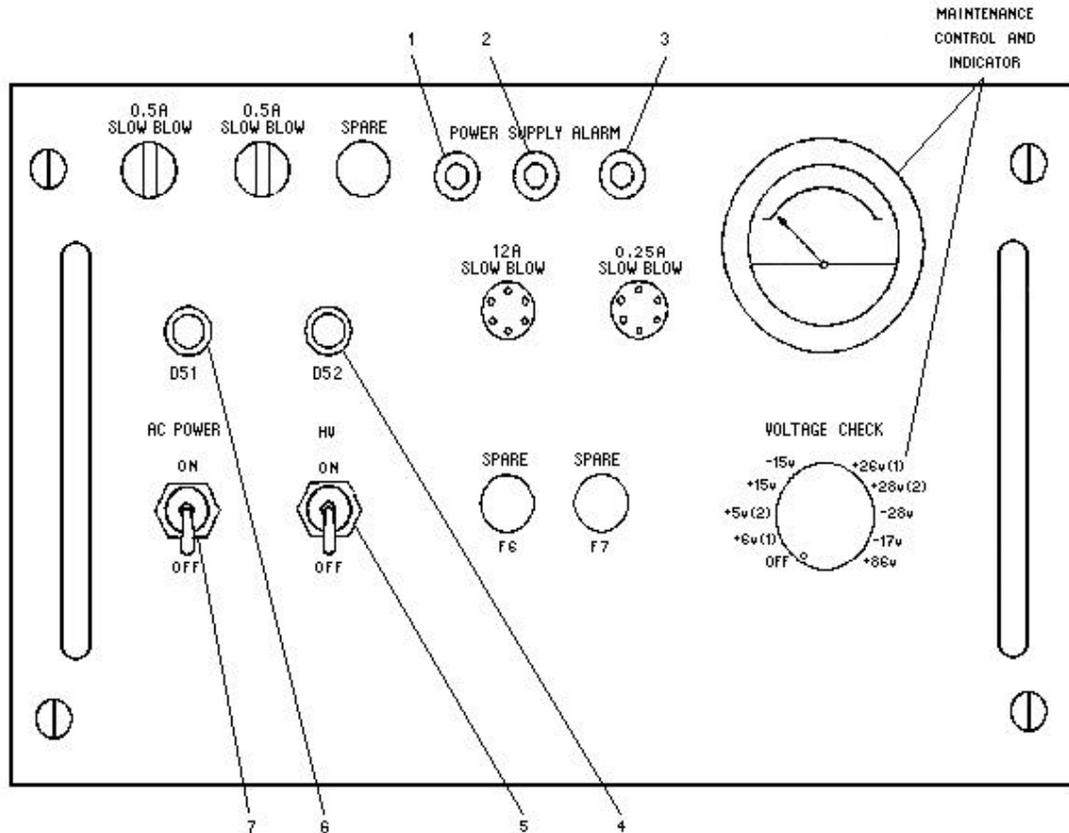
If a power supply alarm is lighted, the AC power switch (7) and HV switch (5) must be turned off and maintenance personnel notified. Do not kick or tap on the N-PAR indicator Power Supply. Damage may result to the power switches, fuses, and/or maintenance controls.

**POWER SUPPLY ALARM**

The POWER SUPPLY ALARM indicators consist of three indicator lamps. **If one of the lamps becomes illuminated the AC power control (7) and the HV (High Voltage control (5) must be positioned to OFF and maintenance notified.** The Illumination of the POWER SUPPLY-ALARM REGULATOR lamps (1, 2, and 3) indicates an overload or over voltage condition in one of the regulators. The HV control consists of an indicator lamp (4) and a two position OFF/ON toggle switch (5). With AC power supplied and the HV toggle switch positioned to ON, the high voltage power supply will be on and the HV indicator lamp will be illuminated.

**AC POWER**

The AC POWER controls consist of an indicator lamp (6) and a two position OFF/ON toggle switch (7). With the AC POWER toggle switch positioned to ON, 115-VAC power is applied to the power supply and the AC POWER lamp will be illuminated.



