Federal Aviation Administration

Initial En Route Qualification Training

Instructor
Lesson 31
Radar Data Display

Course 50148001

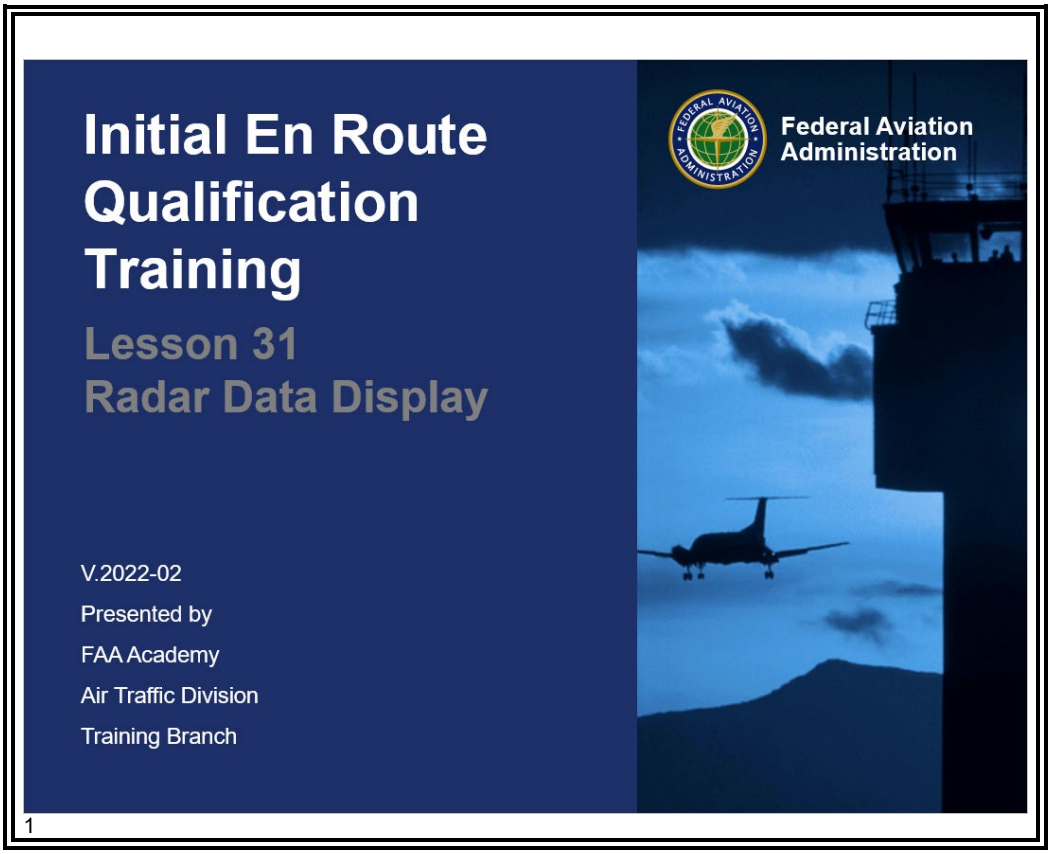
LESSON PLAN DATA SHEET

COURSE NAME:	INITIAL EN ROUTE QUALIFICATION TRAINING
COURSE NUMBER:	50148001
LESSON TITLE:	RADAR DATA DISPLAY
DURATION:	6+00 HOUR(S)
DATE REVISED:	2022-02
VERSION:	V.2022-02
REFERENCE(S)	TI 6160.100, ERAM USER MANUAL; FAA ORDER JO 7110.65, AIR TRAFFIC CONTROL; FAA ORDER JO 7110.311, EN ROUTE AUTOMATION MODERNIZATION (ERAM) IMPLEMENTATION
HANDOUT(S):	NONE
EXERCISE(S)/ ACTIVITY(S):	ACTIVITY 1: IDENTIFYING RADAR SYMBOLS ACTIVITY 2: IDENTIFYING DATA BLOCK INFORMATION ACTIVITY 3: BUILDING A DATA BLOCK ACTIVITY 4: READING RADAR DISPLAY DATA
END-OF-LESSON TEST:	YES *(REFER TO ELT31.PDF)*
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	*APPENDIX A CONTAINS INSTRUCTOR KEY FOR E-LEARNING ACTIVITIES*

☞ ***NOTE:*** *As you prepare for this lesson, recall and be prepared to talk about examples and personal experiences that illustrate or explain the teaching points in the lesson.*

INTRODUCTION

Gain Attention

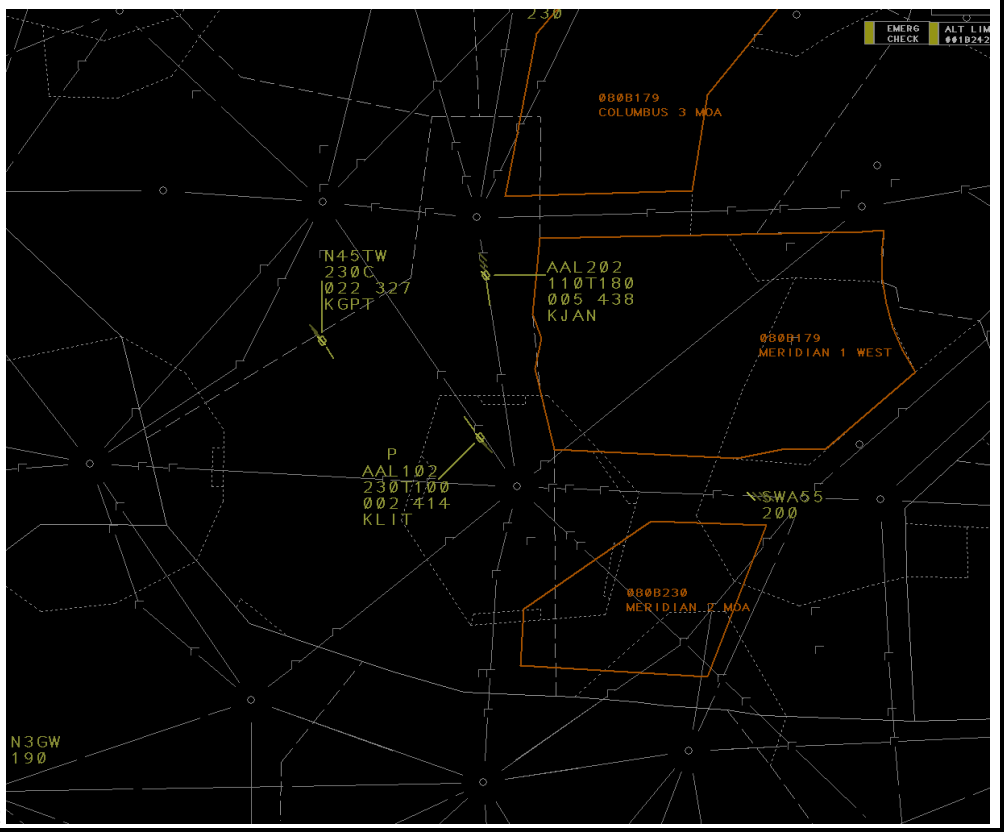


Reading and interpreting information from your strips during the nonradar scenarios enabled you to effectively separate aircraft and follow through on coordination. In a radar environment, reading and correctly interpreting radar data will assist you in the same way.

INTRODUCTION *(Continued)*

Opening Scenario

RADAR DATA DISPLAY



As a Radar-Associate controller, your primary responsibility as a member of the radar team is to ensure separation. To do this, you **must** read and interpret all of the data on the radar display and associated equipment.

NOTE: The term “radar display” is becoming obsolete and being replaced with “situation display”. While you may hear the term radar display in your training at the Academy, the term situation display will be used at ERAM facilities during Stages 2, 3, and 4.

Purpose

This lesson covers the meaning of selected symbols and other radar data to include how they are used and appear on the display.

INTRODUCTION *(Continued)*

Lesson Objectives

LESSON OBJECTIVES

- On an End-of-Lesson Test, and in accordance with TI 6160.100, you will identify the meaning of selected data on the radar display.

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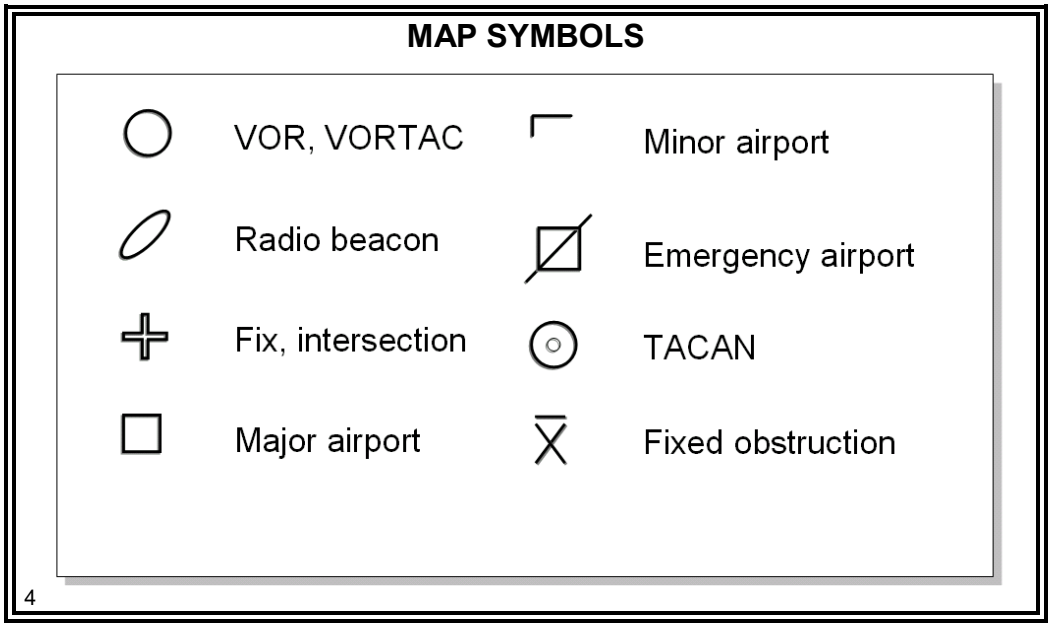
☞ ***NOTE:*** *Teach from graphic.*

RADAR SYMBOLS

Map Symbols



☞ ***NOTE:*** *Click 8 times to show map symbols.*

NOTE: Map symbols may be locally adapted.

☞ ***NOTE:*** *The emergency airport symbol is a way for controllers to get airport information (AI,) in text form, from the system by using the trackball to slew on the symbol.*

⊙ Map symbols are well defined.

⊙ Map symbols are uniform in size and brightness (intensity).

RADAR SYMBOLS *(Continued)*

Target Symbols
TI6110.100, par. 5.1.1

TARGET SYMBOLS

• or +	Unpaired primary	≡	Identing beacon
X	Paired primary	I	Mode C Intruder (MCI) unpaired track eligible for Conflict Alert
/	Unpaired beacon	V	Code 1200 beacon
\	Paired beacon	●	Reduced separation (3 mile)

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☞ ***NOTE:*** *Click 7 times to show target symbols.*

⊙ All targets are tracked by the computer; however:

- A target is considered paired when:
  - The computer correlates the predicted position, speed, and heading with the actual radar return using flight plan information
- A target is considered unpaired when:
  - The computer is **not** correlating the aircraft with flight plan information and is using radar data **only**

NOTE: For unpaired primary targets, "•" means the target is weak and "**+**" means the target is strong.

RADAR SYMBOLS *(Continued)*

Position Symbols
TI6110.100, par. 5.3.2

POSITION SYMBOLS

◇	FLAT track - Flight Plan Aided Tracking
△	Free track - Use of radar data without the use of flight plan information
#	Coast track - Tracking program has lost contact with the radar target
⧖	Frozen data block – Aircraft's track is frozen at its present position
H	Hold at a fix or present position hold

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☞ ***NOTE:*** *Click five times to show position symbols.*

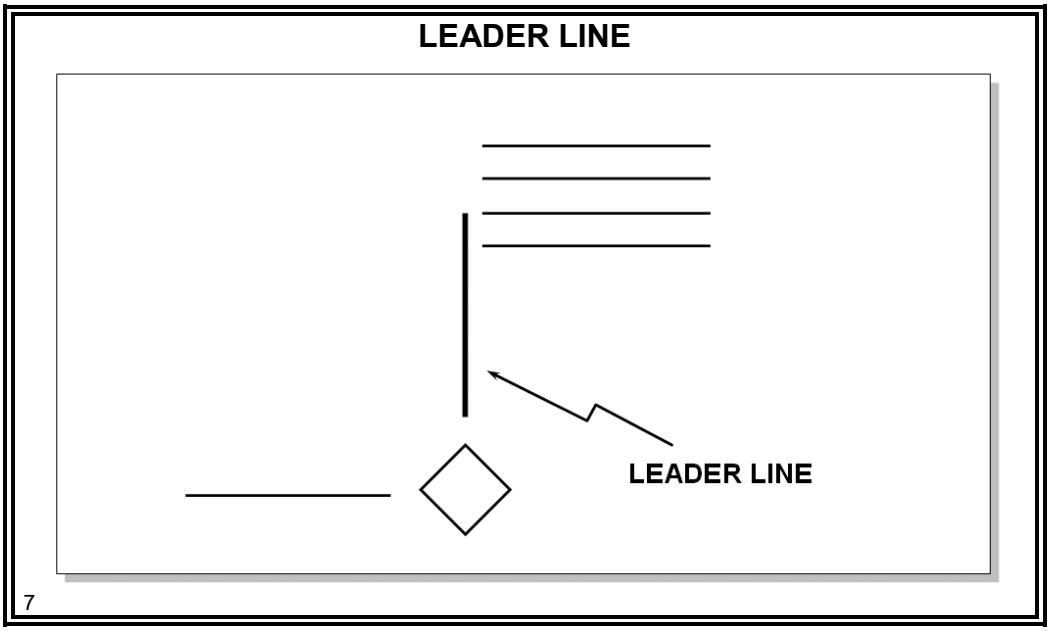
⊙ Indicate:

- Position of track
- Modes of tracking

NOTE: FLAT track is the preferred and most common mode of tracking.

RADAR SYMBOLS *(Continued)*

Leader Line

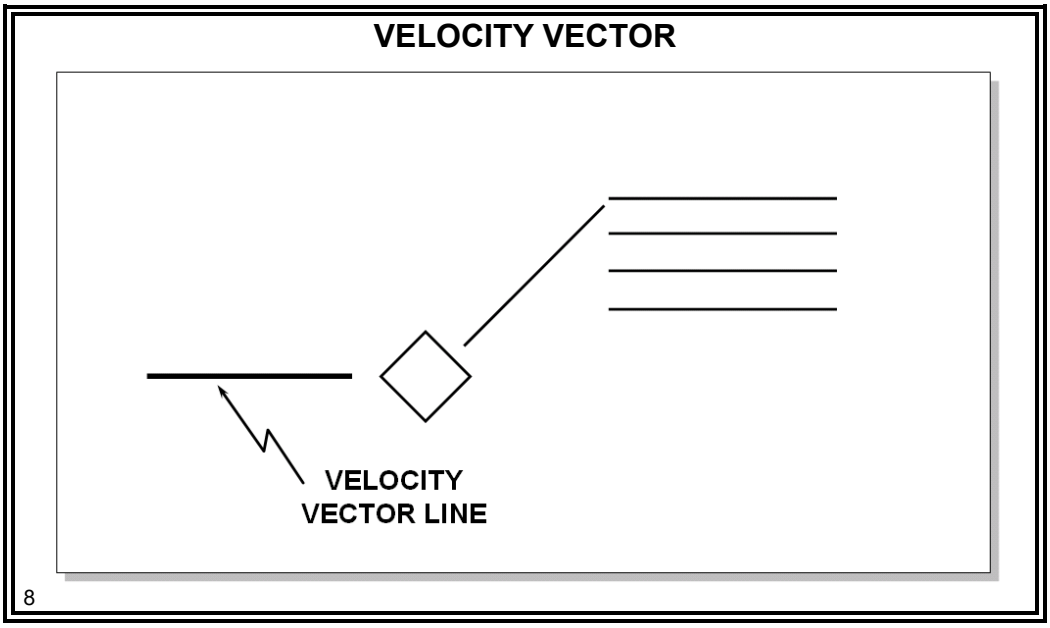


⊙ Connects the position symbol with the Full Data Block (FDB).

- Line length and direction can be selected at the display

RADAR SYMBOLS *(Continued)*

Velocity Vector



- Represents the distance and the direction the aircraft will travel in selected minutes based on the average of the most recent radar position updates.

☞ ***NOTE:*** *Individual facility computer patches may show distance in miles.*

- Based on computer ground speed and track.
- The velocity vector will be inaccurate if the aircraft is in a turn or has recently changed speed.

RADAR SYMBOLS *(Continued)*

ADS-B

ADS-B

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⊙ Coral A next to target indicates:

- Non-ADS-B or
- Malfunctioning ADS-B

NOTE: Same indicator will show up on the EDST.

