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TELEDYNE ELECTRONICS NEWBURY CALIF F/G 17/9  
PRIME ITEM PRODUCT FABRICATION SPECIFICATION FOR IFF TRANSPONDER--ETC(U)  
AUG 77 F33657-77-C-0694

UNCLASSIFIED

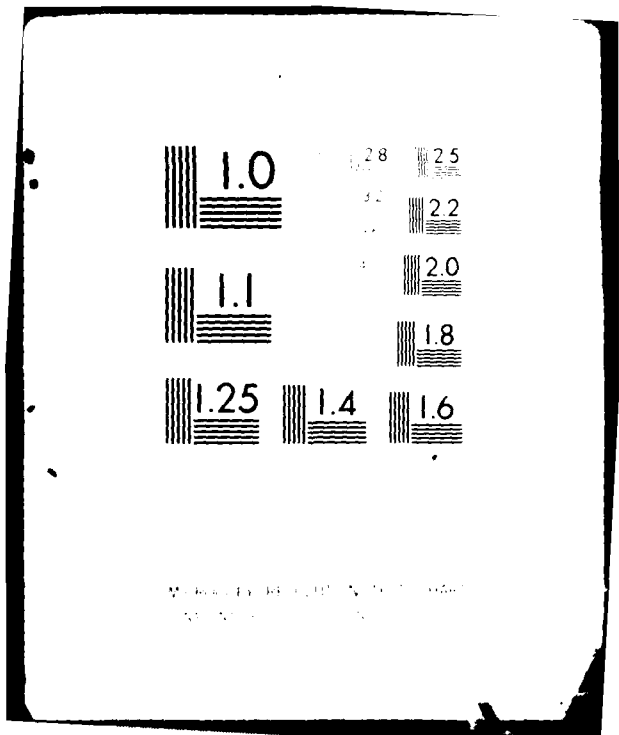
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Resolution Test Chart

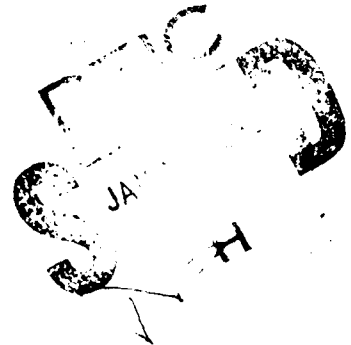
TELEDYNE ELECTRONICS

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DOCUMENT NO. AECA 77-1  
DATE April 30, 1977  
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PAGE 1 OF 18  
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LEVEL

AD 610 5744



PART II OF TWO PARTS

PRIME ITEM PRODUCT FABRICATION SPECIFICATION  
FOR  
IFF TRANSPONDER  
(TRANSPONDER SET AN/APX-101(V))

*175 04 1770 004*

<u>TITLE</u>	<u>CI NUMBER</u>
RECEIVER-TRANSMITTER, RADIO RT-1063B/APX-101(V)	650100A

318 MS 007

AUTHENTICATED BY G. Felicianelli  
U. S. AIR FORCE ASD/AECA  
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APPROVED BY [Signature]  
CONTRACTOR TELEDYNE  
ELECTRONICS

DATE 2 Nov 77

DATE 4/13/77

DISTRIBUTION STATEMENT A  
Approved for Release  
Dissemination



1. SCOPE.

1.1 This Part II of a two-part specification establishes the requirements for manufacture and acceptance of the IFF Transponder prime item, Receiver/Transmitter, Radio RT-1063B/APX-101(V), hereinafter referred to as the Receiver/Transmitter. Part I of this specification specifies those requirements which govern design and qualification of the item.

2. APPLICABLE DOCUMENTS.

2.1 Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered superseding requirements. Documents subsidiary to those specified herein shall be those in effect on 1 July 1969.

SPECIFICATIONS

Military

MIL-P-116F 1 Feb. 1973	Preservation, Methods of
MIL-E-5400K 24 May 1968	Electronic Equipment, Airborne General Specification for

STANDARDS

Military

MIL-STD-100A 1 Oct. 1967	Engineering Drawing Practices
MIL-STD-129F 30 Mar. 1973	Marking for Shipment and Storage
MIL-STD-130C 29 Sep. 1967	Identification Marking of U. S. Military Property
MIL-STD-143A 14 May 1963	Specifications and Standards Order of Precedence for Selection of
MIL-STD-480 30 Oct. 1968	Configuration Control - Engineering Changes, Deviations, and Waivers

MIL-STD-704A (Notice 1) 7 Feb. 1968	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-781B 15 Dec. 1967	Reliability Tests: Exponential Distribution
MIL-STD-794D 15 Dec. 1972	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-810B 15 Jun. 1967	Environmental Test Methods

2.2 Non-Government documents. The following documents, of the latest issue in effect, form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered superseding requirements.