**Figure 1-7. Power Supply**

## SECTION II

ALIGNMENT PROCEDURES  
PRECISION INDICATOR

1. Turn the RWY MAP SELECT switch, on the EMG, to the appropriate runway map generator.
2. Set the RWY SELECT switch, on the EMG, to the correct position (L or R).
3. Insure antennas are scanning. NOTE: The scan toggle switch is located on the radar set control.
4. Turn the AZ- EL indicator VIDEO GAIN, SWEEP INTENSITY, NORMAL/LOG and MTI IF GAIN controls fully COW.
5. Adjust the SWEEP INTENSITY control CW until the sweeps are readily visible. Insure their coverage corresponds to the etched map outline (NOTE: For right -hand operation, adjust the CONTOUR OFFSET control for optimum azimuth coverage. In some cases, due to the PAR shelter location to the runway, it may be necessary to adjust the EL OFFSET control to see the TD reflector when the range display is varied between 6 and 15 miles .) If adjustments are needed, turn the appropriate controls as marked in Fig 1-1.
6. Turn the SWEEP INTENSITY control CCW until the sweeps are barely visible.
7. Adjust the VIDEO GAIN, RANGE MARK and CURSOR INTENSITY controls until the video, range marks, and cursors are clearly presented.
8. Set the indicator controls as listed:

DISPLAY RANGE	6NM
MTI INTERVAL	CCW
STC	OFF
NORMAL-LOG/FTC	NORMAL
STAR	ON
RF GAIN-HIGH/LOW	HIGH

9. Turn the NORMAL/LOG- IF GAIN control until fixed echoes appear and snow barely appears on the indicator.
10. Turn the MTI INTERVAL control to the full CW position and adjust the MTI IF GAIN control until snow barely appears in the display sectors. NOTE: All fixed targets should be canceled and the MTI targets (runway bracket, CLA, and/or CLA/TD reflectors) are present. When turned fully CW, MTI IF GAIN may produce ground clutter in heavy clutter areas (this is normal).
11. Adjust the MTI interval control fully CCW.

## ELECTRONIC MARKER GENERATOR

NOTE: This alignment is very critical for proper alignment of the glidepath and decision height cursors and range marks to coincide with the radar video. Care must be taken to insure the accuracy of this procedure.

1. At the AZ-EL indicator front panel, turn the SWEEP DELAY control fully CCW. **NOTE:** The main bang is the line farthest from the apex of the map outline and will be reduced in size or disappear when STC is turned ON.

2. Set the QM CALIB switch to ON and turn the screwdriver adjust (RM CALIB) control so the first range mark coincides with the leading edge of the main bang (left edge to left edge). Turn the RM CALIB switch OFF.
3. While depressing the STROBE button, adjust the ALIGN control so the strobe pulse (vertical line) coincides with the leading edge of the main bang (left side to left side). Turn the RM CALIB switch ON and OFF to insure the STROBE pulse and the first range mark are coincident (left side to left side).
4. At the AZ- EL indicator front panel, adjust the SWEEP DELAY control for a straight course line.

#### ANGLE BIAS ALIGNMENT

**NOTE:** The purpose of this alignment is to insure the radar video is at its proper position on the indicator display.

1. Unless MTI video is required, use NORMAL video for alignment. (If weather dictates, STC can be used. Turn the STC switch to ON and readjust the NORMAL/LOG-IF GAIN control for the desired video level.)
2. Set the RF GAIN switch to LOW. Turn down the video intensity for the smallest discernible CLA reflector in the azimuth presentation.
3. Turn the METER SELECT switch to ANGLE V and the ANGLE V switch to ART AZ.
4. With the ART ANGLE V control, set the azimuth angle bias (CLA) voltage (AFCC Form 283, data 7A) on the DM.
5. Alternate the ANGLE V switch between ART AZ and OPERATE. Observe that the ART AZ strobe, or "burn -in" line, bisects the CLA reflector. If this condition is not met, adjust the ANGLE BIAS-AZ control until the CLA reflector is bisected by the "burn -in" line.
6. Set the ANGLE V switch to ART EL, On the DM, set in the elevation angle bias (TDR) voltage (AFCC Form 283, data 2A or 2B) with the ART ANGLE V control.
  1. Alternate the ANGLE V switch between ART EL and OPERATE. Observe that the ART EL "burn -in" line bisects the TDR. If this condition is not met, adjust the ANGLE BIAS-EL control until the TDR is bisected by the "burn -in" line.

#### COURSELINE (CL) CURSOR ALIGNMENT

**NOTE:** The purpose of this alignment is to insure the course line cursor represents the actual extended runway centerline.

