

UNCLASSIFIED

ACP 160 (A)

IFF/SIF OPERATIONAL  
PROCEDURES (U)  
ACP 160 (A)

JANUARY 1978

30.01.78

FOREWORD

1. ACP 160 (A), IFF/SIF OPERATIONAL PROCEDURES, IS AN UNCLASSIFIED ALLIED COMMUNICATIONS PUBLICATION (ACP). ACP 160 (A) WILL BE EFFECTIVE WHEN DIRECTED FOR NATIONAL OR ALLIED USE BY THE IMPLEMENTING AGENCY. WHEN EFFECTIVE, ACP 160 (A) WILL SUPERSEDE ACP 160, WHICH SHALL BE DESTROYED IN ACCORDANCE WITH CURRENT SERVICE REGULATIONS.
3. THIS PUBLICATION CONTAINS ALLIED MILITARY INFORMATION AND IS FURNISHED FOR OFFICIAL PURPOSES ONLY.

THE JOINT CHIEFS OF STAFF  
WASHINGTON, D.C. 20301

30.01.78

US NATIONAL LETTER OF PROMULGATION  
FOR ACP 160 (A)

1. THE PURPOSE OF THIS US NATIONAL LETTER OF PROMULGATION IS TO IMPLEMENT ACP 160 (A) WITHIN THE ARMED FORCES OF THE UNITED STATES. ACP 160 (A), IFF/SIF OPERATIONAL PROCEDURES, IS AN UNCLASSIFIED PUBLICATION DEVELOPED FOR ALLIED USE AND, UNDER THE DIRECTION OF THE US JOINT CHIEFS OF STAFF, IS PROMULGATED FOR GUIDANCE, INFORMATION, OR USE OF THE ARMED FORCES OF THE UNITED STATES AND OTHER USERS OF US MILITARY COMMUNICATIONS FACILITIES.
2. ACP 160 (A) WILL BE MADE EFFECTIVE WHEN DIRECTED BY THE RESPECTIVE IMPLEMENTING AGENCIES AND, WHEN EFFECTIVE, WILL SUPERSEDE ACP 160, WHICH SHALL BE DESTROYED IN ACCORDANCE WITH CURRENT SERVICE REGULATIONS. THOSE UNITS ATTACHED OR SCHEDULED FOR SERVICE WITH AN INTERNATIONAL ORGANIZATION SHALL NOT DESTROY ACP 160 UNTIL ACP 160 (A) BECOMES EFFECTIVE WITHIN THE INTERNATIONAL ORGANIZATION. THE EFFECTIVE STATUS OF THIS PUBLICATION WILL BE SHOWN BELOW. FURTHER IMPLEMENTING INFORMATION, WHEN PROMULGATED, SHALL BE FILLED IN BY THE USER.

EFFECTIVE STATUS

PUBLICATION	EFFECTIVE FOR	DATE	AUTHORITY
ACP 160 (A)	NATO	04.02.80	TV.....

3. FOREIGN RELEASE OF THIS PUBLICATION IS AUTHORIZED AS CONTAINED IN CA-27 SERIES.

4. CORRESPONDENCE CONCERNING THIS PUBLICATION SHOULD BE ADDRESSED AS FOLLOWS:  
A. SERVICE-ORIGINATED CORRESPONDENCE WILL BE FORWARDED THROUGH THE NORMAL MILITARY CHAIN OF COMMAND, MARKED FOR THE ATTENTION OF THE APPROPRIATE SERVICE COMMUNICATIONS DIRECTOR, AS LISTED BELOW, AND WILL NOT BE ADDRESSED TO THE US JOINT CHIEFS OF STAFF:

- ARMY (1) DIRECTOR, TELECOMMUNICATIONS AND COMMAND AND CONTROL, US  
(2) DIRECTOR, NAVAL COMMUNICATIONS, US NAVY  
(3) DIRECTOR OF TELECOMMUNICATIONS, AND COMMAND AND CONTROL RESOURCES,

US AIR FORCE.

B. DEFENSE, NATIONAL, AND FEDERAL AGENCIES, AS WELL AS OTHER RECIPIENTS OF THIS PUBLICATION, SHOULD ADDRESS THEIR CORRESPONDENCE TO THE CHAIRMAN, US MILITARY COMMUNICATIONS-ELECTRONICS BOARD, JOINT CHIEFS OF STAFF, THE PENTAGON, WASHINGTON, D.C. 20301.

