REVISED 10-14-86

FMEA NO. 1.2.22 CRITICALITY 2/2	SHUTTLE CCTV CRITICAL ITEMS LIST	UNIT Video Switching Unit (VSU) DWG NO. 2294823-502, 504 SHEET 1 OF 7

FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
Power on reset (POR) remains in high state. Cause: (1) Microprocessor, I/O, A1, 2592389-501 or 2294889-502	Microcomputer and associated logic remains in reset state. Signal routing not possible. Worst Case: Cannot select camera signal for display on monitor or for downlink.	DESIGN FEATURES The VSU is a microprocessor-based video switching unit using an RCA 1802 microprocessor, CMOS RAM, and TTL PROM. Computer I/O, decoding logic, digital audio and switch control circuitry are implemented in CMOS CD4000 series logic to minimize power dissipation. The design incorporates DMOS FET devices (SD211s) purchased to an RCA spec control drawing (SCD) as the basic video switch element. Video split-screen capability incorporates glass delay line modules procured from Microsonics (originally Corning) to an RCA SCD. The video amplifier design uses monolithic NE5539 wideband op amps in a fashion similar to the sync amp design employed in the RCU. Parts were required to be JAN reliability level parts of their equivalent. Part selection falls into three categories: (1) JAN or better parts from the Military QPL, (2) Parts demonstrated to NASA to be equivalent to JAN level via test data (e.g., CD4000/3M series parts), or (3) Parts procured to an RCA spec control drawing which calls out tests and screening to effect JAN equivalency. BARE BOARD CONSTRUCTION (A1) The boards are of "welded wire" construction. At the bare board level this does not distinguish it from a normal PC board except that holes which will take weld pins generally are not connected to PC traces. Only those pins which bring power and ground potentials to the ICs are on PCs. An annular ring surrounds the hole in the board where each power and ground pin is located. These pins are then soldered to the trace like any other component lead. Aside from this feature, all design & construction techniques used in PC board layout apply. BOARD ASSEMBLY (A1) The drilled and etched boards are populated with several hundred solderable or weldable pins. Power and ground pins, as well as connector pins, are soldered in place. Discreet components (resistors, diodes, capacitors) are attached to bifurcated terminals, where they are soldered. Flatpack ICs are welded, lead-by-lead, to the tops of the weld pins. After welding, extra lead material is trimmed away. Circuit connections are made using #30 AWG nickel weld wire. The wire is welded to the pin surfaces on the board backside. All wire welds are done using a machine which is tape driven, thus eliminating the possibility of miswiring due to operator error. All wiring & circuit performance is tested prior to box-level installation. After successful testing, components are staked as required by drawing notes and the assembly is coated with urethane.

FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 504

SHEET 2 OF 7

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FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 504

SHEET 3 OF 7

FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
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FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 504

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FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 509

SHEET 5 OF 7

FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
Power on reset (POR) remains in high state. Cause: (1) Microprocessor, I/O, A1, 2592389-501 or 2294889-502	Microcomputer and associated logic remains in reset state. Signal routing not possible. Worst Case: Cannot select camera signal for display on monitor or for downlink.	QA/INSPECTION (Continued) VSU Assembly and Test An open box test is performed per TP-IT-22944832, and an Acceptance Test per TP-AT-2294823, including vibration and thermal vacuum. Torques are specified and witnessed, traceability numbers are recorded and calibrated tools are check prior to use. RCA quality and DCAS inspections are performed at the completion of specified FPR operations in accordance wtih PAI-204, PAI-205, PAI-206, and PAI-217. DCAS personnel witness VSU button-up and critical torquing. RCA and DCAS personnel monitor acceptance tests and review test data/results. These personnel also inspect after all repair, rework and retest. Preparation for Shipment - The VSU is packaged according to 2280746. Process standard for packaging and handling guidelines. All related documentation including assembly drawing, parts list, ABPL, test data, etc. is gathered and held in a documentation folder assigned specifically to each assembly. This folder is retained for reference. An EIDP is prepared for each VSU in accordance with the requirements of WS-2593176. RCA QC and DCAS personnel witness crating, packaging, packing and marking, and review the EIDP for completeness and accuracy.

FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 504

SHEET 6 OF 7

FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
Power on reset (POR) remains in high state. Cause: (1) Microprocessor, I/O, AI. 2592389-501 or 2294889-502	Microcomputer and associated logic remains in reset state. Signal routing not possible. Worst Case: Cannot select camera signal for display on monitor or for downlink.	FAILURE HISTORY NONE.

REVISED 10-14-86

FMEA NO. 1.2.22

CRITICALITY 2/2

SHUTTLE CCTV
CRITICAL ITEMS LIST

UNIT Video Switching Unit (VSU)
DWG NO. 2294823-502, 504

SHEET 7 OF 7

FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
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