DRAWINGS

Teledyne Electronics

150620

Receiver-Transmitter, Radio  
RT-1063B/APX-101 (V)

OTHER PUBLICATIONS

Teledyne Electronics

SDRL 68-870030-E64

Part I, Individual Acceptance  
Test Procedure for Receiver-  
Transmitter, Radio RT-1063B/  
APX-101(V)

### 3. REQUIREMENTS

3.1 Item definition. The Receiver/Transmitter as manufactured by Teledyne Electronics shall comply with the drawing specified in 3.3.1. The Receiver/Transmitter receives coded interrogations, decodes these interrogations and, in response, transmits pulse coded replies.

3.1.1 Interface definition. The equipment covered herein shall be compatible with the associated equipment listed below and shall meet all requirements when installed in the aircraft and operated in conjunction with the associated equipment listed below. Such associated equipment is not to be supplied as part of the equipment covered by this specification. The equipment shall not be damaged by operation of the associated equipment when in any normal mode of operation (including OFF mode).

C-9012/APX IFF Control Panel and C-9015/ARA Main Comm Control Panel or C-6280(P)/APX Control  
Air Data Computer  
Transponder Computer  
IFF Antenna Set  
Interference Blanker  
IFF Antenna Selector Switch  
F-15 Caution Panel  
F-15 BIT Control Panel  
F-15 Avionics Status Panel  
F-15 AIS (CNI Test Station AN/GSM-230)  
F-15 ADTS (Test Station, IFF Transponder Modules, McDonnell Douglas Part No. 68D190033-1001)  
AN/APM-406 Test Set, Transponder Set  
AN/UPM-137A Test Set, Radar

### 3.2 Characteristics.

3.2.1 Performance. Unless otherwise specified herein the Receiver/Transmitter shall meet the performance requirements specified herein at standard ambient conditions noted below:

- a. Environment in accordance with the standard ambient conditions specified in MIL-STD-810 excluding the "closely controlled" Conditions.
- b. Voltage 28 VDC  $\pm$  0.5

3.2.1.1 Normal sensitivity. Normal sensitivity in Modes 3/A and 4 shall be not less than -77 dBm for a 90% response for both upper and lower

receivers. The minimum triggering level (normal sensitivity) of each receiver shall be adjusted to -76 dBm in Mode 4 for a 90% response.

3.2.1.2 Random triggering. With the equipment set to respond to at least Modes 3/A and C and with the absence of an interrogating signal the random triggering rate shall not exceed 5 pulses per second integrated over an interval equivalent to at least 100 random triggers.

3.2.1.3 Suppression output. The Receiver/Transmitter shall provide a suppression output pulse with the following characteristics for each reply transmitted.

- a. Amplitude 20 - 40 VDC
- b. Rise time 0.5  $\mu$ sec max.
- c. Fall time 1.5  $\mu$ sec max.

3.2.1.4 Suppression input. The Receiver/Transmitter shall provide for the blanking of its own decoder whenever either of the following blanking pulses are received with the following characteristics:

3.2.1.4.1 F-15 Operation

- a. Amplitude 6 - 15 VDC
- b. Rise time 0.5  $\mu$ sec max.
- c. Fall time 1.5  $\mu$ sec max.

3.2.1.4.2 Other Aircraft Operation

- a. Amplitude 15 - 70 VDC
- b. Rise Time 10 volts/microsecond min.
- c. Decay Time - Peak Amplitude shall drop to 1.0 volt within 10 microseconds.

3.2.1.5 Suppression (ISLS). While operating in Mode 3/A the Receiver/Transmitter shall provide suppression (not more than 1% replies) whenever the Interrogation Side-Lobe-Suppression (ISLS) pulse is equal to or greater than the first RF interrogation pulse (P1) with the P1 level equal to 6 dB greater than the minimum triggering level (MTL).



3.2.1.6 Non-Suppression. While operating in Mode 3/A, suppression of the decoder shall not take place when the received amplitude of the first interrogation pulse (P1) is 9 dB greater than the received amplitude of the ISLS control pulse. This non-suppression shall be effective whenever the received RF level is 6 dB greater than the (MTL).

3.2.1.7 Coder, Mode 2. For each pulse appearing at the Mode 2 decoder output when the Mode 2 switch on the Identification Control is energized, a pulse train shall be generated containing from 0 to a maximum of 12 information pulse positions, plus 2 framing pulses that are spaced  $20.3 \pm 0.05$  microseconds. The information pulses shall be referenced from the first framing pulse in multiples of 1.45 microseconds. Each pulse shall be located within  $\pm 0.05$  microsecond of the reference position. The seventh information pulse position shall not be used. Four rotary switches shall be provided on the front panel of the equipment for selecting any of the 4096 code combinations of the information pulses specified.