1. Adjust the appropriate RUNWAY- RM TD control so the first intensified range mark falls on the leading edge (left side to left side) of the TDR. NOTE: Adjust the video intensity for the smallest discernible TDR.
2. Turn the RM SERVO MOD switch to DE- INT. Servo the blank part of the range marks away from the CL cursor and turn the IF GAIN control fully CCW.
3. Turn the ANGLE V switch to ART AZ and dial the 1 NM azimuth cursor alignment voltage (AFCC Form 283, data block 6A) into the DM with the ART ANGLE V control.
4. Adjust the appropriate RUNWAY- COURSELINE - D to RWY control until the azimuth cursor pulse "bug" coincides with the 1 NM range mark pulse.

5. Dial the 5 NM azimuth cursor alignment voltage (AFCC Form 283, data 6B) into the DM with the ART ANGLE V control.
6. Adjust the appropriate RUNWAY- COURSELINE- CL ANGLE control until the azimuth cursor pulse "bug" coincides with the 5NM range mark pulse.
7. Reset the 1 NM azimuth cursor alignment voltage into the DM. Insure the cursor pulse "bug" and the 1 NM range mark pulse coincide. If they do not, move the cursor pulse "bug" with the COURSELINE - D to RWY control until the "bug" is  $\frac{1}{2}$  the current distance to, and on the opposite side of, the 1 NM range mark pulse.
8. Set the 5NM azimuth cursor alignment voltage into the DM. Insure the cursor pulse "bug" coincides with the 5NM range mark pulse. If they do not, move the cursor pulse "bug" with the COURSELINE- CL ANGLE control until they do coincide.
9. Repeat steps 7 and 8 until the 1 and 5 NM alignment requirements are satisfied.
10. Set the ANGLE V switch to OPERATE. Turn the IF GAIN control CW and insure the courseline cursor is centered between the runway bracket reflectors. (If a centerline runway reflector is used, observe that the courseline cursor bisects the reflector).

#### GLIDEPATH (GP) CURSOR ALIGNMENT

**NOTE:** The purpose of this alignment is to insure the glidepath cursor represents the actual glidepath to decision height and touchdown point.

1. Turn the safety cursor (SC), decision height cursor (DHC) intensity and the IF GAIN control fully CCW.
2. Servo the blank part of the deintensified range marks above the GP cursor.
3. Set the AMGLE V switch to ART EL and dial the 1 NM glidepath cursor alignment voltage (AFCC Form 283, data 3A) into the DM with the ART ANGLE V control.
4. Adjust the appropriate RUNWAY- GLIDEPATH- D to TD control until the elevation cursor pulse "bug" and the 1 NM range mark pulse coincide.
5. Dial the 5NM glidepath alignment voltage(AFCC Form 283, data 3B) into the DM with the ART ANGLE V control.
6. Adjust the appropriate RUNWAY- GLIDEPATH- GP ANGLE control until the elevation cursor pulse "bug" coincides with the 5NM range mark pulse.
7. Reset the 1 NM glidepath cursor alignment voltage into the DM. Insure the cursor pulse "bug" and the 1 NM range mark pulse coincide. If they do not, move the cursor pulse "bug" with the GLIDEPATH- D to TD control until the "bug" is  $\frac{1}{2}$  the current distance to, and on the opposite side of, the 1 NM range mark pulse.
8. Set the 5NM glidepath cursor alignment voltage in the DM. Insure the cursor pulse "bug" coincides with the 5NM range mark pulse. If they do not, move the cursor pulse "bug" with the GLIDEPATH - GP ANGLE control until they do coincide.
9. Repeat steps 1 and 8 until the 1 and 5 NM alignment requirements are satisfied.

10. Set the ANGLE V switch to OPERATE and adjust the appropriate GLIDEPATH - GRD LEVEL control until the glidepath cursor terminates at the first range mark (TDR).

#### ELEVATION SAFETY CURSOR (SC) ALIGNMENT

**NOTE:** The purpose of this alignment is to insure the elevation safety cursor represents the actual safety cursor glidepath to decision height and GPI. Check L. see that the safety zone cursor dashed lines intersect the 1 and 5NM range marks. If they do not, have maintenance perform the map generator alignment in TO 31P5-2FPN62-2, para 6-43f, Cursor Sawtooth Adjustments.

