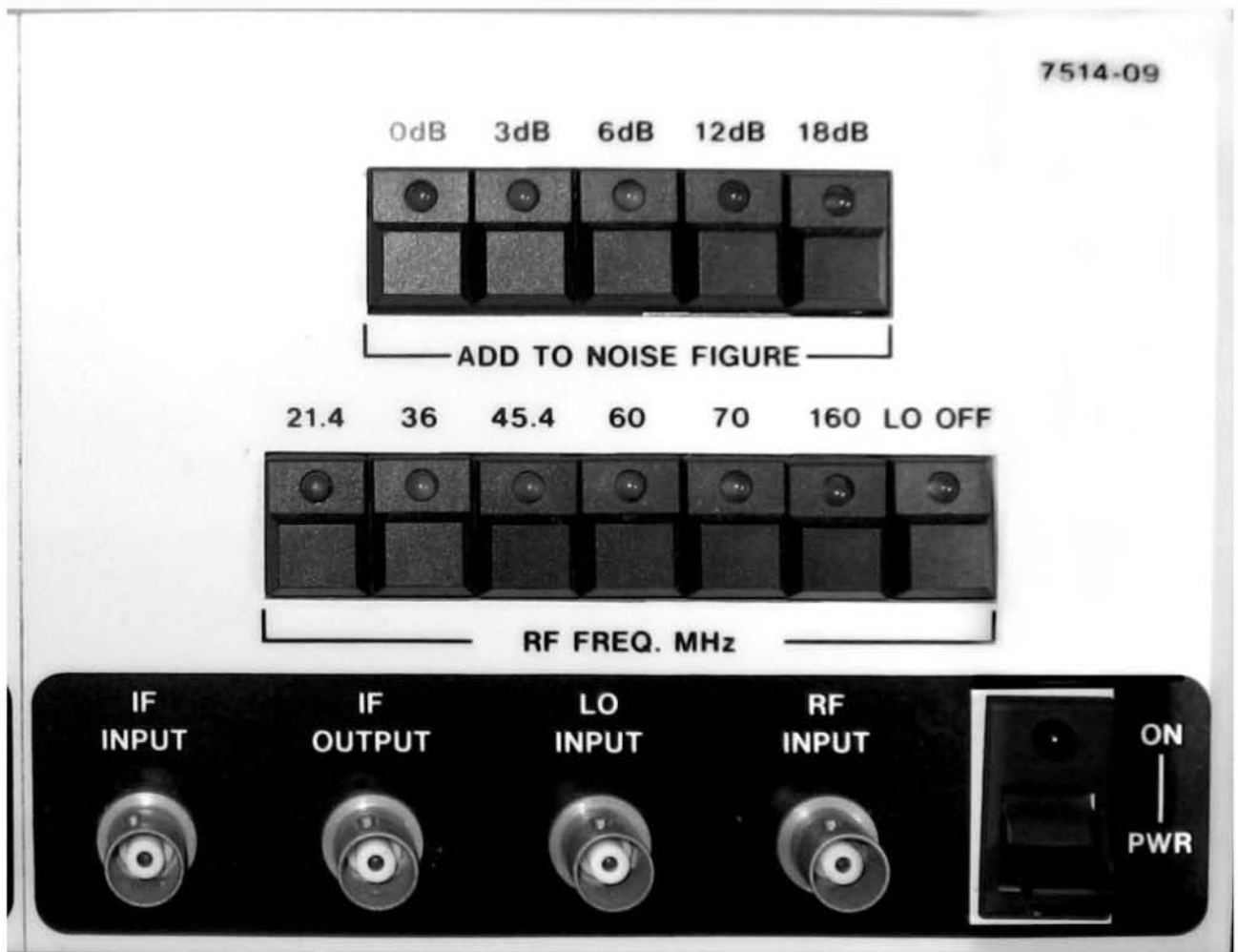



# AIL 7514 Option 09 Front-Panel



  
Jumper to use

## CHAPTER II

### INSTALLATION

#### 2-1. INTRODUCTION

2-2. This chapter describes unpacking, inspection, field installation, preparation for use, and initial checkout of the AILTECH -09 Option used in conjunction with the 7514 Precision Automatic Noise Figure Indicator (PANFI).

