SERIES 60 (LEVEL 68)

MULTICS REMOTE BATCH FACILITY (LEVEL 68 TO LEVEL 6) PRELIMINARY EDITION

SUBJECT

Information Needed to Use the Multics Remote Batch Facility with the Level 6 Remote Batch Facility

Note:

This manual is a preliminary edition provided to describe a special Remote Batch Facility release of software that is not being distributed to all customers at this time.

SOFTWARE REQUIREMENTS

Multics Software Release 7.0
GCOS 6 MOD 400 (Release 110)

ORDER NUMBER

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PREFACE

This manual describes all of the currently available information needed to use the Multics Remote Batch Facility with Level 6 Remote Stations.

Section 1 of this document provides general information about the Level 6 Remote Batch Facility (RBF) software and a brief description of the Multics Front-End Network Processor (FNP). Section 2 describes the capabilities of the RBF and Section 3 describes the RBF software. Documented in Section 4 is information on installing RBF software on MOD 400 operating software. Section 5 includes commands used by Multics users to interface to Multics I/O facilities. Operating instructions are found in Sections 6 and 7. Section 8 documents optional remote-site Multics commands. Section 8 discusses implementation of the Level 6 software, its limitations and problems. Appendix A contains the printable characters available on the printer used with Level 6 remote stations. Card codes and punch representations acceptable to both Multics and the Level 6 are found in Appendix B. Appendix C includes examples. Appendix D provides a description on modem checkout. Lastly, Appendix E contains an example of an iod_admin.ec.

Throughout this manual, references are frequently made to the following manuals:

Order No.	Title
(CB02)	GCOS 6 Commands
(CB24)	GCOS 6 MOD 400 Operator's Guide
(CB32)	GCOS 6 MOD 400 System Building
(CB20)	GCOS 6 MOD 400 System Concepts
(AG92)	MPM Commands and Active Functions
(AG91)	MPM Reference Guide
(CC34)	Multics Bulk Input/Output
(CB30)	Remote Batch Facility User's Guide

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SECTION 1

INTRODUCTION

This document describes the Remote Batch Facility (RBF) available for use on the Honeywell Series 60 (Level 6) when used with a Multics host.

The remote batch facility (RBF) refers to Level 6 software, which supports interfaces to both Multics and GCOS operating systems. The RBF interface to GCOS is fully described in the Remote Batch Facility User's Guide (CB30); the interface to Multics is partially described in Sections 6 and 7 of this manual. These descriptions should suffice for most Multics usage.

The Multics system administrator and operator interfaces to the Multics host driver are described in Multics Bulk Input/Output (CC34). The Multics user interface is described in the Multics Programmers' Manual -- Reference Guide (AG91), and the Multics Programmers' Manual -- Commands and Active Functions (AG92). Section 5 of this document gives some condensed user information.

SOFTWARE

Multics Software

Multics software must be Multics Release 7.0 or later.

Level 6 Software

Presently, the Level 6 Remote Batch Facility (RBF) software is a modification of the released RBF package that interfaces to Level 66 system software (Release 110 of the Series 60 (Level 6) GCOS 6 MOD 400 Operating System).

This modified RBF will support software interfaces to the following:

Series 60 (Level 68) Multics
Series 60 (Level 66) GCOS
Series 6000 GCOS

The current RBF software has been tested under Level 6 Short Address Form (SAF) and Long Address Form (LAF) modes of operation.

HARDWARE

Multics Hardware

The Multics Front-End Network Processor (FNP) can be any one of the following devices. Throughout this document, FNP is used to mean any one of these devices.

- Datanet 355
- Datanet 6632
- Datanet 6670 (Level 6 type architecture)

A synchronous type channel board must be used in the FNP to interface with the Remote Computer Interface (RCI) used in the Level 6.

Level 6 Hardware

For minimum hardware configuration requirements, see the Remote Batch Facility User's Guide.

COMMUNICATIONS LINKS

Examples of running Multics/Level 6 connections are listed below:

Datanet	Baud	Line Type	Modems
355	2400	dialup	201C
355	4800	dialup	208B
355	9600	dedicated	209A
6670	2400	dedicated	209A/201C
6670	4800	dialup	208B
6670	9600	dedicated	modem bypass
6670	9600	dedicated	TDM-bypass

COMMUNICATION INTERFACES

Currently, Multics supports only the Remote Computer Interface (RCI) protocol with the Level 6.

The Multics Front-End Network Processor (FNP) contains a modified package, which uses a G115 line protocol to communicate with the Level 6.

SECTION 2

DESCRIPTION OF RBF CAPABILITIES

The RBF provides the following capabilities to a remote site:

- Remote printing, including some forms and paper control depending upon the remote printer.
- Bulk data input to Multics. Input must be 80 column source card image. The source card image may be actual cards or source card images stored on Level 6 disk storage.
- Absentee control file input, queued for immediate execution or queued for delayed execution.
- Bulk data output from Multics. Output must be 80 column source card images. The images look like actual cards to be punched but are instead directed to Level 6 disk storage.
- A combination of bulk input and bulk output can be used to transfer source card images from one Multics system to another by using the Level 6 as an intermediate storage device and the RBF as the transfer mechanism.
- This same method of bulk data transfer can be used to exchange data between a GCOS operating system and a Multics operating system.
- Spooling of data input/output onto magnetic tape or mass storage disk files.

SECTION 3

DESCRIPTION OF RBF SOFTWARE

In the following examples, some specific station_ids, request types, and device names are used to ensure clarity. The names used in these examples are as follows:

Station_id: Miami

Station Password: <password>

Devices and request types:

type	minor device name	request type
printer	m_prt	miami_prt
punch	m_pun	miami_pun

The exec_coms delivered with the Multics/Level 6 RBF software initiate four task groups during the booting process. The task groups and their functions are described below:

```
$S - System task group
       working_dir, ^vol_id
MU - Multics task group
       working_dir, ^vol_id>UDD>RBT2
GC - GCOS task group
       working_dir, ^vol_id>UDD>RBT2
$H - a general work task group for local processing
       working_dir, ^vol_id
```

The following exec_coms are executed first and are found in the directory ^vol_id:

START_UP.EC

```
& & SID>START_UP.EC
& CSD >SYSLIB2 -LIB2
& SG $H HIS.L6.A 0 >SPD>CONSOLE -OUT >SPD>CONSOLE -POOL AB -WD >HIS
& CWD <
& RDN
& SID>START_UP.EC   78/01/24
CSD >SYSLIB1 -LIB1
CSD >SYSLIB2 -LIB2
EC TASK¦ MU 1 CONSOLE
EC TASK¦ GC 2 CONSOLE
EC GROUP$H
&P      ***** DATE TIME ? SD "YYYY/MM/DD TTTT" *****
RDN
EC >SPD>CONSOLE
```

TASK¦.EC

```
& TASK¦.EC          77/12/14
SG &1 UDD.RBT2.A &2 >SPD>&3 -OUT >SPD>&3 -POOL AB -WD >UDD>RBT2
&Q
```

```
GROUP$H.EC
     & GROUP$H.EC
     SG $H HIS.L6.A 0 >SPD>CONSOLE -OUT >SPD>CONSOLE -POOL AB -WD >HIS
```

Two exec_coms are used to initiate an activity within the MU and GC task groups respectively, and are found in the directory ^vol_id>UDD>RBT2. Examples of these exec_coms are given below:

```
RBTM.EC
     & RBTM.EC       78/02/28/
     &  &1 LRN OF COMM
     ASSOC 1 >SPD>CDR00
     ASSOC 2 >SPD>LPT00
     ASSOC 3 MPUN_OUT
     MSW -ALL OFF -ON 01589
     &  Specifies LRN of 4.  Installation dependent
     RBT_0204 4
     &Q

RBTG.EC
     & RBTG.EC       78/02/28/
     &  &1 LRN OF COMM
     ASSOC 1 >SPD>CDR00
     ASSOC 2 >SPD>LPT00
     ASSOC 3 GPUN_OUT
     MSW -ALL OFF -ON 018
     & Specifies LRN of 3.  Installation dependent
     RBT_0204 3
     &Q
```

All exec_coms should be tailored to meet the needs of a particular site. The examples given here are to provide guidelines only, and should be modified to be consistent with the hardware configuration of a site as well as the work environment of the site.

For example, if a site normally wishes to transmit source code lines (longer than 80 characters) to the Level 6 and locally massage the data, then the print queues could be used and the above RBTM.EC modified to be:

```
RBTM.EC
     & RBTM.EC
     &  &1 LRN OF COMM
     RL >UDD>RBT2>OUTPUT_FILE
     CF >UDD>RBT2>OUTPUT_FILE
     ASSOC 1 >SPD>CDR00
     ASSOC 2 >UDD>RBT2>OUTPUT_FILE
     ASSOC 3 >UDD>RBT2>MPUN_OUT
     MSW -ALL OFF -ON 01589
     & Specifies LRN of 4. Installation dependent.
     RBT_0204 4
     &Q
```

Several other files are delivered with the RBF package. It is expected that these files will be modified for site use. The following are four examples of command files which can be used in response to the Multics request to "Enter station command:"

NOTES:

1. In the following examples, no request type is specified after the station command has been given. However, if the station is allowed to use multiple request types, there must be one or more lines following the station command which names the request type(s) to be used.

2. The word "M_PRT" in the "READY" command is the minor device name of the remote device printer and is dependent on host configuration.

   Consult the system administrator of the host system for the required responses.

```
LOGINGO   (login and begin processing print requests)
     STATION \MIAMI <password>
     SLAVETERM LOG
     SLAVETERM MODES LL48
     READY M_PRT
     GO

LOGINNG   (login but no processing print requests)
     STATION \MIAMI <password>
     SLAVETERM LOG
     SLAVETERM MODES LL48
     READY M_PRT

LOGINNA    (login but no automatic print queue processing)
     STATION \MIAMI <password>
     SLAVETERM LOG
     SLAVETERM MODES LL48
     READY M_PRT
     PRT_CONTROL ^AUTO_PRINT
     GO
```

Two other files are supplied which are used when processing card image input to Multics from the Level 6.

```
UID1
     ++EOF
     ++UID 123456

UID2
     ++EOF
     ++UID JKLMNP
```

The following executable unit is delivered with the system and constitutes the real programs of the RBF package. The main bound unit of RBF programs is the segment RBT_0204. This segment will normally reside in the directory ^vol_id>SYSLIB1.

```
RBT_0204
```

The following CLM files are included as examples of various CLM files that can be used during booting of the RBF package. These CLM files are delivered with the RBF package and are referenced during the various booting possibilities mentioned in Section 6. These files can be modified to be consistent with a particular site or used only as reference for modifications to an existing site CLM file. These CLM files are designed to run under Short Address Form (SAF) operation. Refer to CB30 manual for necessary changes when L6 is operating in LAF mode. For more information on CLM files, see Appendix C.