FOR THE US JOINT CHIEFS OF STAFF:  
F.R. VAN LAETHEM  
COLONEL, US ARMY  
MILITARY SECRETARY, MCEB

SEGUE PROSPETTO: RECORD OF CHANGES AND CORRECTIONS CONSULTABILE A PG. 50167.

## TABLE OF CONTENTS

TITLE PAGE .....	I
FOREWORD .....	III
LETTER OF PROMULGATION.....	V
RECORD OF CHANGES AND CORRECTIONS .....	VII
TABLE OF CONTENTS .....	IX
CHAPTER 1 GENERAL INSTRUCTIONS	
101 PURPOSE .....	1-1
102 SECURITY CLASSIFICATION .....	1-1
103 OBSERVATION OF SIF TRANSPONDERS BY BASIC INTERROGATORS.....	1-1
CHAPTER 2 IFF SYSTEMS	
201 BASIC IFF MARK X SYSTEMS .....	2-1
202 IFF MARK X SELECTIVE IDENTIFICATION FEATURE (SIF) .....	2-1
203 IFF MARK X (A) .....	2-1
204 IFF MARK XII .....	2-1
CHAPTER 3 IFF/SIF COMMON OPERATING CHARACTERISTICS	
301 DESCRIPTION .....	3-1
302 OPERATION .....	3-2
CHAPTER 4 CONTROL PHRASEOLOGY	
401 IFF SYSTEM CODE WORDS .....	4-1
CHAPTER 5 TECHNICAL SPECIFICATIONS	
501 GENERAL .....	5-1
502 BASIC IFF MARK X .....	5-1
503 IFF MARK X (SIF) .....	5-1
504 IFF MARK X (A) .....	5-1
505 IFF MARK XII .....	5-1
CHAPTER 6 IFF CONTROL .....	6-1
CHAPTER 7 RESPONSIBILITY	
701 COMMANDERS' RESPONSIBILITY .....	7-1
LIST OF EFFECTIVE PAGES .....	LEP-1

## CHAPTER 1 GENERAL INSTRUCTIONS

### 101. PURPOSE

THE PURPOSE OF THIS PUBLICATION IS TO BRIEFLY DESCRIBE IFF SYSTEMS AND TO PROVIDE A BASIS FOR ESTABLISHING OPERATIONAL PROCEDURES AND EQUIPMENT POLICY. IFF SYSTEMS HAVE BEEN ADOPTED FOR THE PRIMARY FUNCTION OF ASSISTING IN THE RAPID AND POSITIVE IDENTIFICATION OF FRIENDLY UNITS AND SECONDLY ASSISTING IN THE TRACKING AND CONTROL OF AIRCRAFT. ALTHOUGH CONSIDERED AN IDENTIFICATION DEVICE, IFF SYSTEMS MUST BE USED IN CONJUNCTION WITH OTHER MEANS (E.G., RADARS, FLIGHT PLAN CORRELATION, VOICE AUTHENTICATION, ETC.) TO PROVIDE IDENTIFICATION OF FRIEND-FROM-FOE.

### 102. SECURITY CLASSIFICATION

A. IFF EQUIPMENT AND RELATED TECHNICAL INFORMATION IS UNCLASSIFIED, WITH THE

EXCEPTION OF TECHNICAL DATA ON SECURITY EQUIPMENT FOR IFF MARK XII, WHICH IS CONFIDENTIAL.

B. DOCUMENTS CONTAINING INFORMATION ON THE TACTICAL USE OF IFF EQUIPMENT (INCLUDING DOCTRINE AND PROCEDURES) WILL BE CLASSIFIED SECRET.

C. DOCUMENTS CONTAINING GUIDANCE (INCLUDING DOCTRINE AND PROCEDURES) FOR ONLY NON-TACTICAL (I.E., AIR TRAFFIC CONTROL, AIR/SEA RESCUE) EMPLOYMENT OF IFF SYSTEMS WILL BE UNCLASSIFIED.

