



Systems Reference Library

IBM System/360 Time Sharing System

Planning for Remote Job Entry

This is a planning aid to be used prior to the availability of the remote job entry feature of IBM System/360 Time Sharing System.

Remote job entry provides all central TSS/360 batch processing facilities to remote locations. The input/output device used at remote stations is an IBM 2780 Data Transmission Terminal, Model 1.



PREFACE

This is a functional description of the uses, characteristics, and procedures of TSS/360 remote job entry (RJE). This information represents current implementation plans, which are subject to modification during the period between announcement and availability of the TSS/360 RJE feature. The reader is assumed to have a basic understanding of TSS/360 and its batch processing facilities.

Specific information about the remote station device is in IBM 2780 Data Transmission Terminal - Component Description, Form A27-3005.

First Edition (April 1969)

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CONTENTS

GENERAL DESCRIPTION	5
Remote Station Devices	5
Remote Station Modes	6
RJE Control	6
OPERATION	7
Connecting a Remote Station	7
Initiating an Input/Output Session	7
Input Processing	7
Output Processing	8
Disconnecting a Remote Station	8
COMMANDS AND CONTROL CARDS	9
DIRECT Command	9
JOINRJE Command	9
QUITRJE Command	9
JOIN Command	9
PRINT Command	10
RJSTART Card	10
CONTINUE Card	10
RJEND Card	10

With the remote job entry (RJE) feature, all the facilities of TSS/360 batch processing are available from locations outside the central computer installation. Each remote station has a card reader and printer, and is connected to the central installation's IBM System/360 Model 67.

Batch jobs can be entered from a remote station in the same way as they would be entered at the local, central installation card reader. Except for RJE control cards, all input from remote stations is completely compatible with input from the local card reader. VAM data sets can be created by using the DATASET card facility; nonconversational tasks can be initiated from SYSIN data sets. Printed output is returned to the originating station, unless another station or the local high-speed printer is specified. Printed output can also be routed to remote stations from conversational terminals, including the system operator's terminal.

Messages and other acknowledgments from the system, when it receives remotely entered jobs, are stored in a data set; this acknowledgment data set is printed at the remote station when transmission to the system is completed.

TSS/360 RJE provides efficient, convenient service to and from remote locations.

- Remote station authorization and use is controlled by a symbolic station identification, which is assigned by a system manager or administrator.
- Only three control cards are used: one to begin use of the remote station; one to logically disconnect the station; and one to resume interrupted output at the remote station.
- Printing at the remote station can be interrupted (e.g., to read cards, or for a forms change), and can then be resumed or canceled from the remote station.
- The SETUR macro instruction will be used to specify paper form types for the remote station.
- Error checking and recording are provided.

Remote Station Devices

The RJE device at each remote station is the IBM 2780 Data Transmission Terminal, Model 1, which consists of a card reader and a printer, attached to an IBM 2701 Data Adapter Unit.

The telephone facilities, supported on a point-to-point transmission basis, are:

- 2-wire or 4-wire private (i.e., dedicated) line; rated at 2400 bits per second; used with a Western Electric 201B1 modem (modulator-demodulator).

- 2-wire switched (i.e., dial-up) line; rated at 2000 bps; used with a Western Electric 201A3 modem.

Remote Station Modes

The IBM 2780 can be in one of four modes: INACTIVE, CONTROL, TRANSMIT, and RECEIVE. It is in INACTIVE mode when lines from the computer have been designated for 2780 use, during system generation, and valid station IDs have been assigned.

CONTROL mode is entered initially when the system operator assigns dedicated or dial-up lines to the 2780 and, when necessary, the dial-up procedure is accomplished. Subsequently, CONTROL mode is the transition state between any two of the other three modes.

TRANSMIT is the input mode; the system is reading cards from the 2780. RECEIVE is the output mode; the system is printing on the 2780. In all cases, TRANSMIT has priority over RECEIVE. Printing can be interrupted to read cards; when all the cards have been read, printing can be resumed.

