



Series Six Programmable Controller

GFK-0077A
April 1988

I/O Communications Control Module Type 4 IC600BF950

Interface to Allen-Bradley Data Highway

PLC-2 communication compatibility

DF1 full duplex operation

Configurable data rate

The I/O Communications Control Module Type 4 (I/O CCM4) is a microprocessor based module consisting of two boards in a mother-daughter board configuration.

The module is designed to operate with a Series Six Central Processor Unit (CPU). The module may be installed in the Series Six CPU I/O slot or a High Capacity I/O rack. It connects to an external Allen-Bradley Communication Control Module (Cat. No's. 1771-KE, KF) and permits Series Six access to the Allen-Bradley Data Highway.

Under control of the Series Six application program, the I/O CCM4 module can transfer information to and from any remote device on the Data Highway. Conversely, any remote Data Highway device can also transfer information to and from the Series Six CPU. The I/O CCM4 appears much like a PLC-2 Programmable Controller in the way that it communicates over the Allen-Bradley Data Highway.

The I/O CCM4 full-duplex DF1 protocol conforms closely to the ANSI X3.28 standard. DF1 protocol combines the features of D1 (data transparency) and F1 (two way simultaneous transmission with embedded responses).

The I/O CCM4 features six on-board, light-emitting diodes (LEDs) that display port activity and module status indications.

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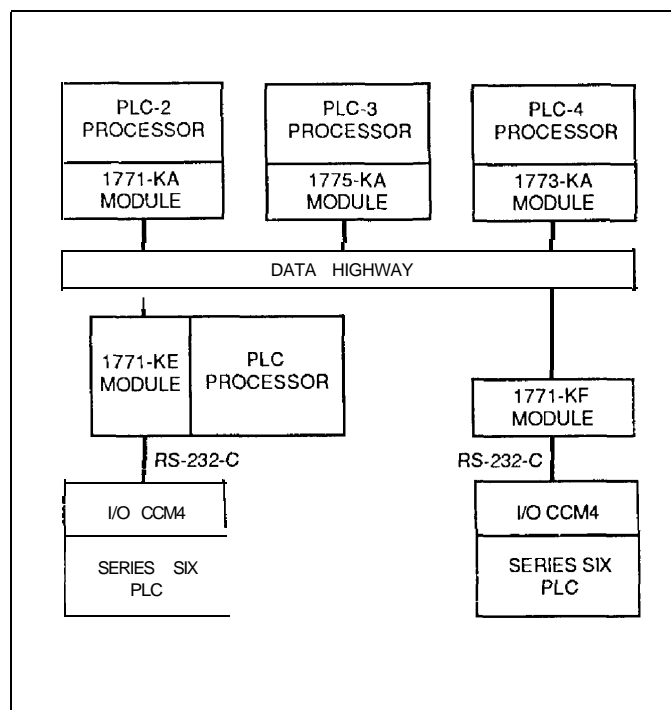


Figure 1
DATA HIGHWAY INTERFACE

If the power-up diagnostics detect a failure, the BOARD OK LED will not turn ON and the remaining five LEDs will provide an error code.

The CPU COMM LED blinks to indicate communications between the I/O CCM4 module and the Series Six CPU. If this LED stays off there is no communication.

The remaining four LEDs provide port activity indication for the respective transmitters and receivers. They will blink when the port is communicating and stay off when there is no activity on the port.

A Series Six CPU with software version V104, or later, is required. The Series Six application (ladder logic) program must include a DPREQ instruction for any I/O to take place through the I/O CCM4. This is true for both locally and remotely initiated I/O instructions.