103. OBSERVATION OF SIF TRANSPONDERS BY BASIC INTERROGATORS  
OPERATORS SHOULD BE ADVISED OF THE APPROXIMATE PARAMETERS OF SIF RESPONSES, I.E., A DISPLAYED PULSE TRAIN THAT APPEARS ON THE OPERATOR'S DISPLAY TO BE APPROXIMATELY TWO NAUTICAL MILES IN LENGTH (RANGE) FOR A NORMAL SIF RESPONSE AND FOUR-FOLD REPETITION OF THIS EXTENDING OVER EIGHT NAUTICAL MILES (APPROX) FOR AN EMERGENCY SIF RESPONSE. OPERATORS SHOULD APPRECIATE THE DISTINCTION BETWEEN A NORMAL OR AN I/P MARK X (SIF) PULSE TRAIN AND A BASIC IFF MARK X EMERGENCY RESPONSE-FOUR SEPARATE PULSES EMBRACING FOUR AND ONE-HALF NAUTICAL MILES AS INDICATED ON THE OPERATOR'S DISPLAY (MORE THAN TWICE THE SIZE OF A NORMAL SIF RESPONSE), BUT NOT VERY DISSIMILAR FROM AN I/P SIF RESPONSE ON MODE 1 WITH CODE "00". THE FIRST PULSE OF ALL SIF PULSE TRAIN RESPONSES CAN BE MADE TO APPEAR AT THE APPROPRIATE RANGE RELATIVE TO A RADAR RESPONSE COMPATIBLE WITH "BASIC" IFF RESPONSES.

## CHAPTER 2 IFF SYSTEMS

### 201. BASIC IFF MARK X SYSTEMS

BASIC IFF MARK X IS THE OLDEST IFF SYSTEM STILL IN OPERATIONAL USE BY FRIENDLY NATIONS. IT HAS THE ABILITY TO REPLY BY MODE ONLY (NO CODES ARE AVAILABLE FROM THE TRANSPONDER). IDENT (I/P) AND EMERGENCY FEATURES ARE AVAILABLE. A LOW RECEIVER SENSITIVITY POSITION IS ALSO AVAILABLE. CERTAIN NATIONS RESTRICT THE USE OF THE BASIC MARK X IFF TRANSPONDER EQUIPPED AIRCRAFT.

### 202. IFF MARK X SELECTIVE IDENTIFICATION FEATURE (SIF)

TO IMPROVE THE FLEXIBILITY FOR OPERATIONAL USE OF THE BASIC IFF MARK X SYSTEM, THE IFF MARK X SELECTIVE IDENTIFICATION FEATURE (SIF) WAS ADOPTED. THE SIF ADDS REPLY PULSE CODING TO THE BASIC IFF MARK X SYSTEM, AND PROVIDES ADDED CAPABILITY FOR PERFORMING IDENTIFICATION, AND THE TRACKING AND CONTROL OF FRIENDLY AIRCRAFT. THE SIF ADDITION TO BASIC IFF MARK X, BECAUSE OF ITS LOW INHERENT SECURITY, DOES NOT PROVIDE IDENTIFICATION OF FRIEND-FROM FOE. THE NUMBER OF CODES AVAILABLE IN MODERN EQUIPMENT IS 32 IN MODE 1, 4096 IN MODE 2, AND 64 IN MODE 3. IDENT (I/P) AND EMERGENCY FEATURES ARE ALSO AVAILABLE.

### 203. IFF MARK X (A)

IFF MARK X (A) IS ESSENTIALLY THE SAME AS IFF MARK X (SIF) EXCEPT THAT MODE 3 PROVIDES 4096 CODES AND SECONDARY SURVEILLANCE RADAR (SSR) MODE C WHICH PROVIDES FOR AUTOMATIC PRESSURE ALTITUDE REPORTING.

### 204. IFF MARK XII

IFF MARK XII EQUIPMENT IS COMPATIBLE WITH IFF MARK X (SIF) AND IFF MARK X (A). IN ADDITION TO MODES 1 THROUGH 3 OF IFF MARK X, A FOURTH MODE OF OPERATION, MODE 4, HAS BEEN ADDED. MODE 4 ADDS SECURITY EQUIPMENT TO THE IFF SYSTEM. IFF MARK XII CONTAINS MODE C WHICH PROVIDES FOR AUTOMATIC PRESSURE ALTITUDE REPORTING.

