

# Chapter 19: Status Readback

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## 19.1 Introduction

Status readback lets the user obtain status information from the printer, such as available printer memory, a list of fonts and symbol sets, and the ID numbers of macros and user-defined patterns.

### Entity Status

Entity status readback provides information about the printer's entities — fonts, symbol sets, macros, or user-defined patterns. For example, the user can ask for a list current fonts and symbol sets, or the ID numbers of macros and user-defined patterns.

Requesting entity status involves the following three steps:

1. Identify **Location Type**
2. Identify **Location Unit**
3. Request status

## Terminology

**Entity:** A font, symbol set, macro, or user-defined pattern.

**Entity Status:** Provides status for the printer's entities. Each individual entity request is limited to a specific entity and a specific location. To request an entity status, the user must send commands that identify a *location type* and a *location unit*, and then request the status.

**Location Type:** The memory location that stores an entity — internal ROM, RAM (for downloaded entities), cartridges, user-installable ROM (SIMMs), and one additional location called *currently selected*, which is the active entity, such as the last-selected font or user-defined pattern (currently selected does not apply to macros or symbol sets).

**Location Unit:** A specific location (or device) within a location type. For example, location unit 1 for location type "cartridge" might refer to the left cartridge; or location unit 1 for location type "downloaded" might refer to temporary, rather than permanent, fonts.

## Process

Entity status readback follows the procedure below:

1. Specify Location Type (*Esc\*s#T*)
2. Specify Location Unit (*Esc\*s#U*)
3. Inquire Entity — identify the entity and request status (*Esc\*s#I*)
4. The printer returns a status or error response.

## Syntax

Entity status readback responses have the same syntax in both the PCL and PJP contexts:

- Responses start with PCL<CR><LF>.
- Each line of the response terminates with <CR><LF>.
- Status responses end with <FF>.
- PCL status readback responses should be in English.

The basic syntax is:

```
PCL<CR><LF>
INFO TITLE<CR><LF>
KEYWORD1=data1<CR><LF>
KEYWORD2=data2<CR><LF>
...
<FF>
```

*TITLE*, *KEYWORD*, and *data* are strings that vary depending on the status readback command. Each response is associated with one or more keyword lines. Since, future keywords may be added, applications should ignore lines with unrecognized keywords.

Sample responses:

```
PCL<CR><LF>
INFO MEMORY<CR><LF>
TOTAL=100000<CR><LF>
LARGEST=25000<CR><LF>
<FF>
```

```
PCL<CR><LF>
INFO FONTS<CR><LF>
SELECT="<Esc>(8U<Esc>(s0p10.00h12.00v0s0b3T"<CR><LF>
SELECT="<Esc>(0N<Esc>(s0p16.67h8.5v0s0b0T"<CR><LF>
SELECT="<Esc>(s1p_ _v1s0b4101T<Esc>(78X"<CR><LF>
SYMBOLSETS="0N,0U,1U,8U,10U,11U,12U"<CR><LF>
SELECT="<Esc>(8U<Esc>(s1p_ _v0s3b4148T"<CR><LF>
SYMBOLSETS="0N,0U,1U,8U,10U,11U,12U"<CR><LF>
<FF>
```

A status request for non-existent information generates an error response so the host will not wait indefinitely. An error response is returned only for recognized escape sequences. For example, an internal memory error, such as out-of-memory, generates the following error response (An appropriate string replaces TITLE, depending on the requested status):

```
PCL<CR><LF>
INFO TITLE<CR><LF>
ERROR=INTERNAL ERROR<CR><LF>
<FF>
```

**NOTE:** Examples in the following sections do not show the <CR><LF>, or <FF> characters.

## Memory Status

Memory Status requests identify the amount of user-memory available in the printer. This is useful when downloading entities, so printer errors can be avoided. The Free Space command (*Esc\*s#M*) is used to request the current number of free bytes in memory.

## Synchronization

Status requests and their associated responses are processed in the order received. On some printers, status responses may be stored in a buffer which is not cleared until the responses are read or the printer is turned off. If multiple users are requesting status, it can be difficult to distinguish one user's status response from another. The Echo command (*Esc\*s#X*) may be used to synchronize an application's status request to the printer's response.

## 19.2 Entity Status Commands

Three commands are used for entity status. Inquire Entity (*Esc\*s#I*) makes the status request. Location Type (*Esc\*s#T*) and Location Unit (*Esc\*s#U*) specify the queried entities.