CLM_USER -- used when booting from channel 0800

```
* CLM_USER          (CARTRIDGE DISK)              78/02/08
*
* SAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
DEVICE KSR00,0,10,X'0500',CONSOLE,140
DEVICE FCD00,15,6,X'0800'
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
LPHDEF 0,48,208
LPH0 4,9,X'0C00',3,,HDX,X'0000'
LPH0 3,9,X'0C80',3,,HDX,X'0000'
LDBU ZQEXEC
LDBU RBRCIP
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
MEMPOOL S,,8000
MEMPOOL ,AB,*
QUIT
```

MULTICS -- used when booting from channel 0802

```
* MULTICS           (CARTRIDGE DISK)              78/02/07
*
* SAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
DEVICE FCD00,15,6,X'0800'
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
LPHDEF 0,48,208
LPH0 3,9,X'0C00',3,,HDX,X'0000'
LPH0 4,9,X'0C80',3,,HDX,X'0000'
LDBU ZQEXEC
LDBU RBRCIP
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
DEVICE TBCL1,31,9,X'FD00',TTY01,80
TTY 31,9,X'FD00',0,0300
MEMPOOL S,,8000
MEMPOOL ,AB,*
QUIT
```

The RBF software can be set up such that there are two possible bootload processes selectable at bootload time. One of the two processes is selected by entering the appropriate number into the D1 register at bootload time. See Section 6. The channel assignment is arbitrary depending upon the remote site configuration. The following description assumes that the Disk Cartridge is assigned to channel 0800.

CHANNEL ACTION

0800

Boots RBF from Removable Cartridge Disk (RCD) with all tasks initialized.

0802

Boots RBF from RCD with a second (separate) console assigned to task GC.

The above channel/action table is dependent upon use of files as delivered with the software. Sites may choose to modify the action taken by any of the above channel designations. For a complete description of the bootstrap options, see Section 2 of GCOS 6 MOD 400 System Building Manual (CB23).

SECTION 4

INSTALLING RBF SOFTWARE

Each module contained on the RBF diskette is found in the directory in which it is expected to reside at a site, with the exception of the volume_id of the diskette. The volume_id of the diskette is ^MRBF. The content of the RBF diskette is as follows:

```
^MRBF
     START_UP.EC
     TASK¦.EC
     GROUP$H.EC

^MRBF>SID
     CLM_USER

^MRBF>SYSLIB1
     RBT_0204

^MRBF>UDD>RBT2
     RBTM.EC
     RBTG.EC
     LOGINGO
     LOGINNG
     LOGINNA
     LOGINSP
```

1. Check the CLM_USER file in use currently with the MOD 400 software. Verify channel and hardware consistency for those devices to be used.

2. Boot the Level 6 to initiate a task group to allow copying of files from the RBF diskette.

3. Copy the files from the RBF diskette onto the cartridge or mass storage disk device, placing them in their appropriate directories on the site's MOD 400 storage device.

   For example, if the remote site has a cartridge disk as the device where the RBF software is to reside, and this disk has a volume_id of ^SITE_X, then the following commands might be used to copy the files from the ^MRBF diskette. Be careful to ensure that there are no file names already residing on ^SITE_X that might cause an overwriting of files.

   ```
   CP ^MRBF>** ^SITE_X>==
   CP ^MRBF>SID>** ^SITE_X>SID>==
   CP ^MRBF>SYSLIB1>RBT_0204 ^SITE_X>SYSLIB1>RBT_0204
   CP ^MRBF>UDD>RBT2>** ^SITE_X>UDD>RBT2>==
   ```

4. Modify the files in >UDD>RBT2 to reflect the requirements and operating environment of the remote site.

5. Reboot the Level 6 following the instructions in Section 6.

SECTION 5

MULTICS USER INTERFACE

In the following examples some specific station_ids, request types, and device names are used to ensure clarity. Please refer to paragraph 1, in Section 3, for a list of these names.

Complete descriptions of the commands used by Multics users to interface to Multics I/O facilities are described in the Multics Programmers' Manual -- Commands and Active Functions (AG92).

COMMANDS FOR MANIPULATING ABSENTEE REQUESTS

enter_abs_request, ear
: enter absentee request into absentee queue

list_abs_requests, lar
: list requests in the absentee queues

move_abs_requests, mar
: move an absentee request from one absentee queue to another

COMMANDS FOR MANIPULATING DAEMON REQUESTS

cancel_daemon_request, cdr
: cancel request in daemon queue

dprint, dp
: enter print request into daemon print queue

dpunch, dpn
: enter punch request into daemon punch queue

list_daemon_requests, ldr
: list status of daemon queues

move_daemon_request, mdr
: move a request from one daemon queue to another

The request_type control argument must be used with any of the above daemon request commands when directing requests to a remote facility. The request_type for the remote site is assigned by the host Multics system administrator.

As a matter of security, the access to any request_type can be adjusted such that only authorized users have access to use the request_type.

There are normally three queues for each request_type. Queue 1 has highest priority and normally costs more to process. Queue 3 is lowest priority and is the default queue. The number of queues is site dependent and controlled by the site administrator in the iod_tables.iodt.

Normally there is one Multics printer request type and punch request type associated with each remote station.

Examples:

To place a dprint request for segment test into queue 1 of request_type miami_prt type:

```
dp -rqt miami_prt -q 1 test
```

To determine how many requests are queued in request_type miami_prt, a Multics user types:

```
ldr -rqt miami_prt -all
```

To cancel a request to dprint segment >udd>Multics>Smith>testdata submitted to queue 3 of request_type miami_prt and reenter the request in queue 1 of request_type miami_prt, a Multics user types:

```
cdr -rqt miami_prt >udd>Multics>Smith>testdata
dp -rqt miami_prt -q 1 >udd>Multics>Smith>testdata
```

The above two commands can be replaced with the single command:

```
mdr >udd>Multics>Smith>testdata -rqt miami_prt -to_q 1
```

To punch a deck of source card images from segment test_seg and put the request into request_type miami_pun, the Multics user types:

```
dpunch -rqt miami_pun test_seg
```

Punching is the method used to transfer source card images to the Level 6. The Level 6 will place source card images on disk or tape depending upon the current device association.

NECESSARY ACCESS FOR READING CARDS

For a more complete discussion of access control required for reading cards, see Section 4, Multics Bulk Input/Output (CC34).

The system administrator of the host system controls the content and access of system databases.

SYSTEM ACCESS CONTROL FOR CARD INPUT

There are three segments defined by the system administrator to control the ability for stations and users to perform card input.

>sc1>rcp>Station_id.acs
The ACL of this segment determines the right to perform card input.
r permission to submit bulk data
e permission to submit absentee input

Permission may be granted to entire projects or individual users.

>sc1>card_input_pnt
- contains Person_id and password of all users able to submit bulk data or absentee input
- contains station_id, alias (optional), and password of all remote stations connected to the host

The ACL of the card_input_pnt must allow rw access for the daemon process which performs the card input.

>scl>rcp>card_input_password.acs
This segment is used to allow unregistered card input users to read in decks. It is used only if the user is unregistered or gives an invalid or blank password. The ACL controls which users can input bulk data. (For RJE a valid non-blank password is required.)

USER ACCESS CONTROL SEGMENT

>udd>Project_id>Person_id>card_input.acs

In the default working directory of each user desiring to submit bulk data and/or absentee input, a segment card_input.acs must be created. The ACL for this segment is a list of all remote station_ids that can submit information on behalf of the user.

Consider the segment >udd>Multics>Smith>card_input.acs with the following ACL:

```
r  Station_a
re Miami
e  Station_b
```

This ACL is necessary to allow Person_id Smith,

- to submit bulk data only from the remote station Station_a
- to submit both bulk data and absentee input from remote station Miami
- to submit absentee input only from remote station Station_b

COMMANDS FOR OBTAINING CARDS FROM THE CARD POOL

The copy_cards command or the copy command is used to copy card images from the system card pool. Each user reading card images into Multics is assigned a directory in the system card pool corresponding to the Person_id of the user. If the host Multics site is not using the Access Isolation Mechanism (AIM), then this directory is:

>ddd>cards>system_low>Person_id

All input submitted on behalf of a user is stored in the appropriate Person_id directory. This includes bulk data input as well as absentee input. Absentee input is executed directly from this Person_id directory. Normally, the central site staff is responsible for keeping the card pool clean of old data. This can be done manually by central site staff, or automatically, preferably on a daily basis, such as login time of the I/O SysDaemon processes. A central site might choose to automatically delete all data older than 7 days, at each login of a particular I/O SysDaemon. Users and Remote site personnel do not have access to delete data from the card pool.

If the host Multics site is using AIM, then the user should contact central site personnel or user representatives to determine the particulars of the user's access, which will determine the location and accessibility of the card pools. The copy_cards command can be used to copy any card pool decks from the card pool to the user's working directory at his current AIM level. (See the copy_cards command in the MPM Commands, Order No. AG92.)

SECTION 6

OPERATING INSTRUCTIONS

Remote site personnel should be familiar with the following Level 6 documentation:

- GCOS 6 MOD 400 System Concepts (CB20)
- GCOS 6 MOD 400 Operator's Guide (CB24)
- Remote Batch Facility User's Guide (CB30)

Remote Site personnel should be familiar with the following Multics documentation:

- Multics Bulk Input/Output (CC34)
- Multics Programmers' Manual -- Reference Manual (AG91), (Appendix C)

CONVENTIONS

Throughout this section, operator input is denoted by the exclamation point (!) at the beginning of the line. All operator input is terminated by depressing the RETURN key.

All alphabetic input from the console is done in uppercase mode. The keyboard should be locked in uppercase mode by pressing the CAP LOCK button. When submitting commands to Multics, uppercase or lowercase can be used. Multics interprets all command input as lowercase. In order to enter an uppercase character, two escape characters, reverse slants (\\), must precede the intended uppercase character.

The -IN ** arguments to the PJ command directs the input to come from the console. The PJ command can then be used without the -IN ** if input is to continue to come from the console. Alternatively, if one or more commands are stored in a Level 6 file, typing PJ -IN <file_name> will cause all commands in the file to be sent to Multics

If commands are being accepted from the console (-IN ** mode), the contents of a file can be sent directly by typing:

$*$PATH <file_name>

as one of the input lines.

A period (.) as the first and only character on a line terminates input mode at the remote console when using PJ -IN **.

