

# DD-6

## ATLAS DIGITAL DIAL

The Atlas Digital Dial is a presettable frequency counter, designed to be compatible with ALL ATLAS 180, 210 and 215 series Transceivers, with a minor modification.\* It plugs into the EXT OSC SOCKET to read your frequency to the nearest 100Hz.

The following unique features are to be found on your new Atlas Digital Dial:

Six large 4x7 Dot-matrixed LED readouts for an unambiguous frequency reading.

Memory storage of the operating frequency for jitter free output to the last digit (100Hz).

Owner adjustable crystal clock, with self-calibrating capability for always accurate readings.

All critical parts, including LED displays, are socket mounted for ease of maintenance.

\* \* \* \* \* IMPORTANT NOTICE \* \* \* \* \*

Due to the current requirements of the Atlas Digital Dial all Atlas Transceivers of a serial number lower than 3950 will require the following modification:

(A) Remove the Transceiver Top Cover (2 screws each side).

(B) Locate the EXT OSC SOCKET, the NEG GND BANANA JACK and the TWO BANANA PLUGS on the back panel behind the SPEAKER. Unsolder the RED WIRE from TERMINAL 8 of the EXT OSC SOCKET. Cut and tape this lead to prevent any short circuits!

(C) TEMPORARILY REMOVE the NEG GND BANANA JACK; this will facilitate access to the BANANA PLUG directly below the JACK.

(D) Connect a 3AMP FUZE, with insulating sleeving from the UPPER BANANA PLUG to TERMINAL 8 of the EXT OSC SOCKET. Use caution to avoid short circuits or the disturbance of any other wiring.

(E) After careful inspection of your work REPLACE the NEG GND BANANA JACK and its GND LUG. REPLACE TOP.

\* \* \* \* \*

Note: The change you have just made removes the 12VDC LOW CURRENT line from the EXT OSC SOCKET and REPLACES it with FUZED 12VDC HIGH CURRENT to TERMINAL 8.

#### To Use The Digital Dial

- (A) Turn on the Transceiver and SET to desired BAND.
- (B) Set the VFO to any 100Khz point on the dial.
- (C) Zero the DIGITAL DIAL reading to this point by means of the DIAL SET CONTROL on the TRANSCEIVER.  
(Example: BAND SW. 3.5 DIAL at 100. ADJUST so the DIGITAL DIAL reads 3600.0).
- (D) Your DIGITAL DIAL will now read frequency within 100Hz correctly throughout this BAND.

Figure 1 is a block diagram of the Atlas Digital Dial with operational blocks to be discussed separately.

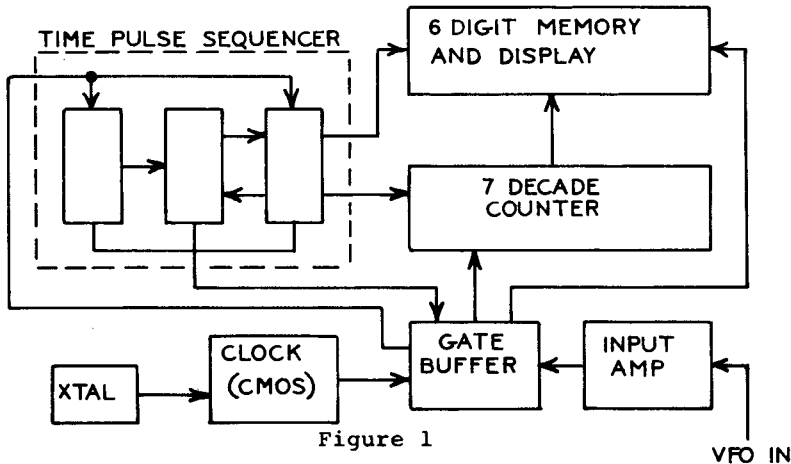


Figure 1

VFO IN

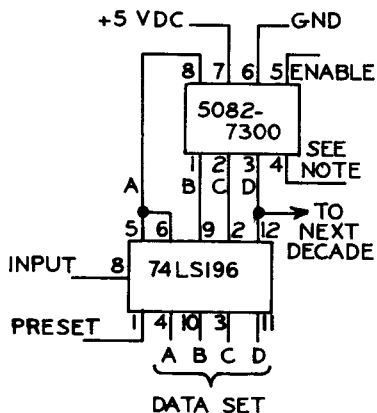
**INPUT AMPLIFIER.** This single stage transistor amplifier assures that the Atlas VFO signal, taken at terminal 2 of the EXT OSC SOCKET, is at a level acceptable to TT Logic. It also acts as a buffer stage preventing any unwanted feedback into the audio circuits of the Transceiver.