## CHAPTER 3 IFF/SIF COMMON OPERATING CHARACTERISTICS

### 301. DESCRIPTION

A. BASIC. IFF SYSTEMS CONSIST OF INTERROGATORS, TRANSPONDERS, PROCESSING EQUIPMENT, AND RELATED ANTENNA SYSTEMS. THE ANTENNAS MAY OR MAY NOT BE ASSOCIATED WITH, OR SLAVED TO, A PRIMARY SURVEILLANCE RADAR.

IN OPERATION AN INTERROGATION PULSE PAIR OR PULSE TRAIN TRANSMITTED FROM THE

INTERROGATOR TRANSMITTER UNIT TRIGGERS EACH TRANSPONDER LOCATED IN THE DIRECTION OF THE MAIN BEAM CAUSING A REPLY TO BE TRANSMITTED BY THE TRANSPONDER(S). THESE REPLIES ARE RECEIVED BY THE INTERROGATOR RECEIVER AND AFTER PROCESSING ARE DISPLAYED TO THE OPERATOR. MEASUREMENT OF THE TIME BETWEEN TRANSMISSION OF THE INTERROGATION PULSE AND RECEIPT OF THE TRANSPONDER REPLY DETERMINES THE RANGE OF THE REPLYING TRANSPONDER WHILE THE MEAN DIRECTION OF THE MAIN BEAM OF THE INTERROGATOR ANTENNA, DURING THE REPLY, DETERMINES THE AZIMUTH. THE ARRANGEMENT OF THE MULTIPLE-PULSE REPLY PROVIDES IDENTITY INFORMATION AND, IN CERTAIN CASES, PRESSURE ALTITUDE OF THE RESPONDING AIRCRAFT.

B. MODES. TO DIFFERENTIATE BETWEEN INTERROGATIONS FOR DIFFERENT PURPOSES, SEVERAL MODES OF OPERATION HAVE BEEN ADOPTED. TECHNICAL DETAILS OF CIVIL MODES ARE CONTAINED IN ANNEX 10 TO THE ICAO CONVENTION. TECHNICAL DETAILS OF MILITARY MODES ARE CONTAINED IN NATO DOCUMENT STANAG 5017 AND/OR NATIONAL DOCUMENTS. IN THE MILITARY ENVIRONMENT, THERE ARE FOUR MODES OF OPERATION KNOWN BY ARABIC NUMERALS AS MODES 1 THROUGH 4. IN THE CIVIL AIR TRAFFIC CONTROL ENVIRONMENT, IFF IS CALLED SECONDARY SURVEILLANCE RADAR (SSR). THE CIVIL MODES ARE KNOWN BY LETTER DESIGNATORS AS MODES A, B, C, AND D. THE BASIC CIVIL SSR MODE IS MODE A AND IS IDENTICAL IN MOST CHARACTERISTICS TO THE MILITARY MODE 3; AS A CONSEQUENCE, THIS MODE IS COMMONLY REFERRED TO AS MODE 3/A. MODES 3 AND A DIFFER MAINLY IN THE CHARACTERISTICS OF THEIR EMERGENCY RESPONSE. THE SECOND CIVIL SSR MODE IS MODE B WHICH HAS VERY LIMITED USAGE AND HAS NO MILITARY EQUIVALENT. MODE C IS RESERVED FOR AUTOMATIC PRESSURE ALTITUDE TRANSMISSION. USE OF THE FOURTH CIVIL SSR MODE, MODE D, HAS NOT BEEN DETERMINED INTERNATIONALLY. MILITARY MODES 1, 2 AND 4 ARE NOT USED IN THE CIVIL SSR SYSTEM.

C. IDENT FUNCTION. IN ADDITION TO SELECTING THE MODE TO WHICH THE TRANSPONDER WILL REPLY AND THE CODE SETTING WITHIN THAT MODE, AIRCREWS CAN ADD TO THE REPLY. ONE ADDITION IS THE IDENTIFICATION OF POSITION (I/P) OR SPECIAL POSITION IDENTIFICATION (SPI) FEATURE. WHEN SELECTED IN MODE 1, TWO PULSE TRAINS CONTAINING THE CODE IN USE ARE TRANSMITTED. WHEN SELECTED IN MODES 2 OR 3, THIS FEATURE ACTIVATES THE TRANSMISSION OF AN ADDITIONAL PULSE 4.35 MICROSECONDS AFTER THE LAST FRAMING PULSE.

