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_{DD} = 5 V ± 10%; 0 V; T_{amb} = 25 °C

Operating supply voltage	V_{DD}	typ.	5	V
Operating supply current	I_{DD}	typ.	80	mA

PACKAGE OUTLINE

28-pin DIL; plastic (SOT-117)

Carrara
240-7907

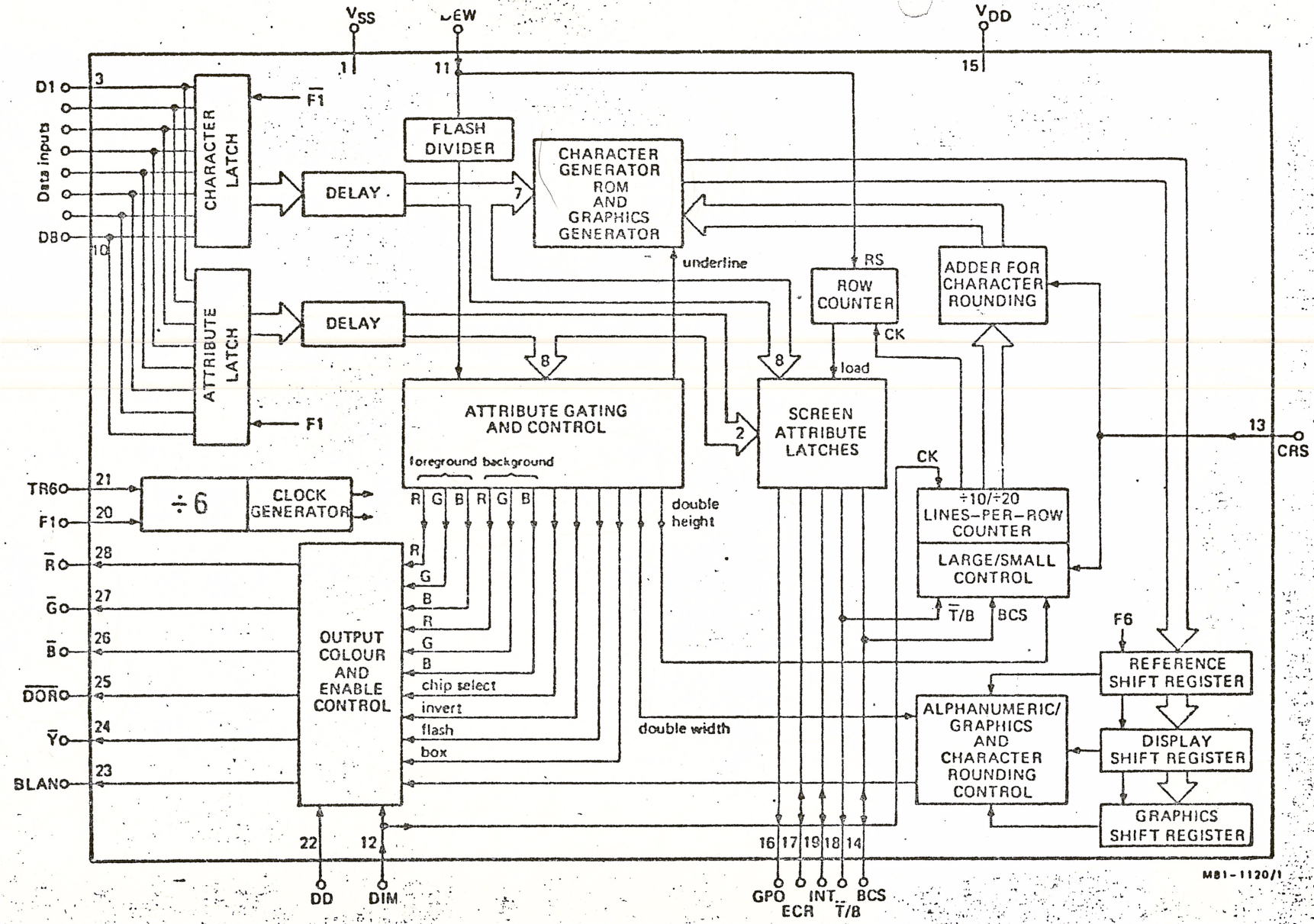

Fig.1 US – AROM block diagram

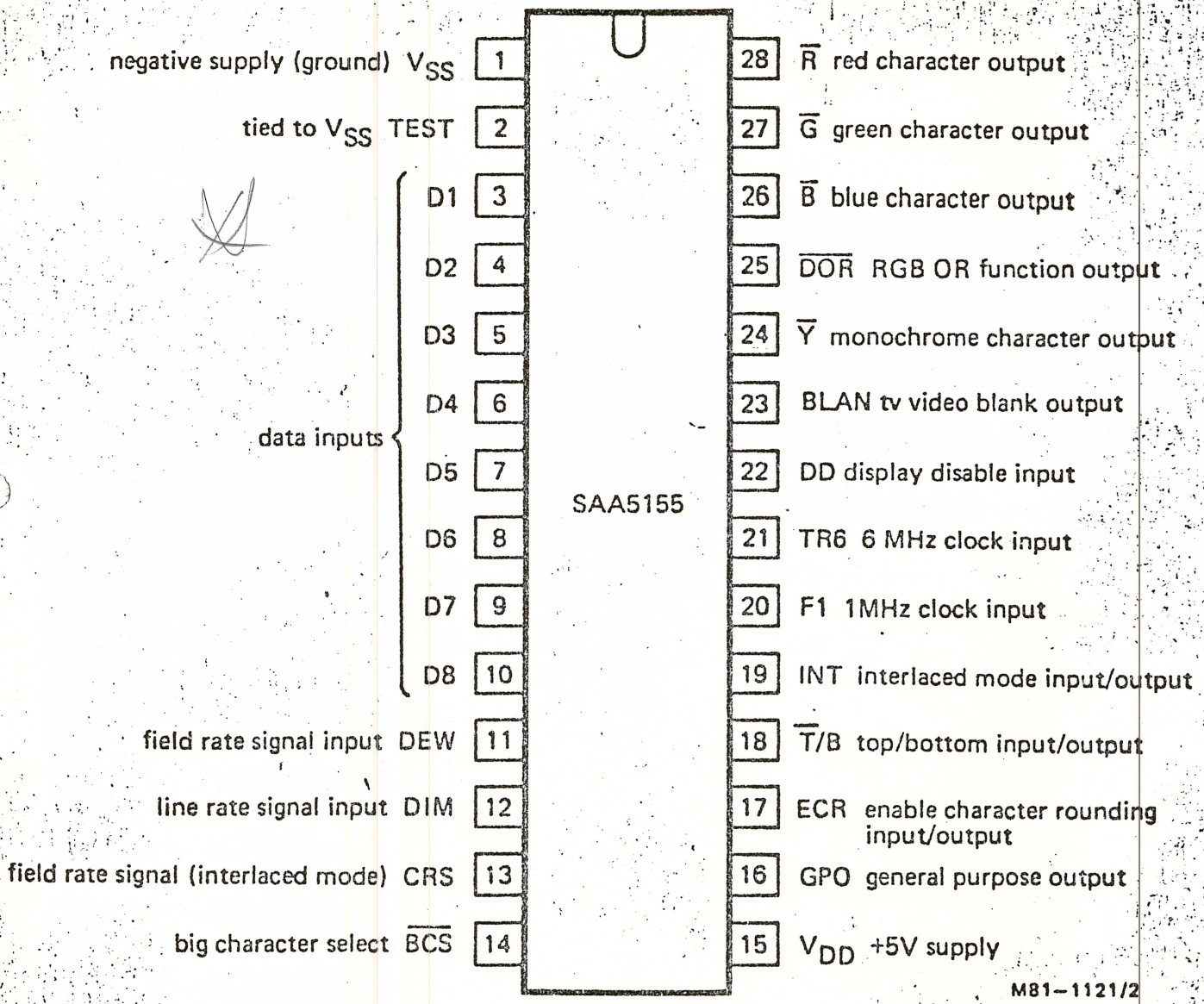

Fig.2 Pinning diagram

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.

Table 1 Character and attribute coding

bit number			
bit 1 to bit 7	character code any code except NUL (0/0)		NUL code (0/0)
	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 b16 are not used for normal operation and must be held LOW.

Table 2 Screen attribute coding

b2	b1	attribute
0	0	tv only
0	1	boxing
1	0	text only
1	1	superimpose

b4	b3	attribute
0	0	no text
0	1	header only
1	0	rest of text displayed
1	1	header and text displayed

b5	attribute
0	concealed
1	revealed

b6	attribute
0	big character select ($\overline{BCS}$)
1	normal

b7	attribute
0	top
1	bottom

b8	attribute
0	non-interlace
1	interlace

b9	attribute
0	general purpose output = '0'
1	general purpose output = '1'

b10	attribute
0	character rounding OFF
1	character rounding ON

Large character, character rounding and interlace are controlled by the $\overline{BCS}$, $\overline{T}/B$, ECR and 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

