

CLASS NOTES: HF Systems Week Seven (7-1-1)

TITLE: Introduction to the AN/WRC-1 High Frequency Transmitter/Receiver Group

NOT A TRANSCEIVER

OBJECTIVES: Upon completion of this lesson you will be able to:

- A. State the basic characteristics of the AN/WRC-1 Transmitter/Receiver Group
- B. Locate, Identify and State the function of the front panel controls and indicators of the T-827/URT HF Transmitter
- C. Locate, Identify and State the function of the front panel controls and indicators of the AM-3007/URT HF RF Amplifier
- D. Locate, Identify and State the function of the front panel controls and indicators of the R-1051/URR HF Radio Receiver
- E. Explain Frequency Application utilized on R-1051/URR Radio Receiver

I. AN/WRC-1 Transmitter/Receiver Group

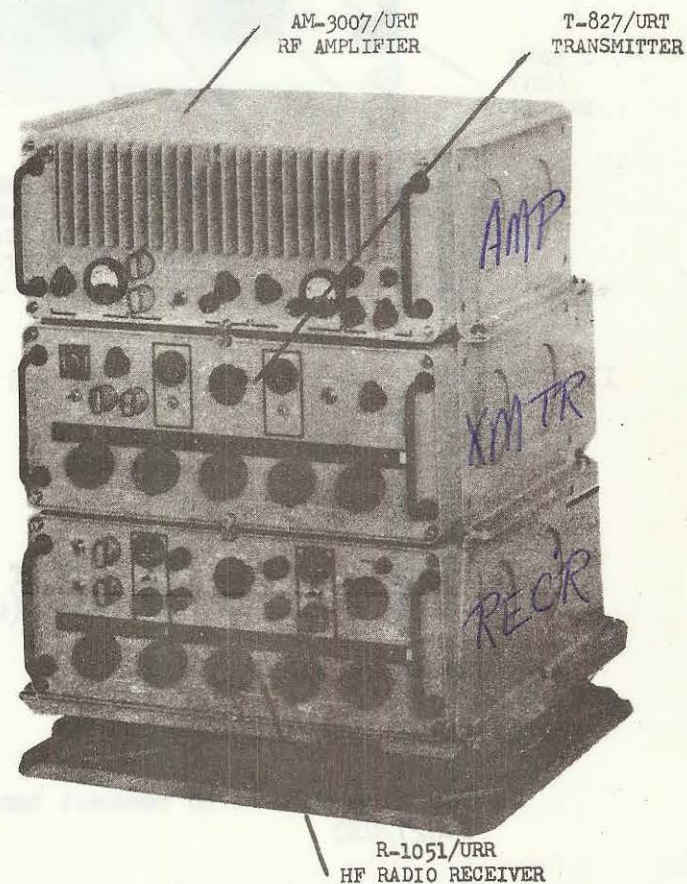
A. General Description/Characteristics

1. Single Sideband Radio Set
2. Transmits and/or Receives on any one of 56,000 Channels spaced in 0.5KHZ increments
3. Frequency Range 2 to 29.9995 MHz
4. Modes of Operation
  - a. Transmit - USB, LSB, ISB, CW, (RFS) FSK, Compatible AM (<sup>INDEPENDENT SIDE BAND</sup> 1 SIDE BAND, NO CARRIER, LONG RANGE)
  - b. Receive - USB, LSB, ISB, CW, FSK, Compatible AM, FAX (PICTURED), Mod. CW, and Standard AM

