

I. TITLE: Introduction to UHF Communications and Introduction to the TED transmitter.

II. OBJECTIVES: When the student completes this lesson he will be able to:

- A. STATE the characteristics and capabilities of UHF COMMUNICATIONS.
- B. STATE the characteristics of the TED transmitter.
- C. LOCATE, IDENTIFY and STATE the functions of the external controls and indicators of the TED transmitter.

A. Characteristics of UHF Communications

- *1. UHF Range: 300 to 3000 MHz
2. NAVY uses: 225 to 400 MHz
3. Radiated Wave: DIRECT WAVE
4. Line-of-Sight: ANTENNA
TO ANTENNA

Capabilities of UHF Communications

5. Low Power and referred to as
SHORT RANGE
- *6. Primary use: TACTICAL
COMMUNICATIONS
7. Other Uses: RELAY
SHIP-TO-SHIP
AIRCRAFT
SATELLITE

B. Characteristics of TED transmitter

1. Description: SHORT RANGE
UHF TRANSMITTER
2. Freq. Range: 225 to 400 MHz
3. Power Output: 12 to 15 WATTS
4. Power output with the AM-1365
100 WATTS
5. Modes of Emission:

MCW

PHONE

MCW - MODULATED CW - PROVIDES 1000 Hz TONE FOR HOMING SIGNAL.

PHONE - ANY AUDIO INPUT (INCLUDE AM)



NOTE: The frequency marked on the TED transmitter crystal is the oscillator frequency. The transmitter output frequency is

12 times the oscillator frequency.

C. Functions of external controls and indicators of TED transmitter.

1. Power ON-Emergency OFF switch: HAS TO BE "ON"
 - a. Controls incoming voltage to equipment.
2. Start-Stop switch
 - a. Energizes and De-energizes the equipment.
3. Microphone Jack
 - a. Facilitates the use of a carbon microphone
 - b. Connected to SPEECH AMP
4. Earphone Jack:
 - a. Facilitates the use of earphones
 - b. Used for adjustment of modulation
 - c. Connected to Speech Amp.
5. Earphone level control
 - a. Controls volume to earphones
6. Handset Jack
 - a. Facilitates use of a dynamic handset
 - b. Connected to Speech Amp.
7. Line fuses:
 - a. protects the AC line input from voltage surges or overloads.
8. Modulator fuses
 - a. Protects the modulator from voltage surges or overloads
 - b. Connected to modulator assembly
9. Power ON light
 - a. RED (color) light
 - b. indicates the transmitter is ON.
10. Carrier ON light
 - a. GREEN (color) light
 - b. Indicates the transmitter is keyed

11. Carrier Test Switch (3 Position Toggle Switch)

- a. Depress Down (Momentary)

CARRIOR ON

- b. Depress UP: LOCKS
CARRIER ON

- c. Center position is OFF.

12. Meter

- a. Used in conjunction with a meter function switch.

13. Spare Line Fuses:

- a. Holder for a spare AC line fuse.

D. AUDIO SECTION (left hand door).

1. Local-Remote switch:

- a. Local ALLOWS LOCAL USE
OF AUDIO INPUT

- b. Remote ALLOWS USE OF
REMOTE UNIT

2. Speech Modulation level control

- a. Controls the level of the audio going to RF section
- b. Connected to modulation assembly

3. Expansion level control

- a. USED FOR PMS FOR ADJUSTMENT OF SPEECH AMPLIFIER

4. Speech Amplifier gain control

- a. Controls AUDIO output of speech amplifier.
- b. Connected to speech Amp.

5. MCW-PHONE Switch:

- a. MCW PROVIDE 1000 Hz AUDIO TONE
- b. PHONE ANY AUDIO INPUT

6. Meter function switch.

- a. 1st DBLE Ig INPUT TO
THE FIRST DOUBLER
- b. 2nd DBLR Ig INPUT TO
THE SECOND DOUBLER
- c. PA Ig INPUT TO THE POWER AMP

ALWAYS SET UP IN PHONE POSITION. KEEPS 1000 Hz FROM GOING OUT OVER AIR.

