
Title:

TELETYPE DRIVER

Description

 **REGNECENTRALEN**

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Abstract:

Description of the TTY driver in the RC3600 MUS/DOMUS system.

TELETYPE CONSOLE

General Rules

This is an operator driver.

About operator process in general, see MUS Programmers Guide.

The teletype driver operates on bytes placed left to right in words, allowing odd addresses and odd byte counts. The driver has to be in the same memory as the user process.

CONTROL

Control messages are ignored and returned with status = 0.

INPUT

Operation: 1 normal input
 5 input with timeout
 17 input with attention request

Operation code is tested by the driver as bit pattern.

Input General:

A line of characters can be input to the storage area defined by the message. The characters are echoed on the teletype during input.

In all input mode, a number of characters have special effects:

BELL	Master Attention Request. Previous input is forgotten, and output in progress is terminated.
RETURN	New Line. An answer is delivered with status = 0, and bytes input defined.
LINE FEED	Same action for RETURN.

RUBOUT Char. cancel.
The character " ←" is output on the teletype, and last character is cancelled in storage area. ¹⁾

BS (Control H) Char. cancel.
The character "&" is echoed, and last character is cancelled in storage area.

ENQ (Control E) Line cancel.
The character "%" is echoed, and all characters are cancelled in the storage area.

ESCAPE

FS (Control shift L)

Attention.

An answer with status = attention (1b5) is returned to the user of attention. If no user is defined, the character is stored in the normal way.

Other control characters with ASCII values <32 terminate input. An answer with status = 0 and bytes input defined is returned, and a DC3 character is echoed to stop the reader.

If input is taken from the reader one or two characters can be lost if fill-characters are not used after characters which causes termination of input.

.1) RUBOUT is echoed as cursor back an F13.

Normal Input.

Input is terminated when storage area is full or when one of the special actions causes termination. Input is terminated temporarily when no characters have been input for 5 seconds. If an output message is pending, input is cancelled, otherwise input is continued.

If the sender process is current user of the console a DC1 (start reader) is output to start the reader.

Input with Timeout.

The same as for normal input, except that input is terminated when no characters have been input for a specified number of seconds placed in mess3 of input buffer. An answer is returned with status = timer (1b14) and bytes input defined.

Input with Attention Request.

Sender of the message is inserted as user of attention.

If ESC or FS key is activated, the buffer returned is found in the following way:

1. If driver is busy with output from user of attention, output is terminated, and buffer is returned with status = attention (1b5) and bytes output defined.
2. If driver is busy with input to user of attention, character is stored and input is terminated. An answer is returned with status = attention and bytes input defined.
3. If driver is busy with input or output from other processes, input is cancelled and output is terminated. Driver now searches for an input buffer with sender equal to user of attention. If found, character is stored, and the buffer is returned with status = attention. If no input buffer is found, the attention buffer is returned in the same way.

Master Attention Request.

Attention request is set when BELL-key is activated. After echo of ">" the name of the process to input to can be typed, terminated by CR or NL. If no input message is pending from the process the text "BUSY" is output, and if the process does not exist "UNKNOWN" is output.

Output.

Before output the user process is inspected. If sender of the message differs the text ><process name> is output before output of data.

The storage area defined by the message is output as 8-bit characters. Output is terminated when the area is empty, after a NULL character, after BELL is operated or if ESC-key is activated and an attention answer is delivered. Byte values <13> and <10> are treated in a special way:

<not 13> <10> is output as <not 13> <13> <10>,
 <13> <not 10> is output as <13> <10> <not 10>, and
 <13> <10> is output as <13> <10>

Byte values <16 (except 7, 10, and 13) and 17 (DC1 = start reader) are skipped at output, but can be output if 128 is added.

