

The information derived from development samples is available for evaluation. It does not necessarily indicate that the device will go into regular production.

# ANTIOPE CHARACTER GENERATOR FOR U.S. 525 LINE SYSTEM (US-AROM)

The SAA5155 is a 28-pin N-channel MOS circuit which provides the video signals to a television receiver to produce the Antiope/viewdata character display for the US market. Each character is based on a 6 (horizontal) by 10 (vertical) dot array stored in the internal ROM. The dot and character rates are derived from the TR6 and F1 input clocks which are resynchronised internally. The circuit can also provide coloured and block displays (graphics) and perform some remote control commands (e.g. big characters). Interlace or non-interlace modes are available as is character rounding of alphanumeric displays in interlace mode. The device is intended for use with the SAA5125 US Antiope timing chain (USATIC).

### Features

- 21 rows of 40 characters displayed
- 127 alphanumeric characters
- 64 contiguous graphic characters and 64 separated graphic characters
- 8 foreground and 8 background colours (including black)
- Flash at 0.75 Hz with 50:50 mark/space ratio
- Concealed characters with user control reveal
- Boxing for character display on top of the normal tv picture
- Transmitted single or double height characters
- Transmitted single or double width characters
- User selected double height display of top or bottom of page
- Underline of alphanumeric characters

### QUICK REFERENCE DATA

V<sub>DD</sub> = 5 V ± 10%; 0 V; T<sub>amb</sub> = 25 °C

Operating supply voltage

V<sub>DD</sub> TYP. 5 V

Operating supply current

I<sub>DD</sub> TYP. 20 mA

### PACKAGE OUTLINE

28-pin DIL; plastic (SOT-117)



