

The new ATLAS DD6C is a frequency counter with a range from 100Hz to over 32MHz, and a DIGITAL DIAL READOUT for all ATLAS 180, 210 and 215 model Transceivers, with a minor modification to some units\*. It plugs into the EXT OSC SOCKET on the ATLAS Transceiver to read the operating frequency to the nearest 100Hz [.1khz].

The ATLAS DD6C may also be used with Swan, Siltronix and the Drake "4" series of equipment. (Modification required [see page 6].)

The following unique features are to be found on the DD6C:

- Six 4x7 Dot-matrixed LED readouts for totally unambiguous readings every time.*
- Memory storage of the operating frequency and a jitter free output to the last digit (100Hz).*
- Adjustable crystal clock with self calibrating capability for always accurate readings of frequency.*
- Digital Hold to retain frequency readings.*
- Switch selectable function; Dial readout or Frequency count.*
- All crytical parts, including LED readout devices are socket mounted for ease of maintenance.*

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

Due to the current requirements of the ATLAS DD6C all ATLAS Transceivers with a serial number LOWER THAN 3950 will require the following modification:

- (A) Remove the TOP COVER [2 screws, each side].
- (B) Locate the EXT OSC SOCKET, the NEG GND BANNANA JACK and TWO BANNANA PLUGS on the rear panel, behind the speaker. Remove the RED WIRE from TERMINAL 8 of the EXT OSC SOCKET. Tape this lead end so as to prevent any short circuits.
- (C) TEMPORARILY REMOVE the NEG GND BANNANA JACK; this will make access to the UPPER BANNANA PLUG easier.
- (D) Connect a 3AMP PIGTAILED FUSE (use insulating sleeving) from the UPPER BANNANA PLUG to TERMINAL 8 of the EXT OSC SOCKET. [Use caution to avoid short circuits or disturbing other wiring.]
- (E) After careful inspection of your work, replace the NEG GND BANNANA JACK and its SOLDER LUG. Replace the TOP COVER

NOTE: The change you have just made replaces a +12VDC low current line with a +12VDC, FUSED high current line to the TERMINAL 8 of the EXT OSC SOCKET.

## SLTUI INSTRUCTION FOR THE DD6C

There are four (4) jumper wire connections provided on the DD6C, ALL ACCESSABLE from the top of the printed circuit board. Make the following connections for your particular Transceiver:

ATLAS 180, 210 or 215; Serial #8400 and above.  
(5645 I F)

JUMPER at "P"- "Q"; JUMPER at "X"; JUMPER at "Z"- "Z";  
Holes "J"- "J", "R" are left open.

ATLAS 180, 210 or 215; Serial #8400 and below.  
(5520 I F)

JUMPER at "P"- "Q"; JUMPER at "X"; Holes "J"- "J", "R"  
and "Z"- "Z" are left open.

DRAKE "4" Series

JUMPER at "P"- "R"; JUMPER at "J"- "J"; Holes "Q", "X"  
and "Z"- "Z" are left open.

SWANS and SILTRONIX

(5500 I F)

JUMPER at "J"- "J"; JUMPER at "P"- "Q"; JUMPER at "Z"- "Z";  
Holes "R" and "X" are left open.

SWAN with 5175 I F

Contact ATLAS Factory

AS SHIPPED FROM THE FACTORY THE DD6C IS SET UP FOR ATLAS 5645 IF

The DD6C as a DIGITAL DIAL

Set S1(HI/LO) to "HI" for 10, 15 or 20 meters; set "LO" for  
40, 80 or 160 meters.

Set S2(NORM/OPP) to "NORM".

Set S3(DIAL/COUNT[on rear panel]) to "DIAL".

Set S4(DH) LEFT to count; RIGHT to retain count.

