F-16 Countermeasures Management Switch (CMS)

Section 5.2: CMS Switch Actuation

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5.2 CMS Switch Actuation

The Countermeasures Management Switch (CMS) is a four-direction hat switch located at the flight stick that provides pilots with rapid, direct control over the F-16's defensive systems during demanding tactical situations. This section tabulates all CMS button combinations, organized by operational layer: Counter Measures (CMDS manual/automatic/semi modes) and Defensive Avionics integration (jamming) with both external ECM pods (ALQ-131/ALQ-184) and internal avionics (IDIAS). CMS actuation is independent of the Master Mode currently selected.

Each table entry specifies:

- **State**: The operational context (master mode, CMDS mode, sensor state).

- **Direction**: The physical direction for pressing the CMS hat (Up, Down, Left, Right).

- **Action**: The press type (Short, Long, Long Hold).

- **Function**: What the CMS command activates or controls.

- **Effect / Nuance**: The resulting system behavior, including tactics and constraints.

- **Dash34**: Reference section in the Dash-34 manual.

- **Training**: Recommended BMS training missions for hands-on practice.

5.2.1 CMS Actuation with CMDS

The ALE-47 CMDS (Automatic Chaff and Flare Dispensing System) provides three operational modes: Manual (MAN), Automatic (AUTO), and Semi-Automatic (SEMI). Each mode grants the pilot different levels of control and autonomy over chaff and flare dispensing. The CMS is the primary interface for program execution and consent authority across all three modes.

Manual Mode

The CMDS Manual (MAN) mode grants the pilot direct, program-by-program control over countermeasure expenditure. Each CMS direction selects or executes a specific program. This mode is recommended when threat types are well-known or when chaff/flare inventory must be conserved, or by pilot choice.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
CMDS MAN	Up	Short	Execute Program 1–4	Runs the program selected via the CMDS panel PRGM knob once per press. No threat sensing; purely pilot-commanded. Overrides any AUTO dispensing, if running.	Dash-34, section 2.7.2.2	TBD

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Table 5.1: CMS Actuation with CMDS Manual Mode

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
CMDS MAN	Left	Short	Execute Program 6	Flare-only program. Often pre-configured for close-range air-to-air engagements or MANPAD defense. No dependency on PRGM knob.	Dash-34, section 2.7.2.2	TBD

Automatic Mode

The CMDS Automatic (AUTO) mode enables the ALE-47 CMDS to dispense chaff/flare programs continuously in response to RWR-detected threats, without requiring pilot consent for each event. Pilot consent is given once by pressing CMS Aft; dispensing continues until CMS Right is pressed or expendables are exhausted.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
CMDS AUTO	Up	Short	Execute Program 1–4	Manual override: runs the selected program once, interrupting any ongoing AUTO dispensing. After the manual program completes, AUTO resumes if threat persists. Useful for pilot override in high-threat scenarios.	Dash-34, section 2.7.2.2	TBD
CMDS AUTO	Left	Short	Execute Program 6	Manual flare-only program, overrides AUTO. After execution, AUTO resumes.	Dash-34, section 2.7.2.2	TBD
CMDS AUTO	Aft	Short	Give Consent; Enable AUTO Dispensing	CMS Aft grants consent for AUTO CMDS. RWR-detected threats trigger automatic program dispensing (selected via PRGM knob). Dispensing continues until threat clears or CMS Right is pressed. Consent state persists even if pilot switches to MAN mode; re-engaging AUTO will resume auto-dispense.	Dash-34, section 2.7.2.1	TBD
CMDS AUTO	Right	Short	Cancel Consent; Disable AUTO	CMS Right removes CMDS consent and places the ALE-47 in Standby. Automatic dispensing halts immediately. Pilot must re-issue CMS Aft to resume AUTO operation or use the system manually.	Dash-34, section 2.7.2.1	TBD