V<sub>DD</sub>

V<sub>CS</sub> DEW

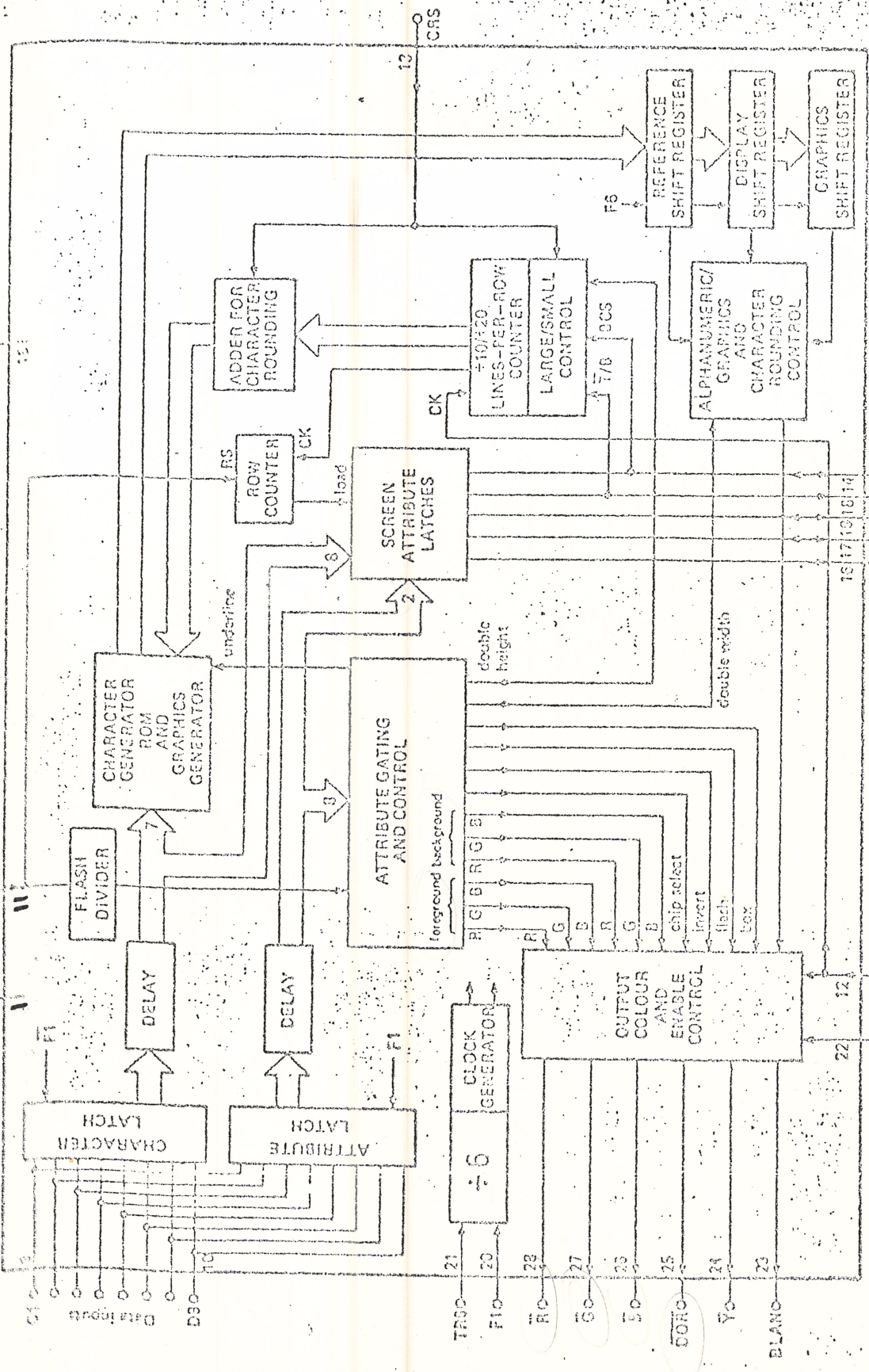


Fig.1 US - AROM block diagram

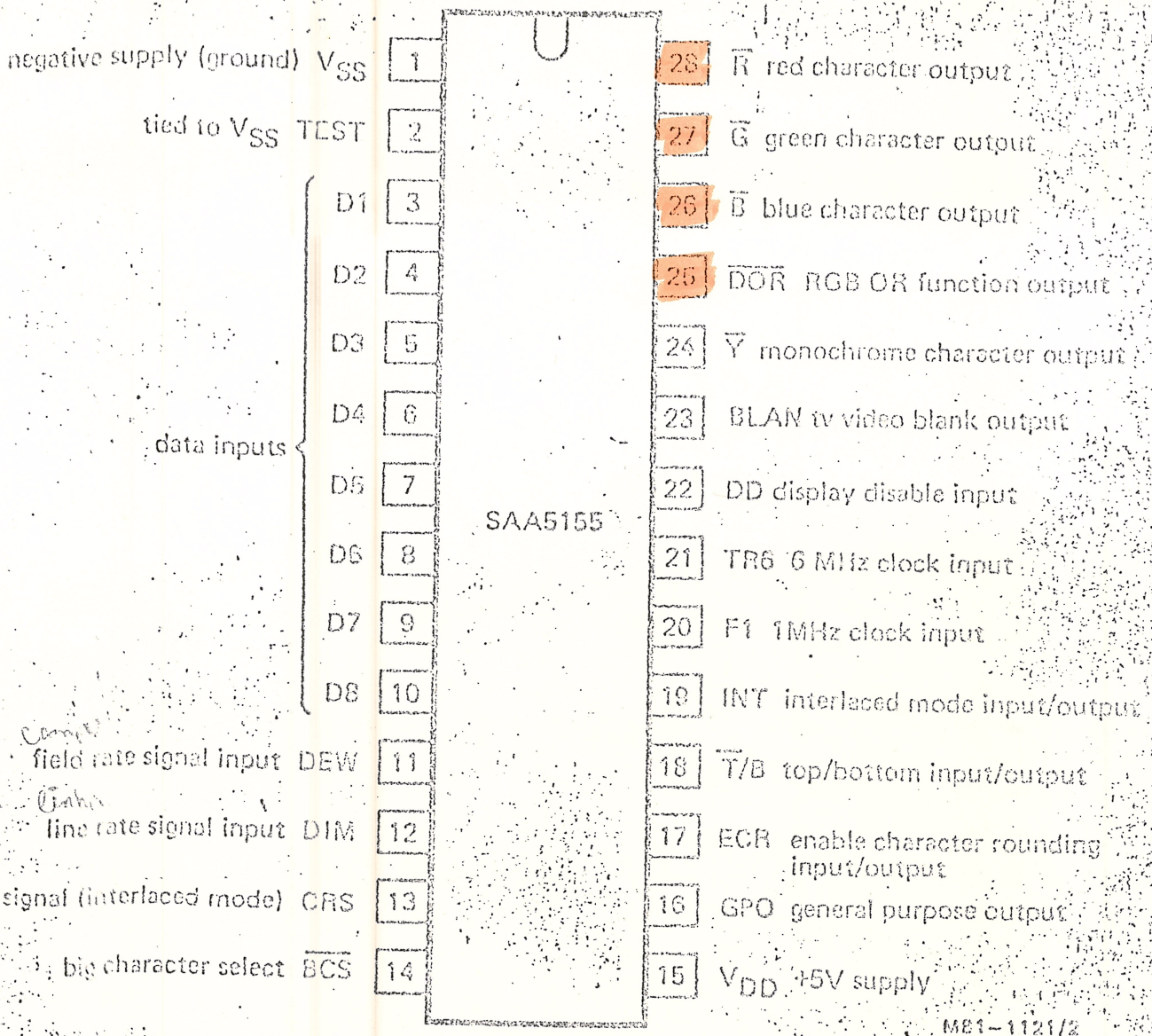


Fig.2 Pinning diagram

DEVICE OPERATION

Each character is allocated 16 bits in the page memory. The device receives this data as two multiplexed 8-bit bytes, containing character information (bits b1 to b8) and attributes (bits b9 to b16). Input data timing with respect to F1 is shown in Fig.6. The type of character indicated by bits b1 to b8 determines the function of the remaining attribute bits (see Table 1). There are three types of character: alphanumeric, graphic and string delimiter.

For alphanumeric and graphic characters bits b8 to b16 define the attributes for individual characters. The NUL (string delimiter) character is displayed as a space in the colour defined by bits b10 to b12. The remaining bits are latched to define string attributes and are active until a new delimiter or the end of the line.

*field rate*  
*Complete*  
*line*

→ Ligado ao modulador PAL-M



Table 1 Character and attribute coding

bit number	character code any code except NUL (0/0)		NUL code (0/0)
bit 0 <i>bit 1 to bit 7</i>	alphanumeric character	graphic character	string delimiter character
bit 8	'0' = alphanumeric	'1' = graphic	'0' = end conceal '1' = start conceal
bit 9	'0' = device selected '1' = outputs OFF	'0' = device selected '1' = outputs OFF	'0' = end box (set after) '1' = start box (set at)
bit 10	foreground colour R	foreground colour R	delimiter colour R
bit 11	foreground colour G	foreground colour G	delimiter colour G
bit 12	foreground colour B	foreground colour B	delimiter colour B
bit 13	'0' = normal height '1' = double height	background colour R	background colour R (set after)