1. Turn the GP/CL CURSOR INTENSITY control fully CCW and the SC CURSOR INTENSITY fully CW.
2. Set the ANGLE V switch to ART EL and dial the 1 NM safety zone cursor alignment voltage (AFCC Form 283, data 4A) into the DM with the ART ANGLE V control.
3. Adjust the appropriate RUNWAY- SAFETY CURSOR - START control until the elevation cursor pulse "bug" and the 1 NM range mark pulse coincide.
4. Dial the 5 NM safety zone cursor alignment voltage (AFCC Form 283, data 4B) into the DM with the ART ANGLE V control.
5. Adjust the appropriate SAFETY CURSOR- ANGLE control until the elevation cursor pulse "bug" coincides with the 5NM range mark pulse.
6. Reset the 1 NM safety zone cursor alignment voltage into the DM. Insure the cursor pulse "bug" and the 1 NM range mark pulse coincide. If they do not, move the cursor pulse "bug" with the SAFETY CURSOR - START control until the "bag" is 1/2 the current distance to, and on the opposite side of, the 1 NM range mark pulse.
7. Set the 5 NM safety zone cursor alignment voltage into the DM. Insure the cursor pulse "bug" and the 5 NM range mark pulse coincide. If they do not, move the cursor pulse "bug" with the SAFETY CURSOR - ANGLE control until they do coincide.
8. Repeat steps 6 and 7 until the 1 and 5 NM alignment requirements are satisfied.
9. Set the ANGLE V switch to OPERATE.

#### DECISION HEIGHT CURSOR (DHC) ALIGNMENT

**NOTE:** The purpose of this alignment is to insure the decision height cursor represents the actual height at which the pilot must decide whether to continue the approach or to execute a missed approach.

1. Turn the CURSOR INTENSITY- DHC control fully CW and adjust the GP/CL and SC controls until they are barely visible. Turn the RM SERVO MOD to INT.
2. Adjust the appropriate RUNWAY- DECISION HEIGHT CURSOR- START, LENGTH and HEIGHT controls so the DHC is approximately 2 inches long and centered above the TDR (first range mark).
3. Set the METER SELECT switch to D HEIGHT (FEET). Adjust the appropriate RUNWAY -DECISION HEIGHT CURSOR - HEIGHT control CCW until the DM just indicates 000 or 001.

4. Set the METER SELECT switch to ANGLE V and the ANGLE V switch to ART EL. Adjust the ART ANGLE V control until the DM shows 0.60 volts (this "burn -in" line equates to the elevation zero degree line).
  5. Adjust the appropriate RUNWAY- DECISION HEIGHT CURSOR- GRD LEVEL control so the DHC pulse(s) coincide with the elevation zero degree "burn in" line at the first range mark. NOTE: Alternating the ANGLE V switch between OPERATE and ART EL will aid in properly aligning the DHC pulse(s).
  6. Turn the ANGLE V switch to OPERATE. Set the METER SELECT switch to D HEIGHT (FEET) and adjust the appropriate RUNWAY- DECISION HEIGHT CURSOR- HEIGHT control to the proper height above the zero degree line (AFCC Form 284, data L) on the DM.
  7. Adjust the appropriate RUNWAY- DECISION HEIGHT CURSOR- START and then LENGTH controls so the DHC extends an equal distance through the GP and SC.
  8. Turn the METER SELECT switch to ANGLE V and the ANGLE V switch to ART EL. Adjust the ART ANGLE V control to show the decision height voltage - A cursor (AFCC Form 283, data 8A). Check to see if the DHC pulse and the elevation cursor pulse "bug" coincide. If they do not, make them coincide by turning the ART ANGLE V control. The result must be decision height voltage- A cursor, plus or minus 0.02 volts.
  9. Repeat step 8 using the decision height voltage - B cursor (AFCC Form 283, data 8B).
- NOTE: If the differences in voltage for step 8 are greater than 0.02 volts, have maintenance perform the map generator alignment in TO 31P5-ZFPN-62-2, para 6-43h, Preliminary DHC Alignments.
10. Adjust DISPLAY RANGE to 15NM.
  11. Adjust the IF GAIN and CURSOR INTENSITY control(s) to the desired level. If MTI is used, adjust the MTI interval control for the desired MTI/NORMAL video transition range.
  12. Set RF GAIN switch to HIGH.