RADAR SYMBOLS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: What is meant by "paired" and "unpaired" target symbols?

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: ***"****Paired" means that the computer correlates the predicted position, speed, and heading with the actual radar return using flight plan information. "Unpaired" means that the computer has no stored flight plan information and is using radar data only.*

KNOWLEDGE CHECK

QUESTION: The symbol △ is a _____ symbol.

A. position

B. map

C. target

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *A*

Continued on next page

RADAR SYMBOLS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: An unpaired primary target is displayed as _____.

A. /

B. X

C. • or +

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *C*

KNOWLEDGE CHECK

QUESTION: An unpaired beacon target is displayed as _____.

A. /

B. X

C. • or +

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *A*

Continued on next page

RADAR SYMBOLS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: The symbol for a paired primary target is _____.

A. /

B. X

C. • or +

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *B*

KNOWLEDGE CHECK

QUESTION: The symbol for a paired beacon target is _____.

A. ⁄

B. \

C. ◇

D. #

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *B*

Continued on next page

RADAR SYMBOLS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: What information does the position symbol ◇ indicate to the controller?

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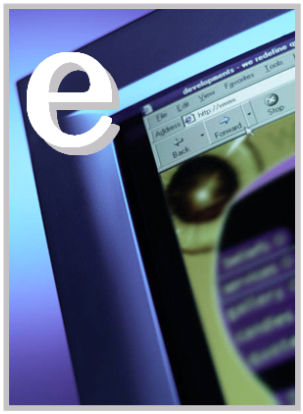
☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *Aircraft is in FLAT track*

ACTIVITY 1: IDENTIFYING RADAR SYMBOLS

Activity 1

IDENTIFYING RADAR SYMBOLS ACTIVITY



Purpose: to practice identifying the radar symbols used on radar data displays

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☞ ***NOTE:*** Have students access the IET eLearning menu and select the first activity for Lesson 31.

Description

In this activity, you will be presented with symbols used on radar data displays, specifically the map, target, and position symbols.

Directions

Access the IET eLearning menu. Select **Lesson 31 – Radar Data Display**. Click on the title to launch the **Identifying Radar Symbols** activity.

Time Allotted

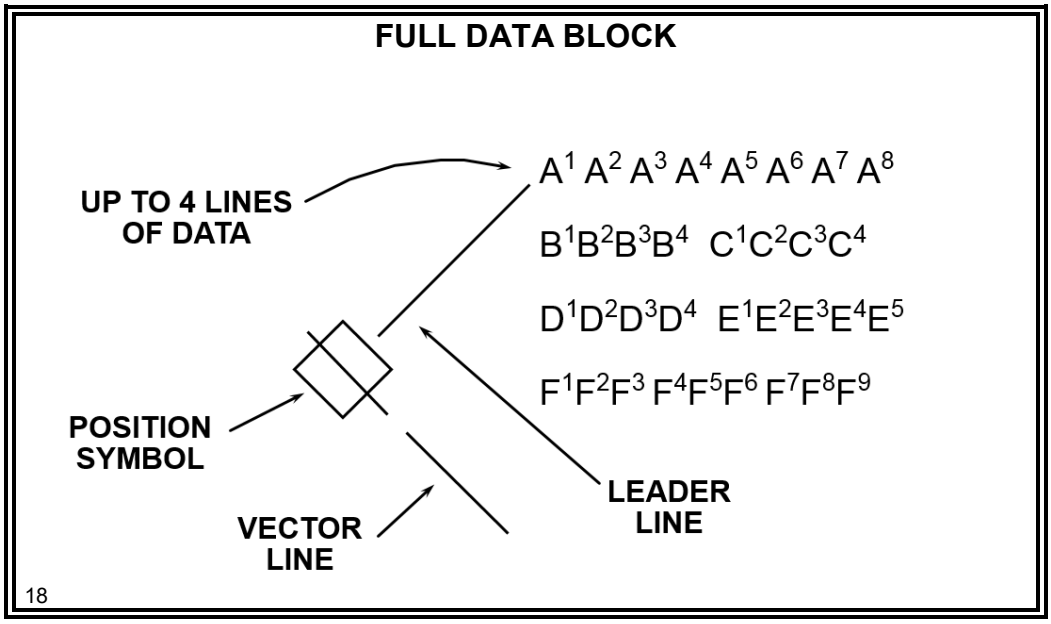
10 minutes

☞ ***NOTE:*** *Refer to Appendix A for the Instructor Key for this eLearning activity.*

☞ ***NOTE:*** *Remember to disable the eLearning capability after students complete the eLearning.*

FULL DATA BLOCK (FDB)

Display
JO 7110.65
par. 5-3-8;
TI 6110.10
par. 4.3

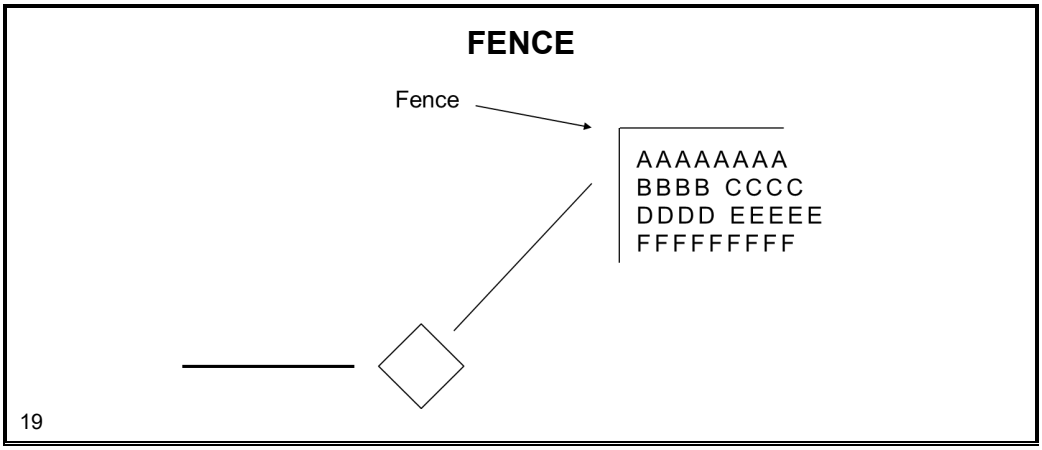


- Full data blocks may contain:
  - Position symbol
  - Up to four lines of alphanumeric data
    - Fourth line is optional
  - Vector line
  - Leader line

NOTE: Although ERAM has the capability of displaying various types of data blocks as will be seen later in this lesson, when a sector has separation responsibility for an aircraft and a paired track exists, a full data block must be displayed.

FULL DATA BLOCK (FDB) *(Continued)*

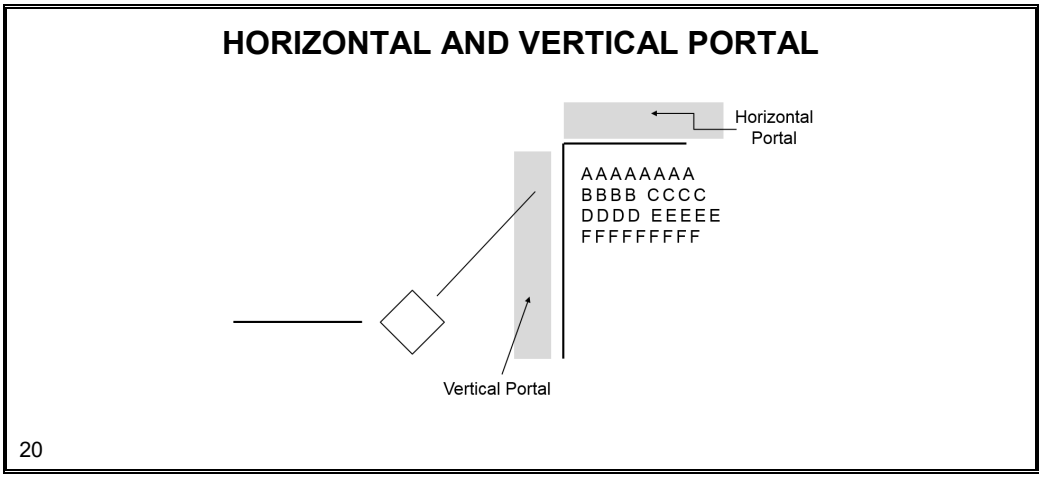
Fence



- The Fence delineates the portal area from the rest of the data block
- Only appears when there is a portal indicator
- Can be toggled on/off through toolbar
- Data blocks will always be left justified, regardless of offset direction.

NOTE: The Fence will not be displayed in training at the Academy.

Horizontal and Vertical Portal



- The horizontal portal contains “To do” information (portal indicators) such as the Full Data Block Coordination Indicator. The Full Data Block Coordination Indicator will not be utilized in your training at the Academy.
- The Vertical Portal houses status information (portal indicators) such as the VCI symbol, the Not your Control “R” and the Auto Inhibit caret

FULL DATA BLOCK (FDB) *(Continued)*

Horizontal Portal Example

HORIZONTAL PORTAL EXAMPLE

- When a PVD is initiated a yellow P is placed in the horizontal portal of the data block.
- If used for a point out, and the yellow coding is removed from the flight plan in the ACL, the yellow P will change to a white A.

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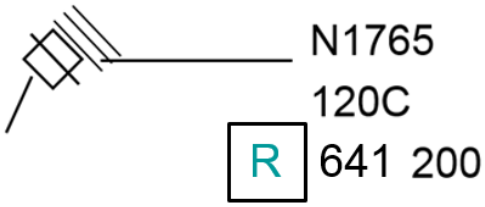
- Enhancements have been made to Point Out functionality to allow an automated acceptance by the initiating or receiving sector.
  - New indicators for this functionality at both R and RA Positions
  - Applies to both interfacility and intrafacility point outs
    - When a point out is initiated, an indicator will appear in the FDB at the R-Position and in the ACL entry at both the initiating and receiving sectors.
    - Indicator on the FDBs is a “P” above the third character of ACID.
  - Yellow “P” indicates unacknowledged point out
- Clicking on the automated point out indicator on FDB at either the initiating or receiving sector displays a pop-up.
- Shows all point outs for which the sector is either the initiating or receiving sector.
- Either sector can acknowledge all point outs and the sector numbers will change to white at BOTH sectors.
  - Allows the initiating sector to see acknowledged point outs.

FULL DATA BLOCK (FDB) *(Continued)*

Vertical Portal Examples

NOT YOUR CONTROL "R"



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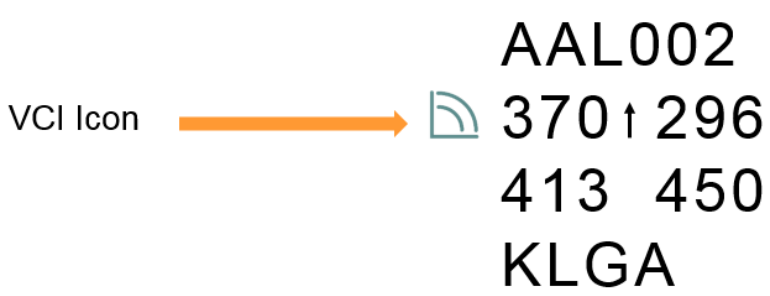
NOTE: Track control allows you to make changes to the aircraft database information.

VOICE COMMUNICATION INDICATOR (VCI)



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- Controllers can manually display an indicator called the Voice Communication Indicator (VCI).
  - Voice Communication Indicator (VCI) must be used to indicate when an aircraft is on frequency.
  - The green VCI icon appears in the data block in the Vertical Portal area next to the altitude field and in the bookkeeping box of the Aircraft list.

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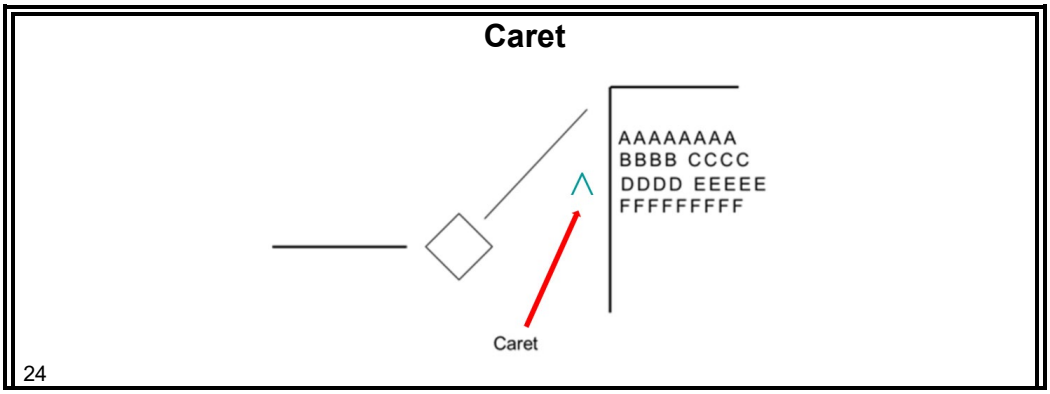
FULL DATA BLOCK (FDB) *(Continued)*

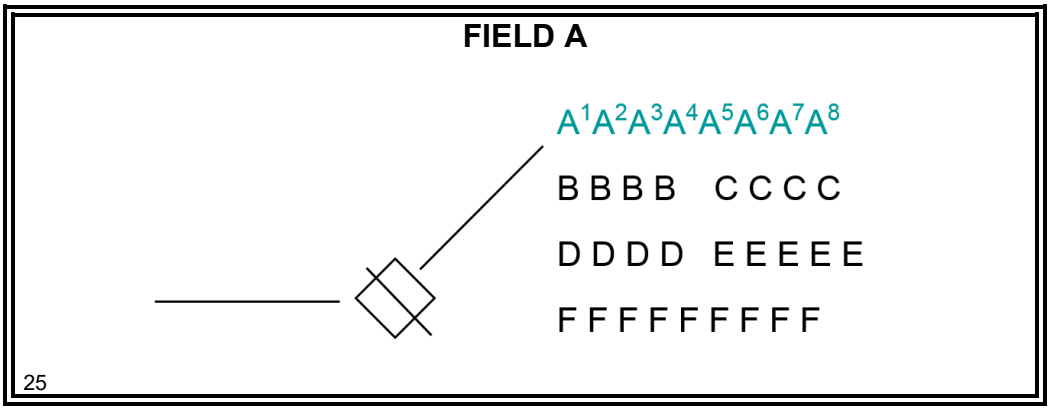
Vertical Portal Examples (Cont'd)



- Accent symbol (^) – also called a caret
  - Located in the Vertical Portal
  - Means
    - the aircraft has entered another sector **without** a handoff being made

      OR
    - the aircraft will not auto-handoff

Field A

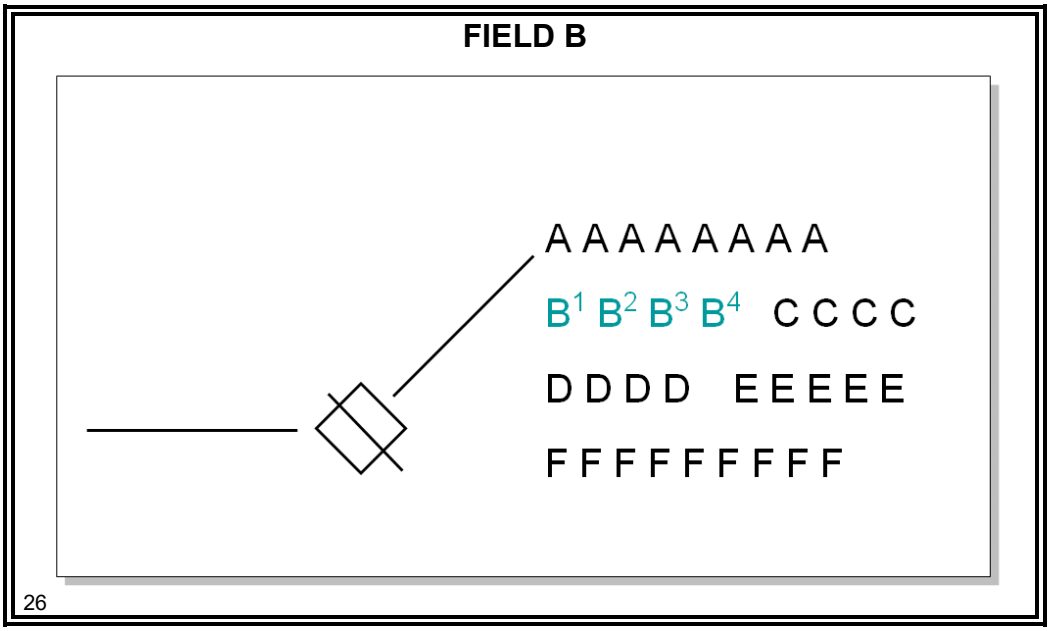


- Consists of eight character positions (A1 through A8).
- Contains aircraft identification beginning at the A2 position.
  - Two to seven alphanumerics
  - A2 position is **always** a letter

NOTE: A1 is seldom used and may be covered in later stage training.