All messages from the FNP or the HOST system are quoted. The RBF produces two different prefixes to lines of output sent to the Remote console. The two prefixes are described below.

The long prefix (>......) is of the form:

(tg)hhmm RBT LRN n X'cccc'

where:

"tg"
is a two character task group id

"hhmm"
is the time in hours and minutes

"n"
is the logical resource number for this task group

"cccc"
is the Level 6 communications channel number (hexadecimal) which this task group is using

The short prefix (>...) is of the form:

(tg)hhmm RBT

where "tg" and "hhmm" are defined above.

Where dialogues are given in this document, it is important for the operator to look for the correct response to any input. If the dialogue deviates from that provided in this document, an error may have occurred. Please observe all console output carefully. Most error messages are adequately described in the Remote Batch Facility User's Guide, Order No. CB30. All Level 6 error messages with particular Multics meaning are described in Appendix E of this manual.

COMMAND INTERFACES

There are several software packages involved with the RBF. Each software package contains its own command interface (set of commands).

Multics user commands - commands executed by Multics users logged in to Multics, using an interactive terminal or absentee user process.

Multics driver commands - commands executed by a daemon. These commands are issued by the remote site operator, and passed through the Level 6 to the Multics driver that is connected to the remote.

Level 6 RBF commands - command executed by the Level 6 RBF software. These commands are given to the Level 6 task group running the Level 6 RBF software.

Level 6 commands - commands executed by the Level 6 operating system or Level 6 users. These commands are given to the Level 6 as operating system commands or Level 6 user commands.

BOOTING THE LEVEL 6

The booting procedure will depend upon the system configuration and certain system data bases. Booting will be described for the default data bases provided with the delivered software.

Before booting, it is important to determine if operation of the Level 6 is to be in LAF or SAF mode. For those systems that can operate in either mode, a switch must be checked. This switch is located under the operator panel, and must be set as follows:

Mode	Switch Setting		
SAF	1,4	--	OFF
	2,3	--	ON
LAF	1	--	OFF
	2,3,4	--	ON

1. Load the disk cartridge into the disk unit from which booting is to take place.

   Initiate the Quality Logic Tests (QLTs) by depressing the following switches in the order given.

S	Stop
CLR	Clear
L	Load
E	Execute

   When the TRAFFIC light goes OFF, the QLTs have finished, and the "check" light should be OFF. If this light is ON, the system may or may not boot. Contact hardware maintenance personnel.

   Select the desired bootload process and initiate the process by depressing the following switches in the order given:

D	letter D	
1	number 1	
S	Step	
C	Change	
0	number 0	┐
8	number 8	¦ Installation
0	number 0	¦ Dependent
x	number 0 or 2	┘
S	Set	
R	Run	
E	Execute	

2. To complete the booting at the remote console, follow the dialogue below:

   ```
   ($S) 1978/01/07 1709:38.500
   (MU) RDY:
   (GC) RDY:
   ($S) ***** DATE TIME ? SD "YYYY/MM/DD TTTT" *****
   ($S) RDY:
   ($H) RDY:
! SD 'yyyy/mm/dd hhmm'
   (where the year, month, day, hour, and minute are set for use with
   time stamps during this bootload)
   ```

3. To start the Multics Task, follow the dialogue below:

   ```
! ØCØ:MU:
! RDN
   (MU) RDY:
! EC RBTM
   (MU)hhmm RBT 0204 <date_time>
   (MU)hhmm RBT RDY:
   ```

To start the GCOS Task, follow the dialogue below:

```
! BCB:GC:
! RDN
  (GC) RDY:
! EC RBTG
  (GC)hhmm RBT 0204 <date_time>
  (GC)hhmm RBT RDY:
```

Set GCOS "ID" and "PW" as follows:

```
! SO -ID <id> -PW <password>
```

BEFORE PROCEEDING, DIAL THE APPROPRIATE NUMBER FOR ENABLING THE COMMUNICATIONS CONNECTION TO THE HOST SYSTEM. CHECK MODEM FOR PROPER BUTTON SETTINGS. SEE APPENDIX D.

4. To request output from the driver, and to change the input association to the operator console, type the RJ command:

```
! RJ -IN **
```

If the driver is booted at the central site, the driver will respond:

```
>..... "Enter station command:"
```

Otherwise the FNP will respond:

```
>..... "NO DATA"
```

The NO DATA message is from the host Multics FNP, and may or may not appear depending upon the speed with which the FNP is communicating with the central system. If the central system is quite busy the NO DATA message will appear, followed by a pause of 5 to 30 seconds, followed by expected output. If expected output does not follow the NO DATA message within 30 seconds, call the central site operations to determine the state of the Multics central system.

If the rje driver is already up and idle from a previous connection of the remote site (direct connect lines only), then the NO DATA message will also appear. To determine if the rje driver is idle and communicating, the remote site can send the status command. See "Determining if the RJE Driver is Idle" described below.

5. Normally, the default input association is the card reader. The operator can change the input association by typing:

```
! SO -IN path_name
```

If the path_name of ** is given, input comes from the operator console keyboard.

Alternately, input/output associations can be changed in the PJ command line. The following dialogue could be used to gain access to Multics:

```
! PJ -IN **
  >... INPUT?
! STATION <station_id> <password>
  >... INPUT?
! <request type>          (depending on the station parameters)
  >... INPUT?
! .
  >... RDY:
```

After some delay of a few seconds, the following messages will appear:

```
>..... "NO DATA" (may or may not appear)
>..... <System dependent greeting message>
>..... "Mount VFU message..."
>..... "Set printer for..."
>..... "<station_id> driver on channel <id> ready at
        <date-time>"
>..... "Enter command:"
```

6. In order to obtain logging messages concerning card input and printed output, the remote site must issue a "SLAVETERM LOG" command line. In order to control the length of the quoted lines printed at the Operator console a "SLAVETERM MODES LLN" command line is given, where N is a number specifying the line length. The following dialogue will do this:

```
! PJ -IN **
  >... INPUT?
! SLAVETERM LOG
  >... INPUT?
! SLAVETERM MODES LL48
  >... INPUT?
! .
  >... RDY:
  >..... <quoted lines displaying previous modes>
  >..... "Enter command:"
```

7. For sites that maintain a consistent mode of operation, several commands can be put into a command file and executed with the following simple command sequence, replacing steps 5 and 6. See Section 3 page 3-3 for a description of LOGINNG.

```
! PJ -IN **
  >... INPUT?
! $*$PATH LOGINNG
  >... INPUT?
! .
  >... RDY:
```

After some delay of a few seconds, the following messages will appear:

```
>..... "NO DATA" (may or may not appear)
>..... <System dependent greeting message>
>..... "Mount VFU message..."
>..... "Set printer message..."
>..... "<device> driver on channel <id> ready at <date_time>
>..... <quoted lines displaying previous modes>
>..... "Enter command:"
```

In this case, the file ^vol_id>UDD>RBT2>LOGINNG contains the following commands (see Section 3):

```
STATION <station_id> <password>
SLAVETERM LOG
SLAVETERM MODES LL48
READY M_PRT
```

The file LOGINGO (see Section 3), contains the additional command GO. If LOGINGO is used instead of LOGINNG, then immediate processing of the print queues will take place.

If the file LOGINGO (see Section 3) is used, then an alternate, and the most simplified, dialogue replacing steps 5 and 6 is as follows:

```
! PJ -IN LOGINGO
  >... RDY:
```

After some delay of a few seconds, the following messages will appear:

```
>..... "NO DATA" (may or may not appear)
>..... <System dependent greeting message>
>..... "Mount VFU tape for ..."
>..... "Set printer for..."
>..... "<station_id> driver on channel <id> ready at <date_time>"
>..... <quoted lines displaying previous modes>
```

Printing will start automatically if the printer is in a ready state and there are entries in the print queues to process. Otherwise, the Level 6 will appear to go idle.

CAUTION: When using this simplified dialogue, it is necessary to redirect the input association appropriately on the next use of the PJ command. If this is not done, the file LOGINGO will be used as input resulting in a dialogue resembling the following:

```
! PJ
  >... RDY:
  >..... "<station_id> driver: Invalid command for
          driver - station"
  >..... "Enter command:"
```

The Level 6 will appear to go idle.

ENTERING MULTICS DRIVER COMMANDS

Multics driver commands can be entered from the remote console as well as through the card reader. The method of input is determined by the current device association. The associations at any time can be displayed by typing:

```
! DO -LFN
```

Default options for a particular task group can be obtained by typing the DO command immediately after initiating that task group.

Command lines are passed to Multics only in response to the ">.... INPUT?" line resulting from the PJ command.

To exit from the INPUT mode, enter a period (.) as the first and only character on a line. Each line of input is terminated by depressing the RETURN key on the remote console.

VERIFYING MINOR DEVICE STATUS

At normal driver command level as signified by the request "Enter command:", minor device assignments can be verified by submitting a STATUS driver command. Once minor device assignments are determined, adjustment of command files (see Section 3) can be made. If at any time an operator forgets these assignments, another STATUS command can be issued. Similarly, the current status with respect to remote devices can be verified with the STATUS command.

LOGGING OUT THE LEVEL 6

The LOGOUT driver command should be given by the remote site as the accepted and recommended method of terminating contact of the remote with the central site driver. The logout command can be entered at any of the following command levels:

```
>..... "Enter command:"
>..... "Enter command (quit):"
>..... "Enter command (request):"
```

To enter the logout command, follow the dialogue below:

```
  >..... "Enter command:"
! PJ -IN **
  >... INPUT?
! LOGOUT
  >... INPUT?
! .
  >... RDY:
```

After some delay of a few seconds, the message announcing logout appears, and the light on the telephone handset will go OFF.

```
>..... "Driver is logging out."
>..... "Device logout for station: <station> at <date_time>"
```

Once the telephone handset light goes OFF, the RBF waits 90 seconds before logically disconnecting the line with the message:

```
>..... DISCONNECTED
```

A QT command to the RBF can be given at this time. During the 90 second interval, any command given to the RBF will yield the response:

```
>... TERMINAL SYSTEM ACTIVE
>... RDY:
```

USING THE CONSOLE FOR COMMAND INPUT

Normally the default input association is the card reader. The operator can change the input association to the console by typing:

```
! SO -IN **
```

Alternately, the input association can be changed on each use of the PJ command. For example:

```
! SO -IN **
! PJ
```

could be executed with a single command line by using

```
! PJ -IN **
```

The following operating instructions assume that the above association was made.