### Location Type *Esc \* s # t/T*

Specifies the memory location that stores an entity.

Value(#)	=	0	Invalid location
	=	1	Currently selected
	=	2	All locations
	=	3	Internal
	=	4	Downloaded
	=	5	Cartridge
	=	7	User-installable ROM device
Default	=	0	
Range	=	0 to 5, 7 (out-of-range values are set to 0, indicating an invalid location)	

Location type 0 (default) causes an error response. Location type 1 is the current value of the entity specified by Inquire Entity (current font, current user-defined pattern, etc).

### Location Unit *Esc \* s # u/U*

Specifies a location or device within a location type.

Value field interpretation depends on location type:

Value(#)	Interpretation	Location Type
*	Invalid location	0
*	Currently selected	1
*	All locations	2
0	All internal	3
0	All downloaded	4
1	Temporary downloaded	4
2	Permanent downloaded	4
0	All cartridges	5
1-n	Cartridges 1 to n (lowest priority)	5
0	All SIMMs	7
1-n	SIMMs 1 to n (lowest priority)	7
Default	=	0
Range	=	0 to $2^{32} - 1$

\* The location unit is ignored for location type values 0, 1 and 2.

The interpretation of location unit occurs only after Inquire Entity is received. Location unit then determines which set of entities to give status on.

The printer retains the location unit setting, which may be changed by this command.

Location type and unit may be set in any order. Invalid combinations are determined when Inquire Entity is received. Even if the value is out of range, the unit is set to that value so that an appropriate error response will be sent.

## **Inquire Entity** *Esc \* s # i/I*

Returns status for all entities of the specified type in the current location.

Value(#) = 0 Font  
 = 1 Macro  
 = 2 User-defined pattern  
 = 3 Symbol set (for unbound fonts)  
 = 4 Font Extended  
 Default = NA  
 Range = 0 to 4 (unspecified values produce an error response)

This command does not affect the current values of location type or location unit.

The response to this command depends on the type of entity, as described below.

### **Font**

A font status request may provide different types of information, depending on the request, the font type, and the location. The possible font status keywords are listed below:

```
SELECT=
SYMBOLSETS=
LOCTYPE=
LOCUNIT=
DEFID=
NAME=
```

An example font status (value=0) is shown below. The five fonts returned are listed in order:

```
Internal bitmap (Courier) font
Internal bitmap (Line Printer) font
Internal unbound scalable (CG Times) font
Downloaded bound scalable (CG Palacio) font
Downloaded bound scalable (Dom Casual) font
```

The response syntax for all location types except the currently selected font is:

```
PCL
INFO FONTS
SELECT="<Esc>(8U<Esc>(s0p10.00h12.0v0s0b3T"
SELECT="<Esc>(0N<Esc>(s0p16.67h8.5v0s0b0T"
SELECT="<Esc>(s1p__v1s0b4101T"
SYMBOLSETS="0N,0U,1U,8U,10U,11U,12U"
SELECT="<Esc>(1U<Esc>(s1p__v0s0b4111T<Esc>(21X"
SELECT="<Esc>(1U<Esc>(s1p__v0s3b4148T<Esc>(22X"
...
```

In the above example, the "SELECT=" keyword identifies five fonts. As described under "SELECT=" below, this keyword varies according to whether the font is bitmap, bound, scalable, unbound scalable,

currently selected, or downloaded. Additional keywords are added for unbound fonts ("SYMBOLSETS="), currently selected fonts ("LOCTYPE=" and "LOCUNIT="), and font extended requests ("DEFID=" and "NAME=").

"**SELECT=**" is returned for **all fonts**. It identifies the font by specifying the font selection characteristics, which are listed in the font selection order of priority (highest first).

For **downloaded** (soft) fonts, the PCL ID selection number is also included at the end. For example, an ID number of 27 is presented as ...<Esc>(27X".

For **bitmap** fonts, all font selection characteristics are listed. In addition, if the bitmap font is a soft font, its PCL ID number is also included at the end of the "SELECT=".

For **scalable** fonts, only relevant characteristics are listed. Symbol set is included for bound scalable fonts. For unbound fonts the "SYMBOLSETS=" keyword is added. Either height or pitch is listed, depending on whether the font is proportional or fixed spaced. Two underscores indicate that the font is scalable.