Semi-Automatic Mode

Semi-Automatic (SEMI) mode allows the ALE-47 to prompt the pilot for consent on a per-threat basis. When the RWR detects a threat requiring countermeasures, the CMDS displays "DISPENSE RDY" on the control unit and sounds a "COUNTER" voice message, requesting pilot consent via CMS Aft.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
CMDS SEMI	Up	Short	Execute Program 1–4	Manual override: runs the selected program once, independent of RWR threat state. After execution, CMDS returns to monitoring for threats and issuing "COUNTER" prompts.	Dash-34, section 2.7.2.2	TBD
CMDS SEMI	Left	Short	Execute Program 6	Manual flare-only program, independent of SEMI threat detection. After execution, CMDS resumes SEMI monitoring.	Dash-34, section 2.7.2.2	TBD
CMDS SEMI	Aft	Short	Give Consent; Dispense One Program	When CMDS issues "COUNTER" (threat detected), pilot presses CMS Aft to execute one instance of the selected program. If threat persists or a new threat appears, CMDS will issue "COUNTER" again. Consent state is tracked; switching to AUTO while consent active will trigger immediate AUTO dispensing on next threat.	Dash-34, section 2.7.2.1	TBD
CMDS SEMI	Right	Short	Cancel Consent; Return to Standby	CMS Right removes SEMI consent. CMDS halts monitoring and returns to Standby. "COUNTER" messages cease.	Dash-34, section 2.7.2.1	TBD

Program Selection & Manual Execution

Program selection (Programs 1–4) is controlled via the CMDS panel PRGM knob. Program 5 is always accessible via the cockpit slap switch (S key). Program 6 is always accessible via CMS Left. This section clarifies which programs are available in each CMDS mode.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — CMDS MAN/SEMI/AUTO	Up	Short	Program 1–4 (PRGM knob selection)	Executes the program currently selected on the CMDS panel PRGM knob (1, 2, 3, or 4). Each press runs the program once. In AUTO, manual CMS Up overrides continuous dispensing and executes the selected program; AUTO resumes on next threat.	Dash-34, section 2.7.2.2	TBD

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Table 5.4: CMDS Program Selection & Manual Execution

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — CMDS MAN/SEMI/AUTO	Left	Short	Program 6 (Always Available)	Executes Program 6 without reference to the PRGM knob. Program 6 is typically configured as flare-only (no chaff) for close-range air-to-air or MANPAD defense. Available in all CMDS modes (MAN, SEMI, AUTO).	Dash-34, section 2.7.2.2	TBD
A-A/A-G — CMDS MAN/SEMI/AUTO	S Key (Slap Switch)	Short	Program 5 (Always Available)	Program 5 is activated via the slap switch on the throttle (not CMS). Program 5 is typically configured as a rapid chaff/flare combo for unexpected or unknown threats. Available in all CMDS modes but is not a CMS function (included for reference).	Dash-34, section 2.7.2.2	TBD

5.2.2   CMS Actuation with ECM

External ECM pods (ALQ-131, ALQ-184) and internal IDIAS (Improved Defensive Internal Avionic System) provide pilot-controlled jamming across frequency bands. The CMS Aft position controls transmit authority for external pods; CMS Left cycles modes for internal IDIAS. Both systems interact with the RF switch and respect landing gear constraints.

External ECM Pod (ALQ-131 / ALQ-184)

External ECM pods provide pilot-controlled jamming across five frequency-band programs. The CMS Aft position grants "ECM consent," enabling the pod to transmit at the XMIT switch setting (modes 1, 2, or 3). The ECM Enable light on the miscellaneous panel indicates consent state.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — ECM Pod any mode	Aft	Short or Long Hold	Enable ECM Transmit; Grant Consent	CMS Aft illuminates the ECM Enable light and permits the external ECM pod to transmit in the mode set by the XMIT switch on the ECM control panel (XMIT 1: AUTO Avionics Priority; XMIT 2: AUTO ECM Priority; XMIT 3: Continuous Jam). Pod continues transmitting as long as CMS Aft is held or until RF switch is moved away from NORM.	Dash-34, section 2.7.4.2.5	TBD