D. EMERGENCY FEATURE. THE EMERGENCY RESPONSE FEATURE MAY BE SELECTED BY THE AIRCREW TO CAUSE THE TRANSPONDER TO REPLY TO ANY MODE OF INTERROGATION WITH A DISTINCTIVE REPLY OF FOUR PULSE TRAINS SPACED 4.35 MICROSECONDS BETWEEN TRAINS. IN MORE MODERN IFF SYSTEMS, THE EMERGENCY RESPONSE FEATURE OF THE 4096 CODE CAPABLE MODE 3/A RADAR BEACON SYSTEM WILL BE CODED 7700 FOR CIVIL AIRCRAFT IN ALL RESPONSES AND 7700 IN THE FIRST TRAIN OF A FOUR-TRAIN RESPONSE FOR MILITARY USERS. MANY EXISTING MILITARY TRANSPONDERS (MARK X/SIF) MAY TRANSMIT THE OPERATING CODES FOUR TIMES OR TRANSMIT CODE 0000 FOR THE LAST THREE TRAINS. IFF MARK XII MODE 3/A WILL PROVIDE CODE 7700 IN THE FIRST TRAIN FOLLOWED BY THREE TRAINS OF CODE 0000. ADDITIONALLY, CODE 7600 SHALL BE USED ON MODE 3/A TO PROVIDE RECOGNITION OF AN AIRCRAFT WITH RADIO COMMUNICATION FAILURE. CODE 7500 SHALL BE USED ON MODE 3/A TO PROVIDE RECOGNITION OF AN AIRCRAFT HAVING HIGHJACKERS ON BOARD.

### 302. OPERATION

A. THE FOLLOWING MODE OPERATION HAS BEEN ADOPTED FOR WORLDWIDE USE:

(1) MODE 1. KNOWN AS THE GENERAL IDENTIFICATION SIGNAL AND/OR BEACON ASSIST. IN OLDER IFF TRANSPONDERS, MODE 1 IS AUTOMATICALLY SELECTED FOR TRANSMISSION WHEN THE TRANSPONDER IS TURNED ON. IN MORE MODERN IFF TRANSPONDERS, MODE 1 IS AVAILABLE BY SWITCH SETTING. WHEN SIF IS AVAILABLE, AIRCREWS CAN SELECT ANY ONE OF 32 REPLY CODES.

(2) MODE 2. KNOWN AS THE INDIVIDUAL IDENTIFICATION MODE. AIRCREWS CAN SELECT WHETHER OR NOT THE TRANSPONDER WILL REPLY TO MODE INTERROGATION. MODE 2 CODE SELECTION IS NOT READILY AIRCREW SELECTABLE. THERE ARE 4096 CODES AVAILABLE.

(3) MODE 3. AIRCREWS CAN SELECT BY SWITCH SETTING WHETHER OR NOT THE TRANSPONDER WILL REPLY TO MODE 3 INTERROGATION. WITHIN MODE 3 THERE ARE 4096 AVAILABLE REPLY CODES. HOWEVER, SOME OLDER EQUIPMENTS HAVE A REDUCED CAPABILITY IN MODE 3 OF ONLY 64 CODES.

(4) MODE 4. PROVIDES FOR POSITIVE SECURE FRIEND IDENTIFICATION. MODE 4 MAY BE SWITCHED IN OR AUT BY THE AIRCREWS IN ACCORDANCE WITH OPERATIONAL REQUIREMENTS.

(5) IDENTIFICATION OF POSITION (I/P) OR SPECIAL POSITION IDENTIFICATION (SPI). THERE ARE THREE AVAILABLE SWITCH SETTINGS WITHIN THIS FUNCTION. IDENT (I-P) - OUT - MIC. TRANSPONDERS ARE NORMALLY OPERATED WITH THIS SWITCH IN THE OUT POSITION. THE SWITCH IS SPRING LOADED SO THAT IT RETURNS TO THE OUT POSITION WHEN RELEASED FROM THE IDENT (I/P) POSITION. WHEN ACTIVATED IN THE IDENT (I/P) POSITION, THE TRANSPONDER REPLIES WITH A SPECIAL RESPONSE FOR EACH INTERROGATION. THIS CONDITION CONTINUES FOR FROM 15 TO 30 SECONDS AFTER RELEASE OF THE SWITCH, AFTER WHICH THE TRANSPONDER WILL REPLY WITH A NORMAL RESPONSE. THE MIC POSITION OPERATES IN THE SAME MANNER AS THE IDENT (I/P) POSITION, I.E. WHENEVER MIC IS SELECTED AND THE PILOT'S MICROPHONE SWITCH IS DEPRESSED, THE TRANSPONDER REPLIES WITH A SPECIAL RESPONSE LASTING FOR FROM 15 TO 30 SECONDS. IN THOSE AIRCRAFT IN WHICH THE MIC POSITION IS NOT INTERCONNECTED WITH THE RADIO TRANSMITTER, THIS POSITION HAS NO FUNCTION.

