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AIR FORCE FLIGHT STANDARDS AGENCY
1535 COMMAND DRIVE, SUITE D-306
ANDREWS AFB, MD 20762-7002

AT-E-02

AIR TRAFFIC CONTROL TRAINING SERIES

EQUIPMENT

DIGITAL BRITE RADAR
TOWER EQUIPMENT
(DBRITE)

1 May 2003

FOREWORD

PURPOSE: This publication is used to train USAF air traffic controllers and is not intended to replace, substitute, or supersede official regulations, procedures, or directives.

SANDRA SERAFIN, Col, USAF
Director of Airfield Operations

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CORRECTIONS TO "AT" TRAINING SERIES

If you encounter an item that is not correct or needs clarification, write to us about it. Use this page and reference the series number, the page, and paragraph number. Briefly state what is wrong and then write your correction or suggestion to correct or improve it. Detach this page from the booklet and return it to:

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SUMMARY OF CHANGES

Correction to AT Training series

#3 AFFSA Web site address corrected

Introduction

#4 Table of contents moved

Section 1 – DBRITE System Equipment

#6 Nomenclature change PSJ changed to PS&J

Section 4 – Display Unit

#8 Comma added to first sentence
#12 Comma added
#16 PEM Control format correction
#19 MOV PEM x Display/Action defined
#23 Change "activated of inhibited" to "activated or inhibited"
#25 Change "circla" to "circle"
#Chapter 4 Identity code changed to Beacon code

TABLE OF CONTENTS

INTRODUCTION

This publication is designed to be used in conjunction with hands on training and classroom instruction to familiarize air traffic controllers with the operation of DBRITE equipment.

DBRITE

The Digital Bright Radar Indicator Tower Equipment (DBRITE) is a tower display system that provides a digitized raster scan presentation of both primary and beacon radar videos and alphanumeric (A/N) data from an air traffic control (ATC) system. The DBRITE system interfaces with one of four types of ATC
automation systems.

1. Automated Radar Terminal System IIA (ARTS II).
2. Automated Radar Terminal System IIIA (ARTS IIIA).
3. Programmable Indicator Data Processor (PIDP).
4. Non-PIDP version of the AN/TPX-42A (TPX-42).

This training series provides a description and procedures for operation of DBRITE equipment interfaced with the PIDP and TPX-42 systems. AT-E-09/ PIDP Operators Manual should be used in conjunction with this book to familiarize personnel with the AF system. Existing FAA training materials will be used for familiarization with DBRITE equipment that is interfaced with ARTS IIIA automation systems.

SECTION 1

DBRITE SYSTEM EQUIPMENT

DBRITE system equipment located in the tower cab:

1. **DISPLAY:** The DBRITE tower display is a high-resolution TV display. It's a self-contained unit capable of ceiling, console, or desk mounting and it provides a flicker free presentation clearly visible in the control tower environment. The presentation is identical to the presentation of the interfaced ATC automation system and is controlled from the tower Remote Control Unit (RCU).

2. **Power Supply and Junction (PS&J) Box:** The PS&J box provides a DC power source and is the connection point for other DBRITE tower components. The PS&J box supports an RCU, up to two keyboards and PEMs, and an aural alarm box.

3. **Remote Control Unit (RCU):** The RCU provides controls for the selection of display parameters such as video gains, display offsets, character size, map selection, A/N formats, compass rose, range mark selections, brightness and contrast.

4. **Keyboard and Position Entry Module (PEM):** The keyboard has a similar layout and the same function as the keyboard of the interfaced automation system and the PEM has the same function as the existing PEM or trackball units of the interfaced automation system.

In the towers, two keyboards and PEMs are provided, except for the TPX-42 system configuration, which only has one keyboard and PEM.

The TPX-42 keyboard and PEM performs the same functions provided by three of the existing TPX-42 automation system input devices: barometric pressure setting switches on the B-Box, range strobe and cursor bearing controls from the display indicators and a subset of the controls on the A-Box.

5. **Aural Alarm Box:** When the DBRITE system is interfaced to a PIDP system, an aural alarm is generated by the PIDP system during MSAW, LOST COMM, or EMERGENCY conditions.

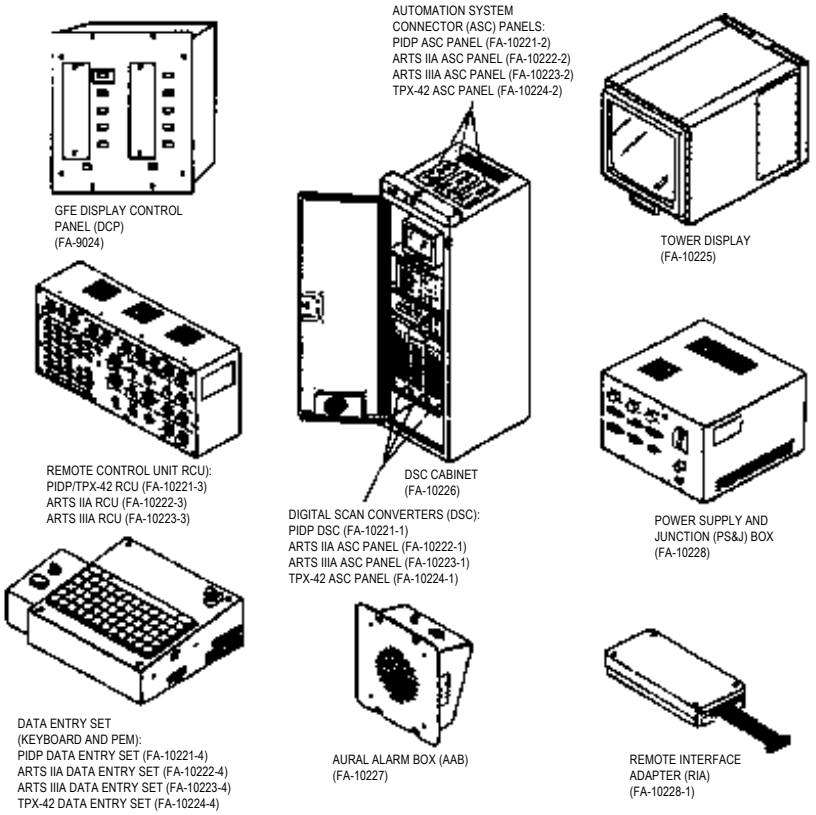
When the DBRITE system is interfaced to a TPX-42 system an aural alarm signal is generated when emergency beacon codes 7500, 7600, or 7700 are received, or when an alarm is generated by the Low Altitude Alerting System (LAAS).

