HEADQUARTERS 20TH AIR DIVISION (ADC) CEM MAINTENANCE OPERATING
Fort Lee AFS, Virginia INSTRUCTION NO. 55-19
1 June 1970

Operations

AN/FSQ-7 COMPUTER OPERATING INSTRUCTIONS

This MOI provides guidance and procedures for computer operators. It is applicable to all direction center (DC) computer maintenance personnel.

1. Procedures:

a. The attachments to this CEM MOI constitute the operating procedures for the AN/FSQ-7 computer. Computer maintenance personnel will become familiar with these procedures and comply as closely as possible when operating the computer.

b. Errors, omissions, corrections and additions should be brought to the attention of the NCOIC, Direction Center CEM Maintenance and the Direction Center CEM Maintenance Officer.

2. Index:

This CEM MOI supersedes CEM MOI 55-19, dated 4 Oct 67.
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Initiation and Switchover of DCA

1. General:

a. Due to downtime or malfunction on the various peripheral equipment associated with the computer, there are several methods of initiating and swit ing DCA. This attachment outlines various methods of initiating and switching DCA, giving the advantages and disadvantages of each method. Operating per sonnel must be thoroughly familiar with each method so that the proper decisi can be made when action is required to maintain the cycling of DCA.

b. Equipment set up for the normal DCA operation:

(1) Tape selections.

(a) #1 operational DCA tape.

(b) #3 MORT tape.

(c) #4 MORT tape.

(d) #5 operational DCA tape.

(2) Plugboard locations.

FAST (Red) operational plugboard in test memory.

c. Before the initiation of DCA, the initiating of DCS or the initiation of standby control in preparation for a switchover, all drums on the applicable computer will be cleared with the drum clear program (reference PGM write-up T.O. 31S5-2FSQ7-8-217).

2. Procedures:

a. Initiation of DCA:

(1) Set up instructions. Octal correction cards for DCA may be loaded concurrently with this set up. See attachment 5-3 for details on octal loading procedures.

(a) Equipment set up as described in items 1b and 1c above.

(b) Duplex switching console; depress the "set time" PB and activate.

(c) With the test memory switch in the unassigned position, depress "start from test memory" push button or with the CSP 2A initiate car in the card reader, depress "load from card reader" push button.

(d) Insert the correct time, month, day and year in the buttons of the lower modules of the utility control console (UCC). Depress the activate PB when DD at UCC indicates to insert time.

(e) Verify the time is correctly entered by observing the tim block on the situation display.

(f) Clear all buttons on the UCC and the duplex switching cor soles.

(g) Place the "stop-branch" switch to "branch" and the "mem ory parity" and "inactivity" switches to "active" on the duplex maintenance co sole. Place the computer "test/operate" switch to "operate" and the "CC dru alarm activate enable/disable" switch to "enable". Place the "outputs G/A TI switch to the "single channel" position.

(2) Comments: This method can be used to initiate DCA on a com- puter when neither computer had previously been cycling DCA. It can also be used to initiate DCA on the standby computer when the active computer has ma functioned. It has the distinct advantage of permitting rapid recovery in the event of error. It automatically returns the DCA tape to load point. When us "start from test memory" push button, the DCA tape must be on selection "1"

b. Normal or scheduled switchover using DCA:

(1) Set up instructions. Octal correction cards for DCA may be loaded concurrently with this set up. See attachment 5-3 for details on octal loading procedures.

(a) Manual erase drums.

(b) Equipment set up as described in 1b and 1c above.

(c) Read the CSP 5A standby control card into the computer. This will read DCA into the computer from tape drive 1 or 5 and the computer will automatically come up in the Alert mode of duplex operation. The DID of the duplex switching console will indicate the time of all safe date transfers, their merit and the mode of operation (see FAST (DCA) Manual for explanatior of DID displays).