**GATE/BUFFER.** IC-2 is a QUAD, 2INPUT NAND GATE. One gate is the CONTROL GATE for frequency counting. As long as a GATING PULSE is present on TERMINAL 12 the VFO can toggle the decades thru TERMINALS 13 and 11. The second gate acts as a BUFFER for the CMOS CLOCK. The third and fourth gates are an INVERTER/DRIVER for the BLANKING signal to the sixth readout LED.

**SEVEN DECADE COUNTER.** The VFO signal is routed thru the CONTROL GATE to the first of seven presettable decades, connected to form a ripple counter. By proper PRESETTING and SWITCHING of the DATA SET terminals on these decades we can obtain either the SUM or

the DIFFERENCE of the VFO and the IF FREQUENCIES. This result then becomes the operating frequency to be displayed by the LEDs.

(Note: IC-6 is a  $\div$  by 10 and is not displayed, even though it is counting. This feature gives us jitter free readings on 100Hz.) IC-7 through IC-12 are typical BCD decades supplying correctly coded numerals to the DISPLAY/MEMORY section. Figure 2 is a typical decade with readout.



**NOTE:**

5082-7300 GND FOR DECIMAL  
5082-7340 LO TO UNBLANK  
5082-7340 HI TO BLANK

Figure 2

QUENCER is composed of a decade (7490) and two dual J-K Flip-Flop (7473), operating as a shift register to deliver the necessary pulses. As you read this section, study Figure 3, a partial schematic and wave form chart. The lettered points are of particular importance in this operation.

The timing sequence BEGINS as IC-3 is RESET to "9" and all other decades are PRESET to their respective predetermined figure by the pulses at "B" and "C" points. On the next 10 millisecond pulse at CLOCK "A" IC-3 produces an output at "D", setting FF-1 HIGH, opening the COUNT GATE at point "E". On the next output at "D" the COUNT GATE closes, FF-1 is RESET, FF-2 SETS, enabling the FF-3. The next pulse at point "A" is utilized by FF-3 to generate the MEMORY PULSE at point "F" and RESETTING FF-2; also FF-3 keys FF-4 into the enabled mode. The next "A" PULSE drives FF-4 to produce the RESET and PRESET PULSES at points "B" and "C" to complete the TIMING SEQUENCE. The above action repeats itself for as long as the Digital Dial is activated by the on switch. As can be seen from the wave form chart this total action is at an exact 130 millisecond rate.

SIX DIGIT DISPLAY/MEMORY. This section consists of six H.P. IC, each containing a MEMORY, a decoder, a driver and a 4x7 Dot-matrix of LEDs. They also have either a decimal or a blanking circuit to disable the left-hand digit on all frequencies below 10MHz. As the MEMORY PULSE is generated in the decades is transferred to the MEMORY where it remains until new data updates it.

TIMING PULSE SEQUENCER. This section, along with the CLOCK is the heart of the Atlas Dial, since precise pulses are used at various points within the counter. The TIMING PULSE SE-