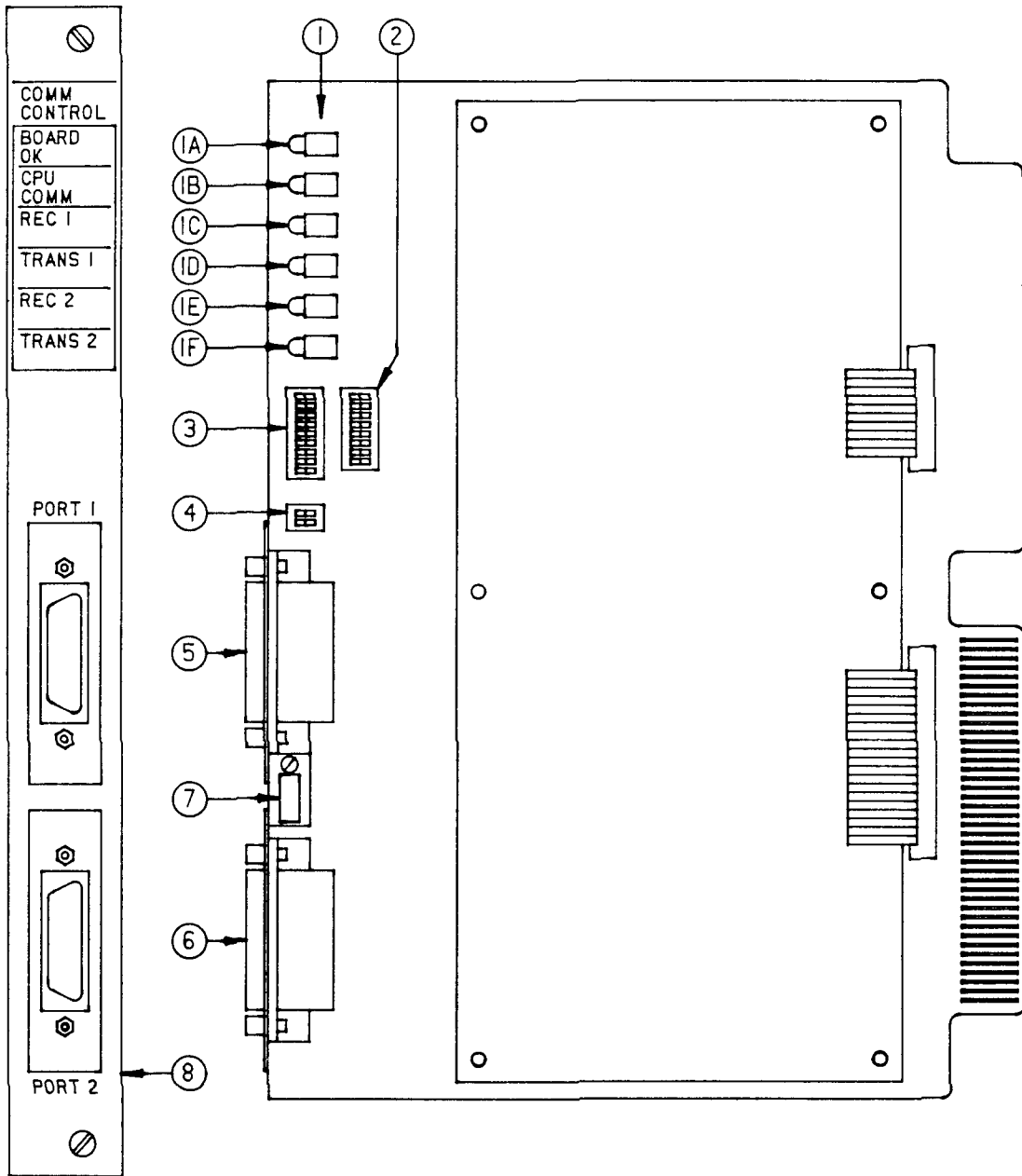


Figure 2 USER ITEMS (I/O CCM4)

- ① LED Status Indicators (Refer to Table 3)
- ② Bank A DIP switches
- ③ Bank B DIP switches
- ④ Bank C DIP switches
- ⑤ J1 connector: 25-pin D-type female connector (unused)
- ⑥ J2 connector: 25-pin D-type female connector (DF1 full duplex)
- ⑦ Hybrid DIP package: RS-232 package orientation
- ⑧ Faceplate

INSTALLATION

The I/O CCM4 module may be installed in any one of the Series Six CPU rack I/O locations or in a High-Capacity I/O rack. Installation of the I/O CCM4 module consists of the following:

- I/O CCM4 module configuration
- Series Six backplane I/O configuration
- RS-232 cable fabrication
- I/O CCM4 Module Installation
- Diagnostic power-up

I/O CCM4 CONFIGURATION

Configure the I/O CCM4 before installing the module into the logic rack. (Refer to Figure 2, User Items I/O CCM4)