3.2.1.8 Transmitter power output. When operating in Mode 2 emergency with a reply code of 7777 and at a PRF of 950/sec, the transmitter power output shall be between 25 and 30 dB above 1 watt into 50 ohms. The difference in power levels between the upper and lower channel shall not exceed 1 dB. The peak power of any pulse in a group of pulses shall not differ from any other output pulse of that group by more than 1 dB.

3.2.1.9 Mode 4 trigger. The Receiver/Transmitter shall generate a Mode 4 trigger with the following characteristics:

- |              |                      |
|--------------|----------------------|
| a. Amplitude | 1.5 to 5.0 VDC       |
| b. Duration  | 0.5 to 3.0 $\mu$ sec |
| c. Rise time | 0.1 $\mu$ sec max.   |
| d. Fall time | 1.0 $\mu$ sec max.   |

3.2.1.10 Mode 4 reply video. The Receiver/Transmitter shall accept Mode 4 reply video with the following characteristics:

- |              |                         |
|--------------|-------------------------|
| a. Amplitude | 3 to 5 VDC              |
| b. Duration  | $0.5 \pm 0.2$ $\mu$ sec |
| c. Spacing   | $1.8 \pm 0.2$ $\mu$ sec |
| d. Rise time | 0.1 $\mu$ sec max.      |
| e. Fall time | 0.25 $\mu$ sec max.     |

3.2.1.11 Mode 4 video. The Receiver/Transmitter provides mode 4 video (third and fourth sync pulse followed by information pulses of the input train). The single pulse characteristics shall be as follows.

- a. Amplitude 1.5 to 5.0 VDC
- b. Duration not less than .45  $\mu$ sec or greater than .65  $\mu$ sec
- c. Rise time 0.1  $\mu$ sec max.
- d. Fall time 0.2  $\mu$ sec max.

3.2.1.12 Mode 4 reply light enable. The Receiver/Transmitter shall provide a Mode 4 reply light enable output whenever Mode 4 replies are generated at 50 or more per second.

3.2.1.13 Caution light enable. A caution light enable output shall occur whenever a zeroize input is received from the Mode 4 computer or the Receiver/Transmitter has failed to reply to valid Mode 4 interrogations. The output shall be disabled whenever Mode 4 reply/disparity pulses are received from the Mode 4 computer or the interrogation PRF is less than 10 per second.

3.2.1.14 Mode 4 audio output. The Receiver/Transmitter shall provide Mode 4 audio pulses with the following characteristics:

- a. Amplitude 0 to 3 VAC, adjusted to 1.5 VAC nominal
- b. Frequency range 300 to 3000 Hz
- c. Pulse width  $\geq 500 \mu$ sec for PRF less than 200

3.2.1.15 Diversity operation. While operating in Mode 1, the diversity network shall route the reply transmission to the antenna associated with the strongest simultaneously received signal when more than 3 dB of signal strength exists between the received signals. When the interval between arrival of signals at the antennas exceeds 200 nsec, the diversity network shall route the reply transmission to the antenna associated with the earliest received signal, without regard for signal strength.

3.2.1.16 Emergency response provisions. Whenever the Receiver/Transmitter is interrogated in Mode 3/A at minimum triggering level plus 6 dB and an emergency input is activated, the following output train shall be provided.

- a. A1, A2, A4, B1, B2, and B4 information pulses within 2 framing pulses spaced  $20.3 \pm 0.5 \mu$ sec followed by three sets of framing pulses each spaced  $24.65 \pm 0.10 \mu$ sec from the preceding F1 pulse.

3.2.1.17 Low sensitivity. Low sensitivity in Mode 3/A shall be  $-65 \pm 1$  dBm for a 90% response. The low sensitivity shall be adjusted to  $-65$  dBm in Mode 3/A for a 90% response and this adjustment shall be locked in place.

3.2.1.18 Pulse Width discrimination. The Receiver/Transmitter shall provide 10% or less Mode 4 triggers if a Mode 4 interrogation signal received is less than .2  $\mu$ sec in duration and provide 10% or less replies, in SIF, if the received signal is less than .3  $\mu$ sec in duration. Single pulses of more than 1.5  $\mu$ sec in duration shall not cause the Receiver/Transmitter to initiate a reply.