Determining If the RJE Driver Is Idle

There is a simple method to ensure that the rje driver, Multics FNP, and the Level 6 are all at idle positions, if the "Enter command:" was not received at the remote console.

```
! PJ
  >... INPUT?
! STATUS
  >... INPUT?
! .
  >... RDY:
```

If all modules are idle, the remote console will receive a message similar to:

```
>..... "IO Daemon Version: 5.0"
>..... "Device: Miami tty ch: c.h017"
>..... "Minor device    request type    status"
>..... "m_prt           miami_prt       ready"
>..... "m_pun           miami_pun       halted"
>..... "Enter command:"
```

Printing at the Level 6

Once the Level 6 is booted and has received the "Enter command:" at the console, processing of the remote print queues can be started using the following dialogue (NOTE: the word m_prt is a minor device name in the iod_tables and is site dependent):

```
! PJ
  >... INPUT?
! READY M_PRT
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

If output is waiting to be processed, printing will start shortly. Otherwise the remote system will receive a NO DATA message.

While a print request is being processed, it can be stopped immediately in order to kill, cancel, defer, restart or save the request. To terminate a print request, type:

```
! CL
  >... RDY:
```

The printer will stop almost immediately. To receive the message announcing the QUIT and any buffered output type:

```
! RJ
  >... RDY:
  >...... "Enter command (quit):"
```

Upon receiving "Enter command (quit):" the driver is at quit command level and there is approximately a 60 second pause after which an automatic restart of processing is attempted. To override this facility, any command (for example, HOLD), may be sent to the driver. This delay may be changed by the remote operator with the AUTO_START_DELAY command (see CC34). To continue processing, immediately or when ready, the operator may choose to start, kill, cancel, defer, restart or save the current request.

Restarting

The following dialogue may be used at quit command level to restart an interrupted request.

```
! PJ
  >... INPUT?
! RESTART
  >... INPUT?
! .
  >... RDY:
  >...... "Restarting request <request_no> at copy <N> of <M>"
  >...... "Driver positioned at page <page N> of the file."
  >...... "Enter command(request):"
```

At this point the driver is at request command level. The above information may be modified by appropriate operator commands (see Bulk I/O, Order No. CC34). To restart using the above information as supplied, continue with:

```
! PJ
  >... INPUT?
! PRINT
  >... INPUT?
! .
  >... RDY:
```

The following dialogue may be used at request command level to restart a request at a different copy and/or page number than reported by the driver, e.g. page 100 of copy 2:

```
! PJ
  >... INPUT?
! COPY 2
  >... INPUT?
! PRINT 100
  >... INPUT?
! .
  >... RDY:
```

If restarting a request immediately after connecting to Multics, such as after a Multics FNP or system crash, the following dialogue could be used:

```
  >..... "Enter station command:"
! PJ -IN LOGINNA            (See Section 3)
>... RDY:
  >..... "NO DATA" (may or may not appear)
  >..... "<System dependent greeting message>"
  >..... "Mount VFU message..."
  >..... "Set printer message..."
  >..... "Miami driver on channel <id> ready at <date_time>"
  >..... "<quoted lines displaying previous modes>"
  >..... "<Several lines of request info including pathname>"
  >..... "Enter command (request):"
! PJ -IN **
  >... INPUT?
! PRT_CONTROL AUTO_PRINT
  >... INPUT?
! PRINT N                    (start at page N, operator estimate)
  >... INPUT?
! .
  >... RDY:
```

This dialogue causes the driver to stop at request command level before the printing of the first request, to allow the operator to specify a starting page number. All subsequent requests will be processed continuously because the "PRT_CONTROL AUTO_PRINT" command was given. If the operator is not sure of the page number, he can use SAMPLE instead of the PRINT command. When the current page number is correct, he can then use the PRINT command without a page number to start printing at the current page.

Killing/Cancelling

The following dialogue may be used to kill or cancel (i.e., stop processing) the current request. The KILL command allows the request to be saved or restarted later. The CANCEL command removes the request from the queues so that it cannot be processed at a later time. (Refer to BULK I/O manual, CC34, for more detailed information.) The request must first be stopped by using the CL command to bring the Multics driver process to quit command level.

```
! PJ
  >... INPUT?
! KILL                       (or CANCEL)
  >... INPUT?
! .
  >... RDY:
```

Deferring

The following dialogue may be used at quit command level to defer the current request indefinitely.

```
! PJ
  >... INPUT?
! DEFER
  >... INPUT?
! .
  >... RDY:
  >..... "**Request <#>: Operator deferred request until a later time."
  >..... "Processing of request <#> terminated."
```

Processing of a deferred request will start from the beginning but not before either the remote operator issues a RESTART_Q driver command, or the central site reinitializes the I/O coordinator process.

The following dialogue causes the processing of any deferred requests for a remote station:

```
! PJ -IN **
  >... INPUT?
! RESTART_Q <device>
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

The <device> specified in the RESTART_Q command refers to one of the minor devices assigned to the remote station by the central site. These are shown by the STATUS command.

Saving

The following dialogue may be used at quit command level to save the current request which can be later restarted from where it was interpreted.

```
! PJ
  >... INPUT?
! SAVE
  >... INPUT?
! .
  >... RDY:
  >... "**Request <#>:  Processing suspended at page N."
```

PROCESSING REQUESTS IN OPERATOR SPECIFIED ORDER

The NEXT driver command allows the remote operator to specify the next request in a queue to be processed. By repetitive use of the next command, the complete order of processing requests can be determined by the remote operator.

The following dialogue causes three arbitrary requests to be processed before the rest of the printer queues for device PRT1:

```
  >..... "Enter command:"
! PJ -IN **
  >... INPUT?
! NEXT -DEV M_PRT -ID <id #> -USER <person_id.project_id>
  >... INPUT?
! NEXT -DEV M_PRT -ID <id #> -USER <person_id.project_id>
  >... INPUT?
! NEXT -DEV M_PRT -ID <id #> -USER <person_id.project_id>
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

Notes:

1. All requests identified to be run by the next command will be charged as though they came from queue 1. Special arrangements can be made with the central site to override this implementation feature.

2. Any requests chosen to run next will be run after any restarted requests (see the RESTART command).

PROCESSING ANOTHER REQUEST TYPE

The Multics site administrator may allow a station to process requests from more than one request type. In this case, the file LOGINNG would look like the following for the remote to process request type miami_prt;

```
STATION \MIAMI <password>
MIAMI_PRT
SLAVETERM LOG
SLAVETERM MODES LL48
READY M_PRT
```

Another file could be generated, LOGINSP, which would look like the following for the remote to process request type miami_sp;

```
STATION \MIAMI <password>
MIAMI_SP
SLAVETERM LOG
SLAVETERM MODES LL48
READY M_PRT
```

In order to process another request type, a reinitialization must occur. For example, if driver Miami is processing request type miami_prt and desires to process request type miami_sp, the following procedure could be used:

```
  >..... "Enter command:"
! PJ
  >... INPUT?
! REINIT
  >... INPUT?
! .
  >... RDY:
  >..... "Driver starting reinitialization"
  >..... "Enter station command:"
! PJ
  >... INPUT?
! $*$PATH LOGINSP
  >... INPUT?
! .
```

```
>... RDY:
>..... "Enter request type for minor device "m_prt":"
>..... "<Site dependent greeting message>"
>..... "Mount VFU tape for 88 lines per page."
>..... "Set printer for 8 lines/inch."
>..... "<station_id> driver on channel <id> ready at <date_time>."
>..... "Modes were..."
>..... "Enter command:"
```

The operator must now SET PRINTER PER INSTRUCTIONS. Then the following dialogue may be used to start request processing.

```
! PJ
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

CARD IMAGE INPUT TO MULTICS FROM THE LEVEL 6

Once the Level 6 is booted and has received the "Enter command:" at the console, reading of source card images can be started. There are several command sequences that can be used to read card images. Sites and users will have to determine the best and appropriate technique for their needs. A few examples are given here.

Card Input to Multics from Remote Disk Files

Since the native character set of the Level 6 is ASCII, this input technique requires the ASCII character set.

```
! PJ -IN **
  >... INPUT?
! READ_CARDS
  >... INPUT?
! $*$PATH <pathname of separator cards>
  >... INPUT?
! $*$PATH <pathname of input deck>
  >... INPUT?
! $*$PATH <pathname of separator cards>
  >... INPUT?
! ++END
  >... INPUT?
! .
  >... RDY:
  >... <messages from Multics about deck>
  >..... "Enter command:"
```

The file of separator cards should look like UID1 or UID2 described in Section 3:

The purpose of the separator cards is to be sure that each file is correctly defined. Several separator card files should be available with different <uid_characters> in each. When using the UID files supplied with the release (see UID1 and UID2 in Section 3) the operator input lines for several decks would look like this (the >... INPUT? lines have been omitted):

```
! PJ -IN **
! READ_CARDS
! $*$PATH UID1
! $*$PATH <pathname for input deck1>
! $*$PATH UID1
! $*$PATH UID2
! $*$PATH <pathname for input deck2>
! $*$PATH UID2
! ++END
! .
  >..... "Card input started."
  >..... "*Begin deck*"
  >..... "Reading <file name for deck1> (rmcc) for <user id>.<project id>."
  >..... "*Successful read*"
  >..... "*Begin deck*"
  >..... "Reading <file name for deck2> (rmcc) for <user id>.<project id>."
  >..... "*Successfulread*"
  >..... "++END card read."
  >..... "Enter command:"
```

The operator should never use the same separator cards for successive input decks. The messages from the driver following the last input by the remote operator indicate the disposition of the card reading. The messages given in this example indicate a successful read of both card decks. If the card reading operation failed, an error message indicating the reason will be displayed at the remote console.

Card Input to Multics from the Remote Card Reader

Cards to be read should first be loaded in the card reader and the reader should be made ready according to the hardware manual. An operator command on the Level 6 is used to start the reader.

