

For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

Last Revised: 2016-03-15 15:54:16.0

8-Channel Clock Distribution Accessory

CDA-2990



- Synchronize up to 8 USRP devices for phase-coherent operation
- Options for external input or internal GPSDO timing sources
- Cascade multiple devices for synchronization of larger systems
- Rack mountable with a 19 in. 1U form factor
- 8-way amplification and distribution of 10 MHz and 1 pulse per second (PPS) time reference signals
- Source detection with automatic switchover in case of failure or disconnect

Overview

The CDA-2990 is an eight channel clock distribution accessory for synchronizing software defined radio systems. The CDA-2990 accepts both external 10 MHz and pulse per second (PPS) input signals and then amplifies and distributes each to eight output ports. The CDA-2990 is offered in two configurations, a more affordable option for distributing externally supplied signals and a second GPSDO (GPS Disciplined Oscillator) enabled version that integrates a GPS disciplined OCXO (Oven controlled oscillator) that generates the 10MHz and PPS signals internally. The GPSDO option provides a reference source using the OCXO when no GPS signal is present, and further increases frequency accuracy and time synchronization capability with a GPS lock (enabled by an external antenna with a line of sight view of the sky.) Multiple CDA-2990 have been cascaded to synchronize higher channel count systems for applications such as Massive MIMO.

[Back to Top](#)

Comparison Tables

Model	Part Number	External Clock Distribution	Internal GPSDO Timing
CDA-2990	784305-01	Yes	No
CDA-2990 with GPSDO	784306-01	Yes	Yes

[Back to Top](#)

Application and Technology

Precision Clock Distribution

The CDA-2990 provides 10 MHz and PPS inputs on the front panel of the device that are then distributed to each of eight 10 MHz and PPS SMA outputs. Matched-length traces are used to ensure proper timing, and each output signal is amplified to maintain level and signal integrity after being divided eight ways.

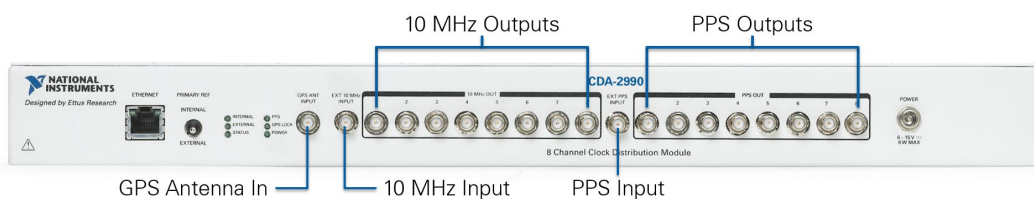


Figure 1. CDA-2990 Front Panel

Optional Internal GPS Disciplined Oscillator (GPSDO)

The optional GPSDO for the CDA-2990 greatly enhances the capabilities of this accessory by adding both an oven-controlled oscillator (OCXO) and the ability to discipline the oscillator using a GPS signal. You can switch between these two sources with a front-panel switch, and the GPSDO features automatic switchover capability in case of failure or source disconnect.

The GPSDO serves as a higher precision reference that you can synchronize to the GPS timing standard. This means you can time-align multichannel systems across the globe to within a few 100 ns. When the GPSDO is not locked to the GPS constellation, it still provides 10 MHz/1 PPS signals using the integrated OCXO and offers accuracy better than 25 ppb.

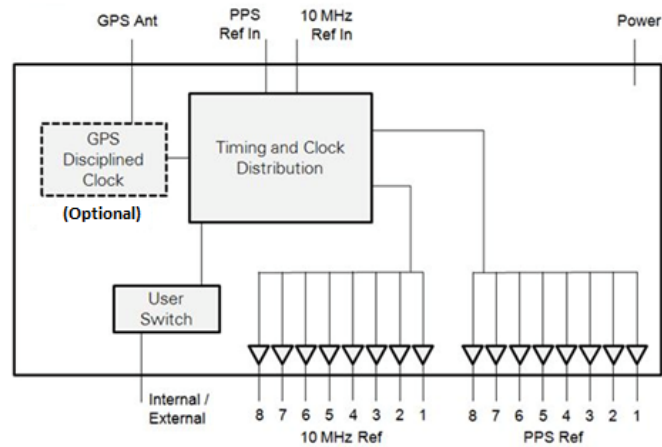


Figure 2. CDA-2990 System Diagram

An example of two-device synchronization using a CDA-2990 with GPSDO is shown in Figure 3. The 10 MHz and PPS outputs from the CDA-2990 with GPSDO are tied to the Ref In and PPS Trig In connections, respectively, on the USRP devices.