(d) When DCA has completely read in and the DID on the duplex switching console has indicated a successful safe data transfer, depres "scheduled switchover" on the UCC and activate the console. The DID on the DSU will indicate the scheduled switchover push button was pushed and the computer will then start the transfers of the tables and drum fields. After this has been completed, the DID on the DSU will indicate on the third line. SWOV and the fourth line will indicate the status of the transfers (see DID explanations). At this time, the operator will push the Active button on the DSU and DCA will automatically cycle in the newly active computer.

(2) Comments. This method will normally be used when making scheduled or continued mode switchovers. If, for any reason, the operator wishes to cancel the switchover, he may depress "Abort SWOV" push button on the UCC and activate the console and the program will return to Duplex operation.

c. Normal or scheduled switchover using DCS:

(1) Set up instructions:

(a) Manual erase drums.

(b) Equipment set up as described in items 1b and 1c above except a DCS tape will be placed on tape selection #2.

(c) Read the DCS program into the computer by reading the DCS one card load through the reader into the computer or place the DCS call plugboard in test memory and depress "start from test memory" on the maintenance console. (this method reading DCS into the computer should only be used when the card reader is not available).

(d) When the DCS program has read into the computer, the DID on the UCC will inform the operator to make initial entry. At this time, the operator will depress "alert" and "scheduled switchover" buttons and then activate the console.

(e) The DCS program will read in the DCA program into the computer and transfer all required information from the active computer to th standby computer. When this has been completed, the DID on the DSU will inform the operator that he may switchover (see DID explanations). Then the operator will depress the "active" button on the DSU and the DCA program wi automatically start over and cycle on the newly active computer.

(2) Comments: This method can be used for all normal or schedul switchovers when the DCA program is to be started over in the continued mod in the newly active computer. This method can also be used to switchover wh the active computer is malfunctioning, still cycling and some information can transferred to the standby computer. If the standby computer cannot obtain a the required information from the active computer, the DCS program will aut matically downgrade the startover to either re-establish or initiate depending upon the amount of information received. If, for any reason, the operator wi to cancel the switchover, he may do so by depressing "Rest Sys" button on the UCC and activate the console. This will return the computer to the duplex co figuration with DCS in control. This method of duplex operation and switchov would not normally be used unless there is a reason to be running maintenanc programs from the DCS tape.

Forced Initiate Startover

1. Procedures: Set up instructions. Set up to load octal corrector cards if required (see procedure for loading octal cards).

a. Duplex switching console. Depress the "initiate" and "set time" butt

b. Duplex maintenance console.

(1) Raise the "inactivity" switch.

(2) Press the "program stop" button.

c. Duplex switching console. Activate the console.

d. Depress load from AM drums.

e. Utility control console.

(1) Insert the correct time, month, day and year in lower button modules.

(2) Activate the console upon request of DSU.

(3) When program is cycling, clear all buttons.

f. Duplex maintenance console. Place the "inactivity" switch to "active position.

2. Comments: This method can be used on the active computer when there i: a malfunction in the program or there is reasonable suspicion that the prograı is incorrect, e.g. erroneous displays on either the SID or DD display. This mode of startover will always be cleared through maintenance control prior tc taking the action unless it is an emergency condition in which DCA will not cyc

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Re-establish Startover

1. Procedures:

a. Set up instructions. Set up and load octal correction at same time if octal cards are required. See procedure for details to load octal correction cards.

(1) Duplex switching console:

Depress the "re-establish" button.

(2) Duplex maintenance console:

(a) Raise the "inactivity" switch.

(b) Press the "program stop" button.

(3) Duplex switching console: Activate console.

(4) Depress "load from AM drums" button.

(5) Duplex maintenance console: Place the "inactivity" switch down.

b. Check computer time with WWV and reset if necessary.

2. Comments: This method can be used on the active computer when there is a malfunction in the program or there is reasonable suspicion that the program is incorrect, e.g. erroneous displays on either the SID or DD display. This mode of startover will always be cleared through maintenance control prior to taking the action unless it is an emergency condition in which DCA wil not cycle.