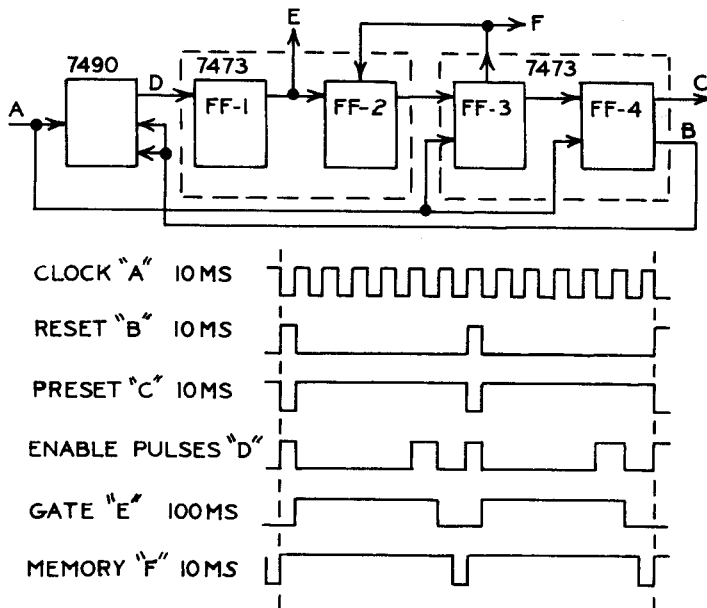


Figure 3

**CLOCK.** The CD4060AE was chosen for ease of operation. It is a CMOS IC OSCILLATOR and a  $\div$  by  $2^{14}$  power. We utilize only the  $2^{12}$  power to acquire a 100Hz square wave from the 409.6Khz crystal in the oscillator section. This 100Hz signal is fed to one gate on the 74LS00 (IC-2) to buffer it to a level compatible with TTL. A trimmer capacitor on the oscillator circuit allows for frequency adjustment as necessary.

**SELF CALIBRATION.** The Atlas Digital Dial is factory tuned and it needs no further adjustment. This section is included to assist in adjustment whenever errors in readings are noted.

(A) Remove the DD-6 Top Cover (2 screws each side).

(B) Turn on the Transceiver to CAL; VFO set to 100; the BAND SWITCH at 21.1. ZERO BEAT this frequency very accurately by means of the DIAL SET CONTROL on the Transceiver. Switch to RCVR and tune the VFO to read 120 on the Transceiver Dial. Note the reading of the DD-6; it should read 21120.0 ( $\pm 1$ ). IF this reading is incorrect continue with the calibration procedure. IF correct replace the cover.

(C) Locate the TEST PIN directly behind terminal 9 of the CD4060AE. Connect a SHORT JUMPER wire from this point to the ANTENNA INPUT on the Transceiver. You should hear a tone at this point.

(D) LEAVING ALL SETTINGS AS ABOVE, use a NON-METALIC TOOL adjust the TRIMMER CAPACITOR for a ZERO BEAT at this point. (This is critical; tune in very small steps.)

(E) Observe the DD-6 READING and RETUNE the VFO to make the DD-6 read 21120.0 exactly.

(F) REPEAT STEPS (D) and (E) until no further improvement can be obtained.

(G) REMOVE the JUMPER of step (C) and replace the TOP.

Figure 4 is the complete schematic of the Atlas DD-6 Digital Dial. The following list is the Integrated Circuit lineup;

IC-1	CD4060AE	IC-7	74LS196	IC-13	5082-7300
IC-2	74LS00	IC-8	74LS196	IC-14	5082-7300
IC-3	7490	IC-9	74LS196	IC-15	5082-7300
IC-4	7473	IC-10	74LS196	IC-16	5082-7300
IC-5	7473	IC-11	74LS196	IC-17	5082-7300
IC-6	74LS196	IC-12	74LS196	IC-18	5082-7340
		IC-19	7805U/C		

