METRIC

A-A-59003/3
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Superseding
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20 August 1964

COMMERCIAL ITEM DESCRIPTION

AMPLIFIER-CONTROL GROUP, AN/SIA-116

The General Services Administration has authorized the use of this commercial item description as a replacement for MIL-A-21577/3 which is canceled.

1. **Scope.** This Commercial Item Description covers the detailed requirements for an audio frequency amplifier control group type AN/SIA-116, for transmission of one-way, 1MC general announcing circuit and two-way 7MC ship's control circuit aboard a submarine.

2. **Salient characteristics.**

2.1 **Precedence.** The amplifier-control group AN/SIA-116 shall be inaccordance with the applicable paragraphs of A-A-59003 and as specified herein. Whenever a requirement of A-A-59003 conflicts with a requirement of this specification, the requirement of this specification shall govern.

2.2 **Equipment complement.** The equipment shall consist of one deck mounted enclosure designed in a modular manner using standard sections both vertically and horizontally throughtout. The enclosure shall contain the following plug-in modules and sections:

4 - Microphone pre-amplifiers.
12 - Twenty watt power amplifiers.
2 - Amplifier oscillators.
1 - Relay section.
1 - Test section.

2.3 **Equipment function.** The function of the amplifier-control group, AN/SIA-116, described herein is to provide the control switching, amplification of voice and alarm signal, and generation of alarm signals required for general announcing system circuit 1 MC and submarine control announcing system circuit 7MC aboard submarines.

2.3.1 **Circuit 1MC function.** The function of the general announcing system circuit 1MC is to provide one way transmission of orders and electronically generated alarm signals to all areas of a submarine where ship's personnel are located.

2.3.2 **Circuit 7MC function.** The function of the submarine control announcing system circuit 7MC is to provide two way transmission of information between all important stations in a submarine.

2.3.3 **Other components.** Other components of circuits 1MC and 7MC. Other equipments used in circuts 1MC and 7MC but not covered by this specification are as specified in 2.3.3.1 through 2.3.3.4.

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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2.3.3.1 **Microphone stations**. Each microphone station consists of one type IC/MJB microphone jack box and one type IC/MPM microphone manufactured in accordance with EIA SE-105. Circuit 1MC microphone stations and circuit 7MC microphone stations are identical.

2.3.3.2 **Loudspeakers**. Types LS-305 and LS-387 loudspeakers in accordance with A-A-59002 are used at all locations requiring loudspeakers except on the bridge of the submarine. A type LS-450/SIC pressure proof loudspeaker is used at the bridge station for both talking and listening.

2.3.3.3 **Bridge talk switches**. For guidance purposes, a magnetic switch SBM 4000 manufactured in accordance with Drawing 815-1853067 is used at the bridge station of the submarine. The switch is designed for switching both circuit 1MC and circuit 7MC.

2.3.3.4 **Alarm contact makers**. All contact makers are normally open single pole switches. Contact makers for all alarms except the general alarm are held closed throughout the time the alarm is sounded. The contact maker for the general alarm, when actuated, momentarily closes the circuit and then opens.

2.4 **System operation**. The amplifier-control group, AN/SIA-116, shall be designed for use with the system components specified in 2.3.3 to provide the types of operation specified in 2.4.1 through 2.4.7.

2.4.1 **Microphone press-to-talk switches circuit 1MC**. The operation of a 1MC microphone press-to-talk switch at any local microphone station except the bridge shall:

(a) Connect the microphone audio circuit at that microphone station to the input of the selected 1MC group amplifiers.

(b) Actuate appropriate system priortity circuits.

(c) Place the connected 1MC group amplifiers in "ready" condition.

(d) Disconnect the adjacent loudspeaker on the local loudspeakers circuit associated with the microphone station box.

(e) Attenuate the ship's entertainment system.

2.4.2 **Microphone press-to-talk switches circuit 7MC**. The operation of a 7MC microphone press-to-talk switch at any local microphone station except the bridge shall:

(a) Connect the microphone audio circuit at that microphone station to the input of he selected 7MC group amplifier.

(b) Place the connected 7MC group amplifier in "ready" condition.

(c) Disconnect the adjacent loudspeaker on the local loudspeaker circuit associated with the microphone station box.