#### 2-3. UNPACKING, INSPECTION AND DAMAGE CLAIMS

2-4. No special instructions or precautions are necessary for unpacking the -09 Option. Factory installed options are ready for use immediately upon receipt. For units that are to be installed in the field, a field installation section (2-7 to 2-12) is provided. The following checks should be made to insure that no damage has occurred during shipment.

- a. Inspect the shipping container prior to acceptance from the carrier. Note any damage to the shipping container on the carrier's receipt.
- b. Inspect the instrument for damage. Check for dents, scratches, broken switches, connectors, etc.
- c. Remove the top and bottom covers of the 7514 if applicable and inspect for broken components or loose hardware.
- d. If damage is not apparent until after the instrument has been accepted, file a claim for concealed damage with the carrier within 5 days after receipt. All packaging material must be kept for inspection by the carrier's agent. A copy of the claim must be forward to Eaton Corporation, Electronic Instrumentation Division (EID).

#### 2-5. ANCILLARY ITEMS

2-6. Each -09 Option is accompanied with a short coaxial interconnecting cable and one instruction manual. A small parts

package is also included for field installation units. Before discarding the shipping container, make sure these items are removed.

2-7. FIELD INSTALLATION

2-8. The following paragraphs detail the procedure for field installing the -09 Option into the 7514. Table 2-1 specifies the tools required for installation.

TABLE 2-1. TOOL REQUIREMENT FOR FIELD  
INSTALLATION OF THE -09 OPTION

Phillips Screwdriver #1 Point

Flat Blade Screwdriver

Diagonal Cutting Pliers

Needle Nose Pliers 6"

3/16" Hex Nut Driver

5/16" Hex Nut Driver

2-9. PROCEDURE - ASSEMBLY

- 2-10.
- a. Remove the A.C. Power Cord from the rear of the 7514.
  - b. Remove the 7514's top and bottom covers as shown in Fig. 2-1.
  - c. Remove top and bottom bezels as shown in Fig. 2-1.
  - d. Remove the four (4) retaining nuts [(2) 3/16" and (2) 5/16"] holding the 30 MHz I.F. panel on. The locations of these are shown in Fig. 2-2.
  - e. Cut the tie wrap holding the A.C. line switch wires and disconnect the A.C. line switch connector.  
NOTE - use care when cutting the tie wrap so as not to nick the A.C. line switch wires.

- f. Disconnect the I.F. input cable from the Postamplifier and the ribbon cable at J901 located on the 30 MHz I.F. panel. See Fig. 2-2.
- g. Remove the 30 MHz I.F. panel assembly from the 7514 and set aside.
- h. Remove the adhesive tie strap mount from the 7514's chassis floor.

2-11. PROCEDURE - ASSEMBLY

- 2-12. a. Slide the -09 Option into the 7514. Care should be exercised so as not to bend any loose cables or wires.
- b. Position the 7514 front panel assembly and -09 Option so that they are in alignment, then secure them by installing the top and bottom bezels.
- c. Secure the -09 Option with the four (4) hex nuts.
- d. Route and connect the I.F. input cable to the Postamplifier. Connect the power connector to J304 on the 7514's main board (at rear of board), and connect the ribbon cable to J901 on the -09 Option front panel assembly.
- e. Connect the A.C. line connector to the A.C. line switch and secure it with the tie strap mount and tie straps provided.
- f. Secure the rear of the -09 Option with the bracket supplied. This is done by mounting the bracket under the two (2) AGC I.F. amplifier retaining nuts closest to the rear of the -09 Option
- g. Replace the 7514's top and bottom covers. This completes the installation of the -09 Option.

2-13. PREPARATION FOR USE

2-14. To operate the -09 Option requires only that the short coaxial cable be connected to the I.F. output port and I.F. input port located on the front panel assembly of the -09 Option.

NOTE: Verification of the 7514 should be made prior to using the -09 Option.



2-15. INITIAL CHECKOUT

2-16. This operational checkout is a preliminary test and is not intended to validate performance standards. (For complete validation procedures, refer to Chapter V. Figure 3-1 and Table 3-2 locate and describe the function of the control, indicators, and connectors referenced below.

