

DCD-521/C

Digital Clock Distributor Network Synchronization System



The DCD-521/C is an ETSI compliant third-generation synchronization and timing distribution system, fully compliant with the CE mark requirements of the European Community that provides the accurate clock references needed throughout a network to ensure reliable synchronization. The DCD-521/C platform in its various configurations meets the synchronization requirements of ITU-T G.811 to ITU-T G.812 and ETS 300-462. Its nodal architecture offers the enhanced reliability of a fault-tolerant system to address all existing and future timing/synchronization needs.

Modular design provides optimum flexibility. For example, Primary Reference Clock (PRC) ITU-T G.811 applications are provided by adding the DCD-LPR/C (Local Primary Reference) system to the input of the DCD-521/C, the Multi-Reference Controller Card (MRC).

Or, for slave clock applications, the DCD-521/C can be equipped with a variety of clocks, including the TNC-E and TNC with outputs in a variety of timing signal formats.



The DCD-521/C is designed for installation in ETSI racks (or cabinets) flush or recessed with front access.

Architecture

A fully redundant modular architecture is used throughout the DCD-521/C, from the reference inputs and clock cards to the timing outputs.

The timing signals are routed to the output ports via a quad redundant distribution bus. Each active plug-in card has its own dc/dc power converter for additional reliability.

Automatic protection switching ensures continued operation if any input reference signal, input card, or on-line clock is lost.

Reference Inputs

A variety of input cards are available for the DCD-521/C. Enhanced input reference management is available using the MRC, which provides a majority vote algorithm that optimizes up to four reference inputs plus the two internal clocks.

Other input cards accept E1, DS1, 2MHz and composite clock timing references sources.

Clocks

The redundant, on-line, ultra-stable clocks filter the input timing signal to virtually eliminate phase transients, jitter and frequency wander

feed-through. If the input reference is lost or out of tolerance, the clocks provide highly stable holdover timing allowing the network to operate error-free for several hours or many days, depending on the clock installed (rubidium or quartz).

The performance level of each clock exceeds the relevant industry requirements in both locked and holdover modes. The TNC-E and TNC are specifically designed for new synchronous transmission systems such as SDH.

Timing Outputs

2MHz, E1, DS1, CC, or logic-level timing output signals are provided by plug-in cards with up to 10 ports each.

A fully equipped system can provide up to 160 redundant timing outputs.

Output signals and formats may be intermixed in any shelf and are protected by automatic switching.

The optional Synchronous Clock Insertion Unit (ESCIU) inserts traceable DCD timing onto E1 circuits for special re-timing applications.

A DCD-521/C system consists of 1 master shelf and up to 3 expansion shelves. All output positions are available for timing outputs, sync clock insertion, or other applications.

Sync Monitoring

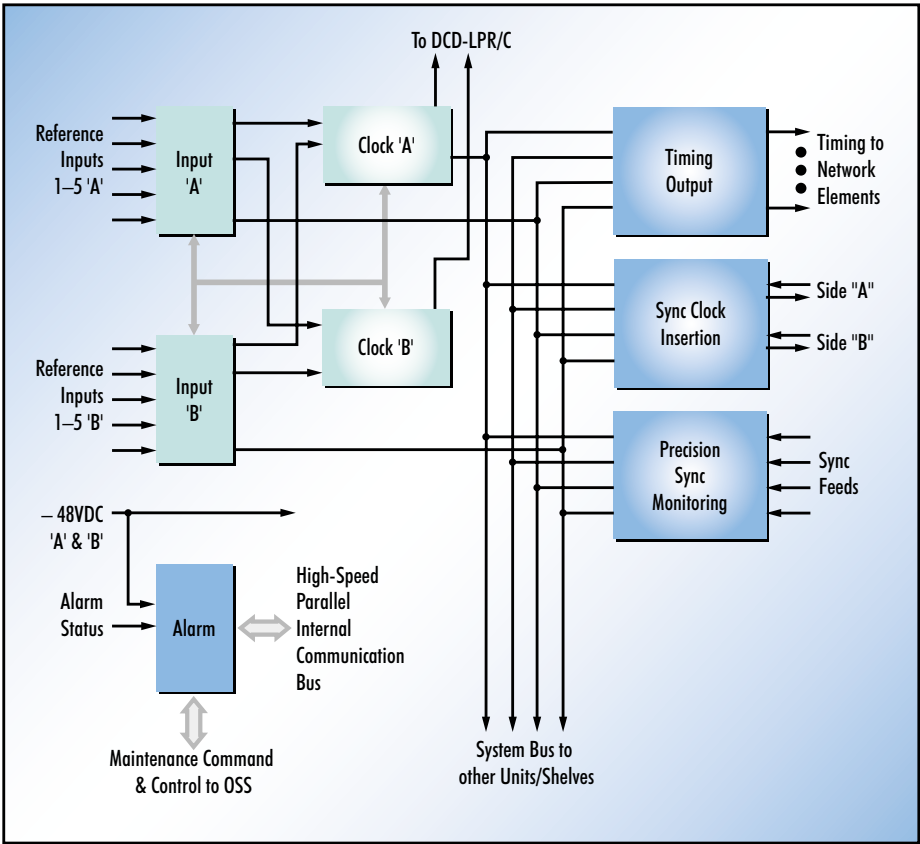
The optional Precision Sync Monitoring unit (PSM) provides better than 5-ns resolution performance reports of MTIE and TVAR. Each PSM plug-in monitors four E1 links, in real time.