B. Composition and Component Function

KNOW NOMENCLATURE

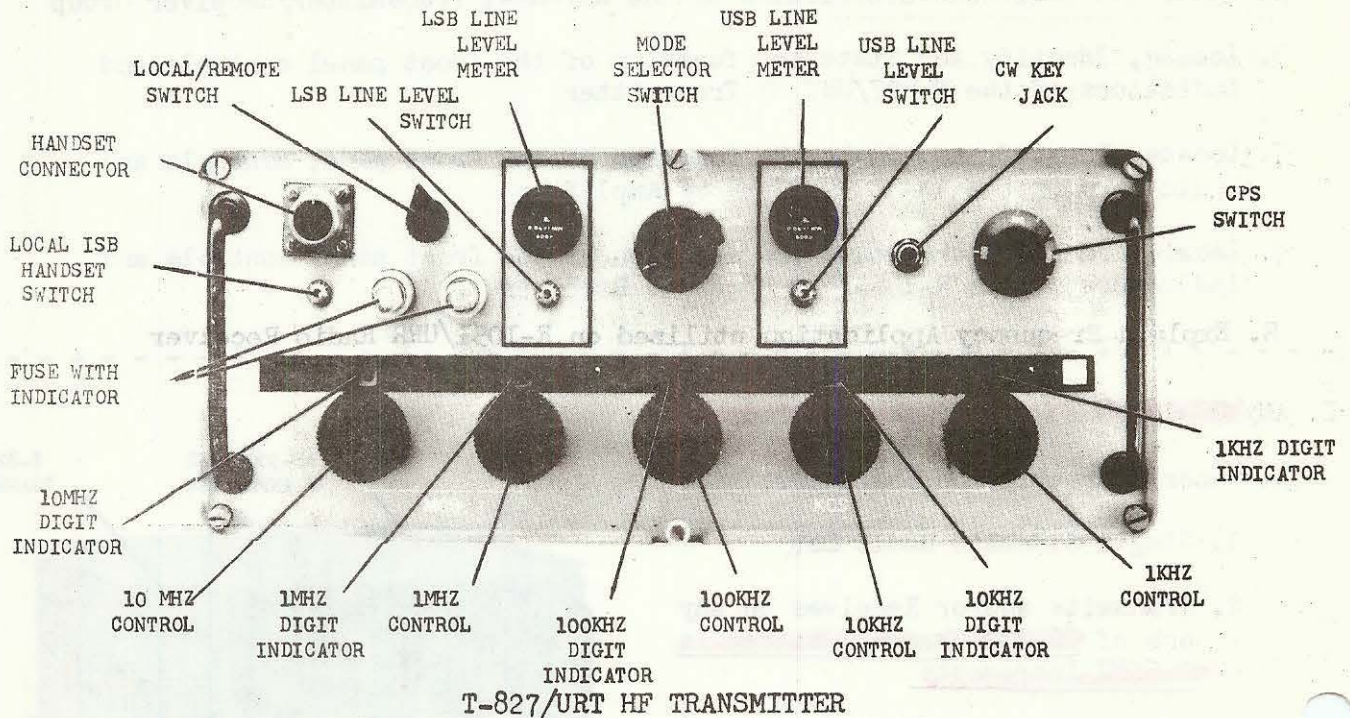
1. T-827/URT HF Transmitter - Modulates a RF Signal of sufficient strength to drive AM-3007/URT RF Amplifier.
2. AM-3007/URT RF Amplifier - Increases RF output from T-827 to 100 Watts peak envelope power for SSB use, 50 Watts CW or FSK, and 25 Watts AM.



AN/WRC-1

3. R-1051/URR HF Radio Receiver - Receives and demodulates RF Signals in the 2 to 30MHZ Frequency Range.

4. CAN BE USED w/ OR INDEPENDENTLY OF ONE ANOTHER, NOT A TRANSCIVER.



## II. T-827/URT Front Panel Controls and Indicators

### A. LOCAL ISB HANDSET switch

1. Locate and Identify
2. Function - Selects Channel of audio output during ISB operation (USB or LSB)

### B. HANDSET connector

1. Locate and Identify
2. Function - Used to connect handset to T-827/URT

### C. FUSES (with indicator)

1. Locate and Identify
2. Function - Protects against overload; indicator glows when fuse is open

D. LOCAL/REMOTE switch

1. Locate and Identify
2. Function - Selects local or remote keying input

E. LSB LINE LEVEL switch

1. Locate and Identify
2. Function - Selects range for LSB Line Meter

F. LSB LINE LEVEL meter

1. Locate and Identify
2. Function - Indicates LSB audio input line level

G. MODE SELECTOR switch

1. Locate and Identify
2. Function - Selects mode of operation

NEVER TURN TO "OFF" UNLESS ALL PUT IN "STAND BY"  
POWER IS LOST.

H. USB LINE LEVEL switch

1. Locate and Identify
2. Function - Selects range for USB Line Meter

-10 DB ≠ +10 DB POSITION

I. USB LINE LEVEL meter

1. Locate and Identify
2. Function - Indicates USB audio input line level

J. CW KEY jack

1. Locate and Identify
2. Function - Used to connect local CW hand key

K. 10MHZ control and indicator

1. Locate and Identify
2. Function - Selects 10MHZ digit of desired operating frequency

DIALS UP ONLY 0, 1, or 2.