2-17. The equipment required for initial operational checkout is as follows:

- a. C.W. Signal Generator - Wavetek 2001 (or equivalent)

2-18. Checkout Procedures

- a. Connect the I.F. output port to the I.F. input port with the cable supplied.
- b. Apply A.C. power to the 7514.
- c. Set the power ON/OFF switch to ON position; depress the CAL switch; allow a few minutes for stabilization and note that the 7514's green AGC LED and the red overrange LED are both off.
- d. Connect the signal generator to the R.F. input port of the -09 Option. Set it for 21.4 MHz C.W. @  $-72 \pm 3$  dBm output.
- e. Depress the 21.4 MHz R.F. frequency switch on the -09 Option.
- f. The green AGC light should be illuminated. Adjust the CAL ADJ control for a meter indication on the calibrate scale of 15.5.
- g. Depress each successive R.F. frequency switch. Adjust the signal generator for that frequency and note that the AGC light is illuminated at each frequency at  $-72 \pm 3$  dBm.

NOTE

If the instrument fails any portion of the checkout procedure, it requires adjustment or repair. Refer to Chapter V for adjustment and troubleshooting instructions. If the unit is still under warranty, contact your local Eaton Corp./EID representative.

## CHAPTER IV

### CIRCUIT DESCRIPTIONS

#### 4-1. INTRODUCTION

4-2. This chapter contains circuit descriptions for the -09 Option. Included is a functional block diagram and description of this option and is followed by detailed individual circuit descriptions.

#### 4-3. FUNCTIONAL BLOCK DIAGRAM

4-4. Figure 4-1 shows the -09 Option's functional block diagram.

#### 4-5. GENERAL CIRCUIT DESCRIPTIONS

4-6. The following paragraphs provide general circuit descriptions of the functional blocks shown in Figure 4-1. A complete schematic diagram of the -09 Option can be found in Chapter V, Maintenance and Adjustments. The diagrams are printed on fold-out pages so that they can be followed simultaneously with the circuit descriptions.

#### 4-7. CONTROL CIRCUITS

4-8. The control circuits perform routing of the applied R.F. signal and control the operation of the internal local oscillators. For switch selected frequencies, the applied R.F. signal is routed through the appropriate bandpass filter and then applied to the mixer input. The local oscillator's frequency is set by control circuits to provide frequency conversion from the applied R.F. signal to the I.F. frequency of 30 MHz. The local oscillator output is applied to the mixer's L.O. input. For external L.O. operation (L.O. OFF Mode), the applied R.F. signal is fed directly to the mixer's R.F. input, and the internal local oscillator is disabled and removed from the mixer's L.O. input.

4-9. CONTROL LOGIC CIRCUITS

4-10. The control logic circuits convert the front panel switch selections into corresponding voltages which are applied to the control circuits to implement each switch selection.

4-11. INITIALIZING CIRCUIT

4-12. The initializing circuit sets the -09 Option in the L.O. OFF mode when power is applied to its circuits.

4-13. INTERNAL LOCAL OSCILLATOR

4-14. The internal local oscillator generates the required R.F. energy needed to enable frequency conversions in the mixer. Its frequency is adjustable and is preset for each switch selectable frequency. These preset frequencies provide frequency conversions of the applied R.F. signal to the 7514's 30 MHz I.F. input.

4-15. BANDPASS FILTER

4-16. The bandpass filters condition the applied R.F. signal so that only the frequency of interest (determined by front panel switches) are allowed to pass through to the mixer's R.F. input. These bandpass filters are bypassed when an external local oscillator is used (L.O. OFF mode).

4-17. MIXER

4-18. The mixer provides frequency conversions from the applied R.F. signal to the 30 MHz I.F. input of the 7514. For the switch selected frequencies, the mixer provides single side-band (SSB) frequency conversions. For frequencies using an external L.O. (L.O. OFF mode), the mixer provides double-side band (DSB) frequency conversions.

4-19. FILTER/AMPLIFIER

4-20. The filter/amplifier conditions the I.F. signals from the I.F. output of the mixer. It passes only those frequencies near 30 MHz through to the I.F. input of the 7514. The gain of the filter/amplifier is set so that the -09 Option offers unity gain from signals applied to its R.F. input to its I.F. output.

