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

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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 (INDEPENDENT SIDE BAND), CW, (RFCS) FSK, Compatible AM (1 SIDEBAND W/CARRIER LONG RANGE)

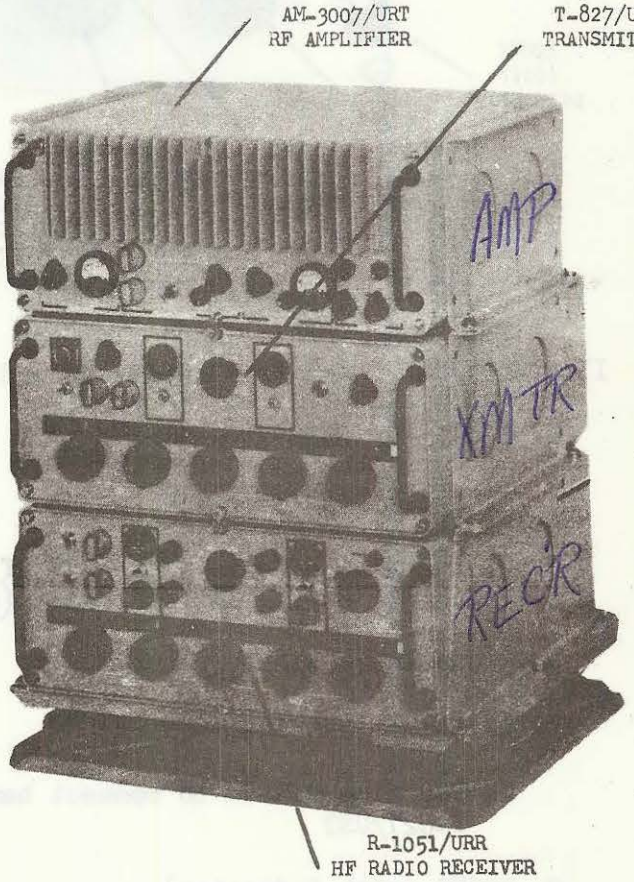
b. Receive - USB, LSB, ISB, CW, FSK, Compatible AM, FAX (PICTURES) MOD. CW, and Standard AM

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.

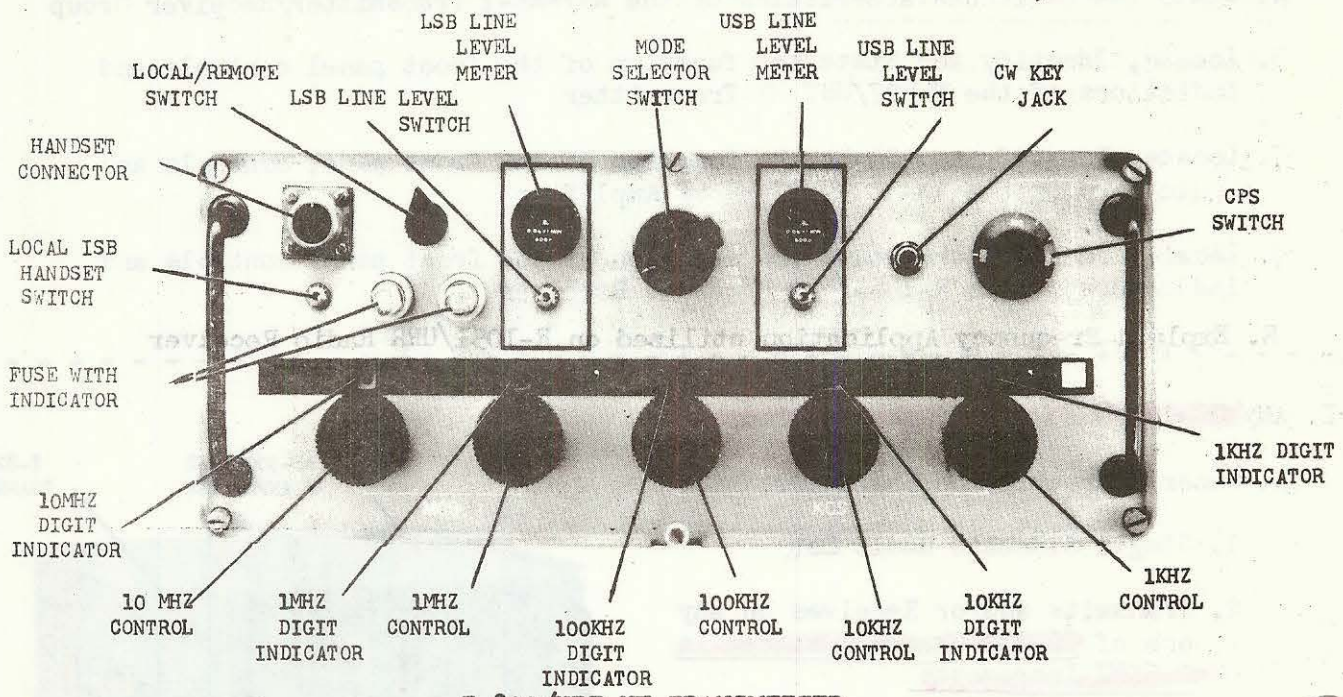
2. AM-3007/URT RF Amplifier - Increases RF output from T-827 to 100 Watts peak envelope power for SSB use, 50 Watts CW or FSK, and 25 Watts AM.