L. 1MHZ control and Indicator

1. Locate and Identify
2. Function - Selects 1MHZ digit of desired operating frequency

SAME  
AS  
USB

M. 100KHZ control and indicator

1. Locate and Identify
2. Function - Selects 100KHZ digit of desired operating frequency

N. 10KHZ control and indicator

1. Locate and Identify
2. Function - Selects 10KHZ digit of desired operating frequency

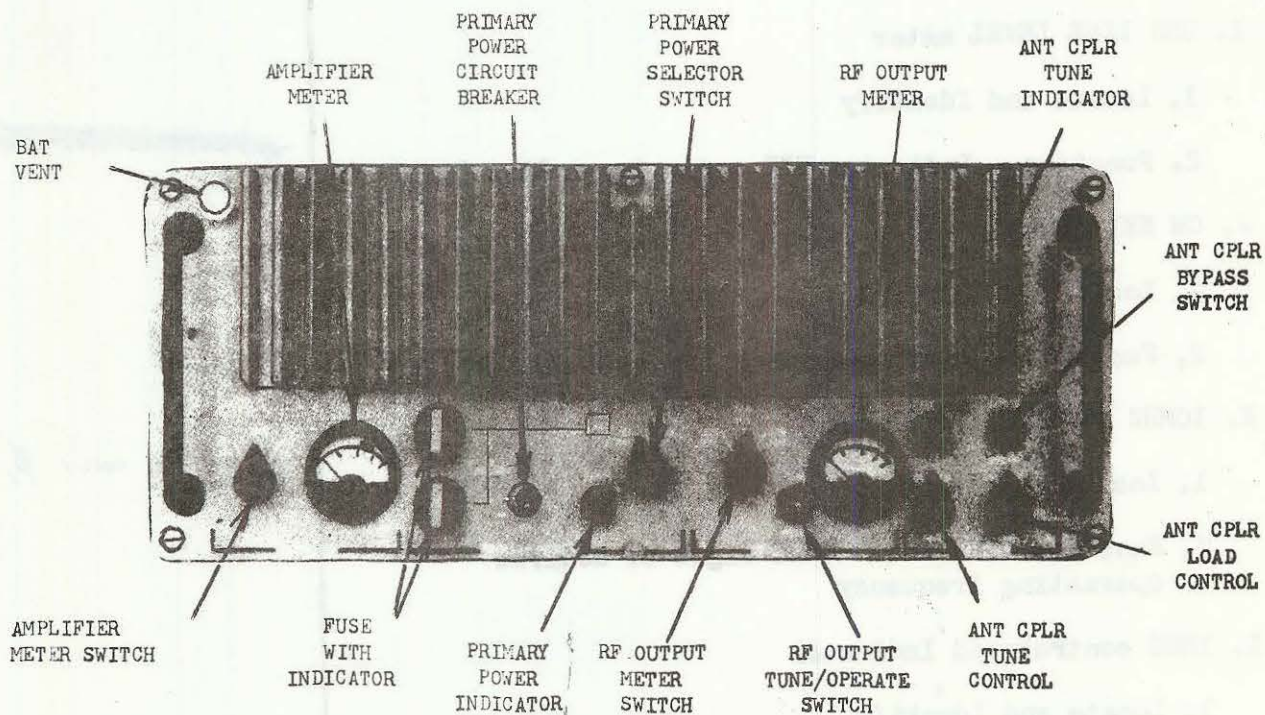
O. 1KHZ control and indicator

1. Locate and Identify
2. Function - Selects 1KHZ digit of desired operating frequency

P. CPS switch

*000 to 999 Hz in  
100 Hz Steps.*

1. Locate and Identify
2. Function - Increases tuning capabilities



RF AMPLIFIER AM-3007/URT

### III. AM-3007/URT Front Panel Controls and Indicators

#### A. BAT VENT

1. Locate and Identify
2. Function - Not used in AN/WRC-1

ALLOW Fumes From INTERNAL BATTERY TO ESCAPE

#### B. AMPLIFIER METER switch

1. Locate and Identify
2. Function - Selects circuits to be monitored by AMPLIFIER meter

3 POSITION (SPRING LOADED)  
1) DRIVE CATHODE  
2) LINE  
3) PA PLATE

#### C. AMPLIFIER meter

1. Locate and Identify
2. Function - Provides indications driver cathode current, equipment input line voltage, and power output stage plate current