DBRITE system equipment located in either the tower or radar equipment room:

1. **Digital Scan Converter (DSC) Cabinet:** The DSC performs the conversion function for the radar, beacon video, and the alphanumeric data from the interfaced automation system. It processes controller entries from the RCU, keyboard and PEM, and reports the status back to the automation system. The DSC also provides the control signals to drive the aural alarm speaker in the tower.

2. **Automation System Connection Panel:** This panel is located on top of the DSC cabinet and provides the connection between radar, automation system and equipment in the tower cab.

3. A maintenance monitor, maintenance panels, and duplicates of the tower cab RCU, keyboard and PEM, and the PS&J box are contained within the DSC to assist with system maintenance action.



SECTION 2

DISPLAY UNIT

The DBRITE display unit, figure 2-1, provides a composite video signal consisting of normal videos, MTI videos, map videos, beacon videos, and alphanumeric information. A Built-In-Test (BIT) capability periodically monitors major functions to provide an on-line visual warning of abnormal conditions. Provisions do exist for linking up to 3 additional display units within each control tower.

The following switches and controls for the display unit are located on the front and rear panels as shown in figure 2-1.

Power Circuit Breaker:
Disconnects primary voltage in the event of over current caused by short circuit or component failure.

Power ON-OFF Switch:
Provides front panel control of primary voltages.

Remote-Local Switch:
In the LOCAL position front panel CONTRAST and BRIGHTNESS are functional. In the REMOTE position CONTRAST and BRIGHTNESS controls are controlled from the RCU. When additional displays are linked to the primary units the switch must be set to LOCAL on the additional displays and the FOCUS and BRIGHTNESS controls on the front panel are functional for only the additional units.

CONTRAST CONTROL:
Provides contrast control in the LOCAL mode during set-up or trouble shooting. Also used during normal operation on additional display units that are linked to the primary display.

BRIGHTNESS CONTROL:
Provides brightness control in the LOCAL mode during set-up or trouble shooting, also used during normal operation on additional display units that are linked to the primary display.

FOCUS CONTROL:
Provides picture sharpness control in both LOCAL and REMOTE modes.

During normal operations the circuit breaker and the power ON-OFF switch remain in the ON positions and the LOCAL-REMOTE switch is set to the REMOTE position. The FOCUS control should be set to obtain the sharpest picture and should not require frequent adjustment. Brightness, contrasts and other video functions are controlled from the RCU during normal operation. When additional display units are linked to the primary displays the BRIGHTNESS and CONTRAST controls on the front panels on the additional units are functional.

