

D20 Control Output Module



Overview

The D20 Control module is composed of two detachable modules, WESTERM D20 K and WESDAC D20 K.

The top module, WESDAC D20 K, processes the data acquired and communicates this to the main D20 processor, see Figure 2.

The bottom module, WESTERM D20 K, is composed of terminal blocks where field wirings are terminated. The WESTERM D20 K termination board handles all connections to and from the WESDAC D20 K module. These connections are:

- The D.20 network ports
- The 9600 baud RS232 maintenance port
- The WESDAC D20 K module address
- The relay outputs
- External DC supply for control output voltage

The D20K is a 32-point control output interface module. The 32 output drivers can be arranged in several hardware/software configurations, depending on the system requirements. The D20K ensures secure operation of the control output interface. All control actions requested by the D20 main processor are initiated, timed, reset and validated by the D20K.

The D20K also provides a Local/Remote switch and control output fusing. The Local/Remote switch is a manually operated switch used to disable D20K relay coil power during maintenance. An off-line indication is passed to the D20 main processor, which is available as a pseudo status to the host.

Two DB 9 connectors are provided to allow daisy chaining of the D.20 Link. This link provides the communication channel over which the main D20 CPU processor can communicate with the WESDAC D20 K. Power for the WESDAC D20 K is also provided over the same cable assembly. A single DB 9 connector is provided for the WESMAINT D20 maintenance port via a VT100 terminal emulator.

The address jumper block for the WESDAC D20 K is located on the WESTERM D20 K. The address on the jumper block corresponds to the module's address on the D.20 link.

Only passive components are mounted on the WESTERM D20 K leaving all the active components on the WESDAC D20 K.

This WESTERM and WESDAC arrangement simplifies field repair and maintenance setup since the WESDAC D20 K can be replaced without disturbing any of the field wiring.

Efficient, Cost Effective I/O Solutions

- The I/O modularity allows for efficient distributed I/O installations - minimizing wiring and enclosure requirements; this eliminates panel and reduces cost
- The active/passive design of the WESDAC/WESTERM I/O modules allows users to quickly test, commission, and troubleshoot via hot swappable WESDAC modules, without disturbing wiring connections ; this significantly speeds up and simplifies maintenance activities

Ease of Use

- To first time users, both the software configuration setup and hardware installations are trivial; this makes it simple to install and maintain the control module

Flexible and Reliable Operations

- The digital output module can be easily configured to support trip-close, raise-lower, and form C types of configurations
- D20K supports up to 32 digital outputs that are isolated. It ensures the secure operation of the control output interface by validating the initiated and timed control request from the D20/D200 Substation controller
- I/O modules are available to be ordered with either a DNP3 communication protocol option or a Standard/ Redundant D.20 link option - the D.20 link is a GE proprietary protocol



Distributed I/O Architecture

The D20 Remote Terminal Unit (RTU) design is based on a distributed-processing architecture including the real-time data acquisition and control software. These I/O modules can be located close to the primary equipment being monitored and controlled as they receive and send data back to the master D20 main processor.

The I/O modules are intelligent modules that contain on-board microprocessors and are configured as slave devices to the D20 main processor. In the figure 1 pictorial setup, specific I/O processing is distributed throughout the D20 RTU to the appropriate I/O modules.

The I/O modules support two communication protocols: (1) DNP 3 protocol, and (2) high speed, high-level data link controller (D.20 Link) in the form of poll and response messages protocol. The peripheral modules have serial communication ports and various types of field connections.

The hardware construction of each remote I/O module type is similar (see Figure 2.)