FULL DATA BLOCK (FDB) *(Continued)*

Field B



- Consists of four character positions (B1 through B4).
  - B1 through B3 contain either:
    - Assigned altitude information (digits representing hundreds of feet),

      or
    - Letters “VFR” or “OTP”

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

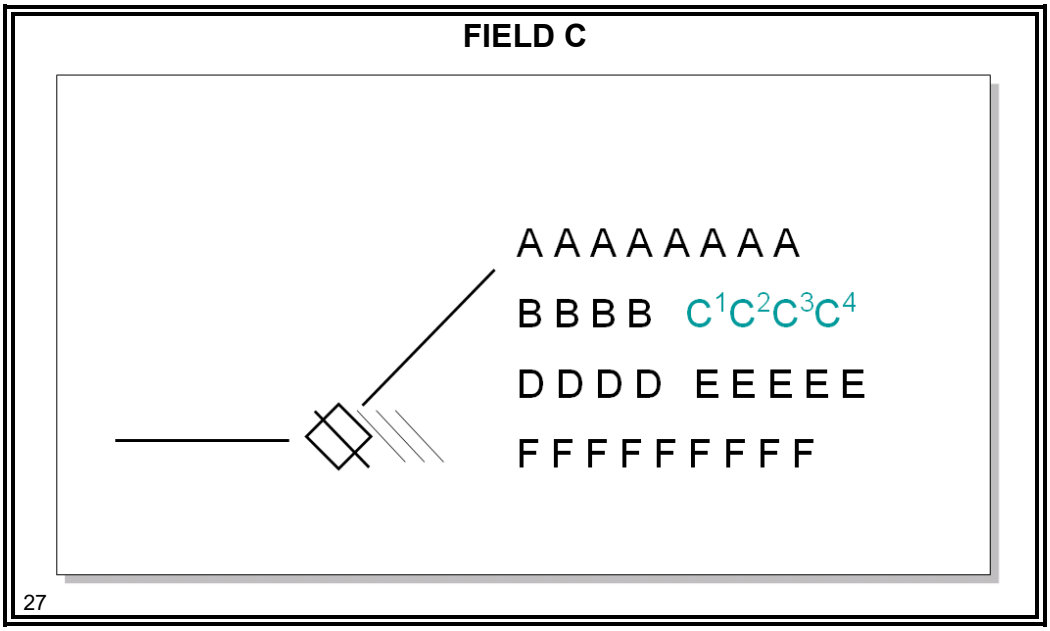
Field B (Cont'd)

- B4 contains one of the following computer-generated altitude qualifiers:

Symbol	Description
C	Mode C reported altitude is within ± 200 feet of single assigned altitude. (Field C will be vacant)
↑	Mode C or controller-entered altitude indicates that aircraft is climbing to assigned altitude.
↓	Mode C or controller-entered altitude indicates that aircraft is descending to assigned altitude.
	Non-RVSM indicator is a coral box around the B4 character.
+	Mode C has previously reported the aircraft at assigned altitude and aircraft has deviated 300 feet or more above assigned altitude.
–	Mode C has previously reported the aircraft at assigned altitude and aircraft has deviated 300 feet or more below assigned altitude.
/	Slant (/) appears when the flight type is VFR.
N	Neither controller-entered nor Mode C reported altitude has been received for aircraft. (Field C will be vacant)
A	Controller-entered reported altitude equals single assigned altitude. (Field C will be vacant)
X	Mode C altitude is corrupt or lost. (Field C will contain “XXX”)
B	Mode C reported altitude is within ± 200 feet of upper or lower limit of block altitude, or controller-entered reported altitude is within the block altitude.
V	Mode C is received, or controller-entered reported altitude, but **no** assigned altitude exists. (Positions B1, B2, and B3 will be vacant)
T	Interim altitude is displayed in B^1 B^2 B^3.

FULL DATA BLOCK (FDB) *(Continued)*

Field C

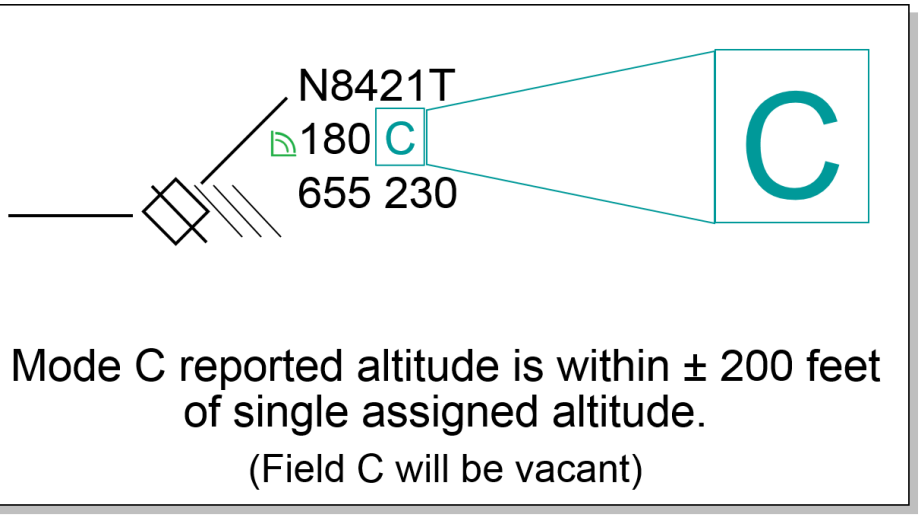


- Consists of four character positions.
  - C1 through C3 contain:
    - Mode C or controller-entered reported altitude
    - Upper altitude of a block altitude
    - “XXX” if Mode C is corrupt or lost
  - C4 position contains pound sign (#) when:
    - Aircraft is **not** responding with Mode C altitude, and
    - Controller-entered altitude does **not** equal the single assigned altitude
  - C4 position may contain an “X” to indicate exceptional vertical rate indicator

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples

ALTITUDE QUALIFIER (B4) EXAMPLE



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☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

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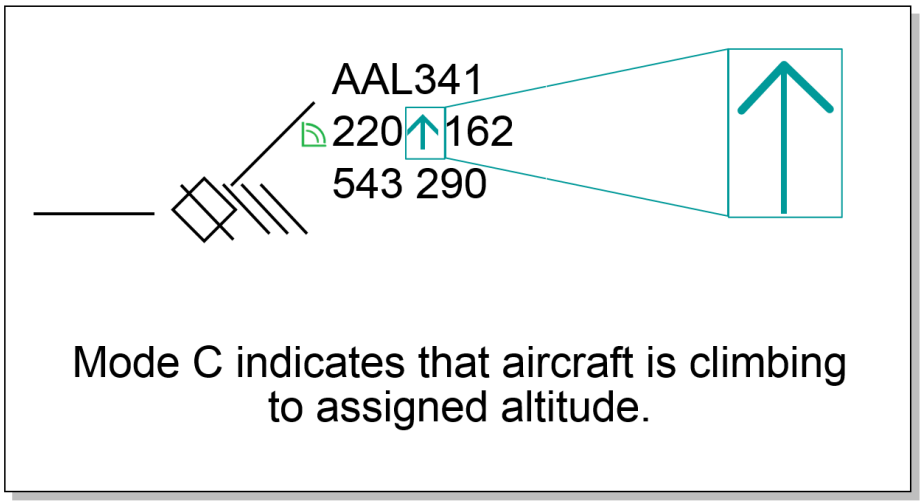
FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE



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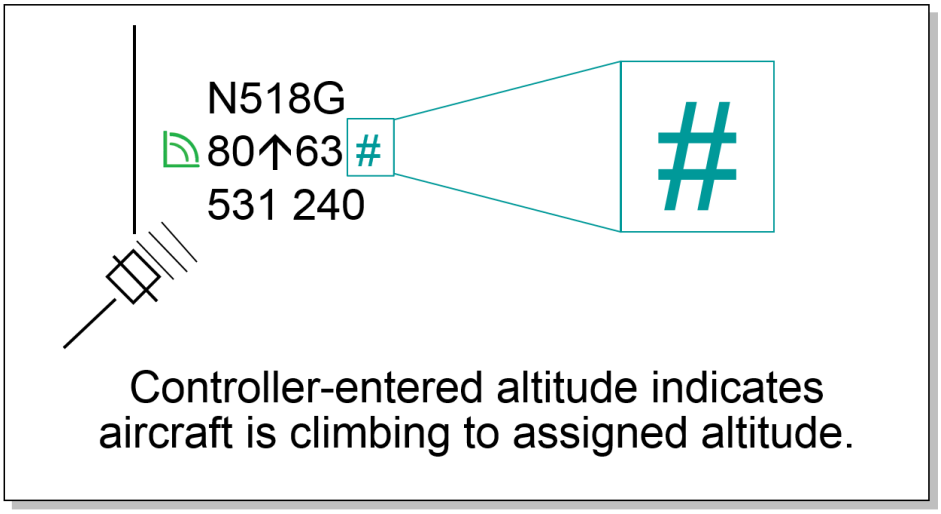
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

ALTITUDE (C4) EXAMPLE



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☞ ***NOTE:*** *Click once to show text.*

NOTE: Altitude information in field C will **not** automatically update unless Mode C reception is reestablished.

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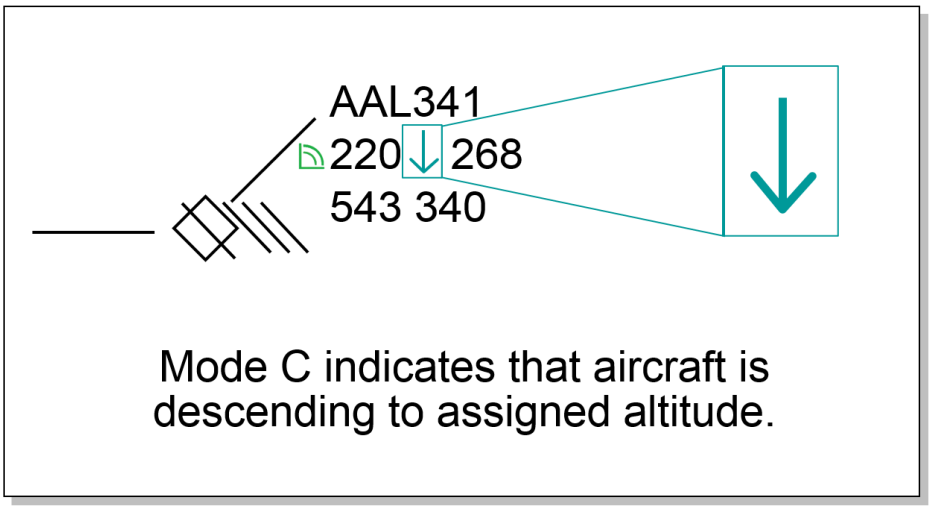
FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE



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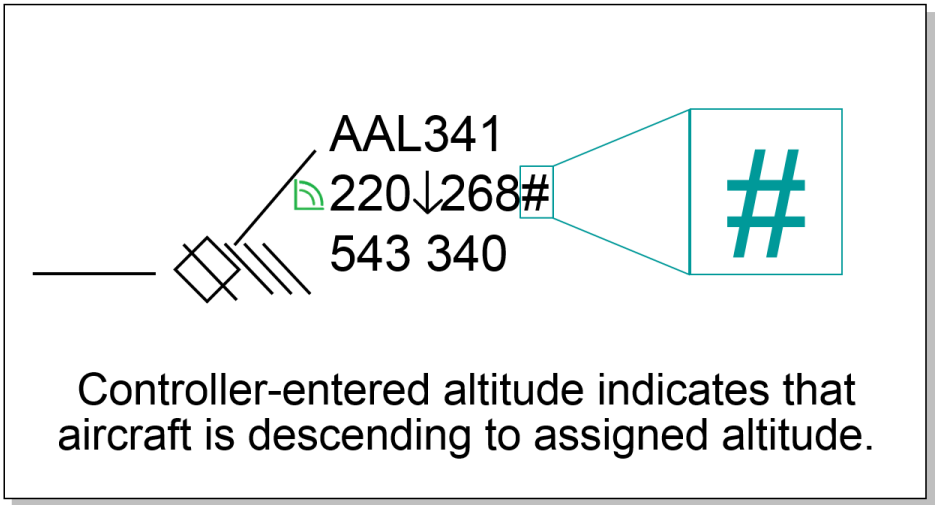
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

ALTITUDE (C4) EXAMPLE



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☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

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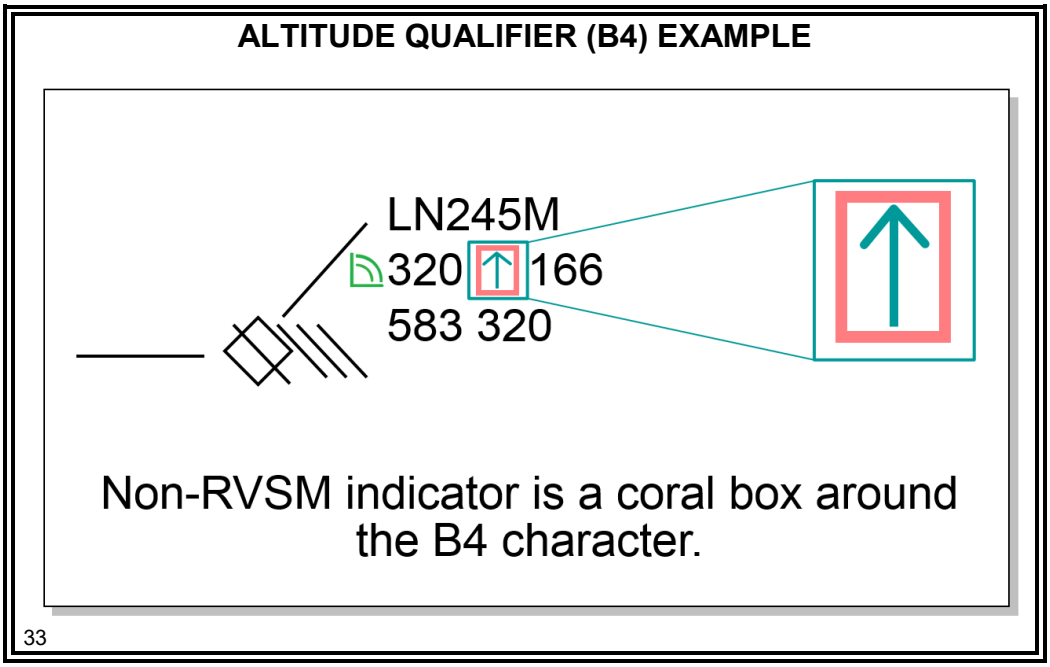
FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)



Non-RVSM indicator is a coral box around the B4 character.

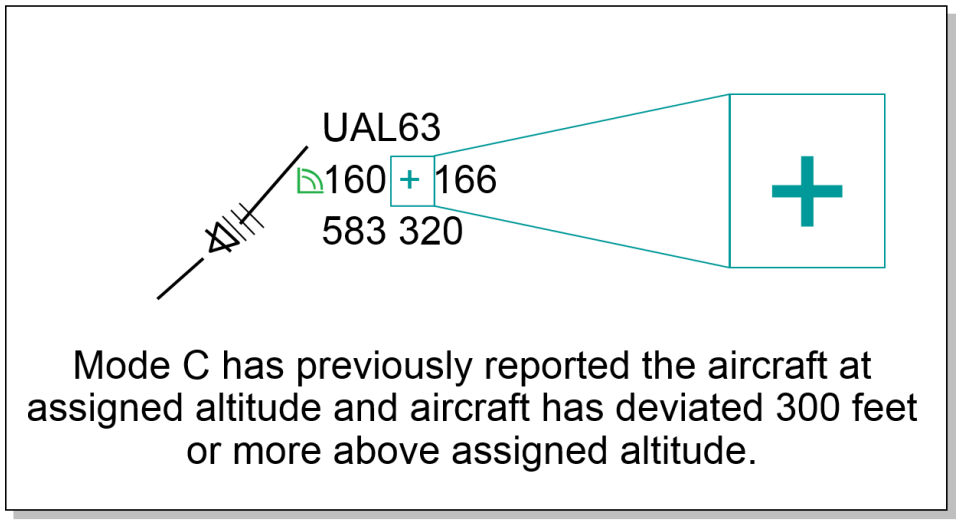
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE



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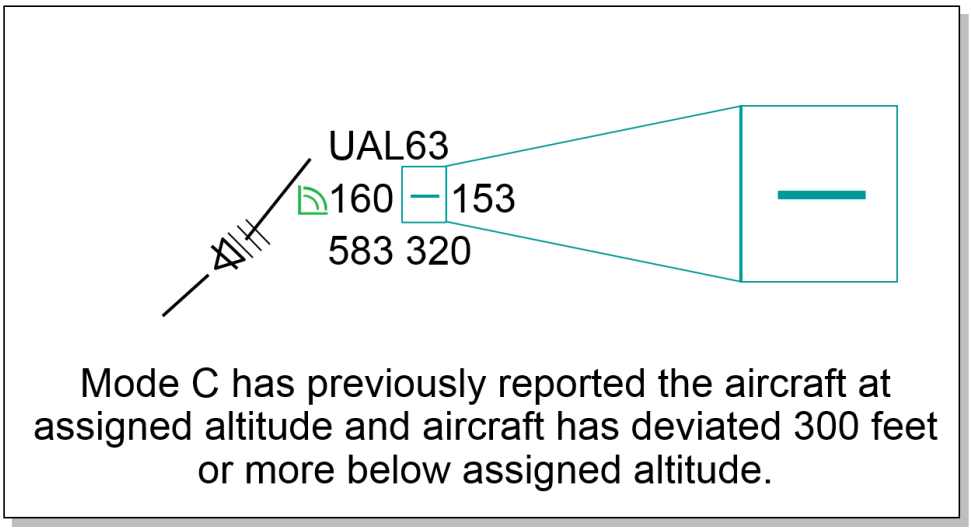
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

ALTITUDE QUALIFIER (B4) EXAMPLE



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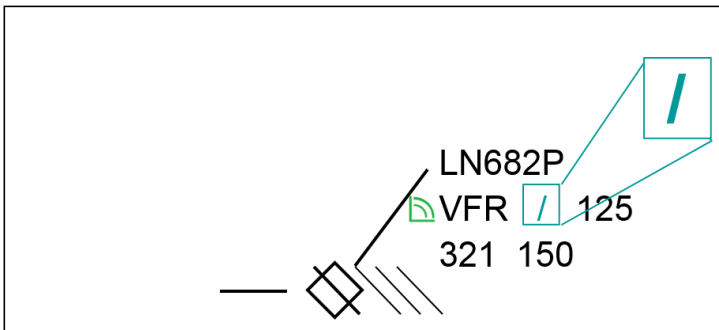
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE



Slant (/) appears when the flight type is VFR.