The alphabet used on different hardware is:

F15 and F16 ALPHANUMERIC DISPLAY/KEYBOARD:

	0	16	32	48	64	80	96	112	128
0			SPRCE	0	@	P	'	p	
1			!	1	A	Q	'	q	
2			"	2	B	R	'	r	
3			#	3	C	S	'	s	
4			\$	4	D	T	'	t	
5			%	5	E	U	'	u	
6			&	6	F	V	'	v	⁴ CURSOR POS
7	⁵ BELL		'	7	G	W	'	w	
8		RIGHT CURSOR	(	8	H	X	'	x	² BACK CURSOR
9			)	9	I	Y	'	y	² TAB
10	NL	UP CURSOR	*	:	J	Z	'	z	
11		ESC	+	;	K	['	{	
12			,	<	L	\	'	|	² ERASE ALL
13	CR	HOME	-	=	M]	'	}	
14		³ EOL	.	>	N	^	'	~	² PRINTER ON
15		³ EOP	/	?	O	_	'	o	² RUBOUT PRINTER OFF

- Remarks:
1. Only F16
 2. Only at output. Value -128 delivered at input.
 3. EOL: Erase end of line.
EOP: Erase end of page.
 4. Cursor position: Next character will be the character address, and the following character the row address. Add 128 to wanted position to avoid skip of character.
 5. Master attention request at input.

F14 SILENT PRINTER/KEYBOARD:

	0	16	32	48	64	80	96	112	128
0			space	0	@	P	\ ¹	p ¹	
1			:	1	A	Q	a ¹	q ¹	
2			"	2	B	R	b ¹	r ¹	
3			#	3	C	S	c ¹	s ¹	
4			\$	4	D	T	d ¹	t ¹	
5			%	5	E	U	e ¹	u ¹	
6			&	6	F	V	f ¹	v ¹	
7	bell ³		'	7	G	W	g ¹	w ¹	
8			(	8	H	X	h ¹	x ¹	back ² space
9			)	9	I	Y	i ¹	y ¹	
10	NL		*	:	J	Z	j ¹	z ¹	
11		ESC	+	;	K	[	k ¹	{ ¹	
12			,	<	L	\	l ¹	! ¹	
13	CR		-	=	M	]	m ¹	} ¹	
14			.	>	N	^	n ¹	~ ¹	
15			/	?	O	_	o ¹	rub- out	

- Remarks:
1. Only at output
 2. Only at output. Value -128 delivered at input.
 3. Master attention request at input.

F13 ALPHANUMERIC DISPLAY/KEYBOARD:

	10	16	32	48	64	80	96	112	128
0			SPACE	0	@	P			
1			!	1	A	Q			
2			"	2	B	R			
3			#	3	C	S			
4			\$	4	D	T			
5			%	5	E	U			
6			&	6	F	V			
7	BELL ³		'	7	G	W			
8		RIGHT CURSOR	(	8	H	X			
9		LEFT CURSOR	)	9	I	Y			
10	NL	UP CURSOR	*	:	J	Z			
11		ESC	+	;	K	[			DOWN CURSOR ¹
12		HOME DOWN	,	<	L	\			
13	CR	HOME UP	-	=	M]			
14		EOL ²	.	>	N	↑			SPOW LATCH ¹
15		EOF ²	/	?	O	LEFT CURSOR		RUBOUT	SPOW UNLATCH ¹

- Remarks:
1. Only at output. Value -128 delivered at input.
 2. EOL: Erase end of line.
EOF: Erase end of frame.
 3. Master attention request at input.

F12 KSR TELETYPE:

	0	16	32	48	64	80	96	112	128
0			SPACE	0	@	P			
1			!	1	A	Q			
2			"	2	B	R			
3			#	3	C	S			
4			\$	4	D	T			
5			%	5	E	U			
6			&	6	F	V			
7	BELL ¹		'	7	G	W			
8			(	8	H	X			
9			)	9	I	Y			
10	LF		*	:	J	Z			
11		ESC	+	;	K	[
12			,	<	L	\			
13	CR		-	=	M]			
14			.	>	N	↑			
15			/	?	O	←		RUBOUT	

Remarks: 1. Master attention request at input.