Table 5.5: CMS Actuation with External ECM Pod

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — ECM Pod any mode	Right	Short	Disable ECM Transmit; Remove Consent	CMS Right extinguishes the ECM Enable light and places the ECM pod in Standby, halting transmission immediately. Pod will not transmit until CMS Aft is re-issued.	Dash-34, section 2.7.4.2.5	TBD
A-A/A-G — ECM Pod + RF Switch	Aft	Short or Hold	ECM Consent (RF Interaction)	CMS Aft grants consent regardless of RF switch position. However, if RF switch is moved to QUIET or SILENT after CMS Aft is issued, ECM automatically enters Standby. Upon returning RF switch to NORM, ECM remains in Standby until CMS Aft is re-issued. CMS Aft is the primary control; RF switch position can override it.	*TO 1F-16CMAM-34-1-1*, Dash-34, sections `2.7.1.1`, `2.7.4.2.5`	TBD
A-A/A-G — ECM Pod + Landing Gear	Aft	Short or Hold	Consent (Gear-Dependent Behavior)	ECM consent (CMS Aft) can be issued at any flight phase. However, if landing gear is extended (down), the pod remains in Standby even with CMS Aft held. Upon gear up and CMS Aft reissued, pod enters transmit mode.	Dash-34, section 2.7.1.1	TBD

Internal ECM (IDIAS)

Internal avionics ECM (IDIAS: Improved Defensive Internal Avionic System) automatically selects frequency bands to jam based on RWR threat priority. CMS Left cycles through operational modes (Standby, Avionics Priority, ECM Priority). CMS Aft is not used for IDIAS; mode control is via CMS Left and the XMTR button on the ECM panel.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — IDIAS ECM	Left	Short (re-peated)	Cycle ECM Operational Mode	Each short press of CMS Left advances the ECM mode: STBY → AVNC (Avionics Priority) → ECM (ECM Priority) → AVNC → ECM (cycles). In AVNC, FCR/TFR/HARM remain protected; only AFT antenna transmits. In ECM, both FWD and AFT antennas transmit; onboard emitters/receivers may be degraded.	Dash-34, section 2.7.4.1.2	TBD

Table 5.6: CMS Actuation with Internal ECM (IDIAS)

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — IDIAS ECM + XMTR OFF	Left	Short (repeated)	No Effect until XMTR ON	CMS Left cycling has no effect if the XMTR button on the ECM panel is in STBY. Press XMTR to OPER first; then CMS Left activates mode cycling.	Dash-34, section 2.7.4.1.2	TBD
A-A/A-G — IDIAS ECM	Right	Short	Set ECM to Standby	CMS Right forces IDIAS ECM into STBY mode, halting all jamming operations. Requires CMS Left cycling to return to AVNC or ECM mode.	Dash-34, section 2.7.4.1.2	TBD
A-A/A-G — IDIAS ECM + Warm-up	Left	Short (repeated)	Mode cycling during warm-up	During ECM warm-up (5–6 minutes after power-on), STBY lamp flashes. CMS Left cycling is available but modes will not activate until warm-up completes and XMTR is set to OPER.	Dash-34, section 2.7.4.1.2	TBD

5.2.3   CMS Consent & Constraints

This subsection clarifies the relationship between CMDS consent (CMS Aft), ECM transmit authority (CMS Aft for external pod), and system constraints (RF switch, landing gear, MMC power). Understanding these interactions is critical for effective defensive posture management during high-workload combat operations.

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — CMDS AUTO/SEMI + ECM Pod	Aft	Short or Hold	Joint Consent (CMDS + ECM)	Single CMS Aft command grants consent to *both* the ALE-47 CMDS (AUTO/SEMI) and the external ECM pod. Pilot does not distinguish between the two; both systems respond to the same CMS Aft press. This unified control maximizes pilot situational awareness and frees workload during combat maneuvering.	*TO 1F-16CMAM-34-1-1*, Dash-34, sections `2.7.1.1`, `2.7.2.1`	TBD
A-A/A-G — CMDS AUTO/SEMI	Up	Short	Manual Override (Both Systems)	CMS Up (manual program) executes chaff/flare but does *not* affect ECM pod transmit state. ECM remains transmitting if CMS Aft is active, or in Standby if CMS Aft is not active.	Dash-34, section 2.7.2.2	TBD

