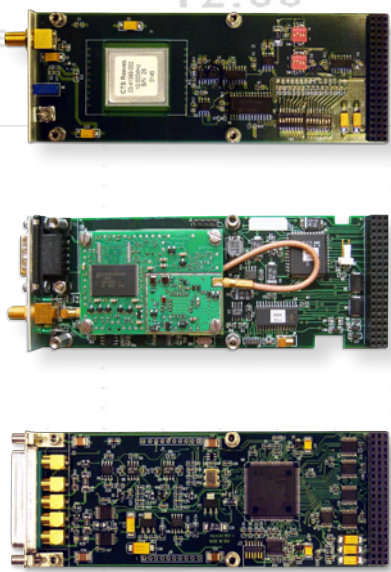


voltage(V)



Precise Timing & Synchronization



Stable Clocks - Accurate Triggers - High Resolution Pulses

Precise Timing and Synchronization at some level is required in most Automatic Test Equipment (ATE), Data Acquisition Systems and in many control environments. This involves the generation of clocks and pulses that are stable and repeatable to levels of accuracy that may be beyond the capability of standard instrumentation. C&H provides solutions for these types of applications:

- **On Board Metrology:** Often it is desirable to build some level of reference into a system, thereby avoiding the need to take instruments out of a system for calibration. C&H can provide clocks and pulse sources locked to its GPS or OCXO modules for providing precision clocking within a system.
- **Pulse/Clock Stimuli:** Most Units Under Test (UUT) will require some form of pulse input in order to properly stimulate them for testing purposes. Both types of sources may be locked to references and pulse edge placement can be made to 10 ps resolution.
- **Synchronized Triggers:** The ability of our programmable clock and pulse generators to be triggered by external events allows generation of tightly controlled and programmable triggers for other devices.
- **Parallel/Multiple Triggers:** Our pulse distribution module provides from 4 to 10 outputs from a single trigger source.
- **Precise Timing between Events:** Use our Pulse Generators alone or in combination with our clocks to create precise times between triggered events with resolutions to 10 ps.
- **Scalable Solutions:** Use our ANSI standard modular instruments to create single or multiple channel solutions for multiple environments as small as PXI and as large as rack mount.



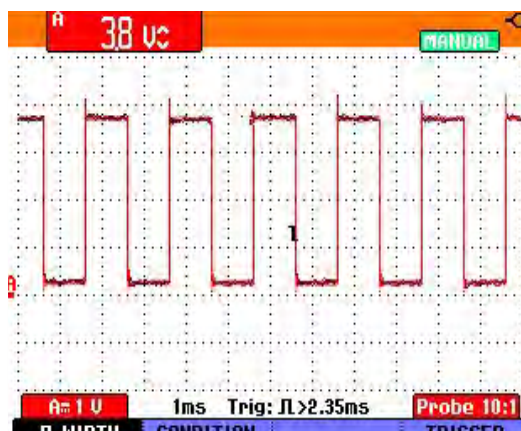
Metrology - Frequency References

- OCXO to 1×10^{-8}
- Pulse Generators & Clocks to 1×10^{-8}
- GPS to 1×10^{-13}



Clock & Pulse Sources

- Lock to Reference for good long term stability
- Use 10ps edge control to tune out cable differences
- Frequencies to 100MHz
- Full range of Pulse Parameter Control
- Multi-channel clocks to 50MHz