RJE Control

Three control cards are used at the remote station: RJSTART, CONTINUE, and RJEND. The RJSTART card starts each input/output session and identifies the remote station to the system. The CONTINUE card restarts printing that was interrupted to read cards. The RJEND card logically disconnects the remote station from the system.

The commands that control authorization of remote stations are JOINRJE and QUITRJE; they establish the identifications against which the station ID operands of RJSTART, PRINT, and DIRECT are validated. New operands in JOIN and PRINT give TSS/360 users the option of printing at a remote station. The DIRECT command allows the system operator to shift output to other remote stations or local printers.

The term "station ID" does not connote a physical location or a specific remote device, but rather a logical location -- the current "mailing address" for output. Normally, an RJE user enters his input at a remote station, and the output is returned to the same station. He may, however, enter input at one remote station, disconnect it (RJEND), enter an RJSTART card with the same station ID at another remote station, and receive the output at that second station. Or, if joined with the RJE option, a user may enter input at one remote station, a conversational terminal, or the local card reader, and in a PRINT command specify any station as the destination for his printed output. Thus, the station ID is the means of assuring that RJE printed output is routed to the device currently associated with the ID, as well as the means of validating that use of RJE facilities is authorized.

Connecting a Remote Station

Remote job entry devices are connected to TSS/360 in the same way as other local, public, unit record devices:

- During system generation, communication lines must be reserved for the 2780 by using the DEVGRP macro instruction.
- After system startup, or if he has deleted the lines, the system operator must assign lines for the remote devices with the ASNBD (add) command. If the line is dedicated, the remote device is then ready for the RJSTART card. If it is a dial-up line, the user must dial in to the system and then enter the RJSTART card.

Before an RJE input/output session can be initiated, the station ID that is used to designate the station must be authorized by a system manager or administrator, who issues a JOINRJE command.

Initiating an Input/Output Session

An RJE input/output session consists of all activity that takes place at a remote station from the time an RJSTART card is read by the system until that session is terminated by an RJEND card.

When the RJSTART card is recognized, its station ID operand is compared with the system's authorization data. If valid, the station ID becomes the "mailing address" for subsequent output to the station. Once the RJSTART card is read and validated, it is not necessary to enter another one unless an RJEND card has ended a session and reactivation of the station is required.

Input Processing

After the remote station has been connected and a session has been initiated, remote job entry transmission can be started. The batch decks are in the same format as those entered in the local card reader.

An RJE user places his card deck into the card-reader hopper and presses the start button; then the system reads the cards. If the station ID has not been validated, all cards are flushed through the reader and an error message is printed at the remote station.

While the batch input stream is being read:

- All messages, batch sequence numbers assigned, and other acknowledgments of input are saved by the system in a data set. The content of this data set is transmitted to the remote station at the normal end of a transmission from the remote station (i.e., after reading all the cards in the hopper).
- The station ID is associated with all tasks and output generated as the result of a remotely entered SYSIN.

- The user is "charged" for each card read and line printed. The charge is made to the user ID that appears in the LOGON or DATASET card, or to the data set name of the print job.

When a station completes a transmission to the computer, the line is again ready to receive input. Thus, the system is always prepared to respond to new input.

Output Processing

Printed output that results from PRINT commands in RJE input and from SYSOUTs is automatically routed back to the point of origin. The remote user or system operator can override this automatic routing:

- A remote user, who has previously been joined with the RJE option (see JOIN Command, later), can specify in a PRINT command that output is to be routed to another remote station or to the local printer.
- A user, previously joined with the RJE option, can also route printed output to a remote station from a conversational terminal via the station ID operand of the PRINT command.
- A system operator can specify, via the DIRECT command, that printed output be routed to another remote station or local printer.

A request to print data sets residing on private storage is defaulted to the local printer (i.e., the system ignores the station ID). To override this default, the remote user can copy the data set onto public storage before issuing the PRINT command. Then, the output can be printed at the remote station.

During output, printer-control characters that are generated by TSS/360, but are nonexistent on the 2780 (e.g., suppress spacing, skip to channels 9-12), are defaulted to single space. All trailing blanks on output records are stripped off to reduce transmission time. When printing is completed, the transmission line is prepared to receive input.