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General Duties of Console Coordinator

1. Monitor the status of all out-of-service equipment. Complete the mainte ance documents for equipment malfunctions.

2. Make normal switchovers as prescribed by computer schedule or as requ ted by utilizing agencies with the permission of the senior director.

3. In the event of computer malfunctions, make a switchover if required. C dinate through MC if circumstances permit (before the switchover).

4. Complete one (1) copy of the lost time report in the event of unscheduled maintenance or two (2) copies of the report in the event of lost air defense.

5. Monitor the tape drives and load/unload tapes for the most efficient utiliz of the active and standby computers.

6. Be aware of the active and standby computer status by monitoring the dis alarms, "fix" printouts, inputs, etc.

7. During computer malfunctions, take pictures of the problem(s) for furthe analysis if necessary.

8. Start/stop the camera console operation as requested by operations.

9. At 0000Z the first day of each month, set time on the active computer. T is required to update the month and reset the day to the first of the month.

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Loading and Dumping Octal Corrections to DCA

1. Octal correction cards may be loaded/unloaded on any startover during DCA. Approval must be obtained from the senior director (via MCC) prior to stopping DCA to load/unload corrections. Octal correction cards must be verified and signed by a division computer programmer.

2. The following procedures are to be utilized in loading octals. These procedures are applicable to loading of octals during initiate startovers, reestablish startovers, continuous mode startovers and to the initial cycle of the standby control program for continuous or emergency switchovers.

a. Place the octal correction cards in the reader and ready the reader (behind the initiate card of standby control call cards).

b. Insure that the printer is ready.

c. Assign test memory and place a "7" in the right "A" switches.

d. Sense switch #2 prevents DCA from checksumming drums during a continuous mode startover; therefore, this switch is required to be depressed only if you are required to load octals to a computer with other octals previously loaded. This prevents the loss of the previously loaded octals. Normally, depress sense switch #2 after the octals have been loaded to a computer.

e. Raise the "inactivity" switch and depress "program stop". (provided that the computer is cycling DCA at this time).

f. Load from AM drums or load from card reader or start from test memory depending upon the operation involved.

g. When the computer is cycling, set sense switch #2 and depress the inactivity switch.

h. Compare the octal cards with the printout to verify correct loading of the octals. If the octal cards do not compare with the printout, reload the oc

3. To dump octal correctors in DCA, simply clear sense switch #2 and force continuous mode startover by loading from AM drums. Octal correctors may dumped and new corrections inserted during one operation. Generally, it is preferable to dump and reload all octals when any changes are to be made. This gives the DCA program a chance to check load all the programs, thereby insuring greater reliability.

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Setting Computer Time

1. When to set time: Computer time will be checked and set if necessary at the following times:

a. On the first alert status change of all missions and exercises.

b. On the first day of each month at 0000Z.

c. At the request of maintenance control.

d. Anytime that a variation of one minute or more is noted between computer time and actual zulu time.

2. Procedures: The following actions will be taken to set time in the compu

a. Depress the "dynamic set time" button in the "action" module of the utility control console (button 3 of the action/op mode module).

b. Insert zulu time, month, day and year in the lower button modules o the utility control console.

c. Push the "activate" button when the minute hand on the wall clock dr backward.

d. Time has been entered. Read the time block on the situation display check the accuracy of the entry. The situation display time will update in ap ximately nine (9) seconds.

3. Precautions:

a. Insure that all involved agencies are aware of the difficulties arising from resetting computer time. Setting time back during missions, PACE flig etc. which require data reduction will cause complications. Coordinate with air surveillance officer to stop MORT recording for the time period involved required to meet reduction objectives. This will simplify the reductions con erably.

4. To check the day, month and year, DCS must be loaded and the standby s The date will appear with the heading printout on the line printer.

5. To obtain the correct time, call the post telephone time service at exten (9) 4075. The time is given at (15) fifteen second intervals.

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SSTM Output Switch

1. Purpose: To clarify the reason for the operation of the SSTM channel sta switch, more commonly known as the SSTM output switch.

a. The use of the SSTM output switch will provide the standby side with limited output capability and enable this division to participate in division and regional SSTMs with the use of the standby rather than the active computer. Except for unique requirements during such SSTMs, it will also do away with the need for loading the lost card in support of hip-pocket air defense with the use of the standby computer.