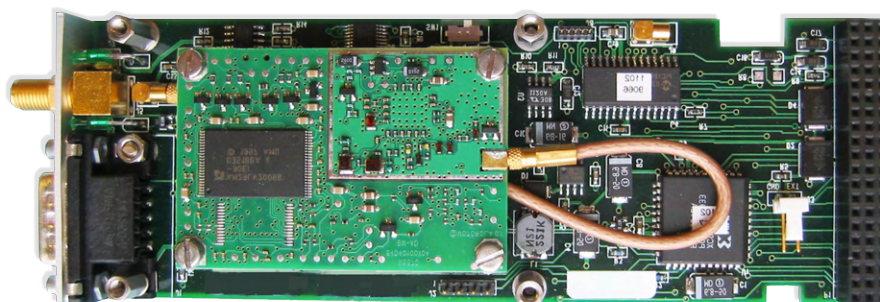


Synchronization & Triggering

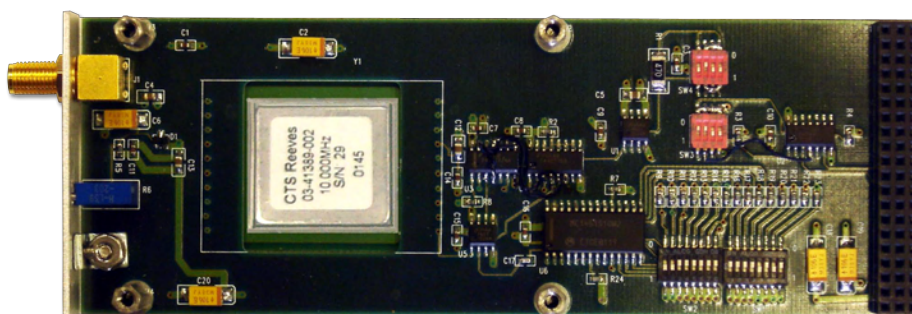
- Pulse & Clock Sources may be gated or triggered
- Multi-channel TTL & ECL Pulse/Trigger distribution
- LVDS trigger bus with sophisticated distribution control on our LXI products



Enabling Core Technologies

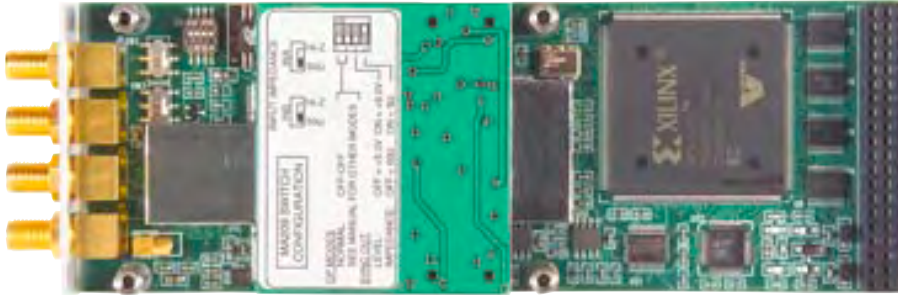


GPS: The C&H Technologies M213 is an ANSI standard M-Module that allows simultaneous tracking of up to 12 satellites to provide extremely accurate output timing.

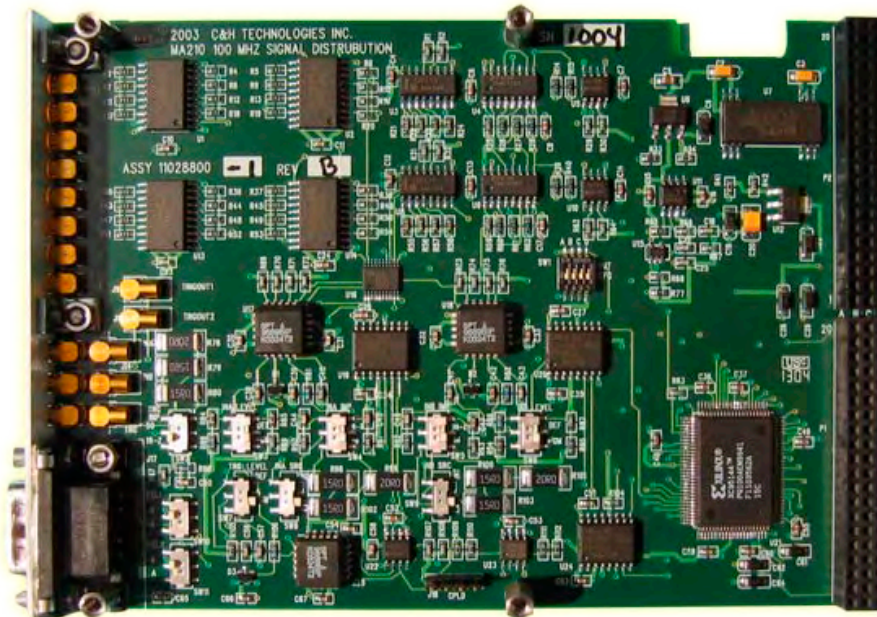


OCXO: The C&H M207 is a precise oscillator source that provides a highly accurate and stable clock reference that can be used as a frequency or time reference.





