

# AUSTRON MODEL 2090A SYNCHRONOUS FILTER



## GENERAL

The AUSTRON Model 2090A Synchronous Filter is a Loran-C waveform averaging system that extends the range and versatility of the AUSTRON Model 2000C Loran-C Receiver in a variety of time/frequency and propagation applications.

Basically, the Model 2090A obtains a pulse waveform average that is taken over a number of pulse group repetition periods and processed for scope display or stripchart recording.

Loran-C waveform averaging accomplishes two important results:

First, most types of coherent CW interference (communication signals, etc.) may be cancelled to zero in less than a second. This type of interference can be particularly troublesome when recording Loran-C waveforms in conventional ways.

Second, averaging improves the waveform signal-to-random-noise ratio in proportion to the effective averaging time. Thus, it is possible to retrieve and analyze

Loran-C signal waveforms that are obscured by atmospheric and manmade noise in the normal 20KHz or 50 KHz receiver RF bandwidth.

## FEATURES

- Recovers Loran-C waveforms buried in noise or interference.
- Up to 30 db signal-to-noise improvement in less than a minute.
- 60 db dynamic range.
- Scope and stripchart recorder outputs.

## APPLICATIONS

- Skywave studies or ionosphere event detection at LF.
- Acquisition and identification of threshold groundwave or skywave.



**AUSTRON** INC.

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# SYNCHRONOUS FILTER

<b>Averaging Time:</b>	5, 10, 20, 50, and 100 sec, apparent at SS0 (200 to 4000 sample average).
<b>Dynamic Range:</b>	60 db
<b>Window Length:</b>	200 $\mu$ sec (Up to 400 $\mu$ sec optional).
<b>Window Position:</b>	-200, -100, 0, + 100 and + 200 $\mu$ sec, beginning of averaging window relative to tracking gate in Model 2000C Receiver.
<b>Storage Clear:</b>	Pushbutton control and external electric input at rear panel provided to start waveform scan for chart recording. Output supplied for relay operation of chart drive motor, pen lift, etc., in recorder.
<b>Tracking Point:</b>	Z-axis output for intensifying scope display at tracking point position. Event channel output for identifying tracking point on strip chart recorder.
<b>Logic:</b>	TTL integrated logic in all digital circuits.
<b>Ambient Temp.:</b>	0°C to 50°C.
<b>Power:</b>	115/230 V + 15%, 48-420 Hz; standby operation on 22-32 VDC, 0.7 amp.
<b>Physical:</b>	Cabinet is 5 $\frac{1}{4}$ " high x 17" wide x 16" deep; adapters supplied for mounting in standard nineteen inch rack. Weight is twenty pounds.

### PRINCIPLES OF OPERATION:

Basic operation of the 2090A is accomplished by employing an array of sample-and-average detectors that are programmed by a ring counter to sample phase decoded RF from the Model 2000C Receiver.

The individual detectors sample during short adjacent segments of time along the desired portion of the Loran-C pulse. Operation of the sampling detectors in the proper sequence is performed by the ring counter. Timing signals from the Model 2000C clock the ring counter and synchronize its cycle within the PRP frame in such a way that each detector always samples at the same point of the Loran-C pulse.

Detector voltages so obtained thus represent average values of the RF waveform at respective sampling times.

To read out, the voltages so obtained are scanned in the original sampling order and the resulting stepwave is filtered to remove harmonics for oscilloscope display.

For stripchart recording, a scanned detector sweeps through the reconstituted waveform; the resulting voltage is provided at a suitable recording level.



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