2. Procedures: After the SSTM is up and cycling on the standby computer, place the SSTM output switch, 1D3 (S2) at the active duplex maintenance console in the SSTM position. This action causes the following:

a. The transfer of the output phone lines for G/G channels 1, 2, 3 and 4 (lateral tell, backtell, forward tell and AADCPs) and teletype channels 1 thru 10 from the active to the standby computers.

b. The normally lit Active light, 1D3 (41) - green lens, will go out.

c. The normally extinguished SSTM lights, 1D3 (4x2) - red lens, to ligh up on both the active and standby duplex maintenance consoles.

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Fix Dump

1. DCA will operate with the capability of dumping core memory on tape in the event of an inactivity situation.

2. Depress fix dump button at the duplex switching unit. If fix is entered wh an inactivity occurs, the program will check for this insertion and if found, w dump Core on the Mort tape in 16 records of 4,097 words each. If the button not depressed, there will be no Core dump. No activate action is required wi this action.

3. If Core is dumped, the Mort tape will be saved for 20OPM, who will use "fix data retrieval program" to process the Fix inactivity core dump. This in mation can be extremely useful in locating problems in the DCA program, as as determining possible machine malfunctions.

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Change Tape Action and Writing "End of File" on MORTs

1. Procedures for writing end of file on MORT tapes (change record tape) w DCA cycling:

a. General - This procedures is used when it becomes necessary to rer a MORT that is being recorded:

b. Procedures:

(1) At the DSU, clear the key modules.

(2) Depress the change record tape button.

(3) Activate the DSU.

(4) The NIFA indicator will light on the selected drive and DCA wi begin to record on the other selection.

(5) At the DSU, restore all buttons to their original configuration.

2. Procedures for writing end of file on a MORT tape when this operation is included in the program being used:

a. At the DMC, raise the inactivity switch, depress program stop (if th computer is in compute).

b. Assign test memory and set the following test memory switches:

(1) Left "A" switches.

(a) 0.06213 if recording on TDU #3.

(b) 0.06214 if recording on TDU #4.

(2) Left "B" switches.

(a) 0.00172 (write EOF).

c. Depress start from test memory.

d. An end of file will be written on the selected tape.

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Power Up Procedures

The following procedures are to be used as general guidelines to recycle duple power to a computer:

a. After a power failure or a scheduled power outage, open the AC input switches to both main and auxiliary drums.

b. Obtain approval from power plant personnel to recycle power. Depre: the AC Only push button firmly. If power fails to recycle properly, inform th power plant personnel and check our system for failure indications. Do not attempt to recycle power until the OK is received from power plant.

c. Allow a maximum of 10 minutes to warm up the filaments prior to applying DC to the loads.

d. Request unregulated AC be reapplied if required.

e. Check and insure filament voltages are set to 120 volts AC.

f. After the filament warmup has elapsed, depress the power on push button. There is no requirement to notify the power plant prior to this action. All units may have DC applied at the same time via the Power On push button.

g. Apply power to the drum motors. Do not attempt to cycle main and a iliary drums at the same time.

h. Repair any obvious failures, then begin the computer checkout with ADIOS-AUOC. Once a failure is detected, run any program that may help sol the problem. AUOC will give an overall analysis; therefore, possibly enablin two problems to be worked on simultaneously. Marginal check program passe are desirable if they can be accomplished during the troubleshooting and repai ing of other areas of the computer.

i. Closeout the ESR after AUOC has cycled error-free for 10-15 minute

NOTE: If a sensitrol is pinned because a power supply was shorted out or ma functioned, the input circuit breaker to the specified power supply will be trip and possibly a sensitrol fuse blown. Check before recycling.