Status and Control

DCD-521/C status is indicated locally by LEDs and relay closures. For remote maintenance and diagnostics, the DCD-521/C interfaces to a network OSS via the Maintenance Interface System (MIS). Current status, real-time alarms, sync monitoring and the event log are transmitted either autonomously or on demand.

Future Options

The DCD-521/C is a flexible timing platform designed to migrate to future needs such as time-of-day code generation, synchronization messaging and advanced sync monitoring.



System Highlights

Meets all requirements of **SSU Synchronization Supply Unit** ITU G.812/G.813, ETS 300-462; **BITS Building Integrated Timing Supply** Bellcore GR-1244/TA-378/TA-436, ANSI T1.101.

FEATURE	BENEFITS
Fully integrated clock system for all levels of timing signals.	Provides SSU or BITS synchronization service anywhere in your network.
Smart front end (Multi-Reference Controller) selects, qualifies, and votes from multiple reference inputs.	Always operates with best reference available for optimum performance.
High-stability filter clocks: TNC-E, TNC. Upgradeable to full PRC performance with DCD-LPR/C.	Hierarchical network portioning: increases overall network timing precision and performance for SDH.
Phase transient management.	Eliminates phase transients, jitter and wander. Facilitates network hitless architecture.
Timing outputs in a wide variety of format combinations.	Provides the exact sync signal needed for every network element.
Fault-tolerant telecom architecture; Distributed intelligence; modular/expandable.	Addresses all existing and future timing and synchronization needs.

Network Synchronization Hierarchy

STANDARD	CLOCK	TYPICAL APPLICATION	TYPE
Primary Reference Clock: (PRC): ITU G.8111	PRC	International/National switching centers	GPS, Rb, Cs
Transit Node Clock ITU G.812, G.813	TNC-E	National switching centers; transit and hub nodes.	Rb
	TNC	Transit and hub nodes	OCXO
Local Node Clock ITU G.812, G.813	TNC	Local and access locations with SDH/SONET	OCXO

DCD-521/C System Specification Highlights

SYSTEM	Total DCD-521/C system consists of: one master shelf; up to 3 expansion shelves; 1:1 protection per shelf; Dual input cards referenced from up to 4 sources each; Dual online clocks (automatic switching); Control, alarms and precision monitoring locally or from remote network control center.						
REFERENCE INPUTS	Signal Type	E1	Analog	Analog	DS1	CC	
		G. 703, §6	G.703, §10	Sinewave	G.703, §4	Bipolar RTZ	
	Rate	2.048 Mb/s	2048 MHz	1, 5, 10, MHz	1.544 Mb/s	64/8 kb/s	
	Impedance: Unbalanced Balanced Terminated or Bridging level inputs	75Ω 120Ω	75Ω 120Ω	75Ω 120Ω	75Ω 120Ω	75Ω 120Ω	
INTERNAL CLOCKS⁴	Name	TNC-E	TNC				
	Standard	G.812	G.812				
	Clock Type	Rubidium	OCXO				
	Holdover (25 ± 3°C, 0-24 hrs)	2 x 10 ⁻¹¹	3 x 10 ⁻¹⁰				
	Pull-in (min)	1.6 x 10 ⁻⁸	7.5 x 10 ⁻⁷				
TIMING OUTPUTS²	Signal Type	E1	Analog	Analog	DS1	CC	Logic Level
		G.703, §6	G.703, §10	Sine wave	G.703, §4	Bipolar RTZ	RS-232, 422 or 423
	Frequency or Rate	2.048 Mb/s	2.048 MHz	8 kHz to 5 MHz	1.544 Mb/s	64/8 kb/s	4 kb/s to 2.048 Mb/s
	Ports/Card	10	10	10	10	2	5 or 10
MONITORING	Signal	4 at 2.048 Mb/s or 4 at 1.544 Mb/s per card					
	Resolution	≤ 5ns					
	Storage	96 – 15 min. data registers					
	Measurements	MTIE (maximum TIE); TVAR (time variance); wander data; and digital error performance					
MAINTENANCE INTERFACE	Language	TL1					
	Alarms/Status	Contact closures, front panel LEDs, Serial Alarms					
	Remote Interface	RS-232, DB9, X.25					
GENERAL	Mounting	ETSI standard rack; front access					
	Dimensions	599mm x 536mm x 271 mm					
	Power:	Dual –48 Vdc ± 10%					
	Temperature:	0° To 50°C (operating)					

CE MARK APPROVED

- NOTES:**
1. Refer to specific card data sheets for full description and specifications.
 2. Various combinations of timing signals available with card options.
 3. Specifications subject to change without notice.
 4. Holdover is inclusive of aging, temperature and all other control loop effects.



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All specifications subject to change without notice.
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