



CHU

CANADA

**SIR SANFORD FLEMING 1827-1915**

Principal Advocate of Standard Time Zones    Principal promoteur des fuseaux horaires



National Research  
Council Canada

Conseil national  
de recherches Canada

CHU time signals are transmitted on 3 330 and 14 670 kHz with a power of 3 kW, and on 7 335 kHz with a power of 10 kW. Carrier frequencies and second pulses are derived from a cesium standard. A time announcement is made each minute in French and English.

Les signaux horaires CHU sont transmis sur 3 330 et 14 670 kHz d'une puissance de 3 kW et sur 7 335 kHz d'une puissance de 10 kW. Les fréquences des porteuses et les repères des secondes sont dérivés d'un étalon au césium. L'annonce de l'heure se fait à chaque minute en anglais et en français.

Thank you for your report  
of reception on

Merci pour votre rapport  
de réception sur

3 330 kHz

7 335 kHz

14 670 kHz

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**Radio Station CHU · Ottawa Ontario Canada K1A 0S1**

## DOMINION OBSERVATORY TIME SIGNALS

Star observations, taken with the Ottawa Photographic Zenith Telescope (P.Z.T.), determine the corrections and rates of several quartz crystal clocks used as primary standards. Similar clocks, corrected daily from these standards, provide correct time for Canada.

CHU Time Signals. Three transmitters broadcast time signals continuously, and operate with the following frequencies and powers:

Transmitter No.	Frequency	Power Output
1	3330 kc.	0.3 kw.
2	7335 kc.	3.0 kw.
3	14670 kc.	0.3 kw.

Their location is latitude  $45^{\circ} 17' 47''$  N, longitude  $75^{\circ} 45' 22''$  W. A three wire folded dipole antenna is employed on each frequency. The transmitter frequencies are not to be considered as frequency standards. The musical pitch of 1000 cycles per second, which is characteristic of these signals, is derived from the transmitting quartz clock.

The beginnings of the beats mark the exact seconds and are reliable to a few hundredths of a second of true time. Seconds' beats are approximately 0.25 second duration except the zero of each minute which is 0.5 second and the zero of each hour which is 1.0 second duration. Intervals between seconds' beats are correct to better than one-thousandth of a second.

Seconds' beats omitted are the 29th, so each half minute may be identified, and the 51st to the 59th inclusive, to allow time for the voice announcement. During the first minute of each hour the call "CHU CANADA CHU" is sent in Morse-code twice in place of the seconds.

The Voice Announcement. The voice announcement in the CHU broadcast is introduced between the 50th and the 60th seconds of each minute and refers to the minute dash which follows. Time is announced on a 24 hour basis and in the following form: "Dominion Observatory, Canada, Eastern Standard Time, --- hours, --- minutes", and at the exact hour: "--- hours exactly".

CBC Broadcast. Over sixty broadcast stations, located across Canada, transmit time signals at 1.00 p.m. eastern time. Eastern time refers to standard or daylight time, whichever prevails at Ottawa. Seconds' beats with a musical pitch of approximately 800 cycles per second commence at  $12^h 59^m 20^s$  and continue to the hour.

C.N. and C.P. Telegraphs. For two minutes each day, coded signals are transmitted by wire, coast to coast, over Canadian National Telegraph lines from 1058 to 1100 hours E.S.T. and over Canadian Pacific Telegraph lines from 1154 to 1156 hours E.S.T.

Department of Mines and Technical Surveys,  
Dominion Observatory,  
Ottawa, Canada.  
(2000, Aug. 1956)

M.M.T.

EXPERIMENTAL PROCEDURE

Star... (faint text describing experimental setup or conditions)

The... (faint text describing the results or observations)

...	...	...
...	...	...
...	...	...
...	...	...

The... (faint text describing the analysis of the data)

The... (faint text describing the conclusions of the experiment)

Second... (faint text describing a specific part of the experiment)

The... (faint text describing the discussion of the results)

The... (faint text describing the summary of the findings)

The... (faint text describing the final remarks)

...

## DOMINION OBSERVATORY SPEAKING CLOCK

Since January 1, 1955, the Dominion Observatory, Ottawa, has been transmitting voice announced time signals each minute over station CHU, on the following frequencies; 3330 kc., 7335 kc. and 14670 kc.

These voice announcements, which augment the regular time signals, are obtained from either one of two machines constructed in France for the Observatory by Atelier Brillié Frères of Paris.

The voice is produced from sound track, cut from 35 mm. film, mounted in grooves on a drum which is revolved at 30 r.p.m. by a synchronous motor. Power for the motor comes from an amplifier controlled by the 60 cycle multi-vibrator output of one of the 5 crystal clocks comprising the Dominion Observatory time standard.

Three "readers", each containing an exciter lamp, a photocell and matching transformer, are mounted on tracks parallel to the drum and are made to move from groove to groove by cam action between announcements.

A point of light from each reader is focused on the sound track and is reflected back to the photocell by a bright surface underlying the film. Modulation is effected by the variable width sound track reflecting varying degrees of light intensity as it is rotated on the drum at the rate of 90 feet per minute.

Cam operated microswitches select each reader in turn to give the proper sequence to the announcements i.e. station, hours and minutes.

An independent set of suitable amplifiers, controls and meters for each machine, are mounted on a rack adjacent to the drum mechanisms. Alarm circuits alert the operator if trouble develops.

Department of Mines and Technical Surveys,  
Dominion Observatory,  
Ottawa, Canada.

V.E.H.

(2000, Feb. 1956)

LABORATORY OBSERVATIONS

On January 1, 1955, the following observations were made during the test. The test was conducted in the laboratory of the National Bureau of Standards, Washington, D.C. The test was conducted by the following persons: J. W. M. and H. W. M.

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