1. Set the I/O CCM4 dual-in-line (DIP) switches banks (A, B and C) for the required configuration. They specify the characteristics of the interface module. (Refer to Page 4, Switch bank setting for A, B and C)
2. Verify that the I/O CCM4 hybrid DIP package is oriented for RS-232 communications on the lower port (Port 2). This package is marked "232" on one end and "422" on the other and is mounted in a socket. Position the package so that "232" appears right-side up on the surface of the package.
A small screwdriver is needed to turn the screw which releases the hybrid package from the socket.
(Refer to Figure 3 for package configuration)

BACKPLANE I/O CONFIGURATION

Set the backplane dual-in-line (DIP) switch package before installing the I/O CCM4 into the rack. The switch package is located on the backplane to the right of each I/O card location.

The DIP switch setting establishes a group of eight consecutive input points in the CPU input table and one register in the register table for use by the I/O CCM4 module.

If more than one module is installed in the same I/O rack, each must have its own unique card address. (Refer to Table 2. DIP switch setting for I/O point selection, and Figure 4. backplane switch configuration.)

CABLE FABRICATION

A cable assembly is required for communication between the I/O CCM4, RS-232 serial port and the port labeled "computer RS232-C" on the Allen-Bradley CCM. (Refer to Page 7, for cable specifications, and Table 1. for Port 2 pin-out.)

I/O CCM4 INSTALLATION

Position the I/O CCM4 module in any one of the Series Six or High-Capacity I/O rack locations.

Refer to Page 8 of this document for module installation.

DIAGNOSTIC POWER-UP

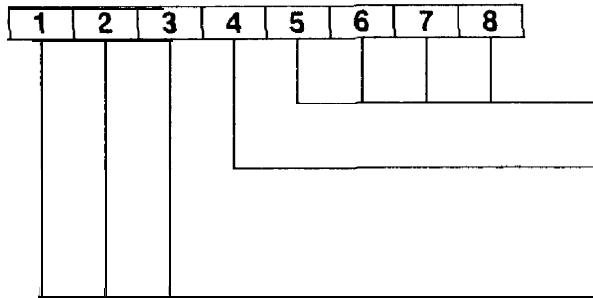
Power-up the system and verify communications of the I/O CCM4 module. (Refer to Page 8 of this document for Diagnostic Power-up Instructions.)

I/O CCM4 SWITCH CONFIGURATION

Position the I/O CCM4 DIP switch banks (A, B, and C) as indicated. Switch notations apply to all three switches.

OFF is equivalent to OPEN
 ON is equivalent to CLOSED
 * Indicates the factory-set default position.

BANK A DIP SWITCH SETTING

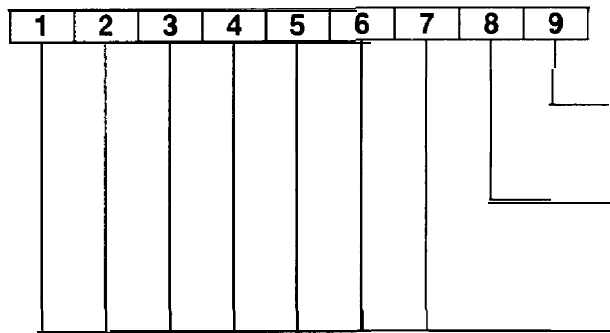


Reserved for future use
 * ON Parity
 * ON - no parity
 OFF - even parity

Data Rate Selection on Port 2

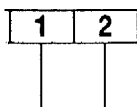
SW1	SW2	SW3	Data Rate
OFF	OFF	OFF	110 b/sec
ON	OFF	OFF	300 b/sec
OFF	ON	OFF	600 b/sec
ON	ON	OFF	7200 b/sec
OFF	OFF	ON	2400 b/sec
ON	OFF	ON	4800 b/sec
OFF	ON	ON	9600 b/sec
* ON	ON	ON	19200 b/sec

BANK B DIP SWITCH SETTING



Hardware reset
 * OFF - normal operation
 Factory diagnostic
 ON - enable
 * OFF - disable
 Reserved for future use
 * OFF

BANK C DIP SWITCH SETTING



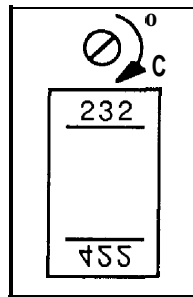
Hardware switch (must be ON)
 * ON

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HYBRID PACKAGE ORIENTATION

Verify that the hybrid DIP package is oriented for RS-232 communication. Position the hybrid DIP package so that "232" appears right-side up on the I/O CCM4 module.