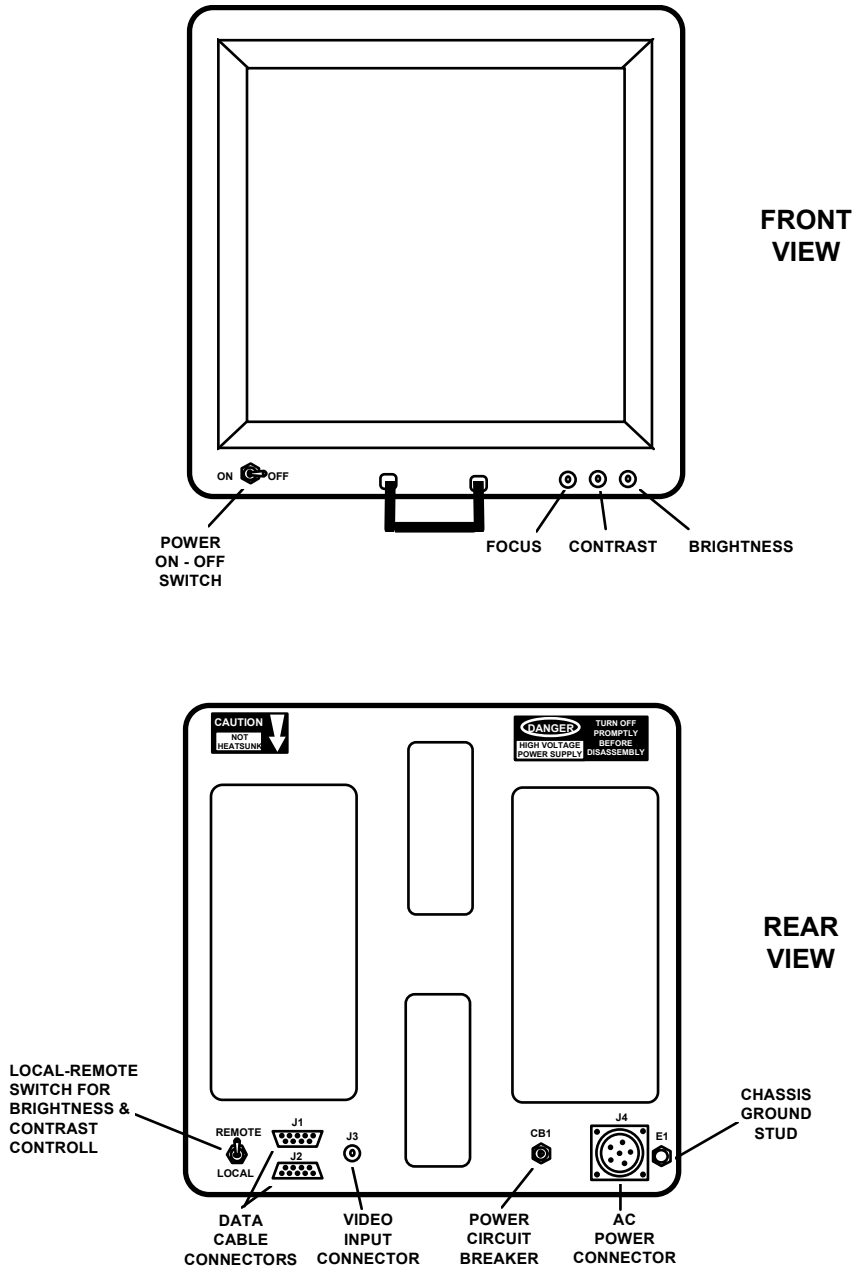


Figure 2-1 Location of Controls and Switches

SECTION 3

PIDP/TPX-42 REMOTE CONTROL UNIT (RCU)

The Remote Control Unit allows operator control of the display presentation. Video gains, range and map selections display offset, interrogator mode selection and alphanumeric character size selection are functions controlled from the RCU panel. The following is a brief description of each control. Functions are applicable to either PIDP or TPX-42 interfaced systems. The RCU is shown in figure 3-1.

CONTROLS AND INDICATORS

PANEL ILLUM	Controls brightness of the RCU panel.
POWER ON	When lit, indicates power is applied to the RCU.
AURAL ALARM	Controls the volume of the aural alarm speaker.
TRAILS	Adjusts length of the target trail history.
LDR-LEN	Adjusts length of the target leader.
COMPASS ROSE	Displays the compass rose.
MODE INDICATOR	Indicates, which beacon interrogator mode, is being transmitted. Mode C indicator should always be lit, as it is automatically transmitted with mode 1,2, or 3A.
MODE SELECT	Selects mode 1,2 or 3A interrogation. Mode C is always selected.
MAP SWITCHES	Displays the selected digital map (1 - 5).
COMM FAILURE	This indicator flashes RED when DBRITE receives a communications failure (7600) alarm message.
EMER	Flashes RED when DBRITE receives an emergency alarm (7500, 7700) message.
RANGE ERROR	Flashes RED when radar range time is in error.

ENGAGE/DISENGAGE When set to DISENGAGE, DBRITE is disconnected from the System computer and A/N data is erased from the display. The PEM, CURSOR, and SWEEP indicators light to indicate they are now active. Keyboard inputs are ignored. When set to ENGAGE, the PEM, CURSOR, and SWEEP indicator lights deactivate. A/N data presentation and keyboard inputs are resumed.

BRKT VIDEO ON/OFF Provides or inhibits the display of a bracket video control slash.

ERASE When this spring loaded switch is depressed, all memory and display of PPI and synthetic data is erased. When a BIT error code is displayed pressing the switch only erases the displayed error code and results in display of the next error code stored in the error code register. Subsequent switching will continue to erase the current BIT error code until the last error code has been erased. Pressing the ERASE switch after the last error code is erased then causes all memory and display data to be erased.

DISPLAY CONTROLS:

BRITE Controls brightness on the first tower display. If additional displays are linked to the first display the BRITE control won't affect their brightness. The LOCAL/REMOTE switch on the first tower display must be set to REMOTE to allow the DSC RCU to control the brightness on the first tower display.

CONT Controls CONTRAST on the tower display. Like the BRITE control it only affects the first display connected to the DSC when the tower display is set to REMOTE.

VIDEO GAIN CONTROLS:

BKG Varies amount of normal video provided as background within the MTI portion of the sweep. Normal video beyond the video crossover point (MTI gate) is not affected.

VIDEO Controls brightness of the NORMAL and MTI video mix.

BCN Controls brightness of the beacon control slash.

MAP Controls brightness of both the analog map from the video mapper and the internally generated digital map.

SPARE Provides the capability to vary the intensity of an additional video selected for display.

DECENTER SWITCHES:

ON/OFF When ON activates the NWSE decenter function.

NWSE A joystick type switch used to reposition the radar sweep origin NORTH, WEST, SOUTH, or EAST. The switch returns automatically to the center position when released: the display location remains fixed. Decenter values remain fixed when the ON/OFF switch is in the OFF positions and the display will return to the selected off-center location when the switch is again placed in the ON position.

MTI/N GATE When ON activates the crossover function.

XOVR Selects the NORMAL/MTI crossover point.

RANGE CONTROLS:

INC(+) DEC(-) Increases or decreases range in 2 NM steps (SEL control must be set to VAR). The control automatically returns to the center (OFF) position when released.

SEL Selects sweep range in variable (VAR) steps or in steps of 10, 30, and 60 NM. When the VAR position is selected the range displayed is the last setting selected for the VAR position.

A/N CONTROLS:

SIZE	Controls the size of the alphanumerics being displayed. There are three possible sizes 0, 1 and 2, 0 is the smallest.
INTEN	Controls brightness of the alphanumerics.