Turn on the Transceiver and set to the desired band; set the  
VFO to any 100Khz marker on the Transceiver dial. Switch to CAL  
and zero with the "DIAL SET CONTROL". The DD6C should read within  
±100Hz. (Example: Band 3.5; Dial at 100; DD6C reads 3600.0[±.1]).  
Set each band in a like manner for accurate readings.

The DD6C as a FREQUENCY COUNTER

Set S3(DIAL/COUNT) to COUNT. Set S4(DH) to LEFT.

Connect the signal to be measured to the "IN" RCA JACK on  
the rear panel; use 50Ω Co-axial cable. CAUTION: Limit the  
input signal to 5 volts P/P maximum.

Figure 1 is a block diagram of the ATLAS DDGC. Each of the operational blocks will be discussed separately, keeping in mind the fact that several functions are occurring simultaneously.

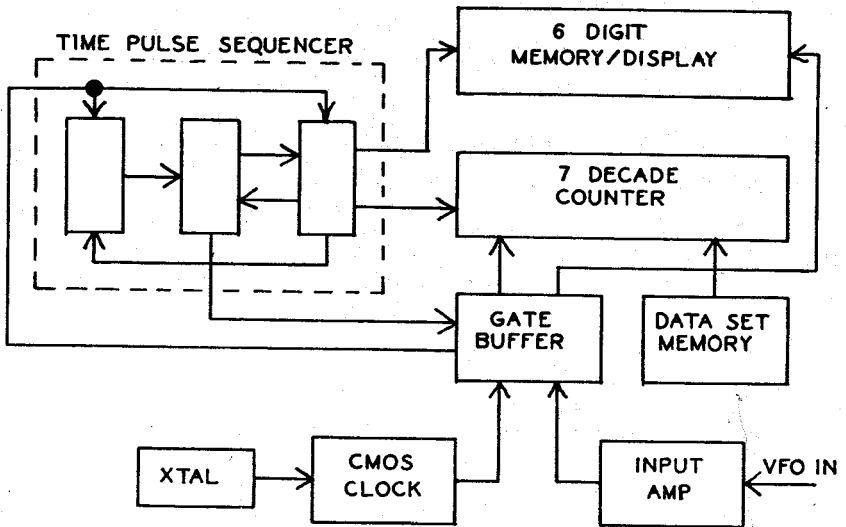
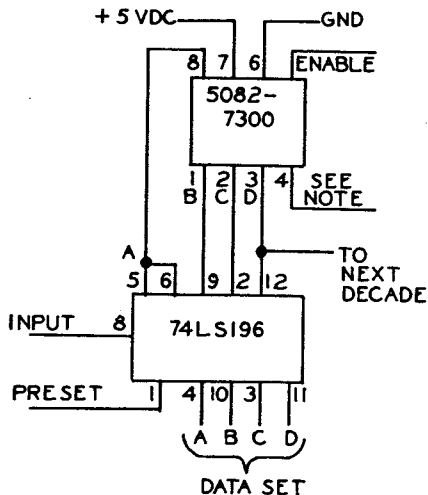


Figure 1

**INPUT AMPLIFIER** This single stage transistor amplifier assures that the VFO signal, taken from pin 2 of the EXT OSC socket, is at a level acceptable to the TTL logic ICs. It also acts as a buffer, preventing any unwanted feedback into the audio stages of the Transceiver.

**GATE BUFFER** IC-2 is a Quad NAND GATE. One gate is the CONTROL GATE for frequency counting. As long as there is a GATING PULSE present at pin 12 the incoming signal can toggle the decades on pins #13 and #11. A second gate acts as a BUFFER for the CMOS CLOCK chip. The third gate is an inverter for BLANKING of the sixth digit on all DIAL FREQUENCIES below 10Mhz.