(6) EMERGENCY (DISTRESS) FEATURE. THIS SIGNAL RESPONSE IS SELECTABLE BY TRANSPONDER SWITCH SETTING. WHEN SELECTED IT WILL CAUSE THE TRANSPONDER TO REPLY TO EACH INTERROGATION WITH FOUR PULSE TRAINS SPACED 4.35 MICROSECONDS BETWEEN TRAINS. THIS PROVIDES A DISTINCTIVE DISPLAY FOR RECOGNITION BY OPERATORS AT THE INTERROGATING LOCATION. EMERGENCY TRANSPONDER REPLIES WILL CONTINUE TO BE TRANSMITTED WITH EACH INTERROGATION UNTIL THE SWITCH SETTING IS CHANGED BY THE AIRCREW. WHILE THE SELECTION OF THE EMERGENCY SIGNAL BY THE AIRCREW WILL CAUSE THE TRANSPONDER TO REPLY IN THE APPROPRIATE MANNER, THERE ARE TIMES IN WHICH THE SIGNAL CAN BE ERRONEOUSLY CAUSED TO APPEAR AT THE INTERROGATING LOCATION (I.E., WHEN TRACKS CROSS AT DIFFERENT ALTITUDES). THEREFORE, THE MODE 3/A EMERGENCY RESPONSE FEATURE WILL INCLUDE THE USE OF CERTAIN CODE SETTINGS TO INSURE RECOGNITION OF THE EMERGENCY AT ALL TIMES. THE CODE SELECTED WILL BE 77 OR 7700, DEPENDING ON THE TYPE OF TRANSPONDER. CODE 76 OR 7600 IS RESERVED FOR RECOGNITION OF AN AIRCRAFT WITH RADIO COMMUNICATIONS FAILURE. CODE 7500 SHALL BE USED ON MODE 3/A TO PROVIDE RECOGNITION OF AN AIRCRAFT HAVING HIGH JACKERS ON BOARD.

B. LOW POSITION (TRANSPONDERS). THE LOW POSITION CAN BE SELECTED FOR OPERATION OF THE TRANSPONDER. THIS SETTING REDUCES THE RECEIVER SENSITIVITY OF THE AIRBORNE TRANSPONDER, THUS REDUCING THE REPLY RATE. TRANSPONDERS WILL BE OPERATED IN LOW POSITION UPON DIRECTION OF THE CONTROLLING AGENCY OR IN ACCORDANCE WITH LOCAL DIRECTIVES. ALTHOUGH THE MAJORITY OF TRANSPONDERS IN OPERATION HAVE THE LOW POSITION AVAILABLE, CERTAIN MODERN TRANSPONDERS/ INTERROGATORS HAVE SIDE LOBE SUPPRESSION (SLS) AND BEAM SHARPENING METHODS AVAILABLE THAT ELIMINATE THE NEED FOR A LOW POSITION.

C. SURFACE TRANSPONDERS. CONTROLS FOR GROUND AND SURFACE TRANSPONDER ARE VERY SIMILAR TO AIRBORNE TRANSPONDERS EXCEPT THAT EMERGENCY, IDENT (I/P) AND MODE C MAY BE OMITTED.

