

SERVICE BULLETIN

SUBJECT: COMMUNICATIONS – ACARS & CPDLC – Modify unit software (Mod 4).

1. PLANNING INFORMATION

A. Effectivity

This change applies to the Dlink+ w/CPDLC, hereinafter referred to as Dlink+, with part numbers shown in the table below.

Part Number	Mod Level	New Mod Level
14114-1-01	1, 2, or 3	4
14114-1-02	1, 2, or 3	4
14114-1-05	1, 2, or 3	4

B. Concurrent Requirements

This Service Bulletin is a cumulative software update. It is not necessary to do any previous Service Bulletins affecting unit software before or after this Service Bulletin is done.

Separate Service Bulletins exist that update the Transport Selector Access Point (TSAP) database. If an update to the TSAP Database update is available for the unit under modification, then do the Service Bulletin for updating the TSAP Database immediately after the successful completion of this Service Bulletin.

C. Reasons

(1) The conditions the Service Bulletin will correct or improve:

(a) Aircraft Communications Addressing and Reporting System (ACARS)

- 1) OOOI (Out/Off/On/In) times and Fuel on Board now display in flight log for current and previous 3 flights.
- 2) User Defined Messages – addition of capability to define and include user variable data items obtained from A429 bus within user defined downlink messages.
- 3) User Defined Menus – addition of capability to define customer AOC menus and logically group both User Defined Messages and shortcut links to standard AOC and ATS messages. Additionally adds support for User Defined ‘Select Lists’ to reduce pilot workload during construction of messages where parameter list is known in advance.
- 4) Cascading event triggers for User Defined messages are no longer dependent on association with messages for each event.
- 5) IATA Out/In fuel report message parameter corrected.
- 6) ICAO Return Event message now included in message log.
- 7) Fuel on Board parameter now includes secondary source calculation if standard A429 Label 247 not available on any of the configured A429 receiver ports.
- 8) Boarded Fuel now calculated and displayed on FLT LOG page and available for use in standard ACARS IATA/ICAO messages and User Defined AOC messages.

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- 9) Correction of the format of ATS Clearance Request messages.
- 10) Enhancements and corrections to A619 protocol layer for connections to devices such as DFDAU, FMC, DMU, and CFDIU. This includes an updated CRC algorithm for A619 messages, and populating Label 270 Status Word.
- 11) Improvement of label RA CMD/RSP uplink message text display.
- 12) Implementation of dynamic printer CPL (Characters Per Line) for printed messages to enable larger character sizes for most standard messages, but accommodate single messages that require higher CPL when printed.

(b) CPDLC

- 1) Additional improvements to station management algorithm to reduce Provider Abort rate and improve CPDLC message handling under heavy load / background traffic conditions.
- 2) Improvement/reduction in number of Transport Layer Acknowledgement frames sent from the unit.
- 3) Addition of capability to manually tune to Mode 2 frequency if CM Logon is required and unit is currently on Mode A frequency.
- 4) Streamlining of some Link2000 message pages to remove unused elements and additionally, reordering of some messages request/response elements to have the most commonly used element as first selection.

(c) General

- 1) OOOI status corrected for CPDLC Only configurations.
- 2) Improvement in VDL performance during frequency congestion.
- 3) Additional improvements in VSWR detection implementation in case of antenna disconnect or damage while unit operational.
- 4) Transport Service Access Point database version display information included in versioning information.

(2) Service or industry experience:

Interoperability testing was performed successfully at both ARINC and SITA network provider interoperability test labs. Formal Verification and Validation testing was performed at Spectralux labs for this software mod June/July 2015.

In addition, flight trials were performed against an in-service production ANSP (Air Navigation Service Provider) during Q1 and Q2 of 2015.

(3) Consequences if the modification is not performed:

- (a) Significantly less flexibility in configuration of ACARS user messages with no ability to organize them within custom user menu pages.
- (b) ARINC 619 protocol connections to peripherals such as DFDAU and FMC could be non-functional.
- (c) VDL Mode 2 ground station connectivity and performance will be less than optimal and could potentially lead to communication delays that cause Provider Aborts when performing CPDLC sessions.

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(4) Expected benefits:

- (a) Improved VDL Mode 2 connectivity / communication.
- (b) Significantly improved ACARS functionality.

D. Description

Software and data in the on-board flash memory is changed. A post-programming test is performed on the changed unit.

The configuration file in the personality module on the aircraft must be changed after a Mod 4 Dlink+ is first installed. Once changed, the personality module will work with any other Dlink+ that has been modified according to this service bulletin.

E. Compliance

No compliance time is given.