**SEVEN DECADE COUNTER** The incoming signal is routed thru the CONTROL GATE to the first of seven presettable decades. By properly PRESETTING and SWITCHING of the DATA SET PINS on these decades we can obtain either the SUM or the DIFFERENCE of the VFO and the IF of the Transceiver. This result then becomes the OPERATING FREQUENCY to be displayed by the readout. (Note; IC-8 is a + by 10 but is not displayed, even though it is a part of the count. In this manner we acquire the jitter free readings to the 100hz.) IC-9 thru IC-14 are typical BCD decades supplying the correctly coded numerals to the MEMORY DISPLAY section. Figure 2 is one



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

Figure 2

DRIVER and a 4x7 DOT-MATRIXED LED READOUT. The 5082-7300 uses a decimal point while the 5082-7340 contains a BLANKING circuit to disable the sixth digit on all DIAL FREQUENCIES below 10Mhz. As the MEMORY PULSE is keyed the data in the ICs #9 thru #14 is fed into this memory, where it is stored and displayed until new data is presented. Updating of data occurs every 130 milliseconds.

**CLOCK** The CD4060AE was chosen for ease of application. It is a CMOS IC OSCILLATOR and a  $\div$  by  $2^{14}$  power. We utilize only the  $2^6$  (for the TEST) and  $2^{12}$  to acquire a 100Hz square wave CLOCK PULSE from a 409.6Khz crystal. We feed this control pulse to one gate of IC-2 to buffer it to TTL level compatible with the rest of the counter. A trimmer capacitor is provided to allow for frequency adjustments if they become necessary. The ATLAS DD6C is already calibrated against WWV.

**TIMING PULSE SEQUENCER** This section, along with the CLOCK, is the heart of the ATLAS DD6C, since precise pulses are required at various points within the counter. The TIMING PULSE SEQUENCER is composed of ICs #3, #4 and #5, as shown in figure 3, a partial schematic and wave form chart covering two timing cycles. As you read this section study figure 3; the LETTERED POINTS are of particular interest in this operation.

The timing sequency begins as IC-3 is RESET to "9" and all other decades are PRESET to the predetermined number by pulses "B" and "C". On the next 10 millisecond pulse at "A" IC-3 will produce an output on line "D", setting FF-1 "HIGH", opening the

decade and readout for the ATLAS DD6C.

**DATA SET MEMORY** This section, IC-6 & IC-7, is two (2) TTL PROM memories coded into a single 32 word by 16 bit configuration to set the decade DATA LINES to the desired IF for the Transceiver in use. Word numbering is from "0" to "31". Words "0" thru "7" and "16" thru "23" are coded for Frequency counting; words "8" to "11" are for DRAKE 4B; words "12" to "15" are SWAN [5175 IF]; "24" thru "27" are for ALL ATLAS UNITS; "28" thru "31" are SWAN [5500 IF]. When a PRESET PULSE is generated each decade is preset from this memory to the proper number for the IF FREQUENCY. (Note; ALL of the decoding of this memory is accomplished by the jumper wire connections on page 2.)

**SIX DIGIT DISPLAY** This section consists of 6 H. P. ICs, each containing a MEMORY, DECODER and

count gate at "E". On the next pulse at "D" FF-1 is reset closing the count gate, FF-2 is set "HIGH" enabling FF-3. The next "A" pulse is utilized by FF-3 to generate the memory pulse, to enable FF-4, reset FF-2, thereby disabling itself. The next "A" pulse drives FF-4 to produce the RESET and PRESET pulses "B" and "C" to complete one cycle. This action will repeat each 130 milliseconds as long as the DD6C is turned on.