#### CHAPTER 4 CONTROL PHRASEOLOGY

#### 401. IFF SYSTEM CODE WORDS

CODE	MEANING
------	---------

PARROT	MILITARY IFF/SIF TRANSPONDER
SQUAWK (ING)	OPERATE IFF/SIF AS INDICATED OR IFF/SIF IS OPERATING AS INDICATED
SQUAWK ONE ( )	TURN IFF MASTER CONTROL ON NORMAL (MODE 1) AND MODE 1 CODE CONTROL DIALS TO DESIGNATED SETTING
SQUAWK TWO ( )	TURN IFF MODE 2 SWITCH ON
SQUAWK THREE ( )	TURN IF MODE 3 SWITCH ON AND MODE 3 CODE CONTROL DIALS TO DESIGNATED SETTING
SQUAWK MAYDAY	TURN IFF MASTER CONTROL TO EMERGENCY
SQUAWK IDENT	TURN I/P SWITCH ON (NOTE: I/P SWITCH IS SPRING LOADED.)
SQUAWK MIKE	TURN I/P SWITCH TO MIC POSITION. MAKE A SHORT RADIO TRANSMISSION
SQUAWK LOW	TURN IFF MASTER CONTROL TO LOW POSITION

SQUAWK NORMAL  
SQUAWK STANDBY

TURN IFF MASTER CONTROL TO NORMAL POSITION  
TURN IFF MASTER CONTROL TO STANDBY

## CHAPTER 5 TECHNICAL SPECIFICATIONS

### 501. GENERAL

DETAILED TECHNICAL SPECIFICATIONS OF IFF/SIF EQUIPMENT AND NECESSARY DETAILED INSTRUCTIONS FOR ITS USE ARE CONTAINED IN APPROPRIATE MILITARY SERVICE PUBLICATIONS AND IN ICAO ANNEX 10 FOR AIR TRAFFIC CONTROL APPLICATION. ONLY THOSE TECHNICAL SPECIFICATIONS OF USE TO OPERATORS OF IFF/SIF SYSTEMS ARE INCLUDED HERE.

### 502. BASIC IFF MARK X

THE BASIC MARK X TRANSPONDER REPLY FOR MODE 1 AND 3 IS A SINGLE PULSE. THE MODE 2 RESPONSE FOR AIRCRAFT IS TWO PULSES WITH 16 MICROSECOND SPACING.

### 503. IFF MARK X (SIF)

WHEN CODING IS ADDED TO BASIC IFF MARK X TRANSPONDER EQUIPMENT, THE REPLIES ARE CHANGED INTO PULSE TRAINS, CONSISTING OF TWO FRAMING/BRACKET PULSES SPACED 20.3 MICROSECONDS APART. CONTAINED WITHIN THESE FRAMING PULSES IS A SERIES OF UP TO 12 SHORT (.45 MICROSECOND) INFORMATION PULSES, THE PRESENCE OR ABSENCE OF WHICH IS DETERMINED BY A CODE SELECTION IN THE TRANSPONDER EQUIPPED VEHICLE.

A. MODE 1 OPERATION OF THE TRANSPONDER USES UP TO 5 INFORMATION PULSE POSITIONS SPACED 2.9 MICROSECONDS APART.

B. MODE 2 OPERATION OF THE TRANSPONDER UTILIZES COMBINATIONS OF PULSES OUT TO A MAXIMUM OF 13 PULSE POSITIONS WITH A SPACING OF 1.45 MICROSECONDS, THE 7TH PULSE POSITION ALWAYS BEING OMITTED.

C. MODE 3 OPERATION USES UP TO 6 INFORMATION PULSE POSITIONS SPACED 2.9 MICROSECONDS APART.

### 504. IFF MARK X (A)

MARK X (A) IS ESSENTIALLY THE SAME AS IFF MARK X (SIF) EXCEPT THAT MODE 3 OPERATION OF THE TRANSPONDER PROVIDES 4096 MADE POSSIBLE BY USING ADDITIONAL COMBINATIONS OF PULSE POSITIONS. MARK X (A) TRANSPONDERS ARE ALSO MODE C CAPABLE PROVIDING AUTOMATIC PRESSURE ALTITUDE REPORTING.

