520 Series 10MHz Frequency Standard Distribution System

Model 520 Central Distribution Amplifier and Power Source for the System

Single 10MHz 50 ohm input

Buffer amplifier with AGC

3 distribution trunks provide:
- 10MHz 50 ohm Signal
- 24VAC Power

Model 521 Distribution Module

High impedance connection to the 10MHz trunk

Powered from 24VAC on the trunk

Output fully isolated from the distribution bus.
Output signal options:
- 10MHz square wave
- 10MHz TTL/HCMOS signal
- 10MHz sine wave
- 1MHz square wave
- 100KHz square wave

PRA Inc.
4821 226th Place NE
Arlington, WA 98223 U.S.A.
Tel:360-435-0484
e-mail:Sales@prainctest.com
www.prainctest.com

520 System Description

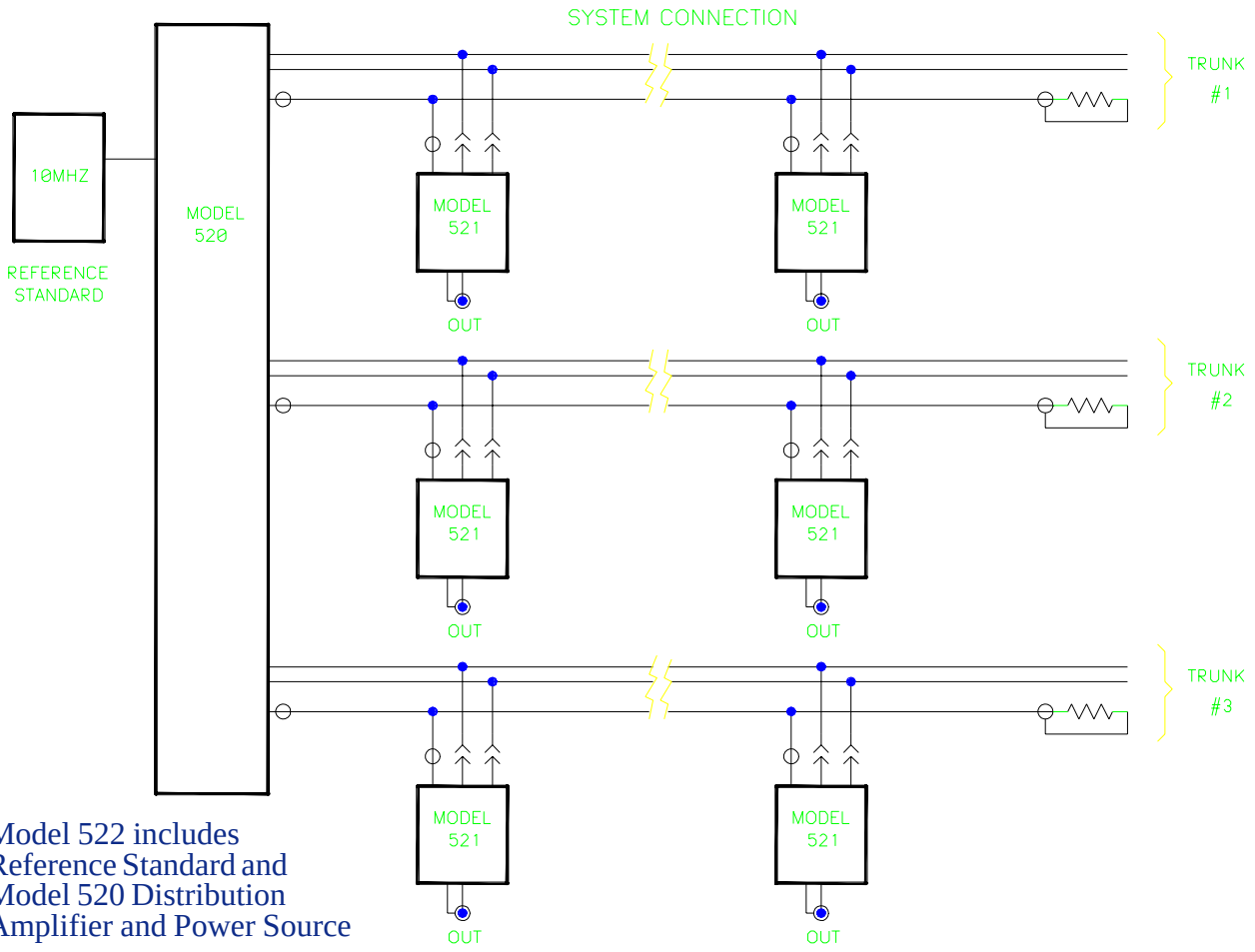
By using transformers to isolate both the precision time signal and the low voltage power to the Model 521 modules, the PRA Model 520/522 Frequency Standard Distribution System provides a noise free, uniform signal to each frequency counter in your facility. This signal can be "user selected" to meet most device requirements.