2.4.3 **Local loudspeaker cutout circuit**. A cutout circuit shall be included for each 1MC and 7MC microphone station to automatically disconnect local loudspeakers when the microphone is in use. The cutout circuit shall consist of a normally closed relay which shall operate to open the audio circuit supplying the local loudspeakers when the microphone press-to-talk switch is operated.

2.4.4 **Bridge, loudspeaker 1MC, 7MC talk switches**. The external bridge loudspeaker shal be used both as a loudspeaker and as a microphone. Operation from the bridge station depends on the three position bridge 1MC/7MC selector switch to be provided on the ampifier control cabinet. Operation from the bridge shall be as

follows:

(a) Switch set at "off" possition. The bridge talk/listen loudspeaker and the 1MC/7MC talk switch shall be disconnected from the system.

(b) Switch set at "bridge normal" position. Operation of 1MC talk switch, shal switch the 1MC amplifiers on, and the bridge talk/listen loudspeakers shall be connected to the input of the amplifiers and transmitted to all remote 1MC loudspeakers. Operation of circuit 1MC talk switch shall also provide voice priority over circuit 7MC. Operation of 7MC talk switch shall switch the 7MC amplifier on, and the bridge talk/listen loudspeaker shall be amplified by 7MC amplifiers and transmitted to all remote 7MC loudspeakers. Release of the 7MC talk switch shall cause the talk/listen loudspeaker to be connec ted to the 7MC amplifier output.

(c) Switch set at "bridge hands free" position. Under this condition circuit 1MC shall not be affected. THe 7MC amplifier shall be continuously energized and the talk/listen loudspeaker shall be connected to the input of the 7MC amplifier. Speech transmitted from the bridge talk/listen loudspeaker shall be amplified by the 7MC amplifier and transmitted to all 7MC remote loudspeakers. When a microphone at any remote 7MC microphone and loudspeaker station is operated the local loudspeaker at that station shall be muted. The microphone shall be connected to the input of the 7MC amplifier, and the bridge talk/listen loudspeaker transferred from the 7MC amplifier input to the output. Speech transmitted from this remote microphone loudspeaker station shall be amplified and transmitted to all other remote loudspeaker staions including the bridge talk/listen loudspeaker. Operation of 1MC talk switch from the bridge shall provide voice priority over circuit 7MC.

2.4.5 **Speech priorities**. Circuit 1MC and 7MC at the bridge station shall have priority over their respective circuits. Circuit 1MC at the bridge shall have priority over circuit 7MC.

2.4.6 **Circuit SE attenuation**. Operation of 1MC system from any 1MC microphone control station or the bridge shall operate a normally open relay which shall operate to complete an external attenuation circuit in the ship's entertainment system.

2.4.7 **Circuit SE muting**. Operation of any external alarm contact maker shall operate a relay which, through an external circuit, shall mute the output of the ship's entertainment system.

2.5. **Enclosure**. The design features of the enclosure shall be accomplished by dividing the amplifier control cabinet into standard size sections and further subdividing the sections to accommodate the various plug-in electronic units. Each of the standard size sections shall contain functional facilities as follows:

(a) Top section. The top section shall contain the forced air cooling fan or fans, ventilation louvers and all the necessary terminal boards for interconnection between the cabinet and the ship's wiring. A front plate for access to the terminal boards and a top plate for terminal tubes shall be provided.

(b) Control section. The control section shall be a hinge mounted panel with safety stops to hold panel in open position for servicing. The control panel shall contain the microphone and speaker disconnect switches, power supply switches, ampoifiers, oscillator and bridge transfer switches, fuses and power available indicator lamp.

(c) Amplifier and oscillator sections. THe amplifier and oscillator sections shall be subdivided into standard units to accommodate the pre-amplifiers, power amplifiers and oscillator units. Each amplifier and oscillator unit shall be of drawer type construction mounted on guide rails and connected by male and female receptacles. A safety catch shll be provided on the right side of the unit which

shall hold the unit in the service position. Release of the safety catch shall allow the unit to be disengaged from the track and completely removed from the cabinet. Dowels and matching bushings provided for support and alignment of units may be used to prevent the units from being accidentally inserted in the wrong tracks. The oscillator cards shall be provided with a device which will prevent inadvertent insertion of alarm cards in wrong order of priority. The device design shall also permit through simple adjustment interchangeability of the alarm cards.