1	V_{SS}	Negative supply normally ground (0 V)
2	TEST	Tied to V_{SS} for normal operation
3 to 10	D1 to D8	Data inputs
11	DEW	Field rate signal input which resets internal counters and is used for flash frequency
12	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.
13	CRS	Field rate signal input used in interlaced mode to control character rounding of single height characters only.
14	$\overline{BCS}$	Big character select — user controlled screen attribute (open drain with internal pull up)
15	V_{DD}	+5 V supply
16	GPO	General purpose output — user controlled screen attribute (open drain)
17	ECR	Enable character rounding — user controlled screen attribute (open drain input/output)
18	$\overline{T}/B$	Top/bottom of big character page — user controlled screen attribute (open drain with internal pull-up, input/output)
19	INT	Interlaced mode when HIGH — user controlled screen attribute (open drain, internal pull-up, input/output)

M81-1121/3/A

Bits b_7 b_6 b_5 →	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4 b_3 b_2 b_1 Row / Col	0	1	2	3	4	5	6	7
0 0 0 0	0	Delimiter — or	°	Space	0	@	P	—	p
0 0 0 1	1	¡	±	!	1	A	Q	a	q
0 0 1 0	2	¢	à	"	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	ſ	)	9	I	Y	i	y
1 0 1 0	10	û	œ	*	:	J	Z	j	z
1 0 1 1	11	ñ	ß	+	;	K	Ç	k	1/8
1 1 0 0	12	←	1/4	,	<	L	/	l	‖
1 1 0 1	13	↑	1/2	-	=	M	]	m	3/8
1 1 1 0	14	→	3/4	.	>	N	©	n	5/8
1 1 1 1	15	↓	¿	/	?	O	®	o	7/8