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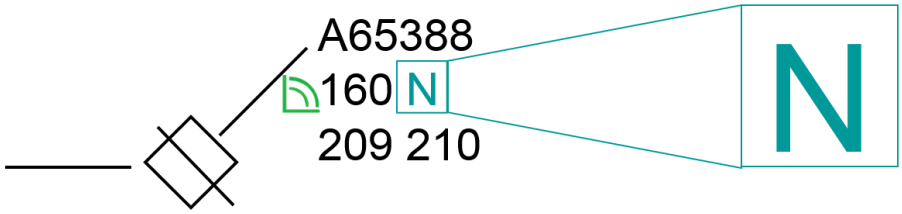
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

ALTITUDE QUALIFIER (B4) EXAMPLE



Neither controller-entered nor Mode C reported altitude has been received for aircraft.

(Field C will be vacant)

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☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

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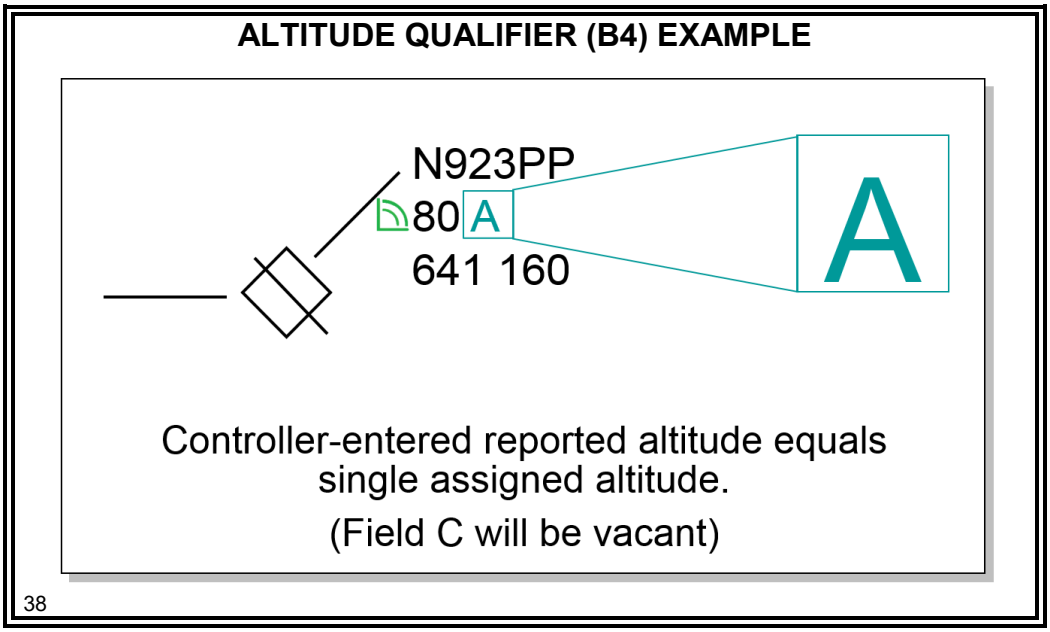
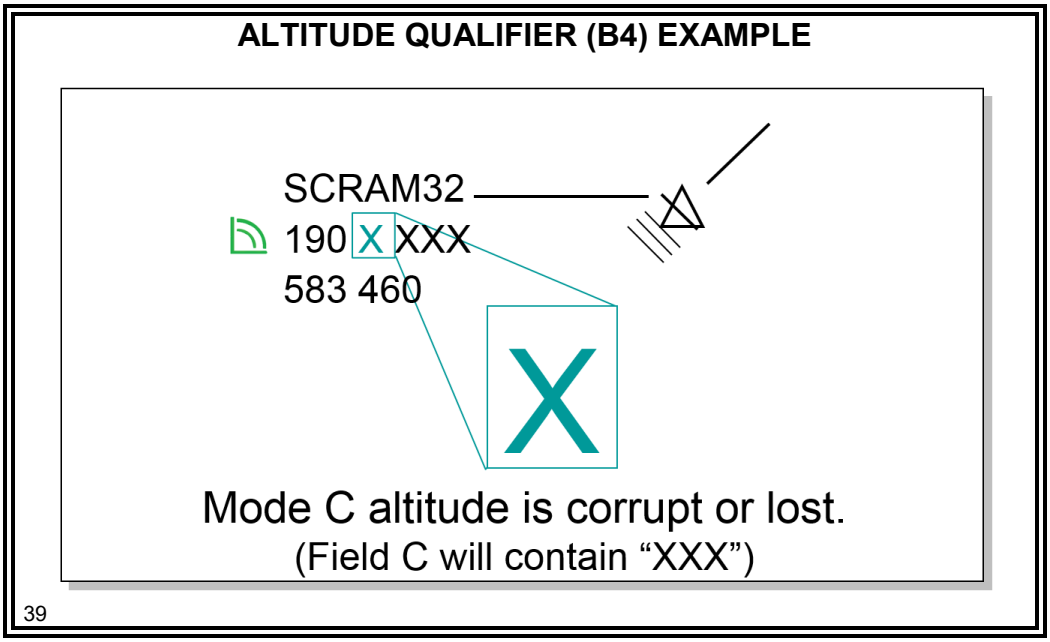
FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)



☞ ***NOTE:*** *Teach from graphic. Click once to show text.*



☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

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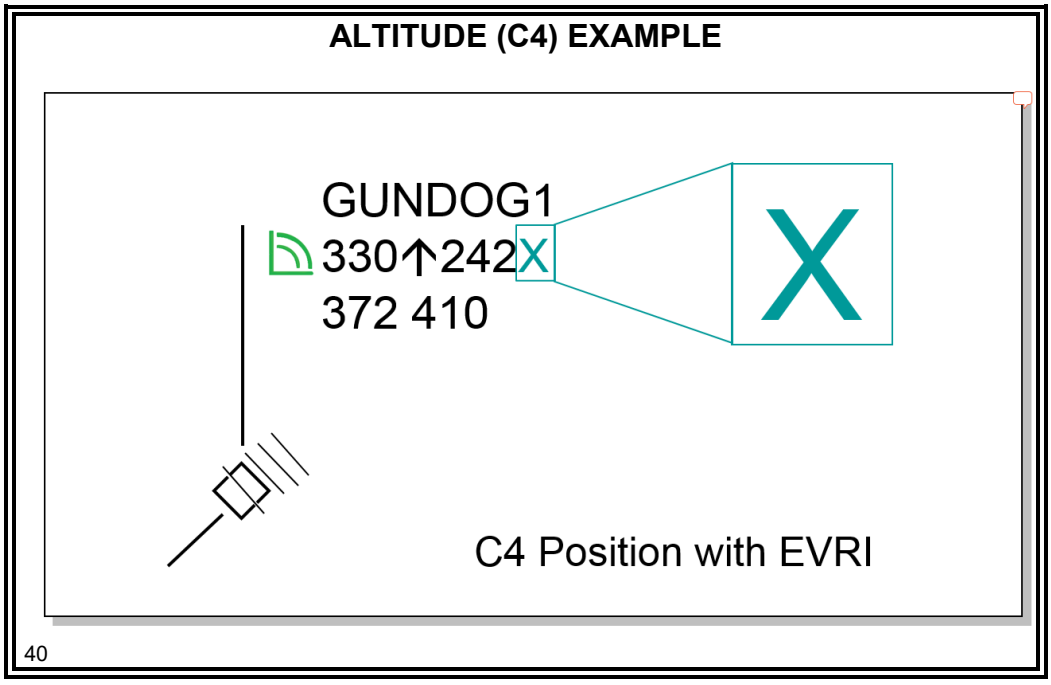
FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)
TI6110.100, par. 5.3.10



- C4 position contains an exceptional vertical rate indicator (X) when the aircraft is climbing/descending at a rate greater than the computer adapted aircraft performance profile.
  - If this occurs, the Mode C altitude readout is not valid and must be revalidated after the X is no longer displayed in the data block.
- The system will NOT use this Mode C for safety alert processing. The system reverts to a nominal rate that is appropriate for the type of aircraft. This is also true for the RA conflict probe.
  - The result is that some conflicts could be missed or displayed late.

NOTE: Exceptional Vertical Rate Indicator is referred to as EVRI.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE

Mode C reported altitude is within ±200 feet of upper or lower limit of block altitude, or controller-entered reported altitude is within the block altitude.

41

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

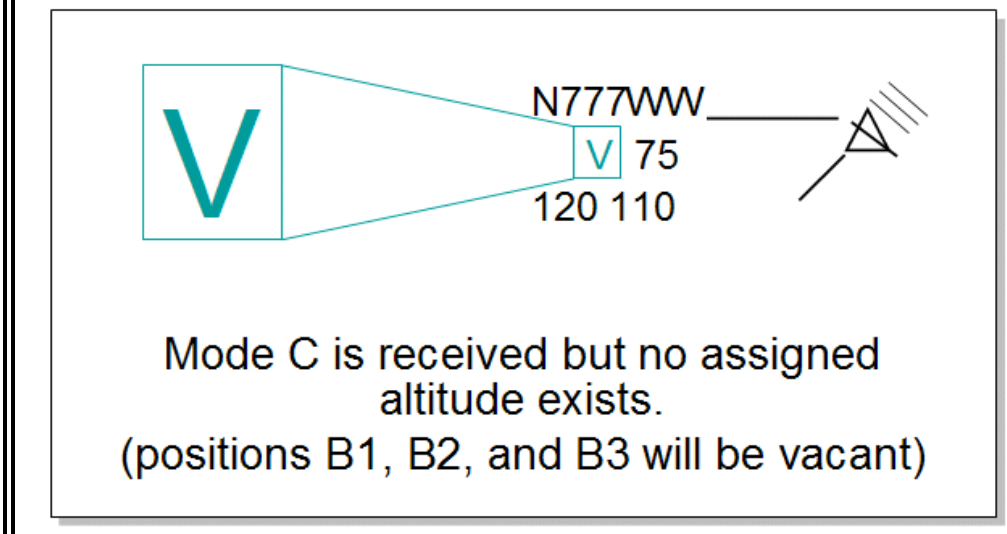
NOTE: # in the C4 position indicates aircraft is within controller-entered block altitude (ex. 210B230#).

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

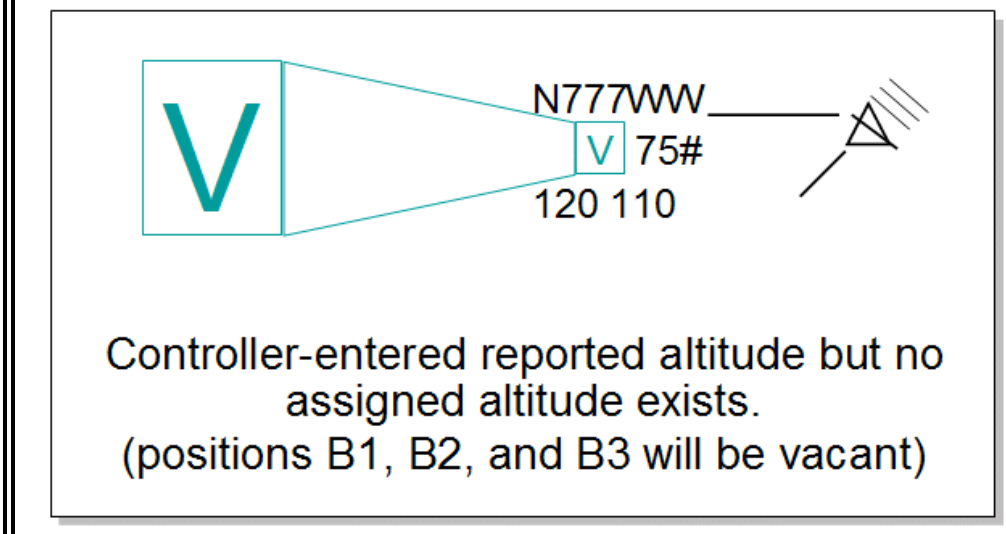
ALTITUDE QUALIFIER (B4) EXAMPLE



42

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

ALTITUDE QUALIFIER (B4) EXAMPLE



43

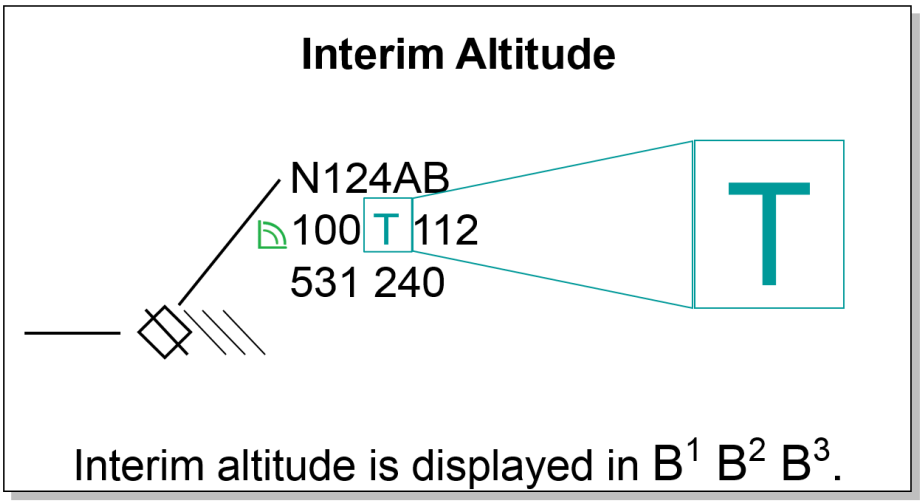
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE



44

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

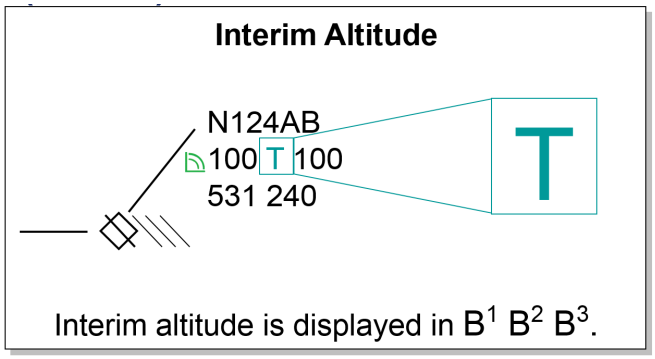
NOTE: The slide shows the actual Mode C altitude.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

ALTITUDE QUALIFIER (B4) EXAMPLE (CONT'D)



45

NOTE: Mode C equals assigned altitude. The B4 character is **not** a C because the 100 in position B1 - B3 was entered as an interim altitude.