Pulse Generation & Placement: The MA209 & MA204 Pulse Generators provide the full range of programmable features with timing resolutions down to 10 pico seconds.

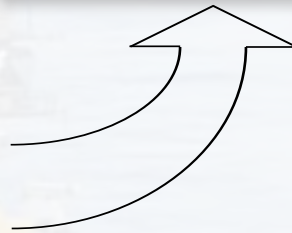
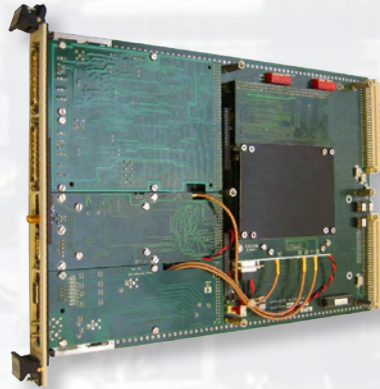


Pulse Distribution: The MA210 Pulse Distribution Module provides parallel TTL and ECL outputs to 100MHz from 1 or 2 pulse generators.

Precise Timing & Synchronization-Solution Examples

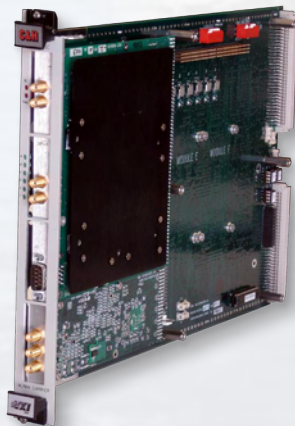
VXI RT-CASS

- On tester clock reference
- Rubidium module locked to GPS reference
- Clock distribution card
- Separate Trigger distribution module
- All packaged on VXI carrier (VX405C)



Legacy PG replacement with VXI

- Standard VXI Carrier (VX405C)
- Standard M-Module Pulse Generator (MA204)
- Custom M-Module for signal amplification & isolation
- Assembly replaces Rack Mount Tri-Phenix PG
- Used on AN/USM-449(v)

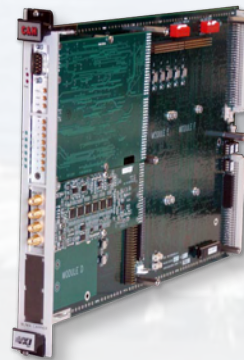


Precise Timing & Synchronization-Solution Examples



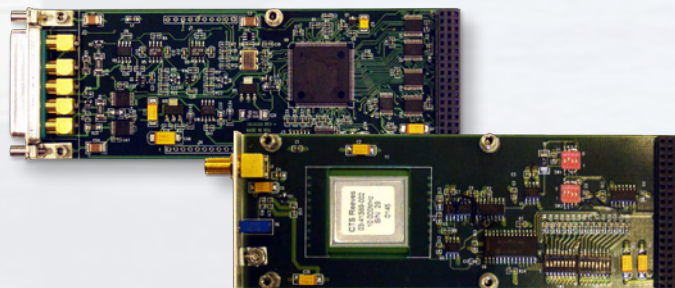
VXI -- Avionics Test

- 100MHz PGs (MA209) & Pulse Distribution (MA210)
- Various Combinations of PGs & Distribution cards on 5 VXI Carriers (VX405C)
- Provides Synchronized signals to UUT
- 10 ps timing control allowed user to tune out system/cable propagation differences



LXI Data Acquisition Synchronization

- M227 Programmable clock provides master sample clock
- M227 with M207 OCXO master for stability
- Clock distributed via LXI trigger lines



Integrate with Exceptional Ease

Scripting Utilities based on Lua¹, an interpretive language, provides a powerful tool for utilizing the intelligence of our EM405-8 LXI (Ethernet) carrier and soon our VX406C intelligent VXI carrier. This software suite, shown in the diagram on the facing page, comes embedded on these carriers at no additional cost. This software provides enhanced programming capabilities that allow the user to embed application software on the carriers mentioned. Additional capabilities include:

- C level drivers for any M Module may be embedded on carrier
- Customized Test Sequencers and Monitors may be easily developed
- Autonomous monitor and control of M Modules reduces load on host and minimizes communications over bus to host
- Automatic configuration possible using start-up scripts
- Start-up scripts can call other scripts thereby going directly to stand alone operation
- Any text editor may be used for script development
- Facilitates development of turn-key solutions with minimal effort

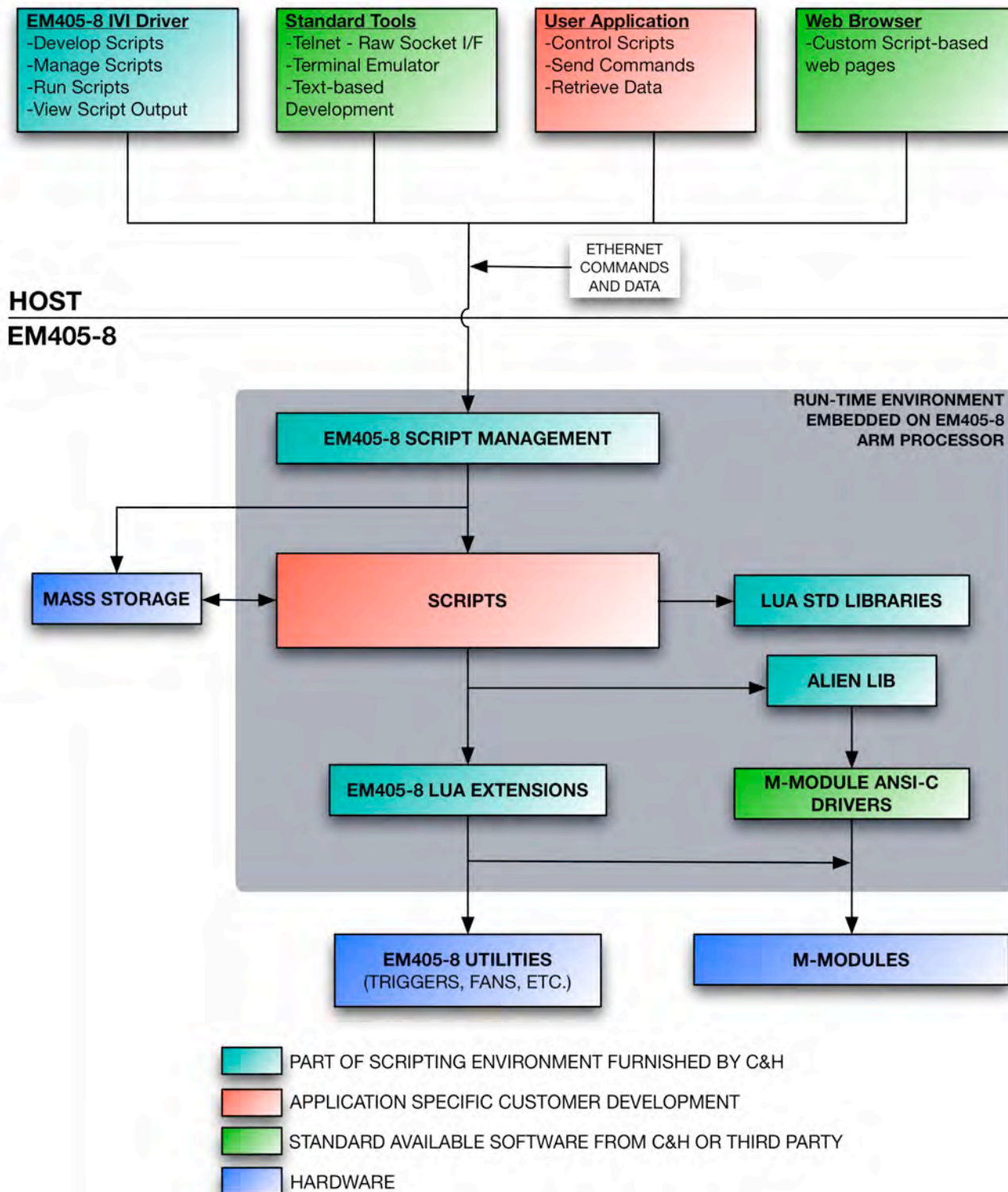
Linux Development Environments are available at additional cost for those who wish to have a greater degree of control over the embedded application environment on the C&H intelligent carriers. Currently available for our intelligent VXI carriers this environment will soon be available for our intelligent LXI (Ethernet) carriers. Data sheets and details may be found on the C&H web site.