### 505. IFF MARK XII

THE MARK XII SYSTEM CONTAINS ALL FEATURES OF MARK X (A) WITH SEVERAL ADDITIONS. THE PRIMARY ADDITION IS MODE 4 PROVIDING A SECURITY CODED RESPONSE TO SUITABLY EQUIPPED INTERROGATORS. THE MARK XII TRANSPONDER HAS AN AIRCREW CONTROL MODE 1 ON-OFF SWITCH WHEREAS ALL BASIC MARK X AND CERTAIN MARK X (SIF) TRANSPONDERS ALWAYS TRANSMIT MODE 1 INFORMATION WHEN THE TRANSPONDER IS IN LOW OR NORMAL OPERATION. MARK XII TRANSPONDERS ARE ALSO MODE C CAPABLE PROVIDING AUTOMATIC PRESSURE ALTITUDE REPORTING. MARK XII TRANSPONDERS ARE FULLY CAPABLE IN MODE/CODE RESPONSE; AND ARE INTEROPERABLE/COMPATIBLE WITH ALL MARK X SYSTEMS.

## CHAPTER 6 IFF CONTROL

601. THE OPERATIONAL CONTROL OF THE IFF SYSTEM IS NORMALLY DETERMINED BY THE THEATER OR AREA COMMANDER IN ACCORDANCE WITH THE REQUIREMENTS OF THE SITUATION ESTABLISHING INTERTHEATER COORDINATION AS NECESSARY.

## CHAPTER 7 RESPONSIBILITY

### 701. COMMANDERS' RESPONSIBILITY

A. COMMANDERS ARE RESPONSIBLE FOR INSURING THAT PERSONNEL UNDER THEIR COMMAND CONCERNED WITH IFF OPERATION ARE COGNIZANT OF THESE INSTRUCTIONS AND THAT THEY ARE FULLY DISSEMINATED, THOROUGHLY UNDERSTOOD, AND PROPERLY EMPLOYED.

B. THE PRIMARY FUNCTION OF IFF SYSTEMS IS TO ASSIST IN THE RAPID AND POSITIVE IDENTIFICATION OF FRIENDLY UNITS AND SECONDLY ASSISTING IN THE TRACKING AND

CONTROL OF AIRCRAFT. TESTS AND STUDIES HAVE REVEALED THAT IFF SYSTEMS MAY SUFFER DEGRADATION DUE TO INTERFERENCE IN AREAS OF HIGH AIRCRAFT DENSITY AND LARGE NUMBERS OF INTERROGATIONS. COMMANDERS WILL THEREFORE INSURE THAT AGENCIES UNDER THEIR COMMAND WILL NOT OPERATE IFF INTERROGATORS EXCEPT FOR THE EXPRESS PURPOSES EXPLAINED ABOVE WITHOUT SPECIFIC AUTHORITY FROM THE APPROPRIATE THEATER OR AREA COMMANDER. AS EXCEPTIONS, NECESSARY MAINTENANCE, OPERATIONAL CHECKS, AND EVALUATIONS MAY BE PERFORMED ON THE IFF INTERROGATORS, AND THEY MAY BE USED IN EXERCISES AS REQUIRED. HOWEVER, SUCH USE MUST BE KEPT TO A MINIMUM.

C. COMMANDERS ARE RESPONSIBLE FOR EFFECTING OPERATIONAL CONTROL IN A MANNER ALLOWING FOR THE PERFORMANCE OF THE AIR TRAFFIC CONTROL FUNCTION.

LIST OF EFFECTIVE PAGES

SUBJECT MATTER	PAGE NUMBERS	CHANGE IN EFFECT
TITLE PAGE	I (REVERSE BLANK)	ORIGINAL
FOREWORD	III (REVERSE BLANK)	ORIGINAL
LETTER OF PROMULGATION DATED 30.01.78	V, VI	ORIGINAL
RECORD OF CHANGES AND CORRECTIONS	VII, VIII	ORIGINAL
TABLE OF CONTENTS	IX (REVERSE BLANK)	ORIGINAL
CHAPTER 1	1-1 (REVERSE BLANK)	ORIGINAL
CHAPTER 2	2-1 (REVERSE BLANK)	ORIGINAL
CHAPTER 3	3-1 TO 3-3 (REVERSE BLANK)	ORIGINAL
CHAPTER 4	4-1 (REVERSE BLANK)	ORIGINAL
CHAPTER 5	5-1 (REVERSE BLANK)	ORIGINAL
CHAPTER 6	6-1 (REVERSE BLANK)	ORIGINAL
CHAPTER 7	7-1 (REVERSE BLANK)	ORIGINAL
LIST OF EFFECTIVE PAGES	LEP-1 (REVERSE BLANK)	ORIGINAL