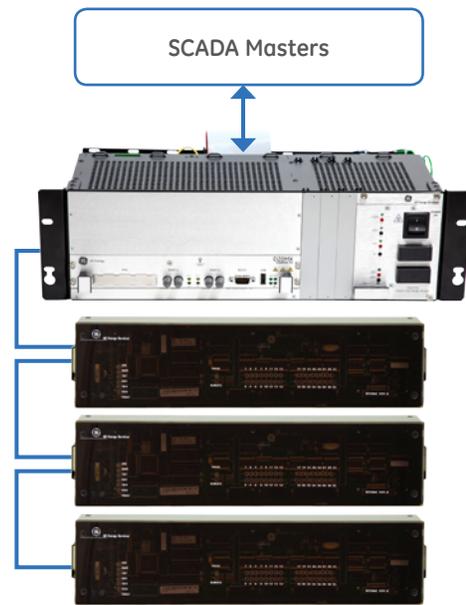
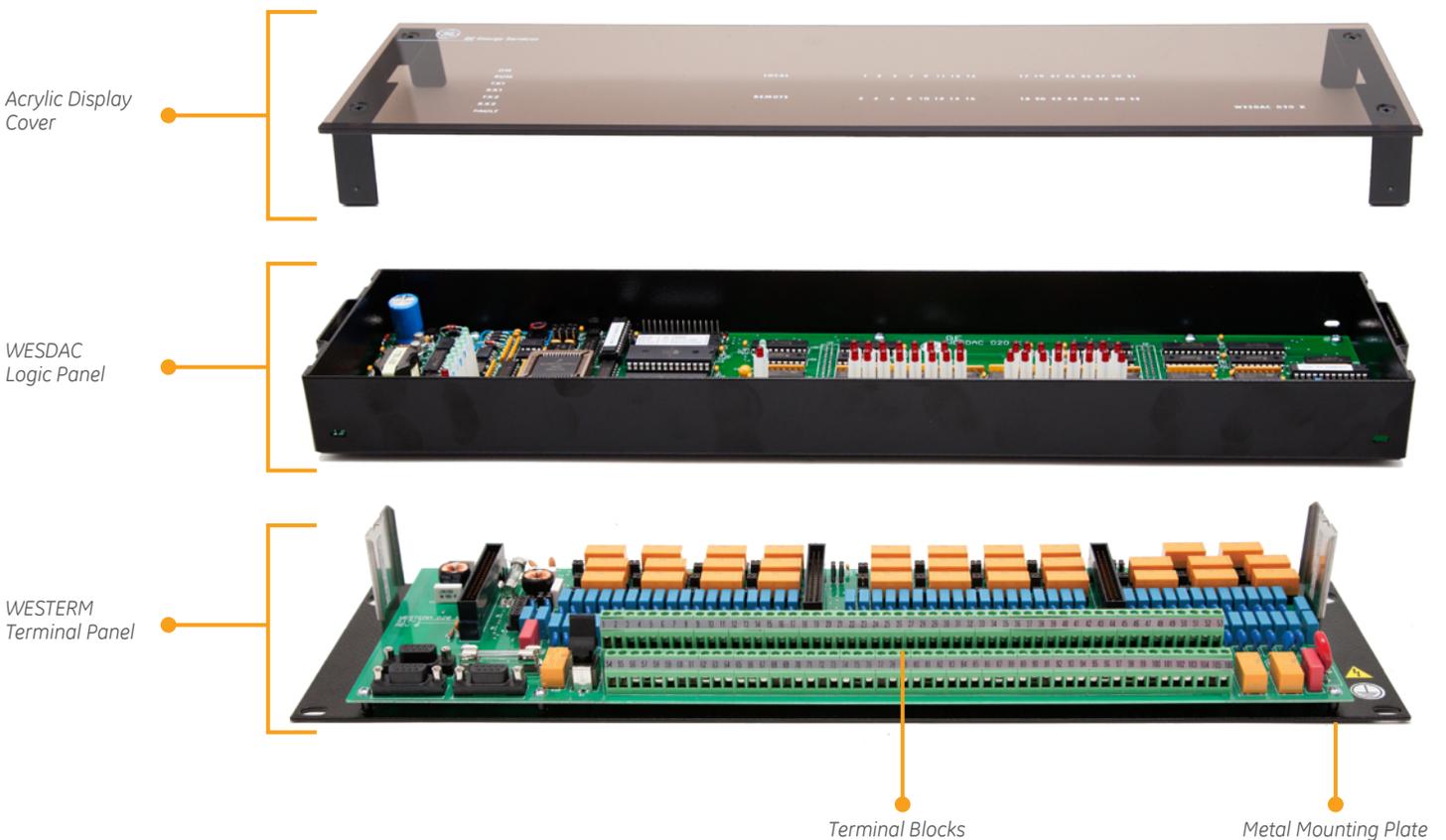