bit 14	'0' = normal width '1' = double width	background colour G	background colour G (set after)
bit 15	'0' = normal colour '1' = inversion	background colour B	background colour B (set after)
bit 16	'0' = steady '1' = flashing	'0' = steady '1' = flashing	'0' = end underline (set at) '1' = start underline (set at)

Mode control is effected using an additional pair of bytes in the page memory known as screen attributes which are in the 1001st location (26th row, first character). This location is automatically addressed by the SAA5125 at the end of every display field. The sixteen bits in this location control the display mode, as indicated in Table 2. These functions are updated every time the screen attributes are accessed (once every field period). If DD (pin 22) is HIGH the screen attribute is not updated. Bits b11 to b10 are not used for normal operation and must be held LOW.

Table 2 Screen attribute coding (modes)

b2	b1	attribute	b4	b3	attribute
0	0	tv only	0	0	no text <i>print</i>
0	1	boxing	0	1	header only
1	0	text only	1	0	rest of text displayed
1	1	superimpose	1	1	header and text displayed <i>print</i>

b5	attribute	b6	attribute	b7	attribute
0	concealed	0	big character select (BCS)	0	top
1	revealed	1	normal	1	bottom

b8	attribute	b9	attribute	b10	attribute
0	non-interlace	0	general purpose output = '0'	0	character rounding OFF
1	interlace	1	general purpose output = '1'	1	character rounding ON

Large character, character rounding and interlace are controlled by the  $\overline{BCS}$ ,  $\overline{T/B}$ ,  $\overline{ECR}$  and  $\overline{INT}$  pins which are input/outputs. They may be connected to  $V_{SS}$  or  $V_{DD}$  to override the control of the screen attribute bits.