ANSI/VITA Std 12-1996 M Module mezzanines, upon which our solutions are based, are available from a number of vendors and add additional capabilities beyond those discussed herein. This can add additional flexibility when implementing a specific Transient Data Acquisition solution.

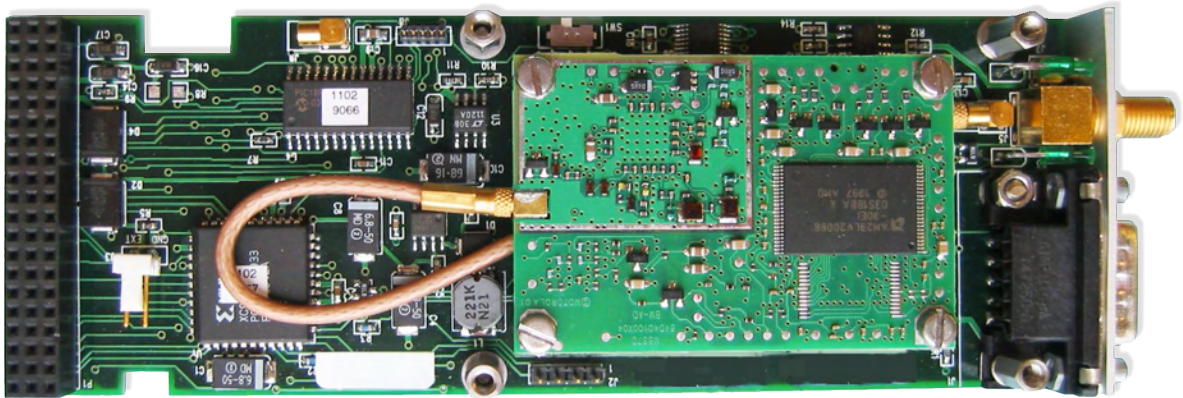
1. Lua is an open source, interpretive programming language designed, implemented, and maintained by a team at PUC-Rio in Brazil. Lua is copyright 1994-2008 Lua.org, PUC-Brazil.



EM405-8 Scripting Utilities Architecture Diagram



M213 GPS Timing Receiver

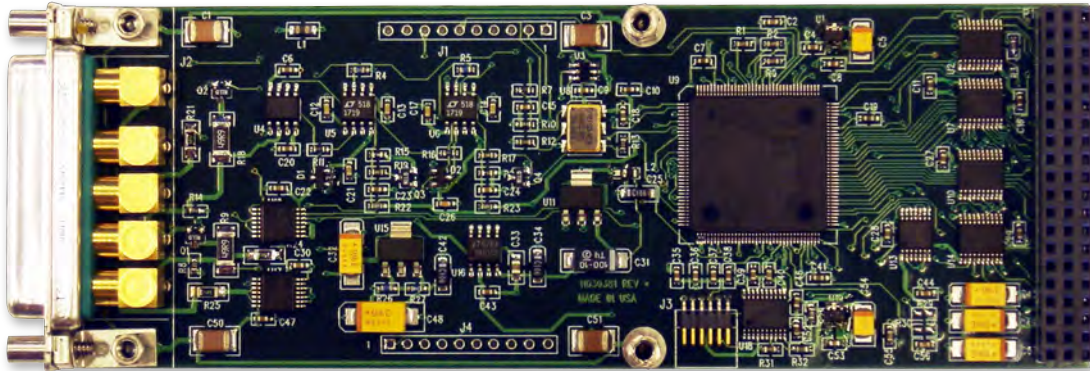


- 1 pps & 100 pps out
- Tracks up to 12 satellites
- Use a primary reference for Rubidium sources, C&H MA209 Pulse Generator or M227 Clock
- Position Tracking capability
- VXI Plug & Play or C drivers