Figure 1: Simple architecture of I/O modules communicating to the D20 RTU

Figure 2: Architecture of I/O logic and termination panels



Control Output Configurations/Applications

The D20K can have one of the following control output configurations:

- 32 Trip/Close pairs
- 24 Trip/Close and 4 Raise/Lower pairs
- 16 Trip/Close and 8 Raise/Lower pairs
- 8 Trip/Close and 12 Raise/Lower pairs
- 16 Raise/Lower pairs
- 32 Isolated Form-C contact control outputs
- 32 Isolated open-drain outputs.

The hardware and software can also be configured to provide a wide range of control output schemes, including parallel, pulse duration, pulse trains and latched-output applications.

The control output duration is software-adjustable from 1 to 215 ms in one-millisecond increments, and on a per-point basis (protocol dependent). The D20K software also supports discrete timed/latch relay functionality.

Termination Types

D20 Control output module can be ordered with the following field termination options:

- **Compression**
Field wiring is terminated directly onto board-mounted screw terminal compression blocks (#12 AWG [2.05mm] max, blade screwdriver - 0.6 x 3.5 x 100 mm) on the D20 I/O Peripheral
- **DB25**
Field wiring is terminated onto the D20 I/O peripheral through DB25 connectors
- **Compression Disconnect**
Field wiring is terminated onto plug-on terminator blocks (#12 AWG [2.05mm] max, blade screwdriver - 0.6 x 3.5 x 100 mm), which then mate with board-mounted headers on the D20 I/O Peripheral.

D20KI Interposing Relay Panel

For applications requiring heavy-duty control ratings, the D20K can be connected to field equipment through interposing relays. The standard D20KI interposing relay panel is equipped with P&B KUPEP and KUP interposing relays (10 A at 150 VDC and 10 A at 240 VAC respectively). It is used in conjunction with a D20KR termination panel, as shown in figure 3.

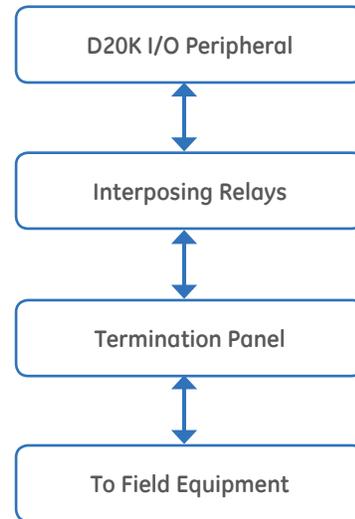


Figure 3: Interposing Relays

D20KI Termination Board Options

The following D20KI termination board options are currently available online: <http://store.gedigitalenergy.com/ViewProd.asp?Model=D20+KI>



Technical Specifications

Table 1: D20K Specifications

ITEM	DESCRIPTION
Processor	8 bit Freescale 68HC11 MPU
Clock	2 MHz MPU clock
Memory	<ul style="list-style-type: none"> 32 KB EPROM 24 KB static RAM 512 bytes EEPROM
Control Outputs	<ul style="list-style-type: none"> 32 open collector drivers for relays Four additional open collector drivers for dedicated Master Trip/Close and Test Breaker relays
Output Types	<ul style="list-style-type: none"> Momentary (fixed) Latching Trip/Close (T/C) Raise/Lower (R/L) Pulse duration Pulse train
Non matrixed output configurations	<ul style="list-style-type: none"> 32 T/C pairs 24 T/C + 4 R/L pairs 16 T/C + 8 R/L pairs 8 T/C + 12 R/L pairs 16 R/L pairs 32 isolated Form-C contact outputs Optional 32 isolated open-drain outputs, rated 150 mA @ 60VDC
D20KI Contact ratings & types (typical)	<ul style="list-style-type: none"> Momentary relays: 60 W max, 3 A max, 220 VDC max. (1 Form C or A)
D20K Contact ratings & types (typical)	<ul style="list-style-type: none"> Interposing relays: 10 A @ 150 VDC (1 Form X), 5 A @ 150 VDC (2 Form A), 3 A @ 150 VDC (2 Form C) Interposing relays: 10 A @ 28 VDC (2 Form C or A) PRD Series Relays: <ul style="list-style-type: none"> PRD3, 20 A @ 125VDC, 1 Form X PRD11, 20 A @ 125VDC, 2 Form C, 24VDC coil PRD11, 20 A @ 125VDC, 2 Form C, 48VDC coil Latching interposing relays: 10 A @ 28 VDC or 240 VAC (2 Form C) Interposing relays (heavy duty): 20 A @ 125 VDC, 30 A @ 240 VAC (1 Form A)