4-21.

## OVERRANGE DETECTOR

4-22. The overrange detector monitors the applied R.F. signal level. When the R.F. signal level exceeds the dynamic range of the -09 Option, the overrange detector output causes the 7514's overrange LED to illuminate. This occurs when the noise ON level exceeds -10 dBm.



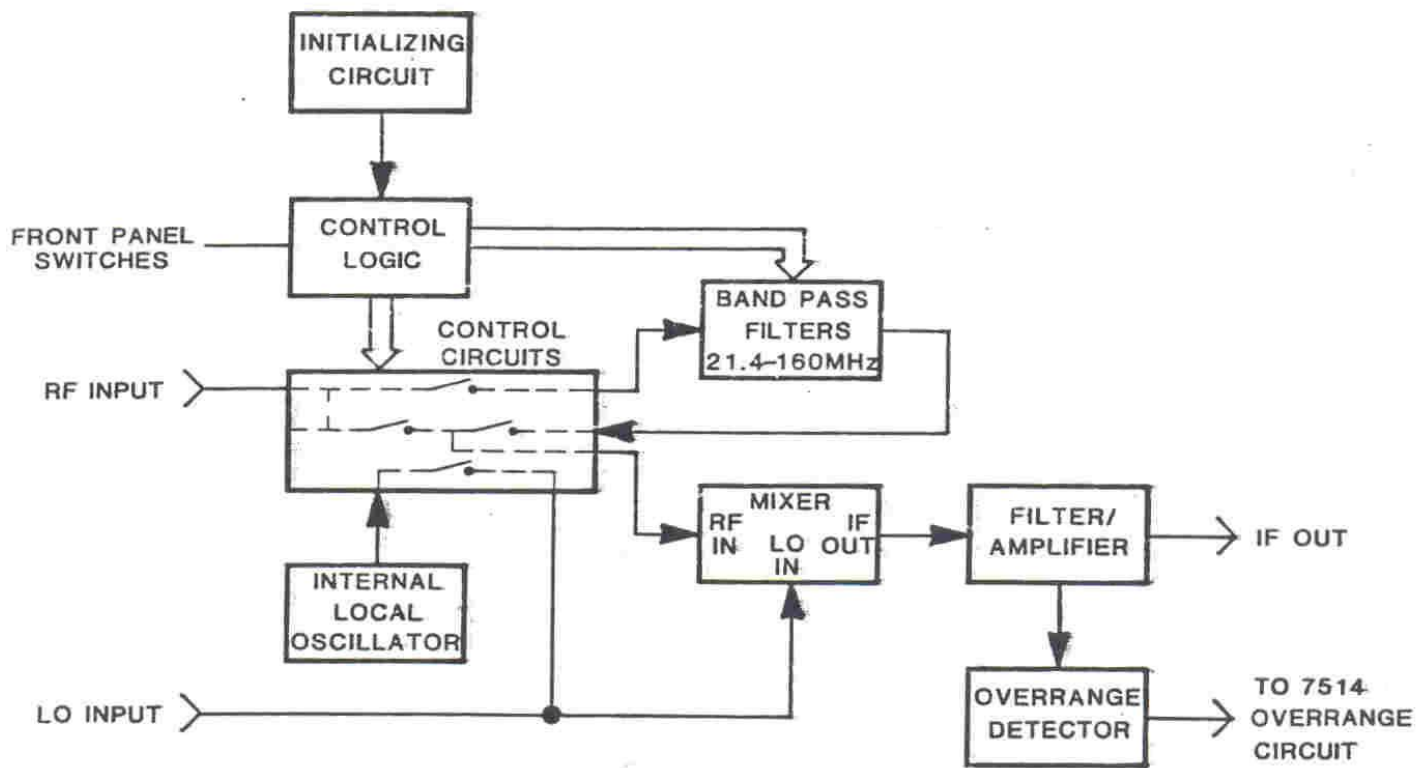
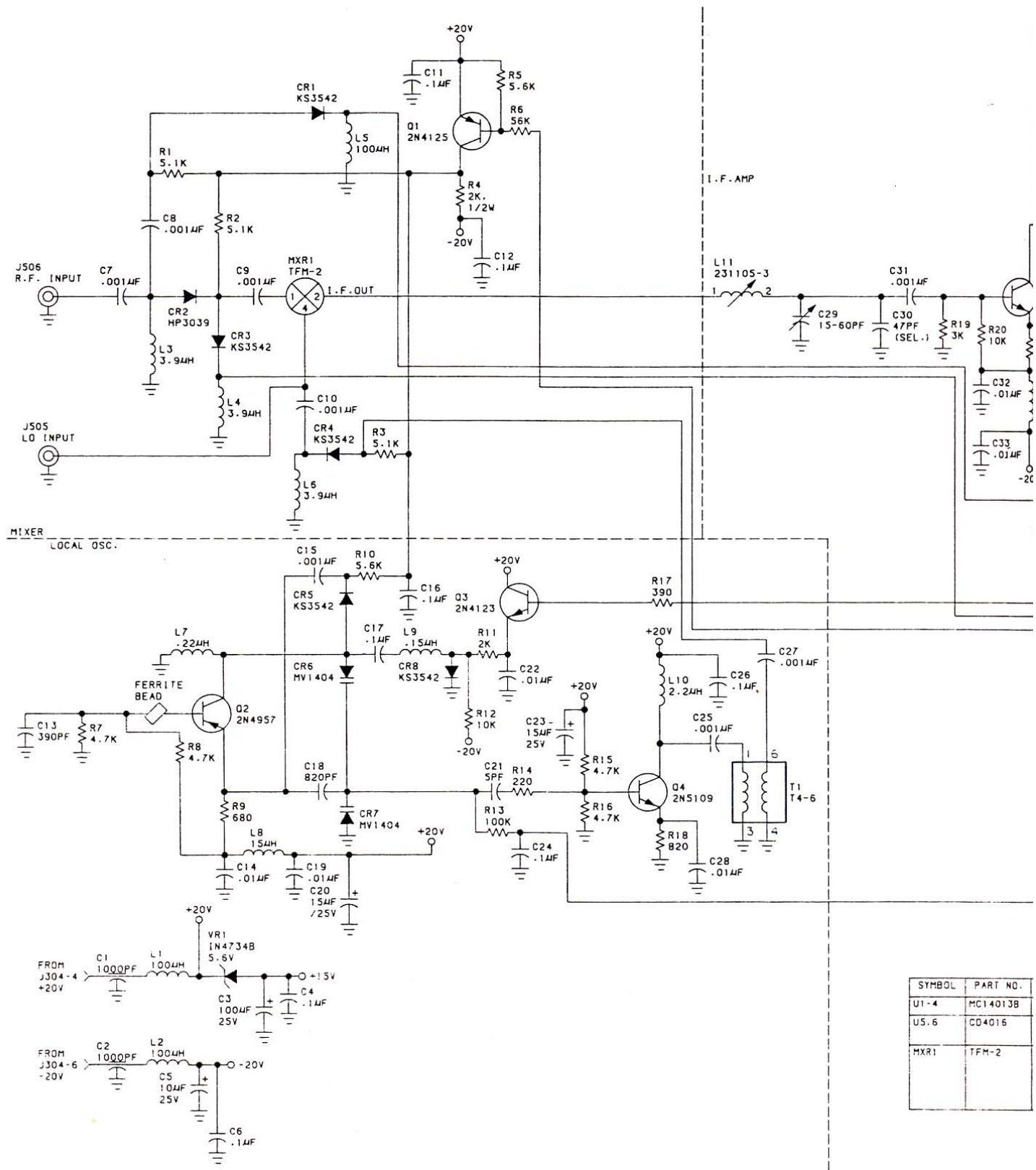
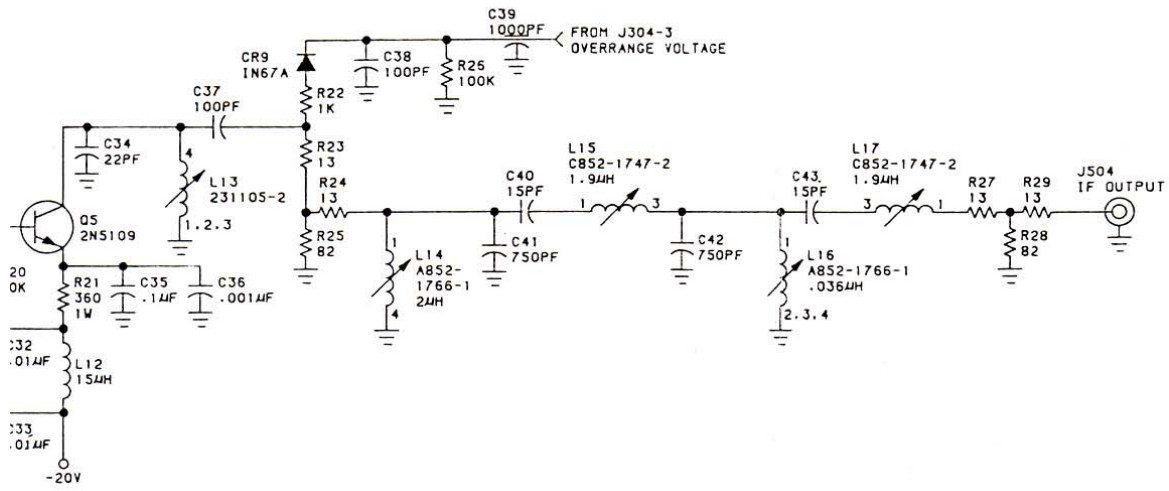