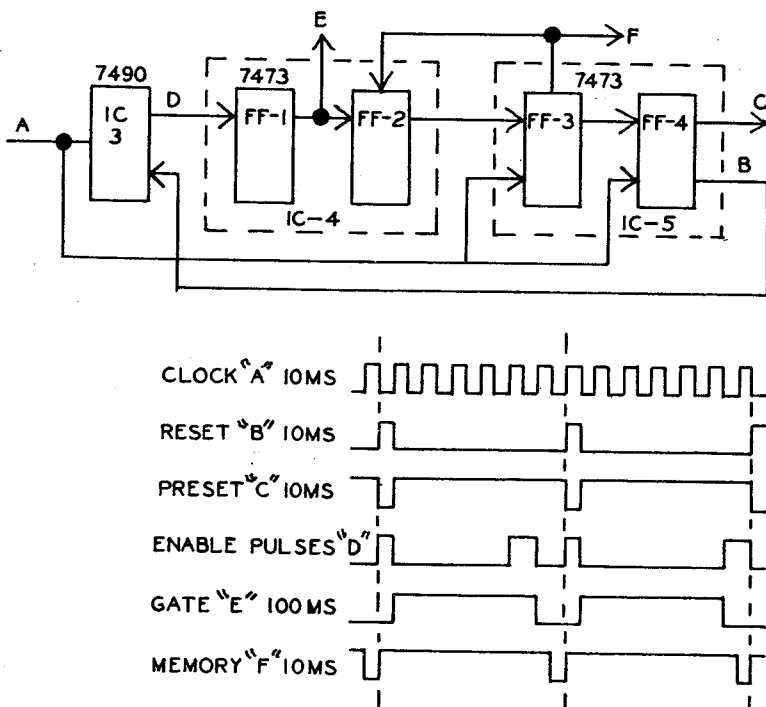


Figure 3

As can be seen, if data in the decades changes the memory section is updated each timing cycle, therefore readout is accurate in all 130 millisecond time periods.

**SELF-CALIBRATION:** The ATLAS DD6C is calibrated at the factory and needs no further tuning at this time. This section is included to assist in adjustment whenever errors are noted in the readings.

(A) Turn on the Transceiver to "CAL"; set the BAND SWITCH to 15 meters; the VFO to 21.1Mhz. Zero beat this frequency as accurately as possible with the "DIAL SET CONTROL" on the Transceiver. Note the reading of the DD6C; it should read 21100.0 ( $\pm 1$ ). If this is not correct continue with the self-calibration instructions.

(B) Remove the TOP COVER of the DD6C (2 screws, each side).

(C) Locate the "TEST" pin directly behind the CD4060AE; connect a short jumper between this point and the ANTENNA INPUT of your Transceiver. Adjust the VFO so that the DD6C reads 21120.0. At this point you will hear a tone.

(D) LEAVING ALL CONTROLS AS IN (C) ABOVE, use a non-metallic tuning tool to adjust the TRIMMER CAPACITOR on the DD6C for a ZEROBEAT at this frequency. THIS IS CRITICAL; TUNE IN SMALL STEPS!

(E) Observe the reading on the DD6C and RETUNE the VFO to return the reading to 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 cover.  
\* \* \* \* \*

The following parts are required to convert either SILTRONIX or SWAN for use with the ATLAS DD6C Digital Dial:

1 NINE PIN TUBE SOCKET	1 1N4005 DIODE
1 FIVE PICOFARAD DISC	1 1000MF ELECTRO CAP.
1 LENGTH RG196A/U	1 SOLDER LUG

(A) Remove the TOP and BOTTOM COVERS.

(B) Locate a clear panel space near the accessory socket; INSTALL the NINE PIN TUBE SOCKET with the SOLDER LUG near pin 4.

(C) Locate the 12VDC LINE (pin 5 on ACCESSORY SOCKET). INSTALL the 1N4005 between this pin and pin 8 of the NINE PIN SOCKET; also INSTALL the 1000MF CAP between pin 8 and ground (observe polarity) and GROUND pin 4.

(D) Connect one end of the RG196A/U to pin 2 of the NINE PIN SO.: the other end will be connected through the 5 PICOFARAD DISC to pin 5 of V1 in the Transceiver (VFO AMP TUBE). Ground the outer sheild of the RG196A/U at BOTH ENDS.

Note: The DD6C now plugs directly into the NINE PIN SOCKET.