CHECK ONCE A DAY

#### D. PRIMARY POWER fuse with indicator

1. Locate and Identify
2. Function - Protects against overload; indicator glows when fuse is open

FOR AC POWER

#### E. PRIMARY POWER circuit breaker (OFF/ON SWITCH)

1. Locate and Identify
2. Function - Controls primary power input to AN/WRC-1 Radio Set

#### F. PRIMARY POWER selector switch

1. Locate and Identify
2. Function - Selects primary power for AM-3007/URT.

INT BATT OR EXT DC

AC = INT BATT

#### G. RF OUTPUT meter switch

1. Locate and Identify
2. Function - Selects ranges for RF OUTPUT meter

100W REFL  
30W REFL  
100W FWD

H. RF OUTPUT meter

1. Locate and Identify
2. Function - Provides indication of transmitted and reflected power output

I. RF OUTPUT TUNE/OPERATE switch

1. Locate and Identify
2. Function - Controls system keying for tuning of antenna coupler

J. ANT CPLR TUNE control

1. Locate and Identify
2. Function - Used in conjunction with ANT CPLR LOAD control to fine tune antenna coupler

K. ANT CPLR LOAD control

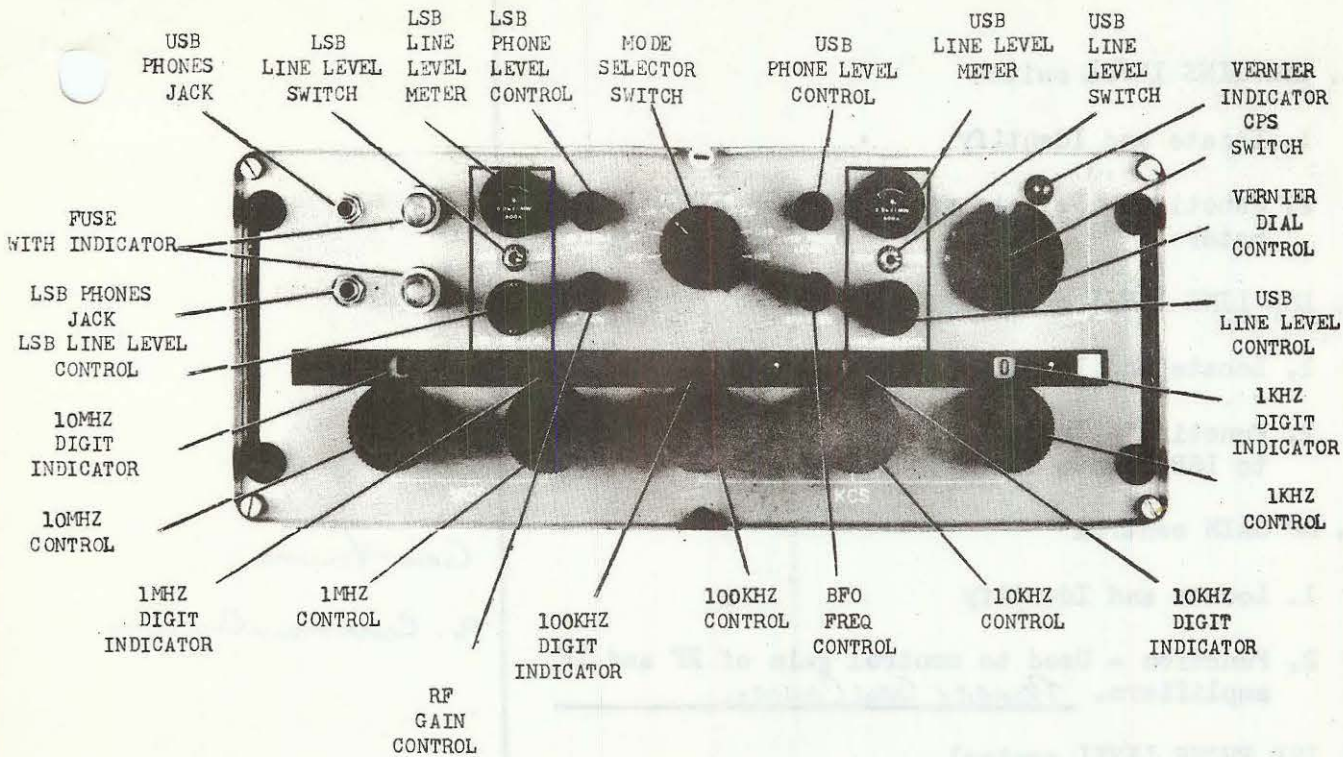
1. Locate and Identify
2. Function - Used in conjunction with ANT CPLR TUNE control to fine tune antenna coupler