The built in power source simplifies installation by requiring 120/240 VAC only at the Model 520/522 Power Source/Signal Buffer Amplifier. The 24 VAC used to power the Model 521 modules is low voltage and very safe. Running the 24 volt line adjacent to the RG-58U line as it is being laid allows for a very simple installation. There are no other power requirements for the Model 521 modules.

The ability to select the best wave shape and frequency at each drop is beneficial. The transformer isolation creates immunity from inter-equipment noise and distribution losses. The development of a consistent voltage waveform at each frequency counter in your system does establish confidence that the output product is correlated to your precision frequency standard. By incorporating an acceptable frequency standard, you can be assured that your product was uniformly manufactured to a time base that is the same all over the world. Product conformance will not be affected by variation in the precision time distribution system.

SPECIFICATION FOR 520/522:

- 3 each 50ohm 10MHz Sinewave outputs
- 3 each 24VAC isolated outputs
- Each output (10MHz and 24VAC) can drive 7 each Model 521s
- Operating Temperature range -5°C to 50°C (non condensing)
- Power Mains: 95 to 125VAC
  -or-
  190VAC to 250VAC
  switch selectable
  50/60Hz



Model 522 includes Reference Standard and Model 520 Distribution Amplifier and Power Source

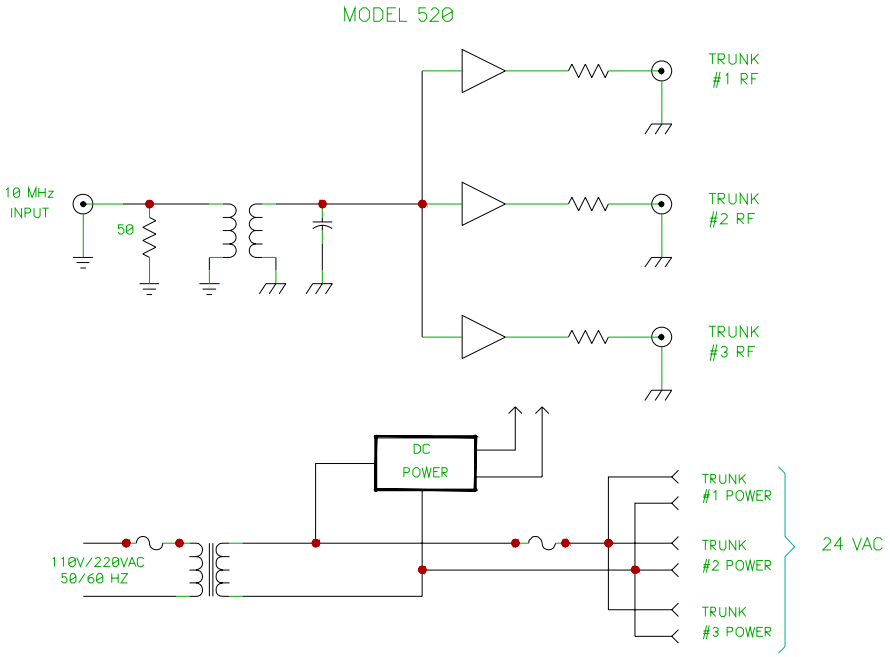
Module 520 Power and Amplifier Signal Source

The system consists of one PRA Model 520 Power Source/Signal buffer Amplifier connected to a maximum of 21 PRA Model 521 Signal Output Modules. A 521 Signal Output Module is located at each frequency counter or system that requires a precision time reference signal. The output module is capable of providing a jumper selected wave shape and reference frequency to supply the optimum input condition for each counter. This selection is independent of any other module.

The system can be easily installed by the customers's maintenance personnel.

The 520 Power Source/ Signal Buffer Amplifier has the following requirements and features:

- A single 50 ohm input from the precision frequency standard at 1 volt peak to peak is required.
- A single 240/120 VAC 50/60Hz is required.
- Provides 3 separate 50 ohm sine wave outputs to drive a maximum of 300 meter long precision frequency standard cable runs to the 521 modules.
- Provides 3 separate 24 VAC outputs for the 521 module power requirements.
- The 520 power source can of driving three runs with a maximum total 21 of the 521 modules of up to 300 meters.
- The 520 module is ~ 10.1cm (4") x 15.2 (6") x 15.2cm (6").



Model 522 Power and Amplified Precision Signal Source

The Model 522 distribution system source is the same as the Model 520 and incorporates a rubidium atomic oscillator with the distribution amplifier. The Model 522 has a rubidium frequency standard included which has stability specifications several decades better than a good OCXO. There are two versions available, these offer differing long term stability differences

Specification	522A	522B
Short term stability per day	±0.1 ppb	±0.2 ppb
Aging per 7 years	±4.22 ppb	±25.2 ppb
Frequency accuracy at shipment	±0.05 ppb	±0.1 ppb

The atomic standard uses the resonance of rubidium, at approximately 5 GHz, to voltage control a built in OCXO. The resonant frequency of the vapor is determined by placing the rubidium vapor in an excited RF field and by measuring the transmissivity of light passing through the excited vapor. Because this is an atomic resonance, the long term stability is excellent.