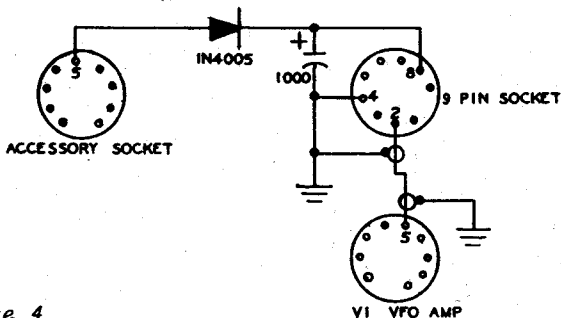


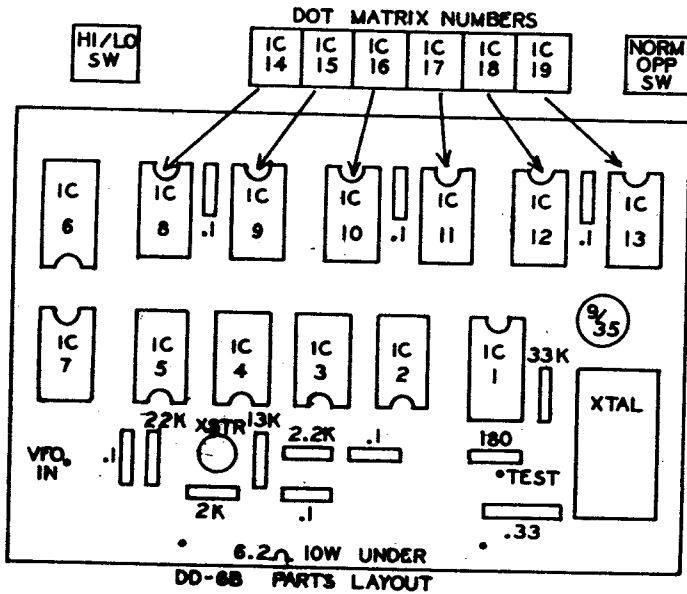
Figure 4

IN CASE OF DIFFICULTY

With the aid of Figure 5 on page 8 and the FOLD OUT FLOW CHART you should be able to correct 95% of all faults in your DD6-B. Replacement parts may be ordered from ATLAS RADIO INC. or directly from MICAL DEVICES, P. O. Box 343 Vista, CA 92083  
THE ATLAS WARRENTY APPLIES IN EITHER CASE

Below is a listing of the replacable parts with ATLAS PARTS NUMBERS; PLEASE ORDER BY NUMBER:

ATLAS #	DISCRIPTION	
085-012	9/35pf Ceramic Trimmer Capacitor	
100-002	DPDT Center OFF Toggle Switch	
100-004	SPDT Toggle Switch	
135-003	DPDT Slide Switch	
410-007	1N914 Silicon Diode	
440-017	2N2222 Transistor	
470-007	CD4060AE IC	(IC# 1)
470-008	74LS196 IC	(ICs# 7 thru 13)
470-009	7490 IC	(IC# 3)
470-010	7473 IC	(ICs# 4&5)
470-011	74LS00 IC	(IC# 2)
470-012	UGH7805U/c IC	(IC# 20)
470-013	DM8577 IC	(IC# 6)
473-001	5082-7300 LED IC	(ICs# 14 thru 18)
473-002	5082-7340 LED IC	(IC# 19)