Cards can be either ASCII or GBCD character sets (See Appendix B). If the card deck is in GBCD, then the command line to read input from the card reader is:

```
! PJ -IN >SPD>CDR00 -GBCD
```

Otherwise, the command for ASCII input should be used:

```
! PJ -IN >SPD>CDR00
```

In the example below, the lines represent cards in the card reader. Two user decks have been combined with the proper control cards to identify the separate decks to the driver. Each user deck with its control cards is identified in the left margin by the "¦" character. The READ_CARDS, ++EOF, ++UID, ++END, and 11-5-8-9 multi-punch cards are supplied by the operator.

```
        Column 1
        ¦
        ¥
        READ_CARDS
        ++EOF
        ++UID ZZZZZZ
     ¦  ++DATA <deck_name1> <Person> <Project>
     ¦  ++PASSWORD <password>
   1 ¦  ++INPUT
     ¦          .
     ¦          .
     ¦          .
     ¦                        (data cards for deck_name1)
     ¦          .
     ¦          .
     ¦          .
        ++EOF
        ++UID ZZZZZZ

        ++EOF
        ++UID 12345678
     ¦  ++DATA <deck_name2> <Person> <Project>
     ¦  ++PASSWORD <password>
   2 ¦  ++INPUT
     ¦          .
     ¦          .
     ¦          .
     ¦                        (data cards for deck_name2)
     ¦          .
     ¦          .
     ¦          .
         +EOF
        ++UID 12345678
        ++END
        <L6 EOF card>  (11-5-8-9 multi-punch to terminate reader input)
```

The console will display status messages for the card decks read.

```
        >... RDY:
        >...... <messages concerning disposition of cards read>
        >...... Enter command (if read were successful)
```

Caution should be exercised when cards are being input directly to Multics from the Level 6 card reader. Depending upon the punch code used for the cards, punches for some characters may conflict with Multics usage. (See Implementation Notes, Section 9.)

Card Input to Multics from Cards with Disk Control Files

Load the L6 card reader with the deck to be read, including the users control cards, followed by the EOF for the reader (11-5-8-9 multi-punch in column 1). Make the reader ready, then type:

```
! PJ -IN **
  >... INPUT?
! READ_CARDS
  >... INPUT?
! $*$PATH <pathname of separator cards>
  >... INPUT?
! $*$PATH >SPD>CDR00
  >... INPUT?
! $*$PATH <pathname of separator cards>
  >... INPUT?
! ++END
  >... INPUT?
! .
  >... RDY:
  >...... <messages from Multics about deck>
  >...... "Enter command:"
```

If more than one deck is to be read this way, then repeating of the $*$PATH command lines will be required for each deck.

Messages describing the disposition of the card reading will appear at the remote console. Upon successful reading of cards, a return of the Multics driver to command level will be announced by the message "Enter command:".

After reading cards a GO command must be sent to Multics in order to continue processing of the print queues.

```
! PJ -IN **
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

Interrupting Card Input at the Level 6

To terminate undesired card reading at the Level 6, press the STOP button on the card reader, and empty the card reader except for the following cards:

```
++EOF
++END
<L6 EOF card>  (11-5-8-9 multi-punch)
```

Then ready the card reader again according to the hardware manual. The three cards will read and the Level 6 will receive "Enter command:".

SENDING CARD DECKS FROM MULTICS TO THE LEVEL 6

Sending source card decks from Multics to the Level 6 is done by processing punch requests from Multics. Currently, only ASCII card images can be transmitted to the Level 6 from Multics. Only the RMCC card code is acceptable for remote punching. See the documentation for the Multics dpunch command.

The card image deck at the Level 6 is produced with two header banner images (cards) and two trailer banner images (cards).

```
          Column 1
          ¦
          ¥
Card 1: <<<<<<<<<<  (80 characters)
Card 2: <<<<<<<<<<  (80 characters)
```

Output for consecutive dpunch requests in the Multics punch queues is placed sequentially in the target output file on the Level 6, separated by header and trailer banner cards.

Sending Card Decks to Remote Disk Files

Before giving the Multics software the signal to begin processing punch requests, ensure that the target output file is correctly specified.

```
! SO -PUN  <pathname of output file>
  >... RDY:
```

Checking for correctness of logical file number assignments should be done before signalling Multics.

```
! DO -LFN
  >... LFN 1 assignment
  >... LFN 2 assignment
  >... LFN 3 assignment
  >... RDY:
```

Signalling Multics to begin processing punch requests is done with the driver at normal command level by the following command sequence ("M_PRT" and "M_PUN" are minor device names in the host iod_tables and is site dependent):

```
! PJ -IN **
  >... INPUT?
! HALT M_PRT      (to prevent printer output until specifically requested)
  >... INPUT?
! READY M_PUN
  >... INPUT?
! GO
  >... INPUT?
! .
  >... RDY:
```

When all the punch output is transferred to the Level 6, a CL command must be given to shutdown the ID and ensure that the target file is closed. After this, an editor can access the target file for appropriate file manipulation.

SECTION 7

USING THE CARD READER FOR COMMAND INPUT

In the following examples some specific station_ids, request types, and device names are used to ensure clarity. Please refer to paragraph 1, in Section 3, for a list of these names.

Normally, the default association for input is the card reader. The operator can change the input association to the console by typing one of the following, depending upon the action desired:

```
! SO -IN **
! RJ -IN **
! PJ -IN **
```

To change the input association back to the card reader (assuming a card reader designated as CDR00), the operator can type one of the following, depending upon the action desired:

```
! SO -IN >SPD>CDR00
! RJ -IN >SPD>CDR00
! PJ -IN >SPD>CDR00
```

The following operating instructions assume that the input association is set to the card reader either by default or explicit assignment.

DETERMINING IF THE RJE DRIVER IS IDLE WHEN USING CARDS FOR COMMAND INPUT

There is a simple method to ensure that the rje driver, the Multics FNP, and the Level 6 are all in idle positions, if "Enter command:" was not received on the remote console. Put the two cards:

```
STATUS
<L6 EOF card>     (11-5-8-9 multi-punch)
```

into the card reader and start it by typing:

```
! PJ
>... RDY:
```

If all modules are idle, the remote console will receive:

```
>...... "IO Daemon Version: 5.0"
>...... "Device: Miami tty ch: c.h017"
>...... "Minor device    request type    status"
>...... "m_prt           miami_prt       ready"
>...... "m_pun           miami_pun       halted"
>...... "Enter command:"
```

PRINTING AT THE LEVEL 6 USING CARDS FOR COMMAND INPUT

The card reader should contain the following cards (note, the word, M_PRT, is a minor device name in the iod_tables and is site dependent):

```
READY M_PRT
GO
<L6 EOF card>     (11-5-8-9 multi-punch)
```

Once the Level 6 is booted and has received the "Enter command:" at the console, the commands in the card reader can be sent to Multics by typing:

```
! PJ
  >... RDY:
```

This causes Multics driver commands to be read from the Level 6 card reader. If output is waiting to be processed, printing will start shortly.

INTERRUPTING A PRINT REQUEST AT THE LEVEL 6

While a print request is being processed, it can be interrupted immediately in order to kill, cancel, defer, restart or save the request. To interrupt a print request, type:

```
! CL
  >... RDY:
```

The printer will stop almost immediately. To receive the message announcing the QUIT, type:

```
! RJ
  >... RDY:
  >...... "Enter command (quit):"
```

Upon receiving "Enter command (quit):", there is a 60 second pause after which an automatic restart of processing is attempted. To override this facility, any command (for example, HOLD) must be sent to the remote daemon. This delay may be changed by the remote operator with the AUTO_START_DELAY command (for more detail refer to the Bulk I/O Manual, Order No. CC34). To continue processing, immediately or when ready, load the card reader with the cards to perform the desired action.

```
RESTART
PRINT
<L6 EOF card>     (11-5-8-9 multi-punch)
```
or
```
KILL
<L6 EOF card>     (11-5-8-9 multi-punch)
```
or
```
CANCEL
<L6 EOF card>     (11-5-8-9 multi-punch)
```
or
```
DEFER
<L6 EOF card>     (11-5-8-9 multi-punch)
```
or
```
SAVE
<L6 EOF card>     (11-5-8-9 multi-punch)
```

Then type:

```
! PJ
  >... RDY:
```

to start the reader and send the commands in the card reader to Multics.

CARD INPUT TO MULTICS FROM THE LEVEL 6 USING CARDS FOR COMMAND INPUT

Once the Level 6 is booted and has received the "Enter command:" at the console, the card reader is loaded and made ready. Card reading is started by typing:

```
! PJ
  >... RDY:
```

This causes Multics driver commands and user decks (marked with "¦" in the left margin), to be read from the Level 6 card reader. Multics driver commands and user decks can be loaded in the card reader as follows:

```
        READ_CARDS
        ++EOF
        ++UID ABCDEFG
    ¦   ++DATA <deck_name> <Person> <Project>
    ¦   ++PASSWORD <password>
1   ¦   ++INPUT
    ¦      .
    ¦      .
    ¦      .
    ¦      .  <deck 1>
    ¦      .
    ¦      .
    ¦      .
        ++EOF
        ++UID ABCDEFG

        ++EOF
        ++UID  1234ABCD
    ¦   ++DATA <deck_name> <Person> <Project>
    ¦   ++PASSWORD <password>
2   ¦   ++INPUT
    ¦      .
    ¦      .
    ¦      .
    ¦      . <deck 2>
    ¦      .
    ¦      .
    ¦      .
        ++EOF
        ++UID 1234ABCD
        ++END
        <L6 EOF card>    (11-5-8-9 multi-punch)
```

An example, for documentation purposes, of an RJE input deck with operator supplied command and control cards is included here:

```
READ_CARDS
++EOF
++UID AAAAA
++RJE ABSONE \SMITH \MULTICS
++PASSWORD <password>
++RJECONTROL -OF >UDD>\MULTICS>\SMITH>RJEDEMO
```

```
++FORMAT RMCC LOWERCASE
++INPUT
&  THIS SEGMENT IS TO BE PUNCHED FROM MULTICS THEN READ INTO THE
&  RJE REMOTE BATCH FACILITY
&
DATE_TIME
&
WHO -LG
&
HMU
&
SMA  \SMITH \MULTICS REMOTE ABSENTEE IS RUNNING
&
PWD; CWD >LDD;  PWD
&
LDR -RQT MIAMI_PRT -ALL
&
PSR
&
ANSWER YES HELP PL1
&
CWD >DOC>IIS; LS -SORT NAMES
LS -PN >DOC>INFO -SORT NAMES
&
CWD
DATE_TIME
DP  -RQT MIAMI_PRT -DL RJEDEMO.ABSOUT
& THIS NEXT STATEMENT IS MERELY COSMETIC
LOGOUT
++EOF
++UID AAAAA
++END
<L6 EOF card>
```

The two characters "& " in the first column indicates a comment.

The special character punches must be checked --

<L6 EOF card>	11-5-8-9
\	0-2-8
;	11-6-8
&	12
_(underscore)	0-5-8
>	0-6-8
+	12-6-8

Appendix B lists the complete set of card codes required for the two character sets accepted by the Level 6 for transmission to Multics.

TERMINATING CARD INPUT AT THE LEVEL 6

To terminate undesired card reading at the Level 6, press the STOP button on the card reader, and empty the card reader except for the following cards:

```
++EOF
++END
<L6 EOF card>    (11-5-8-9 multi-punch)
```

Then ready the reader again according to the hardware manual. The three cards will read and the Level 6 will receive "Enter command:".

SECTION 8

REMOTE SITE OPTIONAL MULTICS COMMANDS

Remote sites may be permitted the use of several useful commands by the central site. The mechanism to do this is similar to the central site use of commands in the segment >sc1>admin.ec. Central site staff can execute portions of this exec_com by use of the central site operator x command. Remote site operators may be given the use of an x command that executes out of the segment >ddd>idd>iod_admin.ec. It is the responsibility of the central site staff to provide documentation for those commands that remote sites are permitted to use.

The following discussion and examples are based upon the iod_admin.ec shown in Appendix E.

LISTING REQUESTS TO BE PROCESSED

Remote sites are generally granted the use of the list_daemon_requests (ldr) command. See the description of the Multics ldr command in MPM Commands and Active Functions, AG92A, or the online info segments.

The following driver command line, issued at the remote, will list all requests found in the queues for each device controlled by the remote:

```
! X LDR
```

The following driver command line, issued at the remote, will list all requests found in the printer queues:

```
! X LDR PRINTER
```

Information provided by the X LDR commands will be sufficient for use with the DEFER and NEXT driver commands. (See Sections 6 and 7.)

MESSAGE FACILITY

A message facility can be set up by the Multics system administrator to allow remotes to communicate with each other or for users to send messages to a particular remote.

Mailboxes are created in the directory, >ddd>idd>io_msg_dir. They are named after the major device name or remote station identifier; i.e., prta.mbx or Miami.mbx.

Remote site operators have three entries in the iod_admin.ec to control the message facility;

```
X AM
X PM
X SM <station> {message}
```

The X AM and X PM commands require no arguments and are used to accept messages and print messages respectively. The defer_messages command is included in the iod_admin.ec to prevent messages from coming out to the remote while processing a print request. The X SM command can be used to send one line messages to or converse with another remote site operator.

To send messages conversationally, do not include any text after the station on the command line.

```
! PJ -IN **
  >... INPUT?
! X SM \\CISL
  >... INPUT?
! .
  >... RDY:
  >... "Enter your station_id as the first message line."
  >... "Type "." to exit send messages."
! PJ
  >... INPUT?
! ATLANTA HERE
  >... INPUT?
      .
      .
      .
      <more message lines to station Cisl>
      .
      .
      .
  >... INPUT?
! \.
  >... INPUT?
! .
  >... RDY:
```

The "\" character is an escape character while in input mode. Since a period normally terminates input mode, the sequence "\." is used to transmit a single period to Multics; this will allow the driver to exit from conversational send message. A double backslash "\\", is needed to transmit a signal backslash to Multics.

The above session assumes the message facility was set up as described in the Bulk I/O Manual (CC34).

SECTION 9

IMPLEMENTATION NOTES, LIMITATIONS, PROBLEMS

IMPLEMENTATION NOTES

1. All characters typed on the L6 console are transmitted to Multics as uppercase. Multics input processing converts these uppercase characters to lowercase. If an uppercase character is to be seen by Multics, it must be sent preceded by the Multics escape character backslash (\).

   The back slash is also an escape character for the Level 6 console. Therefore, a double back slash (\\) is necessary to cause a single back slash to be sent to Multics to act as an escape character to input uppercase letters. For example:

   ```
   \\JONES \\A\\B\\C
   ```

   typed at the remote console will pass:

   ```
   Jones ABC
   ```

   to the Multics software.

2. Reading input will allow for longer than 80 column line information. Punching output may cause multiple 80 character lines to be generated for source lines greater than 80 characters.

   The Multics software replaces horizontal tabs with white space when preparing punch output, sometimes causing lines to exceed 80 characters in output to the L6, whereas the unexpanded line contained fewer than 80 characters.

3. The printer VFU loop used with Printer Model 2260 must be punched in columns 1 thru 3, instead of just column 1.

4. Relative path names are not allowed on the ++RJECONTROL card.

5. The RESTART command positions the page pointer to "page of interruption minus 5" or page 1 if printing were interrupted prior to page 6.

6. Caution should be exercised when files (or cards) are being input to Multics from the Level 6. If the file contains pound signs (#) or commercial at signs (@), check with the Multics system administrator and verify that the erase and kill characters are assigned to 400 (octal) in the terminal type entry assigned to the reader minor device for the remote station.

LIMITATIONS

1. Due to long distances and usage of switched lines rather than dedicated lines, sites may experience frequent short pauses during printing. These pauses are most noticeable during printing of consecutive long lines. The conditions surrounding this phenomenon are:

   - Greater distance from host than 1500 miles
   - 208B modem - 4800 baud
   - 150 ms RTS/CTS delay (modem option)

2. Current implementation of the Multics remote software allows only for the passage of source card images as input or punch output. There is no provision for transmitting object images (binary) or a transparent mode of operation.

PROBLEMS

Single Task Running

1. The following command sequence causes the Multics/RBF interface to drop synchronization.

```
     <processing print request>
     CL
     >... RDY:
     >... LFN 2 LFN 3  ID= GE SHUTDOWN
     !  PJ
     >... INPUT?
  !  KILL
     >... INPUT?
  !  .
     >... RDY:
     >... LFN 2 LFN 3  ID= GE ACTIVATED
     >..... "*QUIT* request in progress on device: printer_1"
     >..... "Enter command (quit):"
  !  RJ
     >..... "NO DATA"
     >... LFN 2 LFN 3  ID= GE SHUTDOWN
     >... RDY:
  !  PJ
     >... INPUT?
  !  KILL
     >... INPUT?
  !  .
     >... RDY:
     >..... "Automatic start given"
     >... LFN 2 LFN 3  ID= GE ACTIVATED
     <processing print request>
  !  CL
     >... RDY:
     >... LFN 2 LFN 3  ID= GE SHUTDOWN
  !  PJ
     >... INPUT?
  !  KILL
     >... INPUT?
  !  .
     >... RDY:
```

This sequence causes output to be transmitted and received, but apparently thrown away. Charges are reported and recorded at the central site. When Multics/RBF drops sync, there is no interrupting this silent conversation.

This is a Level 6 problem (with the RCI protocol handler) whereby information is thrown away when it should not be.

Last duplicated on 12/27/78 using System M.

The request in question can be restarted and printed at no extra cost to the user.

2. When restoring command input from the slave console after a "Slave input terminated" condition, the "Enter command:" message is not transmitted to the remote console.

Multiple Tasks Running

There is some question concerning the priority scheme used with the Level 6.

Given the following condition:

COMM interrupt
GCOS Comm LRN is 3
Multics Comm LRN is 4

GCOS system in same building with Level 6
Multics system, at least 1500 miles distant

GCOS 208B modem using 50 MS option
Multics 208B modem using 150 MS option

GCOS task not printing
Multics task printing

When the GCOS task started printing, it apparently obtained all priority, effectively shutting down the Multics printing. The Multics to Level 6 interface eventually dropped sync, requiring reinitialization of the interface.

TRANSFERRING SOURCE IMAGES FROM GCOS TO LEVEL 6 TO MULTICS

GCOS to Level 6

The following dialogue was used to transfer GCOS source images to the Level 6. This dialogue assumes one has successfully logged on to a GCOS system from an interactive terminal.

```
!  CATA /CAT_NAME          /* asks for a catalog listing of CAT_NAME */

   LIST OF CATALOG CAT_NAME ON <date_time>

   CATALOGS
     FILES

     CARD-DK
     NEW-DK6
     NEW-DK2
```

```
!  FMC                    /* file media conversion */
   FILENAME?
!  /CAT_NAME/CARD-DK
   OUTPUT TYPE?
!  C
   CARD FORMAT?
!  A
   ONLINE OR REMOTE?
!  R
   STATION CODE?
!  M8                     /* varies, can give any legal code */
!  $ IDENT A12345-PROJECT,BANNER     /* varies */
   SNUMB <#>
   *
!  JMON <#>               /* ask for status of request */

   <#> OUTPUT WAITING ID=M8 AT <time>
```

When the above OUTPUT WAITING message appears, the output can be requested at the Level 6. Refer to Steps 1-3, "Booting the Level 6" in this manual.

After specifying the station id with the SO command in step 3, ensure that the "LFN 3" is set to the path name of the file where the punch output is to be placed. If necessary, this can be done with the following SO command, from the GC task group:

```
!  SO -PUN <pathname>
```

After making the communications connection from the Level 6 to GCOS, output can be obtained by typing:

```
!  RJ
```

Level 6 to Multics

See "Card Image Input to Multics from the Level 6" in this manual for instructions on transmitting source images to Multics from remote disk files.

EDITING AT THE LEVEL 6

When output is successfully transmitted from GCOS to the Level 6, the editor must be used at the Level 6 to remove the heading and trailing separator cards. This must be done prior to transmission to Multics. This editing is critical because the separator cards transmitted by GCOS are binary in nature, and will not transmit to Multics from the Level 6.

The following dialogue is an example of removing the separator cards from a Level 6 file created by punching a deck from GCOS. This dialogue assumes that some local work task group, such as $H (see Section 3), is being used. The -PT control argument is accepted only for Level 6 software releases after MOD400 Release 0100.