VISIT WWW.CHTECH.COM FOR DETAILED SPECIFICATIONS



M227 Programmable Clock/Counter/Timer



- 3 Channels, each to 50 MHz
- Primary source on-board or external
- On-board source can be disciplined to an external reference including M213 GPS
- Extensive on-board counting and timing functions
- VXI Plug & Play and C drivers

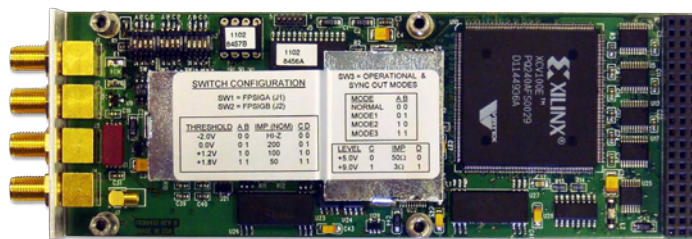
VISIT WWW.CHTECH.COM FOR DETAILED SPECIFICATIONS



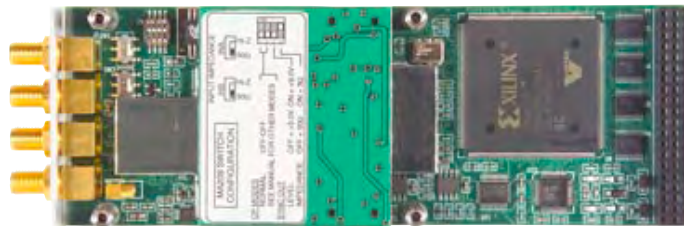


MA204 & MA209 Pulse Generators

- 50 MHz & 100 MHz Models
- Timing resolution to 10 Picoseconds
- Full range of programmable functions
- Burst Mode
- External reference disciplining for greater long term stability including M213 GPS for MA209
- VXI Plug & Play or C drivers



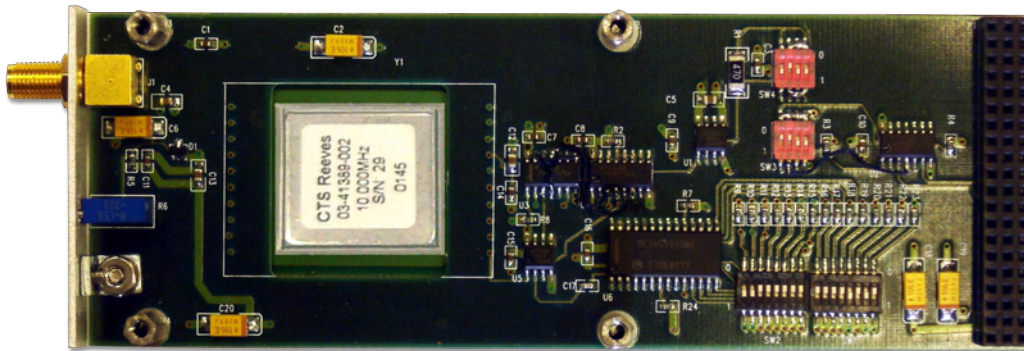
(MA204)



(MA209)