- d. OUTPUT: READ OUTPUT OF XMTR
- e. AVC: Automatic volume control, used for PMS.
- f. MOD: OUTPUT OF THE MODULATOR
- g. VOL EXP: (VOLUME EXPANDER)
USED FOR PMS
- h. 2nd DBLR Ip OUTPUT OF THE SECOND DOUBLER
- i. PA Ip: OUTPUT OF POWER AMP

Ip = CURRENT PLATE

E. RF SECTION (right hand door)

- 1. Crystal holder
 - a. Four positions
 - b. Connected to Master OSC.
- 2. R.F. Driver tuning
 - a. Used to tune the 1st and 2nd DBLR by position of meter switch.
 - b. Used in conjunction with a pointer to indicate approximate setting.
- 3. R.F. Driver Lock
 - a. Locks R.F. Driver tuning to guard against VIBRATION
- 4. P.A. Tuning Control
 - a. Used to tune output freq. of P.A.
 - b. Connected to P.A. Tripler by position of meter switch
- 5. P.A. Tuning Lock
 - a. Locks P.A. Tuning control to guard against VIBRATION

THE CRYSTAL YOU USED HAS TO BE ~~TO~~ THE RIGHT & TO THE REAR

I. TITLE: Introduction to the AN/URR-35 Receiver.

II. OBJECTIVES: When the student completes this lesson he will be able to:

- A. STATE the characteristics of the AN/URR-35 receiver.
- B. LOCATE, IDENTIFY and STATE the functions of the external controls and indicators of the AN/URR-35 receiver.

A. Characteristics of the AN/URR-35 ("RED")

1. Description: UHF RECEIVER
2. Freq. Range: 225-400 MHz
3. Type of frequency control
CRYSTAL CONTROL
VARIABLE MANUAL
4. Modes of Reception:
MCW
PHONE

B. Functions of external controls and indicators

1. Megahertz Dial
 - a. Indicates frequency of receiver
 - b. Reads directly in MHZ
2. Input Meter
 - a. Relative indication of input signal level
 - b. connected in the IF Amplifier
3. Crystal indicator LAMP
 - a. Indicates type of freq. control being used.
 - b. used with First Local OSC. and OSC switch
4. Output Meter
 - a. Indicates AUDIO output of receiver
 - b. Used in conjunction with tuning the receiver
 - c. Measured in decibels.

5. Fuses

- a. Line fuses, protect receiver from voltage surges or overloads.

6. Input MTR adjustment

- a. Adjusts input meter to zero
- b. Adjust with NO signal input
- c. Screw driver adjustment

7. Spare fuse

- a. Used for either side of line located in fuse holder on right hand door.

8. N.L. Switch

- a. N.L. means NOISE LIMITER
- b. Permits N.L. to be in or out of receiver circuits.
- c. This circuit acts as a noise peak limiter and is effective in the reduction of interference of noise peaks of HIGH INTENSITY and SHORT DURATION



9. SILENCER control

- a. Sets operating limit of silencing circuit
- b. Extreme care should be exercised at all times in order that WEAK SIGNALS will not be lost.



- c. Ordinarily the point at which noise just becomes inaudible under the condition of no signal input, with the A.F. level control set for max and the phones gain control in position 8.

10. A.F. Level control

- a. Audio gain control for receiver

PRIMARY GAIN OR VOLUME CONTROL

11. Headphones jack

- a. Provides mean for using standard headset

12. Power switch

- a. ON/OFF switch

13. Phones control

- a. ADJUSTS AUDIO TO PHONES ONLY

14. SILENCER SWITCH - PERMITS SILENCER CIRCUIT TO IN OR OUT POSITION

15. Dimmer control
 - a. controls intensity of panel illumination lamps
16. Lock
 - a. Locks tuning control
17. Tuning control
 - a. Used to tune the receiver
 - b. Frequency is indicated on MHZ dial above it.
18. Crystal holder
 - a. Mounts the freq. determining crystal
 - b. Used for crystal controlled operation

ONLY HOLDS 1 CRYSTAL

NOTE: To calculate the desired frequency from the crystal frequency use following formula: ~~Crystal freq X 12 - 18.6MHZ~~ *
Desired frequency.