RANGE MARK CONTROLS

CENTER/OFFSET	When set to OFFSET, range marks are moved to a new position by using the NWSE switch. When set to CENTER, range marks are centered.
NWSE	A joystick type control that allows the controller to move the range marks NORTH, WEST, EAST, or SOUTH. Releasing the switch automatically returns it to the center (OFF) position. The display position then remains fixed.
SEL	Permits selection of range marks at increments of 2, 5 or 10 nm.
INTEN	Controls brightness of the range marks and the compass rose.

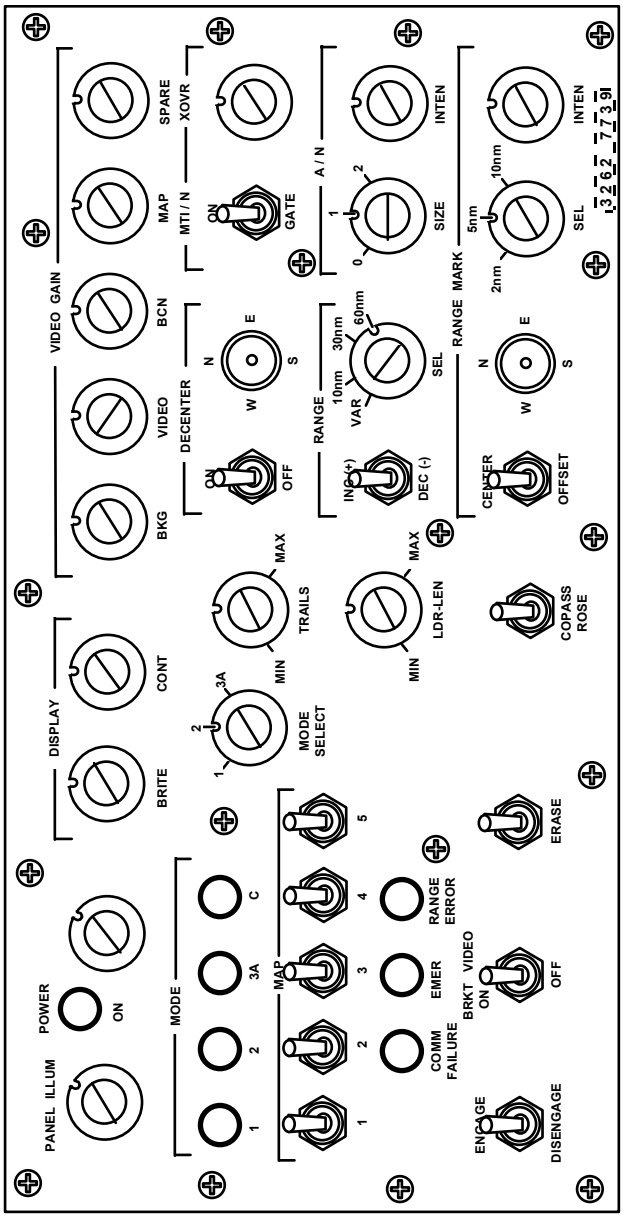


Figure 3-1 PIDP/TPX-42 RCU Control Panel

SECTION 4

TPX-42 KEYBOARD AND POSITION ENTRY MODULE (PEM)

SECTION 4A

KEYBOARD/PEM CONTROLS (see figure 4-1) AND FUNCTIONS

CLEAR	Cancels data entered so far and restores the previous condition. Clears preview area messages if any are displayed.
AA	Toggles altitude filtering ON/OFF.
MOV	MOVE. Used with PEM to move tabular data areas.
ENTER	Execute the entered sequence.
SEL	Selected target category.
NSL	Nonselected target category.
ALT	Altitude format element: affects display of altitude code.
HOOK	Used with the PEM to define an area on the display to off center the cursor origin.
DROP	Drops a selected code from the operational parameter list.
PRE (P)	Preview area of the screen.
SPACE	Separator.
BACKSP	Backspace. Cancels last item entered.
LDR	Used to change the leader direction.
OP	Operating Parameter list entry follows: can also be used to reset operating parameters in the current OP list.
SPEC	Initiates special sequences.
CURS (C)	Used with HOOK key to change cursor origin.
EMG (E)	Used with SPEC and ENTER keys to toggle the aural alarm on/off for emergency conditions.
ALPHABET KEYS	Causes the designated character to be displayed for valid message entries.

NUMERIC KEYS	Serve two functions: display number on key depressed; specifies target leader direction (N/A for the 0 or 5 keys).
TGL (C/S)	Toggles the cursor and range strobe dot on/off.
BRIGHTNESS CONTROL	Adjusts key brightness. Located in upper right corner.
PEM BEARING	When selected allows controller to change cursor bearing using the joystick.
PEM STROBE	When selected, allows controller to change the strobe range using the joystick.
PEM CURSOR	When selected, allows controller to move the cursor origin using the joystick (only functions when DBRITE is DISENGAGED from the automation system).
PEM SWEEP	When selected, allows the controller to move the sweep origin using the joystick (only functions when DBRITE is DISENGAGED from the automation system).
PEM CONTROL	Selects position of specific elements on the display screen. Also provides the capability to identify a target by its position on the display. The PEM symbol moves about the display screen as the controller adjusts the joystick.

Keyboard/PEM entries select presentation parameters for the display unit. Target identity/altitude filtering and display formats barometric pressure setting/transition altitude settings low altitude alert exemption, and aural alarm shut-off are keyboard functions. The PEM is used to change cursor bearing and strobe range and to relocate cursor origins sweep origin, and tabular data lists on the display screen. Table 4-1 lists the entry sequences required to accomplish these actions.