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RS-232-C
SELECTED

Figure 3 HYBRID PACKAGE

CABLE SPECIFICATIONS

A cable assembly is required to connect the I/O CCM4 to the Data Highway. This cable connects the I/O CCM4, RS-232, serial port to the port labeled "Computer RS232-C" on the Allen-Bradley Communication Controller Module.

Only the RS-232, Port 2, (also referenced as J2) is used for the I/O CCM4 interface. Port 2, pin-out is shown below.

Table 1
RS-232-C PORT 2 PIN-OUT

PIN	COMMUNICATIONS PORT (J2)
2	Data Out
3	Data In
7	Ground

BACKPLANE I/O CONFIGURATION

Before installing the I/O CCM4 in the logic rack, set the backplane dual-in-line (DIP) switch package. The switch package is located to the right of each I/O card location.

To set the backplane switch package refer to Table 1 |

Refer to Table 3, cable specifications and Figure 5, cable configuration, for construction of the RS232 cable assembly.

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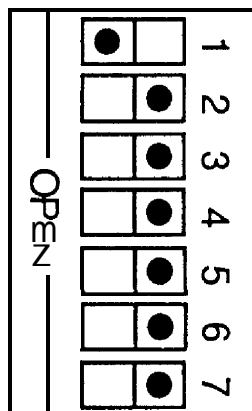