FIGURE 4-1. -09 OPTION FUNCTIONAL BLOCK DIAGRAM



SYMBOL	PART NO.
U1-4	MC14013B
U5.6	CD4016
MXR1	TFM-2



A

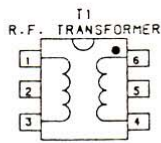
B

C

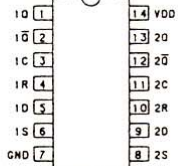
D

E

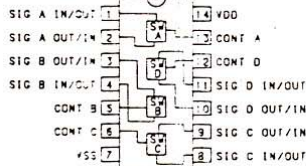
IT NO.	CONNECTIONS
1013B	10
116	PIN 7- GND PIN 14- +15V
-2	PIN 1- RF (BLUE DOT) PIN 2- IF PIN 3- GND PIN 4- LO

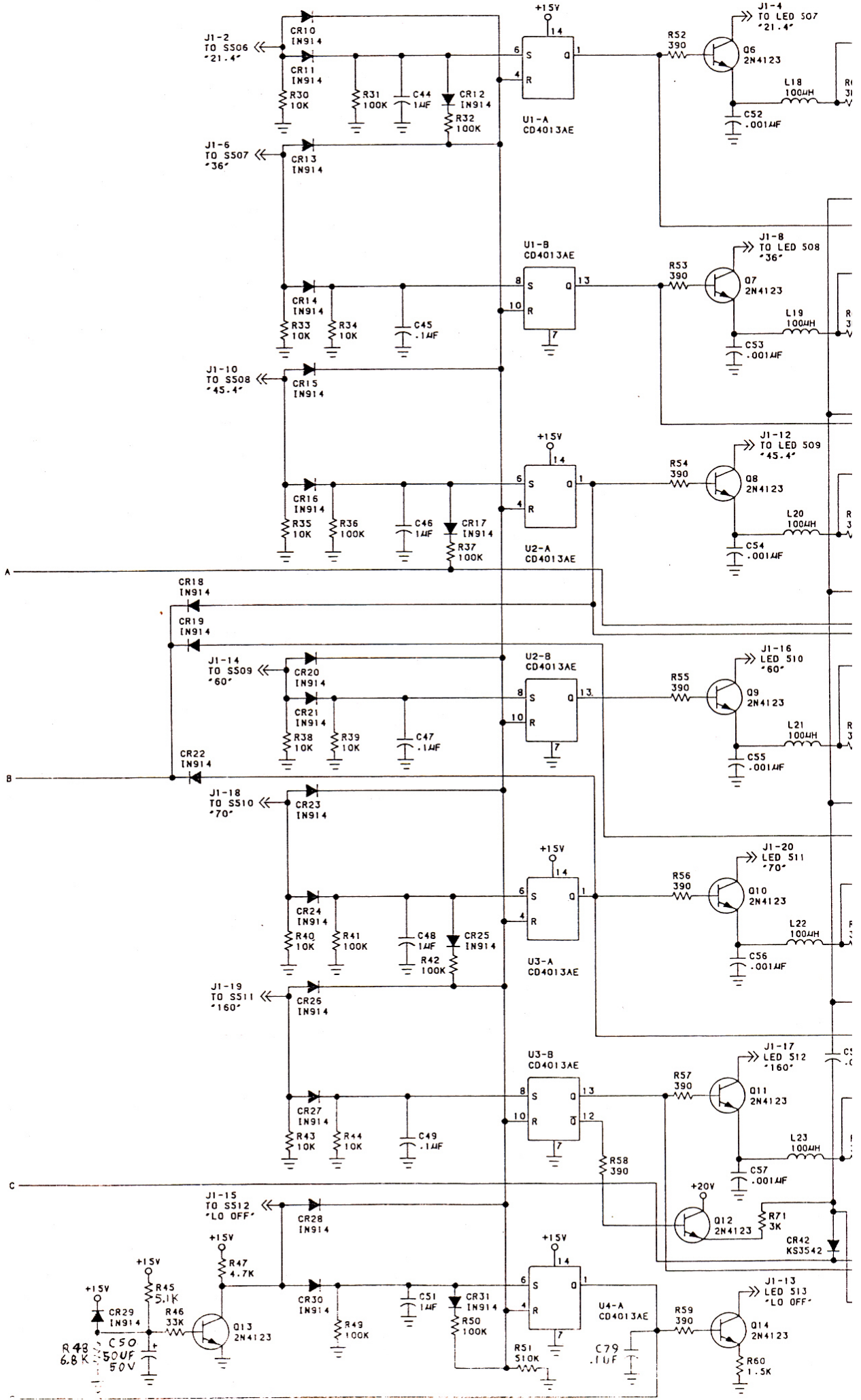


MC14013B  
DUAL TYPE D FLIP-FLOP



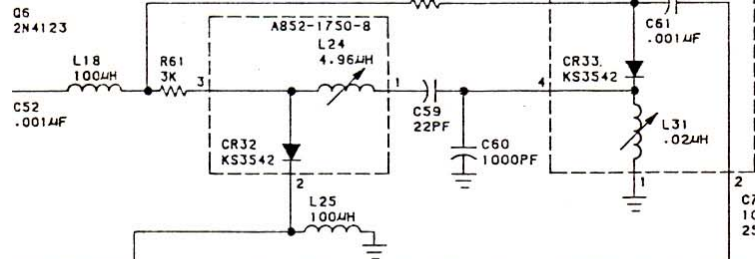
CD4015  
QUAD BILATERAL SWITCH



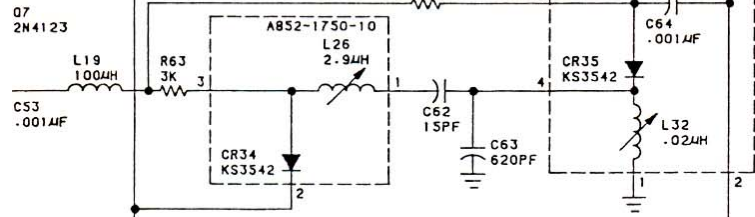




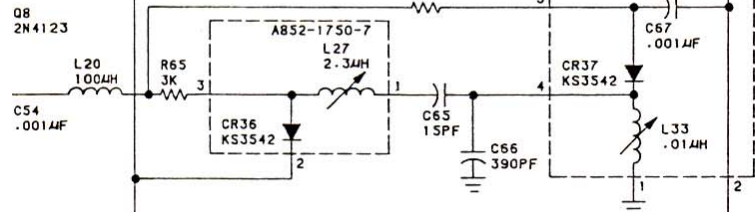
J1-4  
TO LED 507  
"21.4"