3.2.1.19 Receiver bandwidth and center frequency. The Receiver/Transmitter shall provide a receiver center frequency of  $1030 \pm 1.5$  MHz, and the bandwidth between points 6 dB down from maximum response, shall not be less than 7.0 MHz or more than 9.0 MHz.

3.2.1.20 Transmitter center frequency. The transmitter center frequency shall remain within 3 MHz of 1090 MHz.

3.2.1.21 Identification of position (I/P) operation. The Receiver/Transmitter shall provide response provisions for I/P operation. I/P operation will exist for a time period of 15 to 30 sec after activation. In Mode 1 I/P operation, for each trigger appearing at the Mode 1 decoder output, the code in use shall appear twice. In Mode 3/A I/P operation, for each trigger appearing at the mode 3/A decoder output, the code in use shall appear followed by a single pulse spaced  $24.65 \pm 0.10$   $\mu$ sec from F1 and  $4.35 \pm .05$   $\mu$ sec from F2.

3.2.1.22 AOC maximum rate. The Receiver/Transmitter shall provide a sensitivity-reduction type circuit to limit the number of generated pulse trains, for SIF interrogations, without regard to the number of pulses in the reply. The maximum reply rate in SIF shall be 1500 per second with a maximum of 1000 replies per second in Mode 2 emergency operation.

3.2.1.23 Mode 4 CDL. The Receiver/Transmitter shall limit the number of Mode 4 trigger pulses generated in response to Mode 4 interrogations. The Mode 4 trigger rate shall be adjustable from 500 to 3000 trigger pulses per second and set to 1500 per second.

3.2.1.24 Decoding/coding (SIF modes). The Receiver/Transmitter shall decode the following modes of operation.

<u>Mode</u>	<u>Interrogation Code</u>
1	2 pulses spaced $3 \pm 0.2$ $\mu$ sec
2	2 pulses spaced $5 \pm 0.2$ $\mu$ sec
3/A	2 pulses spaced $8 \pm 0.2$ $\mu$ sec
C	2 pulses spaced $21 \pm 0.2$ $\mu$ sec

A pulse train shall be generated for each of the above decode modes as follows:

<u>Mode</u>	<u>Reply Code</u>
1	0 to a maximum of 5 information pulse positions plus 2 framing pulses which are spaced $20.3 \pm 0.05$ $\mu$ seconds.
2 & 3/A	0 to a maximum of 12 information pulse positions plus 2 framing pulses spaced $20.3 \pm 0.05$ $\mu$ sec
C	0 to a maximum of 11 information pulse positions plus 2 framing pulses spaced $20.3 \pm 0.05$ $\mu$ sec

Pulse Characteristics

Duration	$0.45 \pm 0.1$ $\mu$ sec
Rise time	$0.05 \pm 0.1$ $\mu$ sec
Fall time	$0.05 \pm 0.2$ $\mu$ sec

3.2.1.25 Desensitization (Mode 4). Mode 4 desensitization shall terminate within 2  $\mu$ sec after the termination of the Mode 4 sensitivity gate.

3.2.1.26 Auxiliary trigger. The Receiver/Transmitter shall provide an input connection for the application of auxiliary triggers. An RF output pulse of  $0.45 \pm 0.1$   $\mu$ sec shall be generated for each auxiliary trigger input.

3.2.1.27 BIT monitor/BIT test. The Receiver/Transmitter shall provide a BIT monitor and BIT test "Go" or "No-Go" output depending on the status of the LRU. A "Go" indication shall be given whenever the unit is operating in accordance with the conditions herein. An antenna "No-Go" shall be provided whenever the VSWR exceeds 2:5 to 1.

3.2.1.28 AIS and ADTS Compatibility. The equipment shall provide the Input/output and test point signals required to insure interface compatibility with the Avionics Intermediate Shop (AIS) and the Avionics Depot Test Station (ADTS).

3.2.1.29 Control Transponder Set/C-6280 (P)/APX Compatibility. The equipment shall be compatible with the C-6280 (P)/APX interface signals.

3.2.1.30 Test Set Compatibility. The equipment shall be compatible with Test Set, Transponder Set AN/APM-406 and Test Set, Radar, AN/UPM-137A.

3.2.2 Physical characteristics.

3.2.2.1 Weight. The weight of the Receiver/Transmitter shall not exceed 14.3 pounds.

3.2.2.2 Dimensions. The Receiver/Transmitter dimensions and tolerances shall be in accordance with the drawing specified in 3.3.1.

3.2.2.3 Mounting provisions. The Receiver/Transmitter mounting provisions shall be in accordance with the drawing specified in 3.3.1.

3.2.2.4 Connectors. The Receiver/Transmitter electrical connectors shall be in accordance with the drawing specified in 3.3.1.