"**SYMBOLSET=**" is added for **unbound scalable** fonts. This keyword lists all the symbol sets that can be bound to the font. Duplicate symbol set IDs are removed so that a given symbol set ID will appear only once in the list.

If **currently selected** status is requested, the two keywords below are included. Also, if the currently selected font is scalable, the "SELECT=" keyword shows the current symbol set and current size (point size or pitch). Also, if the currently selected font is a secondary font, the "(" character is replaced by ")".

"**LOCTYPE=**" is returned only for a currently selected font request. It identifies the location type of the currently selected font.

"**LOCUNIT=**" is returned only for a currently selected font. It identifies the location unit of a currently selected font request only.

An example of a response for the currently selected font is:

```
PCL
INFO FONTS
SELECT="<Esc>(8U<Esc>(s0p18.00h20.0v0s0b4101T"
LOCTYPE=3
LOCUNIT=1
```

## Font Extended Response

The font extended response (value field = 4) is the same as a font response (value field = 1) with two additional keywords, "DEFID=" and "NAME=".

```
PCL
INFO FONTS EXTENDED
SELECT="<Esc>(8U<Esc>(s0p10.00h12.0v0s0b3T"
DEFID="I 21"
NAME="Courier"
SELECT="<Esc>(s1p_ _v1s3b4101T"
SYMBOLSETS="0N,0U,1U,8U,10U,11U,12U"
DEFID="M2 8"
NAME="CG Times BdlT"
...
```

"DEFID=" identifies the printer font number, which is used by PJI or the control panel to select a default font, consists of two parts, a Location and an ID number, such as "I 21". The possible locations are:

I	-	Internal
C	-	Cartridge
S	-	Permanent soft fonts
Mn	-	SIMMS (where n is the number of the SIMM slot)
NONE	-	Temporary soft fonts

**NOTE:** The printer font ID number — which is different than the Font ID (*Esc\*c#D*) assigned to downloaded fonts — is assigned by the printer. Temporary fonts, which cannot be selected as the default from the control panel or PJI, do not have a printer font ID number.

"NAME=" is returned only for font extended requests. It identifies the name of the font (Courier) and its treatment (bold italic). The name returned is implementation-dependent. If the location type is 1 (currently selected), LOCTYPE and LOCUNIT appear after NAME.

An example of a font extended response is:

```
PCL
INFO FONTS EXTENDED
SELECT="<Esc>(8U<Esc>(s0p10.00h12.0v0s0b3T<Esc>"
DEFID="I 21"
NAME="Courier"
SELECT="<Esc>(s1p_ _v1s3b4101T"
SYMBOLSETS="0N,0U,1U,8U,10U,11U,12U"
DEFID="I 45"
NAME="CG Times BdlT"
SELECT="..."
...
```

An example for a font extended response for the currently selected font is:

```
PCL
INFO FONTS EXTENDED
SELECT="<Esc>(8U<Esc>(s0p18.00hv0s3b4099T"
DEFID="I 21"
NAME="Courier Bd"
LOCTYPE=3
LOCUNIT=1
```

## Macro Response

The macro status response lists all of the macro IDs ("IDLIST=") for the macros in the specified location. ID order is arbitrary and implementation-dependent.

**NOTE:** Location Type 1 (currently selected) is an invalid location for macros.

An example of a macro status response (value field = 1) is shown below:

```
PCL
INFO MACROS
IDLIST="1,8,3,29,32"
```

## User-Defined Pattern Response

The response for user-defined patterns lists all of the user-defined pattern IDs ("IDLIST=") for the patterns in the specified location. ID order is arbitrary and implementation-dependent.

An example of a user-defined pattern response (value field = 2) is shown below:

```
PCL
INFO PATTERNS
IDLIST="9,27,2,456,13,1"
```

If Location Type is 1 (currently selected), "LOCTYPE=" and "LOCUNIT=" lines are added to identify the location (type and unit) of the pattern. An example of a user-defined pattern response for the currently selected pattern is shown below:

```
PCL
INFO PATTERNS
IDLIST="88"
LOCTYPE=4
LOCUNIT=2
```

If the current pattern is set to one of the internal HP-defined patterns (no pattern ID number is assigned), then no number is available and the error response "ERROR=NONE" is returned.

```
PCL
INFO PATTERNS
ERROR=NONE
```



## Downloadable Symbol Set Response

The response for symbol sets (value field = 3) lists all of the symbol set IDs ("IDLIST=") for all the symbol sets for unbound fonts in the specified location (type and unit). ID order in the list is arbitrary and implementation-dependent.