"TPX-42 DATA SET"

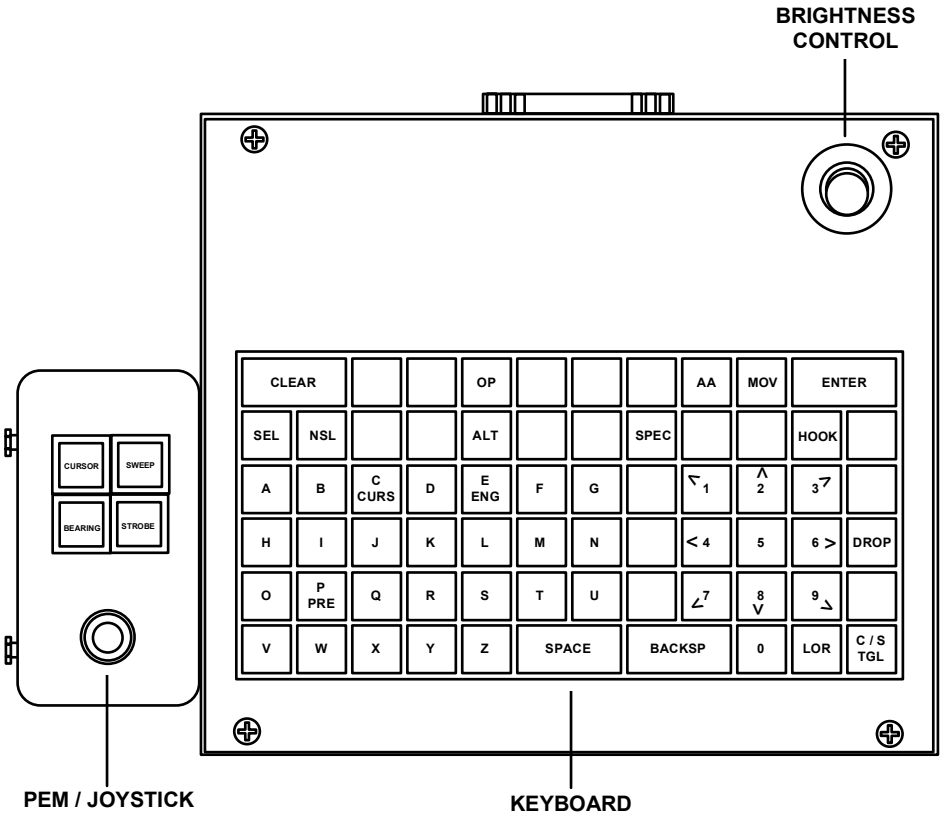


Figure 4-1 TPX-42 Keyboard and PEM

TABLE 4-1 TPX-42 Keyboard Functions

Input Sequence	DBRITE Display/Action
OP xxxx ENTER	Selects and displays all targets having discrete beacon code xxxx (select targets).
OP xxxx	All targets having discrete beacon code xxxx become nonselected (NSL targets).
OP xx ENTER (SELECT	Selects and displays all targets within code block xx targets).
OP xx DROP	All targets within code block xx become nonselected (NSL targets).
SEL xxxx C	Inhibits display of beacon code field in data blocks of SELECT targets with a discrete beacon code of xxxx (toggles on/off).
SEL xx C	Inhibits display of beacon code fields in data blocks of SELECT targets "within" code block xx (toggles on/off).
SEL ALT	Inhibits display of altitude field in data blocks of all SELECT targets (toggles on/off).
OP nnn SPACE xxx ENTER	Lower altitude limit is set to nnn. Upper limit is set to xxx. (nnn and xxx can range from 000 to 999 hundred feet. Nnn must be lower than xxx or DBRITE will not accept the entry)
AA	Toggles altitude filtering on/off.
NSL ENTER	Inhibits display of all NSL targets (toggles on/off).
NSL C	Inhibits display of beacon code field in data blocks of all NSL targets (toggles on/off).
NSL ALT	Inhibits display of altitude field in data blocks of all NSL targets (toggles on/off).
NSL n LDR (NW is default)	Positions leader and data block for all NSL and SELECT (SEL) targets based on direction selected by pressing numeric key n on the keyboard as follows:
SEL n LDR (NE is default)	Key Direction Key Direction 1 NW 6 E 2 N 7 SW 3 NE 8 S 4 W 9 SE

TABLE 4-1 (continued)

Input Sequence	DBRITE Display/Action
SPEC nn SPACE xx ENTER	Sets barometric pressure to nn.xx inches of mercury. (nn =28 to 30, xx =00 to 99)
PEM HOOK C	Relocates origin of the cursor to location of PEM symbol on the display. (in the input sequences PEM means to position the PEM symbol on the display). **NOTE**: This method of moving the cursor origin only functions when the computer is ENGAGED.
SEL ENTER	Inhibits display of all SELECT targets (toggles on/off)
SEL C	Inhibits display of the beacon code field to data blocks of all SELECT targets (toggles on/off).
SEL xxxx ALT	Inhibits display of altitude field of data blocks of SELECT targets with discrete beacon code xxxx (toggles on/off).
SEL xx ALT	Inhibits display of altitude field in data blocks of SELECT targets within code block xx (toggles on/off).
MOV PEM x (D/S)	Moves specified TAB list to location of PEM symbol on the display. (In the input sequences PEM means to position the PEM symbol on the display and x= OP for Operational Parameter (OP) List, P = Preview Area, A= arrival/departure/enroute (A/D) list, or D= drop/suspend list.
SPEC E ENTER	Inhibits the aural alarm for emergency conditions and communications failures (toggles on/off).