☞ ***NOTE:*** *Unlike in previous systems, interim altitudes are forwarded in the FDB to adjacent en route facilities. Students will **only** be familiar with this system and do **not** need detailed explanations of when and why interim altitude did **not** forward previously.*

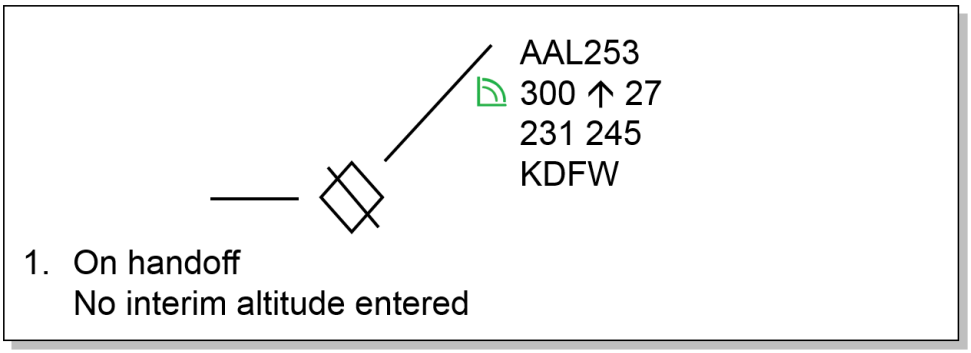
☞ ***NOTE:*** *An interim altitude may only be used during an ERAM to ERAM facility handoff unless otherwise specified by a facility directive. The interim altitude is used to reflect the actual status of the aircraft in the controlling facility while allowing the coordination of a different altitude with a non ERAM facility.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B and C Examples (Cont'd)

INTERIM ALTITUDE/FORWARDING ALTITUDE EXAMPLE

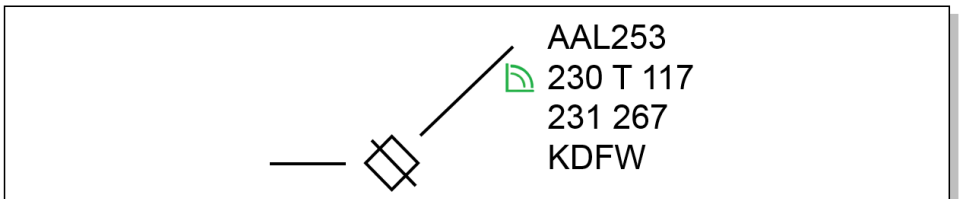


1. On handoff
   No interim altitude entered

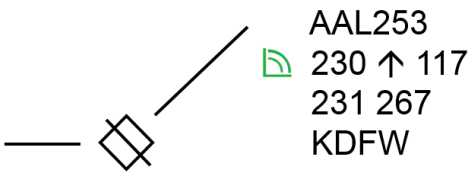
46

☞ ***NOTE:*** *Teach from graphic. Click once to build.*

INTERIM ALTITUDE/FORWARDING ALTITUDE EXAMPLE (CONT'D)



2. FL230 assigned and entered as an interim altitude - sector 45 still has FP information



3. FL230 assigned and entered as assigned altitude - sector 45 does **not** have FP information

47

☞ ***NOTE:*** *Teach from graphic. Click once to build.*

FULL DATA BLOCK (FDB) *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: How many feet must an aircraft deviate from its assigned altitude before the deviation is indicated in position B4 and Field C?

48

☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *300 feet or more*

KNOWLEDGE CHECK

QUESTION: What data block information indicates that Mode C is corrupt?

49

☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *Character B4 shows " X" and Field C shows "XXX"*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

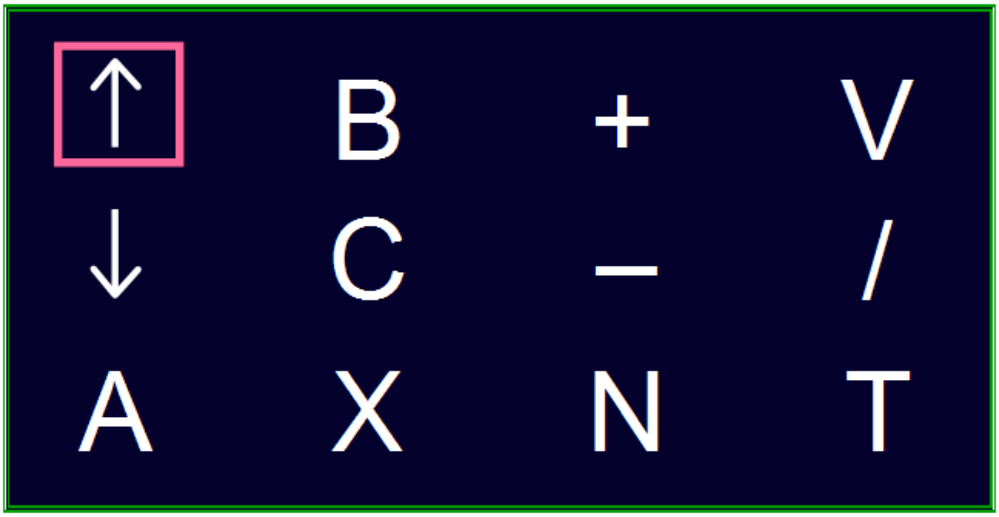
QUESTION: What data block information indicates that Mode C has never been received?

50

☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *Character B4 shows "N" and Field C is vacant*

KNOWLEDGE CHECK

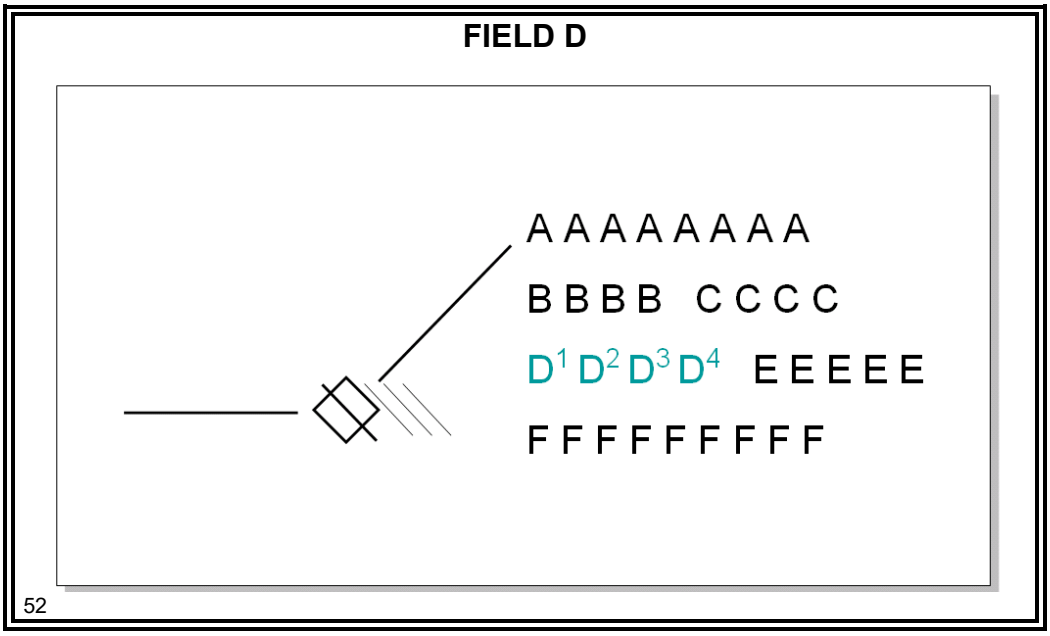


51

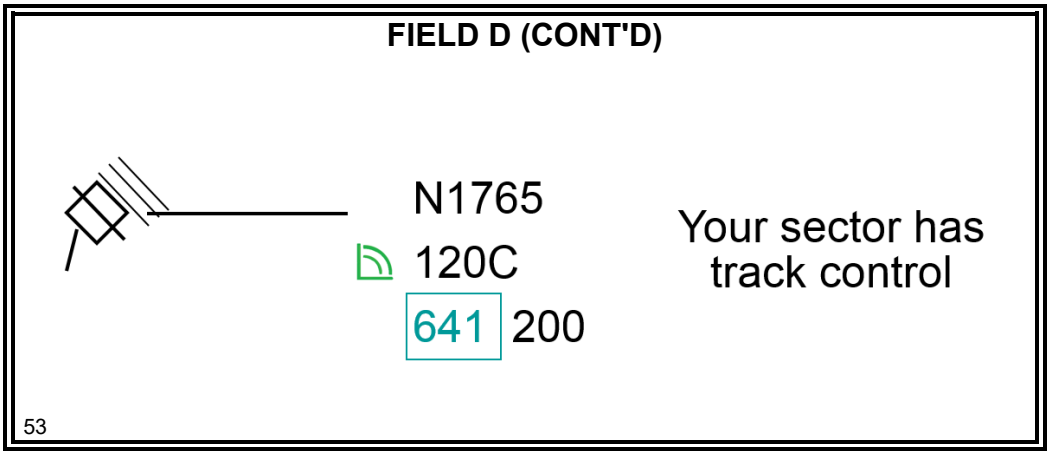
☞ ***NOTE:*** *Call on students to explain the meanings of the B4 characters in the graphic above. Click twelve times to make characters appear.*

FULL DATA BLOCK (FDB) *(Continued)*

Field D



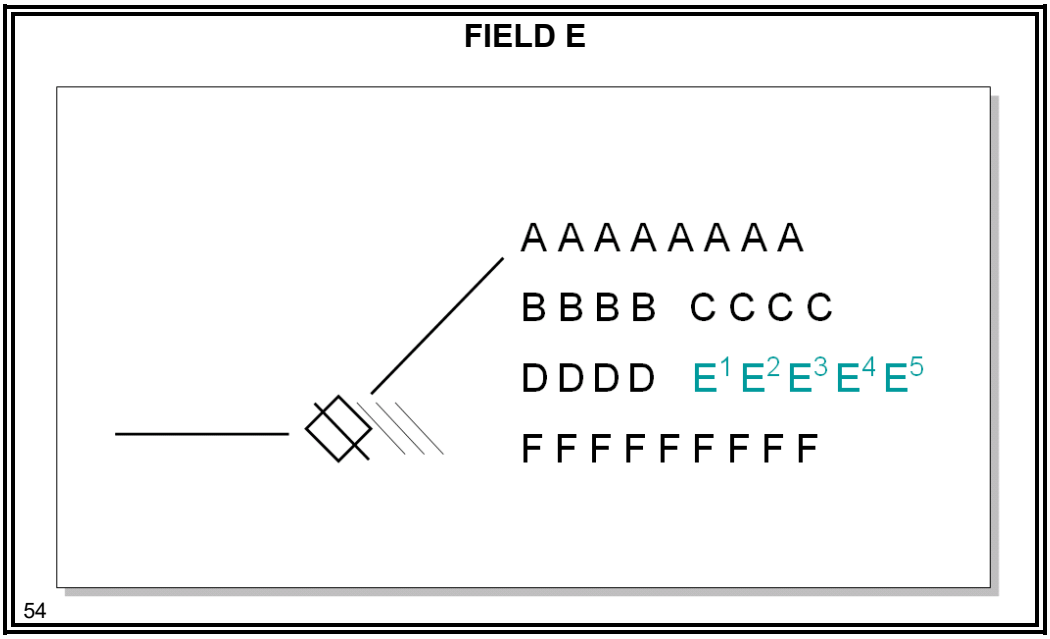
- Consists of four alphanumerics.
  - D2 through D4 contains the Computer Identification (CID)



NOTE: Track control allows you to make changes to the aircraft database information.

FULL DATA BLOCK (FDB) *(Continued)*

Field E



- Consists of five character positions.
  - E1 through E5 contain:
    - Ground speed, which is displayed:
      - → If **no** other information is displayed
      - → On an equal time-sharing basis if an additional item becomes eligible for display

NOTE: When more than one item, other than ground speed, becomes eligible for display, ground speed will **not** be displayed.

    - Special condition information relative to status of aircraft
      - → Displayed on an equal time-sharing basis
      - → Blinks for various time periods depending on the content

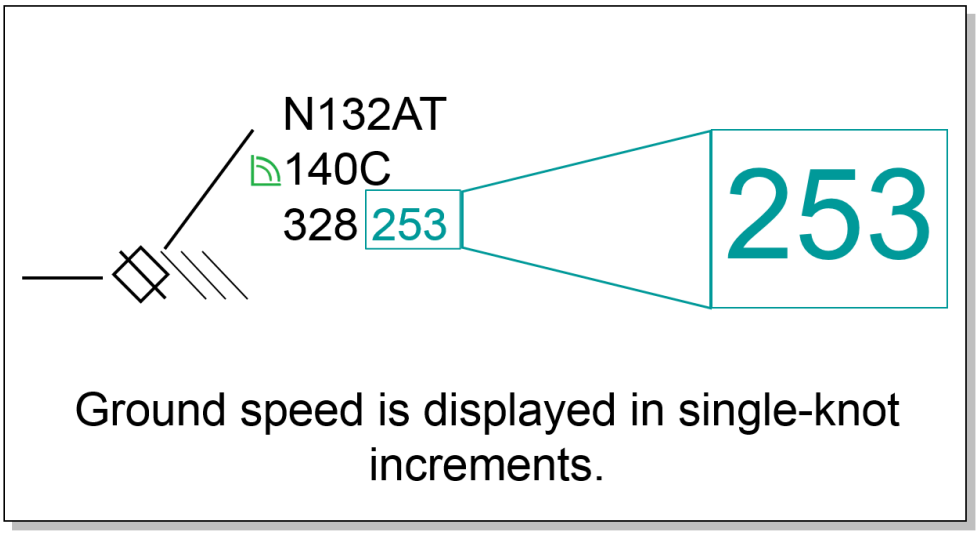
NOTE: E1 character is adapted at some facilities to display a single letter reflecting aircraft destination.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

FIELD E WITH GROUND SPEED



Ground speed is displayed in single-knot increments.

55

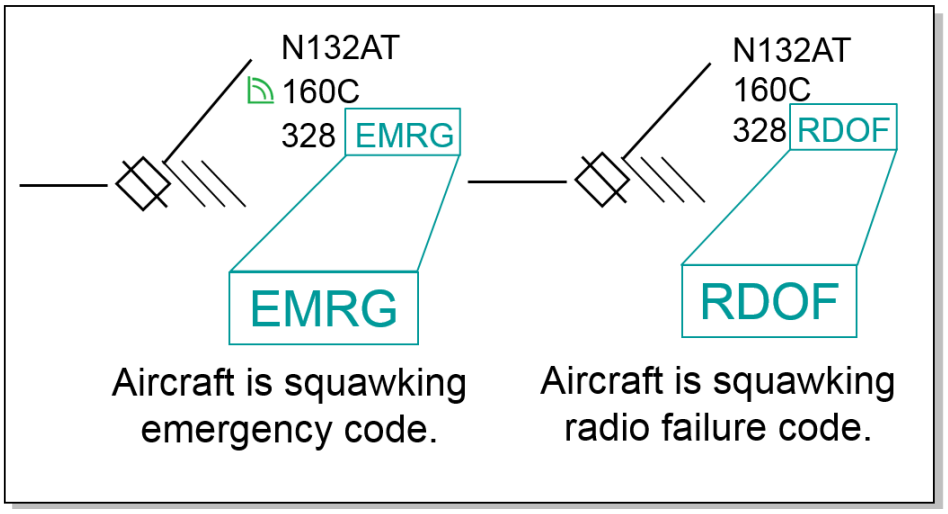
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)
TI6110.100, par. 5.3.3

FIELD E WITH SPECIAL CONDITION INFORMATION

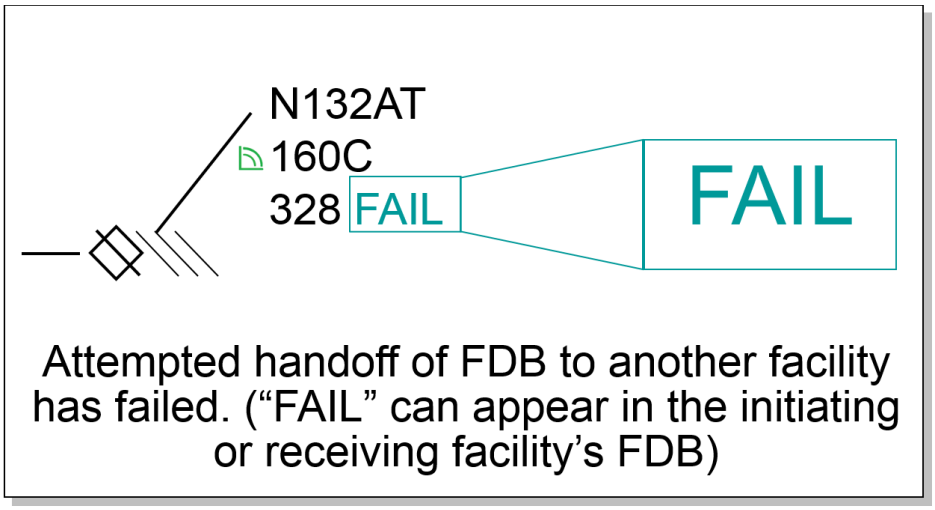


56

☞ ***NOTE:*** *Teach from graphic. Click twice to show text.*

NOTE: This information will blink and time share with other Field E data.