All of the above items should be completed when there is a change of runway or anytime the equipment has been out of service for any reason. The following items should be checked at the beginning of each shift and periodically during the shift: radar operation, angle bias (AZ & EL), courseline cursor (1 & 5 NM check), 1st range mark on TDR, glidepath cursor (1 & 5 NM check), safety cursor (1 & 5 NM check), DHC (A & B check), DH (FEET), and all features of the equipment.

**CHECK PERFORMANCE MONITOR - TEST TARGETS**

A performance monitor (PM) verifies the performance of the radar operational transmitter and receiver channel, and displays this status on the AZ- EL indicator. The performance levels are presented as radar targets in the upper elevation scan sector and are displayed relative to the same snow background and threshold encountered for ranges. The presence or absence of the individual targets in the sequence indicates the performance status as follows:

<b>TEST TARGETS SEEN</b>	<b>RADAR PERFORMANCE</b>
1 - 2 - 3 - 4	Normal performance: i.e., receiver loss less than 6dB, transmitter loss less than 1dB
0 - 2 - 3 - 4	Receiver loss more than 6dB but less than 12dB
1 - 2 - 0 - 4	Transmitter loss more than 1dB but less than 3dB
1 - 2 - 0 - 0	Transmitter loss more than 3dB

0-0-0-0	Receiver loss more than 12dB
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**NOTE:**

1. When one or more targets are not displayed on the AZ- EL indicator, notify the watch supervisor. You may continue to use the PAR indicator based on actual radar performance. The FPN- 62 Performance monitor is intended primarily as a maintenance indicator.
2. Test targets will only be seen using maximum IF GAIN.

## SECTION III

## NORMAL OPERATING PROCEDURES

## N-PAR TURNTABLE OPERATION

The N-PAR provides coverage of one runway; however, it can be repositioned to cover any one of up to six runways. Rotation of the N- PAR turntable (on which the radar is mounted) may be accomplished by the N- PAR controller. Turntable rotation is accomplished by manipulation of N-PAR active radar set control switches located at the N- PAR assistant's position and can be performed in an automatic or manual mode. The following paragraphs provide instruction for N-PAR turntable rotation in both automatic and manual modes.

## AUTOMATIC TURNTABLE ROTATION

Perform the following procedure to rotate the N- PAR turntable to a desired runway.

**WARNING**

Insure that personnel and equipment are clear of the N-PAR shelter before operating the turntable.

1. On the active (ACTIVE RSC indicator is lighted) N-PAR radar set control, set the RUNWAY SELECT switch to the desired runway.
2. Set the TURNTABLE CONTROL ENABLE/NORMAL switch to the ENABLE position.
3. Momentarily set the ROTATE switch to CCW or CW position, depending on the direction the RUNWAY SELECT switch was rotated. Example: if the RUNWAY SELECT switch was rotated CCW from position 3 to position 1, momentarily set the ROTATE switch to CCW position.

## NOTE:

Depress switch momentarily to start rotation, but DO NOT hold switch longer than 3 seconds.

4. When the turntable has rotated to the desired runway position, the runway indicator (next to RUNWAY SELECT switch), TOLERANCE-1 and TOLERANCE-2 indicators will light.

## NOTE:

If the turntable rotates past other runway positions while turning to the desired position, the runway indicators will light momentarily while the turntable passes the undesired runway position.

5. Set the TURNTABLE CONTROL ENABLE/NORMAL switch to the NORMAL position.

**WARNING**

Insure the TURNTABLE CONTROL switch is in the NORMAL position when turntable rotation is not desired. With the TURNTABLE CONTROL switch in the ENABLE position, inadvertent pressing of the ROTATE switch will cause the turntable to rotate, thus creating a hazard to maintenance personnel in the N- PAR maintenance segment.

## MANUAL TURNTABLE ROTATION

If the automatic turntable rotation function fails to work properly, the turntable may be rotated manually by performing the following procedure.

1. On the active (ACTIVE RSC indicator is lighted) N-PAR radar set control, set the RUNWAY SELECT switch to MANUAL.
2. Set the TURNTABLE CONTROL ENABLE/NORMAL switch to the ENABLE position.
3. Hold the ROTATE switch in CCW or CW position, depending on the direction that the desired runway is from the initial runway (as shown on the RUNWAY SELECT switch), until the desired runway indicator lights. Example: If runway number 5 is desired and runway indicator 3 is lighted, set the ROTATE switch to CW until runway indicator 5 is lighted.
4. When the turntable has rotated to the desired runway position, runway indicator and TOLERANCE- 1 and TOLERANCE- 2 indicators will light. Manipulation of the ROTATE switch may be necessary to achieve accurate positioning (both tolerance indicators on).