APPLICATION DATA

- VSS Negative supply normally ground (0 V)
- TEST Tied to VSS for normal operation
- D1 to D8 Data inputs
- DEW Field rate signal input which resets internal counters and is used for flash frequency
- DIM Line rate signal input defining the display period, also used to reset internal control characters to their starting state and to clock internal counters.
- CRS Field rate signal input used in interlaced mode to control character rounding of single height characters only.
- BCS Big character select -- user controlled screen attribute (open drain with internal pull up)
- VDD +5 V supply
- GPO General purpose output -- user controlled screen attribute (open drain)
- ECR Enable character rounding -- user controlled screen attribute (open drain input/output)
- T/B Top/bottom of big character page -- user controlled screen attribute (open drain with internal pull-up, input/output)
- INT Interlaced mode when HIGH -- user controlled screen attribute (open drain, internal pull-up, input/output)

APPLICATION DATA (continued)

10	F1	1 MHz clock input, defining the character space
11	TR6	6 MHz clock input, defining the character dot rate
22	DD	Disables display of text when this input is HIGH
23	BLAN	Blank tv video signal, active HIGH output (open drain)
24	Y	Monochrome character information output, active LOW (open drain)
25	DOR	OR function of R, G, B character information output active LOW (open drain)
26	B	Blue character information output, active LOW (open drain)
27	G	Green character information output, active LOW (open drain)
28	R	Red character information output, active LOW (open drain)

CHARACTERISTICS

		min.	typ.	max.	
input voltage LOW D1 to D8	V <sub>IL1</sub>	—	—	0.8	V
input voltage HIGH D1 to D8	V <sub>IH1</sub>	2.2	—	—	V
input voltage LOW TR6, F1	V <sub>IL2</sub>	—	—	0.6	V
input voltage HIGH TR6, F1	V <sub>IH2</sub>	2.65	—	—	V
input voltage LOW Other inputs and input/outputs	V <sub>IL3</sub>	—	—	0.8	V
input voltage HIGH	V <sub>IH3</sub>	2.0	—	—	V
output voltage LOW input/outputs (I <sub>O</sub> = 1.6 mA)	V <sub>OL1</sub>	—	—	0.4	V
output voltage HIGH input/outputs (-I <sub>O</sub> = 100 μA)	V <sub>OH1</sub>	2.4	—	—	V
output voltage LOW video outputs (I <sub>O</sub> = 2 mA)	V <sub>OL2A</sub>	—	—	0.5	V
output voltage LOW video outputs (I <sub>O</sub> = 6 mA)	V <sub>OL2B</sub>	—	—	2.0	V
output voltage OFF state via open drain pull-up resistor	V <sub>OH2</sub>	—	—	13.2	V
output voltage LOW GPO pin (I <sub>O</sub> = 1.6 mA)	V <sub>OL3</sub>	—	—	0.4	V
output voltage OFF state via open drain pull-up resistor	V <sub>OH3</sub>	—	—	13.2	V
load capacitance input/output pins	C <sub>Lmax1</sub>	—	—	50	pF
load capacitance video pins	C <sub>Lmax2</sub>	—	—	25	pF
rise time	t <sub>SU</sub>	100	—	—	ns
fall time	t <sub>H</sub>	20	—	—	ns
input fall time video outputs (note 1)	t <sub>F</sub>	—	—	30	ns
output fall times video outputs (notes 2 and 3)	t <sub>ΔF</sub>	—	—	20	ns

NOTES

For pull-down transition times of R, G, B, Y, BLAN, DOR the following voltage levels can be assumed,

V<sub>O</sub> (HIGH) = 9 V  
 V<sub>O</sub> (LOW) = 1 V

Measured with a 3 kΩ pull-up resistor to +12 V clamped at +9V.

Relative delay times measured between mid-voltage levels.

R, G, B, Y, BLAN, DOR changes are nominally coincident within a maximum time difference of 20 ns. This assumes that all outputs are driving a load of 25 pF.