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



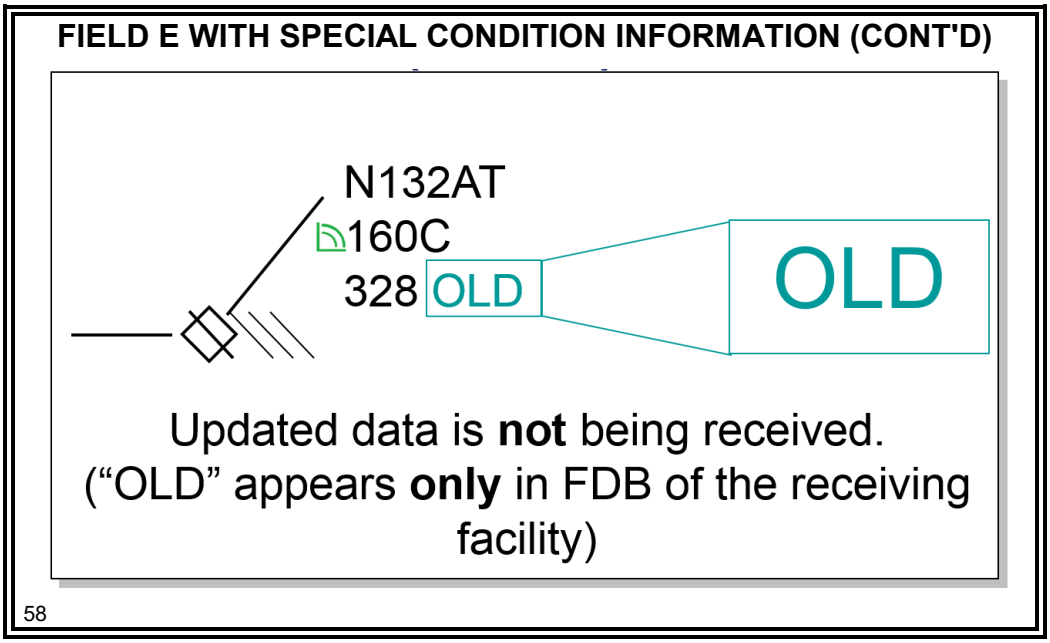
57

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

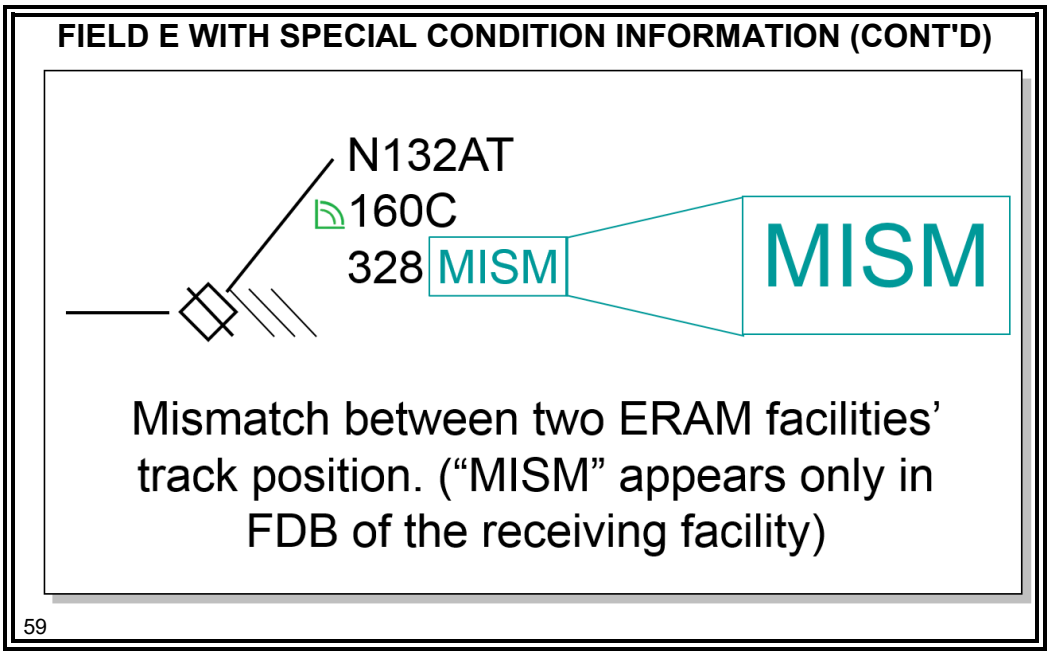
FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)
TI6110.100, par. 5.3.3



☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

TI6110.100, par. 5.3.4



☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

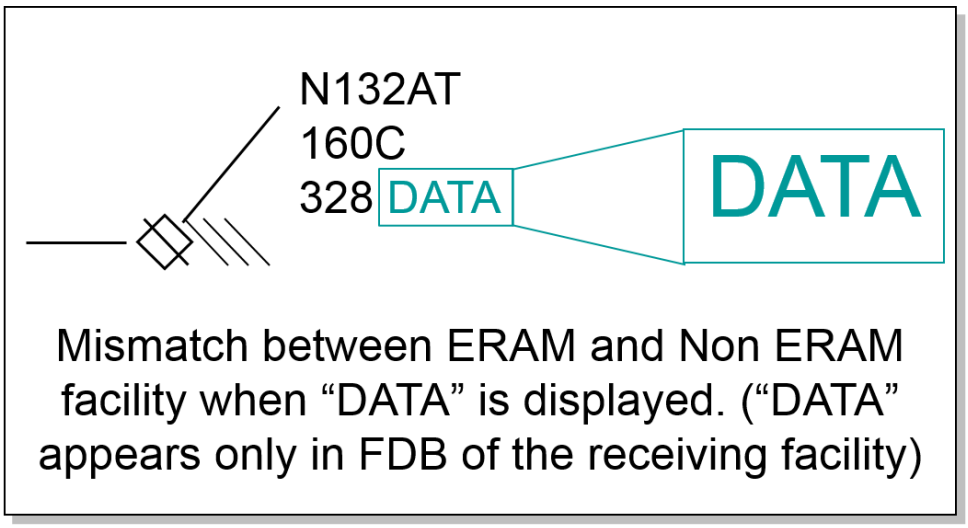
NOTE: When an ERAM facility displays a MISM in the data block, the receiving controller must inform the Front Line Manager (Supervisor).

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)
TI6110.100, par. 5.3.4

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



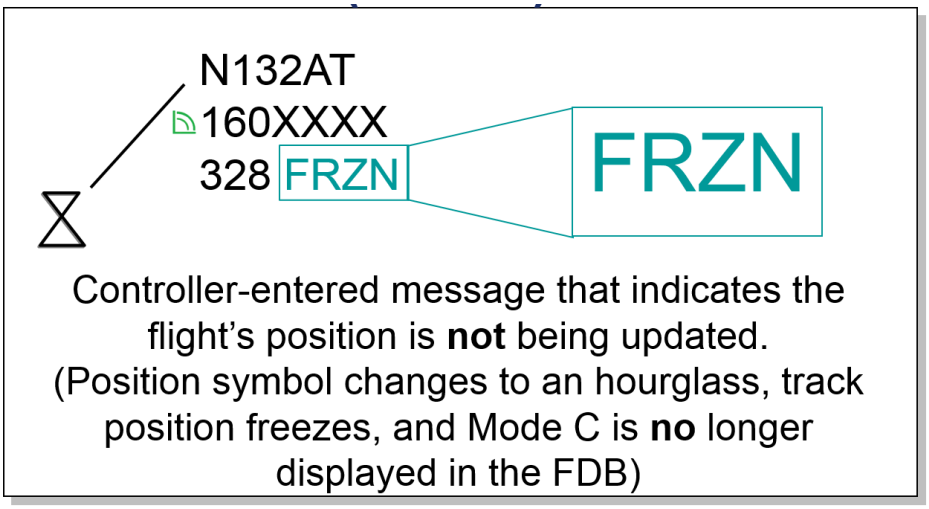
60

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

NOTE: When an ERAM facility generates a DATA in field E of the data block, the receiving controller must call the transferring controller and verify the position of the target.

TI6110.100, pars. 5.3.6 thru 5.3.9

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



61

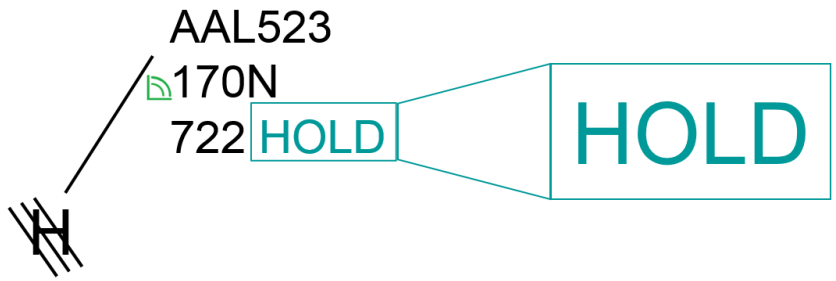
☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)
TI6110.100, par. 5.5.3

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



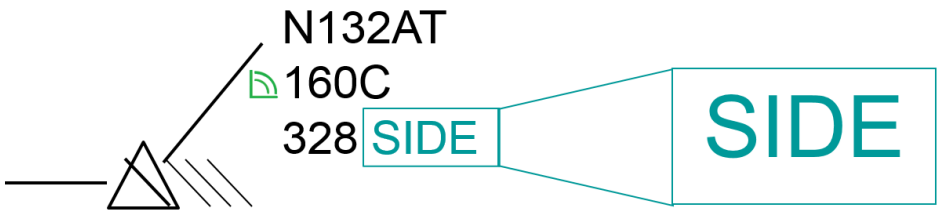
Aircraft has been put into hold at data block's present position.

62

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

NOTE: For aircraft in Hold when EFC time approaches, "EFC" replaces "HOLD" in Field E.

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



Aircraft is in SIDE-STREAM handoff status, to another ERAM facility.

63

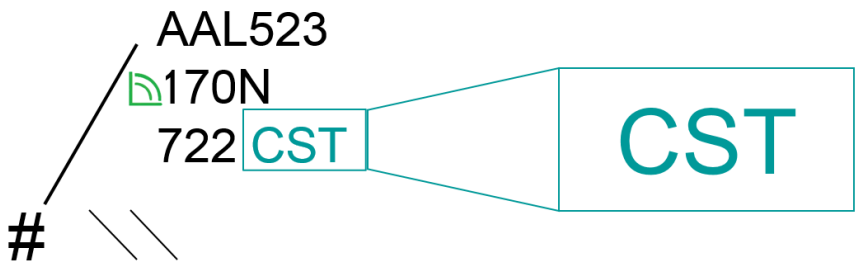
☞ ***NOTE:*** *Teach from graphic. Click once to show text*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



Aircraft is in coast status, **not** tracked by computer.

64

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

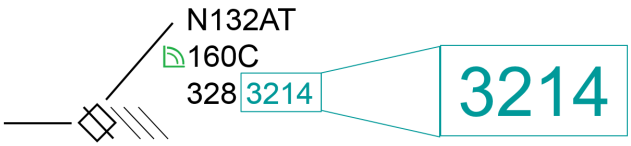
FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)

Aircraft has an assigned beacon code, but none is received.

65

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



Aircraft has an assigned beacon code, but the code received is **not** the proper code. Improper code is displayed. (In the example above, "3214" is the improper code)

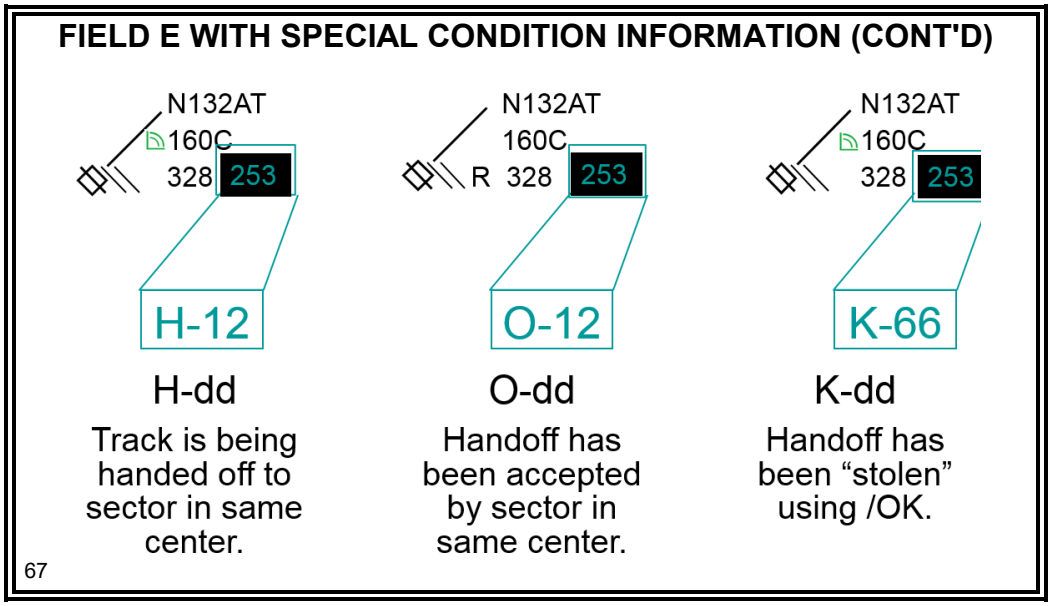
66

☞ ***NOTE:*** *Teach from graphic. Click once to show text.*

Continued on next page

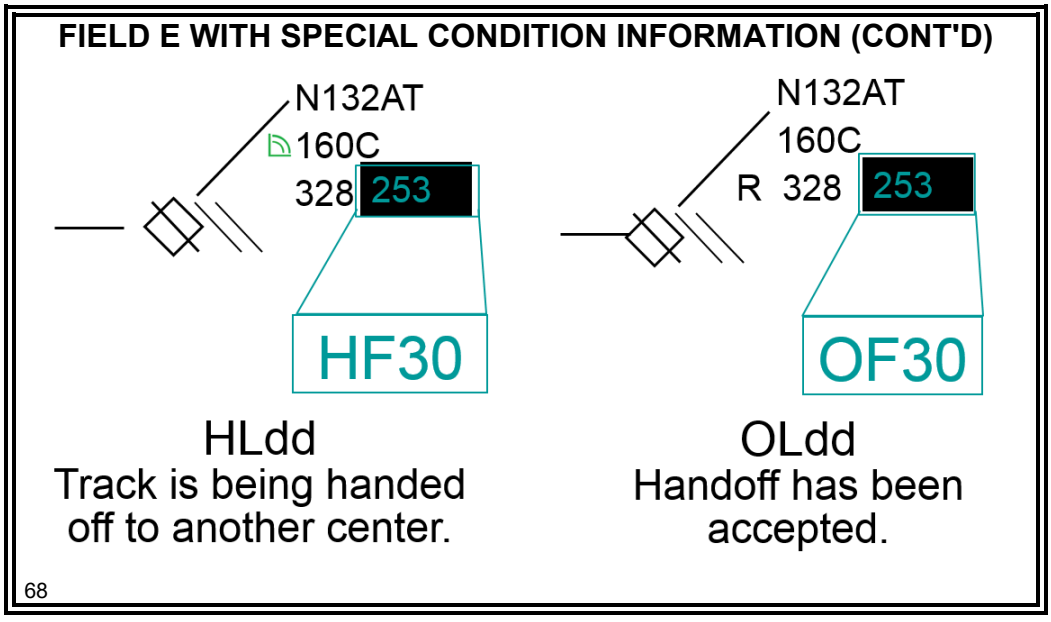
FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)



☞ ***NOTE:*** *Teach from graphic. Click three times to show text.*

☞ ***NOTE:*** *Explain to students that /OK allows you to override computer information and is covered in a later lesson.*



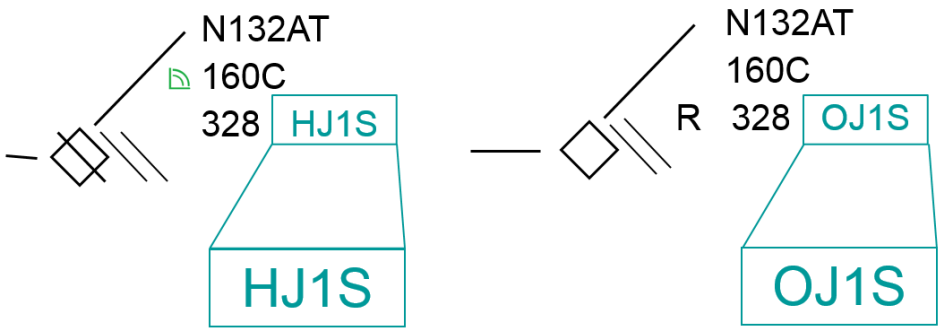
☞ ***NOTE:*** *Teach from graphic. Click twice to show text.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

FIELD E WITH SPECIAL CONDITION INFORMATION (CONT'D)



69

☞ ***NOTE:*** *Teach from graphic. Click twice to show text.*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: When an aircraft has a computer-assigned beacon code but is squawking a different code, how and in what field is this indicated?