```
! ED -PT
  ($H) EDIT-0110-date
  E?
! R GCOS_PUN
  ($H)       1 TRUNC AFTER      80 CHARS
  ($H)       2 TRUNC AFTER      80 CHARS
  ($H)     201 TRUNC AFTER      80 CHARS
  E?
```

```
! 201D
  E?
! 1,2D
  E?
! Q
```

Note that unless the editor is given a special control argument at invocation, all lines are truncated at 80 characters. This provides an easy method of determining which lines to delete, as well as checking for file transmission accuracy.

Likewise, when output is successfully transmitted from Multics to the Level 6, the editor should be used to remove the heading and trailing separator cards. However, these cards contain only less than signs (<), and hence could be transmitted without further editing.

APPENDIX A

PRINTABLE CHARACTERS

The following printable characters are currently available on the printers in use with Level 6 remote stations. Only differences are noted. Some Level 6 remote stations have uppercase only printers.

!	octal 041	Multics	exclamation point
"	octal 042	Multics	quotation marks, diaeresis
#	octal 043	Multics	number sign
$	octal 044	Multics	dollar sign
%	octal 045	Multics	percent sign
&	octal 046	Multics	ampersand
'	octal 047	Multics	apostrophe, closing single quote mark, acute accent
(	octal 050	Multics	left parens, opening parenthesis
)	octal 051	Multics	right parens, closing parenthesis
*	octal 052	Multics	asterisk, star
+	octal 053	Multics	plus sign
,	octal 054	Multics	comma, cedilla
-	octal 055	Multics	minus sign, dash, hyphen
.	octal 056	Multics	period, dot, decimal point
/	octal 057	Multics	slash, division sign, slant
0	octal 060	Multics	zero
1	octal 061	Multics	one
2	octal 062	Multics	two
3	octal 063	Multics	three
4	octal 064	Multics	four
5	octal 065	Multics	five
6	octal 066	Multics	six
7	octal 067	Multics	seven
8	octal 070	Multics	eight
9	octal 071	Multics	nine
:	octal 072	Multics	colon
;	octal 073	Multics	semicolon
<	octal 074	Multics	less than sign
=	octal 075	Multics	equals sign
>	octal 076	Multics	greater than sign
?	octal 077	Multics	question mark
@	octal 100	Multics	commercial at sign
A	octal 101	Multics	uppercase a
B	octal 102	Multics	uppercase b
C	octal 103	Multics	uppercase c
D	octal 104	Multics	uppercase d
E	octal 105	Multics	uppercase e
F	octal 106	Multics	uppercase f
G	octal 107	Multics	uppercase g
H	octal 110	Multics	uppercase h
I	octal 111	Multics	uppercase i
J	octal 112	Multics	uppercase j
K	octal 113	Multics	uppercase k
L	octal 114	Multics	uppercase l
M	octal 115	Multics	uppercase m
N	octal 116	Multics	uppercase n
O	octal 117	Multics	uppercase o
P	octal 120	Multics	uppercase P
Q	octal 121	Multics	uppercase q

R	octal 122	Multics	uppercase r
S	octal 123	Multics	uppercase s
T	octal 124	Multics	uppercase t
U	octal 125	Multics	uppercase u
V	octal 126	Multics	uppercase v
W	octal 127	Multics	uppercase w
X	octal 130	Multics	uppercase x
Y	octal 131	Multics	uppercase y
Z	octal 132	Multics	uppercase z
[	octal 133	Multics	left bracket, opening bracket
\	octal 134	Multics	back slash
]	octal 135	Multics	right bracket, closing bracket
^	octal 136	Multics	hat, circumflex
_	octal 137	Multics	underscore, underline
		Level 6	overscore
`	octal 140	Multics	grave accent, closing single quote mark
a	octal 141	Multics	lowercase a
b	octal 142	Multics	lowercase b
c	octal 143	Multics	lowercase c
d	octal 144	Multics	lowercase d
e	octal 145	Multics	lowercase e
f	octal 146	Multics	lowercase f
g	octal 147	Multics	lowercase g
h	octal 150	Multics	lowercase h
i	octal 151	Multics	lowercase i
j	octal 152	Multics	lowercase j
k	octal 153	Multics	lowercase k
l	octal 154	Multics	lowercase l
m	octal 155	Multics	lowercase m
n	octal 156	Multics	lowercase n
o	octal 157	Multics	lowercase o
p	octal 160	Multics	lowercase p
q	octal 161	Multics	lowercase q
r	octal 162	Multics	lowercase r
s	octal 163	Multics	lowercase s
t	octal 164	Multics	lowercase t
u	octal 165	Multics	lowercase u
v	octal 166	Multics	lowercase v
w	octal 167	Multics	lowercase w
x	octal 170	Multics	lowercase x
y	octal 171	Multics	lowercase y
z	octal 172	Multics	lowercase z
{	octal 173	Multics	left brace, opening brace
|	octal 174	Multics	vertical bar, vertical line
}	octal 175	Multics	right brace, closing brace
~	octal 176	Multics	tilde

APPENDIX B

PUNCH CODE REPRESENTATIONS

The following card codes and punch representations are currently acceptable to Multics and the Level 6. Only differences are noted. The Level 6 supports two card codes, denoted H6000-GBCD and Level 6, as input to Multics.

Punch codes for special control characters can be found in the Multics Programmers' Manual -- Reference Guide, Order No. AG91 (Appendix C).

	040		Multics	space
!	041	11-8-2	Multics	exclamation point
		0-7-8	H6000-GBCD	
		12-8-7	Level 6	
"	042	8-7	Multics	double quote
		0-6-8	H6000-GBCD	
#	043	8-3	Multics	pound sign
$	044	11-8-3	Multics	dollar sign
%	045	0-8-4	Multics	percent sign
&	046	12	Multics	ampersand
'	047	8-5	Multics	single quote
		11-7-8	H6000-GBCD	
(	050	12-8-5	Multics	left paren
)	051	11-8-5	Multics	right paren
*	052	11-8-4	Multics	asterisk
+	053	12-8-6	Multics	plus sign
		12-0	H6000-GBCD	
,	054	0-8-3	Multics	comma
-	055	11	Multics	minus sign
.	056	12-8-3	Multics	period
/	057	0-1	Multics	right slant
0	060	0	Zero	
1	061	1	One	
2	062	2	Two	
3	063	3	Three	
4	064	4	Four	
5	065	5	Five	
6	066	6	Six	
7	067	7	Seven	
8	070	8	Eight	
9	071	9	Nine	
:	072	8-2	Multics	colon
		5-8	H6000-GBCD	
;	073	11-8-6	Semi-colon	
<	074	12-8-4	Multics	less than sign
		12-6-8	H6000-GBCD	
=	075	8-6	Multics	equal sign
		0-5-8	H6000-GBCD	
>	076	0-8-6	Multics	greater than sign
		6-8	H6000-GBCD	
?	077	0-8-7	Multics	question mark
		7-8	H6000-GBCD	
@	100	8-4	Multics	commercial at sign
A	101	12-1	Multics	uppercase a
B	102	12-2	Multics	uppercase b
C	103	12-3	Multics	uppercase c

D	104	12-4	Multics	uppercase d
E	105	12-5	Multics	uppercase e
F	106	12-6	Multics	uppercase f
G	107	12-7	Multics	uppercase g
H	110	12-8	Multics	uppercase h
I	111	12-9	Multics	uppercase i
J	112	11-1	Multics	uppercase j
K	113	11-2	Multics	uppercase k
L	114	11-3	Multics	uppercase l
M	115	11-4	Multics	uppercase m
N	116	11-5	Multics	uppercase n
O	117	11-6	Multics	uppercase o
P	120	11-7	Multics	uppercase p
Q	121	11-8	Multics	uppercase q
R	122	11-9	Multics	uppercase r
S	123	0-2	Multics	uppercase s
T	124	0-3	Multics	uppercase t
U	125	0-4	Multics	uppercase u
V	126	0-5	Multics	uppercase v
W	127	0-6	Multics	uppercase w
X	130	0-7	Multics	uppercase x
Y	131	0-8	Multics	uppercase y
Z	132	0-9	Multics	uppercase z
[	133	12-0-8-5	Multics	left bracket
		2-8	H6000-GBCD	
			Level 6	
\	134	12-8-2	Multics	left slant
		0-8-2	Level 6	
		12-7-8	H6000-GBCD	
]	135	12-11-8-5	Multics	right bracket
		12-4-8	H6000-GBCD	
		11-8-2	Level 6	
^	136	11-8-7	Multics	circumflex
		11-0	H6000-GBCD	
_	137	0-8-5	Multics	underscore
		0-2-8	H6000-GBCD	
`	140	8-1	Apostrophe	
a	141	12-0-1	Multics	lowercase a
b	142	12-0-2	Multics	lowercase b
c	143	12-0-3	Multics	lowercase c
d	144	12-0-4	Multics	lowercase d
e	145	12-0-5	Multics	lowercase e
f	146	12-0-6	Multics	lowercase f
g	147	12-0-7	Multics	lowercase g
h	150	12-0-8	Multics	lowercase h
i	151	12-0-9	Multics	lowercase i
j	152	12-11-1	Multics	lowercase j
k	153	12-11-2	Multics	lowercase k
l	154	12-11-3	Multics	lowercase l
m	155	12-11-4	Multics	lowercase m
n	156	12-11-5	Multics	lowercase n
o	157	12-11-6	Multics	lowercase o
p	160	12-11-7	Multics	lowercase p
q	161	12-11-8	Multics	lowercase q
r	162	12-11-9	Multics	lowercase r
s	163	11-0-2	Multics	lowercase s
t	164	11-0-3	Multics	lowercase t
u	165	11-0-4	Multics	lowercase u
v	166	11-0-5	Multics	lowercase v
w	167	11-0-6	Multics	lowercase w
x	170	11-0-7	Multics	lowercase x
y	171	11-0-8	Multics	lowercase y
z	172	11-0-9	Multics	lowercase z
{	173	12-0	Multics	left brace
|	174	12-8-7	Multics	up arrow
		12-11	Level 6	
}	175	11-0	Multics	right brace
~	176	11-0-1	Multics	tilda

134,135c

APPENDIX C

CLM EXAMPLES

CLM_USER -- used when booting from channel 0800

```
* CLM_USER          (CARTRIDGE DISK)              78/02/08
*
* SAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
DEVICE KSR00,0,10,X'0500',CONSOLE,140
*DEVICE RCD00,14,11,X'0800'
*DEVICE FCD00,15,11,X'0800'
DEVICE FCD00,15,6,X'0800'
*
*         DEBUG RUNS ON 2 LEVELS (ABSOLUTE) PLEASE USE 12&13
*         CONSOLE OFF MLCP REQUIRES THE USE OF LRN 2
*
*DEVICE RCD01,15,14,X'0800'
*DEVICE FCD01,16,14,X'1480'
*
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
*
* SAF REMOTE COMPUTER INTERFACE (RCI) PROTOCOL HANDLER
*
LPHDEF 0,48,208     *****SAF DEPENDENT*****
LPH0 4,9,X'0C00',3,,HDX,X'0000'
LPH0 3,9,X'0C80',3,,HDX,X'0000'
*LPH0 5,9,X'FD00',3,,HDX,X'0000'
*LPH0 6,9,X'FD80',3,,HDX,X'0000'
*
* SAF HDLC PROTOCOL HANDLER
*
*LPHDEF 1,48,32
*LPH1 7,9,X'0E00',3,,FDX,X'0000'
*STATION 8,X'0000'
*STATION 9,X'0000'
*STATION 10,X'0000'
*LPH1 11,9,X'0F00',3,,FDX,X'0000'
*STATION 12,X'0000'
*STATION 13,X'0000'
*STATION 14,X'0000'
*
LDBU ZQEXEC
*LDBU HDLC_S
LDBU RBRCIP
*
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
*DEVICE DSK02,22,22,X'1200'
*DEVICE DSK03,23,23,X'1280'
*DEVICE MT900,24,24,X'1600',,,B
*DEVICE MT901,25,25,X'1680',,,B
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
```