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Reaction to AN/FSQ-7 Air Conditioning Failures

The purpose of this attachment is to establish procedures for removing power to electronic equipment affected by the loss of air conditioning.

a. The air temperature entering the computer is approximately 60 degr The exhausted air is seventy-seven degrees. The AN/FSQ-7 computer syster has four independent air conditioning systems. The "A" and "B" computer sy tems are simplex. A failure of either system may require the shutdown of th associated computer. The computer is expected to be capable of continuing o ation until the temperature reaches 100 to 120 degrees. The input section anc operational display consoles utilize a separate duplex air conditioning system An automatic switchover should occur if either system should fail. Air input the display consoles should not exceed 84 degrees. The reaction time for air conditioning failures must be immediate if complete air flow is lost. Display consoles will overheat in two minutes if air flow is stopped.

b. A 15% reduction of air flow from any system is denot ed by a flashing amber light on the mimic panel (no audible alarm). This is a warning conditi The computer operator will contact utility maintenance to determine if the sy tem may be in eminent danger of failing. Monitor the affected area for possit problems.

c. A 50% reduction of air flow or a temperature increase of five degree will constitute a failure and will be denoted by an audible alarm and a flashing red light indicating the section of equipment that is affected (see Field Techni Instruction FTI 492 for description of mimic panel). Utility maintenance also gets these same alarms and as soon as they acknowledge the alarm, the audib alarm will cease. If the failure condition still exists after acknowledgement, the indicator light for the computer section concerned will glow very bright. The computer operator will:

(1) Make an immediate check to determine the extent of the failure Contact utility maintenance for clarification if any doubt exists as to the statu of the equipm ent.

(2) Notify the senior director via MCC of the pending problem.

(3) Make an emergency switchover for the protection of the air pic if required.

d. Monitor the area affected for possible signs of trouble. If the failur affects the display consoles, remove power to all non-essential units.

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e. Notify the senior director prior to removing power unless an emergency condition exists. During simplex operation or air emergency, the SD may require the computer system until an actual failure occurs.

f. Remove power if conditions approach those listed in paragraph a. Utility maintenance will notify the computer operator when the input air has risen to 68 degrees. Do not wait for this notification or conditions as indicated in paragraph a, if the situation warrants an earlier shutdown.

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Solar Data Reduction

1. It is the responsibility of the computer maintenance section to perform sc data reduction when required. Necessary program tapes and cards will be fu nished by workload control.

2. Procedures: For proper operation, follow this procedure in the sequence follows:

a. Place the SDC PRT PU EDITOR plugboard in the printer.

b. Place the STO tape on tape drive #1 and DLO tape on tape drive #6.

c. Clear drums.

d. Place drums in operate, assign test memory, clear "A" and "B" swi make all sense and alarm switches inactive.

e. Place solar deck in card reader, master reset and load from card re

f. Place site ID in the left "A" switches, in the following format:

Site	Site ID
Z54	L3 active
Z56	L8 active
Z62	L1 active
Z112	L11 active
Z113	L6 active
Z114	L7 active
Z115	L2 active
Z117	L12 active
Z121	L5 active
Z129	L9 active
Z130	L10 active
Z209	L13 active
Z210	L14 active
Z227	L4 active

g. Make RS and R1 active in the "B" switches. If printout is desired, n R2 active.

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h. At the UCC, under the program sel mode, make the sixth button fron the bottom active (this indicates the range to the program).

i. At the UCC, set the time, date and year for each site as furnished by workload control.

j. Depress the activate button at the UCC.

k. Allow the program to cycle for exactly 60 seconds, then raise RS and R1 of the "B" switches. This will halt the program.

l. When the program has halted, lower RS and R1 and depress continue. The program is now in a sub-routine, waiting action at the UCC.

m. At the UCC, set time, date and year, if sunrise time has just been completed, and a sunset time is required, proceed with the sunset time, allowing the computer to cycle exactly 60 seconds each time the activate button at t UCC is depressed.

n. Complete all dates and times for one site before proceeding to the ne Repeat the above procedure for each site requested.

3. Return the STO tape, program cards and DLO tape to workload control.