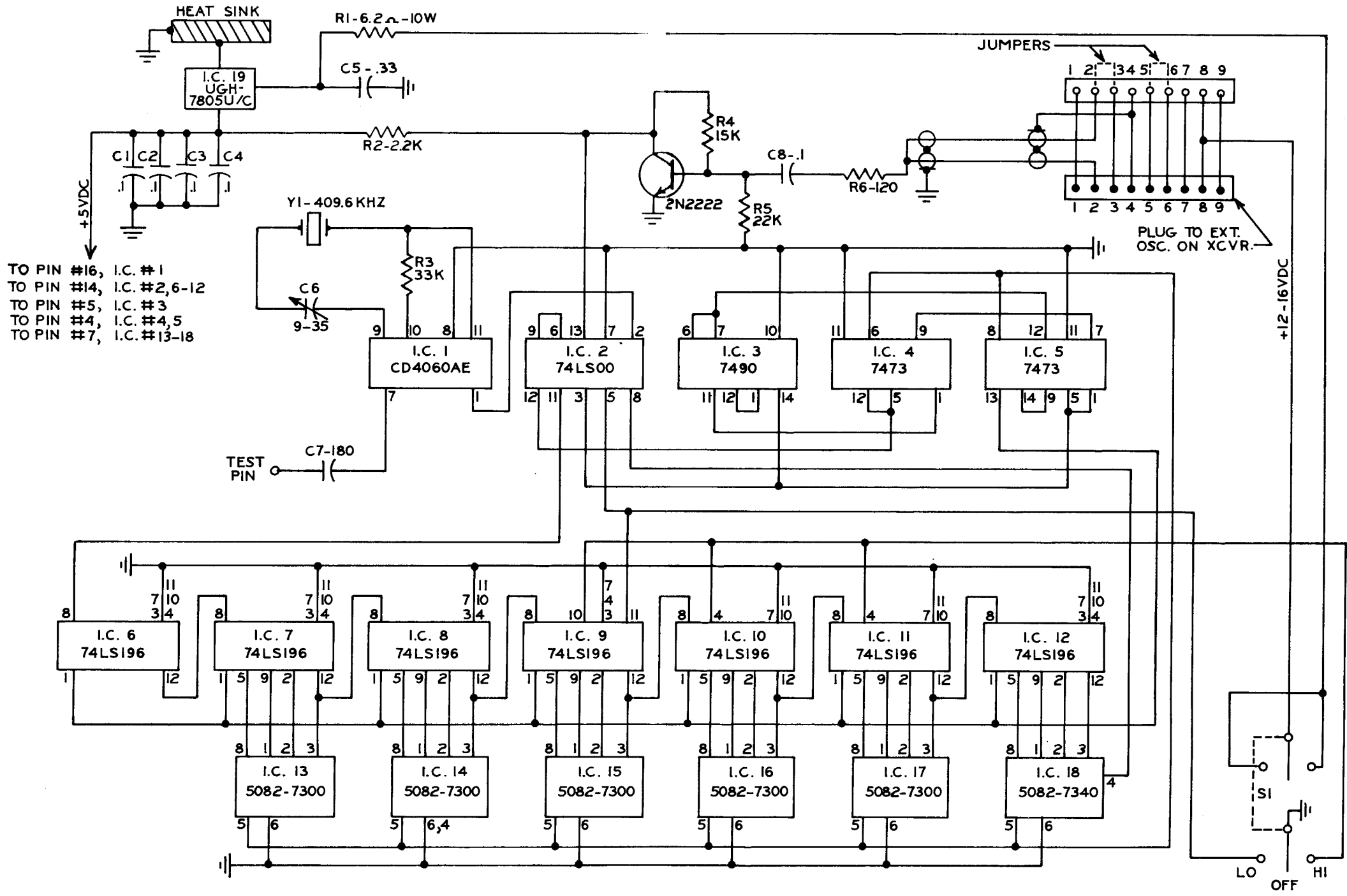
## ATLAS WARRANTY

### **THE ATLAS-210x/215x IS GUARANTEED UNDER THE FOLLOWING SCHEDULE:**

- (1) All components except semiconductors are guaranteed for one (1) year from date of original purchase.
- (2) All semiconductors are guaranteed for (90) ninety days from date of original purchase.
- (3) Workmanship is guaranteed unconditionally for one (1) year from date of original purchase.
- (4) If factory service is required within 30 days Atlas will pay surface freight both ways. After 30 days customer pays shipping cost to the factory, and Atlas pays return freight. After 1 year, customer pays both ways, plus a nominal service charge.
- (5) This warranty will be transferred to owners other than original purchaser, provided the new owner advises Atlas Radio in writing of his name, address, and date of purchase.

**UNDER THE REGULATIONS OF THE MAGNUSON-MOSS WARRANTY ACT, THE ATLAS WARRANTY POLICY IS CLASSIFIED AS A LIMITED WARRANTY.**

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MODEL DD-6 DIGITAL DIAL SCHEMATIC  
ATLAS RADIO 12-17-75