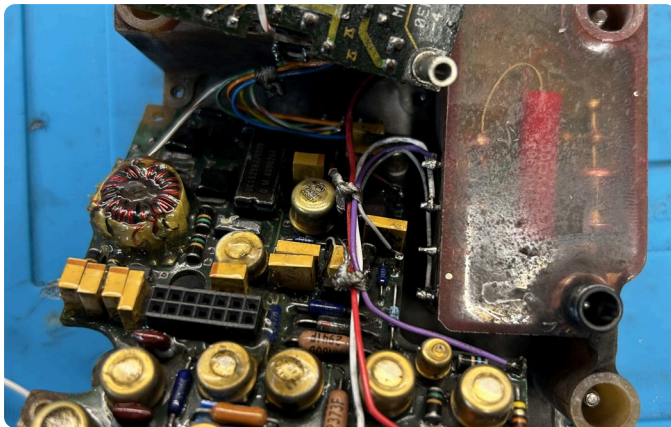


DISPLAY SYSTEMS · BOEING 747 FFS

Colour on, colour off: extending the life of a B747 CRT display

Non-destructive, component-level recovery of a legacy DU-7000 display unit through targeted inspection, cleaning and solder-joint restoration.



BEFORE Dust and fibrous debris on the internal assemblies as received.



AFTER Reassembled DU-7000, returned for installation-level testing.

PLATFORM	ASSET	SCOPE	OUTCOME
Boeing 747 FFS display system	Collins DU-7000 CRT display unit	Non-destructive component-level repair	Restored to service after reinstallation

01 The challenge

The display took progressively longer to stabilise its colour and switched intermittently between colour and monochrome. Replacement assemblies for this generation are scarce, costly and often of uncertain remaining life, so the goal was to preserve the original unit.

02 What we did

We fully disassembled the unit and inspected the high-voltage, power-regulation, video, I/O, processor, deflection and raster/stroke assemblies. Heavy contamination was removed, connectors serviced, capacitors screened and degraded solder joints reworked.

03 The result

After reassembly and installation-level verification the display returned to operational service. Factory modifications and calibration were preserved, and no component was replaced without measured evidence.

Symptoms and constraints

Slower colour stabilisation

Pointed to thermal drift, ageing connections or unstable analogue supplies rather than a permanent logic fault.

Legacy construction, few spares

Favoured preserving the original assemblies and evidence-based intervention.

Colour to monochrome switching

Directed attention to the video path, CRT drive, regulated supplies and board interconnects.

No complete test fixture

Final validation had to take place in the customer's simulator.

Diagnostic method

- 1 Document the unit**
Condition and internal board arrangement before intervention
- 2 Controlled disassembly**
Remove plug-in and CRT-associated assemblies
- 3 Inspect under magnification**
Components, traces, pins, edge contacts, joints, wiring mods
- 4 Remove contamination**
Electronics-safe cleaning, focused on high-voltage and high-impedance areas
- 5 Service interconnects**
Board-to-board contacts checked for oxidation and damage
- 6 Rework solder joints**
Cold, temperature-sensitive joints restored
- 7 Screen capacitors**
ESR measurement on accessible capacitors
- 8 Check for damage**
Overheating, cracked parts, damaged tracks, failed semiconductors
- 9 Reassemble and verify**
Bench integrity checks, then installation-level testing

ROOT CAUSE · TWO CONTRIBUTING FACTORS

Contamination in sensitive circuitry

Dust and fibres near the CRT power and interconnect areas can retain moisture and create leakage currents that worsen drift.

Age-related solder degradation

Joints worn by thermal cycling changed as the unit warmed, matching the progressive, intermittent fault.

EVIDENCE, NOT GUESSWORK

- No abnormal ESR found, so no capacitors replaced
- No burnt ICs, ruptured capacitors or major PCB damage
- Factory modifications and calibration left untouched
- Display restored to service after reinstallation

Lessons for simulator operators

THINK SYSTEM-LEVEL

Intermittent CRT colour faults involve supplies, video stages, connectors and heat together.

DIRT IS A FAULT

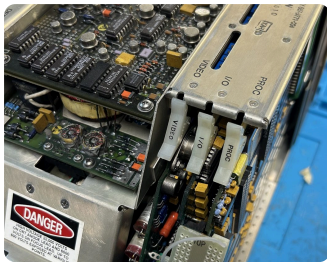
Contamination matters in high-voltage circuits even when nothing looks damaged.

MEASURE FIRST

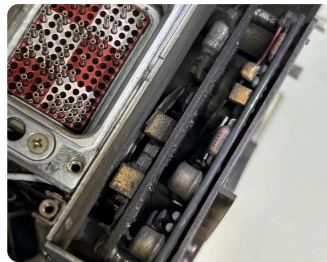
Blanket recapping of calibrated legacy boards can create new faults.

Why the assemblies were checked in this order

ASSEMBLY	PRIORITY	REASONING
High-voltage & power regulation	First	Unstable CRT supplies can affect brightness, focus and colour behaviour.
Analogue interface & VIDEO	Second	The colour-to-monochrome symptom points to the video path.
I/O & processor	Third	Lower probability for a time-dependent image fault.
Deflection & raster/stroke	Last	Checked without disturbing lower-probability calibrated circuits.



Plug-in VIDEO, I/O and PROC cards.



Connector and card interconnects.



Unit identification (serial masked).



Aged components under inspection.

Result and value delivered

ASSET LIFE EXTENDED

A scarce legacy display recovered without replacing the unit

LESS OBSOLESCENCE RISK

Less reliance on donor boards and uncertain surplus stock

CONTROLLED RISK

Symptom-led work, original calibration retained

LESS MATERIAL

No parts replaced where measurements did not justify it

TRANSPARENT VALIDATION

Workshop and simulator-level acceptance kept separate

Recommended sequence for similar CRT display faults

- 1 Record the symptom against warm-up time and temperature
- 2 Prioritise high-voltage and regulated supply sections
- 3 Clean high-voltage and high-impedance areas before measuring
- 4 Inspect solder joints and interconnects under magnification
- 5 Replace components only on measured evidence
- 6 Validate separately on the bench and in the simulator

**When a legacy display starts to drift,
careful diagnosis beats a scarce replacement.**

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Customer identity, unit serial numbers, circuit references and configuration details are omitted and remain in the controlled maintenance record.