ITEM	DESCRIPTION
Coil Status Check	Every 500 μ s
Contact Duration	Programmable 1 to 215 ms in 1 ms intervals (protocol dependent)
Switches	Local Enable/Disable Switch
Component Isolation Rating	1500 Vrms
Dielectric Rating	1000 VDC
D.20 Link Ports	2
Maintenance Port	9600 baud, RS-232
Power Requirements	20-60 VDC, 4 W typical at 24 V, 11 W max. at 24 V with all relays energized
Size	<ul style="list-style-type: none"> D20K logic board and D20K relay termination board assembly: 19" x 5.25" x 2.5" D20KI1 interposing relay board (compression terminals): 19" x 5.25" D20KI2 interposing relay board (barrier terminals): 19" x 7" D20KR termination board for D20KI1/ D20KI2: 19" x 5.25" D20KI-OPC (517-0215): Interposing relay panel for D20SD and D20CD, equipped with sliding link terminal blocks.
LED Indicators	<ul style="list-style-type: none"> Common LEDs Local (GREEN) LED, which turns on when the I/O module is set to Local module using the Local/Remote switch, or if the module's control software has been disabled. Remote (RED), which turns on when the module is in Remote mode. Control points (RED), which turn on when the particular control point is enabled.

Ordering

D20K System Components

Please note

- For the rules regarding the combination of various options to build an order code, visit the online web:
<http://store.gedigitalenergy.com/ViewProd.asp?Model=D20K>
- This ordering guide should ONLY be used with reference to the product documentation and it is assumed the user has read those documents. The ordering guide is for the use of experienced users who have extensive knowledge in the area and the products.
- The order defined in the ordering guide may not be final and can only be accepted once GE has reviewed and accepted the order. This document is only meant as a guide and by no means will portray the final order.
- GE reserves the rights to change or modify the document without notice. The user is responsible to contact GE before placing an order to ensure the accuracy of the order code built.

D20K -	*	*	*	*	*	Description	Equivalent Legacy #
D20K Termination	1					D20K, 32 Channel LV (20-60 VDC or D.20 Power) Compression Termination	517-0164
	F					D20K, 32 Channel LV (20-60 VDC or D.20 Power) Compression Termination (Conformal Coated)	517-0164-CC
	2					D20KR, 32 Channel LV (20-60 VDC or D.20 Power) DB25 Termination	517-0143
	3					D20KX, 32 Channel LV (20-60 VDC or D.20 Power) Compression Disconnect Termination	517-0218
	G					D20KX, 32 Channel LV (20-60 VDC or D.20 Power) Compression Disconnect Termination (Conformal Coated)	517-0218-CC
	5					D20K4Z, 32 Channel HV (40-150 VDC) Compression Termination	517-0242
	K					D20K4Z, 32 Channel HV (40-150 VDC) Compression Termination (Conformal Coated)	517-0242-CC
	H					D20KR, 32 Channel LV (20-60 VDC or D.20 Power) DB25 Termination with Type 2 wire-wrap adapter	517-0220
J					D20KR, 32 Channel LV (20-60 VDC or D.20 Power) DB25 Termination with SOLID STATE RELAYS	517-0235	
D20 PCommon	U					PCommon Chip Not Required	
	1					PCommon 212	
	2					PCommon 213	
	3					PCommon 220	
	4					PCommon 221	
	5					PCommon 300	
	6					PCommon 301	
	7					PCommon 305	
8					PCOMMON 306 (D20A, D20S and D20K)		
D.20 Cable	U					Cable Not Required	
	1					D.20 Cable 12 Inches Long	
	2					D.20 Cable 18 Inches Long	
	3					D.20 Cable 24 Inches Long	
	4					D.20 Cable 36 Inches Long	
	5					D.20 Cable 48 Inches Long	
	6					D.20 Cable 72 Inches Long	
	7					D.20 Cable 96 Inches Long	
8					D.20 Cable 120 Inches Long		
D.20 Terminator	U					D.20 Terminator Not Required	
	1					D.20 Terminator (One Required per D.20 Link)	
D.20 Duct Panel	U					Duct Panel Not Required	
	1					Cable Duct Panel, Tie Wrap Connections	
	2					Two Cable Duct Panels, Tie Wrap Connections	
	3					Cable Duct Panel, No Through Holes	
	4					Two Cable Duct Panels, No Through Holes	
	5					Cable Duct Panel, Through Holes at Each End	
6					Two Cable Duct Panels, Through Holes at Each End		
Second D.20 LAN	U					Second D.20 LAN Port Not Required	
	A					WESDAC D20 ASK D.20 I/F	