The user can interrupt a printing by pressing the stop button on the printer. Then, he can enter his cards in the reader and press the start button. When all the cards have been read, the user can resume printing by pressing the start button on the printer, entering a CONTINUE card in the reader, and pressing the reader's start button (see CONTINUE Card, later).

Disconnecting a Remote Station

- A remote station is logically disconnected from the system (i.e., placed in INACTIVE mode) whenever the user enters an RJEND card.
- A remote station's communication line is disconnected from the system when the system operator issues the ASNBD (delete) command.
- The system manager or administrator can eliminate a station ID by issuing the QUITRJE command. An RJSTART card containing this deleted station ID, and entered at the remote device, will not be accepted and an error message will be returned to the remote device.

There are three commands and three control cards for RJE: DIRECT, JOINRJE, QUITRJE, and RJSTART, CONTINUE, and RJEND. Also, the JOIN and PRINT commands have been modified for RJE.

DIRECT Command

This command is used by the system operator only. It allows him to reroute RJE output to local printers or to another remote station when:

- An RJE station is malfunctioning.
- The operator wants to relieve the backlog of output destined for an inactive remote station.

The operands of the command specify the station ID from which, and the station ID to which, the printed output is to be rerouted. If the originating station ID is specified as ALL, the printed output for all remote stations will be printed at a local printer. If no second station ID is given for the destination, the printed output from the initiating station will be defaulted to a local printer.

JOINRJE Command

This command, available only to managers and administrators, assigns a station ID to a remote station, which must be joined to the system before any input will be accepted from it or output transmitted to it. The JOINRJE command verifies that the station ID is not a duplicate and then adds it to the validation data set that is part of the acknowledgment data set. Every user must identify himself properly with the RJSTART card to receive his output. This function assures proper identification, and also that output can ultimately be sent to the correct destination, when the originating station has been disconnected.

QUITRJE Command

This command, for the system manager and administrator, removes a station ID from the validation data set. An RJSTART card with a station ID that is not in the validation data set will not be accepted.

JOIN Command

Added to the JOIN command is an operand that allows the system manager or administrator to give users the option of issuing PRINT commands for any RJE station. This option is needed whether the user enters the redirecting PRINT command at a remote station or at a conversational terminal.

PRINT Command

The PRINT command includes a new operand, the station ID, which enables a user to request that his output go to a specific remote station or a local printer.

RJSTART Card

The RJSTART card attaches and identifies a remote station to the system. Only after the RJSTART card has been received can any further input or output be scheduled for the remote station.

The RJSTART card must also be submitted to resume RJE activity after the remote station has been logically detached from the system (after the RJEND card or system failure).

Each RJSTART card must contain the station ID of the remote station, as supplied by the system manager or administrator in the JOINRJE command.

CONTINUE Card

The CONTINUE card specifies the disposition of interrupted output. These following conditions may cause the interruptions:

- A forms-requirement message, indicating a change in the form number specified for the output, sent to the RJE station.
- User intervention at the remote station to read in a high-priority job.
- Equipment failure during an output operation; for example, a forms-jam.

When interrupted output is pending for an RJE station, no output is returned until a CONTINUE card is received; however, the system continues to accept input.

The CONTINUE card provides three capabilities:

- The entire interrupted output data set can be retransmitted.
- Transmission can be resumed at the point of interruption.
- The user can direct the system to cancel the print request, if he does not want the output.

RJEND Card

The RJEND card detaches a remote station from the system. This allows the RJE user to logically disconnect his station in an orderly manner. The RJEND card is not recognized unless it appears after a LOGOFF or %ENDDS card.

If there is no job in progress when this card is received, the acknowledgment data set is printed before the station is disconnected. If

printing is in progress, the request for it is rescheduled and then the acknowledgment data set is printed. When the RJEND card is recognized between two jobs in a job stream (e.g., between the LOGOFF card of one data set and the LOGON card of the next), the remaining cards are flushed through the reader before the acknowledgment data set is printed.



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