3.2.3 Reliability. The equipment shall have a specified Mean-Time-Between-Failures (MTBF) of 500 hours,  $\theta_0$  as defined in MIL-STD-781. The minimum acceptable (MTBF) shall be based upon a discrimination ratio of 2.0 and a confidence level of 90 percent.

3.3 Design and construction.

3.3.1 Production drawing. The Receiver/Transmitter shall be fabricated and assembled in accordance with the drawings, parts list, and other documents as defined by the following Teledyne Electronics drawing and part number:

<u>Drawing Title</u>	<u>Drawing No.</u>	<u>Part No.</u>
Receiver-Transmitter, Radio RT-1063B/APX-101 (V)	150620	150620

3.3.2 Standards of manufacture. The Receiver/Transmitter shall be manufactured to the standards and processes specified in the drawing listed in 3.3.1 and as listed herein.

3.3.3 Workmanship. The workmanship employed in the manufacture of the equipment shall be in accordance with Paragraph 3.5 of MIL-E-5400.

3.3.4 Interchangeability. All parts having the same Teledyne Electronics part number shall be functionally and dimensionally interchangeable in accordance with Paragraph 3.3 of MIL-E-5400.

3.3.5 Safety. No special safety precautions are required.

3.3.6 Finish. The Receiver/Transmitter shall be finished in accordance with Paragraph 3.1.10 of MIL-E-5400. The external color of the Receiver/Transmitter shall be in accordance with MIL-E-5400.

3.3.7 Selection of Parts. In the selection of parts for new design and changes thereto, the parts shall be selected in accordance with the current issue of MIL-STD-143.

3.3.8 Burn-In. Burn-in shall be performed in accordance with the drawing specified in paragraph 3.3.1, except that burn-in requirements may be revised on reliability test units at the contractor's option. When the reliability tests units have successfully completed the specified production reliability test, the revised burn-in requirements may be incorporated into the drawings by Class II change; and all subsequent units shall receive the revised burn-in.

3.4 Product Marking. Parts and assemblies shall be marked for identification in accordance with MIL-STD-130.

3.4.1 Nameplates. Nameplates marked in accordance with the requirements of MIL-STD-130 shall be permanently attached to the equipment. As a minimum, the nameplate shall contain the following:

- Equipment nomenclature
- Equipment (manufacturer's) part number
- Equipment (manufacturer's) serial number
- Federal stock number (provide space, list number when available)
- Manufacturer's code identification number
- Configuration Item Number
- Contract number (provide space for the number but do not include number)
- US

3.4.2 Part number. Part numbers and changes to part numbers shall be assigned in accordance with MIL-STD-100.

3.4.3 Serialization. The serial numbers shall be assigned in sequence and shall consist of no less than four characters and a maximum of ten characters. When only four characters are used they shall be numeric, consecutive, and non-repetitive. If more than four characters are used the last four shall be numeric, consecutive, and non-repetitive.

3.5 Engineering changes, deviations and waivers. The provisions of MIL-STD-480, as contractually implemented, shall apply for all engineering changes, deviations, and waivers.

3.6 Design criteria exceptions. Design criteria have been imposed on this item by Government documents invoked through reference in applicable F-15 contract specifications. Exceptions to these criteria which are authorized are shown in Appendix I herein.

#### 4. QUALITY ASSURANCE PROVISIONS.

4.1 General. This section specifies the requirements for verifying that the quality of the Receiver/Transmitter as fabricated and assembled for acceptance under contract complies with the requirements of this specification. The following verification methods shall be utilized.

- a. Test: Examination or trial which yields analytical data; normally requires instrumentation.
- b. Inspection: Visual examination and dimensional verification of the item and/or review of production level inspection records.

4.1.1 Responsibility for inspection. All verification shall be performed by the manufacturer at his own facilities or any other facilities selected by the manufacturer and acceptable to the Government. Records of production level as well as acceptance verification shall be kept complete and available to the Government. The Government reserves the right to witness or separately perform any of the verifications set forth in this specification where such verifications are deemed necessary to assure that the item conforms to specified requirements.

#### 4.1.2 Special tests and examinations.

4.1.2.1 Production Reliability Tests. The reliability requirements of paragraph 3.2.3 shall be verified by production reliability tests to be conducted at the equipment manufacturer's facilities. Production reliability tests shall be run on each production lot using at least two equipments from each lot. Sample lot size for the first test shall be based upon the first three months production.