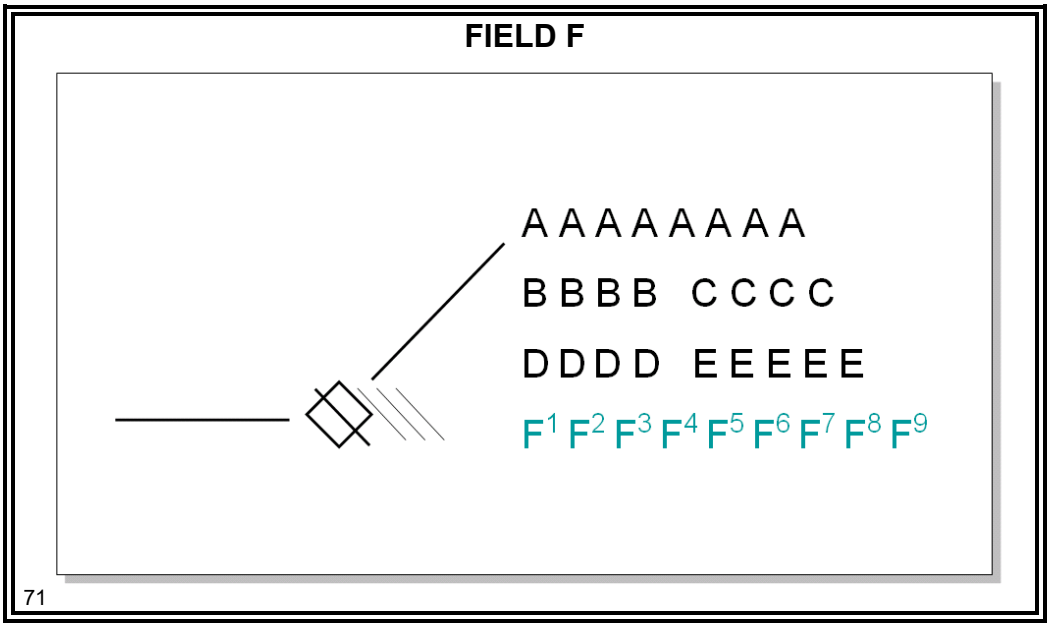
70

☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *The improper code is displayed as four digits in Field E.*

FULL DATA BLOCK (FDB) *(Continued)*

Field F
JO 7110.65,
par. 5-4-10



⊙ Field F is a variable data field with nine character positions located in the fourth line of the FDB.

- Field F can contain the following data:
  - Aircraft type/airborne equipment qualifier
  - Destination
  - Heading
  - Speed
  - Both heading and speed
  - Free-form text

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F (Cont'd)
JO 7110.65, par. 5-4-10; TI 6160.50, par. 11.1

FOURTH LINE TEXT EXAMPLES

Headings	H140, PH, H090/FSM, PH/J43, H310/J80, 320/V187, PH/CHA
Speeds	S300, S230+, S250 M78, M80+, M82-
Deviations	DW, DR, DS, D10L, D20E, D25R, D10N

72

⊙ The following Field F entries are approved for use without verbal coordination:

- Headings - the letter “H” followed by a three-digit number
  - “H” may be omitted due to character limitations if it does **not** result in a misunderstanding

    Examples: H050, H180/JAX, H300/J79, 240/V157
- Present heading - the letters “PH”

  Examples: PH, PH/CHA
- Assigned speeds - the letter “S” followed by a three-digit number, or “M” (Mach) followed by the two-digit assigned value
  - The symbol “ + ” (maintain a specified speed or greater) or the symbol “ - ” (maintain a specified speed or less) may be added to the assigned speed or Mach number

    Examples: S250, S210, S230+, M82-, M76+, M80-
- Weather deviations - the letter “D” followed by a letter designating **L**eft of course, **R**ight of course, **N**orth, **S**outh, **E**ast, or **W**est of course
  - Text may include the number of degrees the aircraft is deviating

    Examples: DS, DE, D20R, D30L

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F (Cont'd)
JO 7110.65, par. 5-4-10; TI 6160.50, par. 11.1

FOURTH LINE TEXT EXAMPLES (CONT'D)

Change Of Altitude Request	RQ070, RQ130, RQ220, RQ290, RQ380, RQ430
Change Of Route Request	RQ/SGF, RQ/WENDY, RQ/IRW, RQ/RIVRS, RQ/ATL, RQ/BARNS

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- Request for altitude change - the letters “RQ” followed by the requested altitude in three-digits

  Examples: RQ090, RQ150, RQ350

- Request for route change - the letters “RQ” followed by a slant “/” and a specific fix identifier

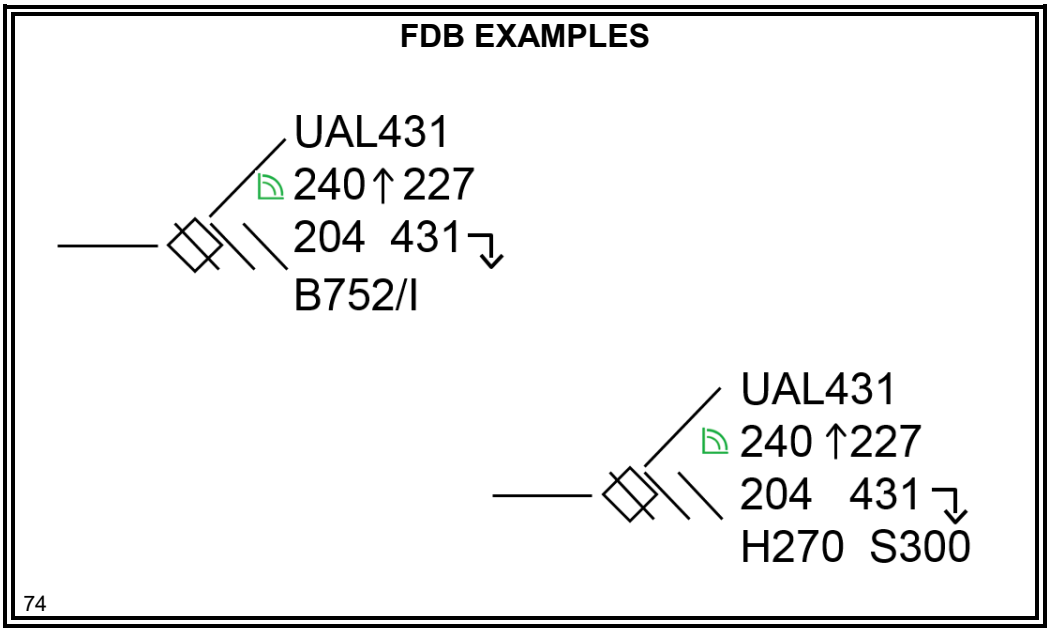
  Examples: RQ/ICT, RQ/TUL, RQ/TRUMP

NOTE: Computer entry of fourth line data will be covered in a later lesson.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F (Cont'd)



- The Heading/Speed/Free Form (HSF) Display/Suppress Indicator (↴) will be displayed if heading, speed, or free-form text is displayable (stored).

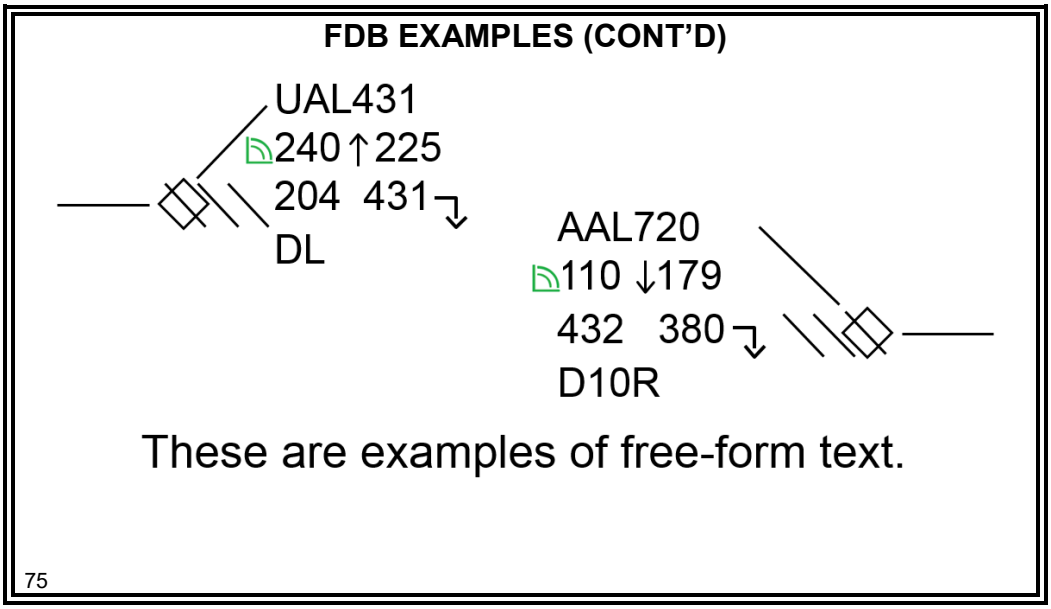
  - If the indicator is **not** displayed, the HSF data is **not** displayable (**not** stored)

☞ ***NOTE:*** *Call on students to tell you everything they can about each data block. For example, call sign, altitude information, CID, code, track status, handoff status, etc.*

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F (Cont'd)

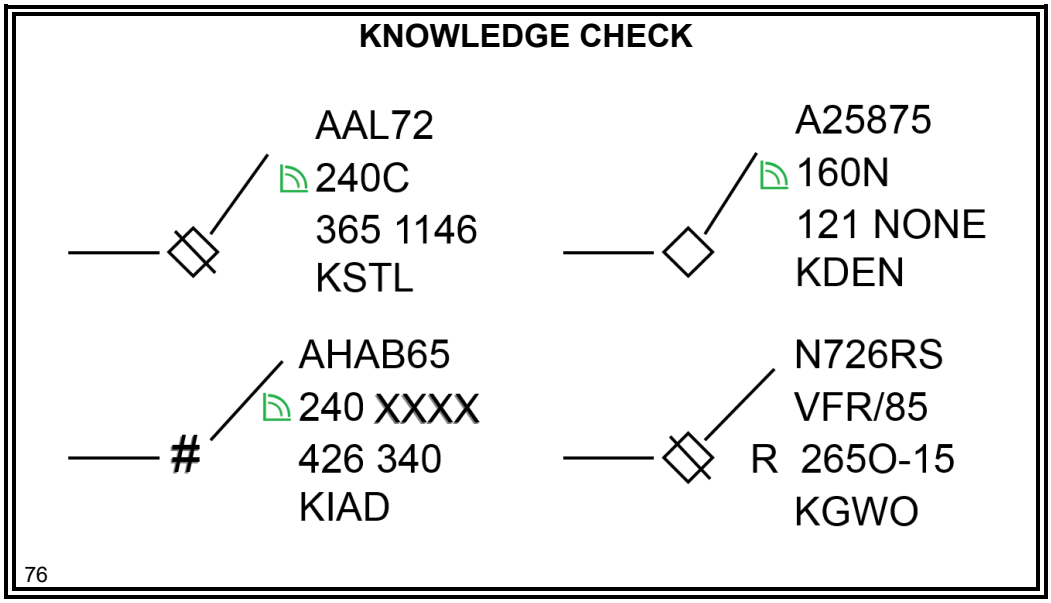


☞ ***NOTE:*** *Teach from graphic.*

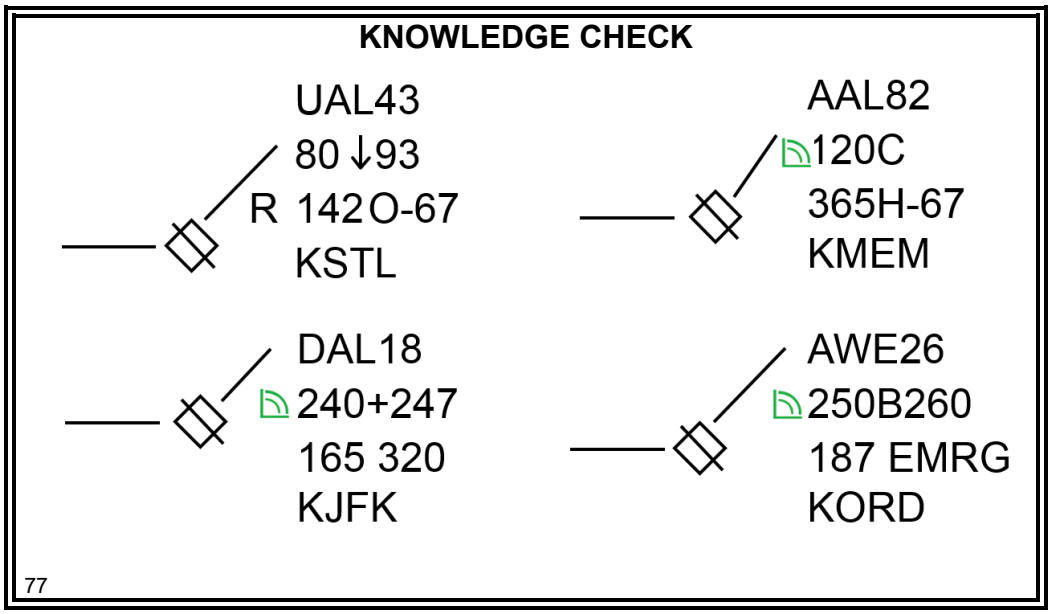
⊙ The fourth line of the data block includes free-form text entered by the controller.

FULL DATA BLOCK (FDB) *(Continued)*

Knowledge Check



☞ ***NOTE:*** *Call on students to explain everything they can about each data block. For example, call sign, altitude information, CID, handoff status, etc.*

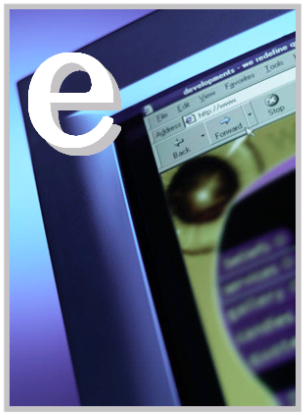


☞ ***NOTE:*** *Call on students to explain everything they can about each data block. For example, call sign, altitude information, CID, handoff status, etc.*

ACTIVITY 2: IDENTIFYING DATA BLOCK INFORMATION

Activity 2

IDENTIFYING DATA BLOCK INFORMATION ACTIVITY



Purpose: to practice identifying data block information on radar data displays

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☞ ***NOTE:*** *Have students access the IET eLearning menu and select the second activity for Lesson 31.*

Description

In this activity, you will practice pairing the fields, qualifiers, and abbreviations used in full data blocks with the correct definition.

Directions

Access the IET eLearning menu. Select **Lesson 31 – Radar Data Display**. Click on the titles to launch the **Identifying Data Block Information** activities (Match and Quiz).