```
*DEVICE CDR01,29,29,X'1300'
*DEVICE KSR01,30,30,X'0580',,133
*DEVICE TBCL1,31,9,X'0C00',TTY01,80
*TTY 31,9,X'0C00',0,1200
*
MEMPOOL S,,8000     *****SAF DEPENDENT*****
MEMPOOL ,AB,*
QUIT
```

MULTICS -- used when booting from channel 0802

```
* MULTICS           (CARTRIDGE DISK)              78/02/07
*
* SAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
*DEVICE KSR00,0,10,X'0500',CONSOLE,140
*DEVICE RCD00,14,11,X'0800'
*DEVICE FCD00,15,11,X'0800'
DEVICE FCD00,15,6,X'0800'
*
*         DEBUG RUNS ON 2 LEVELS (ABSOLUTE) PLEASE USE 12&13
*         CONSOLE OFF MLCP REQUIRES THE USE OF LRN 2
*
*DEVICE RCD01,15,14,X'0800'
*DEVICE FCD01,16,14,X'1480'
*
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
*
* SAF REMOTE COMPUTER INTERFACE (RCI) PROTOCOL HANDLER
*
LPHDEF 0,48,208     *****SAF DEPENDENT*****
LPH0 3,9,X'0C00',3,,HDX,X'0000'
LPH0 4,9,X'0C80',3,,HDX,X'0000'
*LPH0 5,9,X'FD00',3,,HDX,X'0000'
*LPH0 6,9,X'FD80',3,,HDX,X'0000'
*
* SAF HDLC PROTOCOL HANDLER
*
*LPHDEF 1,48,32
*LPH1 7,9,X'0E00',3,,FDX,X'0000'
*STATION 8,X'0000'
*STATION 9,X'0000'
*STATION 10,X'0000'
*LPH1 11,9,X'0F00',3,,FDX,X'0000'
*STATION 12,X'0000'
*STATION 13,X'0000'
*STATION 14,X'0000'
*
LDBU ZQEXEC
*LDBU HDLC_S
LDBU RBRCIP
*
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
*DEVICE DSK02,22,22,X'1200'
*DEVICE DSK03,23,23,X'1280'
*DEVICE MT900,24,24,X'1600',,,B
*DEVICE MT901,25,25,X'1680',,,B
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
*DEVICE CDR01,29,29,X'1300'
*DEVICE KSR01,30,30,X'0580',,133
DEVICE TBCL1,31,9,X'FD00',TTY01,80
TTY 31,9,X'FD00',0,0300
*
MEMPOOL S,,8000     *****SAF DEPENDENT*****
```

```
MEMPOOL ,AB,*
QUIT
```

CLM_USER -- used when booting from channel 0800

```
* CLM_USER          (CARTRIDGE DISK)              78/02/08
*
* LAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
DEVICE KSR00,0,10,X'0500',CONSOLE,140
DEVICE FCD00,15,6,X'0800'
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
LPHDEF 0,80,228     *****LAF DEPENDENT*****
LPH0 4,9,X'0C00',3,,HDX,X'0000'
LPH0 3,9,X'0C80',3,,HDX,X'0000'
LDBU ZQEXEC
LDBU RBRCIP
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
MEMPOOL S,,16000    *****LAF DEPENDENT*****
MEMPOOL ,AB,*
QUIT
```

MULTICS -- used when booting from channel 0802

```
* MULTICS           (CARTRIDGE DISK)              78/02/07
*
* LAF DEPENDENT
*
SYS 60,100,DSIP,10,40,100,,E
DEVICE FCD00,15,6,X'0800'
COMM 5
MODEM 3,X'80',X'80',X'80',X'01',X'80'
LPHDEF 0,80,228     *****LAF DEPENDENT*****
LPH0 3,9,X'0C00',3,,HDX,X'0000'
LPH0 4,9,X'0C80',3,,HDX,X'0000'
LDBU ZQEXEC
LDBU RBRCIP
DEVICE DSK00,20,20,X'0400'
DEVICE DSK01,21,21,X'0480'
DEVICE LPT00,26,26,X'0580'
DEVICE LPT01,27,27,X'1280'
DEVICE CDR00,28,28,X'1200'
DEVICE TBCL1,31,9,X'FD00',TTY01,80
TTY 31,9,X'FD00',0,0300
MEMPOOL S,,16000    *****LAF DEPENDENT*****
MEMPOOL ,AB,*
QUIT
```

APPENDIX D

MODEM CHECKOUT

4.8KB 208B MODEM

If using a 4.8KB 208B modem, the following check should be made before attempting to hookup to the host system. All buttons on the front face of the modem should be in the OUT position. The one possible exception is the button marked "50." The position of this button must match the position of the same button on the corresponding central site modem. If the position of the button on the central site modem is not known, please call the central site operator.

When the proper transmissions between central site and remote site are in progress, such as printing at the remote site, the RTS, CTS, CO, and ER lights will toggle ON and OFF.

Normally, when the Level 6 is connected and idle, the TR, MR, and ER lights are ON. A dialogue between two modems, A and B, goes as follows:

When modem A wants to transmit, the RS light will flash ON, causing the CS light to come ON within 150 milliseconds. At modem B, the CO light goes ON and the ER light goes OFF, putting that modem into receive mode. These lights remain in these ON/OFF positions respectively, while A is transmitting and B is receiving. When A is done transmitting, the CS and RS lights go OFF at A, while the CO light goes OFF and the ER light goes ON at modem B. The opposite sequence takes place when modem B is transmitting and modem A is receiving.

This sequence normally occurs quite rapidly, so that it is difficult to determine the exact sequence. The ER light and the CO light are never ON at the same time. This sequence is repeated continuously while data transmission activity is present. A frequent indication that something is wrong is the absence of an CO light activity in this sequence. This error symptom usually requires a redialing and reconnection of the L6 to Multics.

APPENDIX E

EXAMPLE OF AN IOD_ADMIN.EC

```
& iod_admin.ec - extended IO daemon operator commands.
&
& This exec_com is invoked when the IO daemon operator sends the command line,
&         x function arg1 arg2 ...
&
&    where in this exec_com,
&         &1 = function
&         &2 = arg1
&         &3 = arg2
&         etc
&
& Note:   This iod_admin.ec is only a template and may be modified by
&         system administrative personnel to fit the site's needs.
&
&         It has been primarily designed for use by remote job entry station
&         operators and is not applicable to single device daemons
&         (usually driving on-site peripherals).  The iod_val active
&         function when given the pun_rqt key word will return the
&         string "undefined!" for these single device daemons.
&
& ****************************************
&
& Set up default values for remote driver's use of the iod_admin.ec
&
&command_line off
&if [exists segment [pd]>value_seg]
&then
&else cr [pd]>value_seg; value$set_seg [pd]>value_seg
value$set prt [iod_val request_type]
value$set pun [iod_val pun_rqt]
&
&goto &1_command

& ****************************************
&         This group of entries is the absentee facility.  It
&         allows the operator to manipulate or list only those
&         absentee jobs that were sent in by his station.
&
&label car_command
&
& For: canceling absentee requests
&
&if [exists argument &2] &then &else &goto missing_arg
car -sender [iod_val station_id] &f2
&quit

& ------------------------------------------------
&label lar_command
&
& For: list absentee requests
&
&if [exists argument &2] &then &goto lar_anything
lar -sender [iod_val station_id] -a -psn
&quit
```

```
& --------------------
&label lar_anything
&
lar -sender [iod_val station_id] &f2
&quit

& ------------------------------------------------
&label mar_command
&
& For: move absentee requests
&
&if [exists argument &4] &then &else &goto missing_arg
mar -sender [iod_val station_id] &f2
&quit

& ************************************
&
&   This group of entries is the daemon facility.  It allows
&   the operator to list any queue of any request type known
&   to the system.  The operator may only delete or move those
&   requests that are in the queues currently being process
&   by the driver.
&label cdr_command
&
& For: canceling daemon requests
&
&if [exists argument &3] &then &else &goto missing_arg
&if [or [equal &r2 prt] [equal &r2 pun]] &then &else &goto error_rqt
cdr -rqt [value &2] &f3
&quit

& ------------------------------------------------
&label ldr_command
&
& For: list daemon requests
&
&if [exists argument &2] &then &goto ldr_specific
ioa_ "Print requests in ^a are;" [iod_val request_type]
ldr -rqt [iod_val request_type] -a -admin -psn
ioa_ "Punch requests in ^a are;" [iod_val pun_rqt]
ldr -rqt [iod_val pun_rqt] -a -admin -psn
&quit

& --------------------
&label ldr_specific
&
&if [or [equal &r2 prt] [equal &r2 pun]] &then &else &goto ldr_any_rqt
ioa_ "Requests in ^a are;" [value &2]
ldr -rqt [value &2] -a -admin -psn &f3
&quit

& --------------------
&label ldr_any_rqt
&
&print Requests in &2 are;
ldr -rqt &2 -a -admin -psn &f3
&quit


& ------------------------------------------------
&label error_rqt
&
& The operator made a mistake.
&
&print x: Request argument of "&1" function must be "prt" or "pun".
&quit
```

```
& ************************************
&
&   This group of entries is the message facility.  It
&   allows the operator to initialize his mailbox for
&   receiving messages, printing messages and sending
&   messages to other drivers (either with one line
&   messages or conversationally).
&
&label am_command
&
& For:  accepting messages
&
am -pn >ddd>imd>[iod_val station_id] -print -call iod_driver_message
dm -pn >ddd>imd>[iod_val station_id]
&quit

& ------------------------------------------------
&label pm_command
&
  For: print messages
&
pm -pn >ddd>imd>[iod_val station_id] -call iod_driver_message
&quit

& ------------------------------------------------
&label sm_command
&
& For: send message supplied or conversationally
&
&if [exists argument &2] &then &else &goto missing_arg
&if [exists argument &3] &then &else &goto sm_conversational
sm -pn >ddd>imd>&2 from driver [iod_val station_id]: &f3
&quit

& --------------------
&label sm_conversational
&print Enter your station_id as the first message line.
&print Type "." to exit send message.
sm -pn >ddd>imd>&2
&quit

& ------------------------------------------------
&label missing_arg
&
& Notify the operator that an expected argument is missing.
&
&print <<<< Missing argument to "x &1" command. >>>>>
&quit

& ------------------------------------------------
& An unknown function has been given to the x command.
&
&label &1_command
&
&print >>>> Undefined "x" command function, &1 <<<<
&quit
```

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