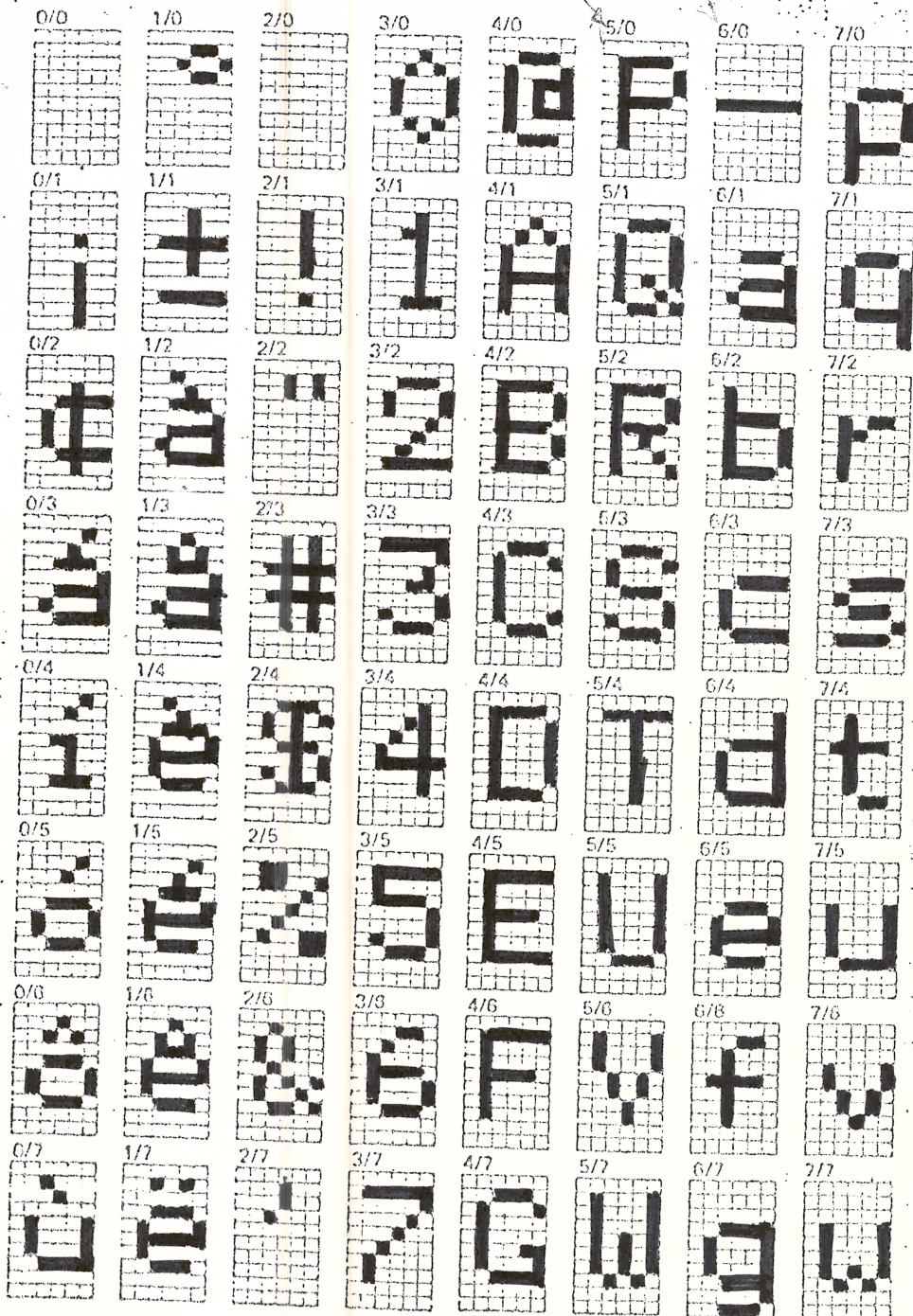
M31-1121/3/A

b7 b6 b5				Col	0	0	0	0	1	1	1	1	1
b4	b3	b2	b1		0	1	0	1	0	1	0	1	0
Row				0	1	2	3	4	5	6	7		
0	0	0	0	0	Es-limit -or	o	Space	0	@	P			p
0	0	0	1	1	i	±	!	1	A	Q	a		q
0	0	1	0	2	¢	á	"	2	B	R	b		r
0	0	1	1	3	á	â	#	3	C	S	c		s
0	1	0	0	4	í	è	\$	4	D	T	d		t
0	1	0	1	5	ó	é	%	5	E	U	e		u
0	1	1	0	6	ô	ê	&	6	F	V	f		v
0	1	1	1	7	ù	ë	/	7	G	W	g		w
1	0	0	0	8	ú	÷	(	8	H	X	h		x
1	0	0	1	9	ü	¸	)	9	I	Y	i		y
1	0	1	0	10	û	œ	*	:	J	Z	j		z
1	0	1	1	11	ñ	¸	+	;	K	E	k		1/8
1	1	0	0	12	←	¼	,	<	L	↘	l		
1	1	0	1	13	↑	½	-	=	M	∩	m		3/8
1	1	1	0	14	→	¾	°	>	N	©	n		5/8
1	1	1	1	15	↓	é	↙	?	O	®	o		7/8

Fig.3 USarom character set



SAA5155 CHARACTER SET



1481-112144

Fig.4