F. Approval

Not applicable. This modification is classified as Minor per 14 CFR Part 21, Subpart O.

G. Manpower

The estimated time to complete this software upgrade is thirty minutes for each component.

H. Weight and Balance

None.

I. Electrical Load Data

Not changed.

J. Software Accomplishment Summary

Not applicable.

K. References

INST-14114-1, Revision D, Installation Manual for Dlink+ w/CPDLC.

L. Other Publications Affected

None.

M. Interchangeability or Intermixability of Parts

Not applicable.

2. MATERIAL INFORMATION

A. Material – Price and Availability

Contact Spectralux customer service for price and availability.

B. Industry Support Information

None.

C. Material Necessary for Each Component

None.

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D. Material Necessary for Each Spare

None.

E. Re-identified Parts / Existing Parts Accountability

Part No.	Old Mod	New Mod	Disposition
14114-1-01	1, 2, or 3	4	RWK / R
14114-1-02	1, 2, or 3	4	RWK / R
14114-1-05	1, 2, or 3	4	RWK / R

RWK – Make the change given in this service bulletin

R – The Old Mod is the Mod level of the units on which the change is to be done and the New Mod is the Mod level of the units after the change is done.

F. Special Tooling and Software Necessary to do this Service Bulletin

(1) Supplied by Spectralux for use in field.

Part No.	Description	Source
Customer specific part number with CCD prefix.	This CCD contains: 1) Dlink_Configuration_Loader.exe 2) Configuration files specific to each aircraft type (.dat file) 3) Unit software: a) eDURom.bin b) eSBCRom.bin c) eIORom.bin d) DSP_ModeA.bin e) DSP_Mode2.bin	Spectralux

(2) Field loading equipment and information supplied by customer.

Description	Source
Laptop PC with Windows XP or Windows 7 and at least one Ethernet port and USB port. A CD drive may be necessary, depending on the customer's distribution media handling protocol.	Any
Black permanent ink	Any
AC Reg (Tail Number) ICAO address (6 characters)	Aircraft-specific information

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3. ACCOMPLISHMENT INSTRUCTIONS

A. Equipment Setup (one time)

Windows administrator privileges are needed to configure and use the PC to perform this service bulletin. The Windows firewall settings may need to be adjusted after Dlink_Configuration Loader.exe is installed to allow it to communicate.

(1) Create directories on the C:\ drive named:

C:\Dlink_Configuration_Loader\Mod4\

(2) Copy the contents of the customer specific distribution with CCD prefix into the directory created in Step (1).

(3) Configure the IP address of the PC as described in the following tables.

Windows XP	Windows 7
Follow this pathway: Control Panel Network Connections Local Area Connection (right mouse click for Properties)	Follow this pathway: Control Panel Network and Sharing Center Change Adapter Settings Local Area Connection (right mouse click for Properties)
Highlight Internet Protocol in scrolling window (do not uncheck it)	Highlight Internet Protocol Version 4 in scrolling window (do not uncheck it)

Windows XP or Windows 7
Click Properties button
Click radio button for "Use the following IP address" and enter IP address = 192.168.255.12 Subnet mask = 255.255.255.0 Default gateway = blank
Click radio button for "Use the following DNS address" and enter Preferred DNS server = blank Alternate DNS server = blank
Click Ok button to exit

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B. Software Update Instructions (each unit)

WARNING:

This procedure must be performed only when the aircraft is on-ground and the aircraft presents signal(s) indicating that it is on-ground to the Dlink+. An error message will appear on the Scratch Pad Line if the Dlink+ has in-air status while attempting this procedure (“CANNOT LOAD IMAGE IN AIR”). The on-ground status is displayed on the MONITOR 1/2B page, which can be accessed by pressing the READ button followed by the A/B select key.

CAUTION:

If the PC is being powered by its internal battery, make sure the battery has enough power for at least one hour of operation. Make sure aircraft power is stable. If the PC battery becomes depleted during programming or aircraft power is interrupted, the Dlink+ may be rendered inoperative, requiring that it be returned to the Spectralux Repair Station.