Fig.3 USarom character set

DEVELOPMENT SAMPLE DATA

SAA5155 CHARACTER SET

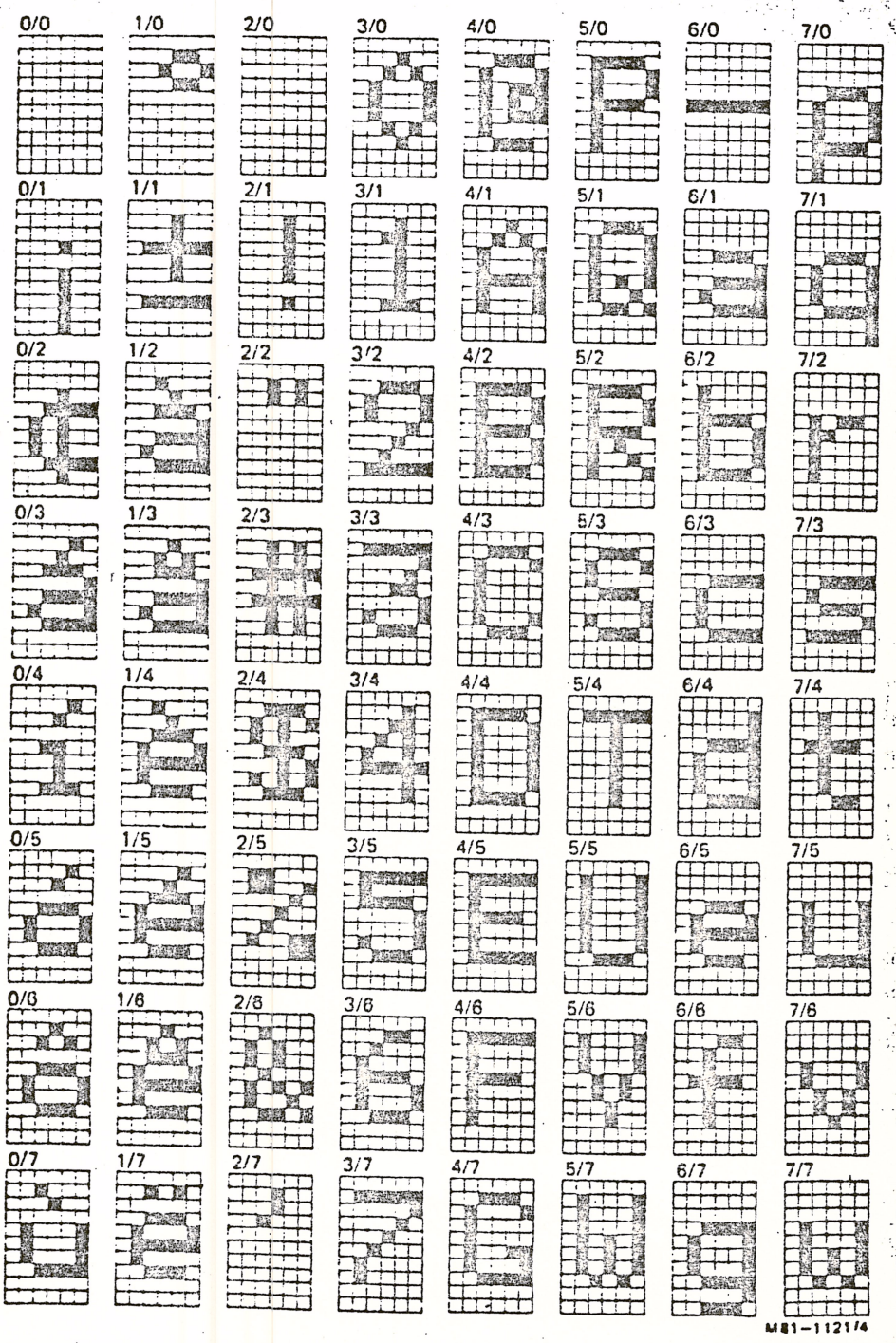

Fig.4

DEVELOPMENT SAMPLE DATA

SAA5155 CHARACTER SET

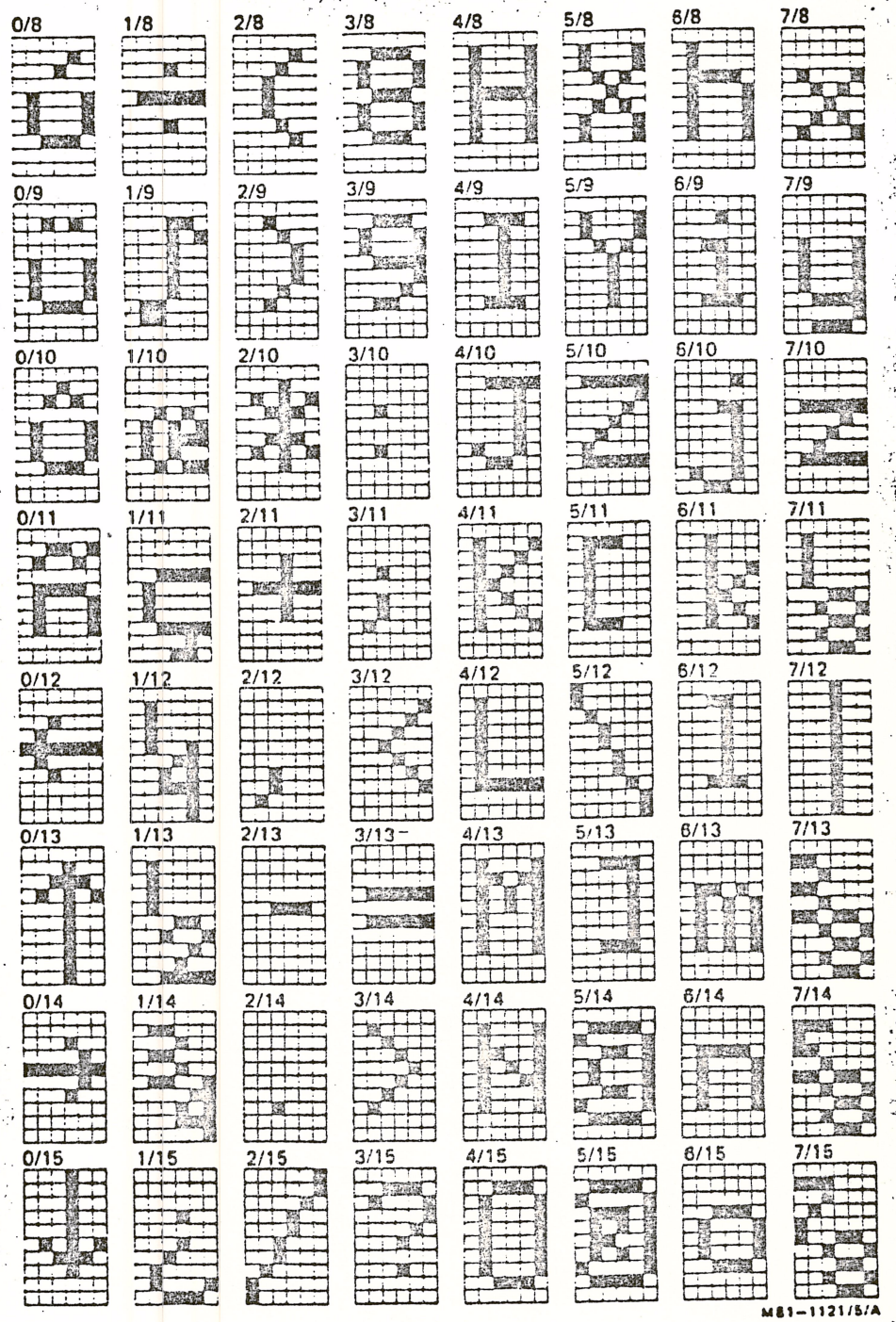

Fig.5