Location type 1 (currently selected) is an invalid location for symbol sets and will return "ERROR=NONE".

An example of a symbol set response is:

```
PCL
INFO SYMBOLSETS
IDLIST="8U,0U,2K,11U,8M"
```

## Error Responses

If the entity type specified is out of range or unsupported, an invalid entity error is returned. For example, if the Inquire Entity command contains an out-of-range value of 8 (*Esc\*s8I*), the following error response is generated:

```
PCL
INFO ENTITY
ERROR=INVALID ENTITY
```

If the entity type is valid, but the location (either type or unit or both) is invalid, or if the specified device is not installed, an invalid location error is returned. For example, if the status for a cartridge type is requested at an out-of-range location unit of 9 (*Esc\*s4t9U*), the following error response is generated:

```
PCL
INFO FONTS
ERROR=INVALID LOCATION
```

If the entity type and location are valid, but there are no entities of the specified type in that location, or if the type is inappropriate for the specified entity (e.g. internal user-defined pattern or currently selected macro), an error response is generated. For example if the user requests a downloaded symbol set and there are no downloaded symbol sets, the following error response is generated:

```
PCL
INFO SYMBOLSETS
ERROR=NONE
```

The status response for some requests can be fairly large (e.g., fonts). If the printer runs out of memory processing status responses, it generates an internal error, as shown below:

```
ERROR=INTERNAL ERROR
```

**NOTE:** The error conditions described above are the only conditions that cause an error response. If the user makes a syntax error in the escape sequence or sends a command that the printer cannot interpret, the printer ignores the command issues no error response.

## 19.3 Memory Status Commands

The Free Space command (*Esc\*s#M*) requests the amount of free user-memory. The Flush All Pages command (*Esc&r#F*) suspends input data until all current pages are printed.

These two commands may be used together or separately. Together, they tell the user how much memory is available without page data. If the printer does not contain sufficient memory to accept a downloaded entity, the user can clear some memory by deleting unneeded entities (fonts, macros, user-defined patterns, etc).

### Free Space *Esc \* s # m/M*

Requests the current number of bytes of free internal user-memory in the device.

Value(#) = Internal memory unit  
 Default = 1  
 Range = 1 (other values produce an error response)

The response returns two values: **TOTAL**= identifies the total available user-memory in bytes; **LARGEST**= identifies the largest continuous block of available memory in bytes.

The following example shows that the printer has 100,000 bytes of available memory, with the largest continuous block being 25,000 bytes.

```
PCL
INFO MEMORY
TOTAL=100000
LARGEST=25000
```

An out-of-range value field that does not specify a valid internal memory unit causes an "Invalid Unit" error. For example, *Esc\*s2M* would produce the following error response:

```
PCL
INFO MEMORY
ERROR=INVALID UNIT
```

**Flush All Pages** *Esc & r #f/F*

Suspends input stream processing until all pages currently in the device have been printed.

Value(#) = 0 - Flush all complete pages  
          = 1 - Flush all pages  
Default = 0  
Range = 0, 1 (other values are ignored)

A value of 0 processes only complete pages. A value of 1 performs a conditional formfeed to process partial pages.

For example, if a printer containing two complete pages (A and B) and one partial page (C) receives this command with a value field of 0, it will eject A and B and retain C. If the value field is 1, the printer will process and eject pages A, B, and C.

The printer resumes receiving data when the last page is processed and ejected.

## 19.4 Response Synchronization

The Echo command allows the user to determine which status response is associated with a given application or user.

**Echo** *Esc \* s # x/X*

The echo command echoes its value field (in ASCII format) back to the host.

Value(#) = Echo value (ASCII)  
Default = 0  
Range =  $-2^{31}$  to  $2^{31} - 1$

Multiple users make it difficult to distinguish one user's response from another. This command provides the means to label status responses. Since the user-selected value for the value field is returned, this command can be used as a user identification mark or place holder. Sending this command with a specific value at the beginning and/or the end of a status request delineates status response data.

Since status readback responses are sent in the order requests are received, this command permits the host to know that all PCL status up to this command has already been sent.

As an example, *Esc\*s-999X* produces the following status response:

```
PCL
ECHO -999
```