SECTION 4B

Operational Parameter (OP) Listing and Keyboard Preview Area

The OP list presented on the display screen contains selections/status of controller inputs entered via the keyboard and PEM. Five lines of up to 35 alphanumeric characters per line comprise the OP list. Location of the list on the display screen is at the controller's discretion. Depress the MOV key (this changes the PEM symbol from a circle to a square), relocate the PEM symbol to the desired location by using the PEM joystick, and finally depress the OP key to complete the move. Locating the list too close to the edge of the display screen may result in portions of the list not being visible on the screen. The default location for the OP list is the top center of the display. List location is not affected by the DBRITE decentering controls. Figure 4-2 provides an OP list example and description of the displayed alphanumerics.

The keyboard Preview area echoes controller inputs on the display screen. Location of the area is identified by an asterisk (*) on the display screen. It's a single line containing up to 21 characters plus the asterisk. As keystrokes are entered the asterisk advances along the line indicating location of the next entry. Depressing the CLEAR key erases the entire line. Depressing the BACKSP key erases only the last character entered. Location of the Preview area on the screens like the OP list, is at the controller's discretion. To move the area use the same procedure required to move the OP lists but the final keystroke will be P instead of OP.

The DBRITE internally checks keystroke inputs for proper format and sequence. If an entry sequence error is detected a reverse 'E' appears at the location of the error. If a valid keystroke is then entered it will overwrite the reverse 'E'. DBRITE also checks for illogical parameter entries, such as reversed altitude filter limits. This is done when a valid keystroke sequence is entered. If the entered sequence is illogical, an error message will be displayed in the Preview area. Table 4-2 lists error messages that may appear. An error message must be acknowledged by depressing the CLEAR key. DBRITE will not accept further inputs until this is accomplished.

FIGURE 4-2. Operational Parameter List

OP List Example

Line 1: B 29.92 A 100-180 AA LA EM TA =020
2: C 000.0 S 030.0
3: NSL NSL/C NSL/ALT SEL SEL/C SEL/ALT
4: 1123LC 12--LA 5567L 44447A 1012C
5: 6660* 3223L* 21-- 3221 22-- L

OP List Description

Line 1: Barometric Pressure is 29.92
Altitude Filter Limits are: 10000(1ower) 18000(upper)
Altitude Filter (AA) is off
LAAS aural alarm (LA) is off
Emergency conditions aural alarm (EM) is off
LAAS map memory chip is missing or malfunctioning and
Transition Altitude (TA) is set at 2000 it.

Line 2: Cursor bearing (C) is 0.0 degrees
Strobe range (S) is 30.0 NM

Line 3: All inhibit functions are activated. (functions appear in fixed positions)

Line 4-5: 7 discrete and 3 nondiscrete codes selected. (max is 5 codes per line)
Functions that have been activated for displayed codes/code blocks are also indicated

Two character function indicators appearing in lines 4 and 5 are as follows:
L = LAAS exempt
C = ID code display inhibited
A = Altitude code display inhibited
* = ID and Altitude code display inhibited
LA = LAAS exempted, Altitude code inhibited
LC = LAAS exempted, ID code inhibited
L* = LAAS exempted, ID and Altitude inhibited
= No exemptions, no display inhibits

By entering the SPEC OP ENTER sequence all OP parameters, except barometric pressure, Transition Altitudes, and cursor bearing/strobe ranges are returned to their default settings. Altitude filter settings are reset to 000 (lower) and 999 (upper) and the filter is deactivated, LAAS and emergency condition alarms are activated all inhibit functions are off as all targets become nonselected and target leader directions return to NE for SELECT targets and NW for NSL targets.

TABLE 4-2. TPX-42 Preview Area Error Messages

Function	Preview Message	Error/Condition
OP xxxx ENTER OP xx ENTER	NOT OCTAL	Code entered was not octal
	MAX CODES ENTERED	10 codes already selected
OP xxxx DROP OP xx DROP	NOT OCTAL	Code entered was not octal
SEL xxxx C SEL xx C	NOT SELECTED	Code entered not a select code
OP nnn SPACE xxx ENTER	LOWER>UPPER ALT	Lower altitude not less than upper altitude limit
SPEC nn SPACE xx ENTER	INVALID ALTIMETER	Barometric pressure entered was less than 28.00 or more than 30.99
	VERIFIED ALT? (Y/N)	Barometric pressure entered varied from current setting by 0.04 or more: requires verification
SEL xxxx ALT SEL xx ALT	NOT SELECTED	Code entered was not a select code
NSL n LDR	INVALID LEADER	Leader direction entered was not a number from 1 to 4 or 6 to 9
SEL xxxx L SEL xx L	NOT SELECTED	Code entered was not a selected code
SPEC T A xxx ENTER	VERIFY TA =xxx: (Y/N)	Entry of transition altitude xxx requires verification.

SECTION 4C

Target Identity and Altitude Fi1tering

The DBRITE TPX-42 system is capable of selecting up to 10 beacon codes/code blocks, inhibiting the display of selected/nonselected target beacon codes and altitudes, and filtering targets within specified altitude limits. The selection of display filtering and inhibit functions determines which target symbols and associated numerics are displayed on the screen.

Any aircraft reporting an emergency condition or communications failure is forced through all inhibit and altitude filters. The target symbol will be displayed as a large 'X' and the symbols leaders and associated numerics will blink on the display screen.

Display of SEL (SELECT) and NSL (NONSELECT) targets is left to the controller's discretion. SEL targets are displayed as a large 'X' and NSL targets are displayed and a small circle, 'o'. Controllers may also limit the displayed data associated with SEL or NSL targets through use of the inhibit functions. The OP (Operational Parameter) list discussed in section 4b identifies which of these functions have been activated or inhibited. Table 4-3 provides examples of target/data displays and the control settings that were activated to achieve the specific displays.