Figure 4 BACKPLANE I/O SWITCH

Table 2 BACKPLANE DIP SWITCH SETTING FOR I/O CCM4 CARD ADDRESS

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DPREQ REGISTER CONTENTS DECIMAL (HEX)	I/O POINT	DIP SWITCH POSITION							DPREQ REGISTER CONTENTS DECIMAL (HEX)	I/O POINT	DIP SWITCH POSITION						
		7	6	5	4	3	2	1			7	6	5	4	3	2	1
1001 (03E9)	1- 8								1505 (05E1)	505- 512		X	X	X	X	X	X
1009 (03F1)	9- 16							X	1513 (05E9)	513- 520	X						
1017 (03F9)	17- 24						X		1521 (05F1)	521- 528	X						X
1025 (0401)	25- 32						X	X	1529 (05F9)	529- 536	X						X
1033 (0409)	33- 40					X			1537 (0601)	537- 544	X						X
1041 (0411)	41- 48					X	X		1545 (0609)	545- 552	X				X		
1049 (0419)	49- 56					X	X		1553 (0611)	553- 560	X				X		X
1057 (0421)	57- 64					X	X	X	1561 (0619)	561- 568	X				X	X	
1065 (0429)	65- 72				X				1569 (0621)	569- 576	X				X	X	X
1073 (0431)	73- 80				X			X	1577 (0629)	577- 584	X			X			
1081 (0439)	81- 88				X	X			1585 (0631)	585- 592	X			X			X
1089 (0441)	89- 96				X	X	X		1593 (0639)	593- 600	X			X			X
1097 (0449)	97- 104				X	X			1601 (0641)	601- 608	X			X			X
1105 (0451)	105- 112				X	X	X		1609 (0649)	609- 616	X			X	X		
1113 (0459)	113- 120				X	X	X		1617 (0651)	617- 624	X			X	X		X
1121 (0461)	121- 128				X	X	X	X	1625 (0659)	625- 632	X			X	X	X	
1129 (0469)	129- 136				X				1633 (0661)	633- 640	X			X	X	X	X
1137 (0471)	137- 144				X			X	1641 (0669)	641- 648	X			X			
1145 (0479)	145- 152				X		X		1649 (0671)	649- 656	X	X					X
1153 (0481)	153- 160				X		X	X	1657 (0679)	657- 664	X	X				X	
1161 (0489)	161- 168				X	X			1665 (0681)	665- 672	X	X				X	X
1169 (0491)	169- 176				X	X	X		1673 (0689)	673- 680	X	X	X			X	
1177 (0499)	177- 184				X	X	X		1681 (0691)	681- 688	X	X	X			X	X
1185 (04A1)	185- 192				X	X	X	X	1689 (0699)	689- 696	X	X			X	X	
1193 (04A9)	193- 200				X	X			1697 (06A1)	697- 704	X	X			X	X	X
1201 (04B1)	201- 208				X	X		X	1705 (06A9)	705- 712	X	X	X				
1209 (04B9)	209- 216				X	X	X		1713 (06B1)	713- 720	X	X	X				X
1217 (04C1)	217- 224				X	X	X	X	1721 (06B9)	721- 728	X	X	X			X	
1225 (04C9)	225- 232				X	X	X		1729 (06C1)	729- 736	X	X	X			X	X
1233 (04D1)	233- 240				X	X	X	X	1737 (06C9)	737- 744	X	X	X	X			
1241 (04D9)	241- 248				X	X	X	X	1745 (06D1)	745- 752	X	X	X	X			X
1249 (04E1)	249- 256				X	X	X	X	1753 (06D9)	753- 760	X	X	X	X	X		X
1257 (04E9)	257- 264			X					1761 (06E1)	761- 768	X		X	X	X	X	X
1265 (04F1)	265- 272			X				X	1769 (06E9)	769- 776	X	X					
1273 (04F9)	273- 280			X			X		1777 (06F1)	777- 784	X	X					X
1281 (0501)	281- 288			X			X	X	1785 (06F9)	785- 792	X	X					X
1289 (0509)	289- 296			X		X			1793 (0701)	793- 800	X	X				X	X
1297 (0511)	297- 304			X		X	X		1801 (0709)	801- 808	X	X			X		
1305 (0519)	305- 312			X		X	X		1809 (0711)	809- 816	X	X			X		X
1313 (0521)	313- 320			X		X	X	X	1817 (0719)	817- 824	X	X			X	X	
1321 (0529)	321- 328			X	X				1825 (0721)	825- 832	X	X			X	X	X
1329 (0531)	329- 336			X	X			X	1833 (0729)	833- 840	X	X		X			
1337 (0539)	337- 344			X	X		X		1841 (0731)	841- 848	X	X		X			X
1345 (0541)	345- 352			X	X	X	X		1849 (0739)	849- 856	X	X		X			X
1353 (0549)	353- 360			X	X	X			1857 (0741)	857- 864	X	X		X			X
1361 (0551)	361- 368			X	X	X	X		1865 (0749)	865- 872	X	X		X	X		
1369 (0559)	369- 376			X	X	X	X		1873 (0751)	873- 880	X	X		X	X		X
1377 (0561)	377- 384			X	X	X	X	X	1881 (0759)	881- 888	X	X		X	X	X	
1385 (0569)	385- 392			X	X				1889 (0761)	889- 896	X	X		X	X	X	X
1393 (0571)	393- 400			X	X			X	1897 (0769)	897- 904	X	X	X				
1401 (0579)	401- 408			X	X		X		1905 (0771)	905- 912	X	X	X				X
1409 (0581)	409- 416			X	X		X	X	1913 (0779)	913- 920	X	X	X				X
1417 (0589)	417- 424			X	X	X			1921 (0781)	921- 928	X	X	X				X
1425 (0591)	425- 432			X	X	X		X	1929 (0789)	929- 936	X	X	X		X		
1433 (0599)	433- 440			X	X	X	X		1937 (0791)	937- 944	X	X	X		X		X
1441 (05A1)	441- 448			X	X	X	X	X	1945 (0799)	945- 952	X	X	X		X	X	
1449 (05A9)	449- 456			X	X	X			1953 (07A1)	953- 960	X	X	X		X	X	X
1457 (05B1)	457- 464			X	X	X		X	1961 (07A9)	961- 968	X	X	X	X			
1465 (05B9)	465- 472			X	X	X	X		1969 (07B1)	969- 976	X	X	X	X			X
1473 (05C1)	473- 480			X	X	X	X	X	1977 (07B9)	977- 984	X	X	X	X			X
1481 (05C9)	481- 488			X	X	X	X		1985 (07C1)	985- 992	X	X	X	X			X
1489 (05D1)	489- 496			X	X	X	X	X	1993 (07C9)	993- 1000	X	X	X	X	X		X
1497 (05D9)	497- 504			X	X	X	X	X									

* For programming use only: add 1000 to I/O points.

X = Switch in OPEN Position (Depressed to the Left).