Thereafter, each sample lot size shall be based upon six months production. Test samples shall be selected by the Air Force and tested in accordance with the requirements of MIL-STD-781, Test Plan III. The tests shall be conducted in accordance with Test Level F, utilizing the standard method of temperature cycling per 5.2.3.1, MIL-STD-781, with the equipment stabilized at the upper level temperature for 2 hours. Input voltage cycling shall be in accordance with 5.2.4, MIL-STD-781, except that the voltage limits shall be as specified in MIL-STD-704 for Category B equipment with normal steady-state limits for both ac and dc voltages. Equipment operation during this testing, including time phased apportionment of modes of operation, shall simulate service usage. The equipment shall be cycled operationally during the "ON" portion of the temperature cycle. The performance parameters to be monitored during the reliability testing shall be adequate to demonstrate, as a minimum, the satisfactory functional operation of the equipment under test. These parameters shall be specified in the detailed reliability test procedure which is subject to Air Force review and approval. The temperature cycling, equipment on-off cycling, and input voltage cycling, coupled with 10 minutes of vibration out of every hour of operating time, shall be continued for the duration of the test. The period of vibration shall start within 15 minutes after the start of the equipment "ON" cycle. The accept-reject criteria shall be in accordance with the criteria of 4.2.8.3 of MIL-STD-781. The minimum test time on any equipment shall not be less than one-half the expected decision point ( $5.1 \theta_0$  as defined by paragraph 6.3.1 of MIL-STD-781) divided by the total quantity of equipments tested, or one-half the average test time of all equipments tested, whichever is lesser. Only equipment "ON" time is to be used in computing the required total test time. All pattern failures, as defined in MIL-STD-781, shall be corrected regardless of the outcome of the test. The detailed requirements of Section 5, MIL-STD-781, shall apply. In the event a reject decision is approached, the contractor may elect to stop the test, incorporate corrective action into the units under test, and rerun or continue the reliability test until an accept decision is reached. In the event a reject decision is reached, the test shall be immediately stopped, corrective action incorporated into the units under test, and the test rerun to demonstrate that an accept decision has been reached. Any corrective action required as a result of a Production Reliability Test shall apply to all equipments in the lot from which the sample was taken and to all future production equipments delivered.

#### 4.2 Quality conformance inspections.



4.2.1 Verifications. Each Receiver-Transmitter submitted for acceptance shall be inspected and tested in accordance with 4.2.1.1, 4.2.1.2, and 4.2.1.3 below.

4.2.1.1 Inspection. The following requirements of Sections 3 and 5 shall be verified by inspection of the item to the level of detail necessary to insure that specified requirements are fulfilled.

- Weight (3.2.2.1)
- Dimensions (3.2.2.2)
- Mounting provisions (3.2.2.3)
- Connectors (3.2.2.4)
- Workmanship (3.3.3)
- Finish (3.3.6)
- Product marking (3.4)
- Nameplates (3.4.1)
- Preservation and packaging (5.1)
- Packing (5.2)
- Marking (5.3)

4.2.1.2 Burn-In (3.3.8). The burn-in shall be performed satisfactorily in accordance with the drawing specified in paragraph 3.3.1.

4.2.1.3 Individual acceptance test.

4.2.1.3.1 Tests. The following requirements of Section 3 shall be verified by accomplishment of the corresponding Acceptance Test Procedure as approved by the Government.

- Normal sensitivity (3.2.1.1)
- Random triggering (3.2.1.2)
- Suppression output (3.2.1.3)
- Suppression input (3.2.1.4.1 & 3.2.1.4.2)
- Suppression (ISLS) (3.2.1.5)
- Non-suppression (3.2.1.6)
- Coder mode 2 (3.2.1.7)
- Transmitter power output (3.2.1.8)
- Mode 4 trigger (3.2.1.9)
- Mode 4 reply video (3.2.1.10)
- Mode 4 video (3.2.1.11)
- Mode 4 reply light enable (3.2.1.12)
- Caution light enable (3.2.1.13)

- Mode 4 audio output (3.2.1.14)
- Diversity operation (3.2.1.15)
- Emergency response provisions (3.2.1.16)
- Low sensitivity (3.2.1.17)
- Pulse width discrimination (3.2.1.18)
- Receiver bandwidth and center frequency (3.2.1.19)
- Transmitter center frequency (3.2.1.20)
- Identification of position (I/P) operation (3.2.1.21)
- AOC maximum rate (3.2.1.22)
- Mode 4 CDL (3.2.1.23)
- Decoding/coding (SIF modes) (3.2.1.24)
- Desensitization (Mode 4) (3.2.1.25)
- Auxiliary trigger (3.2.1.26)
- BIT monitor/BIT test (3.2.1.27)
- AIS and ADTS Compatibility (3.2.1.28)
- C-6280 (P)/APX Compatibility (3.2.1.29)

The Acceptance Test used for verification of these requirements shall be

<u>Subcontractor's Name</u>	<u>ATP Title</u>	<u>ATP No.</u>
Teledyne Electronics	Part I Individual Acceptance Test Pro- cedure for Receiver/ Transmitter, Radio RT-1063B/APX-101(V)	SDRL 68-870030-E64

4.2.2 Test sequence. Not applicable.

4.2.3 Accept-reject criteria. No Receiver/Transmitter unit is considered to be ready for shipment until the unit has successfully met the requirements of Section 3 as verified in 4.2.1 herein.