19. OSC switch
 - a. determines whether receiver is crystal controlled or manually controlled

WORKS JUST LIKE A RADIO WHEN ON MANUAL

TO GET CRYSTAL ON RECEIVER, DO JUST LIKE "TED" BUT SUBTRACT 18.6 MHz TO GET CRYSTAL FOR "TED"

20. ALIGN-REC switch
 - a. controls the functional operation of the input meter
 - b. ALIGN: PERMIT USE OF METER TO ALIGN RECEIVER
 - c. REC: FOR RECEIVING A SIGNAL

RED AND TED CRYSTALS ARE NOT INTERCHANGEABLE

I. TITLE: Introduction to the AN/URC-9 Transceiver

II. OBJECTIVES: When the student completes this lesson he will be able to:

A. STATE the characteristics of the AN/URC-9 Transceiver.

B. LOCATE, IDENTIFY and STATE the functions of the external controls and indicators of the AN/URC-9 transceiver.

A. Characteristics of the AN/URC-9

1. Description: UHF

TRANSCEIVER

2. Freq. Range: 225 TO 399.9 MHz

3. Frequency control: 38

SELF-CONTAINED CRYSTALS

WHICH PRODUCE 1750 DIFFERENT

FREQ. SPACED .1 MHz. APART

4. Power output: 16-24 WATTS

5. Modes of Operation:

NOR ANY AUDIO INPUT

RETRANS PROVIDES FOR

AUTOMATIC RELAY

-tone PROVIDES 1000 Hz TONE

6. Memory Drum: Provides 19 channels on which frequencies can be programmed and retrieved when needed.

B. Functions of the external controls and indicators of the AN/URC-9

1. Power supply

a. Power Indicator: lights when primary power is applied

b. Power on Toggle switch: Used to turn on Transceiver

c. Dimmer control: controls intensity of panel lights

d. Fuses: Protect equipment from voltage surges or overloads

2. Transceivers

a. Audio Inputs

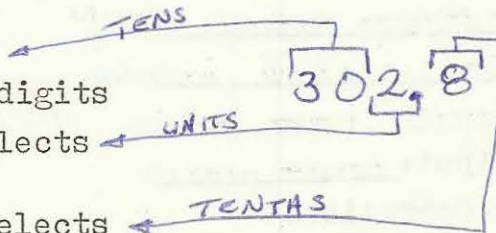
- (1) Microphone
- (2) Earphones
- (3) Handsets (two dynamic Handsets)

b. CHAN SEL control: a 21 position switch

- (1) Remote-Preset: transfers **FDR** use with C-3866/SRC & C-3868/SRC control to the Remote channel selector
- (2) Positions 1-19 selects **CORRESPONDS TO MEMORY DRUM SETTINGS** preset channels 1-19
- (3) MANUAL: transfers freq. selection to Manual Freq switches.

c. MANUAL FREQUENCY switches: selects manual operating frequency.

- (1) TENS switch selects first two digits
32 to 39
- (2) UNITS switch - selects third digit
0 to 9
- (3) TENTHS switch - selects fourth digit.
0 to 9



d. CHANNEL indicator Indicates preset channel in use

FREQ. CHAN. 18 is 306.8



e. Frequency Indicators Indicates frequency in use.

f. SQUELCH control Establishes minimum strength of signal required to operate receiver.

REMOVES STATIC & NOISE. BE CAREFUL, IT CAN ELIMINATE SIGNAL ALL TOGETHER.

g. SQUELCH DISABLE-PUSH switch

- (1) Disables squelch circuit when pressed.
- (2) Inoperative when CHAN SEL switch is in REMOTE-PRESET

h. CALL LIGHT

- (1) Lights when squelch is disabled or WHEN A SIGNAL IS RECEIVED.

