
Logic circuit selects most intense signal

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In police wireless communications where each patrol car has its own frequency, messages from the cars are received at police headquarters via satellite receiver stations to avoid blind angles, obstacles, and dead zones. An operator at headquarters could select the best signal from these stations by manually sampling the various outputs from the HQ receiver and comparing their volumes. This method is unsatisfactory because of delays

in switching and subjective evaluation of signals. Therefore, an automatic maximum-strength-signal selector is needed to select the strongest of incoming signals and connect it to the headquarters receiver. Whenever the signal level from any unselected relaying station becomes higher, the headquarters receiver must promptly select that signal.

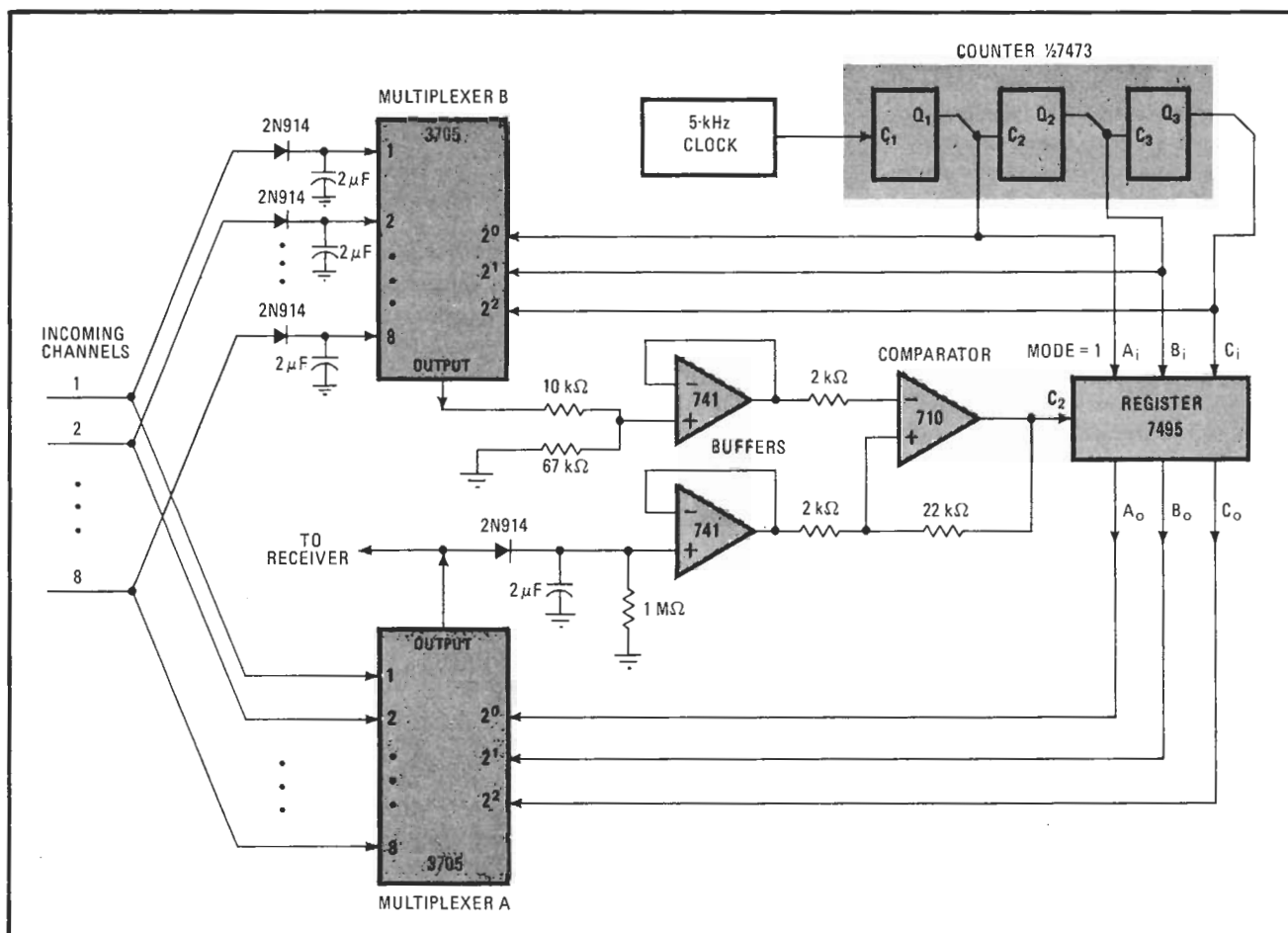
The circuit shown uses a pair of analog multiplexers to automatically connect the headquarters receiver to the strongest signal. The incoming signals from eight satellite stations, band-limited to the range from 300 to 3,000 Hz, are amplitude-limited to ± 5 volts peak to peak. These signals go to multiplexer A and also go through eight level-detectors to multiplexer B. The channel-selector inputs to multiplexer B are driven by a 3-bit counter that counts 5-kHz clock pulses. Thus, the signal levels of the eight incoming channels appear, one after another, at the output of B. These levels are compared with the level-detected output from multiplexer A by a 710 comparator. The output from the comparator controls the operation of a 7495 register.

The channel-selector inputs to A come from a register that contains the code for the channel with the highest signal level, as explained below. The output from B is attenuated about 10% by the resistive voltage divider, to give the output from A an advantage in the comparator.

The comparator's output is high as long as the most intense signal is selected by A.

If propagation conditions change so that the signal level on some unselected channel, say U, exceeds the level on the selected channel, then when multiplexer B is switched to channel U the output of B is higher than the output of A. Therefore the comparator's output goes low. On this trailing edge, the contents of the counter are clocked into the register so that A also selects channel U. Because of the 10% advantage given to A, the comparator's output then becomes high again. Thus the most intense signal is selected by A and connected to the receiver; all of this takes place within a fraction of a clock period.

The inputs of the comparator are buffered through the type 741 voltage followers to avoid loading on the level detectors and thus preserve the accuracy of comparison. The level detectors are simple diode peak detectors with 2-microfarad capacitors. Their performance is satisfactory, but they may be replaced by better level-detectors if necessary. □



Goes with strength. Most intense signal coming from relaying stations is connected to central receiver through multiplexer A. If signal from A is not the strongest, comparator goes low when counter clocks multiplexer B to the stronger signal. Register then changes input code to A so that the stronger signal is connected to receiver. System allows police cars (each with own frequency) to contact HQ via satellite stations.