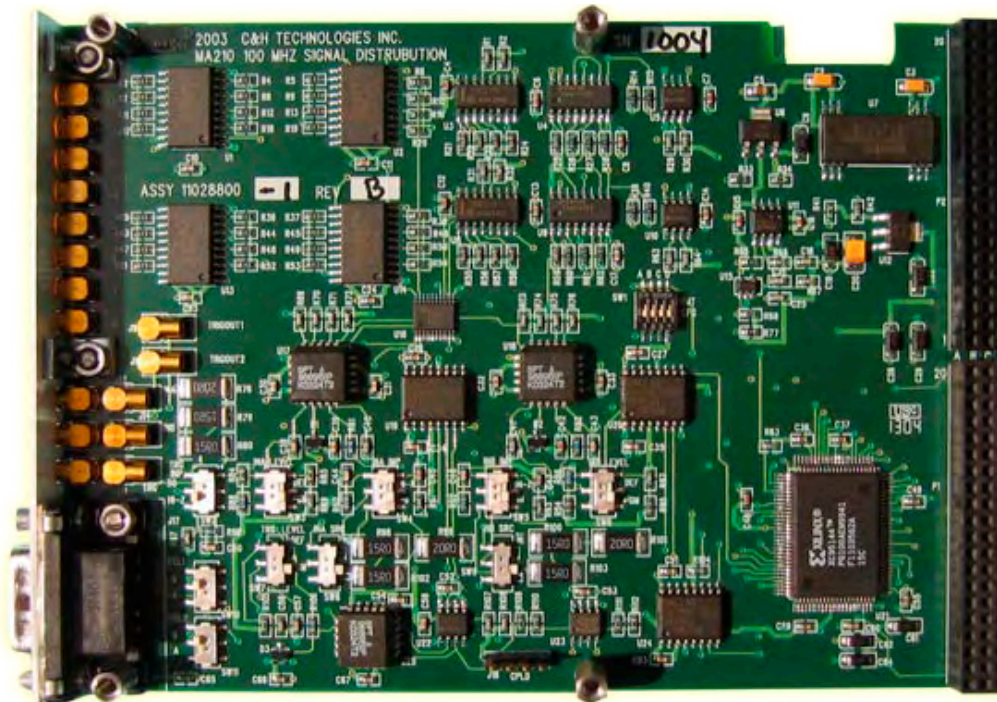
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M207 Precision Oscillator



- 10 MHz OCXO
- Stability of 1×10^{-8}
- Settable divide by “N” Output
- Stable reference for MA204 Pulse Generator, MA209 Pulse Generator or M227 Clock
- Output to Front Panel or Carrier
- No Driver is required

MA210 Pulse Distribution



- 2 Channels to 100 MHz
- 4 TTL & 1 ECL Out/Channel
- Combine channels for 8/2 out
- Programmable or settable Hysteresis & Threshold
- VXI Plug & Play or C drivers

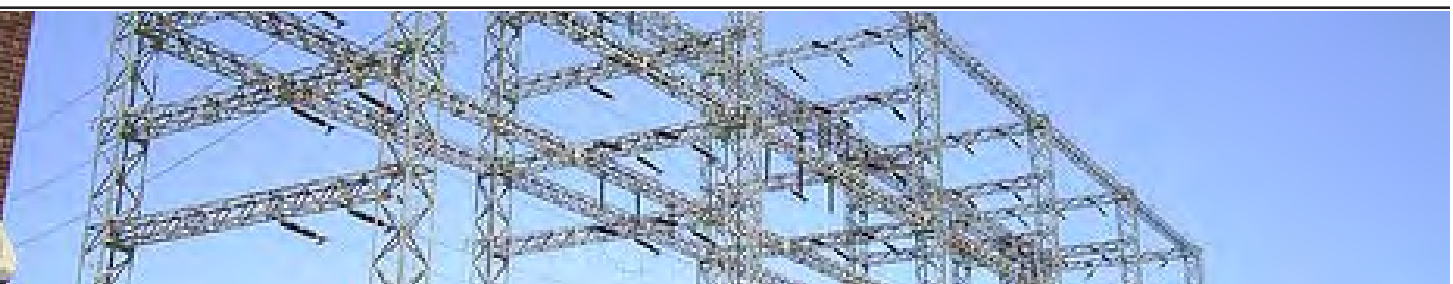
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Carrier Family



- Facilitates custom solutions in LXI, VXI, PXI, Ethernet, VME, cPCI and PCI
- On-board processing capabilities of VXI and LXI carriers make it easier to support customized configurations

VISIT WWW.CHTECH.COM FOR DETAILED SPECIFICATIONS





C&H Technologies provides test, measurement and data acquisition solutions to industries in design, production, maintenance and monitoring of electronic devices.

Our products provide easily integrated solutions for precise timing and synchronizing requirements through:

- Stable Clock Sources
- Accurate Triggering
- High resolution pulses

C&H is a Round Rock, TX based company that has been providing products and systems solutions for Test, Measurement and Data Acquisition markets for over two decades. Its solutions are based on industry standard mezzanine technology that with appropriate carriers can provide common instrument solutions for a variety of backplanes and busses including LXI, VXI, PXI, VME, PCI and others.



445 Round Rock West Dr.
Round Rock, TX 78681 USA

(512) 733-2621

<http://www.chtech.com>