- (1) Attach Ethernet cable between PC and aircraft maintenance port of Dlink+.
- (2) Double click the application “Dlink_Configuration_Loader.exe”.
- (3) Enable power to Dlink+. Wait until the status reported by the Dlink_Configuration_Loader.exe changes from NOT CONNECTED to CONNECTED in both the server and client areas.
- (4) Go to the Applications tab of the Dlink_Configuration_Loader.exe. (see Figure 1)

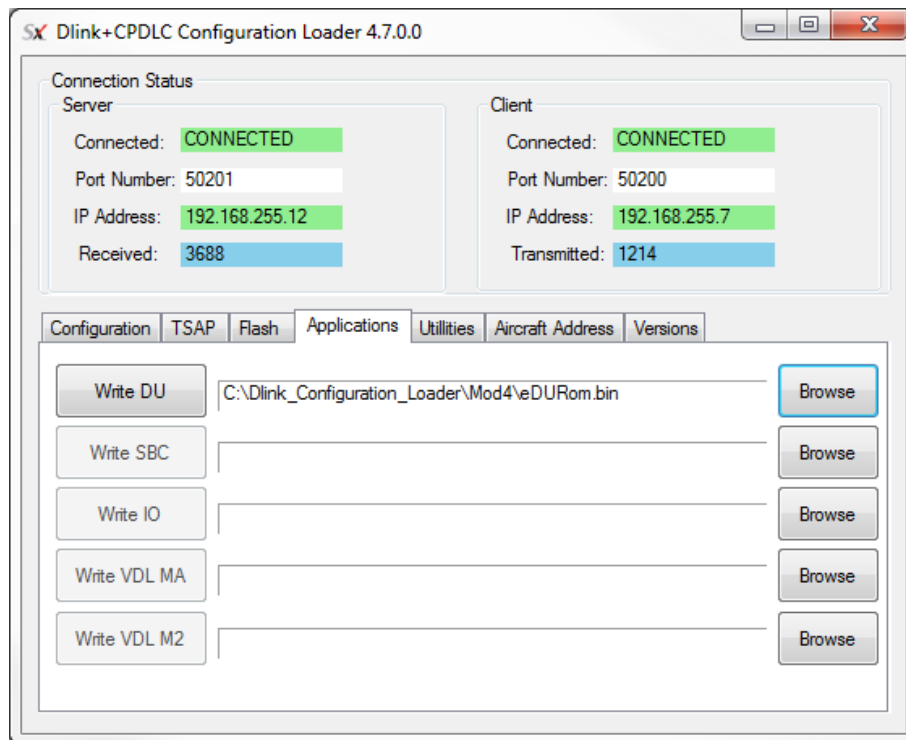


Figure 1 – Applications Tab

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- (5) Click Browse and navigate to C:\Dlink_Configuration_Loader\Mod4. Open eDURom.bin and click on the Write DU button. Click Yes in the Confirm pop-up box if the CRC agrees with the value in the table below. (Click No if the CRC does not agree with the value in the table and do not proceed with programming until the discrepancy is resolved.) Files will be loaded in the order shown in this table.

CAUTION:

If the load order is not followed as shown in the below table, the Dlink+ may become inoperative, requiring that it be returned to the Spectralux Repair Station.

Button Click	File	CRC
Write DU	eDURom.bin	B7B3
Write SBC	eSBCRom.bin	F02D
Write Configuration	Example: cc_PN_12345-1_V4.cfg.xml.dat	NA
Write IO	eIORom.bin	D825
Write VDL MA	DSP_ModeA.bin	A6BB
Write VDL M2	DSP_Mode2.bin	DEC0

- (6) The Dlink+ will count up while PROGRAM LOADING and then after a short delay, will reboot. Wait until the unit reboots and connection status becomes CONNECTED.
- (7) Load the eSBCRom.bin as described previously in Steps (5) and (6).

NOTE:

The Dlink+ will display CORRUPTED OR MISSING CONFIGURATION if the configuration in the personality module of the aircraft disagrees with the version of software in the unit. This condition will be cleared in the next step.

- (8) Go to the Configuration tab of the Dlink_Configuration_Loader.exe. (see Figure 2) Click Browse on the Write Configuration Line and navigate to C:\Dlink_Configuration_Loader\Mod4. Open the customer Mod 4 configuration for your airline and this aircraft. Click Write Configuration.

The Dlink_Configuration_Loader screen will count up while RECEIVING CFG and then the Dlink+ will show "DLINK IS WRITING TO PM". Wait until the unit reboots and connection status becomes CONNECTED. The CORRUPTED OR MISSING CONFIGURATION message should not be present.