*Figure 5*

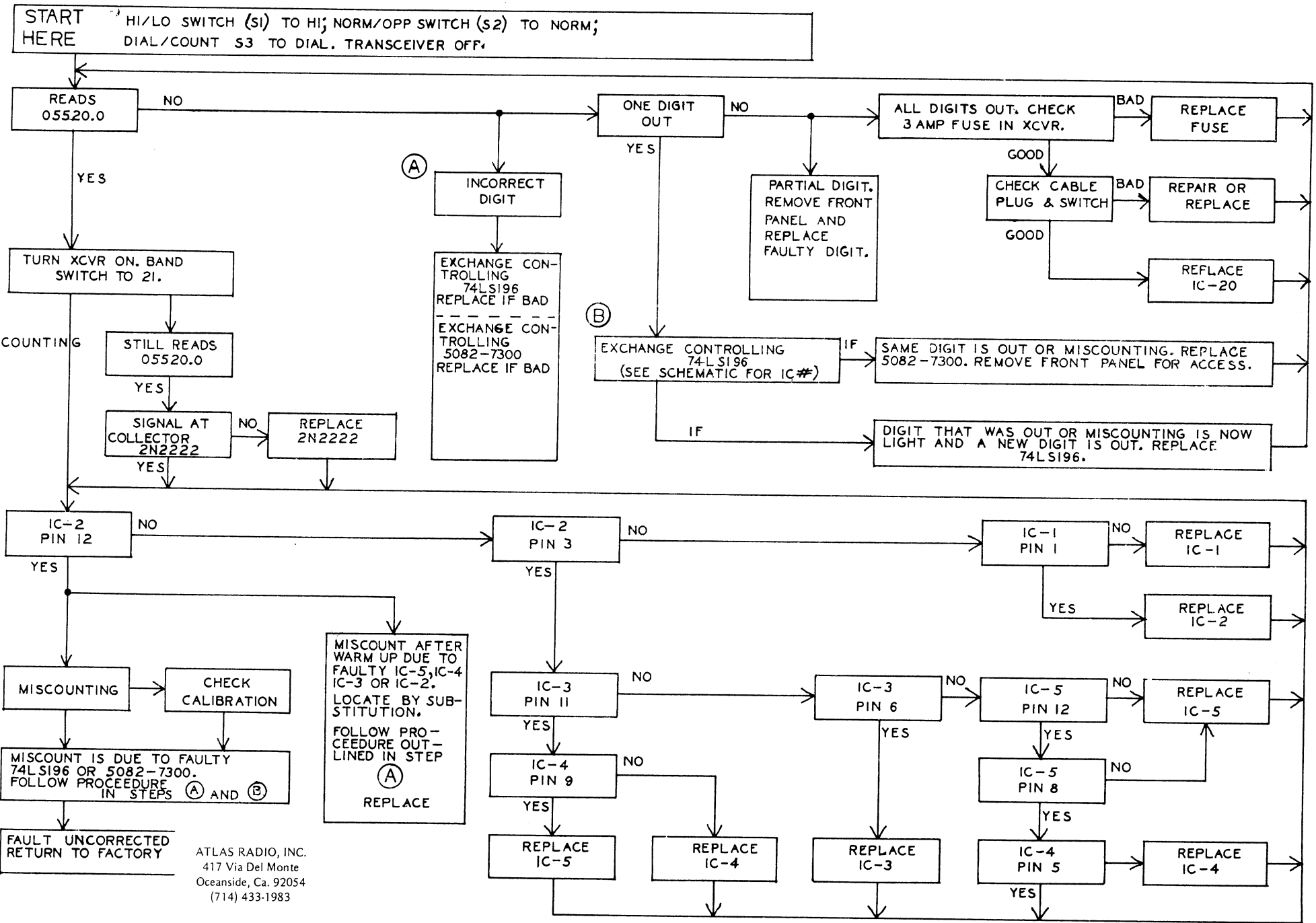
**TO USE THE CHARTS**

Locate the parts on Figure 5 and follow the ARROWS on the flow chart beginning at the UPPER LEFT CORNER.

