



ControlNet Communication Interface

Cat. nos. 1747-KFC15 and 1770-KFC15

Firmware Version 4.2

What's in These Release Notes?

These Release Notes cover changes to and new features of the KFC firmware in Version 4.2. Version 4.2 is a complete rewrite of the KFC firmware. It is intended to be more robust and fix several issues that could not be easily addressed with the previous firmware architecture. The version 4.2 firmware is a direct replacement for previous versions of the KFC module.

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Terms and Abbreviations

Table 1 Terms and abbreviations used in this document

This term:	Means:
a.k.a.	also known as
ACK	a DF1 or ControlNet acknowledgement
CNB	a 1756-CNB or 1756-CNBR module; a ControlLogix backplane to ControlNet bridge
DF1	DF1 protocol is an Allen-Bradley data-link layer protocol that combines features of subcategories D1 (data transparency) and F1 (two-way simultaneous transmission with embedded responses) of ANSI x3.28 specification. The KFC uses DF1 protocol to communicate on the serial port.
DH+	Data Highway Plus
DH+ PCCC message	a PCCC message that originated from a device on a DH+ network
DHRIO	Data Highway and Remote I/O
DST	The destination address on a DF1 link
KFC	Refers to both the 1747-KFC15 and 1770-KFC15 modules
NAK	A DF1 negative acknowledgement
new KFC	Version 4.2 of the KFC firmware
old KFC	Any 1747-KFC15 or 1770-KFC15 firmware released before this v4.2, including version 2.2 (a.k.a. version B/B) and older firmware
PCCC	Programmable Controller Communication Commands
SRC	The source address on a DF1 link
Standard PCCC message	A PCCC message that originated from a device that is not on a DH+ network

New Features and Functional Changes

All previous KFC issues have been resolved by this new version of the KFC firmware. Several new features have also been added. Version 4.2 of the KFC firmware differs from the old KFC in the following ways:

- The new KFC is more robust and tolerant of network errors, including breaking of the network cables (i.e., disconnecting and reconnecting the KFC's network cables).
- Improved memory buffer management has been added. The old KFC would fault with error 29 when it ran out of buffers. The new KFC will detect that it is low on memory buffers and reject new messages until it can recover. While the KFC recovers, the Status or OK LED will flash RED. The new buffer management facility also helps prevent a low memory buffer condition.
- An "Extra-hop" feature has been added. This can be used to route PCCC packets from DF1 devices to Logix Controllers. Refer to The Extra-hop Feature on page 12.
- The new KFC can now process a DH+ PCCC message received from ControlNet. From an application standpoint, this means that a PCCC message initiated by a module on DH+ can be routed through a ControlLogix gateway (e.g., in through a DHRIO module, across the backplane and out through a CNB module) to a KFC on ControlNet. The KFC will properly pass the message through to a PCCC device on DF1, as well as route the PCCC reply from DF1 back to the initiator.
- Diagnostic counters can now be viewed on the 7 segment display of the 1770-KFC15.
- The 1747-KFC15 now shows traffic activity and error conditions on 6 display-panel meters.
- Configuring a ControlNet network works well now when using RSNetWorx software and the new KFC as the network interface.
- The new KFC works well with phone modems.
- The DF1 source address is now remembered and returned as the destination address in the reply message. The old KFC would always return the ControlNet address as the DF1 destination address.

- The flash update procedure is more robust. The KFC will now tolerate non-flash-update traffic during the flash update procedure. Note that it is still advisable to minimize the traffic to the KFC (or any other module) during a flash update.
- The flash update procedure can be restarted if it is interrupted. If a flash update is interrupted, do not reset the KFC. Just retry the flash procedure. However, remember that the firmware currently in the module does the update. So if the module you are flashing does not have version 4.2 firmware, you cannot restart the flash procedure.
- The sending of embedded responses is now configurable.
- A message-reply-timeout parameter has been added.
- A default-DF1-address parameter has been added to the 1770-KFC15.
- An auto-recovery feature has been added so that the KFC can automatically recover from non-hardware error conditions. The default setting for this feature is "Disabled".
- A problem in which a timeout on one connection could affect another connection has been resolved.
- PCCC PLC-5 Typed Read and PLC-5 Typed Write messages between a KFC and a 1747-SCNR module work now.
- All lockup issues have been resolved.
- The parallel port on the 1770-KFC15 is no longer supported.
- Standard PCCC packets that come in the DF1 port will be sent out on ControlNet as unconnected rather than connected messages.
- For the 1770-KFC15, DF1 error checking defaults to CRC instead of BCC. This was always the case for the 1747-KFC15.
- The ControlNet auto-address feature is no longer supported on the 1770-KFC15. Note that the ControlNet auto-address feature was never supported on the 1747-KFC15.
- The ControlNet address on the 1770-KFC15 now defaults to 99 instead of auto-address mode.

- The major and minor revisions of the firmware are now reported as numbers instead of letters. In addition, the first two digits of the firmware build number now correspond to the major and minor revisions. For example, the old 1747-KFC15 would report its revision as “REV# B/B M122”. The new 1747-KFC15 will report its revision as “REV# 4.2 M420”. The 122 and 420 are the old and new build numbers respectively. The ‘M’ in front of the build number stands for ‘Main Firmware’. Note that on the old 1770-KFC15, the build number was not displayed. However, the new 1770-KFC15 will display the build number in its product ID string when it is browsed with RSLinx.
- The new 1747-KFC15 can handle 32 connections. The new 1770-KFC15 can handle 14 connections.

Corrections to the User Manuals

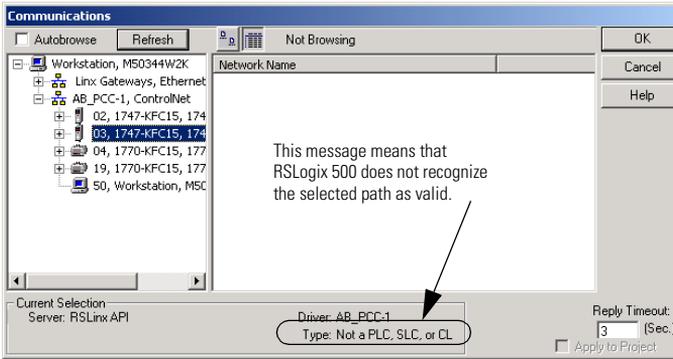
The SLC500 ControlNet RS-232 Communication Interface User Manual, publication 1747-5.34, contains these errors and omissions:

- The manual indicates that the 1747-KFC15 can handle a baud rate of 56k. The correct maximum baud rate for both the 1747-KFC15 and the 1770-KFC15 is 38.4k.
- The manual does not include information on the 1747-KFC15 module’s current draw. The module draws 640mA of current from the SLC500 backplane.

Communicating With an SLC Processor Using the 1747-KFC15

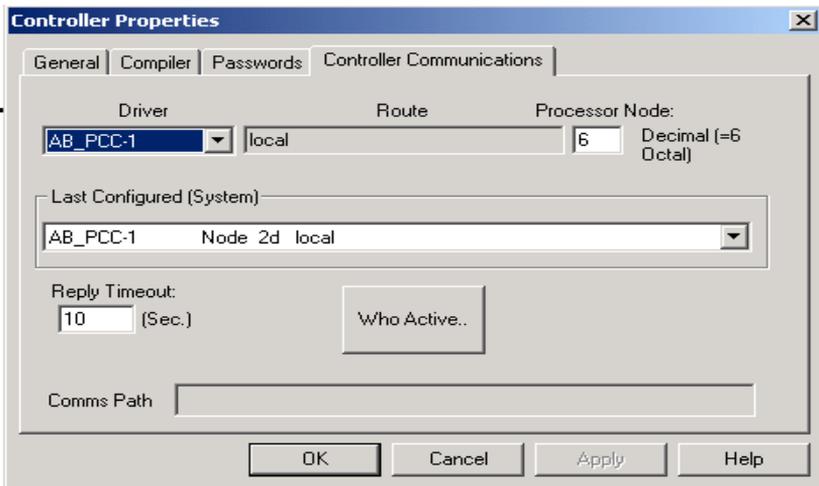
The RSLogix 500 software has changed so that you cannot use the [Comms] ⇒[System Comms] screen to go online with an SLC processor via the 1747-KFC15 module, as is described in the current 1747-KFC15 manual. As before, you still cannot use the [Comms] ⇒[Who Active Go Online] screen. If you try to use this screen to select a KFC, you will be able to click on the [OK] button, and the software will try to go online. However, RSLogix 500 will not use the path to the KFC that you have just selected. Instead, the software will use the last path that it knows about. When you select the KFC, the Type field at the bottom of the Who Active Go Online screen displays “Not a PLC, SLC, or CL.” This indicates that the

software does not recognize the selected path as valid, and will use an old path if the [OK] button is pushed.



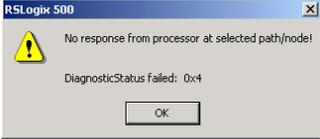
To communicate with your SLC processor using RSLogix 500, follow this procedure:

1. Start RSLogix 500 and open or create a new file.
2. Double-click on [Controller Properties].
3. Select the [Controller Communications] tab. You see the Controller Properties screen.



4. Select the driver from the Driver drop-down box.

5. In the Processor Node field, enter the 1747-KFC15 ControlNet network address displaying on the KFC15 module. If you are unsure, remember the network address is set by the rotary switches on the KFC15 module. Refer to Chapter 2 of publication 1747-5.34, SLC500 ControlNet RS-232 Communication Interface User Manual, for more information.
6. Click [OK] to save the communication path information.
7. From the [Comms] menu, select [Go Online].

If:	Then RSLogix 500 software will:	So you should:
the communication path you entered in steps 4 and 5 is correct, and the 1747-KFC15 can communicate with the SLC processor (i.e. the baud rate and other serial parameters are correct)	go online	do nothing
the communication path you entered in steps 4 and 5 is not correct, or the 1747-KFC15 cannot communicate with the SLC processor	try for about 2 minutes, after which it will display the following error message: 	Check the 1747-KFC15's meters while trying to go online. If you see activity on meter 1 (DF1 packets sent) but not on meter 2 (DF1 packets received) the communication path to the KFC is correct, but the 1747-KFC15 cannot communicate with the SLC processor. The most likely cause of this problem is that one or more of the serial port parameters (e.g. baud rate) are incorrect.

During the 2 minutes in which the software is trying to go online, it will not respond to user input and will appear to be locked up.

Performing a Flash Update

Follow this procedure to perform a flash update of the KFC modules.

1. Obtain the latest KFC ControlFLASH firmware upgrade kit from the Rockwell Automation Knowledgebase. Go to <http://support.rockwellautomation.com>, then click the link to Knowledgebase. Search for KFC15.
2. Unzip the KFC ControlFLASH firmware upgrade kit.
3. Run the Setup.exe file to install the KFC ControlFLASH firmware upgrade kit.

4. For the 1770-KFC15, set the ControlNet node address to 99 since it may come up as ControlNet node address 99 when the flash update is complete. If you skip this step, the flash update process will still work. However, ControlFLASH will report a failure because it can no longer talk to the KFC since its Mac ID has changed to 99.

TIP



The 1747-KFC15 has switches that configure its Mac ID. Therefore, the Mac ID will not change after a flash update. So you can flash update a 1747-KFC15 at any Mac ID.

IMPORTANT

Stop all network traffic to the KFC. For example, make sure there is no browsing of the network going on. This is especially important if you are updating a module containing old KFC firmware - version 2.2 (a.k.a. version, B/B) or earlier. This is not a problem in the new KFC (v4.2), which will tolerate other traffic during a flash update. Remember that it is the firmware currently in the module that is doing the update.

5. Use ControlFLASH to update the firmware. Refer to the User Manual or online help that accompanied ControlFLASH for assistance.

TIP



Although the new KFC (v4.2) will flash update on a 2-node ControlNet network, many modules will not. We recommend that you have at least a 3-node network when updating any module over ControlNet.

TIP



Most older versions of firmware will require that you manually reset the module after the flash update by cycling power to it.

6. Install the new EDS file. You can use the RSLinx EDS tool or the EDS Wizard in RSNetWorx.
 - You can start the RSLinx EDS tool by selecting [Start] ⇒ [Rockwell Software] ⇒ [RSLinx Tools] ⇒ [EDS Hardware Installation Tool].
 - You can start the EDS Wizard from within RSNetWorx by selecting [Tools] ⇒ [EDS Wizard].
7. Once the EDS file is installed, shut down and restart RSLinx and RSNetWorx so that they can be properly used by these tools.

1770-KFC15 Counters

Diagnostic counters can now be accessed on the 7 segment display of the new 1770-KFC15. All the counters, except 0, are 16 bits wide and are displayed in hexadecimal format. Pressing the [Data] key will toggle between viewing the low byte and high byte.

Counter 0 is not really a counter at all. Rather it displays the value of the hardware handshake lines.

The following counters can be displayed:

Table 2 Counter descriptions

Counter	Description
0	Handshake Lines (Low byte only). This is a hexadecimal value that indicates the state of the hardware handshake lines. The bits are defined as follows: x x x DTR DCD DSR RTS CTS. The three most significant bits, represented by 'x', are not used and are always 0. There is no corresponding upper byte for this counter.
1	DF1 packets transmitted
2	DF1 packets received
3	DF1 retries exceeded
4	DF1 retries
5	DF1 NAKs received
6	DF1 ENQs received. In Half-Duplex mode, these are POLL commands from the Half-Duplex master
7	DF1 NAKs sent for reasons other than low memory
8	DF1 NAKs sent due to low memory
9	DF1 Duplicate packets received
A	DF1 CRC or BCC errors
B	DF1 Unmatched Responses

Table 2 Counter descriptions

Counter	Description
C	DF1 Rx Overrun Errors
D	DF1 Rx Framing or Parity Errors
E	DF1 ENQs sent
F	PCCC status byte, STS, non-zero in Tx packet
G	PCCC status byte, STS, non-zero in Rx packet
H	Fragmentation Errors
I	DF1 Number of DLE STXs seen. If this counter is advancing but counter 2 is not, the DF1 address could be set incorrectly in Half-Duplex mode. The address is ignored in Full-Duplex mode.
J	Connection Timeouts
K	CNet Rx Good Packets
L	CNet Rx Bad Packets
M	CNet Tx Packets

To view the counters:

1. Press the [View] key until you see a C and 2 dashes {C - -}.
2. Press the [Data] key to enter the counters submenu. Counter 0, the hardware handshake lines, is displayed.
3. Press the [View] key to advance to counter 1. The low byte of Counter 1, the number of DF1 packets sent, is displayed. For example, if 36 packets (24 hexadecimal) have been transmitted, you will see {1. 2 4.}. Notice the decimal points after the 1 and after the 24. The decimal point after the 1 indicates that you are in a submenu. The decimal point after the 24 indicates that the low byte is being displayed.
4. Press the [Data] key to view the high byte of the counter. You see {0. 0 0}. There is no decimal point after the 00, indicating that this is the high byte.
5. Press the [Data] key again to view the low byte.
6. Press the [View] key to display the next counter.
7. Press the [View] and [Data] keys together to clear all the counters.

Reading 1770-KFC15 and 1747-KFC15 Counters With a Diagnostic Command

Diagnostic counters can be read by sending a PCCC Diagnostic Read Counters command to the 1770-KFC15 or 1747-KFC15. See Appendix C of publication 1747-5.34, SLC ControlNet RS-232 Interface User Manual, and 1770-6.5.20, ControlNet Communication Interface User Manual. The only change for firmware version 4.2 is that the counters listed above under 1770-KFC15 Counters, can now be read by setting the address parameter to 0x0001. If the address parameter is set to any other value, the old KFC counters will be read instead.

Note that the PCCC diagnostic command can be sent from DF1 or ControlNet. On ControlNet the command should be sent to the PCCC object.

1747-KFC15 Meters

Instead of counters, the 1747-KFC15 shows traffic activity and error conditions on 6 display-panel meters. The meters come in 2 groups of 3 and are to the right of the OK and address messages. For example, if the KFC's CNet address is 30 and all the meters are at maximum value, you would see:

OK ||| |||

alternating with:

30 ||| |||

From left to right, the meters are:

1. DF1 Packets Sent
2. DF1 Packets Received
3. CNet Packets Received
4. DF1 NAKs Sent or Received
5. DF1 Line Errors (framing + parity + overrun)
6. DF1 PCCC status byte, STS, non-zero in Rx or Tx packet.

Since meters 4, 5, and 6 display errors, the values on these meters will persist for about 8 seconds to give the user time to view them.

The Extra-hop Feature

The Extra-hop feature has been added so that network routing information can be added to standard PCCC, DF1 packets. For example, using this feature, a PCCC message from a PLC-5 message instruction can be routed through a KFC to a CNB, out the ControlLogix backplane port of the CNB, and across the ControlLogix backplane to a Logix controller.

Before you send a PCCC read or write command to a Logix controller, you need to map one or more of the Logix controllers tags to a PLC- or SLC-style file number. To map a tag in RSLogix 5000:

1. Ensure RSLogix5000 is offline.
2. Select the Logic menu.
3. Select Map PLC/SLC Messages.
4. Map one or more tags to file numbers.

There are two ways to use the Extra-hop feature.

Method 1: No Configuration

This is specifically intended to route messages through CNB modules to Logix controllers in the same backplane. Just add 100, 150, or 200 to the ControlNet node address of the DF1 message. (In full-duplex mode, the ControlNet node address of the DF1 message is simply the DF1 destination address which is ignored on the local DF1 link. In-half duplex mode, it is the remote address.)

When the new KFC sees an address that is higher than 99, it will add a Port Number of 1 and a Slot/Address of 0, 1 or 2 to the message. The Port Number of 1 refers to the ControlLogix backplane port of the CNB module.

- Adding 100 to the ControlNet node address will route the message to slot 0.
- Adding 150 to the ControlNet node address will route the message to slot 1.
- Adding 200 to the ControlNet node address will route the message to slot 2.

TIP

The actual ControlNet address of the CNB must be between 1 and 50.

**EXAMPLE**

You have a Logix rack with a controller in slot 0. The rack also contains a CNB that is set to Mac ID 5. You set up a PLC-5 (or other DF1 device) to send a message to address 105 (decimal). The message will get routed to the CNB at Mac ID 5 and then to the controller in slot 0.

Method 2: Configure a Path Using The Pushbuttons and 7-segment Display:

IMPORTANT

This method works only for the 1770-KFC15. For the 1747-KFC15, use method 1.

You can use this method to access Logix controllers that are in slots greater than 2. Up to 99 paths can be defined, with up to 3 hops each. The ControlNet node address parameter is used to select which of the 99 paths is being defined or viewed. Therefore, you can define only one path for each ControlNet node address on the local ControlNet network.

A path consists of a path length followed by a sequence of port numbers and network addresses or slot numbers.

Path Length

The path length can be set to 0, 2, 4, or 6.

- 0 – Indicates that no path is configured.
- 2 – The path contains 1 hop (1 Port and 1 Address/Slot Number).
- 4 – The path contains 2 hops.
- 6 – The path contains 3 hops.

Port Numbers

Port Numbers can range from 1 to 14. If a device has a backplane connector, that connector will be port 1.

See Table 3 on page 14 for the port numbers for several modules. Check the product documentation or EDS file to find the port numbers of other modules.

Table 3 Port numbers

Module:	Port Number:	Description
1756-CNB 1756-CNBR	Port 1	ControlLogix Backplane
	Port 2	ControlNet
1788-CN2DN	Port 2	DeviceNet
	Port 3	ControlNet
1770-KFC15 1747-KFC15	Port 2	ControlNet
	Port 3	DF1

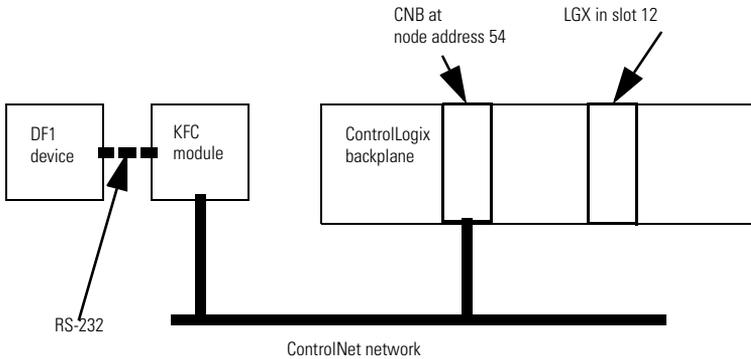
Address/Slot Number

This is either the address of a node on a network or a slot number of a module in a backplane. The value has a range of 0 through 99. On the ControlLogix backplane, you can use slot numbers of 0 through 16.

Example 1

EXAMPLE

This example assumes a CNB at ControlNet node address 54 and a Logix controller (LGX) in slot 12 of a ControlLogix backplane. The slot number of the CNB, as well as the ControlNet node address of the KFC, are not specified, since they are not needed to construct the path.



To program the path:

1. Press the [View] key several times until the path sub-menu appears. You see {P - -}.
2. Press [Data] to enter the path sub-menu.
3. Press [Data] to select the address of the ControlNet device (e.g. the CNB). If the address is 54, you see {- 5 4}. The leading - indicates that no path has been defined for this ControlNet node address. That is, the path length is 0. If the path length is non-zero, you will see an A instead of the -; for example, {A 5 4}. The A stands for Address or Active.
4. Press [View] to advance to the Path Length parameter. You see {L 0 0}
5. Press [Data] to set the Path Length. Our example has 1 hop, so the path length will be 2, since 2 bytes are needed (one for Port and one for Slot/Address). You see {L 0 2}.
6. Press [View] to advance to the first Port parameter. You see {1 0 1}. The default Port Number is 1, so you don't need to do anything. Port 1 is the ControlLogix backplane port of the CNB module.
7. Press [View] to advance to the first Address/Slot parameter. You see {2 0 0}
8. Press [Data] to set the Slot number. Since the controller is in slot 12, you see {2 1 2}.

The Extra-hop path is now configured. Press [View] several times to review the path data. You see:

{A. 5 4}	The ControlNet node address parameter (the CNB ControlNet node address)
{L. 0 2}	The Path Length
{1. 0 1}	The first port. (1 => CNB ControlLogix backplane port).
{2. 1 2}	The first Address/Slot number (12 => Slot number of the Logix Controller).
{3. 0 1}	The second port. Not used in our example.
{4. 0 0}	The second Address/Slot number. Not used.
{5. 0 1}	The third port. Not used in our example.
{6. 0 0}	The third Address/Slot number. Not used.

TIP



Note that since the path length is 2, parameters 3, 4, 5 and 6 are ignored in this example. Also note that the Port Numbers default to 1, while the Address/Slot values default to 0.

9. You can now press [View] and [Exit] together to save the path to flash.

IMPORTANT

If you press [Exit] twice, the KFC will exit configuration mode and any information you entered will be discarded.

TIP



Note that up to 99 paths can be defined, with up to 3 hops each. The ControlNet node address parameter is used to select which of the 99 paths is being defined or viewed. Therefore, you can only define one path for each ControlNet node address on the local ControlNet network.

Example 2

EXAMPLE

For this example you have 2 ControlNet networks. (See the diagram that follows). The first contains the KFC and a CNB. The CNB is at ControlNet node address 65. This is CNB 1. CNB 1 is in slot 4 of ControlLogix backplane 1.

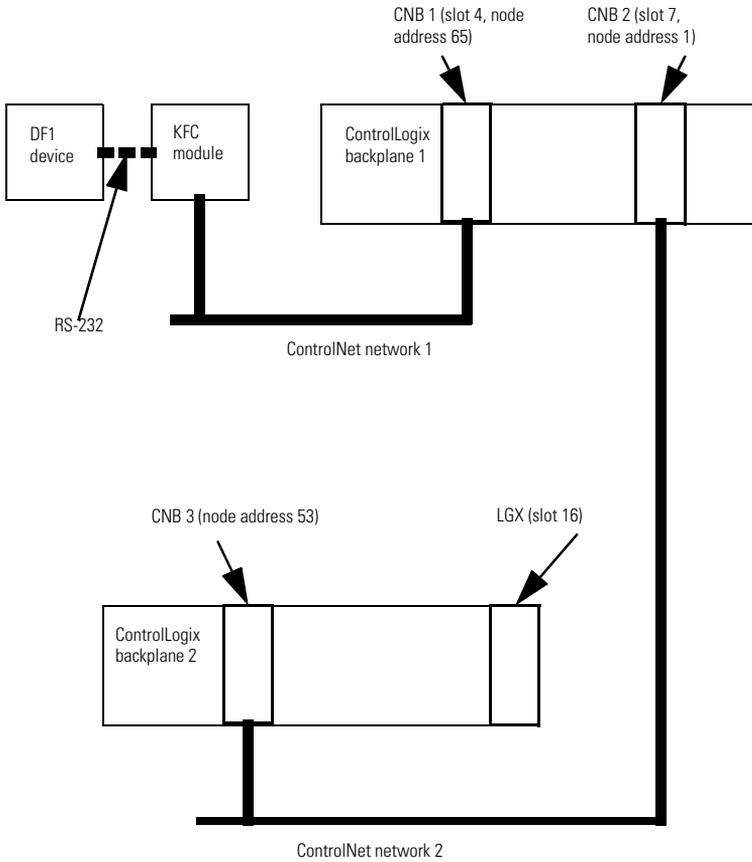
The second network contains 2 CNBs. One CNB is at ControlNet node address 1 (CNB 2) and the other is at ControlNet node address 53 (CNB 3). CNB 2 is in slot 7 of ControlLogix backplane 1. CNB 3 is in ControlLogix backplane 2 along with a Logix Controller (LGX) in slot 16.

Note that neither the slot numbers of CNB 1 and CNB3 nor the node address of CNB 2 are needed to construct the path.

The following path will route a DF1 message from the DF1 device to the Logix Controller in slot 16 of the remote ControlLogix backplane. The DF1 message should be sent to address 65.

You see:

{A. 65}	The ControlNet node address parameter (node address of CNB 1)
{L. 0 6}	The Path Length (6 => 3 hops)
{1. 0 1}	The 1st port. (1 => ControlLogix Backplane port of CNB 1)
{2. 0 7}	The 1st Address/Slot Number. (7 => Slot # of CNB 2)
{3. 0 2}	The 2nd port. (2 => ControlNet port of CNB 2)
{4. 5 3}	The 2nd Address/Slot Number. (53 => The ControlNet node address of CNB 3)
{5. 0 1}	The 3rd port. (1 => ControlLogix Backplane port of CNB 3).
{6. 1 6}	The 3rd Address/Slot Number. (16 => Slot # of Logix Controller.)



Embedded Responses

An embedded response occurs when a DF1 ACK or NAK is embedded within another DF1 message. Embedded responses can improve the throughput of a full-duplex DF1 link since a transmitter will not need to wait any longer than necessary to receive a response (ACK or NAK) to the last message it has sent. The old KFC would always send an embedded response whenever there was an opportunity to do so. However, some DF1 drivers can not tolerate them. Therefore, the new KFC can be configured to send or not send embedded responses.

By default, the 1770-KFC15 and 1747-KFC15 will wait until they hear an embedded response before sending one. This is referred to as embedded response “auto-detect” mode. This is the only embedded response mode available on the 1747-KFC15.

The 1770-KFC15 defaults to embedded response “auto-detect” mode but can also be configured to always send or never send embedded responses. Parameter 6 in the ‘A’ submenu is used to configure the embedded response mode. The parameter can have one of the following values:

- 0 – Auto Detect – Default
- 1 – Always send embedded responses
- 2 – Never send embedded responses

To configure this parameter, do the following:

1. Press the [View] key several times until the ‘A’ sub-menu appears. You see {A - -}
2. Press the [Data] key to enter the sub-menu.
3. You see {0. 0 2} assuming the number of DF1 retries is set to 2.
4. Press the [View] key several times until parameter 6 appears. You see {6 0 0}, indicating that Auto-Detect mode is active.
5. Press the [Data] key to change the value.
6. Press the [View] and [Exit] keys together to save the new value.

For more information on configuring 1770-KFC15 parameters, refer to the ControlNet Communication Interface User Manual, publication 1770-6.5.20.

Message Reply Timeout

To aid in memory buffer management, a message reply timeout parameter has been added to the KFC firmware. This is the length of time the KFC will wait for a reply to a request message. Note that this is different than an ACK timeout, which occurs if the network node to which the message was sent cannot respond. The message reply timeout becomes active only after an ACK is received.

If the request message was sent on ControlNet and no reply message is received before the timer expires, an error reply with the status byte set to 2 (2 means undeliverable) is sent on DF1 and the memory buffers are freed up to handle new messages.

If the request message was sent on DF1 and no message is received before the timer expires, no error reply is sent on ControlNet. However, the memory buffers are freed up to handle new messages. It is assumed that the node that originated the original request message on ControlNet has already timed out and does not need a reply.

For the 1770-KFC15, parameter 7 in the 'A' submenu is used to configure the message reply timeout. This parameter represents time in seconds and has a range of 1 to 99 seconds. The default value is 5 seconds. For instructions on how to program a parameter in the 'A' submenu, refer to Embedded Responses on page 19.

For the 1747-KFC15, the message reply timeout is set to 10 times the DF1 ACK timeout. The default value is 32 seconds since the default DF1 ACK timeout value is 3.2 seconds.

TIP

In a normally functioning system, the message reply timeout should never occur, since it would be rare for a device to acknowledge a message with an ACK and then never send a reply.

Default DF1 Address

When a standard (non-DH+) PCCC message is received from ControlNet, the KFC must decide to which destination address to send it on the DF1 link. The old KFC would always send such packets with a DF1 destination address equal to the ControlNet address of the KFC. This means that if you are using half-duplex mode, the address of the other DF1 device must be set to the ControlNet address of the KFC. For the new 1770-KFC15, the default DF1 destination address can be configured so that the DF1 address of the other device does not have to match the ControlNet address of the KFC.

For the 1770-KFC15, parameter 8 in the 'A' submenu is used to configure the default DF1 address. This parameter is a hexadecimal value and has a range of 0 to FF. The value FE is a special value that indicates that the current ControlNet address should be used. The default value is FE. Therefore, the default behavior is to use the ControlNet address just as the old KFC did. For instructions on how to program a parameter in the 'A' submenu, refer to Embedded Responses on page 19.

The new 1747-KFC15, will always use the ControlNet address as the default DF1 destination address, as did the old KFC.

Note that DH+ PCCC messages (i.e., PCCC messages that originate from a device on DH+) have source and destination information contained in their message header. Therefore, these source and destination values are used for the source and destination addresses on the DF1 link.

DF1 SRC and DST Address

In full-duplex mode, the SRC and DST values are ignored on the DF1 link. This is because full-duplex operation implies a point-to-point configuration with only two nodes on the DF1 link. Since there are only two nodes, there is no need to examine the SRC and DST values. In fact, you will often see the SRC and DST addresses set to the same value on a full-duplex DF1 network.

In half-duplex mode, more than two nodes are allowed to be connected to the DF1 network (if half-duplex modems are used). The SRC and DST address values are used to determine which node is to receive which packet. For example, in half-duplex mode, the KFC will not receive any DF1 messages unless the DST address is equal to its DF1 station address.

DF1 SRC (source) and DST (destination) values are chosen in the following 3 cases:

1. If the message request came in from the DF1 port, the DF1 reply message will have SRC and DST address values that are opposite that of the request message. For example:
 - Reply DST = Request SRC
 - Reply SRC = Request DST

This is compliant with the DF1 specification. Note that the old KFC would always set the DST address to its ControlNet address.

2. If a standard PCCC message request comes in from ControlNet, it must be forwarded onto the DF1 link. The DF1 request message will have a DST address equal to the default DF1 destination address (usually set to the KFC's ControlNet address). The DF1 SRC address will be equal to the ControlNet address of the node that sent the message (the ControlNet source address) if the serial port is operating in full-duplex mode. In half-duplex mode, the DF1 SRC address is always set to the KFC's DF1 station address.
 - Request DST = default DF1 destination address (Refer to Default DF1 Address on page 20.)
 - Request SRC = ControlNet source address (full-duplex mode) or the KFC's DF1 station address (half-duplex mode).
3. If a DH+ PCCC message request comes in from ControlNet, it must be forwarded onto the DF1 link. Since DH+ PCCC messages have source and destination information contained in their message header, these source and destination values can be used for the SRC and DST addresses on the DF1 link. However, note that in half-duplex mode, the DF1 SRC address is always set to the KFC's DF1 station address.
 - Request DST = Destination address from message header
 - Request SRC = Source address from message header (full-duplex mode) or the KFC's DF1 station address (half-duplex mode).

TIP



Since it is easier to configure and much faster to run, full-duplex mode is always the preferred mode of operation. Use half-duplex mode only if you do not have a choice.

RSLinX DF1 Driver Anomaly

In versions of RSLinx older than 2.31.00, the DF1 driver has a rare anomaly which causes the driver to cease to transmit packets. If the driver is in this state and you examine the RSLinx driver diagnostics for the DF1 driver, you will see the Write Errors counter incrementing as the driver attempts to send packets.

To recover from this condition, either stop and start the driver in RSLinx or delete it and configure it again.

Auto-recovery

An auto-recovery feature has been added so that the new KFC can automatically recover from non-hardware error conditions. The default setting for this feature is "Disabled." It is recommended that this feature be enabled if the KFC is operating in a remote location where a manual reset of the module would be difficult. Using the KFC to connect to a remote location using phone modems is one example.

One example of a non-hardware error condition that could trigger this feature would be that the KFC ran out of memory buffers and was unable to recover from this condition within 35 seconds.

For the 1770-KFC15, parameter 9 in the 'A' submenu is used to configure the auto-recovery feature. A parameter value of 0 means disabled (the default), and a value of 1 means enabled. For instructions on how to program a parameter in the 'A' submenu, refer to Embedded Responses on page 19.

For the 1747-KFC15, switch 7 of DIP switch bank S1 is used to configure the auto-recovery feature. Off means disabled (the default), and on means enabled.

Message Buffers

The new 1747-KFC15 has 67 message buffers. The new 1770-KFC15 has 18 message buffers. However, if the messages are PCCC messages coming in from ControlNet, the number is limited to 10 outstanding messages.

From an application point of view, this means that a DF1 device (PLC-5, DCS, RSLinx, etc.) connected to the serial port of a new 1770-KFC15 is able to send 18 DF1 messages through the KFC before receiving a reply to any of them. This is referred to as 18 outstanding messages. If a 19th message is sent by the DF1 device before a reply, good or bad, is returned for any of the 18 other messages, the KFC will respond with a NAK to indicate that it is low on memory and does not have a message buffer in which to place the 19th message. If this happens, the DF1 device should wait until it hears a reply to one of the outstanding messages (or until the message times out) and try the 19th message again.

In general, applications using the 1770-KFC15 should be designed so that no more than 18 DF1 messages are outstanding at one time. For example, a PLC-5 connected to the serial port of the 1770-KFC15, should not be programmed to execute more than 18 message instructions at one time that would send DF1 messages to the KFC's serial port. However, if a 1747-KFC15 is used instead of the 1770-KFC15, then 67 DF1 message instructions can be executed simultaneously.

The picture is different for applications that send PCCC messages to the KFC via ControlNet. For example, consider an application that has 3 PLC-5 processors and a KFC all connected to ControlNet. The KFC has some DF1 device connected to its serial port. The PLC-5 processors have been programmed with message instructions that read data from the DF1 device via ControlNet and the KFC. This application

should be designed so that no more than 10 message instructions execute at one time in all 3 of the PLC-5 processors. Note that the value of 10 outstanding PCCC messages from ControlNet applies to both the 1770-KFC15 and the 1747-KFC15.

For applications using the RSLinx DF1 driver, a user trying to increase the number of outstanding messages the RSLinx driver uses (to browse the ControlNet network, for example), should use care when doing so. Some messages may time out too soon. If this happens, the user sees red X's in the RSWho screen. If the number of outstanding messages is increased from 3 to 10, for example, the timeouts should also be increased to a value near 10 seconds (depending on the network configuration).



TIP

We recommend using the default driver settings of 3 outstanding messages with a 3-second timeout

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Publication 1770-RN001A-EN-P - May 2002

PN 957689-27

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