DBRITE TPX-42 data blocks are either in limited data block (LDB) format or when a LAAS alert is presents full data block (FDB) format. Two lines of 4 characters each are displayed in the LDB format. Line 1 is the 4 digit beacon code and line 2 is the 3 digit altitude readout followed by the LAAS exempt indicator in position 4 when the target is LAAS exempt. The FDB format is displayed only when a LAAS alert is detected by DBRITE. A third line of up to 8 characters is displayed. Line 3 consists of the letters 'ALT', a blank spacer and the 3 digits representing the low altitude boundary.

LDB	FDB
1234	1234
050	047
	ALT 050

Table 4-3 TPX-42 Displayed Target Symbols and Data Blocks

Display Format	Description	Condition (Control Setting)
1234 X	Large X, identify code, and altitude	Select Target w/discrete code 1234 or 12 code block & altitude of 9900 ft
1234 X	Large X and identity code	Select Target w/discrete code 1234 or 12 code block (SEL ALT - ON)*
099 X	Large X and altitude	Select Target w/altitude of 9900 feet (SEL C - ON)*
X	Large X	Select Target (SEL C, SEL ALT- 0N)*
1234 /// X	Large X with identity code and 3 slashes	Select Target with invalid or no altitude (AA - ON/OFF)
1234 … X	Large X with identity code and 3 dashes	Select Target with altitude greater than 99,900 feet (AA - ON/OFF)
1234 NEG	Large X with identity code and “NEG”	Select Target with negative altitude (AA - ON/OFF)
1234 099 ALT 100 X	Large X, identity, altitude (3 digits or "NEG"), &LAAS alert ("ALT” & LA boundary). All flashing.	Select Target with valid altitude below LA boundary (Forced through a11 filters and inhabit functions)
1234 099< X	Large X with identity code, altitude (3 digits, ///, ---, or ”NEG”), & < character	Select Target with discrete code 1234 or code block 12 exempt from normal LAAS alerting (SEL L - ON)* (SEL ALT, AA - ON/OFF) (SEL Target Inhibit - ON/OFF)

Table 4-3 TPX-42 Displayed Target Symbols and Data Blocks - CONT

Display Format	Description	Condition (Control Setting)
1234 099< X	Large X with identity, altitude (3 digits or "NEG"), & flashing < character	Select Target w1th discrete code 1234 or code block 12. and valid altitude of 9900 it exempt from normal LAAS alerting and below LA boundary (SEL L - ON)* (SEL ALT, AA - ON/OFF) (SEL Target Inhibit - ON/OFF)
4567 099 o	Small circle, iden-target code, & altitude (3 digits, ///, ---, or "NEG")	NSL Target w/beacon code and altitude of 9900 it (AA - ON/OFF)
4567 o	Small circle with iden-tity code	NSL Target with beacon code (NSL ALT -ON) (AA - ON/OFF)
099 o	Small circle with altitude	NSL Target with altitude of 9900 feet (NSL C - ON, or beacon code is invalid or different than mode selected)
o	Small circle	NSL Target (NSL ALT- ON) (NSL C - ON, or beacon code is invalid/different mode)
1234 099 o	Shrinking circle, identity, altitude	Select Target squawking SPI with valid identity & altitude (Subject to altitude filtering & inhibit factions)
4567 099	Shrinking circle, identity, altitude	NSL Target squawking SPI with valid identity & altitude (Subject to altitude filtering & inhibit factions)
7700 099	Large X, beacon code, and altitude (3 digits, (///, --- a or "NEG"). All flashing.	Select or NSL Target reporting emergency (7700), hijack (7500), or comm failure (7600) (Forced through all filters and inhibit functions)

NOTES:
1. Assume for Select Targets that OP 12 ENTER or OP 1234 command was entered.
2. Inhibit functions are assumed OFF less specified ON.
3. For entries marked with an asterisk (*) Inhibited/Except function activated for the specified select code 1234 or 12 code block or for ALL Select Targets.

SECTION 4D

TPX-42 LOW ALTITUDE ALERTING SYSTEM (LAAS) FUNCTION AND TRANSITION ALTITUDE SETTING

The DBRITE LAAS function generates a visual and aural alarm when a SELECT targets reporting valid altitude information, is 300 feet or more below an established minimum safe altitude for a defined map segment. This function is not performed for NSL targets. When a SELECT target enters of descends within a map segment below its minimum altitude the aural alarm sounds and the data block begins blinking on the screen. Data blocks are forced through any identity and altitude inhibit functions that are selected. A third line of numerics is also displayed, reflecting the altitude boundary of the segment in hundreds of feet.

LAAS map segments are defined by range and azimuth boundaries. SELECT targets on boundary lines are compared to the lower altitude value of the map segments: A target occurring on the boundary line between a 3400 ft. segment and a 3900 ft. segment will activate the LAAS alarm if below 3400 ft. The LAAS function is not performed on SELECT targets reporting invalid altitude readouts.

SELECT discrete codes or code blocks may be exempted from the LAAS alerting function. This is done by entering SPEC xxxx L for discrete codes or SPEC xx L for code blocks. Exempted SELECT targets display a LAAS exempt indicator (<) in the altitude field. Display of the altitude code for LAAS exempted targets is forced through any activated altitude inhibit functions. If a LAAS exempted target is operating below a LAAS altitude, only the LAAS exempt symbol will blink not the entire data block.

The aural alarm will not sound for LAAS exempt targets. The aural alarm for LAAS and also emergency conditions, may be toggled on and off via simple keystroke entries. SPEC L ENTER for LAAS, and SPEC E ENTER for emergency conditions. These entries only affect the aural alarm: data blocks will continue to blink for targets violating LAAS or experiencing emergency conditions.