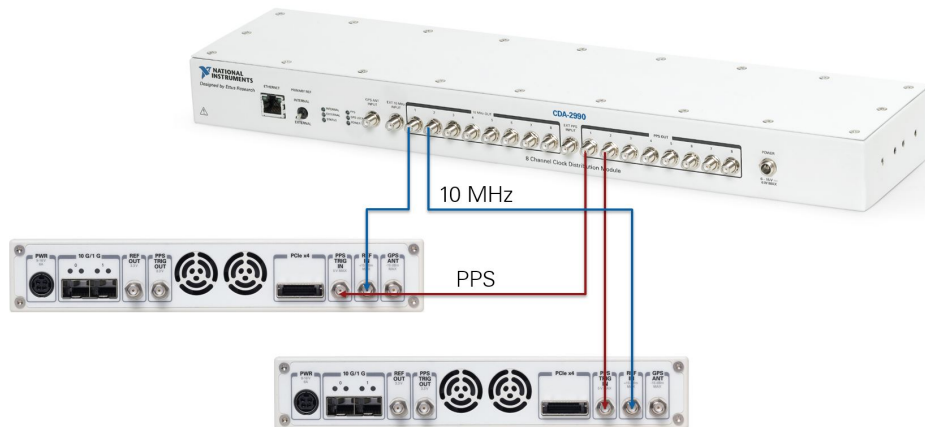


Figure 3. Synchronization of Two USRP Devices Using a CDA-2990 with GPSDO

Multichannel Synchronization

The CDA-2990 is designed to help you easily build MIMO systems and work with higher-channel-count systems that might include MIMO research, direction finding, beamforming, transmitter geolocation, and more. You also can synchronize multiple clock distribution accessories to a master CDA-2990 using matched length cables to synchronize up to 64 USRP devices.

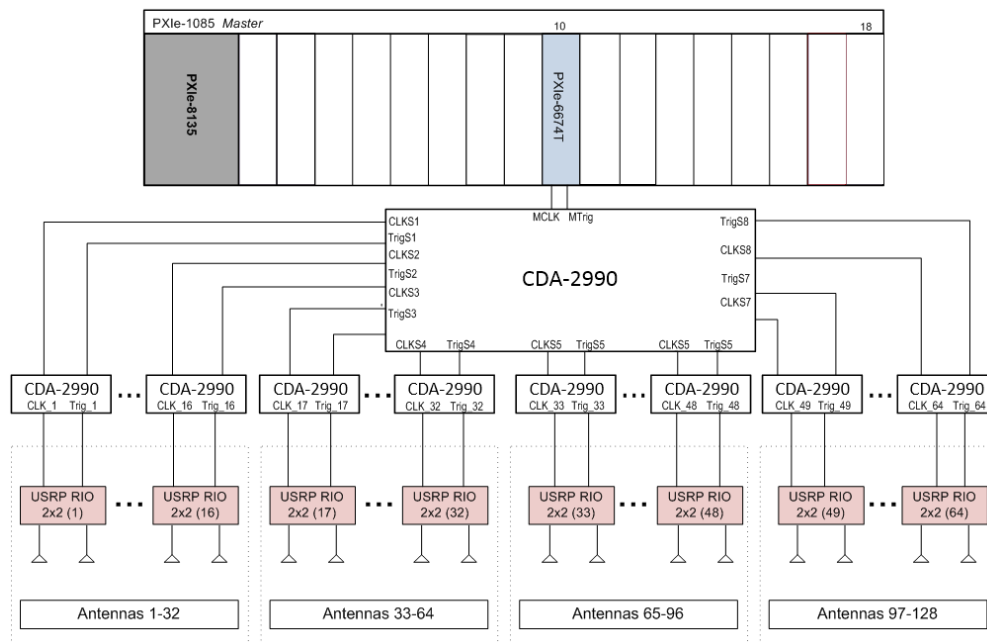


Figure 4. Synchronization of a 128-Channel SDR System (data connections omitted)

[Back to Top](#)

Support and Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

Calibration

NI measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of your measurement hardware, NI offers basic or detailed recalibration service that provides ongoing ISO 9001 audit compliance and confidence in your measurements. To learn more about NI calibration services or to locate a qualified service center near you, contact your local sales office or visit ni.com/calibration.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit ni.com/support to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit forums.ni.com for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit ni.com/training for more information.

Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.

[Back to Top](#)

©2016 National Instruments. All rights reserved. CompactRIO, FieldPoint, National Instruments, NI, ni.com, and USRP are trademarks of National Instruments. Other product and company names listed are trademarks or trade names of their respective companies. A National Instruments Alliance Partner is a business entity independent from National Instruments and has no agency, partnership, or joint-venture relationship with National Instruments.

[My Profile](#) | [RSS](#) | [Privacy](#) | [Legal](#) | [Contact NI](#) © 2014 National Instruments Corporation. All rights reserved.