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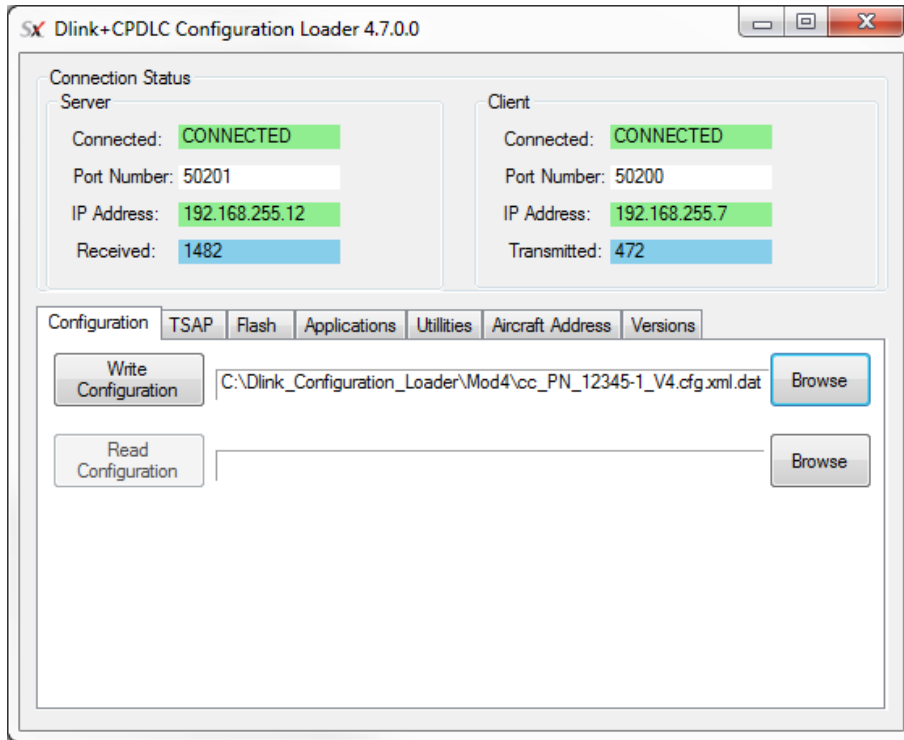


Figure 2 – Configuration Tab

- (9) Load the remaining files (eIORom.bin, DSP_ModeA.bin and DSP_Mode2.bin) as described previously in Steps (5) and (6).

The FAIL annunciator may turn on after the IO has been programmed, but will be resolved after completing the Mod 4 software loads.

- (10) Go to the Versions tab of the Configuration loader and click Read. The programming has been successful if all numbers in the CRC, Version, and FPGA columns match Figure 3.

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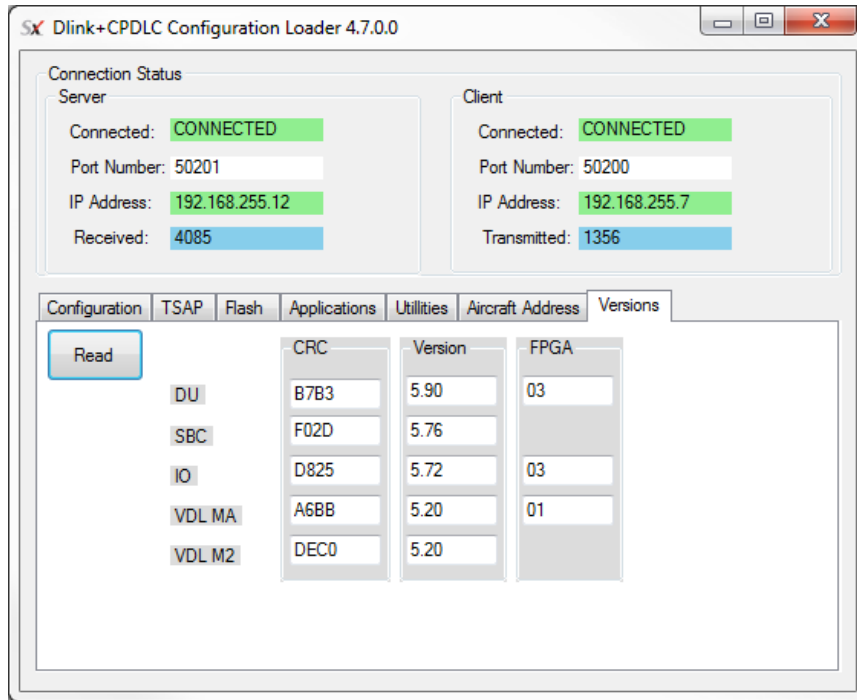


Figure 3 – Versions Tab

- (11) Go to the Aircraft Address tab of the Dlink_Configuration_Loader.exe.
- (12) Click Read to populate the fields.
- (13) Enter the aircraft-specific information into the AC Reg (Tail Number) field and the airline-specific information into the ICAO Address field.
- (14) Click Write and wait until the Dlink+ writes to the personality module, reboots, and is CONNECTED. Then click Read and confirm that the reported addresses are correct.
- (15) Proceed to C. Post-Programming Test.

C. Post-Programming Test

All confirmations in this section are by visual inspection.