D20K Spare Components

Please note

- For the rules regarding the combination of various options to build an order code, visit the online web:
<http://store.gedigitalenergy.com/ViewProd.asp?Model=D20K+Spare+Parts+>
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D20K -	*	*	*	*	*	*	*	*	*	Description
Module Type	T D 3									WESTERM Module WESDAC Module DNP 3 I/O Module
Input Voltage to Module		U H L								None (Need ONLY RNET Voltage Adapter Packs) High Voltage (40-150VDC) Low Voltage (20-60 VDC or D.20 Link Power)
Termination Type			U D P X							None DB25 Termination Type Compression Termination Type Compression/Disconnect Termination Type
Environmental Protection				U C E						None Conformal Coat Epoxy-Conformal Coat
D20K Special Options					U R W					None WESTERM allows for D.20 Link and Dual PS Input WESTERM allows for Wire Wrap Adaptor Connection
D.20 Link						U R L S				None WESTERM Redundant D.20 Link & Dual Power Supply Option (540-0313) WESDAC Redundant D.20 Link & Dual Power Supply Option (540-0207) Standard D.20 Link [For Module type T, or D] (540-0162)
PCOMMON							U 1 2 3 4 5 6 7 8			None PCommon 212 (SBA0001/00) PCommon 213 (SBA0003/00) PCommon 220 (SBA0004/00) PCommon 221 (SBA0007/00) PCommon 300 (SBA0005/00) PCommon 301 (SBA0006/00) PCommon 305 (SBA0009/00) PCOMMON 306 (P010-0 VER.306)
DNP3 Digital Output Points Configuration								U A B		None Trip/Close Configuration Raise/Lower Configuration
Wire Wrap Adapter									U A	None WESTERM D20K Wire Wrap Adapter [517-0228]