Table 3 RS-232C CABLE SPECIFICATIONS

Length, Maximum:	50 feet (15 meters)
Overall Shield Recommended	
24 AWG Minimum	
Mating connector to Port 2 is a Male, D-Subminiature Type. Cannon DB25P (Solder Pot) with DB110963-3 Hood or Equivalent. (Standard RS-232C male connector.)	
Mating connector to Allen-Bradley RS-232 Port is a Male, D-Subminiature Type. Cannon DB15P (Solder Pot) with DA110963-2 Hood or Equivalent.	
Almost any shielded cable is adequate. The shield is connected to pin 1 of the 15 pin connector only.	

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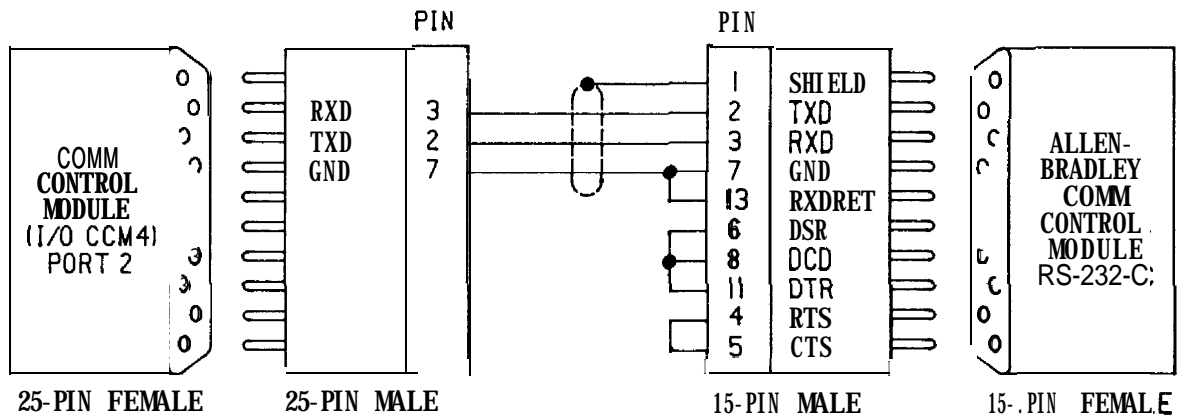


Figure 5 RS-232-C CABLE COMMUNICATION LINK

MODULE INSTALLATION

Use the extraction/insertion tool furnished with the Series Six PLC rack to remove or install the module. Position the I/O CCM4 board in any one of the Series Six I/O locations, or High Capacity I/O rack.

Guide the faceplate over the circuit board so that the proper contact is made. Then secure the faceplate to the rack using the thumbscrews at the top and the bottom. Refer to Figure 2, item 8

DIAGNOSTIC POWER-UP

Apply power to the I/O CCM4 module and external communication controller module. The CPU provides a window to the I/O CCM4 using the DPREQ instruction as shown below. When properly entered the CPU COMM LED will start blinking to indicate that the windows are occurring.

```

          Ixxxx          Rnnnn          Oyyyy
-----] [-----[DPREQ]----- ( )
                    HHHH
  
```

Table 4 I/O CCM4 LED DIAGNOSTICS

LED	DESCRIPTION
(1A) BOARD OK	ON: Board has passed self-diagnostics and is operating properly. OFF : Indicates a failure.
(1B) CPU COMM	ON: Board is communicating with the Series Six CPU. OFF : No communication between the Series Six and the board.
(1C) REC 1	ON: Serial data present at receiver 1 input. OFF: Receiver 1 input inactive. (Unused)
(1D) TRANS 1	ON: Serial data present at transmitter 1 output. OFF : Transmitter 1 output inactive. (Unused)
(1E) REC 2	ON: Serial data present at receiver 2 input. OFF: Receiver 2 input inactive.
(1F) TRANS 2	ON: Serial data present at transmitter 2 output. OFF: Transmitter 2 output inactive.

GFK-0077

I/O CCM4 POWER-UP ERROR CODES

If the BOARD OK light remains OFF after the self-diagnostics routine, the indicator lights will create one of the patterns as follows: (● = ON)

Table 5 I/O CCM4 POWER-UP ERROR CODES

LED		CODE 1	CODE 2	CODE 3	CODE 4	CODE 5	CODE 6
(6)	BOARD OK	○	○	○	○	○	●
(5)	CPU COMM	○	○	○	○	○	○
(4)	REC 1	○	○	○	○	●	○
(3)	TRANS 1	○	○	○	●	●	○
(2)	REC 2	○	○	●	●	●	○
(1)	TRANS 2	○	●	●	●	●	○

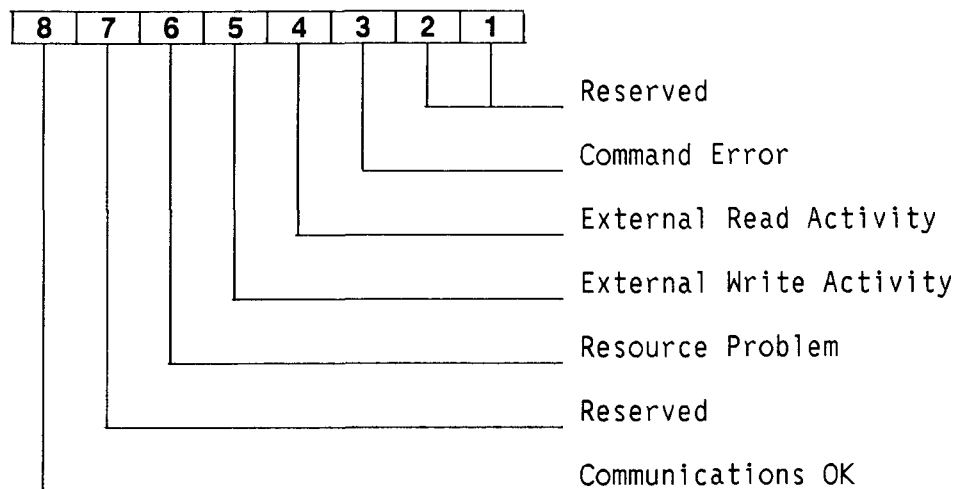
Code Description

- 1 Processor test failed (Defective board)
- 2 Timer test failed
- 3 EPROM checksum test or EPROM test failed
- 4 RAM test failed
- 5 S/W initialization failure
- 6 Power-up complete and successful

I/O CCM4 MODULE - SERIES SIX INTERFACE

The I/O CCM4 maintains a status byte holding the latest status of the I/O CCM4 operation. The byte is comprised of 8 consecutive Input Points. The Input Points assigned to the I/O CCM4 depend on the backplane address of the I/O CCM4 card. Refer to GFK-0076 User's Manual, Chapter 3, for more information concerning status byte.

SERIES SIX I/O CCM4 INPUT STATUS BYTE



SPECIFICATIONS

Space Requirements:	One Series Six I/O slot in either a Model 60 or High-Capacity I/O rack		
	Circuit Board:	8.15 x 11.0 (inches)	208 x 280 (mm)
	Faceplate:	12.46 x 1.175 (inches)	317 x 30 (mm)
Rated Voltage:	240 Vdc or RMS ac, 50/60 Hz.		
Power Requirements:	+5 Vdc, +12 Vdc (Supplied by rack power supply) 5 Vdc-20 unit loads		
Storage Temperature:	0 to 70°C		
Operating Temperature:	0 to 60°C		
Humidity:	5% - 95% (non-condensing)		
Altitude:	Up to 10,000 feet (3,000 meters) above sea level (operating)		
Isolation:	(Port to Port and either Port to Series Six common).		
Noise & Transient: Immunity:	Meets following specifications: Showering arcs per NEMA ICS 2,230.40 Surges per ANSI C37.90.9 5 W R.F. transmitter 27-450 Mhz		

ORDERING INFORMATION

<u>Circuit Board and Faceplate</u>	<u>Faceplate</u>
IC600BF950	IC600FP948

CATALOG NUMBER REVISION SUFFIX

The equipment listed above having the catalog numbers shown and the same equipment having a higher alpha suffix is designed for listing by UL for use as auxiliary control devices. The equipment is a direct replacement for equipment having the same catalog number but a lower alpha suffix.

The UL® symbol on the nameplate means the product is listed by Underwriters Laboratories Inc. (UL Standard No. 508, Industrial Control Equipment, subsection Electronic Power Conversion Equipment .)