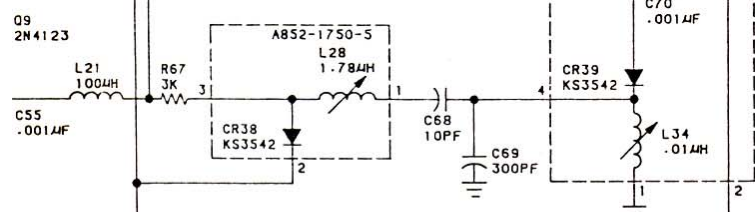
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TO LED 508  
"36"



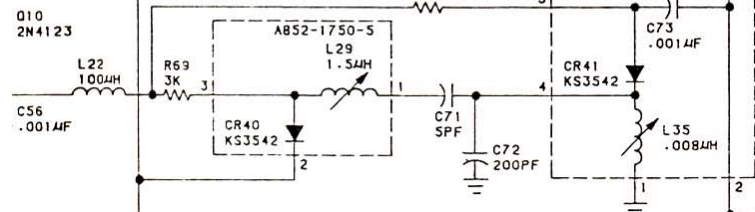
J1-12  
TO LED 509  
"45.4"



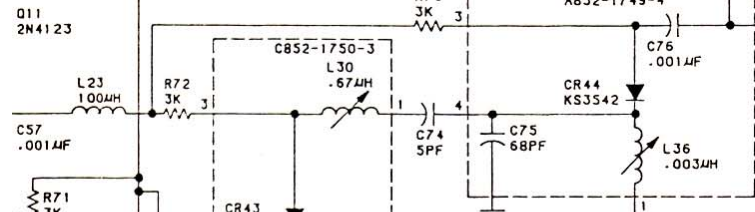
J1-16  
LED 510  
"60"



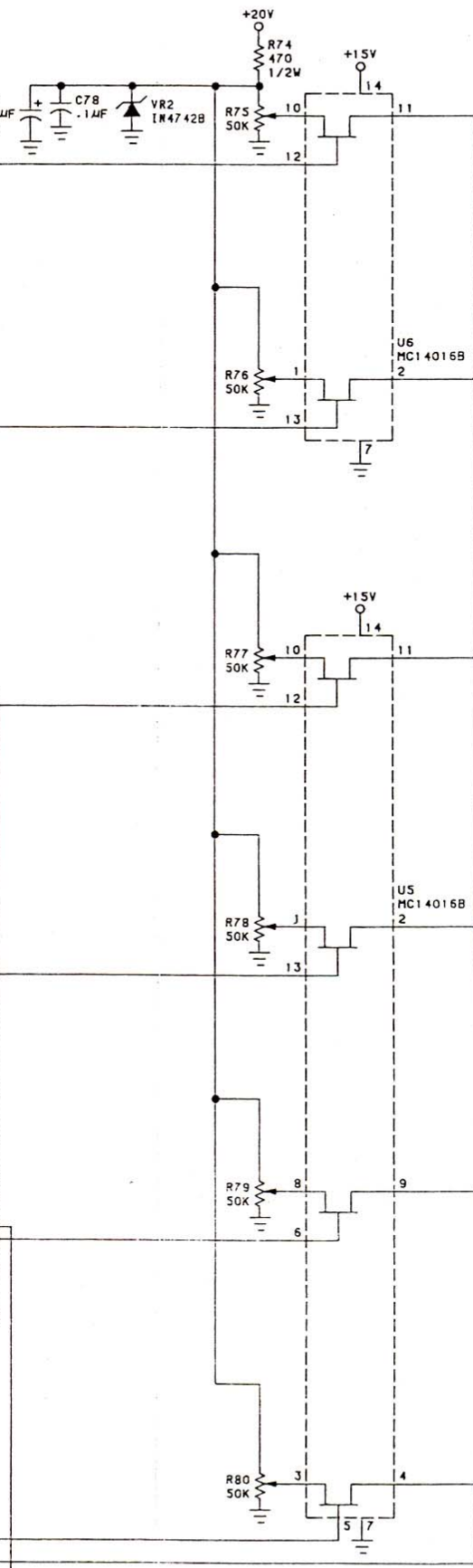
J1-20  
LED 511  
"70"



J1-17  
LED 512  
"160"



J1-13  
LED 513  
"LO OFF"



R60  
1.5K