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Table 5.7: CMS Interaction with CMDS and ECM (Consent &
Constraints)

State	Dir	Act	Function	Effect / Nuance	Dash34	Train
A-A/A-G — CMDS AUTO + RF Switch Change	Aft (after RF change)	Short or Hold	Consent State Reset	If RF switch is moved to QUIET or SILENT while CMS Aft is active, CMDS AUTO dispensing is halted (CMDS enters Standby). Returning RF to NORM does *not* automatically resume AUTO; pilot must re-issue CMS Aft.	*TO 1F-16CMAM-34-1-1*, Dash-34, sections `2.7.1.1`, `2.7.2.1`	TBD
A-A/A-G — CMDS AUTO + MMC Power Cycle	Aft (after power cycle)	Short or Hold	Consent State Cleared	After MMC power is cycled (power switch off then on), CMDS consent is lost. AUTO dispensing is disabled until CMS Aft is re-issued. Pilot must remember to reestablish consent after power recovery.	Dash-34, section 2.7.2.1	TBD
A-A/A-G — CMDS AUTO + Landing Gear	Aft (with gear down)	Short or Hold	AUTO Disabled (Gear Constraint)	AUTO dispensing is inhibited when landing gear is down. CMS Aft has no effect until gear is retracted. This safety feature prevents inadvertent chaff/flare dispense during taxi or landing.	Dash-34, section 2.7.2.1	TBD

5.2.4   Important Operational Notes

The CMS provides rapid, tactile access to CMDS program selection and ECM transmit authority without requiring the pilot to manipulate distant panels during high-G maneuvering. Mastery of CMS actuation across all CMDS modes (MAN, SEMI, AUTO) and ECM configurations (external pod, IDIAS) is essential for effective defensive operations. Pilots must understand the consent state model, RF switch interactions, and inventory management to avoid unintended dispensing or system saturation.

Consent State Tracking

In AUTO and SEMI modes, the CMDS tracks the consent state even if the pilot temporarily switches to MAN mode. If the pilot gives CMS Aft consent in AUTO, then switches the CMDS MODE knob to MAN, the consent state is retained. Upon re-engaging AUTO without issuing CMS Aft again, the CMDS will immediately begin dispensing if a threat is detected. This behavior can be exploited for rapid mode switching during combat but may also lead to unintended dispensing if not carefully managed.

Bingo Quantity Behavior

If expendables (chaff or flare) fall to or below the bingo quantity, the CMDS will still request consent (CMS Aft) and continue dispensing. The "LOW" and "OUT" voice messages alert the pilot to low or

exhausted inventory, but dispensing does not automatically stop. Pilot must monitor EWS upfront pages and manually manage inventory via CMDS MAN or by pressing CMS Right to inhibit AUTO.

RF Switch Override

The RF switch on the throttle is a master control for ECM transmission. Moving the RF switch away from NORM (e.g., to QUIET or SILENT) overrides any previous CMS Aft command and places both the external ECM pod and internal IDIAS in Standby. Returning RF to NORM does *not* automatically restore transmission; the pilot must re-issue CMS Aft.

ECM Consent vs. CMDS Consent

A single CMS Aft press grants consent to both the ALE-47 CMDS and the external ECM pod (if installed). The pilot does not issue separate commands; the CMS Aft action is unified. However, internal IDIAS uses CMS Left for mode cycling, not CMS Aft. This distinction is critical for aircraft configured with IDIAS.

Ground Operations Safety

On the ground, ECM pods are held in Standby for safety reasons. Pilots must not hold CMS Aft while on the ground in the vicinity of personnel, as the ECM pod may radiate and pose a hazard. Ground personnel must be clear before the pilot engages ECM for pre-flight high-level BIT (Built-In Test). Once airborne, ECM consent (CMS Aft) can be issued and maintained as tactically required.