D20K Spare Cross-Reference

LEGACY PART NUMBER AND DESCRIPTION	SMART CATALOG NUMBER PREFIX AND DESCRIPTION
WESTERM MODULES - LEGACY PART NUMBER	WESTERM MODULES - NEW PART NUMBER PREFIX
(517-0164) - WESTERM D20K TYPE 1 VERSION 1	(D20K-TL-P-UU) - D20K LV (20-60VDC or D.20 Power), Compression Termination
(517-0164-CC) - WESTERM D20K TYPE 1 VERSION 1 (CONFORMAL COATED)	(D20K-TL-P-CU) - D20K LV (20-60VDC or D.20 Power), Compression Termination, Conformal Coated
(517-0143) - WESTERM D20 KR	(D20K-TL-D-UU) - D20KR LV (20-60VDC or D.20 Power), DB25 Termination
(517-0143-CC) - WESTERM D20 KR (CONFORMAL COATED)	(D20K-TL-D-CU) - D20KR LV (20-60VDC or D.20 Power), DB25 Termination, Conformal Coated
(517-0218) - WESTERM D20KX W/TB PLUGS	(D20K-TL-X-UU) - D20KX LV (20-60VDC or D.20 Power), Compression Disconnect Termination
(517-0218-CC) - WESTERM D20KX W/TB PLUGS (CONFORMAL COATED)	(D20K-TL-X-CU) - D20KX LV (20-60VDC or D.20 Power), Compression Disconnect Termination, Conformal Coated
(517-0242) - WESTERM D20 K4Z	(D20K-TH-P-UU) - D20K4Z HV (40-150VDC or D.20 Power), Compression Termination
(517-0242-CC) - WESTERM D20 K4Z (CONFORMAL COATED)	(D20K-TH-P-CU) - D20K4Z HV (40-150VDC or D.20 Power), Compression termination, Conformal Coated
(517-0242 - ECC) - WESTERM D20 K4Z - Epoxy Conformal Coat	(D20K-TH-P-EU) - D20K4Z HV (40-150VDC or D.20 Power), Compression Termination, Epoxy Conformal Coated
(517-0220) - WESTERM D20KR TYPE 2	(D20K-TL-D-UW) - D20KR TYPE 2 LV (20-60VDC or D.20 Power), DB25 Termination with Wire-Wrap adapter option
(517-0250) - WESTERM D20 OKR	(D20K-TL-D-UR) - D20 OKR LV (20-60VDC or D.20 input), Compression Termination, redundant D.20 and PS Input
WESDAC MODULES - LEGACY PART NUMBER	WESDAC MODULES - NEW PART NUMBER PREFIX
(508-0101) - WESDAC D20K TYPE 1 VERSION 1	(D20K-DL-U-UU) - WESDAC D20K LV
(508-0101-CC) - WESDAC D20K TYPE 1 VERSION 1 (CONFORMAL COATED)	(D20K-DL-U-CU) - WESDAC D20K LV, Conformal Coated
(508-0102) - WESDAC D20K HV	(D20K-DH-U-UU) - WESDAC D20K HV
(508-0102-CC) - WESDAC D20K HV (CONFORMAL COATED)	(D20K-DH-U-CU) - WESDAC D20K HV, Conformal Coated
(508-0102-ECC) - WESDAC D20 KHV - Epoxy Conformal Coat	(D20K-DH-U-EU) - WESDAC D20K HV, Epoxy Conformal Coated
DNP 3 CONTROL MODULES - LEGACY PART NUMBER	DNP 3 CONTROL MODULES - NEW PART NUMBER PREFIX
(508-0301) - DNP I/O MODULE - CONTROL	(D20K-3L-U-UU)- WESDAC D20K LV, DNP3 Communications
(508-0301-CC) - DNP I/O MODULE - CONTROL (CONFORMAL COATED)	(D20K-3L-U-CU)- WESDAC D20K LV, DNP3 Communications, Conformal Coated
(508-0302) - DNP I/O MODULE - CONTROL HV	(D20K-3H-U-UU)- WESDAC D20K HV, DNP3 Communications
(508-0302-CC) - DNP I/O MODULE - CONTROL HV (CONFORMAL COATED)	(D20K-3H-U-CU)- WESDAC D20K HV, DNP3 Communications, Conformal Coated

Note: The cross reference tab attempts to compare the old part numbers to the new smart catalogue numbers. The new smart catalogue numbers represented are the prefix or base line for the complete catalogue number. For the complete catalogue number, and to determine the selections for the various sub components, visit: <http://store.gedigitalenergy.com/ViewProd.asp?Model=D20K+Spare+Parts+>

See figure 9 for examples of sub components specific to a user: D20K Special options, D.20 Link options, D20 PCOMMON options, DNP3 control output configuration, D20K Wire Wrap Adapter.

GE Digital Energy

650 Markland St.

Markham, ON

Canada L6C 0M1

+1 877-605-6777 (toll free in North America)

+1 678-844-6777 (direct number)

gedigitalenergy@ge.com

GEDigitalEnergy.com

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