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 TRANSCEIVER.



T-827/URT HF TRANSMITTER

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

SAME AS USB

F. LSB LINE LEVEL meter

1. Locate and Identify

2. Function - Indicates LSB audio input line level

G. MODE SELECTOR switch — NEVER TURN TO "OFF" UNLESS ALL POWER IS LOST. / PUT IN "STAND BY"

1. Locate and Identify

2. Function - Selects mode of operation

H. USB LINE LEVEL switch — -10 DB ≠ +10 DB POSITION

1. Locate and Identify

2. Function - Selects range for USB Line Meter

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 — DIALS UP ONLY 0, 1, OR 2.

1. Locate and Identify

2. Function - Selects 10MHZ digit of desired operaating frequency

L. 1MHZ control and Indicator

1. Locate and Identify

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

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

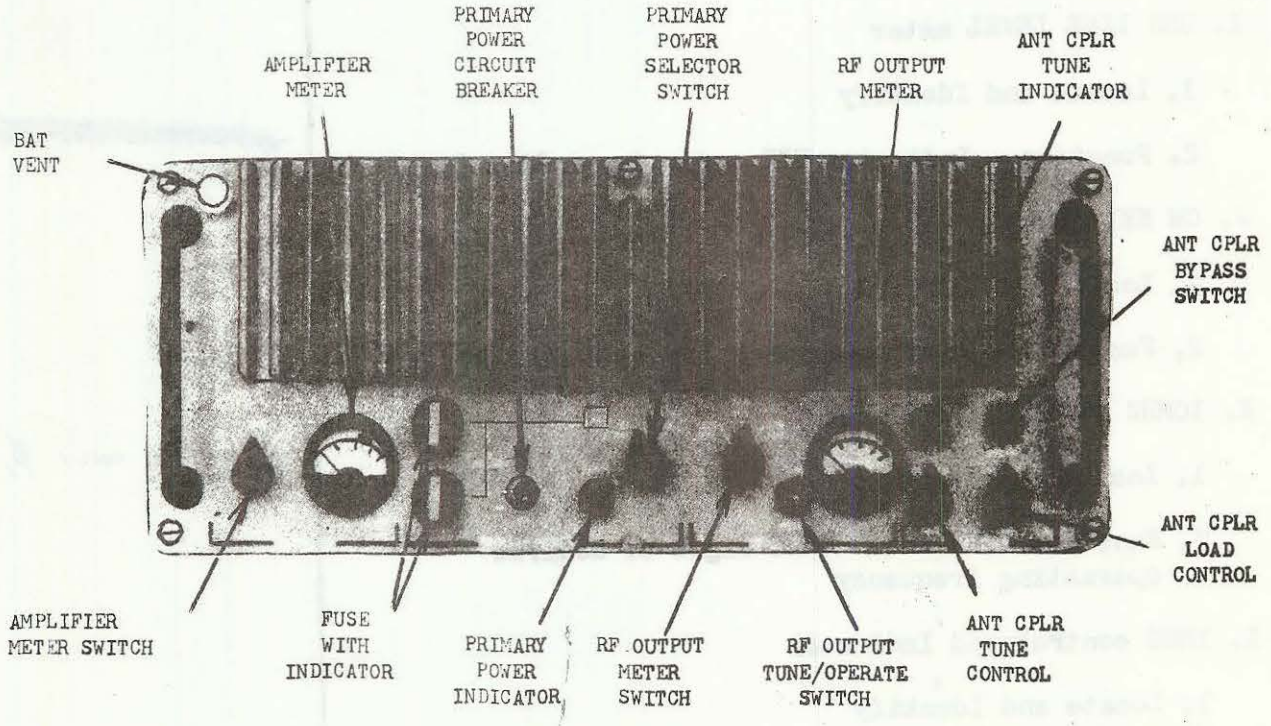
1. Locate and Identify

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

P. CPS switch ØØØ to 9ØØ 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

ALLOW FUMES FROM INTERNAL BATTERY TO ESCAPE

2. Function - Not used in AN/WRC-1

B. AMPLIFIER METER switch

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

1. Locate and Identify

2. Function - Selects circuits to be monitored by AMPLIFIER meter

C. AMPLIFIER meter

1. Locate and Identify

CHECK ONCE A DAY

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

D. PRIMARY POWER fuse with indicator

1. Locate and Identify

FOR AC POWER

2. Function - Protects against overload; indicator glows when fuse is open

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