**NOTE:**

If the turntable rotates past other runway positions while turning to the desired position, one runway indicators will light momentarily while the turntable passes the undesired runway position.

5. Set the TURNTABLE CONTROL ENABLE/NORMAL switch to the NORMAL position.

**WARNING**

Insure the TURNTABLE CONTROL switch is in the NORMAL position when turntable rotation is not desired. With the TURNTABLE CONTROL switch in the ENABLE position, inadvertent pressing of the ROTATE switch will cause the turntable to rotate, thus creating a hazard to maintenance personnel in the N-PAR maintenance segment.

N-PAR CONTROL TRANSFER

The procedure for transfer of control of the N-PAR radar between the OPS segment and maintenance segment is performed with the local common radar set control (LCRSC) in the maintenance segment and the common radar set control (CRSC) in the OPS segment. The procedure is as follows:

MAINTENANCE SEGMENT TO OPS SEGMENT TRANSFER

1. Establish intercom communications between maintenance personnel in the maintenance segment and the N- PAR controller in the OPS segment.
2. Depress the CENTER indicator switch on the LCRSC in the maintenance segment. The ENABLE portion of the LOCAL/ENABLE indicator switch on the LCRSC goes off and the ENABLE portion of the CENTER/ENABLE indicator switch on the OPS CRSC goes on.
3. Depress the CENTER/ENABLE indicator switch on the OPS CRSC and the CENTER portion goes on. At the same time, the CENTER indicator switch and the LOCAL portion of the LOCAL/ENABLE indicator switch at the LCRSC goes off. The OPS segment now has control.

OPS SEGMENT TO MAINTENANCE SEGMENT TRANSFER

1. Establish intercom communications between maintenance personnel in the maintenance segment and the N- PAR assistant in the OPS segment.

2. Depress the LOCAL indicator switch on the OPS CRSC. The ENABLE portion of the CENTER/ENABLE indicator switch at the OPS CRSC goes off and the ENABLE portion of the LOCAL/ENABLE indicator switch on the LCRSC goes on.
  
3. Depress the LOCAL/ENABLE indicator switch on the LCRSC and the CENTER section of the CENTER/ENABLE CRSC indicator extinguishes while the CENTER indicator switch at the LCRSC goes on. The LOCAL portion of the LOCAL/ENABLE indicator switch goes on. At the same time, the LOCAL indicator at the OPS CRSC goes on. The maintenance segment now has control.

## SECTION IV

## FAILURES AND REMEDIAL ACTION

Figure 4-1 lists possible fault indications, caused by partial equipment failure, that can be observed on the N-PAR power supply, radar set control, or display console. The remedial action listed in figure 4-1 provides instructions to the controller if a failure occurs. The controller observing the fault indication should promptly contact maintenance personnel to restore the equipment to its full operating capabilities, in addition to performing the remedial action listed in figure 4-1.

N-PAR FAULT INDICATION	REMEDIAL ACTION
The POWER SUPPLY ALARM REGULATORS, POWER SUPPLY ALARM-17VU, or POWER SUPPLYALARM +86V lamp lights.	Set the AC POWER and HV switch on the power supply to OFF. Transfer aircraft responsibility to the other N-PAR controller.
The 28 V PS FAULT ALARM or the OVERTEMP ALARM lights on the active radar set control.	Transfer to standby N- PAR channel by pressing the CHANNEL A or CHANNEL B switch on the common radar set and put the previous channel in maintenance mode by pressing the associated MAINT switch. If the standby channel is in maintenance mode, set the SCAN switch and HV pushbutton switch to OFF.
A failure occurs in one of the master controls at the master N-PAR position.	Select another N- PAR position by setting the MASTER SELECT switch on the active set control to the corresponding position.
Erratic or loss of radar video (MTI or Normal) or both N- PAR displays.	Select the standby channel by pressing either channel A or channel B on the common radar set control. Place the previous channel in maintenance mode by pressing the corresponding MAINT switch.
Erratic or loss of radar video on the N-PAR display.	Set the AC POWER and HV switch on the power supply to OFF. Transfer aircraft responsibility to the other N-PAR controller.

**Figure 4-1 N-PAR Faults and Remedial Action**