The OCXO provides excellent short term stability and the atomic particle resonance is used to correct the aging of the OCXO. The results of this combination is a standard that is stable to about 0.05 parts per billion (ppb) per month. The part of the rubidium oscillator that contains the gases is called the "physics package". It has a limited life of approximately 7 years under operation. The physics package must be replaced at the end of the 7 years life.

The Model 522 should be connected to a good "personal computer type" uninterruptible power source so the atomic standard is never turned off thus providing the least aging and best accuracy possible.

This is an atomic resonant technique, not an atomic emission technique. There are no atomic particle emissions. This is an extremely safe product.

The 522 module is ~ 20.3cm (8") x 24.1 (9.5") x 8.9cm (3.5").

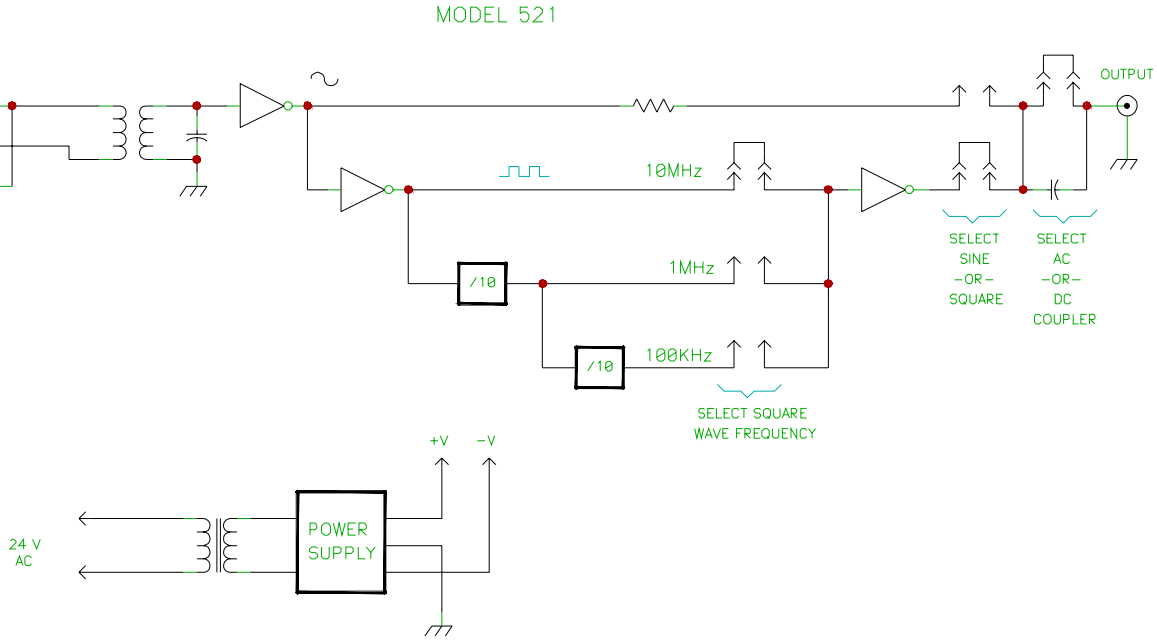
Module 521 Description

The Model 521 Signal Output module has the following features:

- Has a transformer isolated connection to the 24VAC power supply line.
- Has a high impedance, tuned transformer isolated, connection to the Model 520 conditioned frequency standard distribution cable.
- The user sets the wave shape and the frequency output to the counter with a jumper on the module. It can be different at each module on the line to match most known frequency counter input requirements. Those available are:
  - 10 MHz 5 volts PP sine wave
  - 10 MHz TTL square wave; 0 to 5V
  - 10 MHz 4 volt PP square wave
  - 1.0 MHz TTL square wave; 0 to 5V
  - 1.0 MHz 4 volt PP square wave
  - 100 KHz TTL square wave; 0 to 5V
  - 100 KHz 4 volt PP square wave
- The signal out to the frequency counter is a BNC connector.
- Requires no other power sources.
- The physical size is ~ 5.1cm (2") x 5.1cm (2") x 10.1cm (4") .

The system uses standard 50 ohm RG-58U coaxial cable for the precision time reference signal distribution. A BNC connection is required to connect the Model 520 buffered reference line to each of the Model 521 signal output modules. Continuation of the reference signal distribution is easily made from the other BNC connector on the opposite side of the module. At the end of each run, all you have to do is terminate the cable with a 50 ohm resistor.

The power distribution for the Model 521 modules is a 16 gauge power cord that is laid next to the RG-58U cable. Many people tie-wrap the power cord to the RG-58U cable as it is being run. The 24 VAC is totally isolated from the precision time reference in this manner. The connection at each module is made with a crimp on AMP Mate-N-Lok connector.



NOTE: PRA Inc. reserves the right to make changes to the product contained in this data sheet in order to improve the design or performance and to supply the best possible product. PRA Inc. reserves the right to make these changes without notice.

Revised 9/22/07