4.3 Verification summation. Table I is a tabulated summation of the methods of verification of all of the requirements of Sections 3 and 5.

5. PREPARATION FOR DELIVERY.

5.1 Preservation and packaging.

5.1.1 Level A and B. Methods of preservation and packaging shall be determined in accordance with MIL-STD-794 and accomplished in accordance with MIL-P-116/MIL-STD-794.

5.1.2 Level C. Preservation and packaging shall comply with Level C requirements as defined in MIL-STD-794.

5.2 Packing.

5.2.1 Levels A, B and C. Packing and shipping containers shall be in accordance with requirements of MIL-STD-794.

5.3 Marking. Marking shall be in accordance with MIL-STD-129.

6. NOTES.

6.1 Intended use. The Receiver/Transmitter shall receive coded interrogations, shall decode these interrogations and, in response, shall transmit coded replies.

6.2 Ordering data. Procurement documents associated with the fabrication of the Receiver/Transmitter should incorporate the following requirements as necessary:

- a. Part I Prime Item Development Specification for IFF Transponder, AECA 77-1.
- b. Part II Prime Item Product Fabrication Specification for IFF Transponder, AECA 77-1.
- c. Configuration Item Number: CI 650100A
- d. Level of preservation, packaging and packing in accordance with 5.1 and 5.2.

TABLE I  
SPECIFICATION REQUIREMENT/VERIFICATION REFERENCE INDEX

REQUIREMENT REFERENCE	N/A	ACCEPTANCE VERIFICATION METHOD	
		INSP	TEST
3. REQUIREMENTS			
3.1 Item definition	X		
3.1.1 Interface definition	X		
3.2 Characteristics	X		
3.2.1 Performance	X		
3.2.1.1 Normal sensitivity			X
3.2.1.2 Random triggering			X
3.2.1.3 Suppression output			X
3.2.1.4 Suppression input			X
3.2.1.5 Suppression (ISLS)			X
3.2.1.6 Non-suppression			X
3.2.1.7 Coder mode 2			X
3.2.1.8 Transmitter power output			X
3.2.1.9 Mode 4 trigger			X
3.2.1.10 Mode 4 reply video			X
3.2.1.11 Mode 4 video			X
3.2.1.12 Mode 4 reply light enable			X
3.2.1.13 Caution light enable			X
3.2.1.14 Mode 4 audio output			X
3.2.1.15 Diversity operation			X
3.2.1.16 Emergency response provisions			X
3.2.1.17 Low sensitivity			X
3.2.1.18 Pulse width discrimination			X
3.2.1.19 Receiver bandwidth and center frequency			X
3.2.1.20 Transmitter center frequency			X
3.2.1.21 (I/P) operation			X
3.2.1.22 AOC maximum rate			X
3.2.1.23 Mode 4 CDL			X
3.2.1.24 Decoding/coding			X
	N/A		
3.2.1.25 Desensitization (Mode 4)			X
3.2.1.26 Auxiliary trigger			X
3.2.1.27 BIT monitor/BIT test			X
3.2.2 Physical characteristics	X		
3.2.2.1 Weight			X
3.2.2.2 Dimensions			X
3.2.2.3 Mounting provisions			X
3.2.2.4 Connectors			X
3.2.3 Reliability			X*
3.3 Design and construction	X		
3.3.1 Production drawings	X		
3.3.2 Standards of manufacture	X		
3.3.3 Workmanship	X		
3.3.4 Interchangeability	X		
3.3.5 Safety	X		
3.3.6 Finish	X		
3.3.7 Selection of parts	X		
3.3.8 Burn-in	X		
3.4 Product marking	X		
3.4.1 Nameplates	X		
3.4.2 Part numbers	X		
3.4.3 Serialization	X		
3.5 Engineering changes, deviations and waivers	X		
3.6 Design criteria exceptions	X		
5. PREPARATION FOR DELIVERY	X		
5.1 Preservation and packaging			X
5.2 Packing			X
5.3 Marking			X
*Test per Production Reliability Test Paragraph 4.1.2.1			

APPENDIX I

10. NOTICES OF EXCEPTION

10.1 Scope.

This Appendix covers the following Notices of Exception (NOE) as authorized and approved by the Deputy F-15/JEPO or AFPRO designee and may be applied in the manufacture of the Receiver/Transmitter.