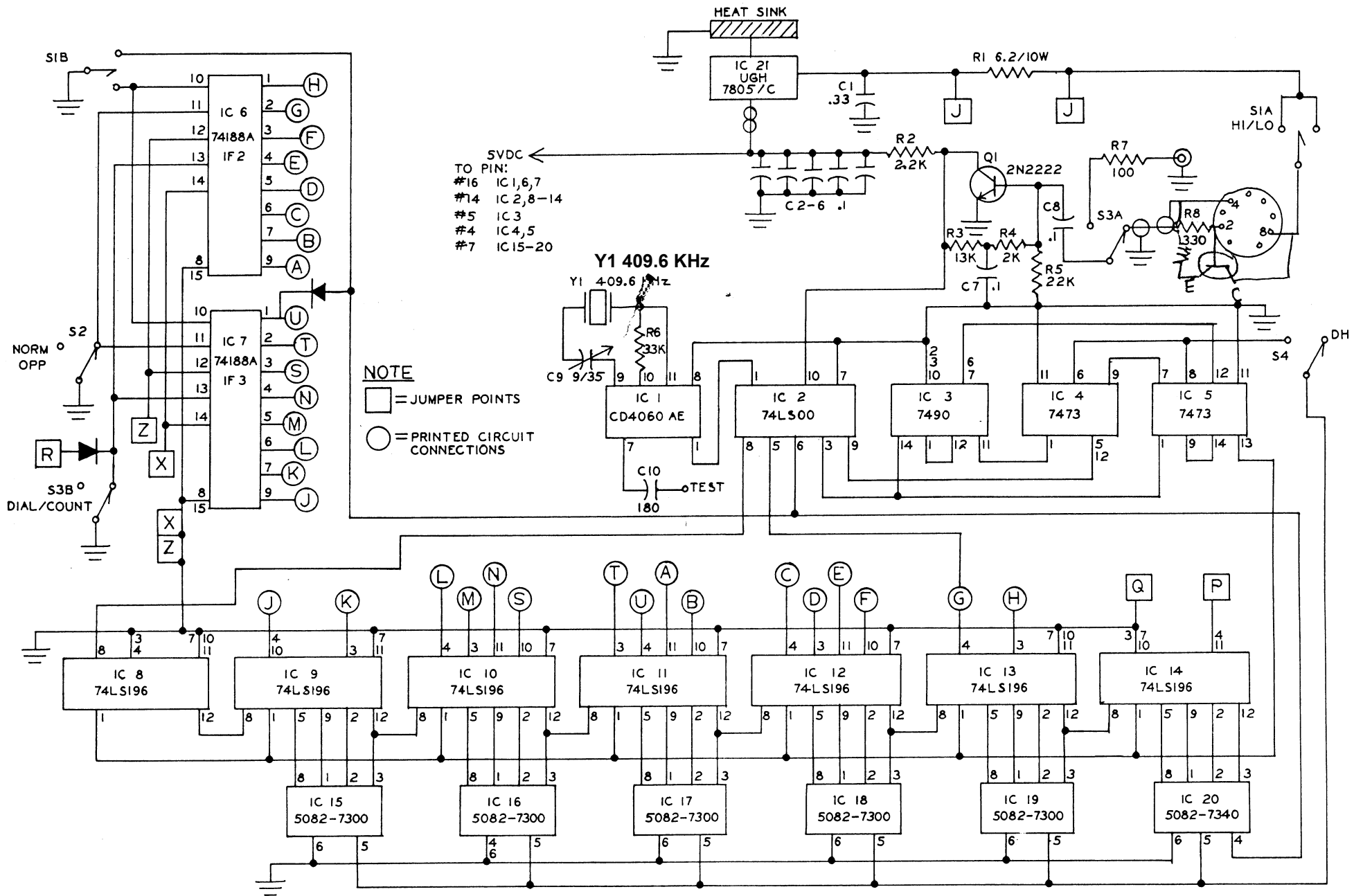
A CORRECT FUNCTION is indicated by "YES" on the Chart

A MALFUNCTION is indicated by "NO".





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DD6C SCHEMATIC

9-24-76