INT BATT OR EXT DC

AC = INT BATT

1. Locate and Identify

2. Function - Selects primary power for AM-3007/URT.

G. RF OUTPUT meter switch

1ØØW REFL
3ØW REFL
1ØØW FWD

1. Locate and Identify

2. Function - Selects ranges for RF OUTPUT meter

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

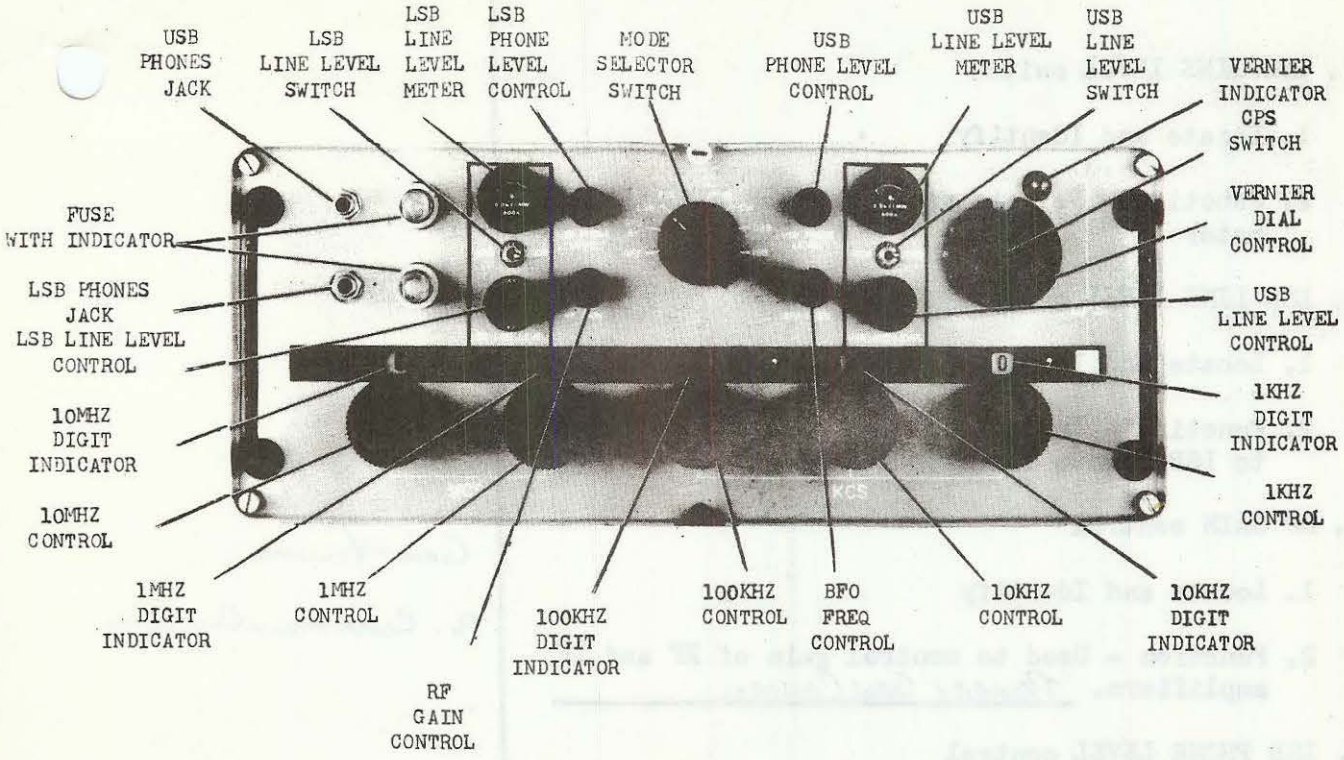
1. Locate and Identify

2. Function - Flashes when rough-tunning 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

FOR EVERYTHING EXCEPT LSB & ISB (LOWER)

1. Locate and Identify

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

SAME AS USB

1. Locate and Identify

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

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

GAIN = VOLUME

PUT COMPLETELY CLOCKWISE

1. Locate and Identify

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

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 adjust volume of remote audio (IN DB) for USB, ISB (USB), FSK, CW and AM operation

M. USB LINE LEVEL switch

1. Locate and Identify (Ø OR +2Ø DB) (ADJUST TO Ø 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 (ØØØ to 9ØØ Hz IN 1ØØ 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 (ØØØ to 1ØØØ Hz) (USED TO GET A FULL 3Ø 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 (Ø, 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 ISB 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

LSB = AF + 2 KHz
USB = AF − 2 KHz

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

EXAMPLE:

LSB ASSIGNED FREQUENCY	SUPPRESSED CARRIER FREQUENCY	USB ASSIGNED FREQUENCY
2714 KHZ	2716 KHZ	2718 KHZ
CW, AM, FAX, MCW	LSB, USB, LSB	CW, AM FAX, MCW