i. VOLUME control

adjusts audio level to local speaker or remote speaker

j. MODE switch

NOR ANY AUDIO INPUT

RETRANS AUTOMATIC RELAY

TONE 1000HZ AUDIO TONE

k. Meter and Meter switch

Meter monitors any of twelve functions selected by meter switch

- (1) METER TURNS METER "OFF"
 - (2) S RECEIVED SIGNAL STRENGTH - NORMAL
 - (3) SWR STANDING WAVE RATIO
(REFLECTED POWER) - ZERO (ALL THE WAY TO THE LEFT)
 - (4) PWR POWER (FORWARD POWER) - NORMAL
 - (5) DVR Ib DRIVER PLATE CURRENT - NORMAL
 - (6) PA Ig PA POWER GRID (INPUT TO PA) - NORMAL
 - (7) PA Ib PA PLATE CURRENT (OUTPUT OF PA) - NORMAL
 - (8) %MOD % MODULATION - VARIES WITH VOICE
- 1-110-200-1
- (9) +26.5V } VOLTAGE
 - (10) +125V } READINGS
 - (11) +325V }
 - (12) BIAS MINUS 11 VOLTS READING

I. TITLE: Introduction to the AN/SRC-21 Transceiver

II. OBJECTIVES: When the student completes this lesson he will be able to:

- A. STATE the characteristics of the AN/SRC-21 transceiver
- B. IDENTIFY the components of the AN/SRC-21 transceiver
- C. LOCATE, IDENTIFY and STATE the functions of the external controls and indicators of the AN/SRC-21 transceiver

A. Characteristics of the AN/SRC-21

1. All the characteristics of the AN/SRC-21 are the same as for the AN/URC-9 transceiver.

B. Components of the AN/SRC-21

1. AN/URC-9, Transceiver
2. C-3866/SRC, Radio Set Control

★ a. Provides primary AC power to ENTIRE UNIT

★ b. Allows the AN/URC-9 to be operated from a remote station

3. C-3868/SRC, Indicator control.

a. Optional equipment

b. Device for remote channelization of AN/URC-9

c. Maximum of 4 C-3868'S wired to one C-3866.

4. AN/SRA-33, Antenna Coupler

a. Optional equipment

b. Four couplers in a cabinet

C. Functions of the external controls and indicators of the AN/SRC-21

1. AN/URC-9 transceiver - All the functions are the same as for the AN/URC-9 previously taught.

2. C-3866/SRC, Radio Set Control

- a. Fuses - Protects the entire system from voltage surges or overloads
- b. Emergency Power switch - Controls primary power to entire system.
- c. Emergency Power light - indicates when emergency power is ON.
- d. Radio Set Power -

START ENERGIZES EQUIPMENT

STOP DEENERGIZES EQUIPMENT

LIGHT INDICATES EQUIP. IS ENERGIZED

- e. Local - Remote

LOCAL - ALLOWS USE OF C-3866 & DISCONNECTS C-3868

REMOTE - DISCONNECTS C-3866 & CONNECTS C-3868

- f. Channel Dial -

Telephone type dial for selecting preset channels when CHAN SEL on URC-9 is in REMOTE PRESET.

When used with SRC-20, the AM-1565 must be in remote.

★ NOTE: TO DIAL CHANNELS 11 thru 19 dial (A) for the tens unit or replace the number 1.

- g. Squelch controls - 19 POTENTIOMETERS, 1 FOR EACH CHANNEL
Controls the ability to adjust the squelch, there is one for each channel; enables presetting of the squelch on each channel. When using URC-9 it is in REMOTE PRESET.

3. C-3868/SRC, Indicator Control

- a. ON-OFF switch - Energizes the C-3868

ONLY

- b. Channel dial - serves the same function as the dial on the C-3866, but it is in a remote location

- c. Indicator - Indicates whenat channel the URC-9 is on and also if C-3866 is in Local or Remote
- d. Chart -
For writing the frequency of the different channels at the remote location so operating personnel know what frequency they are operating on

4. AN/SRA-33, Antenna Coupler

COME IN BANKS OF 4.

- a. Power ON-OFF switch
Energizes the whole bank of couplers.
- b. Manual, Local-Preset, Remote-Preset
MANUAL - for use when manually setting up frequency

Local Preset - Used when setting up memory drum

Remote-preset - Used when you are using the coupler from remote.

- c. Manual Frequency Controls -
Used when the frequency is manually set up

- d. Memory Drum -
19 Preset channels can be set on the memory drum for remote operation

- e. Channel selector - *HAS A WINDOW TO INDICATE CHANNEL*
Used with the Local-Preset when presetting the 19 channels.