<u>NOE NO.</u>	<u>SUBJECT</u>
MI0600-0022	Handle Size Receiver/Transmitter
MI0600-0081	Printed Wiring for Electronic Equipment
MI0600-0270	EMI Characteristics Requirements for Equipment
MI0600-0278RI	Wire Jumper Use on Single and Double Sided Printed Wiring Board Assemblies

TELEDYNE ELECTRONICS

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PART II OF TWO PARTS

PRIME ITEM PRODUCT FABRICATION SPECIFICATION  
FOR  
IFF TRANSPONDER  
(TRANSPONDER SET AN/APX-101(V))

<u>TITLE</u>	<u>CI NUMBER</u>
RECEIVER-TRANSMITTER, RADIO RT-1063C/APX-101(V)	650100A

AUTHENTICATED BY G. Felicianelli  
U. S. AIR FORCE ASD/AECA  
AERONAUTICAL SYSTEMS DIV.

APPROVED BY R. J. Berner  
CONTRACTOR TELEDYNE  
ELECTRONICS

DATE 2 Nov 77

DATE 4/13/77

INDEX OF ACTIVE SHEETS

PAGE NUMBER	REV LTR	PAGE NUMBER	REV LTR	PAGE NUMBER	REV LTR	PAGE NUMBER	REV LTR
1 and 2	C						
3 and 4	B						
5 and 6	A						
7	B						
8	C						
9 and 10	A						
11	B						
12 thru 15	A						
16	B						
17 and 18	A						
Appendix I-1 thru I-9	A						

3.2.1.11 Mode 4 video. The Receiver/Transmitter provides mode 4 video (third and fourth sync pulse followed by information pulses of the input train). The single pulse characteristics shall be as follows.

- |    |           |  |
|----|-----------|--|
| a. | Amplitude | 2.0 to 5.0 VDC   |
| b. | Duration  | Not less than .45 $\mu$ sec or greater than .65 $\mu$ sec except for the 4th sync pulse which must be $1.1 \pm 0.15$ $\mu$ sec wide. |
| c. | Rise time | 0.1 $\mu$ sec max.   |
| d. | Fall time | 0.2 $\mu$ sec max.   |

3.2.1.12 Mode 4 reply light enable. The Receiver/Transmitter shall provide a Mode 4 reply light enable output whenever Mode 4 replies are generated at 50 or more per second.

3.2.1.13 Caution light enable. A caution light enable output shall occur whenever a zeroize input is received from the Mode 4 computer or the Receiver/Transmitter has failed to reply to valid Mode 4 interrogations. The output shall be disabled whenever Mode 4 reply/disparity pulses are received from the Mode 4 computer or the interrogation PRF is less than 10 per second.

3.2.1.14 Mode 4 audio output. The Receiver/Transmitter shall provide Mode 4 audio pulses with the following characteristics:

- |    |                 |  |
|----|-----------------|--|
| a. | Amplitude       | 0 to 3 VAC, adjusted to 1.5 VAC nominal    |
| b. | Frequency range | 300 to 3000 Hz                             |
| c. | Pulse width     | $\geq 500$ $\mu$ sec for PRF less than 200 |

3.2.1.15 Diversity operation. While operating in Mode 1, the diversity network shall route the reply transmission to the antenna associated with the strongest simultaneously received signal when more than 3 dB of signal strength exists between the received signals. When the interval between arrival of signals at the antennas exceeds 200 nsec, the diversity network shall route the reply transmission to the antenna associated with the earliest received signal, without regard for signal strength.

3.2.1.16 Emergency response provisions. Whenever the Receiver/Transmitter is interrogated in Mode 3/A at minimum triggering level plus 6 dB and an emergency input is activated, the following output train shall be provided.

- |    |  |
|----|--|
| a. | A1, A2, A4, B1, B2, and B4 information pulses within 2 framing pulses spaced $20.3 \pm 0.5$ $\mu$ sec followed by three sets of framing pulses each spaced $24.65 \pm 0.10$ $\mu$ sec from the preceding F1 pulse. |
|----|--|

3.2.1.17 Low sensitivity. Low sensitivity in Mode 3/A shall be  $-65 \pm 1$  dBm for a 90% response. The low sensitivity shall be adjusted to  $-65$  dBm in Mode 3/A for a 90% response and this adjustment shall be locked in place.



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