Transition altitude setting is automatic when the LAAS computer chip is installed and functioning properly. If the chip isn't installed or isn't functionally properly, controllers may manually enter the transition altitude via the keyboard. SPEC T A xxx ENTER is the proper keyboard entry sequence with xxx representing the transition altitude in hundreds of feet. DBRITE will then display "VERIFY TA =xxx: (Y/N)?" on the screen. If the entry is correct depress 'Y' for YES and the entry is completed. If the entry is not correct depress 'N' (NO) to clear the entry and then repeat the sequence with the correct entry. DBRITE will not accept a transition altitude entry, or display it in the OP list if the LAAS chip is installed and functioning properly.

SECTION 5

PIDP KEYBOARD AND PEM

The PIDP keyboard and PEM are shown in figure 5-1. DBRITE systems interfaced with the PIDP air traffic automation system have the same capability as the host radar facility. A detailed description of PIDP functions is provided in AT-E-09, PIDP Operators Manual. Refer to that document for training specific PIDP functions and operating procedures.

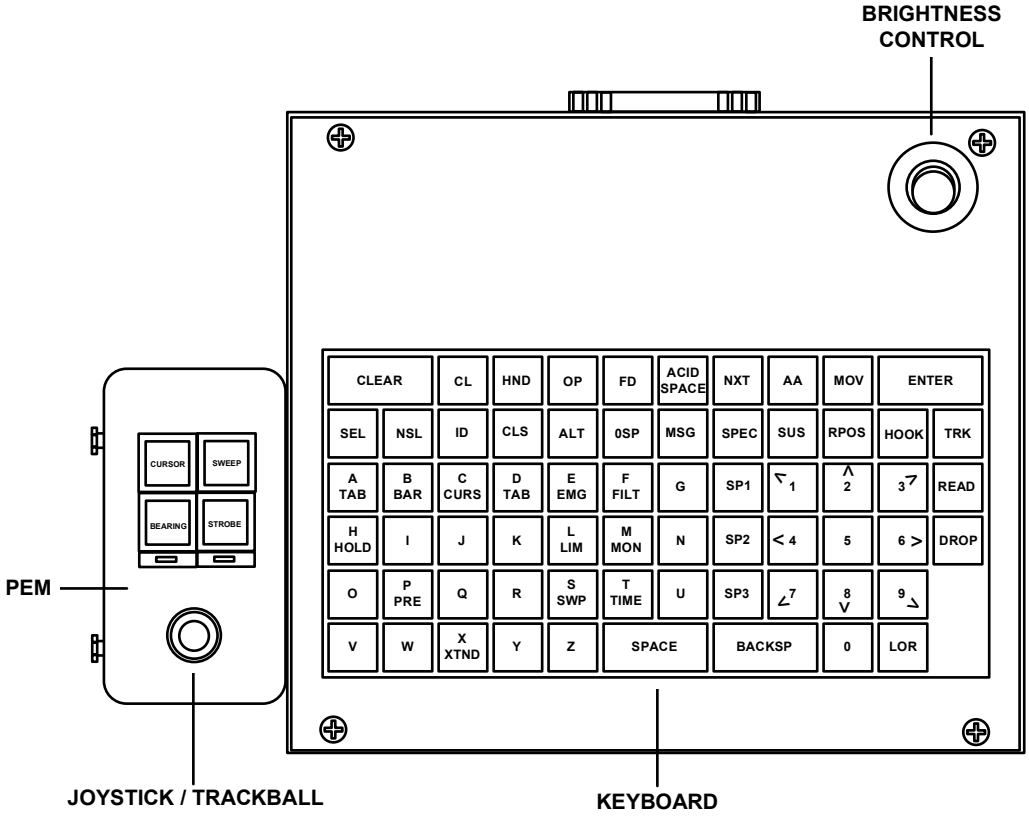


Figure 5-1. PIDP Keyboard and PEM

SECTION 6

BUILT-IN-TEST (BIT) FUNCTION

The DBRITE BIT function performs a series of diagnostic tests on the system. Two types of BIT tests are conducted: On-Line BIT are the automatic system checks conducted continuously while the system is operating. Off-Line BIT requires maintenance personnel and is conducted while, as the name implies the system is off-line. The controller's primary concern will be with the On-Line BIT.

A BIT status symbol appears on the display screen to indicate the BIT function is operating. The symbol is a large "O" with a dot rotating abound the outside edge at approximately one rotation per second. The status symbol and the error code block may be located about the display at 45 degree intervals. Relocating the status symbol and error block is a maintenance function, not a controller input. When a system error is detected the status symbol is replaced with a BIT error code block made up of alphanumeric characters indicating the nature of the error. The alpha characters indicate the major DBRITE component with the error, and the numeric characters indicate which element of that component is the most likely source of the problem. The following list of alpha characters, and the major component they represent, is provided for your information.

R = RCU problem
I = Automation system or interface board problem
P = PS and J box, tower displays, RCU, or keyboard problem
S = Synthetic board problem
D= Tower display problem
X= Circuit card assembly problem

In the below example, the "D" indicates a problem in the Display Unit, and the "010" further defines the problem as a video preamp malfunction.

E: D Ø1Ø

DBRITE can detect more than one error at a time. Pressing the RCU ERASE switch will advance the error code display if more than one error is present. Depressing the RCU ERASE switch when more than one error code exists only advances the error codes and does not actually "erase" the remainder of the display presentation. After the last error code has been displayed/ the entire display is erased with the next depression of the RCU ERASE switch. The sequence then repeats until the condition causing the error is repaired. **ALL ERROR CODES MUST BE REPORTED TO MAINTENANCE PERSONNEL FOR CORRECTIVE ACTION**.