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A HIGH PERFORMANCE RECEIVER WITH GRAPHIC DISPLAYS AND A SYNCHRONOUS DETECTOR

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## ABSTRACT

A recent developed SW receiver can not only receive conventional broadcasting clearly, but also demodulate and print out facsimile signals. Moreover the LCD display provides receiving conditions and status. Three technologies i.e, a high precision PLL synthesizer (10Hz resolution), a new demodulating circuit and a 8-bit micro computer control with big memory size support above mentioned functions.

### 1) PLL Synthesizer (Fig. 1)

Frequency stability and 10Hz resolution for fine frequency tuning were required for a SW receiver which receives SSB, FAX and RTTY.

In order to obtain the frequency stability,  $\pm 3\text{ppm}$  (between  $-10$  degrees and  $+60$  degrees) TCXO (Temperature Compensated Crystal Oscillator) is adopted.

To realize the resolution (10Hz), a PLL synthesizer with a triple PLL circuit is utilized, which enabled the tuning at 80KHz step and 10Hz step with quick response of frequency change.

The use of the triple PLL circuit also enabled a high C/N ratio.

### 2) New Demodulating Circuit (Fig. 2)

A synchronous detecting circuit is adopted to reduce jamming from adjacent stations and overmodulation distortion due to selective fading.

In the synchronous detecting circuit, the detected LSB/USB output can be obtained by the following process. PLL circuit generates internal carriers of the in-phase component and the quadrature component. These two types of internally generated carriers are respectively multiplied by the AM wave. The LSB or USB detected output are obtained by the sum of or difference between the above two audio signals.

The synchronous detecting circuit consists of a detecting IC (CX-857), a PSN unit and peripherals.

### 3) CPU Block (Fig. 3)

A large-scale (88KBYTE) CPU block is provided to enable the following functions.

- Signal processing and print out of FAX and RTTY information
- Display of reception mode and wave conditions on the large-scale LCD

As is usually the case in a receiver incorporating a CPU block, shield technology to isolate the signal portion from the digital portion is employed to obtain satisfactory receiving performance.