(d) Relay and test sections. The same unit construction shall be considered in the design of these sections. However, should the unit construction design not be practical, components shall be mounted on hinged panels.

2.6 **Size**. Maximum overall dimensions of the amplifier-oscillator control rack shall be 1753 mm in height, 521 mm in width, and 381 mm in depth. Minimum practical dimensions consistent with design requirments will be acceptable.

2.7 **Semiconductors**. Semicondutor circuits shall be used exclusively.

2.8 **Relays**. Relays except power type contactors may be hermetically sealed.

2.9 **Output power**. The rated output power for the individual power amplifier units shall be 20 watts, minimum rating.

2.10 **Time constant**. Under the conditions specified in the overload limiter characteristic reqirements of A-A-59003, the pre-amplifier output voltage shall return to the value specified in the overload limiter characteristic requirements within 0.025 second after the sudden increase or decrease in input signal voltage above reference level.

2.11 **Interstage input facilities**. Interstage input circuit, input impedance and input level will not be required.

2.12 **Power supply**. Each amplifier or ampifier oscillator unit shall be provided with its own power supply for all power requirements of the unit.

2.13 **Output level**. The amplifier-oscilllators shall be capable of maintaining an output level equal to that selected for the microphone pre-amplifiers. This voltage shall be used as a test signal source as specified in A-A-59003.

2.14 **Adjustment of output level**. A locking type adjustment, adjustable by screwdriver, coin, or hand, shall be provided in the amplifier oscillator or in combination with the associated control circuits to permit independent adjustment of the amplifier oscillator output level for the alarm signal into the amplifier input.

2.15 **Visual alarm**. Operation of alarm signals 1 and 5 by the external contact makers shall operate a relay for control of external visual alram signal.

2.16 **Alarm signals**. The following alarms shall be provided and shall have the following order of priority:

(a) Collision alarm.
(b) Diving alarm.
(c) General alarm.

2.17 **Input facilities**. The number and type of microphone control stations associated with the amplifier system shall be as follows:

Microphone station number	Microphone station type	Circuits controlled
1 to 4	IC/MJB	1MC
1 to 12	IC/MJB	7MC

2.18 **Output facilities**. The number and designation of loudspeaker groups associated with the amplifier system shall be as follows:

Loudspeaker group number	Loudspeaker group designation	Circuit
1 to 4	(Blank)	1MC
1 to 12	(Blank)	7MC

2.19 **System switching functions**. The system swicthing of audio lines shall be accomplished at the intermediate audion level. Power amplification shall be fulfilled by bridging the inputs of the power amplifiers across their respective audio circuits. Circuit 1MC shall consist of one pre-amplifier and four power amplifiers. Circuit 7MC shall consist of one pre-amlifier and two power amplifiers. The combined 1MC and 7MC circuits shall comprise of group "A" amplifier channels. The remaining pre-amplifiers and power amplifiers shall likewise be connected to comprise the group "B" amplifier channel. An amplifier transfer switch shall be provided for transfer of the group "A" and "B" amplifiers as specified in A-A-59003.

2.20 **Power supply switches**. Separate power switches shall be provided as follows:

Each 1MC group amplifier unit.
Each 7MC group amplifier unit.
Each amplifier-oscillator unit.
Relay unit.
Forced air cooling blower.

2.21 **Test facilities**. Test facilities shall be provided as specified in A-A-59003.

2.21.1 **Amplifier start switches**. Nonlocking type start switches shall be provided and shall make it possible to place any of the individual power amplifiers under test in the "ready " condition. These switches shall not interfere with normal operation of the systme.

24.2 **Combined metering**. A common voltmeter with switching facilities shall be provided to monitor the output voltages of the operating power amplifier group. The same meter may also be used to measure the output voltages of the operating power amplifier group. The same meter may also be used to measure the output of a pre-amplifier, any power amplifier and any amplifier-oscillator selected for test. The meter shall indicate 0 dB for normal output of the units under test.

3. **Quality Assurance**.

3.1 **Responsibility for inspeciton**. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Goveernment reserves the right to perform any of the inspections set forth in t he specification; where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4. **Preservation, packaging, packing, labeling, and marking**. Preparation for delivery shall be as specified in A-A-59003.

5. **Notes**. The notes specified in A-A-59003 are applicable to this specification.

Preparing activity:
Navy - SH
(Project 6320-N049)