Time Allotted

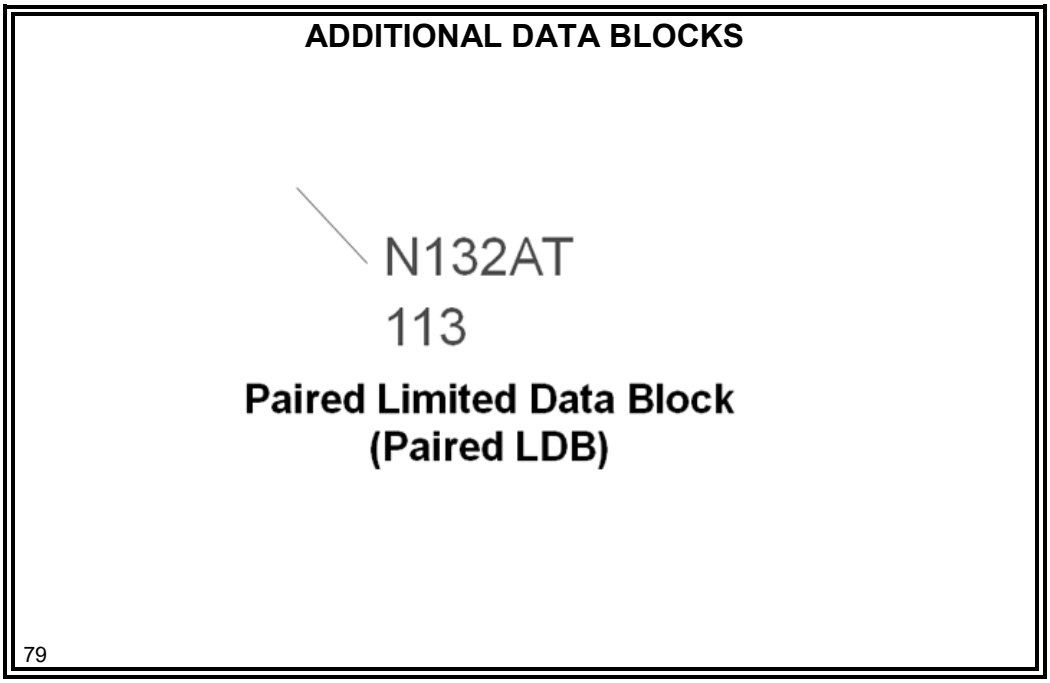
10 minutes

☞ ***NOTE:*** *Refer to Appendix A for the Instructor Key for this eLearning activity.*

☞ ***NOTE:*** *Remember to disable the eLearning capability after students complete the eLearning.*

ADDITIONAL DATA BLOCKS

Additional Data Blocks
TI6110.100, par. 5.3.1



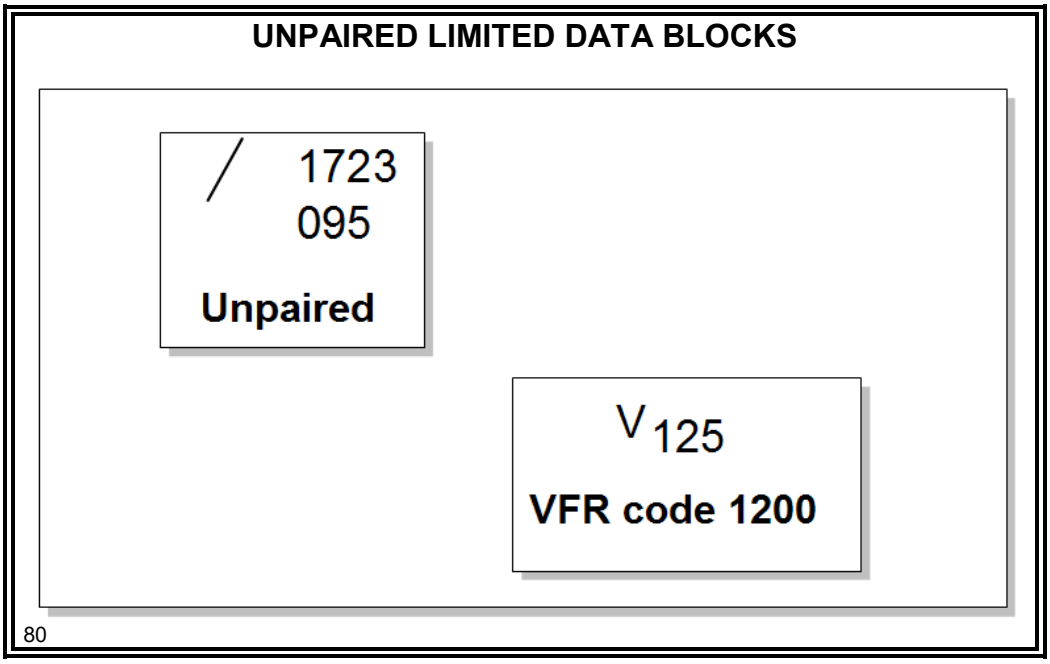
☞ ***NOTE:*** *Teach from graphic.*

Paired Limited Data Block
TI6110.100, par. 5.3.1

- Displays AID (call sign) and Mode C altitude.
- **Always** appears east of target.

ADDITIONAL DATA BLOCKS *(Continued)*

Unpaired Limited Data Blocks

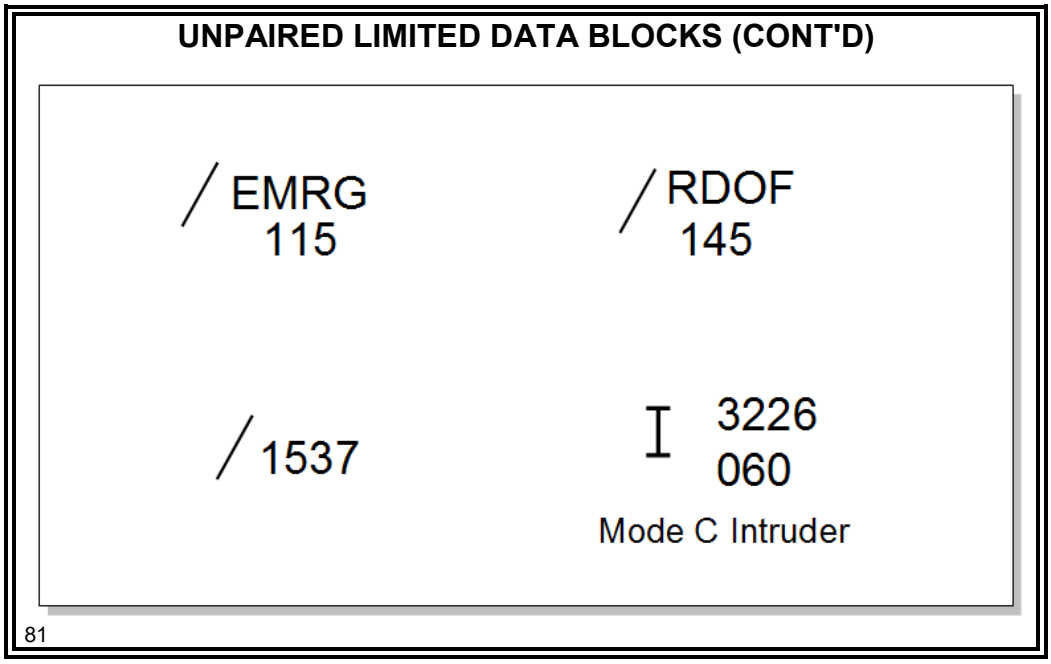


- Displays beacon code and, if available, Mode C altitude for untracked aircraft.
- Displays at same intensity as LDB.
- **Always** appears east of the target.
- Does **not** show code for VFR aircraft squawking 1200.
  - Target symbol is “V”
- The **only** data block that does **not** contain aircraft call sign.

Continued on next page

ADDITIONAL DATA BLOCKS *(Continued)*

Unpaired Limited Data Blocks (Cont'd)

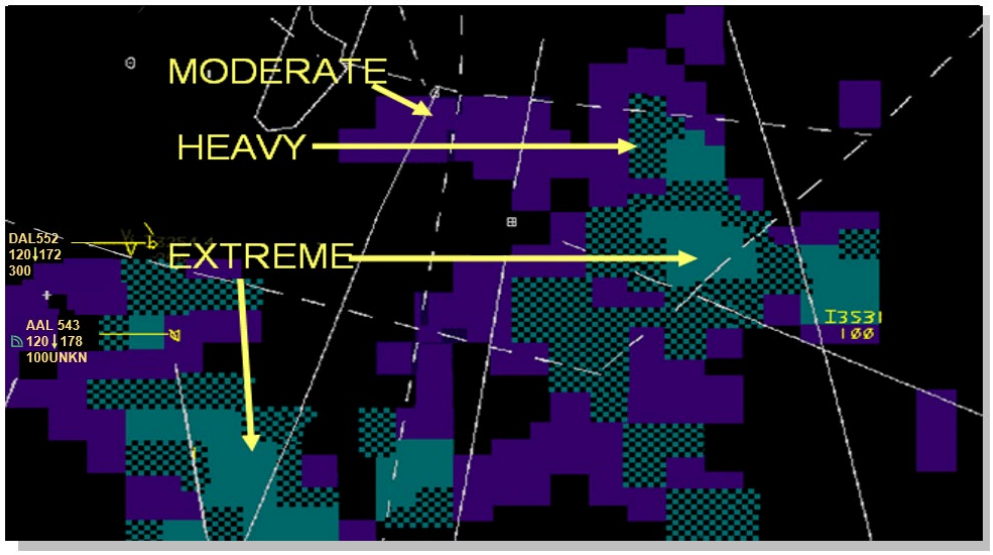


- Mode C Intruder Unpaired LDBs occur for untracked aircraft.
  - Target symbol is "**I**" for untracked Mode C Intruders (MCIs)

WEATHER DISPLAY

Next Generation Radar (NEXRAD) Display

NEXT-GENERATION RADAR (NEXRAD) DISPLAY



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- Displays three precipitation levels:
  - Moderate (purple)
  - Heavy (checkered cyan)
  - Extreme (cyan)

ACTIVITY 3: BUILDING A DATA BLOCK

Activity 3

BUILDING A DATA BLOCK ACTIVITY

Purpose: to practice building a data block

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☞ ***NOTE:*** Have students access the IET eLearning menu and select the third activity for Lesson 31.

Description

In this activity, you will practice building data blocks. This activity consists of a set of flight strips and blank data blocks. You will need to drag and drop the data from the strip to the data block.

Directions

Access the IET eLearning menu. Select **Lesson 31 – Radar Data Display**. Click on the title to launch the **Building a Data Block** activity.

Time Allotted

10 minutes

☞ ***NOTE:*** *Refer to Appendix A for the Instructor Key for this eLearning activity.*

☞ ***NOTE:*** *Remember to disable the eLearning capability after students complete the eLearning.*

ACTIVITY 4: READING RADAR DATA DISPLAY

Activity 4

READING RADAR DATA DISPLAY ACTIVITY

Purpose: to practice reading the radar data display

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☞ ***NOTE:*** Have students access the IET eLearning menu and select the fourth activity for Lesson 31.

Description

In this activity, you will view a radar scope image and will answer a series of related multiple choice and fill-in-the-blank questions.

Directions

Access the IET eLearning menu. Select **Lesson 31 – Radar Data Display**. Click on the title to launch the **Reading Radar Data Display** activity.

NOTE: Turn your CAPS Lock feature on for this activity.

Time Allotted

10 minutes

☞ ***NOTE:*** *Refer to Appendix A for the Instructor Key for this eLearning activity.*

☞ ***NOTE:*** *Remember to disable the eLearning capability after students complete the eLearning.*

IN CONCLUSION

Lesson Review

LESSON REVIEW

The following topics were covered in this lesson:

- Radar symbols
- Full Data Block (FDB)
- Additional data blocks
- Weather display

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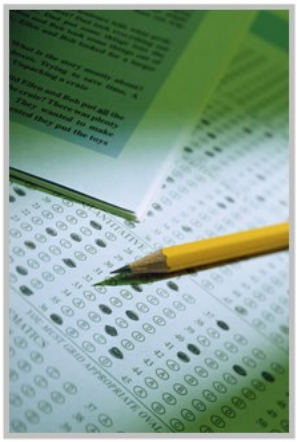
☞ ***NOTE:*** *Teach from graphic. Review and elaborate briefly on the topics covered in this lesson.*

End-of-Lesson Test

END-OF-LESSON TEST

Radar Data Display



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☞ ***NOTE:*** *Visit ERAM lab if possible.*

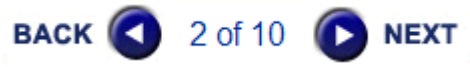
APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES

Purpose

This document serves as a guide for facilitating the eLearning activities of the Initial En Route Training course and provides an overview of the objectives and content of the eLearning activities within this lesson.

Navigation

- To navigate within the eLearning activities, a Navigation Bar is positioned at the top right of the page and contains the following options:
  - MAIN MENU: Allows students to access a main menu listing all of the eLearning activities
  - RESOURCES: Allows students to access additional resources, including:
    - A **Glossary** link
    - A **References** link
    - A **Help** link
  - EXIT: Allows students to exit from the eLearning activity at any time



- To navigate within an activity, a navigation tab is also positioned near the top right of the screen, just below the navigation bar.
  - The navigation tab contains the following buttons:
    - BACK: When active, returns students to the previous page
    - NEXT: When active, allows students to advance to the next page

NOTE: Inactive BACK and NEXT buttons indicate students are at the beginning or at the end of a lesson.

Navigation Tips

- To refresh a page or reset an activity, press **F5**.
- You can advance to a specific page in the activity without completing the activity. Click the **NEXT** or **BACK** buttons until the page is displayed.

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APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES (*Continued)*

Lesson Title Lesson 31 Radar Data Display

eLearning Objectives The objective of the following eLearning activities is to reinforce the knowledge of symbols and information used on the radar data display, in full data blocks, radar display symbols, and to identify components of the radar data display scope.

eLearning Activities

⊙ Lesson 31 contains the following eLearning activities:

- Activity 1: Identifying Radar Symbols
- Activity 2: Identifying Data Block Information
- Activity 3: Building a Data Block
- Activity 4: Reading Radar Display Data

Activity 1: Identifying Radar Symbols

Activity 1 Description In this activity, students practice identifying the radar symbols used on radar data displays, specifically the map, target, and position symbols. The first part of the activity consists of a set of electronic flash cards. Students **must** click each card to view the description of the symbol (just like traditional flashcards). In the second part, students answer questions regarding radar symbols. In the final part, students take a quiz regarding radar symbols to see how accurately they can identify radar symbols.

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APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES *(Continued)*

Activity 1 Content

- Flashcards for Radar Data Display
  - Page 1 contains a flashcard activity introduction.
  - Page 2 contains electronic flashcards with symbols and corresponding descriptions.
- Identifying Symbols Practice
  - Page 1 contains a practice activity introduction.
  - Page 2 contains hot spot questions regarding radar symbols.
- Identifying Symbols Quiz
  - Page 1 contains a quiz introduction.
  - Page 2 contains a 10 question quiz consisting of hot spot and multiple choice questions regarding radar symbols.

Activity 1 Specifics

- Flashcard activity
  - Students have 4 sets of randomized flashcards to complete.
- Hot spot practice activity
  - Students have one attempt to answer each of the 21 hot spot questions. They receive immediate feedback on whether their response to each question is correct or incorrect.
  - After completing all questions, students can see the percentage of answers they answered correctly. They should click **REVIEW ANSWERS** to see their marked answers and the correct answers.
- Hot spot and multiple choice quiz
  - Students have 5 minutes to complete all 10 questions before they see their score and can view the correct answers.
  - If students want to review their answers or make changes to their answers before seeing their score, they can navigate through the questions by clicking **FORWARD** or **PREVIOUS**.
  - Students **must** click **SUBMIT ANSWERS** when they are done answering all 10 questions. Then they will see a quiz results page. They should click **REVIEW ANSWERS** to see their marked answers and the correct answers.

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APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES *(Continued)*

Activity 2: Identifying Data Block Information

Activity 2 Description

In the first part of this activity, students pair the fields, qualifiers, and abbreviations used in full data blocks to the correct definition. In the first round, students match the FDB field to the correct description. In the second round, students match B4 qualifiers to the correct description. In the third round, students match Field E special condition information abbreviations to the correct description. After each round, students submit their answers and receive feedback. In the second part of the activity, students complete a quiz regarding data block information.

Activity 2 Content

- Page 1 contains an activity introduction.
- Pages 2-5 contain a drag and drop activity in which students **must** match the data block fields with their appropriate descriptions.
- Page 1 contains a quiz introduction.
- Page 2 contains a quiz with 8 multiple choice questions regarding data block information.

Activity 2 Specifics

- Matching Activity
  - Students have two attempts to match the symbol with the descriptions before the correct answer is given. There are 3 sets total.
- Multiple choice quiz
  - Students have 5 minutes to complete all 8 questions before they see their score and can view the correct answers.
  - If students want to review their answers or make changes to their answers before seeing their score, they can navigate through the questions by clicking **FORWARD** or **PREVIOUS**.
  - Students **must** click **SUBMIT ANSWERS** when they are done answering all 8 questions. Then they will see a quiz results page. They should click **REVIEW ANSWERS** to see their marked answers and the correct answers.

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APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES *(Continued)*

Activity 3: Building a Data Block

Activity 3 Description

In this activity, students are given a set of flight strips and incomplete data blocks. Students **must** drag and drop data from the flight progress strip to the incomplete data block to complete the data block.

Activity 3 Content

- ⊙ Page 1 contains an activity introduction.
- ⊙ Pages 2-7 contain a drag and drop activity in which students build data blocks using data from given flight progress strips.

Activity 3 Specifics

- ⊙ Drag and drop activity
  - On pages 2-7, students have two attempts to drag and drop data from the given flight progress strip to the blank spaces on the data block before they are given the correct answer.

Activity 4: Identifying Radar Data

Activity 4 Description

In this activity, students view a radar scope image and answer a series of related multiple choice and fill-in-the-blank questions.

Activity 4 Content

- ⊙ Page 1 contains an activity introduction.
- ⊙ Pages 2-4 contain multiple choice questions regarding the radar data display.
- ⊙ Pages 5-10 contain fill-in-the-blank questions regarding the radar data display.

Continued on next page

APPENDIX A: INSTRUCTOR KEY FOR ELEARNING ACTIVITIES *(Continued)*

Activity 4 Specifics

- Multiple choice questions
  - Students have two attempts to answer before they are given the correct answer.
  - Students can click the map image to zoom in or out and click and drag to view specific areas on the image.
- Fill-in-the-blank questions
  - Students are given two attempts before they are given the correct answer.
  - Students can click the map image to zoom in or out and click and drag to view specific areas on the image.