L. ANT CPLR TUNE indicator

1. Locate and Identify
2. Function - Flashes when rough-tuning antenna coupler, when lamp goes out the antenna coupler is rough tuned

M. ANT CPLR BYPASS switch

1. Locate and Identify
2. Function - Switches antenna coupler elements into and out from receiver antenna RF line



**R-1051/URR Radio Receiver**

*2 to 30 MHz*

IV. R-1051/URR Front Panel Controls and Indicators

A. LSB PHONES jack

1. Locate and Identify
2. Function - Used to connect headset to LSB receiver output

B. USB PHONES jack

1. Locate and Identify *FOR EVERYTHING EXCEPT LSB & ISB (LOWER)*
2. Function - Used to connect headset to USB receiver output

C. Fuses with indicator

1. Locate and Identify
2. Function - Protects against overload; indicator glows when fuse is open

D. LSB LINE LEVEL control

1. Locate and Identify
2. Function - Used to adjust volume of remote audio for LSB and ISB (LSB) operation

*SWR AS USB*

SAME AS USB

E. LSB LINE LEVEL switch

- 1. Locate and Identify
- 2. Function - Selects range for LSB LINE LEVEL meter

F. LSB LINE LEVEL meter

- 1. Locate and Identify
- 2. Function - Indicates level of audio supplied to LSB remote lines

G. RF GAIN control

- 1. Locate and Identify
- 2. Function - Used to control gain of RF and IF amplifiers. PRIMARY GAIN CONTROL

GAIN = VOLUME

PAT COMPLETELY COUNTERCLOCKWISE

H. ISB PHONE LEVEL control

- 1. Locate and Identify
- 2. Function - Used to adjust volume of audio applied to headphones in LSB and ISB (LSB) operation

I. MODE SELECTOR switch

- 1. Locate and Identify
- 2. Function - Selects mode of operation

J. BFO FREQUENCY control *BEAT FREQ. OSC.*

- 1. Locate and Identify
- 2. Function - Used to adjust pitch of audio output tone when receiving CW

K. USB PHONE LEVEL control

- 1. Locate and Identify
- 2. Function - Used to adjust volume of audio applied to phones in USB, ISB (USB), FSK, CW and AM operation



L. USB LINE LEVEL control

1. Locate and Identify
2. Function - Used to <sup>IN DB</sup> adjust volume of remote audio for USB, ISB (USB), FSK, CW and AM operation

M. USB LINE LEVEL switch

1. Locate and Identify  $\phi$  OR  $+2\phi$  DB  
ADJUST TO  $\phi$  DB ON METER
2. Function - Selects range for USB LINE LEVEL meter

N. USB LINE LEVEL meter

1. Locate and Identify
2. Function - Indicates level of audio supplied to USB remote lines

O. CPS switch

1. Locate and Identify  $\phi\phi\phi$  to  $9\phi\phi$  Hz  
IN  $1\phi\phi$  Hz STEPS
2. Function - Increases tuning capabilities

P. VERNIER control

1. Locate and Identify MUST BE POSITIONED SO  
RED "V" IS SHOWING
2. Function - Used to provide continuous tuning between any two 1KHZ increments  $\phi\phi\phi$  to  $1\phi\phi\phi$  Hz

USED TO GET A FULL 30 MHz

Q. VERNIER indicator

1. Locate and Identify
2. Function - Indicator flashes to indicate that CPS switch is in the VERNIER position

R. 10MHZ control and indicator

1. Locate and Identify  $\phi, 1, \& 2$  ONLY
2. Function - Selects 10MHZ digit of desired operating frequency

S. 1MHZ control and indicator

1. Locate and Identify
2. Function - Selects 1MHZ digit of desired operating frequency

station. The following guidelines apply when selecting desired frequency:

1. When receiving CW, AM, FAX or MCW, receiver should be tuned to the Assigned Frequency
2. When receiving LSB, USB or LSB the receiver should be tuned to the Suppressed Carrier Frequency. This is done by adding 2 KHZ to the Assigned Frequency during LSB operation, and subtracting 2 KHZ from the Assigned Frequency during USB operation
3. During FSK operation, 2 KHZ must be subtracted from the Assigned Frequency to compensate for a 2 KHZ tone being supplied by the FSK unit of the Transmitting Station

~~LSB = AF + 2 KHz~~  
~~USB = AF - 2 KHz~~

EXAMPLE:

