

622-601 COMMON TRUNK [PROCESSOR TO PROCESSOR] INTERCOUPLER

This publication is designed as a general functional description of the 622-601 Common Trunk (Processor-to-Processor) Intercooler. While the information it contains may be helpful to the programmer, it is not intended as a substitute for NCR Century Series programming manuals.

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INTRODUCTION

The 622-601 Common Trunk (Processor-to-Processor) Intercoupler is a control unit used as a connecting link, on the common trunk, between two NCR Century Series computers. The intercoupler occupies a position on one trunk of each system and permits both systems to interchange information through the trunks. Control logic and trunk interface is contained within the unit, which operates with a minimum of software programming. The control logic within the unit permits the use of a self-selection feature which leaves the trunk free for use by other peripherals until data is ready to be transferred. When one processor is set to input and the other processor is set to output, the intercoupler has the ability to place itself in the input state on one trunk and the output state on the other trunk. This places both trunks in a busy state and data transfer takes place. Data transfer occurs until the output processor transmits all the required data, at which time the operation is terminated. Because the intercoupler provides processor-to-processor data transfer on a self-selection basis, the trunk is busy until the function is terminated.

The intercoupler is contained in the standard NCR Century lowboy cabinet, 34 x 27 x 43 3/4 inches (width, depth, and height). The unit is a freestanding peripheral containing its own power supplies, control logic necessary for operation, and test features for maintenance personnel. A control panel, containing the POWER ON, POWER OFF switches and a POWER ON indicator, is built into the top of the cabinet. The intercoupler is physically connected to a position on one trunk of each system, with the cable length not to exceed 100 feet for each system.

FUNCTIONAL DESCRIPTION

GENERAL DESCRIPTION

The intercoupler performs all the functions necessary for transmitting information between two NCR Century processors through their respective trunks. The unit performs its operations on each trunk as if it were two units operating through a single controller on a single position of the trunk. The unit may be selected for input and/or output on either or both trunks at the same time; however, data flows only in one direction at a time. Once a function is initiated in one direction, that function must be ended before data transfer can begin in the opposite direction. The intercoupler is always in a functional state (see FUNCTIONAL OPERATION), and must be activated from both trunks before the data transfer can occur; one processor must be set to receive the data and the other processor must be set to send the data.

FUNCTIONAL OPERATION

The unit operates as a normal peripheral, requiring selection through the INOUT command (refer to the Product Information Processor publications for the specific processor being used), data transfer, and termination. Operation always starts from a functional state. The functional states assumed by the intercoupler on one trunk are independent of the functional states assumed on the other trunk, except as described in the following table.

FUNCTIONAL STATES	
NAME	DESCRIPTION
INPUT IDLE STATE	Input permit is off. The trunk is free for use by other peripherals. This is a normal state when power is turned on. An input permit command places the unit in the input permit state. The unit returns to the idle state upon receipt and initiation of a reset input command or after termination of input on that trunk.
INPUT PERMIT STATE	Input permit is on. The trunk is free for use by other peripherals. The unit is taken out of this state by a reset input command or by entering the input state.
INPUT STATE	This is the state of actual data transfer. The trunk is busy until the function terminates. With the unit in input permit state on one trunk, recognition of the output state on the other trunk causes the unit to place itself into this state for data transfer.
OUTPUT IDLE STATE	Output permit is off. The trunk is free for use by other peripherals. This is a normal state when power is turned on. An output permit command puts the unit in the output permit state. The unit returns to this state after a reset output command or after termination of output on that trunk.
OUTPUT PERMIT STATE	Output permit is on. The trunk is free for use by other peripherals. The unit is taken out of this state by a reset output command or by entering the output state.
OUTPUT STATE	This state is the actual data transfer state. The trunk is busy until the function terminates. With the unit in output permit state on one trunk, recognition of the input state on the other trunk causes the unit to place itself in this state for data transfer.

NOTE

When the intercoupler is in an input state on one trunk, it must be in the corresponding output state on the other.

Selection

An INOUT command from the processor selects the intercoupler and specifies the function to be performed, using information contained in the peripheral address field. Refer to the specific processor publication in the Product Information library for a complete description of the INOUT Command. Upon termination of the INOUT Command, an S2 status character is stored to indicate the result of the selection attempt.

- Peripheral Address Field

The peripheral address field (PAF) is a 2-character field in memory, addressed by the effective A address of the INOUT command. The first character selects trunk and position on the trunk; the second character designates the function to be performed by the unit.

NOTE

On an NCR Century 100 System, the intercoupler must be connected to trunk 1. Due to the character transfer rate, if this unit is placed on trunk 0, a system overload may occur on the system disc.

- Function Code

The function code is an 8-bit character that designates what the unit is to do. The following table lists the permissible function codes, giving the bit configuration, name, and description of each code.

FUNCTION CODES		
CONFIGURATION	NAME	DESCRIPTION
00000000	RESET INPUT	Special function code; sets input permit off. If the unit is in the input state the command is not effective. No S3 status character is sent for this command.
00000001	INPUT PERMIT	Turns the input permit on.
00000011	RESET OUTPUT	Special function code; sets output permit off. If the unit is in the output state the command is not effective. No S3 status character is sent for this command.
00000010	OUTPUT PERMIT	Turns the output permit on.

NOTE

If a second INPUT PERMIT or OUTPUT PERMIT function is issued before the first like function has been reset or terminated, an error condition occurs that is not detected by the unit.

S2 Status Characters

The S2 status character is stored in the memory location specified by the effective B address of the INOUT command; it denotes the condition of the selection attempt. The following table gives the bit configuration, the name and a description of each S2 status character used with the 622-601 Intercoupler.

S2 STATUS CHARACTERS		
CONFIGURATION	NAME	DESCRIPTION
01000000	COMMAND INITIATED	The unit has been successfully selected.
10000000	BUSY	Either the unit or the trunk is busy with a previous selection.
00000010	INOPERATIVE	The unit is in an inoperative state: AC power off.

Data Transfer

The intercoupler must be activated from both trunks before data transfer can occur; one processor must be ready to receive the data, and the other processor must be ready to send the data. In practice, both processors are usually set to permit receipt of data; however, when one processor wants to send data it simply initiates an output permit function code and, when both processors are ready (the trunks are not busy), the data transfer takes place. Data transfer is controlled by the I/O control unit in the processor using response numbers and control words assigned to the intercoupler.

- Response Number

Each intercoupler is assigned four response numbers, two for each processor. One response number is for an input function, and the other is for an output function. The response number sent to the I/O control by the intercoupler permits the I/O control to access the memory location where the control word is stored. The response number is used whenever a data character is transferred to or from the processor's I/O control.

- Control Word

Each intercoupler has four control words assigned, two for each trunk (one for input and one for output). Control words are eight characters in length and stored in memory. A control word permits the I/O control to manipulate data without limiting the processing system to a single I/O function. The format of a control word is:

S	NA			TA		USED BY SOFTWARE
	N3	N2	N1	T2	T1	

with:

S = Location where the S3 or S4 status character is stored.

NA = Location containing the beginning address in memory from which data is read or into which data is stored.

TA = Terminating address; an address that the NA value is compared against for a processor termination. For a more detailed description of the control word refer to the processor publications in the Product Information library.

S3 and S4 Status Characters

Since the data transfer occurs within the normal framework of an NCR Century I/O operation, S3 or S4 status characters are used to inform the processor of what happened during the operation. At the termination of the data transfer, either an S3 or S4 status character, depending upon its origin, is stored in the first character of the control word. This character reflects the outcome of the data transfer operation. Each bit in the status character indicates a specific condition by being set to 1. The following table shows the bit configuration, name, and description of each S3 or S4 status character used in the intercoupler data transfer operation.

S3 AND S4 STATUS CHARACTERS		
CONFIGURATION	NAME	DESCRIPTION
S3 CHARACTER		Sent by the intercoupler to the I/O control
00000000	OPERATION COMPLETE	Sent to both processors when processor terminate (NA=TA) is received from the output processor.
11000000	SEGMENT COMPLETE	Sent to the input processor only when a processor terminate (NA=TA) signal is received from the input processor and the output function from the other processor has not terminated (NA≠TA).
00000010	INOPERATIVE	Sent to one processor when power is off on the other processor or when some other inoperative condition exists.
00100000	ERROR	Sent to one processor when a transmission error, latent ME or latent PE is detected in the other system.
S4 CHARACTER		Sent by the I/O control for I/O detected errors.
10000001	TRANSMISSION ERROR	Indicates parity error detected on input.
10000100	LATENT ME	Indicates memory error.
10001000	LATENT PE	Indicates program error.

Termination

Termination of the I/O operation occurs at the end of the data transfer. Four types of termination may occur: normal termination, special termination, error termination, and inoperative termination.

- Normal Termination

A normal termination occurs on both trunks when the output processor sends a processor terminate signal (NA = TA) to the intercoupler and no errors have occurred. The operation complete S3 status character is stored in each processor memory.

- Special Termination

A special termination occurs when the input processor sends a processor terminate (NA = TA in the input processor only) to the intercoupler. The

segment complete S3 status character is stored in the input processor. This indicates that the output processor has more data to send and no processor terminate signal has been received from the output processor, the input processor must be re-selected and data transferred for normal termination.

- Error Termination

An error termination indicates that either a transmission error, a latent memory error, or a latent program error has occurred on one of the processors. The error S3 status character is sent to the processor that did not cause the error; the system causing the error receives the Transmission Error, Latent ME or Latent PE S4 status character.

- Inoperative Termination

This termination occurs when one processor loses power after both processors have been selected.

PHYSICAL SPECIFICATIONS	
AC INPUT	120 volts 2-wire w/frame ground single phase 60 hz
KVA	.6
AMPERAGE (AMPERES)	7
BTU/HR	1800
DIMENSIONS	
width	34 inches
depth	27 inches
height	44 inches
AIR FLOW	Top to bottom

NOTE

The environmental specifications are the same as those included in the systems to which the intercoupler connects.

OPERATIONS

CONTROL PANEL

The 622-601 intercoupler control panel, mounted in the top of the cabinet, contains POWER ON and POWER OFF switches and a POWER ON indicator. Pressing the POWER ON switch actuates the 622-601 lighting the POWER ON indicator. No further operator action is required for the intercoupler. Pressing the POWER OFF switch in effect disconnects the unit from the system.