- (1) Disable power to the Dlink+.
- (2) Remove Ethernet cable connecting PC to unit being programmed.
- (3) Enable power to the Dlink+ and wait until bootup is complete.
- (4) Press USER key, then MAINT LSK (line select key), then CONFIG LSK, then VERSIONS LSK.
- (5) Confirm that the display shows HW: 14494-1-XX BOM REV B and that CRC and FPGA values agree with Figure 1.

VDL MA in Figure 1 is equivalent to M0 on the unit.

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- (6) Press down arrow LSK (right of display).
- (7) Confirm that CFG PART NO agrees with part number included in filename of correct configuration file for aircraft.
- (8) Press down arrow LSK (right of display).
- (9) Confirm that Version values agree with Figure 3 – Versions Tab.
- (10) Press USER key, MAINT LSK, CONFIG LSK, USER EDIT LSK. Enter using Dlink+ keyboard, "USER00". Press ENTER key (not RETURN).
- (11) Confirm AC TYPE is the expected model, CUSTOMER is correct, and VERSION matches the v number included in the filename of the correct configuration file for the aircraft.
- (12) If the unit passes the test, proceed to D. Return to Service.

D. Return to Service

- (1) Mark the unit label according to Figure 4 – Mod 4 Label Marking.
- (2) Perform SB – 14114-23-08 or later service bulletin updating the TSAP database, if not done already on this unit.

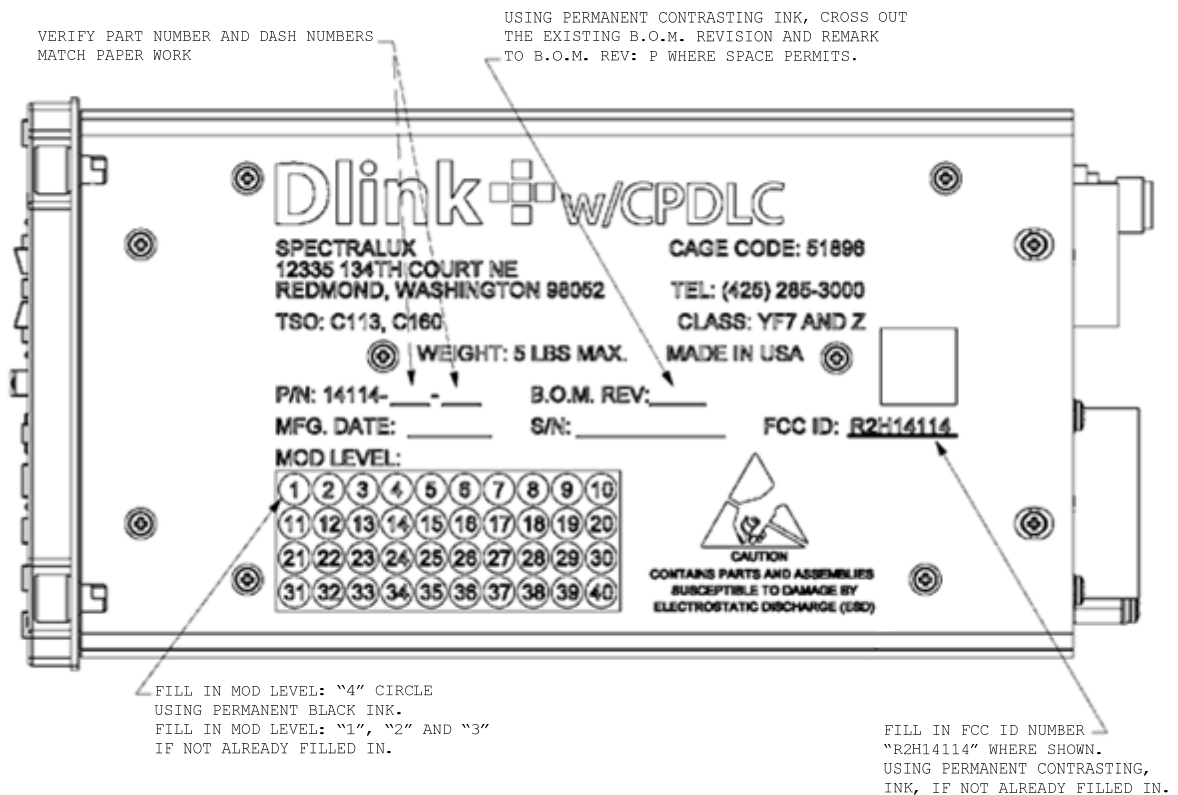


Figure 4 – Mod 4 Label Marking

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1. APPROVAL

Prepared by: _____

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