- f. Frequency window -
Indicates the frequency that has been tuned up from the memory drum or manual freq. controls.

- g. Meter -

Forward R.F. INDICATES
FORWARD POWER

Reflected R.F. PWR INDICATES
REFLECTED POWER

I. TITLE: Introduction to the AN/SRC-20 Transceiver

II. OBJECTIVES: When the student completes this lesson he will be able to:

- A. STATE the characteristics of the AN/SRC-20 transceiver
- B. IDENTIFY the components of the AN/SRC-20 transceiver
- C. LOCATE, IDENTIFY and STATE the functions of the external controls and indicators of the AN/SRC-20 transceiver.

A. Characteristics of the AN/SRC-20

1. Most characteristics of the AN/SRC-20 are the same as for the AN/URC-9

2. Exception: Power output is

100 TO 200 WATTS

B. Components of the AN/SRC-20

1. AN/URC-9, XCVR

2. C-3866/SRC, RADIO SET CONTROL

3. C-3868/SRC, INDICATOR CONTROL ← OPTIONAL

4. AM-1565/URT, RF POWER AMP

5. AN/SRA-33, ANTENNA COUPLER ← OPTIONAL

C. Functions of the external controls and indicators of the AN/SRC-20

1. AN/URC-9, All the functions are the same as for the AN/URC-9 transceiver as previously taught.

2. C-3866/SRC, Radio Set Control, all the functions are the same as for the C-3866/SRC previously taught.

3. C-3868/SRC, Indicator Control, all the functions are the same as the C-3868/SRC previously taught.

4. AM-1565/URT, Radio Frequency Amplifier.

a. Power switch - ON/OFF SWITCH
Applies input AC power to R.F. Amplifier.


b. Power Indicator -
Indicates that primary Power has been applied

- c. Meter switch - selects one of 11 functions to be monitored. The two, Radio-man would be concerned with are:

PWR - FORWARD POWER

SWR - REFLECTED POWER

- d. Dimmer control - controls brilliance of front panel indicator lamps

-  e. CAUTION INDICATOR - YOU MIGHT GET SHOCKED, BAD! DO NOT TOUCH!
Indicates when HIGH VOLTAGE CALL ET.

PROTECTION has been removed.

- f. Test Key switch -

(1) OFF DISCONNECTED

(2) ON MOMENTARY CARRIER ON

(3) LOCK ON LOCKS CARRIER ON

- g. HV B+ -

Indicates that high voltage B+ is ON.

NOTE: THIS IS A TIME DELAY SWITCH AND AMPLIFIER WILL NOT COME ON FOR APPROXIMATELY 5 MINS AFTER YOU TURN IT ON.

- h. Manual tuning control -

Provides manual frequency control

- i. Excitation control -

(1) LOW-HIGH, provides manual low or high excitation adjustment

LOW - 100 WATTS OUT
HIGH - 200 WATTS OUT

(2) AUTO-MANUAL, provides manual or automatic excitation control.

- ~~j. ANT 500ohms coaxial connector - Provides 500ohms output from amplifier~~

- ~~k. R.F. Input 50ohms coaxial connector - Provides input to R.F. Amplifier from exciter AN/URC-9~~

l. LOCAL-REMOTE -
provides local or remote control
of desired frequency channels.

m. OUTPUT LOADING screws.

Matches amplifier output to load
impedance (resistance) for
each channel.

n. Channel tuning potentiometers -
Provides tuning for 19 preset
channels

o. CHAN SEL switch -
provides selection of preset
and manual channels in local
operation

p. FREQ-MC meter -
Indicates frequency of
amplifier in MHZ,

q. ~~LOG-LOG dial -~~
~~NOT used by U.S. NAVY.~~

r. R.F. Power output switch -

(1) HIGH PROVIDES 100 TO 200
WATTS OUTPUT

(2) LOW BYPASSES AMPLIFIER.
ONLY HAVE 16-24 WATTS OUTPUT.

(MAKES IT AN SRC-21 AGAIN RATHER
THAN THE SRC-20)

5. AN/SRA-33, ANTENNA COUPLER

a. All the functions are the same as for the AN/SRA-33
previously taught.